ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Coolcam Turlough SAC 000218

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

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Department of Culture, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Coolcam Turlough SAC 000218. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000218	Coolcam Turlough SAC

3180	Turloughs*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1992
Title :	Turloughs over 10ha - Vegetation survey and evaluation
Author :	Goodwillie, R.N.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 1)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 2)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2017
Title :	Conservation objectives supporting document: Turloughs* and Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation
Author :	O Connor, Á.
Series :	Conservation objectives supporting document

Other References

Year :	1986
Title :	A study of the geology, hydrology and geomorphology of turloughs
Author :	Coxon, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	2015
Title :	Goodwillie (1992) Turloughs over 10 hectares: vegetation survey and evaluation
GIS Operations :	Goodwillie map scanned and georectified. Turlough as outlined on map digitised. New turlough dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	3180 (map 2)

3180 Turloughs

To restore the favourable conservation condition of Turloughs* in Coolcam Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable at c.56ha or increasing, subject to natural processes	Based on the approximate area of 56ha for Coolcam turlough from Waldren (2015), of which 55.5ha lies within the boundary of Coolcam Turlough SAC. Coolcam was one of 22 Trinity College Dublin (TCD) turlough project study sites (Waldren, 2015). It was also studied by Goodwillie (1992). Neither of these studies surveyed the north-west of the SAC, so the figure of 56ha may underestimate the area of the habitat. See map 2 for the recorded extent (based on Waldren, 2015). Coolcam turlough was assessed as being in inadequate conservation condition (Waldren, 2015). See also Coxon (1986) for information on Coolcam turlough. See O Connor (2017) for information on all attributes and targets
Habitat distribution	Occurrence	No decline, subject to natural processes	See map 2
Hydrological regime	Various	Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes (groundwater distribution, flood duration, frequency, area and depth, and permanently flooded/wet areas) and targets in O Connor (2017). Coolcam turlough has basins separated by a narrow esker; the smaller Coolcam Lough dries out in summer, the larger seems to retain water throughout the year (Waldren, 2015). The hydrological data suggest that this turlough experiences one significant flooding event per annum and has become wetter over time (Waldren, 2015). Coolcam turlough is hydrologically linked with Croaghill turlough (SAC 000255) (Waldren, 2015)
Soil type	Hectares	Maintain variety, area and extent of soil types necessary to support turlough vegetation and other biota	Coolcam soils are moderately alkaline and mineral, with an alluvial mineral soil type covering almost 95% of the turlough area (Waldren, 2015)
Soil nutrient status: nitrogen and phosphorus	N and P concentration in soil	Maintain/restore nutrient status appropriate to soil types and vegetation communities	Waldren (2015) found mean total nitrogen (TN) at Coolcam of 4,983mg/kg TN and total phosphorus (TP) of 245mg/kg TP
Physical structure: bare ground	Presence	Maintain sufficient wet bare ground, as appropriate	See O Connor (2017) for further details on this and all attributes
Chemical processes: calcium carbonate deposition and concentration	Calcium carbonate deposition rate/soil concentration	Maintain appropriate calcium carbonate deposition rate and concentration in soil	Soils were moderately alkaline at Coolcam, with a percentage calcium carbonate content of 4.78% (Waldren, 2015)
Water quality	Various	Restore appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes (nutrients, colour, phytoplankton and epiphyton biomass) and targets in O Connor (2017). Waldren (2015) recorded mean TP of 34µg/l and mean chlorophyll *a* of 18µg/l. Owing to the dominance of mineral alluvial soils at Coolcam, ≤20µg/l TP may be sufficient to restore favourable condition. It is likely, however, that Coolcam naturally had 10µg/l TP, so further nutrient reductions may be required to restore more oligotrophic communities, e.g. marl lake/pond
Active peat formation	Flood duration	Maintain active peat formation, where appropriate	No peat soils were recorded at Coolcam (Waldren, 2015)

Vegetation composition: area of vegetation communities	Hectares	Maintain area of sensitive and high conservation value vegetation communities/units	See Goodwillie (1992) and Waldren (2015) for information on vegetation communities at Coolcam
Vegetation composition: vegetation zonation	Distribution	Maintain vegetation zonation/mosaic characteristic of the site	See Goodwillie (1992) and Waldren (2015) for information on vegetation at Coolcam
Vegetation structure: sward height	Centimetres	Maintain sward heights appropriate to the vegetation unit, and a variety of sward heights across the turlough	See Goodwillie (1992) and Waldren (2015) for information on vegetation at Coolcam
Typical species	Presence	Maintain typical species within and across the turlough	Typical species is sub-divided into more detailed attributes (terrestrial, wetland and aquatic plants, invertebrates and birds) and targets in O Connor (2017). See Goodwillie (1992) and Waldren (2015) for information on plant and aquatic invertebrate species at Coolcam
Fringing habitats: area	Hectares	Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	See O Connor (2017) for further details on this and all attributes
Vegetation structure: turlough woodland	Species diversity and woodland structure	Maintain appropriate turlough woodland diversity and structure	See O Connor (2017) for further details on this and all attributes

Pollynoon
Brierfort
Lettera
Pollnacreeve
Coolcam
Coolcam Lough
Kildaree
Graveyard
Cartro
West
B327
105
93
92
87
85
86
83
81

CO. MAYO
CO. ROSCOMMON
CO. GALWAY
SAC 000218
Ballymoe
Dunmore

Legend

Coolcam Turlough SAC 000218

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

MAP 1:
COOLCAM TURLOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000218; version 3.01.
CO. ROSCOMMON / CO. GALWAY

0 0.1 0.2 0.3 0.4 0.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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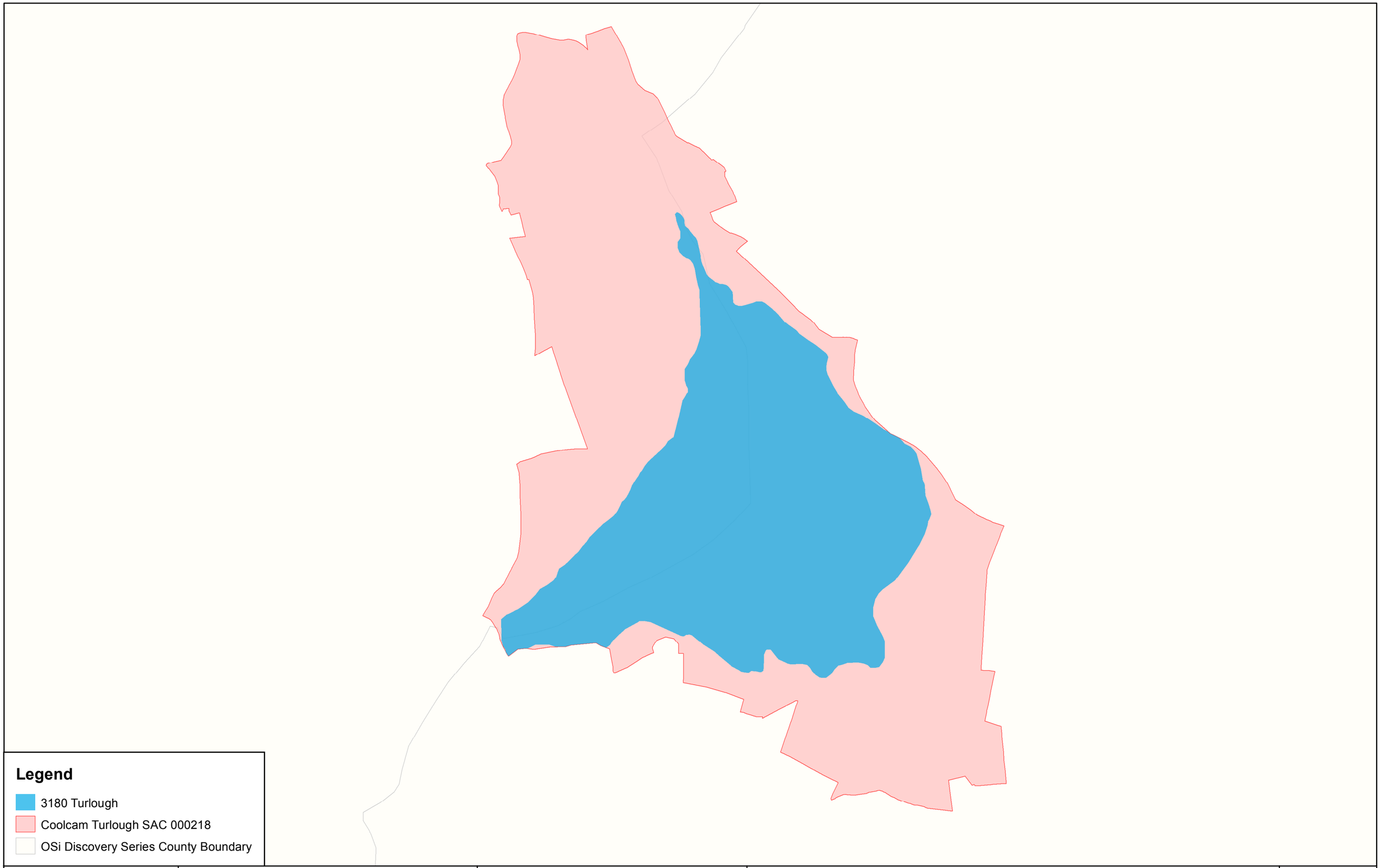
Map Version 1
Date: Aug 2017



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Culture, Heritage and the Gaeltacht

MAP 2:
COOLCAM TURLOUGH SAC
CONSERVATION OBJECTIVES
TURLOUGH

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

SITE CODE:
SAC 000218; version 3.01.
CO. ROSCOMMON / CO. GALWAY

0 100 200 300 400 500 Meters

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: Aug 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Croaghill Turlough SAC 000255

An Roinn
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Department of
Culture, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Culture, Heritage and the Gaeltacht,

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Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Croaghill Turlough SAC 000255. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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- the conservation status of its typical species is favourable.

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

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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.
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Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000255	Croaghill Turlough SAC

3180	Turloughs*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1992
Title :	Turloughs over 10ha - Vegetation survey and evaluation
Author :	Goodwillie, R.N.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 1)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 2)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2017
Title :	Conservation objectives supporting document: Turloughs* and Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation
Author :	O Connor, Á.
Series :	Conservation objectives supporting document

Other References

Year :	1986
Title :	A study of the geology, hydrology and geomorphology of turloughs
Author :	Coxon, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	1995
Title :	Additions to the Irish range of *Rorippa islandica* (Oeder ex Murray) Borbas
Author :	Goodwillie, R.
Series :	Irish Naturalists' Journal, 25(2): 57-59

Spatial data sources

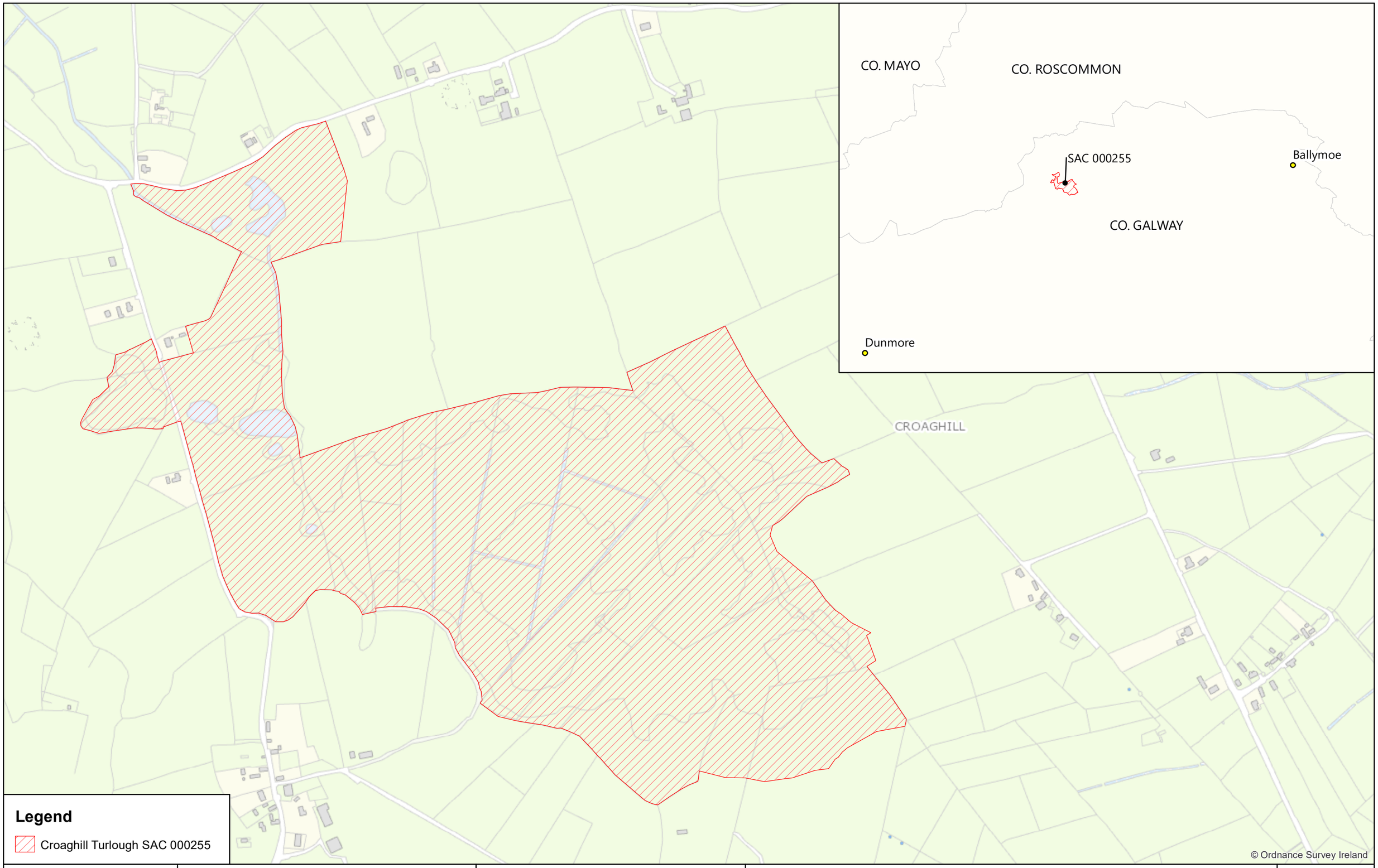
Year :	2015
Title :	Goodwillie (1992) Turloughs over 10 hectares: vegetation survey and evaluation
GIS Operations :	Goodwillie map scanned and georectified. Turlough as outlined on map digitised. New turlough dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	3180 (map 2)

3180 Turloughs

To restore the favourable conservation condition of Turloughs* in Croaghill Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable at c.37ha or increasing, subject to natural processes	Based on the approximate area of 38.6ha for Croaghill turlough from Waldren (2015), of which 36.67ha lies within the boundary of Croaghill Turlough SAC. Croaghill was one of 22 Trinity College Dublin (TCD) turlough project study sites (Waldren, 2015). It was also studied by Goodwillie (1992). See map 2 for the recorded extent (based on Waldren, 2015). Croaghill turlough was assessed as being in inadequate conservation condition (Waldren, 2015). See also Coxon (1986) and Goodwillie (1995) and for information on Croaghill turlough. See O Connor (2017) for information on all attributes and targets
Habitat distribution	Occurrence	No decline, subject to natural processes	See map 2
Hydrological regime	Various	Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes (groundwater contribution, flood duration, frequency, area and depth, and permanently flooded/wet areas) and targets in O Connor (2017). The hydrological data suggest that Croaghill turlough experiences a single significant flooding event per annum (Waldren, 2015). Croaghill turlough is hydrologically linked to Coolcam turlough (SAC 000218) (Waldren, 2015)
Soil type	Hectares	Maintain variety, area and extent of soil types necessary to support turlough vegetation and other biota	Croaghill soils are moderately acidic and peaty, with low amounts of calcium carbonate (Waldren, 2015)
Soil nutrient status: nitrogen and phosphorus	N and P concentration in soil	Maintain/restore nutrient status appropriate to soil types and vegetation communities	Waldren (2015) found mean total nitrogen (TN) at Croaghill was towards the high end of the range for turloughs (and very variable among samples) with a mean of 15,883mg/kg TN, and total phosphorus was moderate at 896mg/kg TP
Physical structure: bare ground	Presence	Maintain sufficient wet bare ground, as appropriate	See O Connor (2017) for further details on this and all attributes
Chemical processes: calcium carbonate deposition and concentration	Calcium carbonate deposition rate/soil concentration	Maintain appropriate calcium carbonate deposition rate and concentration in soil	Percentage calcium carbonate content was low at Croaghill (3.8%) (Waldren, 2015)
Water quality	Various	Restore appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes (nutrients, colour, phytoplankton and epiphyton biomass) and targets in O Connor (2017). Waldren (2015) recorded average TP of 25µg/l. Owing to the dominance of peat soils at Croaghill, ≤10µg/l TP is likely to be required to restore favourable condition
Active peat formation	Flood duration	Maintain active peat formation, where appropriate	More than 90% of the Croaghill turlough area is fen peat (Waldren, 2015)
Vegetation composition: area of vegetation communities	Hectares	Maintain area of sensitive and high conservation value vegetation communities/units	See Goodwillie (1992) and Waldren (2015) for information on vegetation communities at Croaghill
Vegetation composition: vegetation zonation	Distribution	Maintain vegetation zonation/mosaic characteristic of the site	See Goodwillie (1992) and Waldren (2015) for information on vegetation at Croaghill

Vegetation structure: sward height	Centimetres	Maintain sward heights appropriate to the vegetation unit, and a variety of sward heights across the turlough	See Goodwillie (1992) and Waldren (2015) for information on vegetation at Croaghill
Typical species	Presence	Maintain typical species within and across the turlough	Typical species is sub-divided into more detailed attributes (terrestrial, wetland and aquatic plants, invertebrates and birds) and targets in O Connor (2017). See Goodwillie (1992) and Waldren (2015) for information on plant and aquatic invertebrate species at Croaghill. Northern yellow-cress (*Rorippa islandica*) occurs at Croaghill (Goodwillie, 1992, 1995)
Fringing habitats: area	Hectares	Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	See O Connor (2017) for further details on this and all attributes
Vegetation structure: turlough woodland	Species diversity and woodland structure	Maintain appropriate turlough woodland diversity and structure	See O Connor (2017) for further details on this and all attributes



Legend

Croaghill Turlough SAC 000255

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Department of
Culture, Heritage and the Gaeltacht

MAP 1:
CROAGHILL TURLOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000255; version 3.01. CO. GALWAY

0 50 100 150 200 250 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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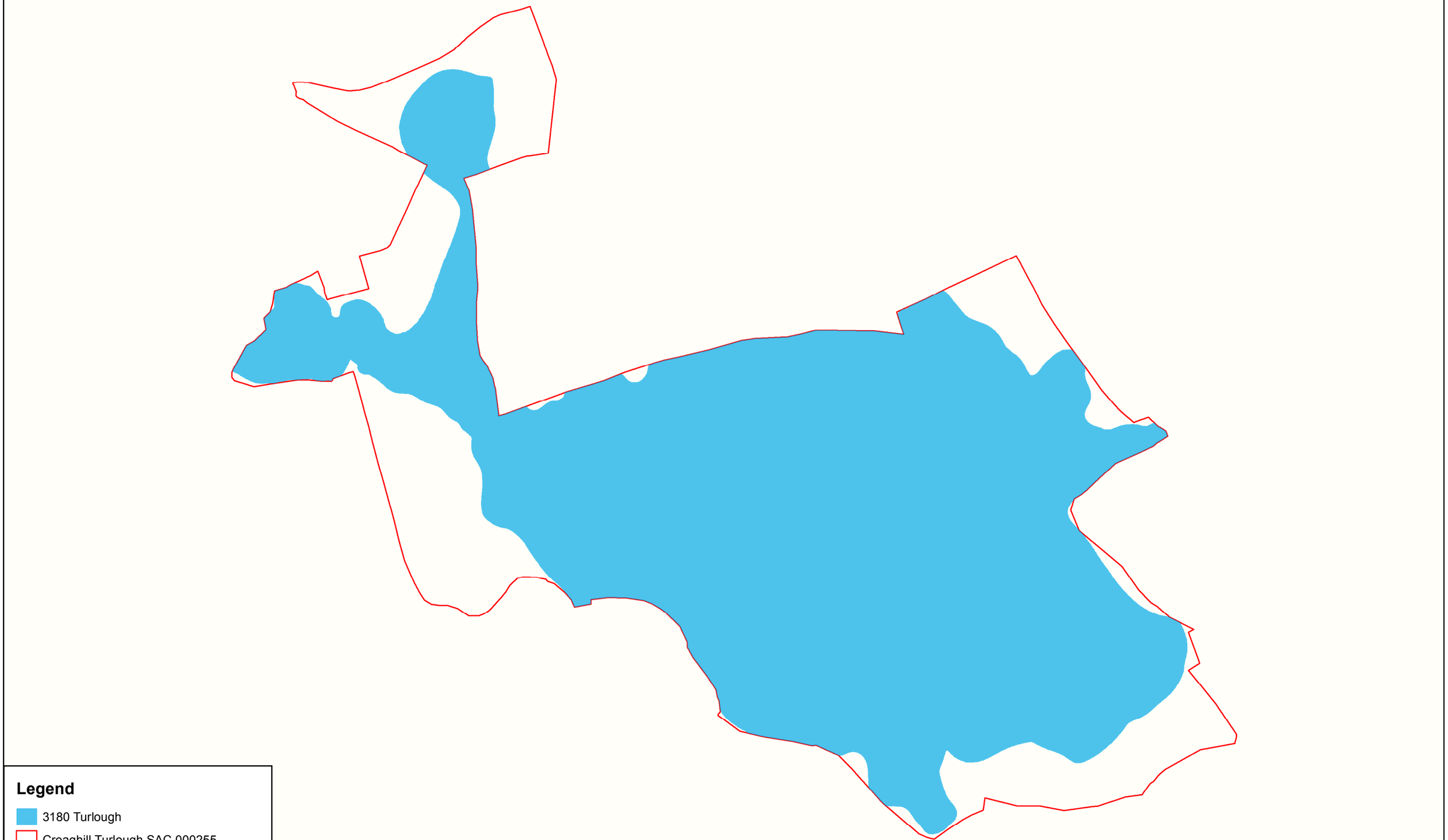
Map Version 1
Date: Aug 2017



Legend

- 3180 Turlough
- Croaghill Turlough SAC 000255
- OSi Discovery Series County Boundary

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Department of Culture, Heritage and the Gaeltacht

MAP 2:
CROAGHILL TURLOUGH SAC
CONSERVATION OBJECTIVES
TURLOUGH

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

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SAC 000255; version 3.01. CO. GALWAY

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Map Version 1
Date: Aug 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Inishbofin and Inishshark SAC 000278

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201p) Conservation Objectives: Inishbofin and Inishshark SAC 000278. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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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***

000278	Inishbofin and Inishshark SAC
1150	Coastal lagoons*
1364	Grey Seal *Halichoerus grypus*
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths

Please note that this SAC overlaps with High Island, Inishshark and Davillaun SPA (004144) and Inishbofin, Omey Island and Turbot Island SPA (004231). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	2003
Title :	Grey seal population status at islands in the Inishkea group, as determined from breeding ground surveys in 2002
Author :	Ó Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2004
Title :	Harbour seal population assessment in the Republic of Ireland: August 2003
Author :	Cronin, M.; Duck, C.; O Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.
Series :	Irish Wildlife Manual No. 11
Year :	2004
Title :	Summary of National Parks and Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003
Author :	Lyons, D.O.
Series :	Irish Wildlife Manual No. 13
Year :	2007
Title :	Grey seal moult population survey in the Republic of Ireland, 2007
Author :	Ó Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2007
Title :	Inventory of Irish coastal lagoons (version 2)
Author :	Oliver, G.
Series :	Unpublished report to NPWS
Year :	2008
Title :	An assessment of the breeding population of grey seals in the Republic of Ireland, 2005
Author :	O Cadhla, O.; Strong, D.; O'Keeffe, C.; Coleman, M.; Cronin, M.; Duck, C.; Murray, T.; Dower, P.; Nairn, R.; Murphy, P.; Smiddy, P.; Saich, C.; Lyons, D.O.; Hiby, L.
Series :	Irish Wildlife Manual No. 34
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79

Year :	2015
Title :	Inishbofin and Inishshark SAC (site code:278) Conservation objectives supporting document-coastal lagoons V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Inishbofin and Inishshark SAC (site code: 278) Conservation objectives supporting document-marine species V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	1983
Title :	The grey seal (*Halichoerus grypus*) in Ireland
Author :	Summers, C.F.
Series :	Unpublished Report to the Minister for Fisheries, Forestry and Wildlife
Year :	1988
Title :	The Irish red data book 1. Vascular plants
Author :	Curtis, T.G.F; McGough, H.N.
Series :	Wildlife Service, Dublin
Year :	1998
Title :	Population biology of grey seals (*Halichoerus grypus*, Fabricius 1791) in western Ireland
Author :	Kiely, O.R.M.
Series :	Unpublished PhD thesis, National University of Ireland, University College Cork
Year :	1998
Title :	Grey seal (*Halichoerus grypus*) pup production at the Inishkea island group, Co. Mayo and the Blasket Islands, Co. Kerry
Author :	Kiely, O.; Myers, A.A.
Series :	Biology and Environment: Proc. Royal Ir. Acad. 98B (2): 113-122
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie. 27: 2620-2623
Year :	2001
Title :	Grey seal interactions with fisheries in Irish coastal waters
Author :	BIM
Series :	Report to the European Commission DG XIV. Study 95/40
Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester

Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S., Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems 19 (3): 264–273
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M., Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2013
Title :	Monitoring and assessment of Irish lagoons for the purposes of the EU Water Framework Directive, 2009-2011. Parts 1 and 2
Author :	Roden, C.M; Oliver, G.A.
Series :	Unpublished report to the Environmental Protection Agency
Year :	in prep.
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, A.
Series :	Unpublished report by NPWS
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 3)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110 (map 4)
Year :	2012
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1364 (map 5)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1364 (map 5)

1150 Coastal lagoons

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 8.0ha. See map 3	Areas calculated from spatial data derived from Oliver (2007). Site code IL070 (Lough Bofin). See lagoons supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for mapped lagoon	Site IL070 in Oliver (2007). See lagoons supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	Lough Bofin apparently undergoes extreme variations in salinity. See lagoons supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Lough Bofin is shallow (less than 1.5m in depth). See lagoons supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	Lough Bofin has a cobble barrier. See lagoons supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to maximum depth of lagoon	Increased depth of colonisation increases both the extent and diversity of submergent macrophytes. As Lough Bofin is less than 2m deep, it is expected that macrophytes would extend to its full depth
Typical plant species	Number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver (2007). See lagoons supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver (2007). See lagoons supporting document for further details
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutrient levels increase the threat of unnatural encroachmenr by reedbeds. See lagoons 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 Inishbofin and Inishshark SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The selection of the SAC for habitat 3110 was based on information on Lough Gowlangower, Inishbofin, which has *Eriocaulon aquaticum* and *Lobelia dortmanna*, however the lakes within the SAC have not been comprehensively surveyed. There is a large number of small lakes and ponds on Inishbofin, many of which are likely to contain lake habitat 3110 (see map 4), but require field confirmation. 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. For further information on this and other attributes see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, it is likely that the habitat is widespread in the site (see map 4), however detailed field survey is required to confirm this potential distribution
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). Survey work is required to identify the typical and other species that characterise the lakes in the SAC
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other lake habitats
Vegetation distribution: maximum depth	Metres	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. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that the oligotrophic soft water habitat is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. Substratum particle size is likely to vary with depth and along the shoreline within a single lake

Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140), however targets have yet to be established for the remaining lake habitats. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; mg/l N	Maintain 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 Water Framework Directive (WFD) 'high' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For the oligotrophic soft water lake habitat, annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040 mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to the oligotrophic soft water habitat (3110). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8 µg/l. The annual average chlorophyll *a* concentration should be <2.5 µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in the oligotrophic soft water habitat should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for the oligotrophic soft water lake habitat is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For oligotrophic soft water lakes (3110), and adopting a precautionary approach based on Arts (2002), minimum pH should not be <5.5 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 ≤100mg/l CaCO3). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009)
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 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 <50 mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <0mg/l PtCo) in oligotrophic soft water lakes (3110), where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Total area of this habitat has not been calculated although it is known to be distributed thoughout the SAC, usually occurring in mosaic with other habitats such as other heath types (including European dry heaths (4030)), exposed rock, blanket bog and grasslands (NPWS internal files; Commonage Framework Plan (GA03))
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes	See note above
Ecosystem function: soil nutrient status	Soil pH and nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Changes to soil nutrient status can occur from high stock densities or supplementary feeding above appropriate levels
Vegetation composition: cross-leaved heath	Occurrence in vicinity of a representative number of monitoring stops	Cross-leaved heath (*Erica tetralix*) present	Attribute and target based on Perrin et al. (2014)
Vegetation composition: positive indicator species	Percentage cover at a representative number of monitoring stops	Cover of positive indicator species, as listed in Perrin et al. (2014) at least 50%	Attribute and target based on Perrin et al. (2014). Ling (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), sedges including dioecious sedge (*Carex dioica*) and bog-sedge (*C. limosa*) are listed for the heath in this SAC (NPWS internal files)
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: ericoid species	Percentage cover at a representative number of monitoring stops	Cover of ericoid species at least 15%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: rare/scarce species	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order 1999 and/or the red data book (Curtis and McGough, 1988). Species that have been recorded in the past include marsh clubmoss (*Lycopodiella inundata*) and wood small-reed (*Calamagrostis epigejos*) (NPWS internal files)
Vegetation composition: dwarf-shrub species	Percentage cover at a representative number of monitoring stops	Cover of dwarf shrub sspecies collectively less than 75%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of negative indicator species collectively less than 1%	Attribute and target based on Perrin et al. (2014), where negative indicator species are also listed
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity	Cover of bracken (*Pteridium aquilinum*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity	Cover of soft rush (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014). Dense areas of soft rush can indicate disturbance

Vegetation structure: *Sphagnum* condition	Percentage at a representative number of monitoring stops	Less than 10% of *Sphagnum* cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage at a representative number of monitoring stops	Last complete growing season's shoots of ericoids showing signs of browsing collectively less than 33%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning inside sensitive areas	Attribute and target based on Perrin et al. (2014), where sensitive areas are also defined
Physical structure: drainage	Percentage cover 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: disturbed bare ground	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)

4030 European dry heaths

To restore the favourable conservation condition of European dry heaths in Inishbofin and Inishshark SAC, which is defined by the following list of attributes and targets:

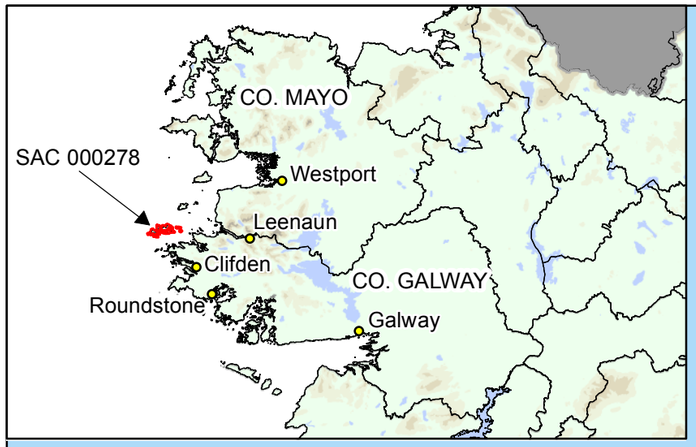
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Total area of this habitat has not been calculated although it is known to be distributed thoughout the SAC, usually occurring in mosaic with other habitats such as other heath types (including Northern Atlantic wet heaths with *Erica tetralix* (4010)), exposed rock, blanket bog and grasslands (NPWS internal files; Commonage Framework Plan (GA03)))
Habitat distribution	Occurrence	No decline, subject to natural processes	See note above
Ecosystem function: soil nutrient status	Soil pH and nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Changes to soil nutrient status can occur from high stock densities or supplementary feeding above appropriate levels
Vegetation composition: positive indicator species	Number and percentage cover at a representative number of monitoring stops	At least two positive indicator species, as listed in Perrin et al. (2014), with combined cover of at least 50%	Attribute and target based on Perrin et al. (2014). Bell heather (*Erica cinerea*), ling (*Calluna vulgaris*) and Western gorse (*Ulex gallii*) are listed for the heath in this SAC (NPWS internal files)
Vegetation composition: bryophyte and non-crustose lichen species	Number at a representative number of monitoring stops	At least three bryophyte or non-crustose lichen species present, excluding *Campylopus* and *Polytrichum* moss species	Attribute and target based on Perrin et al. (2014)
Vegetation composition: rare/scarce species	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order 1999 and/or the red data book (Curtis and McGough, 1988). Spotted rock-rose (*Tuberaria guttata*), a species listed in Curtis and McGough (1988) has been recorded on shallow peat on Inishbofin (NPWS internal files)
Vegetation structure: dwarf shrub species	Percentage cover at a representative number of monitoring stops	Cover of bog myrtle (*Myrica gale*), creeping willow (*Salix repens*) and Western gorse (*Ulex gallii*) collectively less than 50%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of negative indicator species collectively less than 1%	Attribute and target based on Perrin et al. (2014), where negative indicator species are also listed
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity	Cover of bracken (*Pteridium aquilinum*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: soft rush	Percentage cover in local vicinity	Cover of soft rush (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014). Dense areas of soft rush can indicate disturbance
Vegetation structure: senescent ling	Percentage cover at a representative number of monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Attribute and target based on Perrin et al. (2014)

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

1364 Grey Seal *Halichoerus grypus*

To maintain the favourable conservation condition of Grey Seal in Inishbofin and Inishshark SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the SAC should not be restricted by artificial barriers to site use. See map 5	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve the breeding sites in a natural condition. See map 5	Attribute and target based on background knowledge of Irish breeding populations, comprehensive breeding surveys in 1995 (Kiely, 1998; Kiely and Myers, 1998), 1998 and 1999 (BIM, 2001), 2002 (Ó Cadhla and Strong, 2003) and 2005 (Ó Cadhla et al, 2008) and unpublished NPWS records, including those reported by Lyons (2004). See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve the moult haul-out sites in a natural condition. See map 5	Attribute and target based on background knowledge of Irish populations, on review of data from Kiely (1998) and Lyons (2004), a national moult survey (Ó Cadhla and Strong, 2007) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve the resting haul-out sites in a natural condition. See map 5	Attribute and target based on review of data from Kiely (1998), BIM (2001), Lyons (2004), Cronin et al., (2004), Ó Cadhla et al, (2008) and unpublished NPWS records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the grey seal population at the site	See marine supporting document for further details



INISHBOFIN
Inis Bó Finne

INISHSHARK
Inis Airc

Stags of Bofin
Beanna Inis Bó Finne

Middlequarter
An Cheathrú Láir

Westquarter
An Cheathrú Tarrtharach

Cloonamore
Cluana Mór

Davillaun
Damhollean

Inishskinnymore
Inis Scine Mór

Inishskinnybeg
Inis Scine Beag

Inishgort
Inis Goirt

Inishlyon
Inis Laighean

Shark Head

Ferry (P)

47 48 49 50 51
67 66 65 64 63

Legend

Inishbofin and Inishshark SAC 000278

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

MAP 1:
INISHBOFIN AND INISHSHARK SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000278; version 3.02. CO. GALWAY

0 0.5 1 1.5 2 km

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Map Version 1
Date: April 2015

SAC 000278

SAC 004144

SAC 004231

SAC 004144

Legend

- Inishbofin and Inishshark SAC 000278
- High Island, Inishshark and Davillaun SPA 004144
- Inishbofin, Omey Island and Turbot Island SPA 004231
- OSi Discovery Series County Boundary

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Department of
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MAP 2:
INISHBOFIN AND INISHSHARK SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000278; version 3.02.
SPA 004144: version 1.01,
SPA 004231; version 1.03. CO. GALWAY

0 1 2 3 4 km

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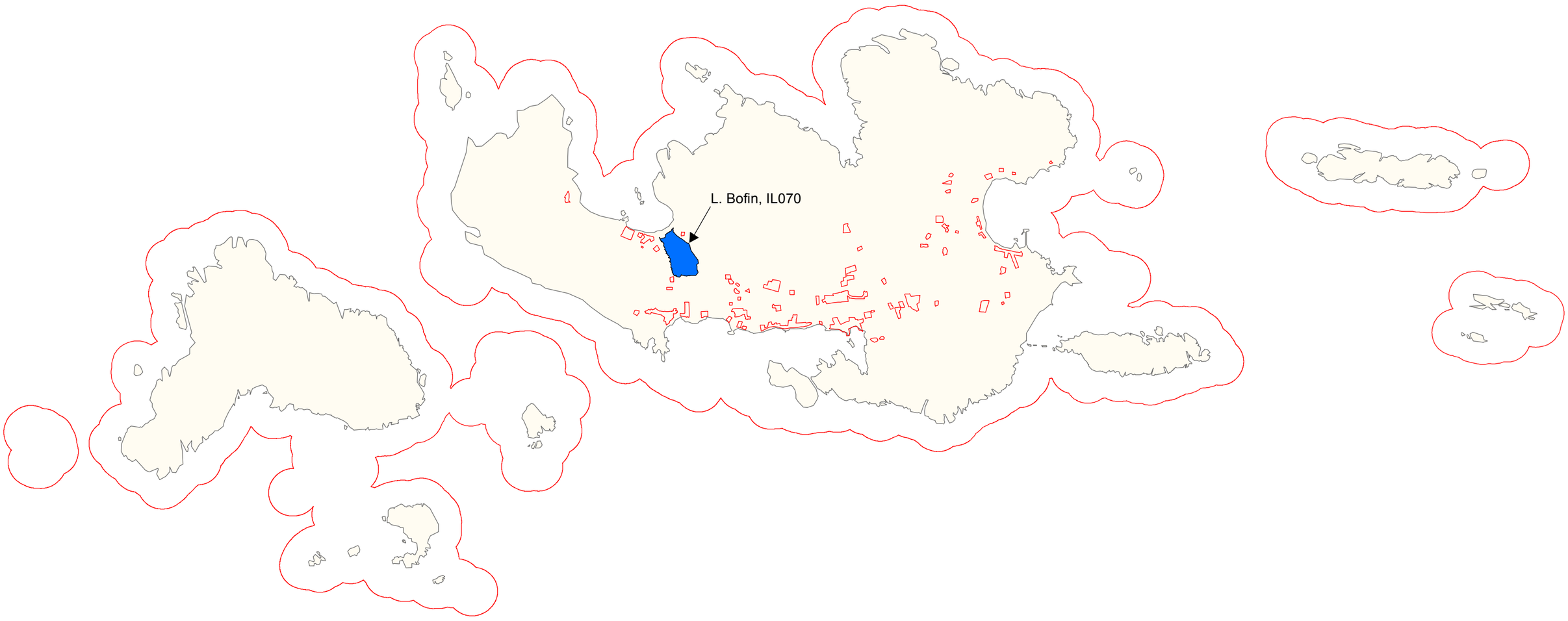
Map Version 1
Date: April 2015



Legend

- Inishbofin and Inishshark SAC 000278
- 1150 *Coastal lagoons
- OSi Discovery Series County Boundary

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MAP 3:
INISHBOFIN AND INISHSHARK SAC
CONSERVATION OBJECTIVES
COASTAL LAGOONS

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

SITE CODE:
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0 0.5 1 1.5 2 km

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Date: April 2015

Legend

- Inishbofin and Inishshark SAC 000278
- Potential 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- OSi Discovery Series County Boundary

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MAP 4:
INISHBOFIN AND INISHSHARK SAC
CONSERVATION OBJECTIVES
LAKE HABITATS

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

SITE CODE:
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0 0.5 1 1.5 2 km

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Legend

- Inishbofin and Inishshark SAC 000278
- 1364 Grey Seal - *Halichoerus grypus* breeding sites
- 1364 Grey Seal - *Halichoerus grypus* moulting sites
- 1364 Grey Seal - *Halichoerus grypus* resting sites
- 1364 Grey Seal - *Halichoerus grypus* habitat
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 5:
INISHBOFIN AND INISHSHARK SAC CONSERVATION OBJECTIVES GREY SEAL

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

SITE CODE:
SAC 000278; version 3.02. CO. GALWAY

0 0.5 1 1.5 2 km

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Map Version 1
Date: April 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Kilsallagh Bog SAC 000285

An Roinn
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Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

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Citation:

NPWS (201p) Conservation Objectives: Kilsallagh Bog SAC 000285. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000285	Kilsallagh Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	Kilsallagh Bog (SAC 000285), Co. Galway, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2015
Title :	Kilsallagh Bog SAC (site code: 285) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

Conservation Objectives for : Kilsallagh Bog SAC [000285]

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Kilsallagh Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 35.6ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 11.5ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 18.1ha. See map 2. It is estimated that all of this area is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 29.6ha. Eco-hydrological assessments of the cutover estimates that an additional 6.0ha of bog forming habitats could be restored. The long term target for ARB is therefore 35.6ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB habitat at Kilsallagh comprises central and sub-central ecotopes that currently occurs on both the northern and southern parts of the bog. DRB also occurs on both parts of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Kilsallagh Bog SAC in 2012 (latest figure available) was 182.1ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	No natural marginal habitats exist on the margins of this bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 17.8ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 35.6ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed on Kilsallagh Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Kilsallagh Bog is noted for the presence of two flushes within the high bog. The flush in the south of the SAC contains several swallowholes. Notable bird species that have been recently recorded include breeding red grouse (*Lagopus lagopus*) and breeding curlew (*Numenius arquata*)
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding, and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*) and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Kilsallagh Bog suggests that the current level is approximately 11.3kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Kilsallagh Bog SAC

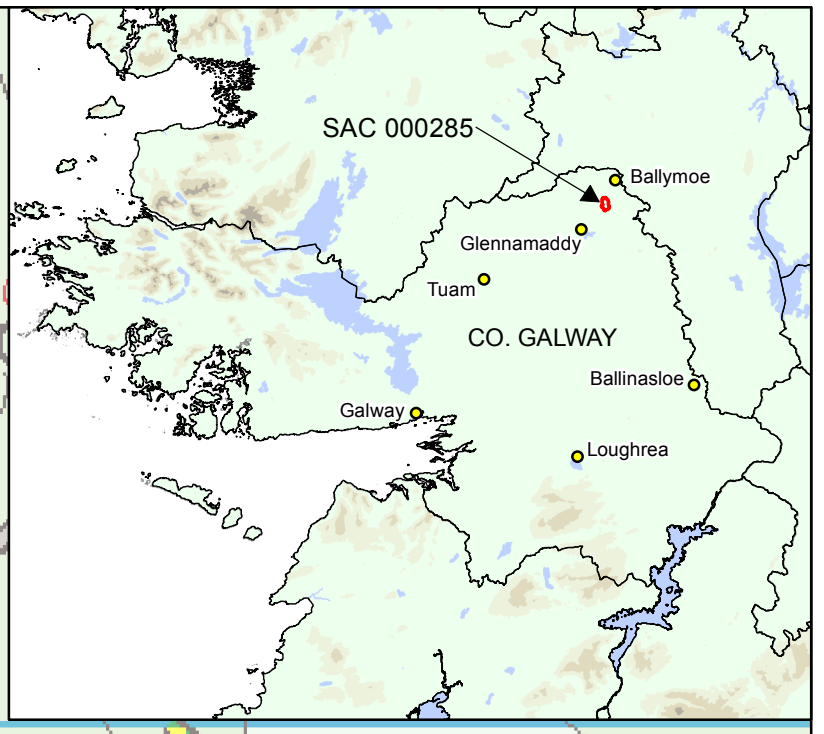
Attribute	Measure	Target	Notes

Conservation Objectives for : Kilsallagh Bog SAC [000285]

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Kilsallagh Bog SAC

Attribute	Measure	Target	Notes



Kilcoo

67

79

Cillín Ardagh

90

93

Newtown

allagh

Salach

Oughtagh

across

Standing Stone

Kilmacrickard

Legend

Kilsallagh Bog SAC 000285

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

MAP 1: KILSALLAGH BOG SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 000285; version 3.01. Co. Galway

0 100 200 300 400 500 m

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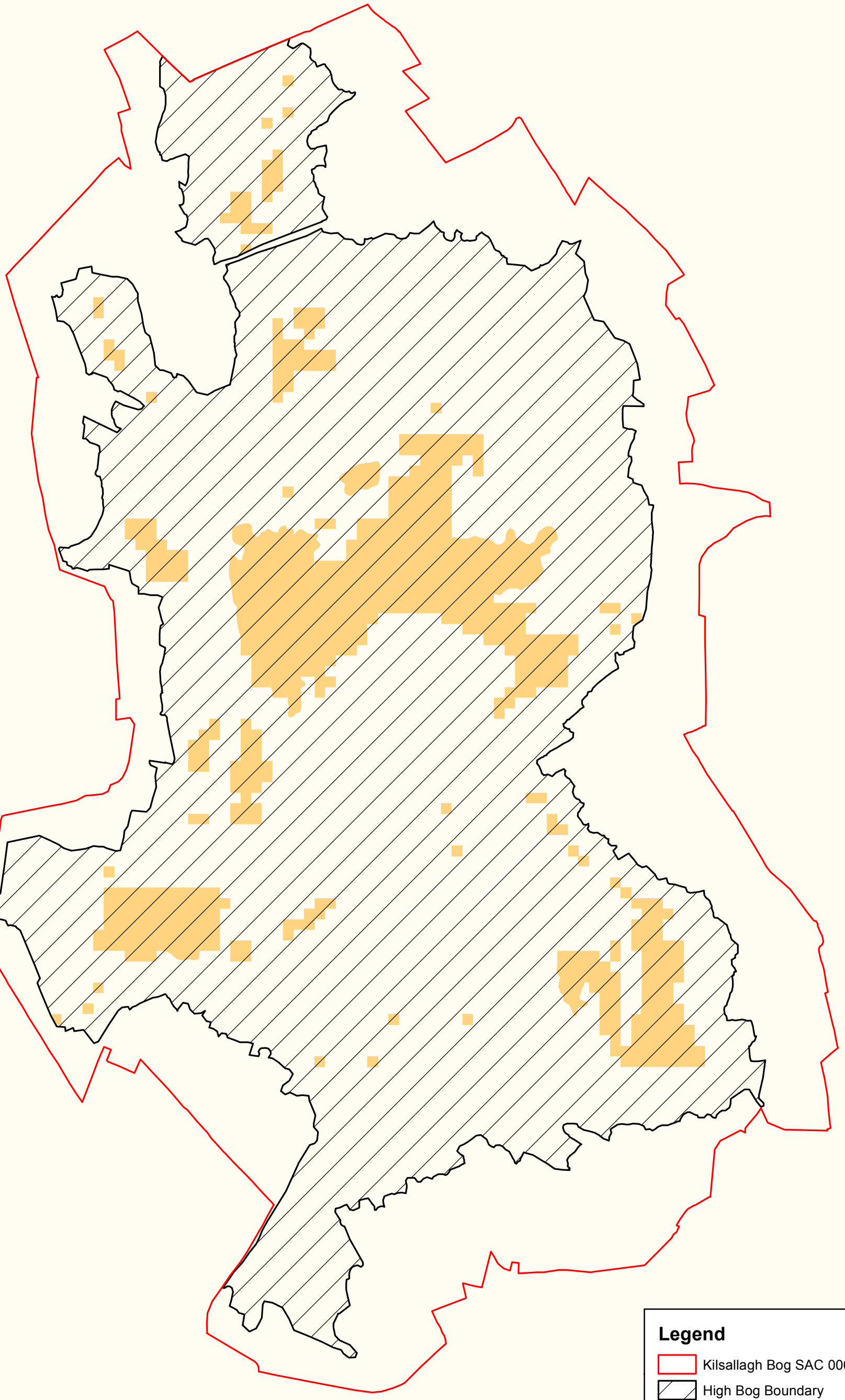

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Department of
Arts, Heritage and the Gaeltacht

MAP 2:
KILSALLAGH BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000285; version 3.01. Co. Galway

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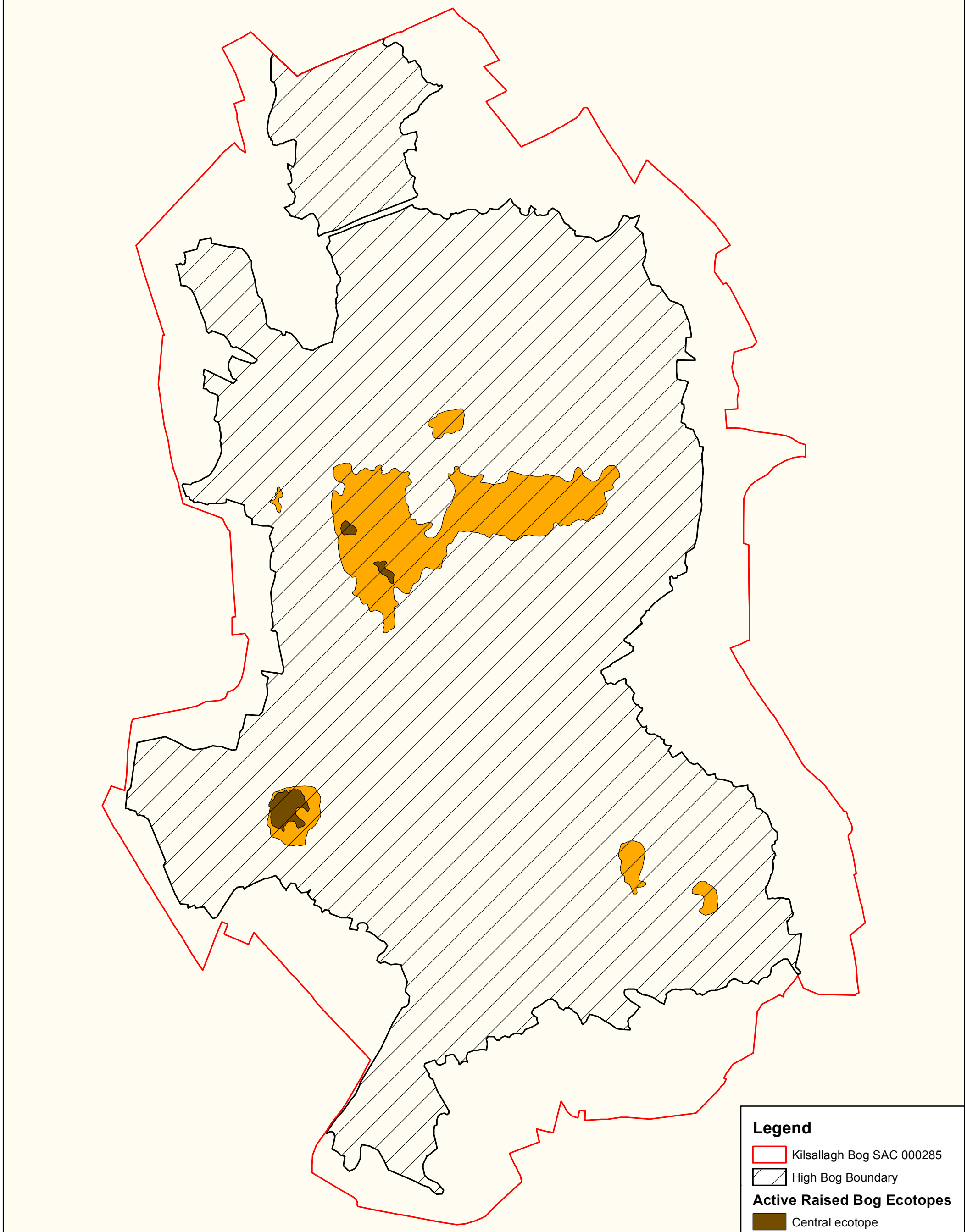
Map Version 1
Date: Nov 2015



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Department of Arts, Heritage and the Gaeltacht

MAP 3: KILSALLAGH BOG SAC CONSERVATION OBJECTIVES ACTIVE RAISED BOGS ECOTOPES

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

SITE CODE:
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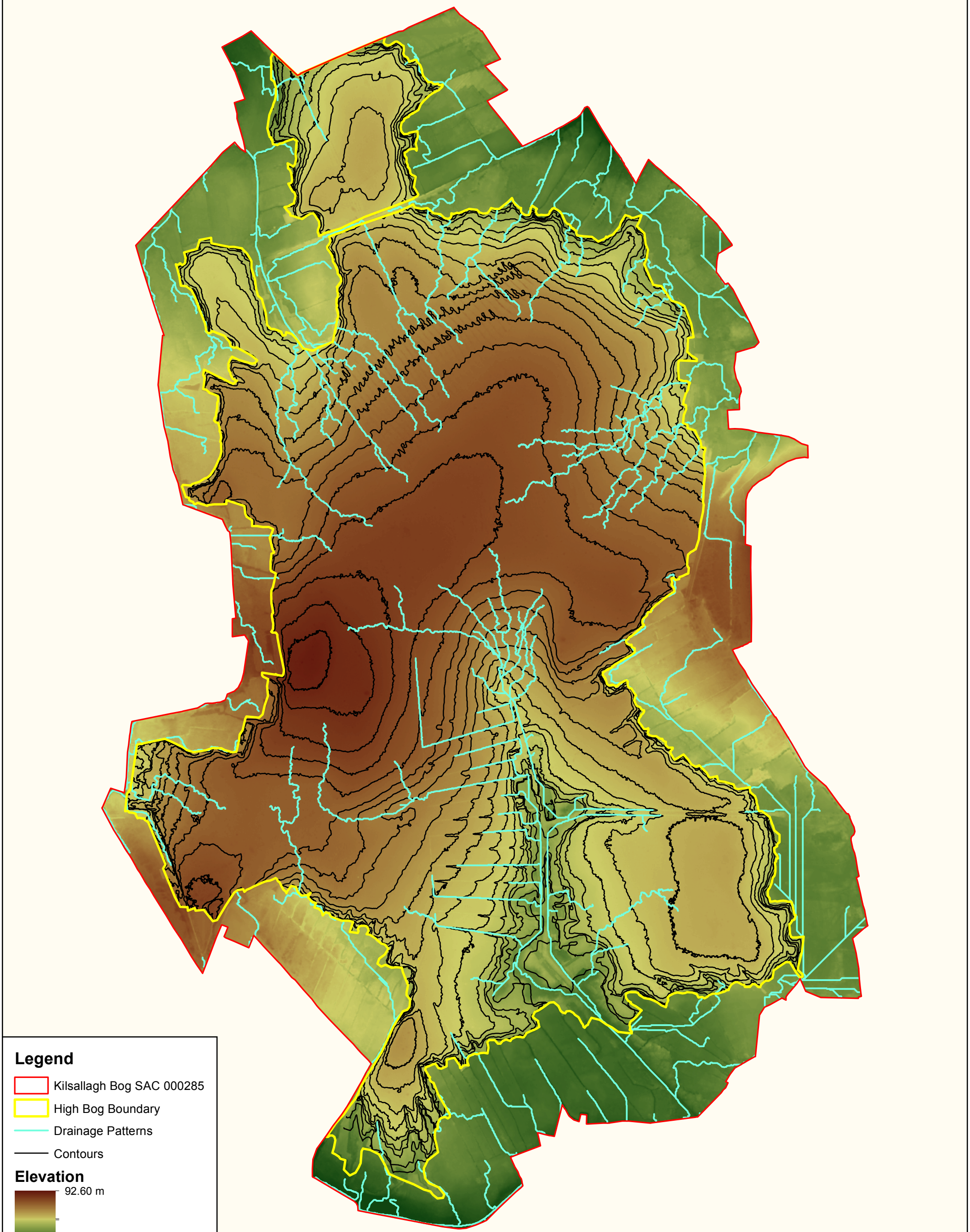

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Department of Arts, Heritage and the Gaeltacht

MAP 4:
KILSALLAGH BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

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Map Version 1
Date: Nov 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lisnageeragh Bog and Ballinastack Turlough SAC 000296

An Roinn
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Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Lisnageeragh Bog and Ballinastack Turlough SAC 000296. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey

ISSN 2009-4086

Introduction

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

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Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000296	Lisnageeragh Bog and Ballinastack Turlough SAC
3180	Turloughs*
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	Lisnageeragh Bog (SAC 000296), Co. Galway, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2016
Title :	Lisnageeragh Bog and Ballinastack Turlough SAC (site code: 296) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2016
Title :	Lisnageeragh Bog and Ballinastack Turlough SAC (site code: 296) Conservation objectives supporting document- turloughs V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2016
Title :	Goodwillie (1992) Turloughs over 10 hectares: vegetation survey and evaluation
GIS Operations :	Goodwillie map scanned and georectified. Turlough as outlined on map digitised. New Turlough dataset clipped to SAC Boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	3180 (map 2)
Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 3 and 5)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 4)

3180 Turloughs

To maintain the favourable conservation condition of Turloughs in Lisnageeragh Bog and Ballinastack Turlough 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	Current mapped area of Ballinastack Turlough is 23.7ha. See map 2. See turloughs supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	The location of Ballinastack Turlough is shown in map 2. See turloughs supporting document for further details
Hydrological regime: flood duration, frequency, area, depth; permanently flooded area	Various	Maintain/restore appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes in the turloughs supporting document
Soil type: area	Hectares	Maintain variety, area and extent of soil types necessary to support turlough vegetation and other biota	See turloughs supporting document for further details
Soil nutrient status: nitrogen and phosphorous	N and P concentration in soil	Maintain/restore nutrient status appropriate to soil types	See turloughs supporting document for further details
Physical structure: bare ground	Presence	Maintain sufficient wet bare ground, as appropriate	See turloughs supporting document for further details
Chemical processes: calcium carbonate deposition and concentration	CaCO3 deposition rate/soil concentration	Maintain CaCO3 deposition rate/soil concentration	See turloughs supporting document for further details
Water quality: nutrients; colour; phytoplankton; epiphyton	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes in the turloughs supporting document
Active peat formation	Flood duration	Restore active peat formation, where appropriate	See turloughs supporting document for further details
Vegetation composition: area of vegetation communities	Hectares	Maintain area of sensitive and high conservation value vegetation communities/units	See turloughs supporting document for further details
Vegetation composition: vegetation zonation	Distribution	Maintain vegetation zonation/mosaic characteristic of the site	See turloughs supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain sward heights appropriate to the vegetation unit, and a variety of sward heights across the turlough	See turloughs supporting document for further details
Typical species: terrestrial, wetland and aquatic plants, invertebrates and birds	Presence	Maintain typical species	Typical species is sub-divided into more detailed attributes in the turloughs supporting document
Fringing habitats: area	Hectares	Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	See turloughs supporting document for further details. See also the conservation objective for Active raised bogs (7110)

Vegetation structure: turlough woodland	Species diversity and woodland structure	Maintain appropriate turlough woodland diversity and structure	See turloughs supporting document for further details

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Lisnageeragh Bog and Ballinastack Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 58.8ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 29.6ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 38.0ha. See map 3. However, it is estimated that only 26.6ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 56.2ha. Eco-hydrological assessments of the cutover estimates that an additional 2.6ha of bog forming habitats could be restored. The long term target for ARB is therefore 58.8ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 4 for distribution in 2012	ARB habitat at Lisnageeragh Bog is central and sub-central ecotopes and active flush. ARB currently occurs mainly in the south-central part of the bog. DRB occurs on both the south-central and northern parts of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 3	The area of high bog within Lisnageeragh Bog SAC in 2012 (latest figure available) was 269.5ha (DAHG, 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 5 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	Studies suggest that the ARB is threatened due to water loss from past drainage and peat-cutting at Lisnageeragh Bog. Only remnant semi-natural margins occur between the bog and the turlough in the north of the SAC. See also the conservation objective for Turloughs (3180). Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 29.4ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 58.8ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in the southern part of Lisnageeragh Bog

Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Lisnageeragh Bog is noted for the presence of a number of flushes on the high bog and the transition to turlough in the northern part of the SAC
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*) and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Lisnageeragh Bog suggests that the current level is approximately 11.4kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Lisnageeragh Bog and Ballinastack Turlough SAC

Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lisnageeragh Bog and Ballinastack Turlough SAC

Attribute	Measure	Target	Notes

Stonepark
Tomb &
Cillín
Cornacoyntia
65
93
Ballinapeaka
Curraghmulmurry
Kilcolumb
htown
105
Stonetown
Graveyard
Holy
Well
Rosdaul
64
Swiftsacre
95
Lisnageeragh
Clooncon East
Englishtown
Keeloges Wes
63
Holy
Well
Clooncon West
R364
Whiskey
Hill
Frass
Glennamaddy
Mountkelly
PO
Gleann na Madadh
62
Barna
Burial Ground
R362
Spinagl
West
SAC 000296
Glennamaddy
Tuam
Mountbellew Bridge
Galway
CO. GALWAY

Legend

Lisnageeragh Bog and Ballinastack Turlough SAC 000296

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Department of Arts, Heritage and the Gaeltacht

MAP 1:
LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 000296; version 3. Co. Galway

0 250 500 750 1,000 m

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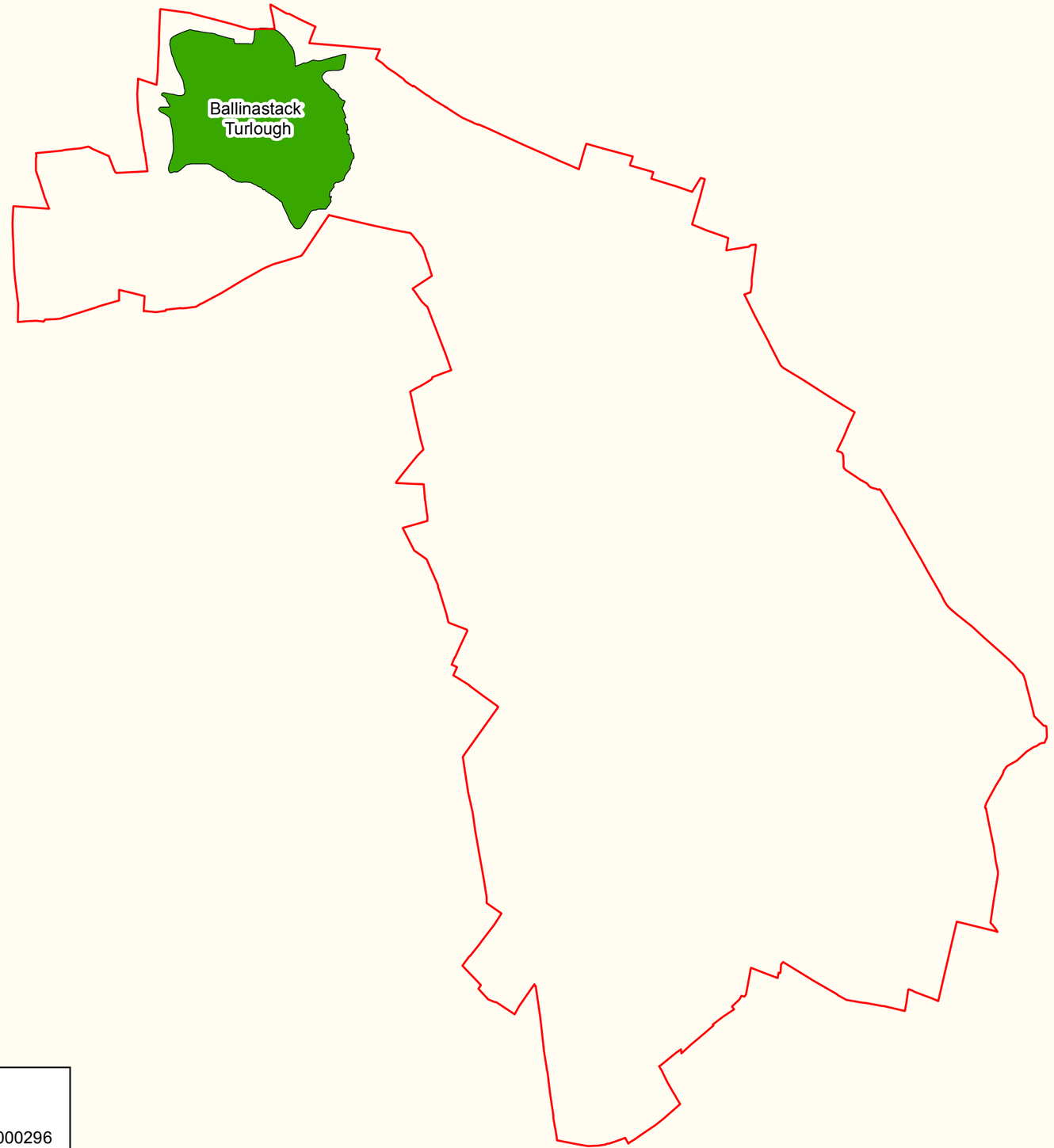
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: March 2016



Legend

- Lisnageeragh Bog and Ballinastack Turlough SAC 000296
- 3180 *Turloughs

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH SAC CONSERVATION OBJECTIVES TURLOUGHS

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

SITE CODE:
SAC 000296; version 3. Co. Galway

0 250 500 750 1,000 m

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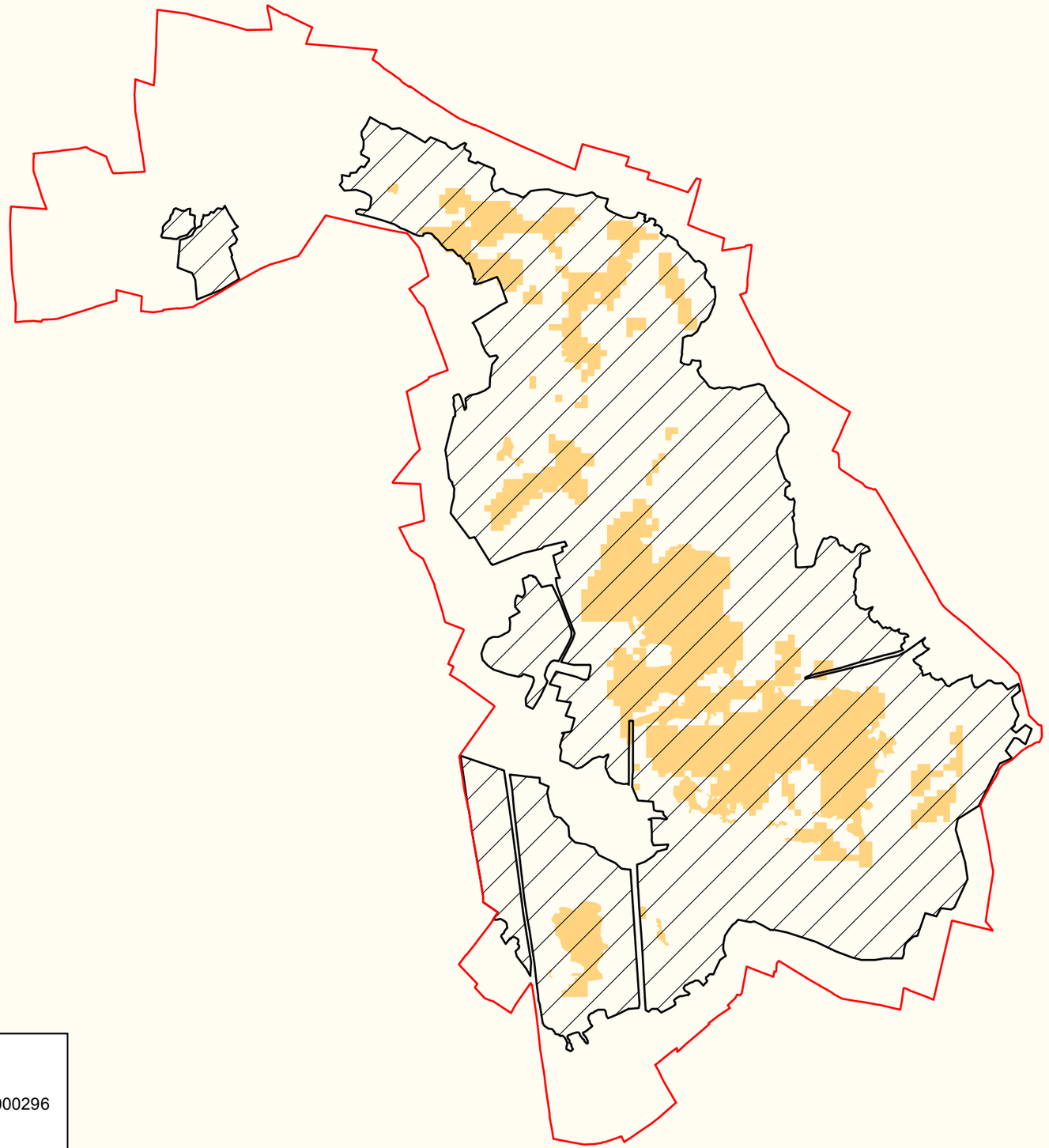
N

Map Version 1
Date: March 2016



Legend

- Lisnageeragh Bog and Ballinastack Turlough SAC 000296
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000296; version 3. Co. Galway

0 250 500 750 1,000 m

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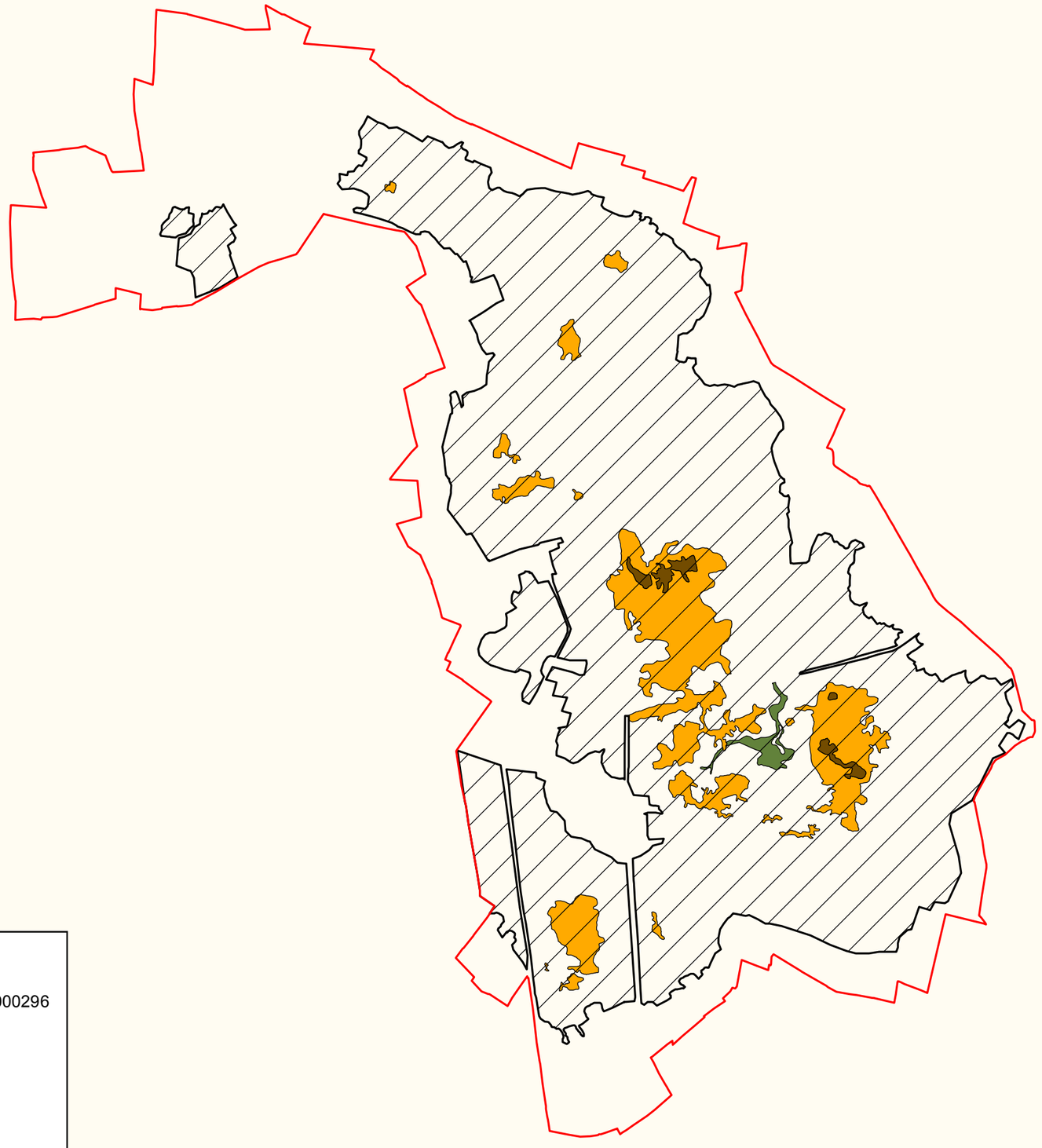
Map Version 1
Date: March 2016



Legend

- Lisnageeragh Bog and Ballinastack Turlough SAC 000296
- High Bog Boundary

Active Raised Bogs Ecotopes

- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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MAP 4:
LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS ECOTOPES

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

SITE CODE:
SAC 000296; version 3. Co. Galway

0 250 500 750 1,000 m

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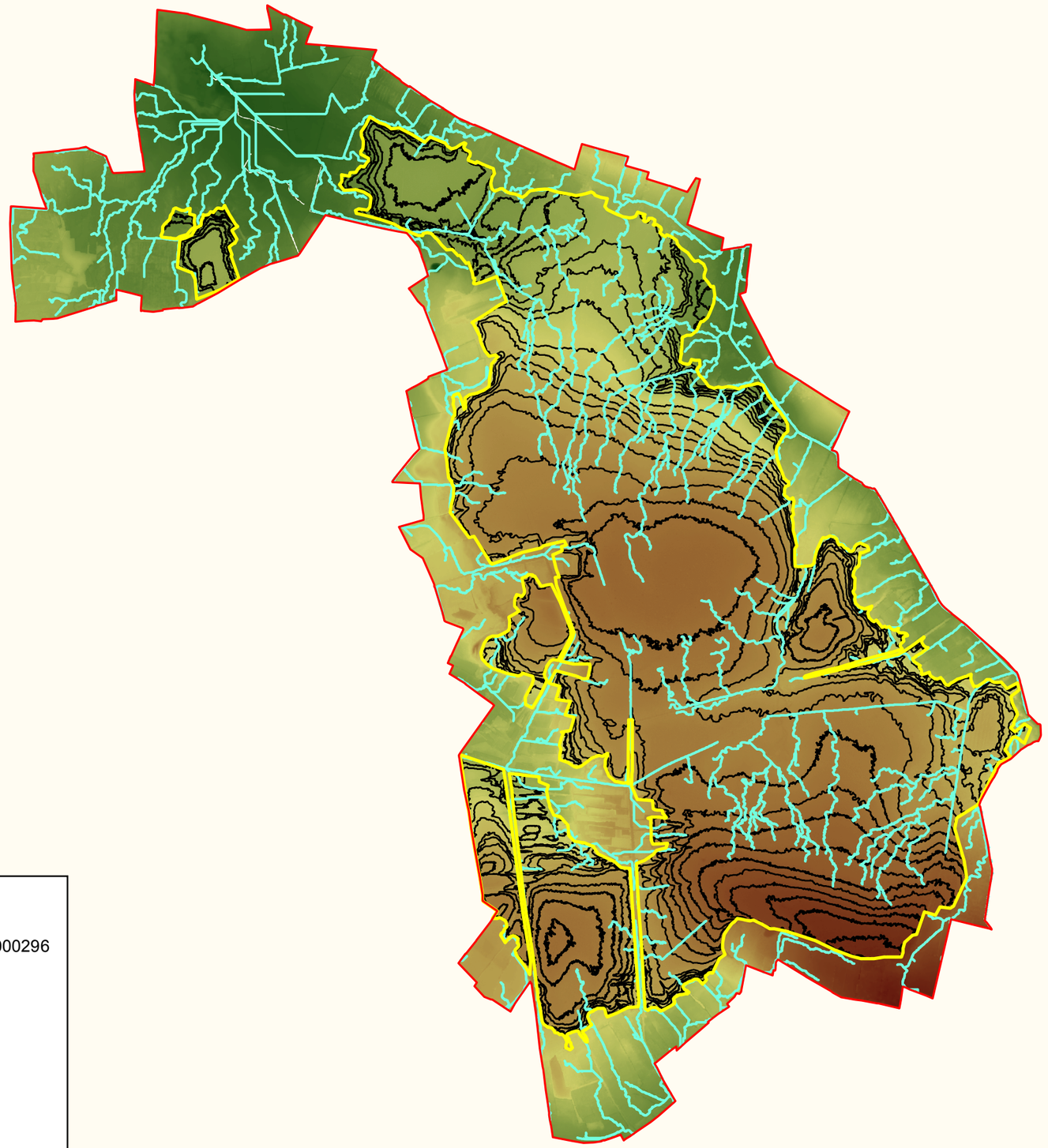
Map Version 1
Date: March 2016



Legend

- Lisnageeragh Bog and Ballinastack Turlough SAC 000296
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

99.51 m

78.14 m

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MAP 5:
LISNAGEERAGH BOG AND BALLINASTACK TURLOUGH SAC
CONSERVATION OBJECTIVES
RAISED BOG DIGITAL ELEVATION MODEL & DRAINAGE PATTERNS

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

SITE CODE:
SAC 000296; version 3. Co. Galway

0 250 500 750 1,000 m

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Map Version 1
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ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Corrib SAC 000297

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

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

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Lough Corrib SAC 000297. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000297	Lough Corrib SAC
1029	Freshwater Pearl Mussel *Margaritifera margaritifera*
1092	White-clawed Crayfish *Austropotamobius pallipes*
1095	Sea Lamprey *Petromyzon marinus*
1096	Brook Lamprey *Lampetra planeri*
1106	Salmon *Salmo salar*
1303	Lesser Horseshoe Bat *Rhinolophus hipposideros*
1355	Otter *Lutra lutra*
1393	Slender Green Feather-moss *Drepanocladus vernicosus*
1833	Slender Naiad *Najas flexilis*
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 Isoeto-Nanojuncetea
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*
7220	Petrifying springs with tufa formation (Cratoneurion)*
7230	Alkaline fens
8240	Limestone pavements*
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
91D0	Bog woodland*

Please note that this SAC overlaps with Lough Corrib SPA (004042). It is adjacent to Galway Bay Complex SAC (000268), Maumturk Mountains SAC (002008), Connemara Bog Complex SAC (002034) and Monivea Bog SAC (002352). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1995
Title :	Mapping of proposed SAC rivers for *Margaritifera margaritifera*. A report for the National Parks and Wildlife Service on work carried out from August to October 1995
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	1998
Title :	Conservation management of the white-clawed crayfish, *Austropotamobius pallipes*
Author :	Reynolds, J.D.
Series :	Irish Wildlife Manual No. 1
Year :	2002
Title :	*Najas flexilis* in Donegal
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2004
Title :	Pilot project for monitoring populations of the freshwater pearl mussel *Margaritifera margaritifera*. Baseline survey of the Owenriff River SAC, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2004
Title :	The distribution of *Najas flexilis* in Ireland 2002-2004
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2005
Title :	Monitoring populations of the freshwater pearl mussel *Margaritifera margaritifera*. Repeat survey of the Owenriff River cSAC, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
Year :	2007
Title :	A survey of juvenile lamprey populations in the Corrib and Suir catchments
Author :	O'Connor, W.
Series :	Irish Wildlife Manual No. 26

Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	Monitoring populations of freshwater pearl mussel *Margaritifera margaritifera*. 2008 repeat survey of the Owenriff River SAC, County Galway
Author :	Moorkens, E.; Killeen, I.
Series :	Unpublished report to NPWS
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: monitoring of the freshwater pearl mussel in the Owenriff
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: Report on biological monitoring of surface water quality in the Owenriff catchment (Corrib sub-catchment), Co. Galway
Author :	Williams, L.
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
Author :	Paul Johnston Associates
Series :	Unpublished report to NPWS
Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (*Austropotamobius pallipes*) in Irish lakes
Author :	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manual No.45
Year :	2010
Title :	Second Draft Owenriff Freshwater Pearl Mussel Sub-basin Management Plan (2009-2015). March 2010
Author :	NPWS
Series :	Unpublished document to Department of the Environment, Heritage and Local Government
Year :	2011
Title :	Monitoring populations of the freshwater pearl mussel *Margaritifera margaritifera* – 2011 condition assessment survey of the freshwater pearl mussel in the Owenriff River, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS

Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernandez, F.
Series :	Irish Wildlife Manual No. 73
Year :	2013
Title :	Results of a monitoring survey of bog woodland
Author :	Cross, J.; Lynn, D.
Series :	Irish Wildlife Manual No. 69
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer, J.; Duff, K.; Smith, G.
Series :	Irish Wildlife Manual No. 81

Year :	2014
Title :	Addergoole Bog (SAC 000297), Co.Galway, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer, J.; Duff, K.; Smith, G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Monitoring methods for *Hamatocaulis vernicosus* (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91
Year :	2015
Title :	Monitoring populations of the freshwater pearl mussel *Margaritifera margaritifera* – 2014 Monitoring survey of the Owenriff River, County Galway. March 2015
Author :	Moorkens, E.A.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Monitoring populations of the freshwater pearl mussel *Margaritifera margaritifera* – 2015 Monitoring Survey of the Owenriff River, County Galway. November 2015
Author :	Moorkens, E.A.
Series :	Unpublished report to NPWS
Year :	2016
Title :	Monitoring guidelines for the assessment of petrifying springs in Ireland
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Irish Wildlife Manual No. 94
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	2016 Survey and condition assessment of the population of the freshwater mussel *Margaritifera margaritifera* in the Owenriff River, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2017
Title :	Lough Corrib SAC (site code: 297) Conservation objectives supporting document- *Najas flexilis* V1
Author :	NPWS
Series :	Conservation objectives supporting document

Year :	2017
Title :	Lough Corrib SAC (site code: 297) Conservation objectives supporting document- raised bog habitats 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 :	1989
Title :	The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author :	Hedenäs, L.
Series :	Lindbergia, 15: 8-36
Year :	1990
Title :	The phytosociology and ecology of the aquatic and wetland communities of the lower Lough Corrib basin, County Galway
Author :	Mooney, E.P.; O'Connell, M.
Series :	Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science, 90B(5): 58-97
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 :	1994
Title :	The ecological status of Lough Corrib, Ireland, as indicated by physiographic factors, water chemistry and macrophytic flora
Author :	Krause, W.; King, J.J.
Series :	Vegetatio, 110: 149–161
Year :	1996
Title :	Studies on the biology and ecology of *Margaritifera* in Ireland
Author :	Moorkens, E.
Series :	Unpublished Ph.D. thesis, University of Dublin, Trinity College.

Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London
Year :	2002
Title :	A survey of the white-clawed crayfish (*Austropotamobius pallipes*) Lereboullet and of water quality in two catchments of eastern Ireland
Author :	Demers, A.; Reynolds, J.D.
Series :	Bulletin Francais de la Peche et de la Pisciculture, 367: 729-740
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2003
Title :	Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*
Author :	Harvey, J.; Cowx, I.
Series :	Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion Vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2003
Title :	Identifying lamprey. A field key for sea, river and brook lamprey
Author :	Gardiner, R.
Series :	Conserving Natura 2000 rivers, Conservation techniques No. 4. English Nature, Peterborough
Year :	2004
Title :	The ecology of *Najas flexilis*
Author :	Wingfield, R.A.; Murphy, K.J.; Hollingsworth, P.; Gaywood, M.J.
Series :	Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)
Year :	2005
Title :	Common standards monitoring guidance for freshwater fauna
Author :	JNCC
Series :	Joint Nature Conservation Committee, Peterborough
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press

Year :	2006
Title :	The status of host fish populations and fish species richness in European freshwater pearl mussel (*Margaritifera margaritifera*) streams
Author :	Geist, J.; Porkka, M.; Kuehn, R.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2007
Title :	Evolutionary history of lamprey paired species *Lampetra fluviatilis* L. and *Lampetra planeri* Bloch as inferred from mitochondrial DNA variation
Author :	Espanhol, R.; Almeida, P.R.; Alves, M.J.
Series :	Molecular Ecology, 16: 1909-1924
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19 (3): 264–273
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Addressing the conservation and rehabilitation of *Margaritifera margaritifera* populations in the Republic of Ireland within the framework of the habitats and species directive
Author :	Moorkens, E.
Series :	Journal of Conchology, 40: 339
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland
Author :	Gargan, P.G.; Roche, W.K.; Keane, S.; King, J.J.; Cullagh, A.; Mills, P.; O'Keeffe, J.
Series :	Journal of Applied Ichthyology, 27 (Suppl. 3): 66-72

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2012
Title :	A report on the sub-littoral environment around selected navigation markers in the north west sector of Lough Corrib
Author :	Roden, C.
Series :	Unpublished report to RPS Group
Year :	2013
Title :	Aspects of brook lamprey (*Lampetra planeri* Bloch) spawning in Irish waters
Author :	Rooney, S.M.; O'Gorman, N.M.; Green, F.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 113B(1): 13-25
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment, 470–471: 216–223
Year :	2014
Title :	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel (*Margaritifera margaritifera*) in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
Year :	2015
Title :	Behaviour of sea lamprey (*Petromyzon marinus* L.) at man-made obstacles during upriver spawning migration: use of telemetry to access efficacy of weir modifications for improved passage
Author :	Rooney, S.M.; Wightman, G.D.; O Conchuir, R.; King, J.J.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 115B: 1-12
Year :	2015
Title :	River engineering works and lamprey ammocoetes; impacts, recovery, mitigation
Author :	King, J.J.; Wightman, G.D.; Hanna, G.; Gilligan, N.
Series :	Water and Environment Journal, 29: 482-488
Year :	2015
Title :	The flora and conservation status of petrifying springs in Ireland
Author :	Lyons, M.D.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve any issues arising
Used For :	3110, 3130, 3140 (map 3)
Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset and RBSB13_SACs_DrainagePatterns_5k dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 4 and 6)
Year :	2003
Title :	Turf Cutting Impact Assesment Project
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 5)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes, 91D0 (maps 5 and 8)
Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 7)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0 (map 8)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas data
GIS Operations :	Relevant catchment boundary identified. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 9)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1029, 1092, 1393 (maps 9 and 10)
Year :	2012
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Relevant roost identified by clipping to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 11)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 11)

Year :	2010
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	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 Discovery Series river and canal datasets. 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 lake boundary to highlight potential commuting points
Used For :	1355 (map 12)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of 10m buffer on terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Creation of 20m buffer applied to river and stream centreline data; These datasets combined with derived OSI 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2013
Title :	*Najas flexilis* data
GIS Operations :	Lake habitat for species clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1833 (map 13)

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

To restore the favourable conservation condition of Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The distribution of lake habitat 3110 in Lough Corrib SAC has not been fully surveyed. Krause and King (1994) recorded it in the "western arm proper". Within Lough Corrib, it is likely to be restricted to this 'western arm' (the north-western bay). It may, however, occur elsewhere along the northern or western shoreline of Lough Corrib, in Ballydoo Lough (N. of Corrib) and in small lakes in the Owenriff catchment. Two measures of extent should be used: 1. the area of the lake itself; 2. the extent of the vegetation communities/zones that typify the habitat. Further information on this and all other 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. See map 3 for indicative lake habitat distribution	The selection of the SAC for lake habitat 3110 was based on data on the macrophyte flora of Lough Corrib, particularly the north-western bay, from Krause and King (1994). Despite the occurrence of slender naiad (*Najas flexilis*) in this bay, the vegetation appears to be typical of lake habitat 3110. It is possible that habitat 3110 occurs elsewhere along the northern and western shores of Lough Corrib, on acid geology, as well as within some smaller lakes in the SAC, e.g. Lough Ateean in the Owenriff catchment
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 O Connor (2015)
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)
Vegetation distribution: maximum depth	Metres	Restore 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. Recent investigations have indicated a significant decline in depth of colonisation throughout Lough Corrib (Roden, 2012; Roden and Murphy, in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that the oligotrophic soft water habitat is associated with a range of nutrient-poor substrates, from stones, cobble and gravel, through sands, silt, clay and peat. Substratum particle size is likely to vary with depth and along the shoreline within a single lake. Lake substratum quality in Lough Corrib is impaired as a result of peat deposition and possibly also nutrient enrichment (Roden, 2012; Roden and Murphy, in prep.)
Water quality: transparency	Metres	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. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Secchi depth did not exceed 2m in the 'western arm' of Lough Corrib and approximately 5m in the northern basin in 2012 (Roden, 2012)
Water quality: nutrients	µg/l P; mg/l N	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 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 lake habitat 3110, annual average Total Phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040 mg/l N and annual 95th percentile for total ammonia should be ≤0.090 mg/l N. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the 10µg/l target in Upper Corrib in a number of recent years (Clabby et al., 2008; McGarrigle et al., 2010)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Restore appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll *a* in Upper Corrib has exceeded the OECD target of ≤8.0µg/l in five of the nine monitoring cycles from 1976-2009 (McGarrigle et al., 2010)
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 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Restore/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

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 ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009)
Water colour	mg/l PtCo	Restore/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 PtCo or even <10mg/l PtCo) in oligotrophic soft water lakes (3110), where the peatland in the lake's catchment is intact. Roden (2012) recorded very dark water and poor visibility in Upper Corrib and the western arm
Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Restore/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. Roden recorded low transparency, very hard water, poor visibiliy and peat deposition in Lough Corrib, all of which suggest increased turbidity (Roden, 2012)

Fringing habitat : area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

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

To restore the favourable conservation condition of Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoëto-Nanojuncetea in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full distribution and characteristics of lake habitat 3130 in Lough Corrib SAC have not been mapped. While the characteristic species slender naiad (*Najas flexilis*) was recorded in the western arm of Lough Corrib, that area appears to be dominated by lake habitat 3110, with lake habitat 3130 found towards the northern basin proper. The division between lake habitats 3130 and 3140 may be difficult to determine, and both habitats may occur throughout the lake. Habitat 3130 is thought likely to dominate Ballycuirke Lake. Two measures of extent should be used: 1. the area of the lake itself; 2. the extent of the vegetation communities/zones that typify the habitat. For additional information see Krause and King (1994). Further information on this and all other attributes is contained in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015) and the *Najas flexilis* supporting document
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3 for indicative lake habitat distribution	The characteristics and distribution of lake habitat 3130 in Ireland are not yet fully understood. The Annex II macrophyte slender naiad (*Najas flexilis*) is considered to be characteristic of the habitat and occurs in Lough Corrib. Based on Environmental Protection Agency (EPA) macrophyte data, lake habitat 3130 is also likely to occur in Ballycuirke Lough (Loch Bhaile Ui Choirc)
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 lake habitat 3130 (NPWS, 2013) and O Connor (2015)
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)
Vegetation distribution: maximum depth	Metres	Restore 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. Recent investigations have indicated a significant decline in depth of colonisation throughout Lough Corrib (Roden, 2012; Roden and Murphy, in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Restore 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 *Najas flexilis* is typically found on soft substrata of mud, silt or fine sand (Preston and Croft, 2001; Roden, 2002, 2004). Lake substratum quality in Lough Corrib is impaired as a result of peat deposition and possibly also nutrient enrichment (Roden, 2012; Roden and Murphy, in prep.)
Water quality: transparency	Metres	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 *Najas flexilis* at depths of up to 10m. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. There is likely to be some variation across lakes with habitat 3130 in Secchi depth and site-specific conditions should also be considered. Secchi depth did not exceed 2m in the 'western arm' of Lough Corrib and approximately 5m in the northern basin in 2012 (Roden, 2012)
Water quality: nutrients	µg/l P; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Lake habitat 3130 is associated with high water quality, with low dissolved nutrients. It is naturally more productive than 3110, probably reflecting higher concentrations of nutrients such as calcium, rather than P alone. 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 ≤10µg/l TP, average annual total ammonia should be ≤0.04mg/l N and annual 95th percentile for total ammonia should be ≤0.09mg/l N. Where nutrient concentrations are lower, there should be no upward trend. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the 10µg/l target in Upper Corrib in recent years (Clabby et al., 2008; McGarrigle et al., 2010)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Restore appropriate water quality to support the habitat, including high chlorophyll *a* 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 *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* should be <2.5µg/l and the annual peak chlorophyll *a* should be <8.0µg/l. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll *a* in Upper Corrib has exceeded the OECD target of ≤8.0µg/l in five of the nine monitoring cycles from 1976-2009 (McGarrigle et al., 2010)

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	Restore/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 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, lake 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 soft water lake habitat with base-rich influences (3130). 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 habitat 3130. Acidification reduces the abundance and reproductive capacity of *Najas flexilis* (Wingfield et al., 2004). The specific requirements of lake habitat 3130, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. In line with targets for *Najas flexilis*, 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/Alkalisation status is high. Maximum pH should be <9.0 pH units, in line with the surface water standards. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Restore/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 is generally <30mg/l PtCo or, more naturally, <20mg/l PtCo in lake habitat 3130, where the peatland in the lake's catchment is intact. Roden (2012) recorded very dark water and poor visibility in Upper Corrib and the western arm
Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Restore/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. Roden recorded low transparency, very hard water, poor visibiliy and peat deposition in Lough Corrib, all of which suggest increased turbidity (Roden, 2012)
Fringing habitat: area and condition	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. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

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

To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The hard water lake habitat (3140) is found in Lough Corrib, notably the southern basin. Its exact distribution and area has not been mapped however, and it is likely to also extend along the eastern side of the northern basin. For additional information see Heuff (1984), Mooney and O'Connell (1990), Krause and King (1994) and Roden and Murphy (in prep.). Further information on this and all other 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. See map 3 for indicative lake habitat distribution	The distribution of the hard water lake habitat (3140) in Lough Corrib is determined, in the main, by geology and water chemistry. The hydrological regime (water circulation) in the Lough Corrib basins influences water mixing and, therefore, water chemistry. As a result, lake habitat 3140 is considered to dominate the southern basin, but is also likely to be widespread in the northern basin
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical species (cyanobacteria, algae, higher plants and water beetles), see the Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and O Connor (2015). Lough Corrib is, naturally, a 'typical' marl lake as described by Roden and Murphy (2013; in prep.). Monitoring in 2012 demonstrated that the hard water vegetation in Lough Corrib is in bad condition, with shallow euphotic depth, some dead/dying charophytes and absent and decaying krustenstein (Roden and Murphy, in prep.)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.). Charophyte zonation was reasonably intact in Lough Corrib in 2012, with *Chara curta, C. rudis, C. virgata* and *C. denudata* present, however the zones had become compressed since surveyed in 2004 and *C. contraria* and *Nitella flexilis* zones were not recorded (Roden and Murphy, in prep.). The krustenstein zone was either absent or decaying (Roden and Murphy, in prep.)
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question, but is typically expected to be deep in clear, hard water lakes. An indicative target of more than 6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Extremely clear marl lakes can have charophyte vegetation to far greater depths, such as Lough Rea (charophytes to 10-11m), or Coolorta (>9m) (Roden and Murphy, in prep.). In 2004, the euphotic zone of Lough Corrib extended to 6m, but in 2012 the maximum depth of vegetation was 4.2m (Roden and Murphy, in prep.). Decaying charophytes were recorded at 3m (Roden and Murphy, in prep.)

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the vegetation	The hard water lake habitat is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Lake substratum quality in Lough Corrib is impaired as a result of peat deposition, likely also nutrient enrichment, krustenstein decay and colonisation by zebra mussels (*Dreissena polymorpha*) (Roden, 2012; Roden and Murphy, in prep.). Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial
Water quality: transparency	Metres	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. A target has been set for hard water lakes (3140) of >6m (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms (Roden and Murphy, in prep.). Secchi depth was 4m in lake habitat 3140 in 2012 (Roden and Murphy, in prep.)
Water quality: nutrients	µg/l P; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Lake habitat 3140 is typically associated with high water quality, including low dissolved nutrients. Some forms of the habitat appear to be naturally more productive than others, e.g. the machair form may be naturally more nutrient-rich. The default target for typical marl lakes is Water Framework Directive (WFD) 'High Status' or oligotrophic (OECD, 1982). Annual average Total Phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. Where nutrient concentrations are lower than the targets, there should be no upward trend in nutrient concentrations. For further information see the European Communities Environmental Objectives (Surface Waters) Regulations 2009. TP has exceeded the 10µg/l target in Lower Corrib in a number of recent years (Clabby et al., 2008; McGarrigle et al., 2010)

Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Lake habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD 'High Status' or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. Annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll *a* concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Maximum chlorophyll *a* in Lower Corrib exceeded the OECD target of ≤8.0 µg/l in five of the six monitoring cycles from 1976-2000 (McGarrigle et al., 2010). In recent years, however maximum concentrations have dropped to c.8µg/l, probably as a result of zebra mussel (*Dreissena polymorpha*) activity
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, the default target for lake habitat 3140 is WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Restore/maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in hard water lakes (3140) should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, the default target for lake habitat 3140 is high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Restore high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for hard water lakes (3140). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Water) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	The specific requirements of lake habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to habitat 3140, however eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards. See the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the habitat	Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). Lake habitat 3140 is typically associated with very clear waters and expected colour would be <10 or, more likely, <5mg/l PtCo. Higher colour is found in some hard water lakes with significant areas of peatland in their catchment, but it is not clear whether this is natural or the result of peatland degradation. Roden and Murphy (in prep.) recorded dark water in Lough Corrib

Dissolved organic carbon (DOC)	mg/l	Restore/maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Restore/maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species-richness than the lake habitats themselves. Fringing fen habitats can be particularly important around hard water lakes, notably the Annex I habitats alkaline fen, *Cladium* fen and petrifying springs (habitat codes 7230, 7210 and 7220). Lough Corrib has important areas of fen, limestone pavement, marsh, reedswamp and some woodland along its shoreline. See also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Lough Corrib 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	The description of 3260 is broad, from upland bryophyte/macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts. Selection of SACs for the habitat used this broad interpretation. Site-specific objectives for the habitat concentrate upon high conservation value sub-types. Little is known, however, about the characteristics or sub-types in Lough Corrib SAC. Many of the rivers were included in the SAC for Atlantic salmon (*Salmo salar*). Most of the rivers are in arterial drainage schemes that have altered aquatic plant distribution and species composition. Note: rooted macrophytes should be absent or trace (<5% cover) in freshwater pearl mussel (*Margaritifera margaritifera*) habitat. The freshwater pearl mussel (1029) conservation objective takes precedence over this objective for habitat 3260 in the Owenriff River within this SAC, because the mussel requires environmental conditions closer to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, little is known about the distribution of the habitat and its sub-types in this SAC. The vegetation of the River Corrib was documented in Mooney and O'Connell (1990). Macrophyte vegetation has expanded in the Owenriff River resulting in a decline in the condition of this priority freshwater pearl mussel (*Margaritifera margaritifera*) population and its habitat (NPWS, 2010). The Cornamonna, Owennaraha, Owenakilla and other rivers flowing into the north-western part of Lough Corrib are worthy of further investigation
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Any high conservation value sub-types in the SAC will be associated with natural, fast and highly variable flows. Owing to regular disturbance (through variations in flow), river macrophytes rarely reach a climax condition but frequently occur as transient communities. 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 of the sub-types of this 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
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regimes	It is likely that rivers over limestone bedrock have a significant groundwater contribution. There may be tufa formation associated with such groundwater springs and seepages. Such petrifying springs are an in-stream form of the Habitats Directive priority Annex I habitat "Petrifying springs with tufa formation (Cratoneurion)" (7220) and of high conservation value

Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural process	Although many of the high conservation value sub-types are dominated by coarse substrata, for certain sub-types, notably tidal forms, fine substrata are required. The size and distribution of particles is largely determined by the river flow. 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
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The specific targets may vary among sub-types. Bryophyte-rich and tufaceous streams and rivers are considered highly sensitive to nutrient enrichment and are likely to require high status waters. Water quality for other sub-types should reach a minimum of Water Framework Directive (WFD) good status, in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	The sub-types of this habitat are poorly understood and their typical species have not yet been fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates
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)
Riparian habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	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 an integral part of the structure and functioning of river systems. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers 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 also the conservation objectives for associated Annex I habitats and Annex II species within the SAC

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

To maintain the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) in Lough Corrib SAC in owing list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) occurs mainly as small areas and in intimate association with other habitats in this SAC including other grassland types, fens and limestone pavements and is therefore difficult to map separately. O'Neill et al. (2013) surveyed and mapped some grassland sites within the SAC in detail and the surveys of limestone pavement sites carried out by Wilson and Fernandez (2013) included associated grassland habitats; however, as all areas of this habitat within the SAC have not been identified, the total area is unknown
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including two "high quality" species	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species, including high quality species, as identified by the Irish Semi-natural Grasslands Survey (ISGS) is presented. O'Neill et al. (2013) should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species as identified by the ISGS is presented
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species (except certain listed species) and bracken (*Pteridium aquilinum*) not more than 5% cover	Attribute and target based on O'Neill et al. (2013). Woody species that can occur above 5% cover are juniper (*Juniperus communis*), burnet rose (*Rosa spinosissima*), mountain avens (*Dryas octopetala*) and hoary rock-rose (*Helianthemum oelandicum*)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

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

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in Lough Corrib 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	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) occurs mainly as small areas and in intimate association with other habitats in this SAC such as other grassland types and fens and is therefore difficult to map separately. O'Neill et al. (2013) surveyed and mapped some grassland sites within Lough Corrib SAC. However, the full extent of this habitat in this SAC is currently unknown
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species, including high quality species, as identified by the Irish Semi-natural Grasslands Survey (ISGS) is presented. O'Neill et al. (2013) should be consulted for further details
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species as identified by the ISGS is presented
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: moss species	Percentage at a representative number of monitoring stops	Hair mosses (*Polytrichum* spp.) not more than 25% cover	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (*Pteridium aquilinum*) not more than 5%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 10cm and 80cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs* in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore the area of active raised bog to 78.8ha, subject to natural processes	There are two raised bogs for which Active Raised Bog (ARB) has been selected in Lough Corrib SAC: Addergoole Bog and Lough Tee Bog. The total area of ARB habitat for these two bogs was mapped as 45.2ha. The area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 72.0ha. See map 4. However, it is estimated that only 24.1ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 69.3ha. Eco-hydrological assessments of cutover bog estimate that an additional 9.5ha of peat-forming habitats could be restored. The long-term target for ARB is therefore 78.8ha. See the Lough Corrib SAC conservation objectives supporting document for raised bog habitats for further details on this and the following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 5 for distribution in 2012	ARB currently occurs on the north-eastern and southern parts of Addergoole Bog and the north-western part of Lough Tee Bog. DRB occurs over much of the remainder of the high bog at Addergoole and also occurs at Lough Tee Bog. Such areas will require restoration measures. See also the conservation objective for Bog woodland (91D0)
High bog area	Hectares	No decline in extent of high bog subject to the conservation requirements of the SAC. See map 4 for mapped extent	The area of HB within Addergoole Bog in 2012 (latest figure available) is 157.4ha and 79.6ha at Lough Tee Bog (DAHG, 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout each site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm and water levels should not be more than 10cm below the bog surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 6 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect the raised bog ecosystem and the services it provides	Cutting has continued until recently around the eastern and southern margins of Addergoole Bog. Remnant semi-natural margins occur elsewhere (locally along the north-east and east margins of the site) and there are interesting transitional wetland habitats to the east of the high bog. Transitional areas between Lough Tee Bog and the adjacent mineral soils mostly corresponds with cutover bog at different stages of re-colonisation by vegetation. Eco-hydrological assessments are evaluating the potential for ARB on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 39.4ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). The target area of active raised bog for the site has been set at 78.8ha (see habitat area target above)

Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) occurs at both Addergoole and Lough Tee bogs; however, both have been negatively affected by burning
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions, but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions, but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Addergoole Bog is noted for the presence of a soak system, a rare feature of Irish raised bogs, which occurs in the centre of of the bog near two lakes. This soak includes an area of Bog woodland (91D0) which is a priority Annex I habitat and a qualifying interest for the SAC (see also the conservation objective for 91D0)
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding, and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and hare's-tail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	The most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*) and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/yr	Air quality surrounding the bogs close to natural reference conditions. The total nitrogen deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest nitrogen deposition figures for the area around the bogs in Lough Corrib SAC suggests that the current level is approximately 8.5kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120	Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Lough Corrib SAC

Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Lough Corrib SAC

Attribute	Measure	Target	Notes

7210 Calcareous fens with Cladium mariscus and species of the Caricion davallianae

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae in Lough Corrib 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	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae have not been mapped in detail for Lough Corrib SAC and thus total area of the qualifying habitat is unknown. While the full extent of Annex I fen habitats (both this habitat and Alkaline fens (7230)) within the SAC is currently unknown, their area is extensive and they often occur in association with and transitional to other habitats including *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Active raised bogs (7110), Petrifying springs with tufa formation (Cratoneurion) (7220) and Limestone pavements (8240) (NPWS internal files). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat in this SAC is currently unknown - see notes for area above
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: 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: 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
Vegetation structure: typical species	Presence	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen habitat in this SAC includes *Campylium stellatum*, while vascular plants include saw sedge (*Cladium mariscus*), slender sedge (*C. lasiocarpa*), long-stalked yellow sedge (*C. lepidocarpa*), black bog-rush (*Schoenus nigricans*), water mint (*Mentha aquatica*), wild angelica (*Angelica sylvestris*) and meadow thistle (*Cirsium dissectum*). Slender cottongrass (*Eriophorum gracile*) is known from fen habitat in this SAC (NPWS internal files)
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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: 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). Scrub and trees will tend to invade if fen conditions become drier
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 not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes

Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Areas showing signs of drainage as a result of drainage ditches or heavy trampling not more than 10%	Attribute and target based Perrin et al. (2014). Drainage can result in loss of characteristic species and transition to drier habitats
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 on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

7220 Petrifying springs with tufa formation (Cratoneurion)

To maintain the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)* in Lough Corrib 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	Petrifying springs with tufa formation (Cratoneurion) have not been mapped within Lough Corrib SAC and thus the total area of the qualifying habitat in the SAC is unknown. However, the necessary ecological conditions required for this habitat occur around Lough Corrib
Habitat distribution	Occurrence	No decline, subject to natural processes	As mentioned above, this habitat has not been mapped within the SAC. It is often associated with other habitats including Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (7210), Alkaline fens (7230) and Limestone pavements (8240). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate. Lyons and Kelly (2016) describe eight plant communities of Irish petrifying springs based on relevé data. Further information on 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). In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (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
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 (*Acer pseudoplatanus*) 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
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 maintain the favourable conservation condition of Alkaline fens in Lough Corrib 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	Alkaline fens have not been mapped in detail for Lough Corrib SAC and thus total area of the qualifying habitat is unknown. While the full extent of Annex I fen habitats (both this habitat and Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (7210)) within the SAC is currently unknown, their area is extensive and they often occur in association with and transitional to other habitats including *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) (6410), Active raised bogs (7110), Petrifying springs with tufa formation (Cratoneurion) (7220) and Limestone pavements (8240) (NPWS internal files). The conservation objectives for all these habitats in the SAC should be used in conjunction with each other as appropriate
Habitat distribution	Occurrence	No decline, subject to natural processes	The full distribution of this habitat in this SAC is currently unknown - see notes for area above
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 in NPWS (2013)
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	Further information on the vegetation communities associated with alkaline fens in the uplands 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. Mosses listed for fen in this SAC includes *Campylium stellatum* (NPWS internal files)
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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Vascular plants listed for fen in this SAC include saw sedge (*Cladium mariscus*), slender sedge (*C. lasiocarpa*), long-stalked yellow sedge (*C. lepidocarpa*), black bog-rush (*Schoenus nigricans*), water mint (*Mentha aquatica*), wild angelica (*Angelica sylvestris*) and meadow thistle (*Cirsium dissectum*). Slender cottongrass (*Eriophorum gracile*) is known from fen habitat in this SAC (NPWS internal files)

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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) 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 Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
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 Perrin et al. (2014). Scrub and trees will tend to invade if fen conditions become drier
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 (*Juncus effusus*) and common reed (*Phragmites australis*) 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). Vegetation heights lower than these would indicate undesirable levels of grazing
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). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based Perrin et al. (2014). Drainage can result in loss of characteristic species and transition to drier habitats
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 on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

8240 Limestone pavements

To maintain the favourable conservation condition of Limestone pavements* in Lough Corrib 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	Limestone pavements often occur in intimate association with other habitats including the Annex I habitats Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (6210), Petrifying springs with tufa formation (Cratoneurion) (7220) and Alkaline fens (7230). Therefore, these habitats cannot easily be mapped or considered separately. Conservation objectives for all these habitats should be used in conjunction with each other as appropriate. In Lough Corrib SAC, limestone pavements occur along the southern and eastern margins of Lough Corrib and more extensively in the southern part of the SAC. However, the total area of the Annex I habitat in the SAC is unknown. Wilson and Fernandez (2013) mapped the indicative area in the southern part, including mosaics with other habitats (map 7)
Distribution	Occurrence	No decline, subject to natural processes. Map 7 shows the indicative distribution in the southern part of the SAC, including mosaics with other habitats	See notes for area above. This habitat can be split into exposed pavement and wooded pavement (Wilson and Fernandez, 2013)
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Attribute and target based on Wilson and Fernandez (2013), where the positive indicator species for exposed and wooded pavement are listed
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Attribute and target based on Wilson and Fernandez (2013), where the negative indicator species are listed. Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (*Pteridium aquilinum*) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Attribute and target based on Wilson and Fernandez (2013). Wooded limestone pavement is usually low-growing hazel (*Coryllus avellana*) woodland. Atlantic hazel woodland is an internationally rare woodland type. Despite its low stature it is nonetheless an important habitat for woodland species
Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)

Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	This includes species on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016), and other rare or localised species, as well as archaeological and geological features, which often support distinctive species

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

To maintain the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in Lough Corrib 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	Most of the woodland in Lough Corrib SAC occurs as narrow belts of low woodland around the lake, with occasional larger stands. Old sessile oakwoods are likely to occur as mosaics with other woodland types and the total extent within the SAC is unknown. As part of the National Survey of Native Woodlands (NSNW), Perrin et al. (2008) surveyed a number of sites in the SAC; one (Annaghwood; NSNW site no. 1624), contained this habitat (see map 8). It is important to note that further unsurveyed areas of old oak woodland are likely to be present within the SAC, including at the Hill of Doon and on some of the islands in the lake (NPWS internal files)
Habitat distribution	Occurrence	No decline. Surveyed location shown on map 8	Distribution shown based on Perrin et al. (2008). It is important to note that further unsurveyed areas are likely to be present within the SAC. See note on area above
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large"; woods at least 25ha in size and "small" woods at least 3ha in size.	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al (2008) and NPWS internal files
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Based on data from Perrin et al. (2008)
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak (*Quercus petraea*) regenerates poorly. In suitable sites, ash (*Fraxinus excelsior*) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) identified Annaghwood (NSNW site code 1624) as "possible ancient woodland"
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files

Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: rhododendron (*Rhododendron ponticum*), cherry laurel (*Prunus laurocerasus*), sycamore (*Acer pseudoplatanus*) and beech (*Fagus sylvatica*)

91D0 Bog woodland

To maintain the favourable conservation condition of Bog woodland* in Lough Corrib 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. At least 1.22ha. See map 8	Bog woodland occurs on Addergoole Bog in Lough Corrib SAC and is regarded as a component of the Active raised bogs habitat (7110) of that bog. Thus, the conservation objective and supporting document for active raised bog are also relevant to this habitat and common attributes have not been repeated here. The latest survey for bog woodland on Addergoole was carried out by the Raised Bog Monitoring Project (RBMP) in 2012 (Fernadez et al., 2014)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8	Bog woodland occurs at one known location in this SAC, on Addergoole Bog. This is the most westerly known location for this habitat in Ireland
Vegetation composition: positive indicator species	Number in a representative number of monitoring stops	Birch (*Betula pubescens*), bog moss (*Sphagnum*) species and at least five other indicator species present	Bog woodland is typically species-poor but with a characteristic and distinctive flora. Positive indicator species are listed in Cross and Lynn (2013). Fernandez et al. (2014) note that Scot's pine (*Pinus sylvestris*) could be considered to be a positive indicator species; however, strong regeneration of the species can indicate that the site is drying out
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Both native and non-native invasive species absent or under control. Total cover should be less than 10%	Negative indicator species include bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*), which can become invasive if the site begins drying out
Woodland structure: cover and height of birch	Percentage cover and metres at a representative number of monitoring stops	A minimum 30% cover of birch (*Betula pubescens*) with a median canopy height of 4m	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: dwarf shrub cover	Percentage cover at a representative number of monitoring stops	Dwarf shrub cover not more than 50%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: ling cover	Percentage cover at a representative number of monitoring stops	Ling (*Calluna vulgaris*) cover not more than 40%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: bryophyte cover	Percentage cover at a representative number of monitoring stops	Bryophyte cover at least 50%, with bog moss (*Sphagnum* spp.) cover at least 25%	Attribute and target based on bog woodland monitoring survey (Cross and Lynn, 2013)
Woodland structure: tree size classes	Occurrence	Each size class present	Size classes are defined in Cross and Lynn (2013). The presence of all size classes suggests that a woodland has good structural variety with trees of varying ages
Woodland structure: senescent and dead wood	Occurrence	Senescent or dead wood present	Mature and veteran trees and dead wood are important for bryophytes, lichens, saproxylic organisms and some bird species. Their retention within a woodland is important to ensure continuity of habitats/niches and propagule sources over time. However, as birch (*Betula pubescens*) trees seldom exceed 30cm in diameter in this habitat and dead wood rots quickly and is engulfed by bog mosses (*Sphagnum* spp.), volume of dead wood may not be as high as in other woodland types

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain at 9.1km. See map 9	The conservation objective applies to the Owenriff freshwater pearl mussel (*Margaritifera margaritifera*) population in Lough Corrib SAC, which is of international importance and one of eight Irish populations prioritised for conservation action (Moorkens, 2010; NPWS, 2011). Its distribution is well-documented and full baseline monitoring took place in 2004 (Moorkens, 2004). The species is widespread in the Owenriff catchment, being found in the lower reaches of the Glengawbeg River, from Lough Agraffard to just upstream of the mouth of Lough Corrib in the Owenriff, and also in the Derrygauna tributary (Moorkens, 2004; NPWS, 2010). The Derrygauna River is in Connemara Bog Complex SAC (002034). The target length relates to the part of the distribution within Lough Corrib SAC. The objective is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Owenriff system. See NPWS (2010) for further information
Population size	Number of adult mussels	Restore Owenriff population to at least one million adult mussels	The Owenriff population was estimated as c.1 million in 2009 (NPWS, 2010). NPWS (2013) estimated that it had reduced to 940,000 in 2012, based on a 1% per year decline owing to insufficient recruitment. Declines were detected in 2011, 2014 and 2015. A large kill followed a drought in 2014 (Moorkens, 2015). The Owenriff population has been surveyed frequently since the 1990s, and monitored regularly since the baseline survey in 2004 (Moorkens, 2004, 2005, 2006, 2009, 2015, 2017; Moorkens and Killeen, 2008, 2014). Mussels are abundant (over 250 per 100m, often 150/m²) from the hatchery at Canrawer East to upstream of Oughterard wastewater treatment plant (WWTP) discharge (Moorkens, 2004). The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Owenriff 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 ≤65mm are considered 'young mussels' and may be found buried in the substratum and/or beneath adult mussels. Mussels ≤30mm are 'juvenile mussels' and are always buried in the substratum. See the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The Owenriff had one of the best population profiles of any Irish population (Moorkens, 2004, 2009). NPWS (2010) summarises demographic work up to 2010. In 2013, it passed the targets, but failed both targets in 2011 (0% ≤65mm), 2014 (13.6% ≤65mm; 2% ≤30mm) and 2016 (10% ≤65mm; 0% ≤30mm) (Moorkens, 2011, 2015, 2017). In 2014, juveniles died owing to a combination of low flows and algal growth. In 2016, the smallest mussel was 11mm. The Owenriff population is unsustainable owing to lack of survival of juvenile mussels. 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 Owenriff 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. Significant kills have been recorded on a number of occasions in the Owenriff, notably in 2004 and 2014. The Owenriff failed the target for dead shells in 2009, 2011, 2015 and 2016, but passed in 2014; and failed the 5% target in 2011, 2014 and 2015, but passed in 2016 (Moorkens, 2009, 2011, 2015, 2017; NPWS, 2010). 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 Owenriff system
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 8.3km in the Owenriff and Glenawbeg rivers (see map 9) and any additional stretches necessary for salmonid spawning	The extent of the freshwater pearl mussel habitat in the Owenriff is well-documented; from the early surveys of Ross (1984, 1988) and Moorkens (1995, 1996) to full baseline monitoring in 2004 (Moorkens, 2004). Most of the available habitat in the Owenriff system is occupied by adult mussels, but below carrying capacity (Moorkens, 2004, 2005, 2006, 2009, 2011, 2015, 2017; Moorkens and Killeen, 2008, 2014). Annual monitoring has shown that episodes of poor habitat condition are causing loss of juveniles in the Owenriff, with very poor conditions recorded in 2011, 2014 and 2015, but near-favourable conditions in 2013 and 2016. Flow, macroalgal, macrophyte and sedimentation impacts are all concerns. Pollution appears to be chronic and episodes of good mussel habitat condition are found at higher flows. 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 Owenriff 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 and mussel habitat typically overlap. Fish spawning habitat is generally adjacent to mussel habitat, but may lie upstream of the generalised mussel distribution. Only spawning areas that regularly contribute juvenile fish to adult mussel habitat 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 contribute to such impacts. The habitat in the Owenriff cannot support sufficient juvenile survival owing to nutrient and sediment pollution and hydrological impacts (Moorkens, 2017). 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 Owenriff 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	These EQRs 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 Owenriff River failed the macroinvertebrate standard at all sites and passed the phytobenthos standard (Ní Chatháin, 2009; 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 Owenriff 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 habitat in the Owenriff failed the macrophyte and the filamentous algal targets in 2009 (Moorkens, 2009; NPWS, 2010). Abundances of up to 100% filamentous algae and/or *Myriophyllum* were recorded in the best mussel habitat (Williams, 2009; NPWS, 2010). High cover abundance of both algae and macrophytes has been recorded regularly in the Owenriff from 2004-present, indicating on-going nutrient enrichment. In 2016, the algal target was exceeded in 57 of 65 quadrats and both filamentous algal and diatom biomass was elevated (Moorkens, 2017). Algae were abundant in 2015 and 2014 (Moorkens, 2015). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. 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 Owenriff 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 habitat for the species in the Owenriff is unsuitable for the recruitment of juveniles owing to sedimentation and enrichment. The habitat failed this target in 2009 and significant sedimentation was recorded during all monitoring to 2009 (NPWS, 2010). Silt plumes and/or infiltration have been recorded 2010-2016 and the target was failed in 2011 and 2015 (Moorkens, 2011, 2015). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. Sufficient survival 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 Owenriff 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. In 2009, the Owenriff failed the redox target, with averages at three locations of 18.9%, 24.2% and 24.5% at 5cm depth, giving an overall average of 22.5% (Moorkens, 2009; NPWS, 2010). The Owenriff passed the redox target in 2014 (average of 14.6%) and failed in 2011 (24%) and 2015 (22%) (Moorkens, 2011, 2015). In 2016, the average was 10.5%, and 100% of measurements had <20% loss (Moorkens, 2017). Episodic poor habitat condition is leading to losses of juveniles. Good condition is linked to higher flows. 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 Owenriff system

Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regimes	The availability of suitable habitat is largely determined by flow (catchment geology being the other key factor). In order to restore the habitat for the species, 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 sediment 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. Hydrological change and wetland loss in the Owenriff are significant 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 Owenriff 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 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 densities and biomass of host fish were associated with high numbers of juvenile mussels. Fish movements 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. No glochidia were found on fish in 2009, possibly owing to mussel stress (Johnston, 2009; NPWS, 2010). A fish host survey is planned for 2017/18
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, even where not part of a natural floodplain, are integral to the structure and functioning of river systems. Fringing habitats aid in settlement of fine suspended material, protect banks from erosion, contribute to nutrient cycling and the aquatic food web (e.g. allochthonous matter such as leaf fall), and provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates. Shade may be important in suppressing algal/macrophyte growth in enriched rivers and moderating temperatures. Fringing habitats are dependent on rivers/lakes, particularly water levels, and support wetland communities and species of conservation concern. Riparian wetlands and woodland are very important in the Owenriff and wetland damage is a significant concern. 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 Owenriff system

1092 White-clawed Crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed Crayfish in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: rivers	Occurrence	No reduction from baseline. See map 10	White-clawed crayfish (*Austropotamobius pallipes*) is recorded from the entire lengths of the four main tributaries of the River Clare. There are post-1996 records from the following tributaries: Abbert, Grange, Dalgan and Sinking Rivers. It is also present in some minor lower order streams within the Clare catchment
Distribution: Lough Corrib	Occurrence	No reduction from baseline. See map 10	The distribution of crayfish in Lough Corrib is uncertain. It certainly occurs in three 1km squares in the northern section of the lower basin (M2341, M2342, M2941) and is probably more widely distributed
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in all occupied tributaries and occupied parts of Lough Corrib	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as a major direct threat to this species and as a disease vector. Ireland is currently free of non-native invasive crayfish species. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	Disease is identified as a major threat and crayfish plague has occurred in Ireland even in the absence of alien vectors. Disease can, in some circumstances, be introduced through contaminated equipment and water in the absence of vector species. See Reynolds (1998) for further details
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in habitat heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available throughout the occupied habitat

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Sea lamprey (*Petromyzon marinus*) traditionally congregate and build spawning nests in the River Corrib in Galway city, both up- and downstream of the Salmon Weir Bridge. Their further upstream passage is impeded by the regulating weir immediately upstream. The combination of barriers to passage and low flows can impede further upstream passage in Irish catchments and prevent or reduce penetration and extensive colonisation (Gargan et al., 2011; Rooney et al., 2015). Sea lamprey have been recorded passing through the denil fish passage facility at the regulating weir. However, no quantitative assessment has been made, nor has any annual record been maintained. Sea lamprey have also been observed using their sucker mouths to project themselves up the damp concrete faces of the weir structure at low water levels (J. King, Inland Fisheries Ireland (IFI), pers. comm.)
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on Harvey and Cowx (2003). No sites surveyed in 2006 (O'Connor, 2007) or 2013 (IFI, unpublished data) were positive for sea lamprey ammocoetes
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed habitat mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels. Artificial barriers can prevent lampreys from accessing suitable spawning habitat. As mentioned above, artificial barriers are currently preventing lamprey from accessing suitable spawning habitat above the regulating weir in the River Corrib
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive, with a minimum of four positive sites in a catchment, which are at least 5km apart	Artificial barriers can prevent juvenile lampreys from accessing the full extent of suitable habitat. Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all watercourses down to first order streams	Artificial barriers can block or cause difficulties to brook lampreys' migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003) and JNCC (2005). It is impossible to distinguish between brook and river lamprey ammocoetes in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Ammocoetes/m²	Mean catchment ammocoete density of brook/river lamprey at least 5/m²	Ammocoetes burrow in areas of fine sediment in still water. Attribute target revised upward based on more recent proposals of JNCC (2005) and replacing initial proposals of Harvey and Cowx (2003). New criterion set at 5 ammocoetes/m² on a catchment basis. The majority of sub-catchments in the SAC achieved this target in 2013 (IFI, unpublished data)
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Brook lamprey spawning habitat attributes compiled in Rooney et al. (2013) and the particle size required is considered to be available very widely in all river systems within the SAC, apart from very steep and torrential areas of boulder and bedrock. It is not considered that spawning habitat is a limiting feature for the conservation status of this species
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Target of 50% presence in suitable habitat based on Irish experience to date in catchment-wide surveys. 50% of surveyed sites in the catchment were positive in 2013 (IFI, unpublished data) compared with 49% in 2006 (O'Connor, 2007). Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained

1106 Salmon *Salmo salar*

To maintain the favourable conservation condition of Atlantic Salmon in Lough Corrib 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	There are no barriers to migration of salmon (*Salmo salar*) in Lough Corrib SAC. Salmon spawn in the headwaters of Lough Corrib tributaries. There is an artificial canal joining Lough Corrib and Lough Mask where salmon did not have access historically and does not constistute a limit on the distribution of salmon in Lough Corrib SAC
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 Corrib catchment is currently exceeding its CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
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. The habitat for salmon is good and habitat rehabilitation programmes have been undertaken throughout the Corrib catchment to restore drained channels and repair habitat damaged by overgrazing
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)

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To restore the favourable conservation condition of Lesser Horseshoe Bat in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 100 bats for summer roost (roost id. 217 in NPWS database). See map 11	A figure of 100 bats for summer roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bats (*Rhinolophus hipposideros*). NPWS conduct annual counts at each qualifying roost. Qualified means from the 2006-2012 data have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean, or the MQS (i.e. 100 bats), whichever is higher, is set as the target figure for the roost
Summer roosts	Condition	No decline	Lough Corrib SAC has been selected for lesser horseshoe bats because of the presence of one important summer roost (roost id. 217 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding the roost will lead to a decline in its condition (Kelleher and Marnell, 2006)
Number of auxillary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity roost. Such additional roosts within the SAC may be important as night roosts/satellite roosts etc. A database of all known lesser horseshoe roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 11 which shows a 2.5km zone around the above named roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss, within 2.5km of qualifying roosts. See map 11	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species, most importantly within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 11	Lesser horseshoes are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing the energetic cost for bats (Schofield, 2008)

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter in Lough Corrib 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 1,054ha along river banks/ lake shoreline/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline and river banks identified as critical for otters (NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 314.2km	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 4,178ha	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; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase. For guidance, see map 12	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

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

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

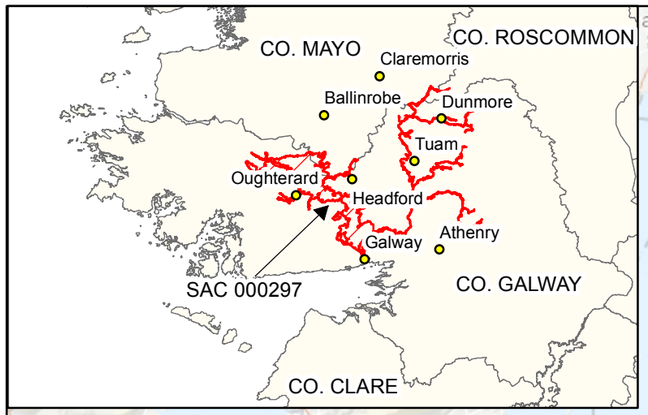
Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline, subject to natural processes. See map 10 for known location at NW of Gortachalla Lough	(Please note that *Drepanocladus vernicosus* was reclassified as *Hamatocaulis vernicosus* by Hedenäs (1989)). The known population of slender green feather-moss (*Hamatocaulis vernicosus*) in Lough Corrib SAC occurs at NW of Gortachalla Lough in transition mire which is bounded to the west by acid bog. Data from NPWS surveys (NPWS internal files), Campbell (2013) and Campbell et al. (2015)
Population size	Number of individuals	No decline, subject to natural processes	The population at NW of Gortachalla Lough was estimated by Campbell (2013) to be 153,376,875 shoots (c.153,377,000 shoots). Counts of shoots were based on the mean of number of shoots in four 10cm x 10cm areas, extrapolated to 41,175 shoots/m² in 3,725m² (Campbell, 2013). See Campbell et al. (2015) for further details
Population cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of slender green feather-moss (*Hamatocaulis vernicosus*) should be at least 45%	The mean percentage cover of slender green feather-moss (*Hamatocaulis vernicosus*) recorded in four 2m x 2m plots at NW of Gortachalla Lough was c.60% (Campbell, 2013). The target cover figure is a c.20% reduction of the recorded cover to allow for a margin of error and variability over monitoring seasons. See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The area of occupancy at NW of Gortachalla Lough is estimated from mapping of GPS co-ordinates to be 6,209m². However, only c.60% of this is suitable habitat i.e. c.3,725m² (0.373ha). See Campbell et al. (2015) for further details
Hydrological conditions: water table level	Metres	Maintain suitable hydrological conditions	Slender green feather-moss (*Hamatocaulis vernicosus*) is mostly confined to mesotrophic fens, a transitional habitat between acid bog and base-rich fen. This appears to occur in at least two forms in Ireland: upland transitional flushes, where the plants can occur in lawns that rise and fall with fluctuating water table levels; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer, such as at NW of Gortachalla Lough. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation composition: tree cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage tree cover should be less than 15%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0% tree cover at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: shrub cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage shrub cover should be less than 20%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0-1% shrub cover at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: grass cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage grass species cover should be less than 25%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of grasses, maintained by a low grazing intensity by rabbits (*Oryctolagus cuniculus*) at NW of Gortachalla Lough. Campbell (2013) recorded grass cover of 0-10% in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)

Vegetation composition: bryophyte cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage bryophyte cover should be more than 50%	Campbell (2013) recorded bryophyte cover of 34-95% in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation composition: cover of *Calliergonella cuspidata*	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of *Calliergonella cuspidata* should be less than 15%	*Calliergonella cuspidata*, a moss species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. Cover of *Calliergonella cuspidata* was 0-3% in four 2m x 2m plots recorded by Campbell (2013) at NW of Gortachalla Lough. See also Campbell et al. (2015)
Vegetation structure: vegetation height	Centimetres in a representative number 2m x 2m monitoring plots	Mean vegetation height should not exceed 40cm	Campbell (2013) recorded a mean vegetation height of 40cm in four 2m x 2m plots at NW of Gortachalla Lough. See also Campbell et al. (2015)

1833 Slender Naiad *Najas flexilis*

To restore the favourable conservation condition of Slender Naiad in Lough Corrib SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population extent	Hectares; distribution	Restore the spatial extent of *Najas flexilis* within the lake, subject to natural processes. See map 13 for known locations	See the *Najas flexilis* supporting document for further details
Population depth	Metres	Restore the depth range of *Najas flexilis* within the lake, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population viability	Plant traits	Restore plant fitness, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population abundance	Square metres	Restore the cover abundance of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Species distribution	Occurrence	Restore to at least the north-western bay, subject to natural processes	See the *Najas flexilis* supporting document for further details
Habitat extent	Hectares	Restore, subject to natural processes	See the *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See the *Najas flexilis* supporting document for further details
Lake substratum quality	Various	Restore appropriate substratum type, extent and chemistry to support the population of the species	See the *Najas flexilis* supporting document for further details
Water quality	Various	Restore appropriate water quality to support the population of the species	See the *Najas flexilis* supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Water colour	mg/l PtCo	Restore/maintain appropriate water colour to support the population of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Associated species	Species composition and abundance	Restore appropriate associated species and vegetation communities to support the population of *Najas flexilis*	See the *Najas flexilis* 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 *Najas flexilis*	See the *Najas flexilis* supporting document for further details



MAP 1:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

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SITE CODE:
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CO. GALWAY / MAYO / ROSCOMMON

0 2 4 6 8 10 km

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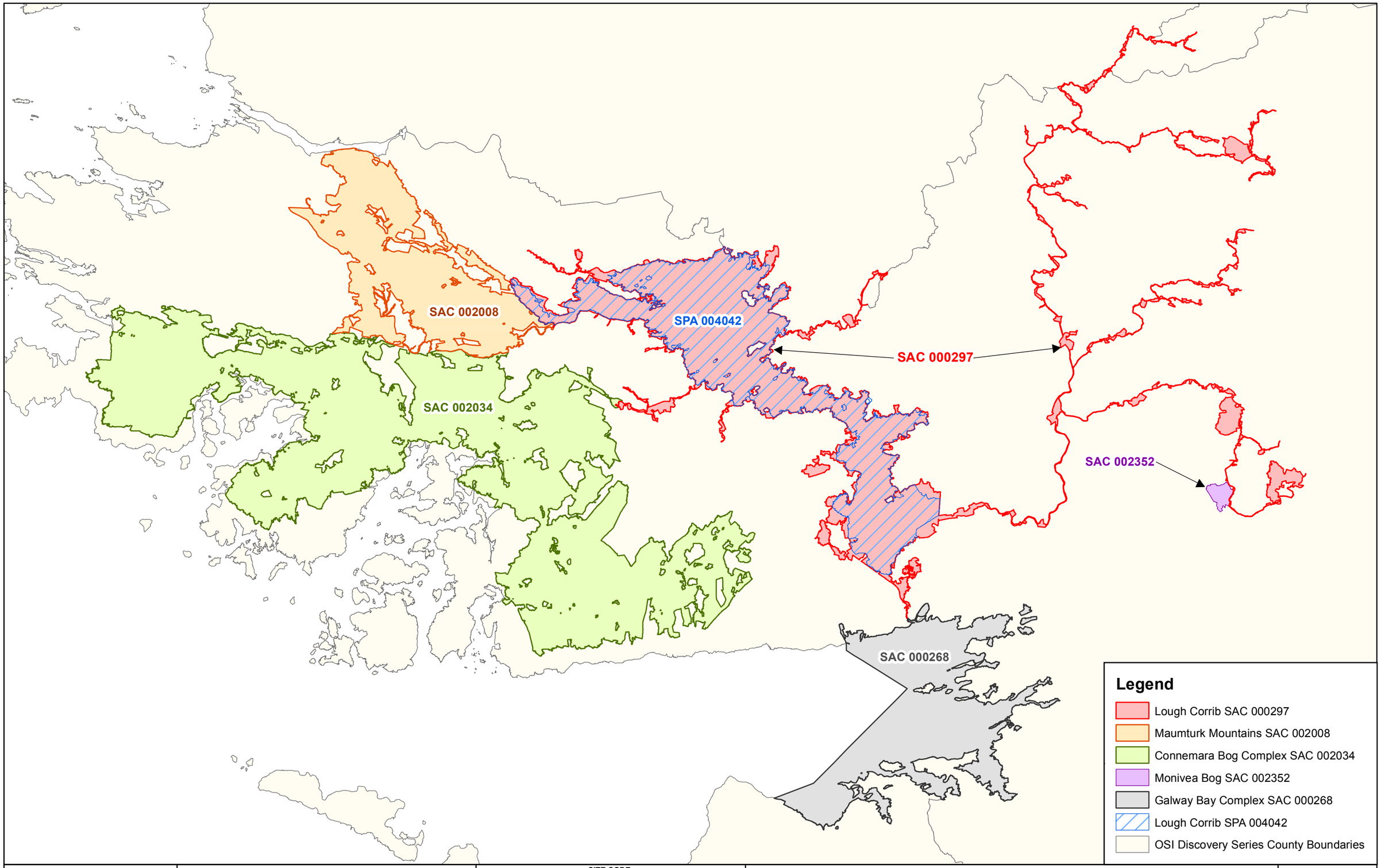
Legend

Lough Corrib SAC 000297



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MAP 2: LOUGH CORRIB SAC CONSERVATION OBJECTIVES ADJACENT / ADJOINING & OVERLAPPING DESIGNATIONS

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

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0 2 4 6 8 10 km

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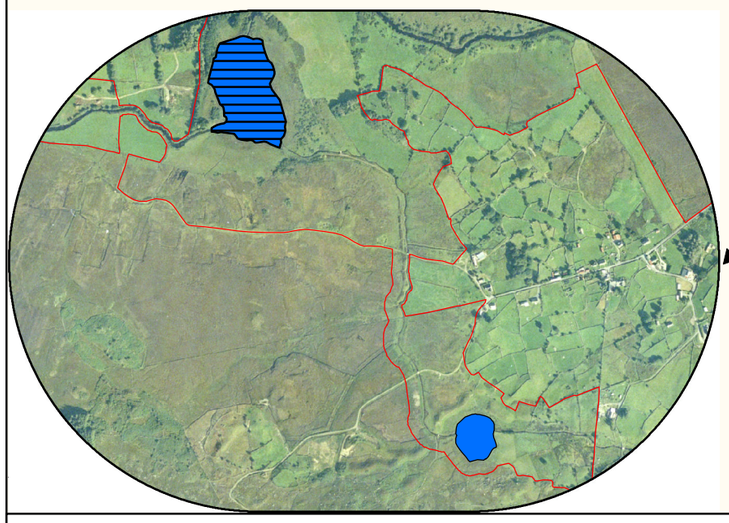

Legend

- Lough Corrib SAC 000297
- OSI Discovery Series County Boundaries

Indicative Lake Habitats

- Dominant 3110, Dominant Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Dominant 3130, Dominant Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea
- Dominant 3140, Dominant Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- Potential 3110, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Potential 3130, Potential Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea
- Potential 3110 / Potential 3130, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea

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MAP 3:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

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0 1 2 3 4 5 km

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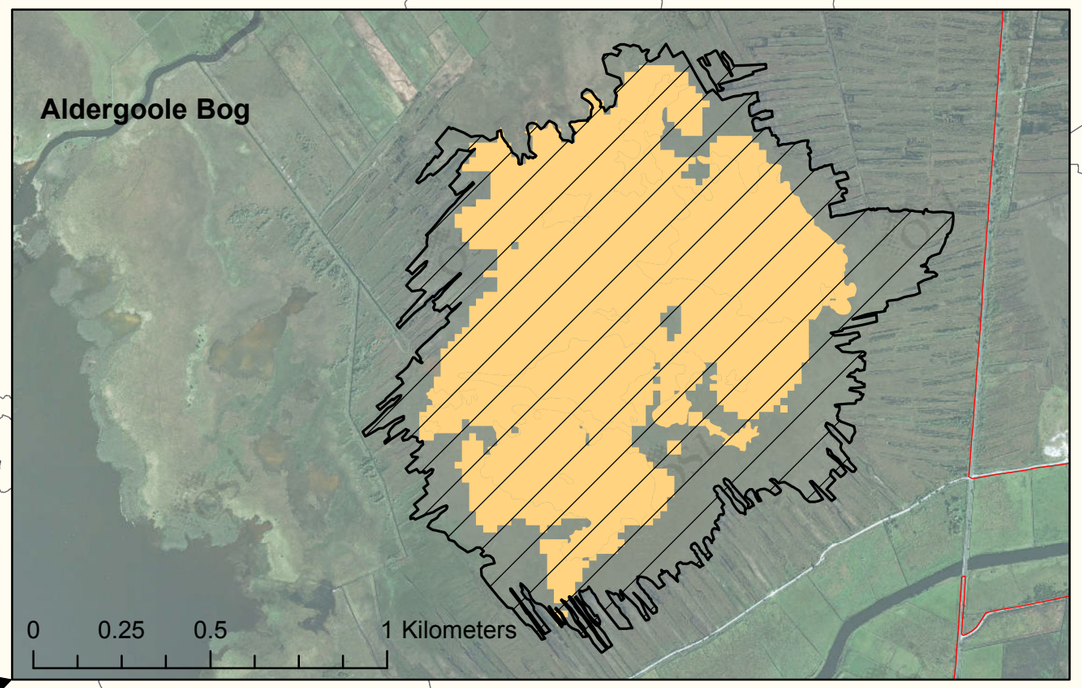

Legend

- Lough Corrib SAC 000297
- High Bog Boundary
- Potential 7110 Active Raised Bogs
- OSI Discovery Series County Boundaries

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MAP 4:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

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0 3 6 9 12 15 Kilometers

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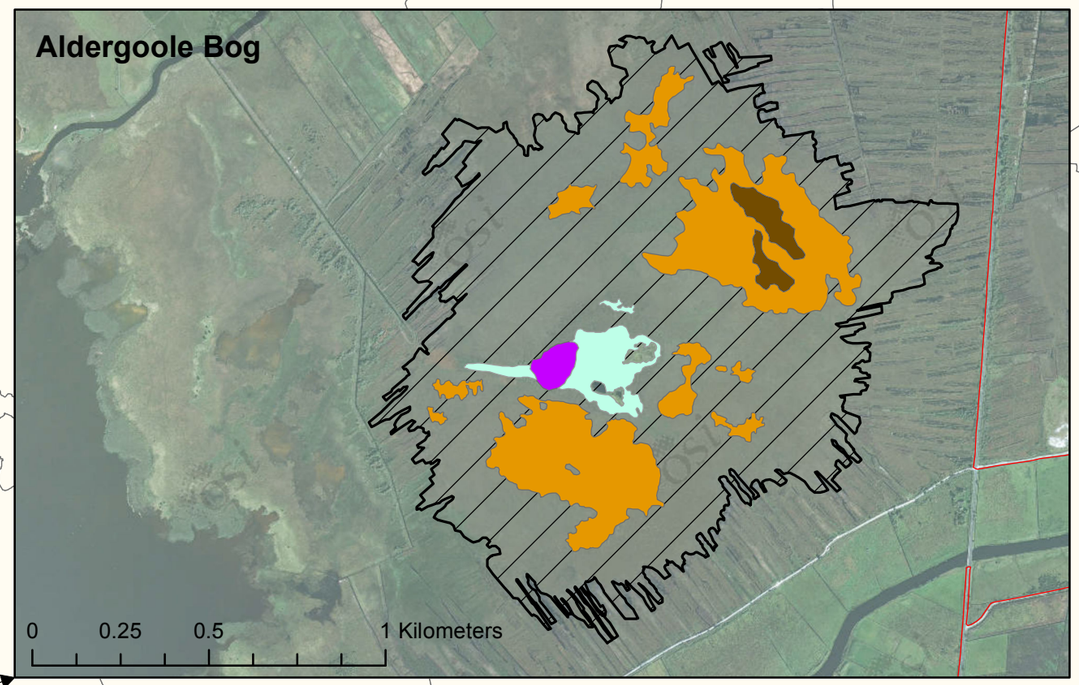

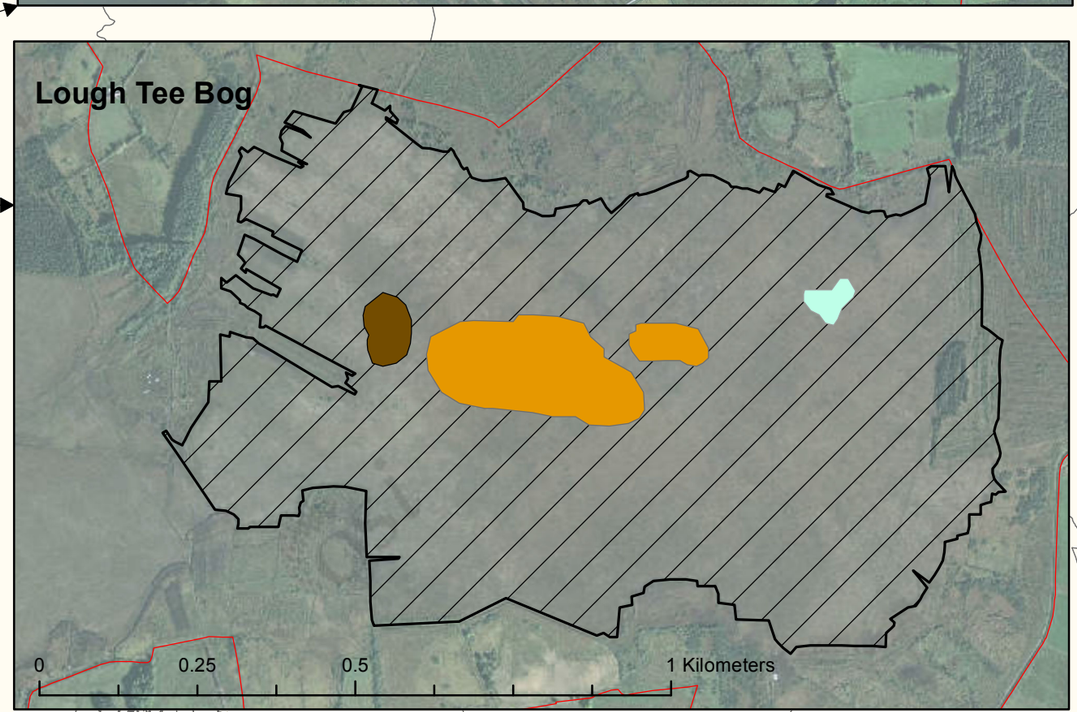

Legend

- Lough Corrib SAC 000297
- High Bog Boundary

Active Raised Bog Ecotopes

- Active Flush
- Bog Woodland
- Central
- Sub-central
- OSI Discovery Series County Boundaries

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MAP 5:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

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0 4 8 12 16 20 Kilometers

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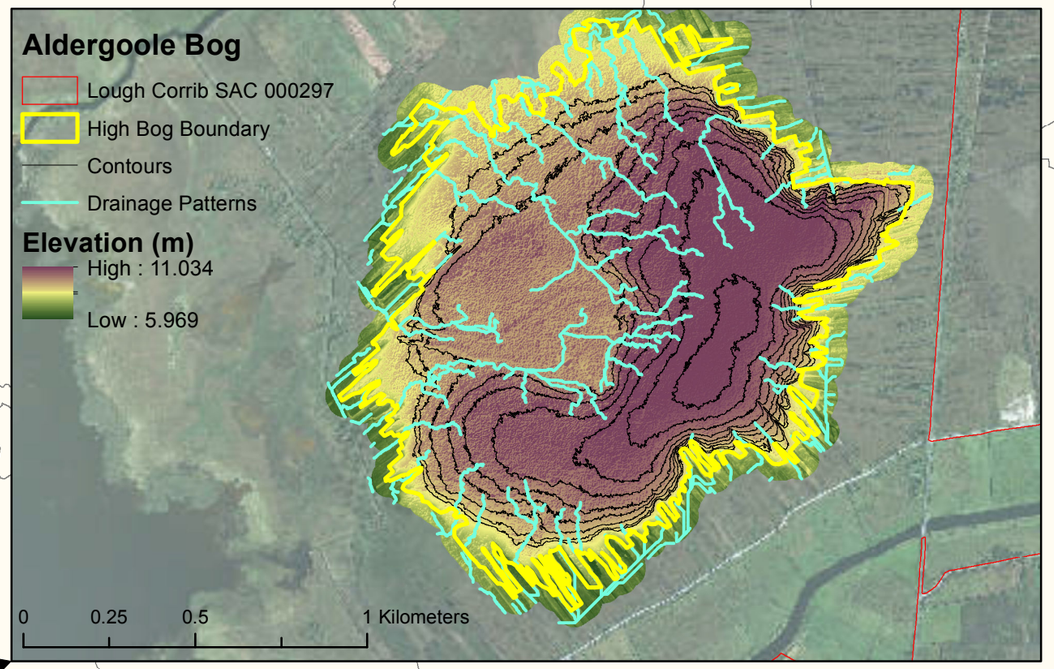

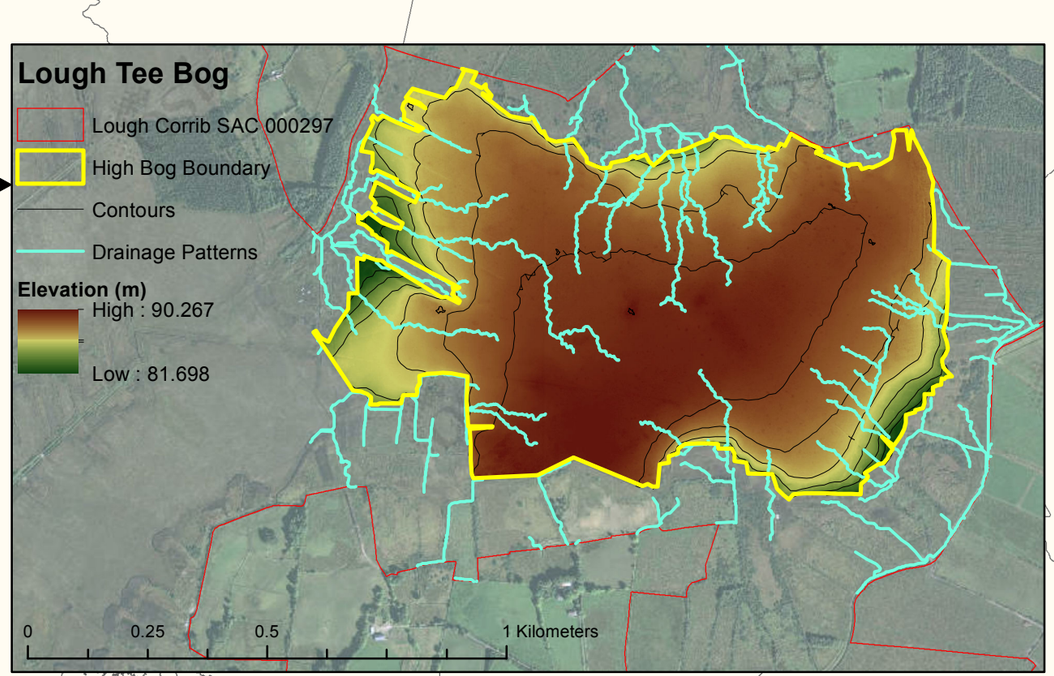

Legend

- Lough Corrib SAC 000297
- OSI Discovery Series County Boundaries

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MAP 6:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
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0 3 6 9 12 15 Kilometers

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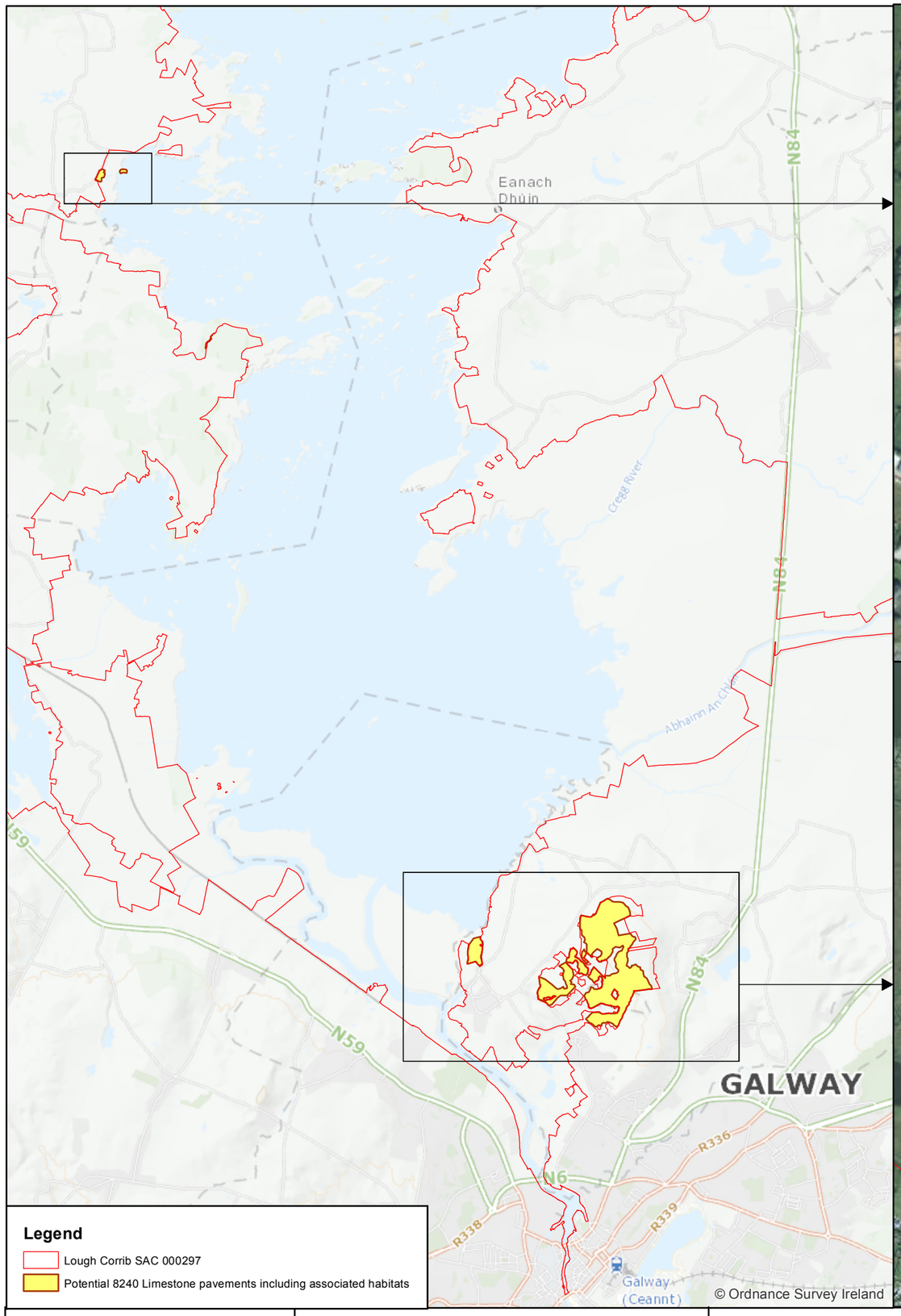

Legend

- Lough Corrib SAC 000297
- Potential 8240 Limestone pavements including associated habitats

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MAP 7: LOUGH CORRIB SAC CONSERVATION OBJECTIVES LIMESTONE PAVEMENTS

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

SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON

0 1 2 4 km

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NSNW: 1624

Cong
An Mám
Corrna Mhúa
Mám Chinn an Leamhain
Loch Coirib
Headford
Oughterard
Carrowmoreknock
Corrandulla
Eanach Dhúin
Geata Éamainn Mhuimhnigh
Cnocán an Bhodaigh
Leaca Donna
Seanadh Seangán
Seanadh Mhaoilín
Cnoc Chamais
Maigh Cuilinn
Baile Chláir
Cnoc Leamhchoille Beag
An Cnoc Garbh
Cnoc na gCaorán Dubh
Cnoc an Gharráin
GAILLIMH
Abhainn Ard Nihil
Creeb River
R345
R336
R334
N59
N84
N17
N63

Legend

Lough Corrib SAC 000297

Woodland Habitats

Qualifying Interests

91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

91D0 *Bog woodland

Non Qualifying Interests

91E0*Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae)

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MAP 8:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
WOODLAND HABITATS

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

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0 1 2 3 4 5 km

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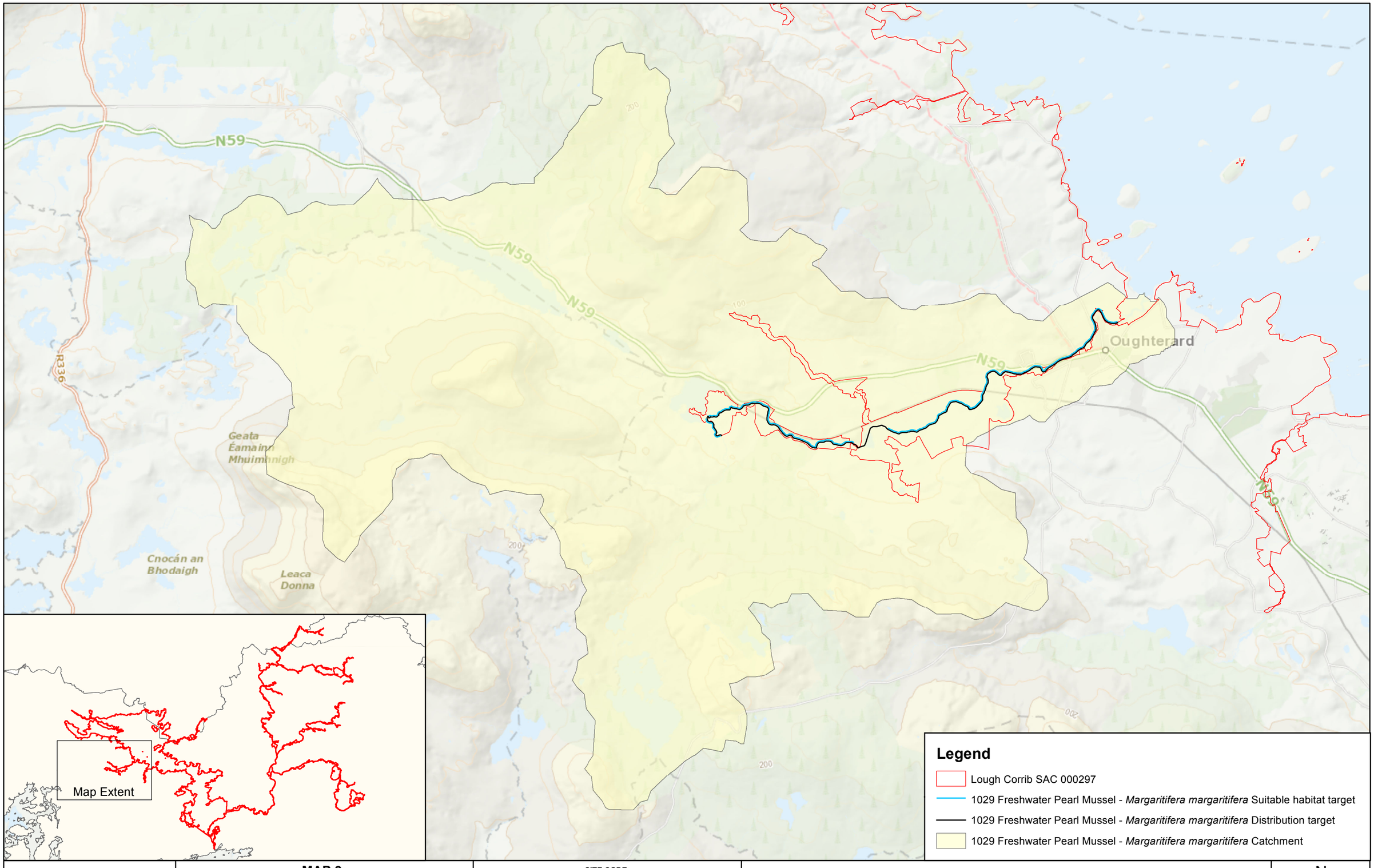
Date: April 2017



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MAP 9:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
FRESHWATER PEARL MUSSEL - *MARGARITIFERA MARGARITIFERA*

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

SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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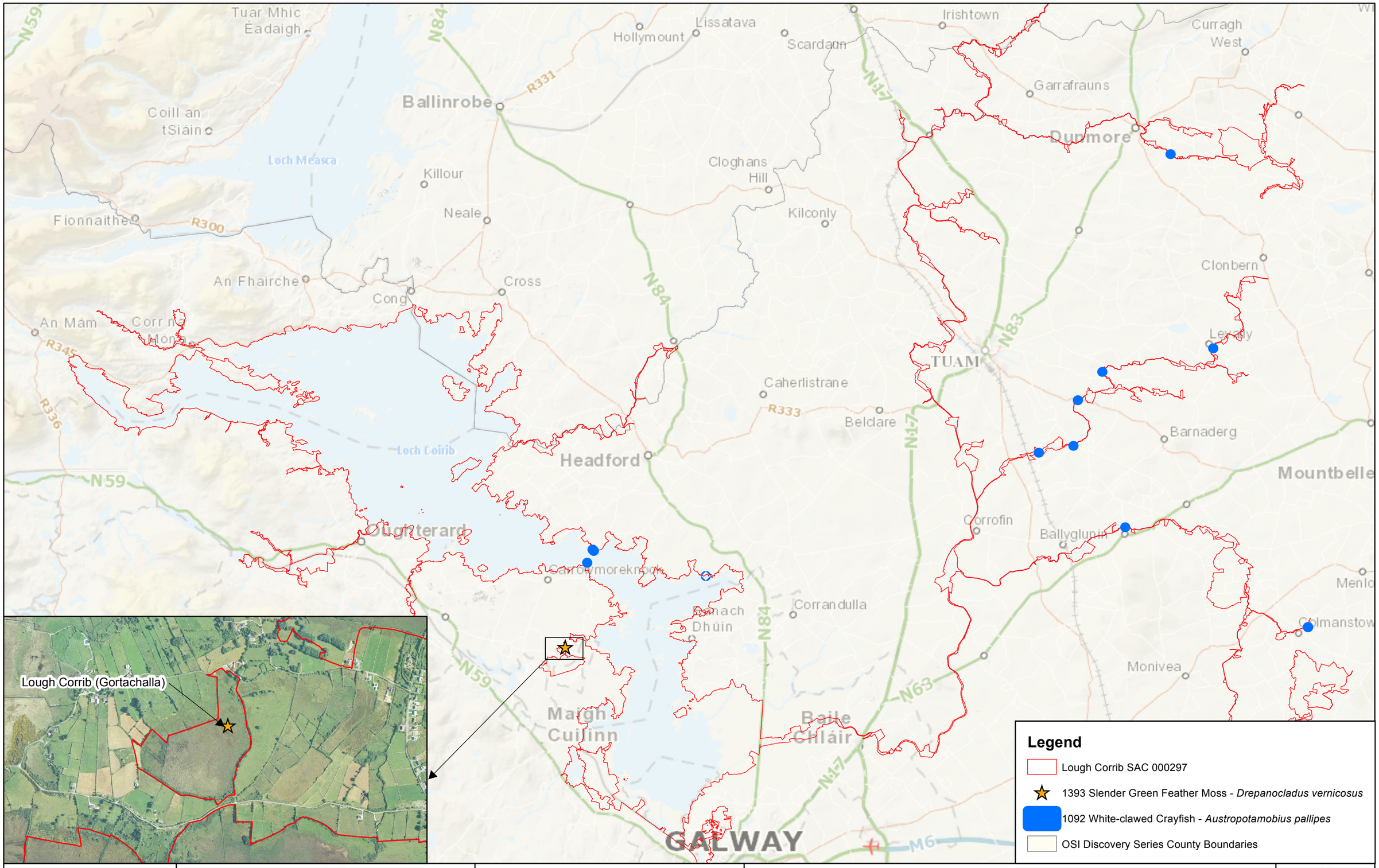
Map Version 1
Date: April 2017



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MAP 10:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH
& SLENDER GREEN FEATHER-MOSS

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

SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON

0 1.5 3 4.5 6 7.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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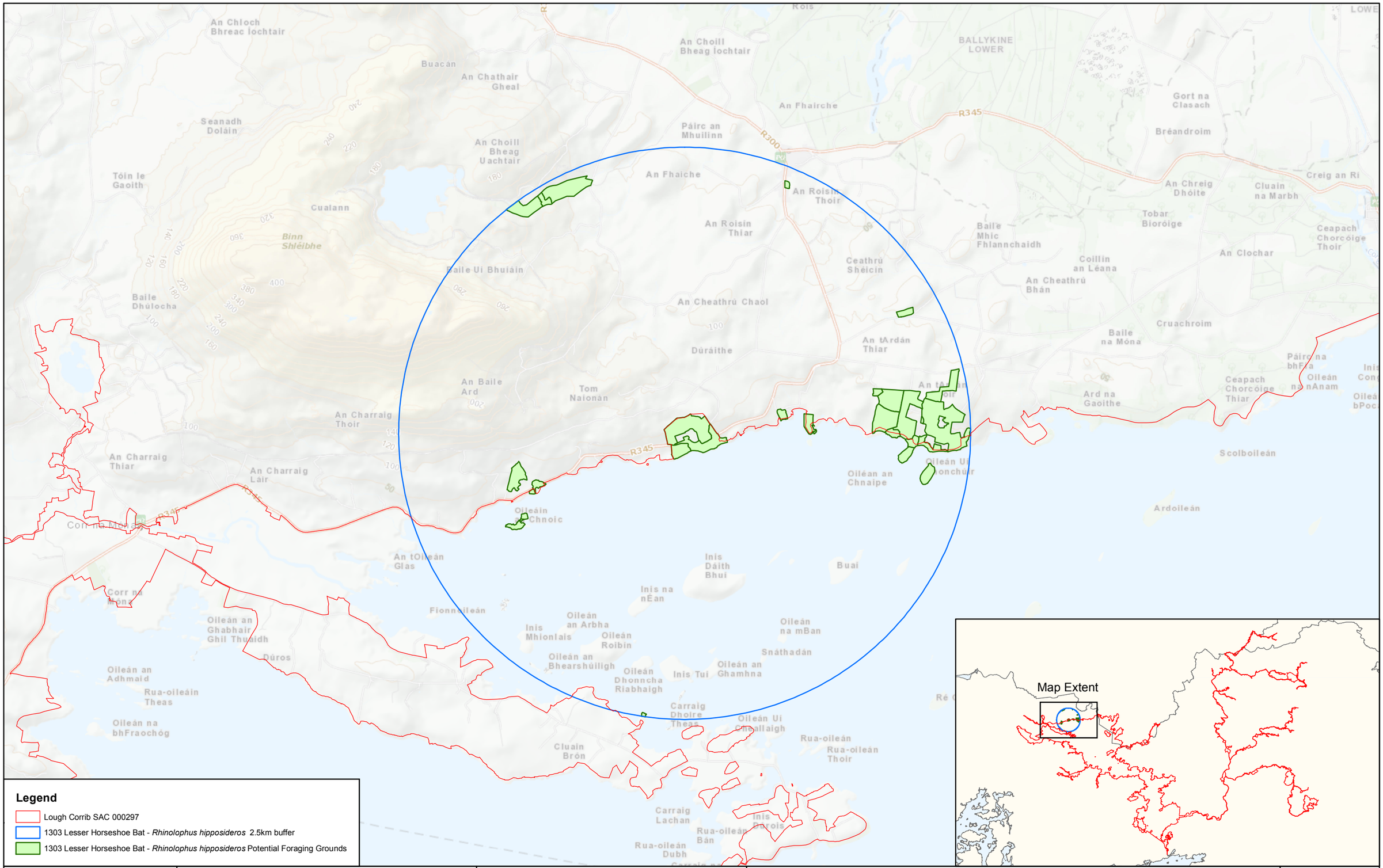
Map Version 1
Date: April 2017



Legend

- Lough Corrib SAC 000297
- 1303 Lesser Horseshoe Bat - *Rhinolophus hipposideros* 2.5km buffer
- 1303 Lesser Horseshoe Bat - *Rhinolophus hipposideros* Potential Foraging Grounds

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MAP 11:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: April 2017

Legend

- Lough Corrib SAC 000297
- 1355 Otter - *Lutra lutra* Commuting 250m buffer

Map Extent

MAP 12:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
OTTER COMMUTING

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

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SITE CODE:
SAC 000297; version 3.04.
CO. GALWAY / MAYO / ROSCOMMON

0 1 2 3 4 5 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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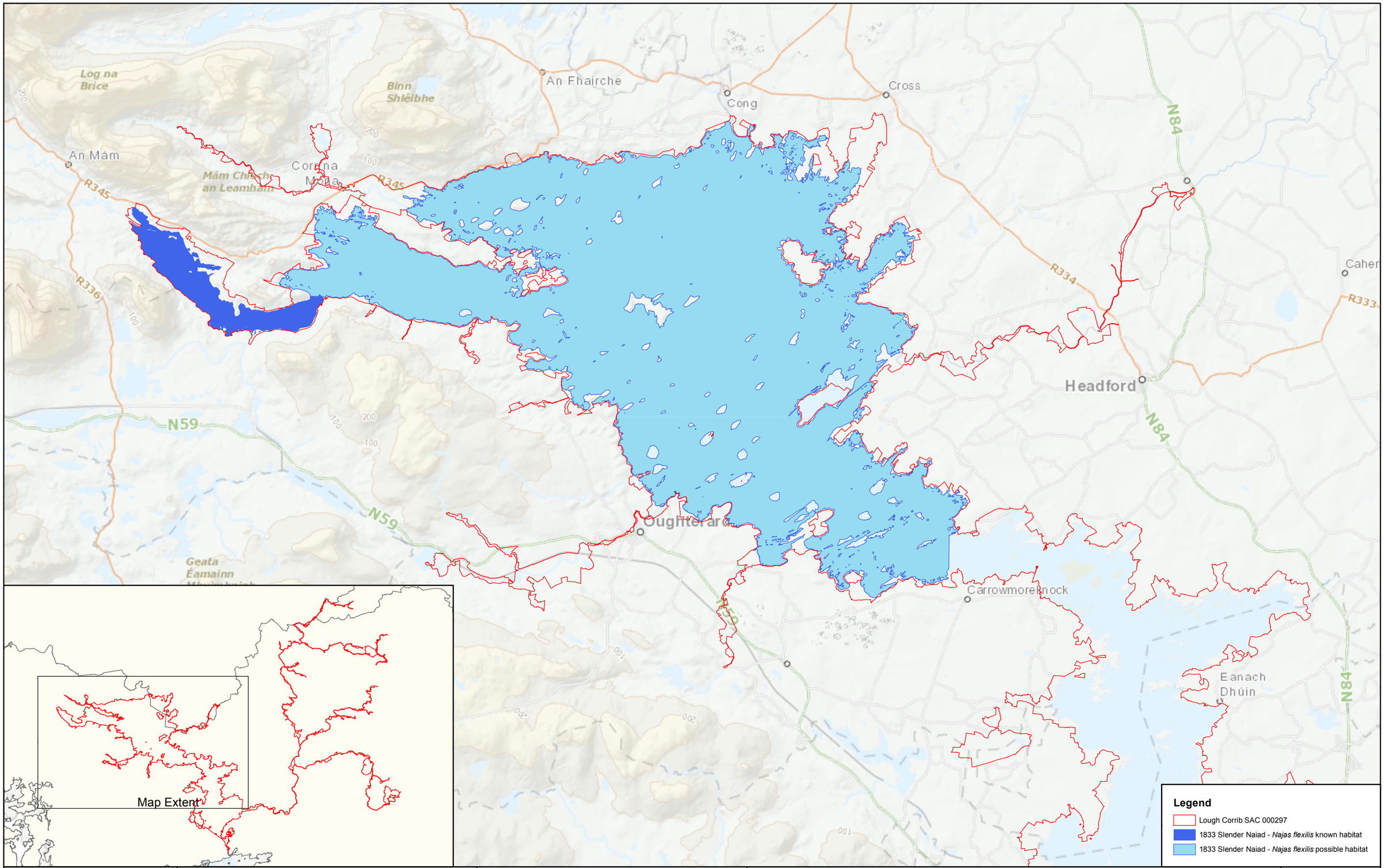

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Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 13:
LOUGH CORRIB SAC
CONSERVATION OBJECTIVES
SLENDER NAIAD - *NAJAS FLEXILIS*

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

SITE CODE:
SAC 000297; version 3.09.
CO. GALWAY / MAYO / ROSCOMMON

0 1.5 3 4.5 6 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: April 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Killala Bay/Moy Estuary SAC 000458

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

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Citation:
NPWS (2012) Conservation Objectives: Killala Bay/Moy Estuary SAC 000458. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000458	Killala Bay/Moy Estuary SAC
1014	Narrow-mouthed Whorl Snail *Vertigo angustior*
1095	Sea Lamprey *Petromyzon marinus*
1130	Estuaries
1140	Mudflats and sandflats not covered by seawater at low tide
1210	Annual vegetation of drift lines
1310	Salicornia and other annuals colonizing mud and sand
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1365	Harbour Seal *Phoca vitulina*
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')
2130	*Fixed coastal dunes with herbaceous vegetation ('grey dunes')
2190	Humid dune slacks

Please note that this SAC overlaps with Killala Bay/Moy Estuary SPA (004036) and is adjacent to River Moy SAC (002298). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications (listed by date)

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

Title: Harbour seal pilot monitoring project, 2011
Year: 2012
Author: NPWS
Series: Unpublished Report to NPWS

Title: Killala Bay/Moy Estuary SAC (000458). Conservation objectives supporting document - marine habitats and species. [Version 1]
Year: 2012
Author: NPWS
Series: Unpublished Report to NPWS

Title: Killala Bay/Moy Estuary SAC (000458). Conservation objectives supporting document - coastal habitats. [Version 1]
Year: 2012
Author: NPWS
Series: Unpublished Report to NPWS

Title: Subtidal Benthic Investigations in Killala Bay/Moy Estuary cSAC (Site Code: IE000458) Co. Sligo/Mayo
Year: 2011
Author: Aquafact
Series: Unpublished Report to NPWS & MI

Title: A survey of mudflats and sandflats in Ireland An intertidal soft sediment survey of Killala Bay
Year: 2011
Author: ASU
Series: Unpublished Report to NPWS & MI

Title: Monitoring and Condition Assessment of Populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland
Year: 2011
Author: Moorkens, E.A.; Killeen, I.J.
Series: Irish Wildlife Manuals, No. 55

Title: Harbour seal pilot monitoring project, 2010
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: Harbour seal population monitoring 2009-2012: Report no. 1. Report on a pilot monitoring study carried out in southern and western Ireland, 2009
Year: 2010
Author: NPWS
Series: Unpublished Report to NPWS

Title: Saltmarsh Monitoring Report 2007-2008
Year: 2009
Author: McCorry, M.; Ryle, T.
Series: Unpublished Report to NPWS

Title: Coastal Monitoring Project 2004-2006

Year: 2009

Author: Ryle, T.; Murray, A.; Connolly, C.; Swann, M.

Series: Unpublished Report to NPWS

Title: The phytosociology and conservation value of Irish sand dunes

Year: 2008

Author: Gaynor, K.

Series: Unpublished PhD thesis, National University of Ireland, Dublin

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Title: Saltmarsh Monitoring Report 2006

Year: 2007

Author: McCorry, M.

Series: Unpublished Report to NPWS

Title: A Survey of Juvenile Lamprey Populations in the Corrib and Suir Catchments

Year: 2007

Author: O'Connor, W.

Series: Irish Wildlife Manuals No. 26

Title: Harbour seal population assessment in the Republic of Ireland: August 2003

Year: 2004

Author: Cronin, M.; Duck, C.; Ó Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.

Series: Irish Wildlife Manuals No. 11

Title: Summary of National Parks & Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003

Year: 2004

Author: Lyons, D.O.

Series: Irish Wildlife Manuals No. 13

Title: A survey of juvenile lamprey populations in the Moy catchment

Year: 2004

Author: O'Connor, W.

Series: Irish Wildlife Manuals No. 15

Title: Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*

Year: 2003

Author: Harvey, J.; Cowx, I.

Series: Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough

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Title: A survey of bottlenose dolphins (*Tursiops truncatus*) in the Shannon Estuary

Year: 2000

Author: Rogan, E.; Ingram, S.; Holmes, B.; O'Flanagan, C.

Series: Marine Institute Marine Resource Series No. 9

Title: 1989 survey of breeding herds of common seal *Phoca vitulina* with reference to previous surveys

Year: 1990

Author: Harrington, R.

Series: Unpublished Report to Wildlife Service

Title: An assessment of the status of the common seal *Phoca vitulina vitulina* in Ireland

Year: 1980

Author: Summers, C.F.; Warner, P.J; Nairn, R.G.W.; Curry, M.G.; Flynn, J.

Series: Biological Conservation 17: 115-123

Spatial data sources

Year:	2010
Title:	EPA WFD transitional waterbody data
GIS operations:	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1130 (map 3)
Year:	Interpolated 2012
Title:	Mudflat and sandflat survey 2010; subtidal benthic survey 2010
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used for:	Marine community types, 1140 (maps 4 and 5)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used for:	Marine community types base data (map 5)
Year:	Revision 2010
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used for:	1310, 1330 (map 6)
Year:	2009
Title:	Coastal Monitoring Project 2004-2006. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used for:	1210, 2110, 2120, 2130, 2190 (map 7)
Year:	2012
Title:	NPWS rare and threatened species database
GIS operations:	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used for:	1014, 1365 (maps 8 and 9)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used for:	1365 (map 9)

1014 Narrow-mouthed Whorl Snail *Vertigo angustior*

To maintain the favourable conservation condition of Narrow-mouthed Whorl Snail in Killala Bay/Moy Estuary 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 this SAC. See map 8	From Moorkens and Killeen (2011)
Presence on transect	Occurrence	Adult or sub-adult snails are present in at least 3 places on the transect where optimal or sub-optimal habitat occurs (minimum 5 samples)	Transect established as part of condition assessment monitoring at this site (Moorkens and Killeen, 2011). See habitat area target below for definition of optimal and sub-optimal habitat
Abundance	Number per sample	At least 2 samples on the transect have more than 10 *V. angustior* individuals (minimum 5 samples)	From Moorkens and Killeen (2011)
Transect habitat quality	Metres	More than 50m of habitat along the transect is classed as optimal or sub-optimal	From Moorkens and Killeen (2011). See habitat area target below for definition of optimal and sub-optimal habitat
Transect optimal wetness	Metres	Soils, at time of sampling, are damp (optimal wetness) and covered with a layer of humid thatch for more than 50m along the transect	From Moorkens and Killeen (2011)
Habitat area	Hectares	1.465ha of potential habitat (optimal and sub-optimal); Optimal habitat is defined as marsh with transition of ecotone between red fescue (*Festuca rubra*) and silverweed (*Potentilla anserina*) wet grassland and waterlogged marsh dominated by yellow iris (*Iris pseudacorus*) and low growing herbs. Vegetation height 20-40cm. Habitat growing on wet to saturated soil covered with a deep layer of mosses and humid, open structured thatch. Sub-optimal habitat is defined as for optimal habitat, but either vegetation height is less than 20cm, or between 40 and 50cm; or the soil is dry, or covered with standing water	From Moorkens and Killeen (2011)

1095 Sea Lamprey *Petromyzon marinus*

To maintain the favourable conservation condition of Sea Lamprey in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of estuary accessible	No barriers for migratory life stages of lamprey moving from freshwater to marine habitats and vice versa	This SAC only covers the estuarine portion of the River Moy. The adjacent River Moy SAC (site code: 2298) encompasses the freshwater elements of sea lamprey habitat. Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. See O'Connor (2004) for further information on artificial barriers in the Moy catchment
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007). Important juvenile habitat identified immediately downstream of Ballina (see O'Connor, 2004)
Juvenile density in fine sediment	Juveniles/m²	Juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003). Important juvenile habitat identified immediately downstream of Ballina (see O'Connor, 2004)

1130 Estuaries

To maintain the favourable conservation condition of Estuaries in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated as 736ha using OSi data and the defined Transitional Water Body area under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community, subject to natural processes. See map 5	Estimated by EPA during 2011 intertidal survey. See marine supporting document for further details
Community structure: *Zostera* density	Shoots per m^2	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	Estimated by EPA during 2011 intertidal survey. See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Muddy sand to fine sand dominated by *Hydrobia ulvae*, *Pygospio elegans* and *Tubificoides benedii* community complex; Estuarine muddy sand dominated by *Hediste diversicolor* and *Heterochaeta costata* community complex; and Fine sand dominated by *Nephtys cirrosa* community complex. See map 5	Habitat structure was elucidated from intertidal and subtidal surveys undertaken in 2010 (Aquafact, 2011; ASU, 2011). See marine supporting document for further details

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 1,332ha using OSi data
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community, subject to natural processes. See map 5	Estimated by EPA during 2011 intertidal survey. See marine supporting document for further details
Community structure: *Zostera* density	Shoots per m²	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	Estimated by EPA during 2011 intertidal survey. See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Muddy sand to fine sand dominated by *Hydrobia ulvae, Pygospio elegans* and *Tubificoides benedii* community complex; Estuarine muddy sand dominated by *Hediste diversicolor* and *Heterochaeta costata* community complex and Fine sand dominated by *Nephtys cirrosa* community complex. See map 5	Habitat structure was elucidated from intertidal survey undertaken in 2010 (ASU, 2011). See marine supporting document for further details

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of drift lines in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Bartragh Island-0.58ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al. 2009). 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. This habitat was only recorded from Bartragh Island. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	Based on data from Ryle et al. (2009). Two separate narrow strips of strandline habitat were recorded on the northern side of Bartragh Island. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	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. Sea defence/coastal protection works are present near the main access point to the beach at Inishcrone (Ryle et al. 2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). At Bartragh Island there are transitions from sand dunes into saltmarsh habitats. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and Orache (*Atriplex* spp.)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

1310 Salicornia and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bartragh Island- 0.26ha, Ross- 0.29ha. See map 6	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry, 2007). Habitat mapped at two of the four sub-sites surveyed, giving a total estimated area of 0.55ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from McCorry (2007). Salicornia is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007). Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. Accretion was noted at Ross and Bartragh Island. Old seawalls were recorded at Bartragh Island and some protection works were noted around buildings close to the shoreline at Ross. See coastal habitats backing 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 and Ryle (2009). Creeks deliver sediment throughout saltmarsh system. Creeks and pan structures are well developed at Ross. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007). Transitions to dune habitats are found at Bartragh Island and Ross. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry (2007). At Castleconor, grazing is absent. There are moderate levels of grazing at Rusheens, while grazing at Ross is heavy in places. Grazing intensity is low on Bartragh Island See coastal habitats supporting document for further details

1310 Salicornia and other annuals colonizing mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of the area outside of the creeks vegetated	Based on data from McCorry (2007). Castleconor and Rusheens are heavily poached in places. There are moderate levels of poaching at Bartragh Island and Ross. See coastal habitats supporting document for further details
Vegetation composition: typical species & sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	See coastal habitats supporting document for further details
Vegetation structure: negative indicator species-*Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry (2007). See coastal habitats supporting document for further details

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

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia*) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Bartragh Island- 29.22ha, Ross- 14.95ha, Rusheens- 1.24ha, Castleconor - 1.61ha. See map 6	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle 2009). Four sub-sites that supported Atlantic salt meadow were mapped (47.02ha) and additional areas of potential ASM (3.34ha) were identified from an examination of aerial photographs, giving a total estimated area of 50.37ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from McCorry (2007). ASM is the dominant saltmarsh type with a wide distribution throughout the SAC. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). The SMP noted accretion at Ross and Bartragh Island. Old seawalls were recorded at Bartragh Island and there are some protection works around buildings close to the shoreline at Ross. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure/ allow to develop, subject to natural processes, including erosion and succession	Based on data from McCorry and Ryle (2009). Creeks and pan structures are well developed at Ross. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry (2007). Transitions to dune habitats are found at Bartragh Island and Ross. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward	Based on data from McCorry (2007). At Castleconor, grazing is absent. At Rusheens there are moderate levels of grazing. At Ross grazing is heavy in places. At Bartragh Island grazing intensity is low. See coastal habitats supporting document for further details

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

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia*) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of the area outside of the creeks vegetated	Based on data from McCorry (2007). Castleconor and Rusheens are heavily poached in places. There are moderate levels of poaching at Bartragh Island and Ross. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009)	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: negative indicator species-*Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%	Based on data from McCorry (2007). See coastal habitats supporting document for further details

1365 Harbour Seal *Phoca vitulina*

To maintain the favourable conservation condition of Harbour Seal in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 9 for suitable habitat	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve the breeding sites in a natural condition. See map 9	Attribute and target based on background knowledge of Irish breeding populations, review of data summarised by Summers et al. (1980), Harrington (1990), Lyons (2004) and unpublished National Parks and Wildlife Service records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve the moult haul-out sites in a natural condition. See map 9	Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004), Cronin et al. (2004), NPWS (2010), NPWS (2011), NPWS (2012) and unpublished National Parks and Wildlife Service records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve the resting haul-out sites in a natural condition. See map 9	Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004), unpublished National Parks and Wildlife Service records and unpublished data collected by University College Cork/Inland Fisheries Ireland. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	See marine supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Ross-0.81ha, Bartragh Island - 0.75ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Habitat is very difficult to measure in view of its dynamic nature and was only recorded at Bartragh Island and Ross, giving a total estimated area of 1.56ha. Accretion was noted from the western end of Bartragh Island. Embryo dune habitat is restricted to a small area on the seaward edge at Ross. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Sea defence/coastal protection works are present near the main access point to the beach at Inishcrone (Ryle et al. 2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008) and Ryle et al. (2009). At Bartragh Island and Ross there are transitions from sand dunes into saltmarsh habitats. See coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Ross- 1.58; Bartragh Island- 7.52ha ; Inishcrone- 3.65ha. See map 7	Habitat was mapped during the Coastal Monitoring Project (Ryle et al., 2009). Habitat was mapped at three sub-sites to give a total estimated area of 12.75ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from Ryle et al. (2009). Mobile dunes are well developed at Bartragh Island, while at Inishcrone they are patchy in distribution and eroded back to the fixed dune in places. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth, thus encouraging further accretion. There are coastal protection works in place at Inishcrone. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008) and Ryle et al. (2009). At both Bartragh Island and Ross there are transitions from sand dune to saltmarsh habitats. See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities dominated by marram (*Ammophila areanaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009). Bartragh Island, Ross and Inishcrone all support a characteristic dune flora. See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. The mobile dune habitat at Ross has a high cover of creeping thistle (*Cirsium arvense*) and common ragwort (*Senecio jacobaea)*. At Inishcrone and Bartragh Island, ragwort (*Senecio jacobaea*) is also common. See coastal habitats supporting document for further details

2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-site mapped: Ross - 100.79ha; Bartragh Island - 120.13ha; Inishcrone - 38.53ha. See map 7	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Habitat mapped at three sub-sites to give a total estimated area of 259.46ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Fixed dune habitat is extensive at Bartragh Island. The extent of the fixed dune habitat is reduced at Inishcrone owing to presence of Enniscrone golf course. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions.	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. There are coastal protection works at the main access to the beach at Inishcrone. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). At both Bartragh Island and Ross there are transitions from sand dune to saltmarsh habitats. See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes.	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: sward height	Centimeters	Maintain structural variation within sward.	Based on data from Gaynor (2008) and Ryle et al. (2009). Vegetation is quite rank in places at Ross, Inishcrone and Bartragh Island due to undergrazing. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details

2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. Bracken (*Pteridium aquilinum*) was recorded at Bartragh Island. At Inishcrone, common ragwort (*Senecio jacobaea*), creeping thistle (*Cirsium vulgare*) and bramble (*Rubus fruticosus*) occur. At Ross, creeping thistle (*Cirsium arvense*), common ragwort (*Senecio jacobaea*) and hogweed (*Heracleum sphondylium*) occur. See 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). Scattered shrubs and stunted trees occur at Ross, while occasional scrub occurs at Bartragh Island. See coastal habitats supporting document for further details

2190 Humid dune slacks

To maintain the favourable conservation condition of Humid dune slacks in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Ross: 3.87ha; Bartragh Island: 1.22ha. See map 6	Based on data from the Coastal Monitoring Project (Ryle et al., 2009). Habitat was mapped at two sub-sites, giving a total estimated area of 5.09ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 6 for known distribution	Based on data from Ryle et al. (2009). Dune slacks at Bartragh Island are narrow linear features. See coastal habitats supporting document for further details.
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain 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 coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Presence/ absence of water abstraction or drainage works	Maintain natural hydrological regime	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al., (2009). At both Bartragh Island and Ross sub-sites there are transitions from sand dune to saltmarsh habitats. See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground.	Based on data from Gaynor (2008) and Ryle et al. (2009). At Ross, the dune slacks are poached by cattke in places. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimeters	Maintain structural variation within sward.	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: cover of S. repens	% cover; centimeters	Maintain more than 40% cover of creeping willow (*Salix repens*)	Based on data from Ryle et al. (2009). Cover of creeping willow (*Salix repens*) needs to be controlled (e.g. through an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. *Salix repens* ssp. *argentea* was noted at Bartragh Island, but its cover was only 10% and it was not widespread. See coastal habitats supporting document for further details

2190 Humid dune slacks

To maintain the favourable conservation condition of Humid dune slacks in Killala Bay/Moy Estuary SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

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MAP 1: KILLALA BAY / MOY ESTUARY SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012

Legend

- SAC 000458 Killala Bay/Moy Estuary
- SAC 002298 River Moy
- SPA 004036 Killala Bay/Moy Estuary
- OSi Discovery Series County Boundaries

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MAP 2:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000458 CO.MAYO; version 1.01, CO.SLIGO; version 1.01
SAC 002298 CO.MAYO; version 1.14, CO.SLIGO; version 1.09
SPA 004036 CO.MAYO; version 1.02, CO.SLIGO; version 1.02

0 2 4 6 8 10 km

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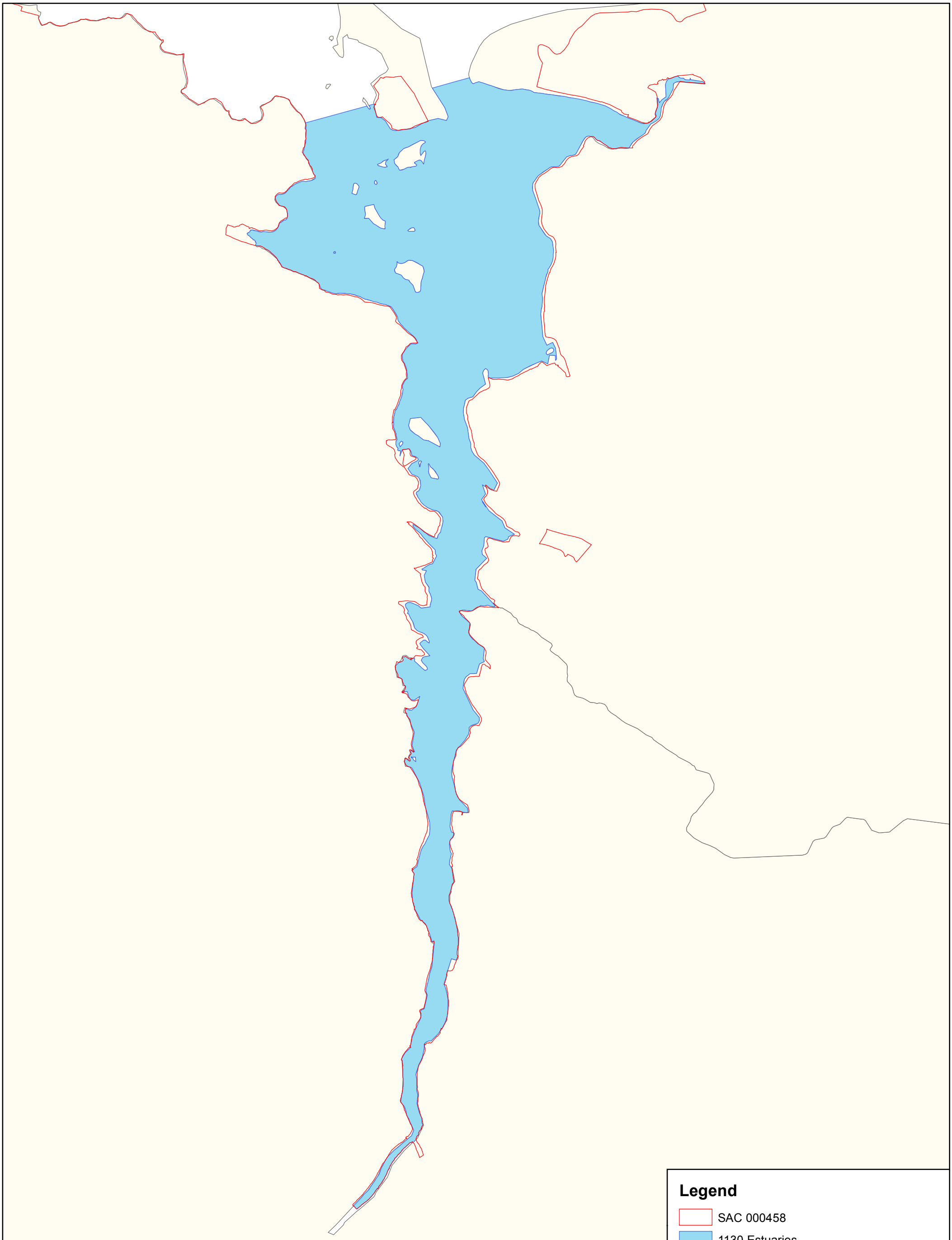
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar
comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis
le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012



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MAP 3:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
ESTUARIES

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

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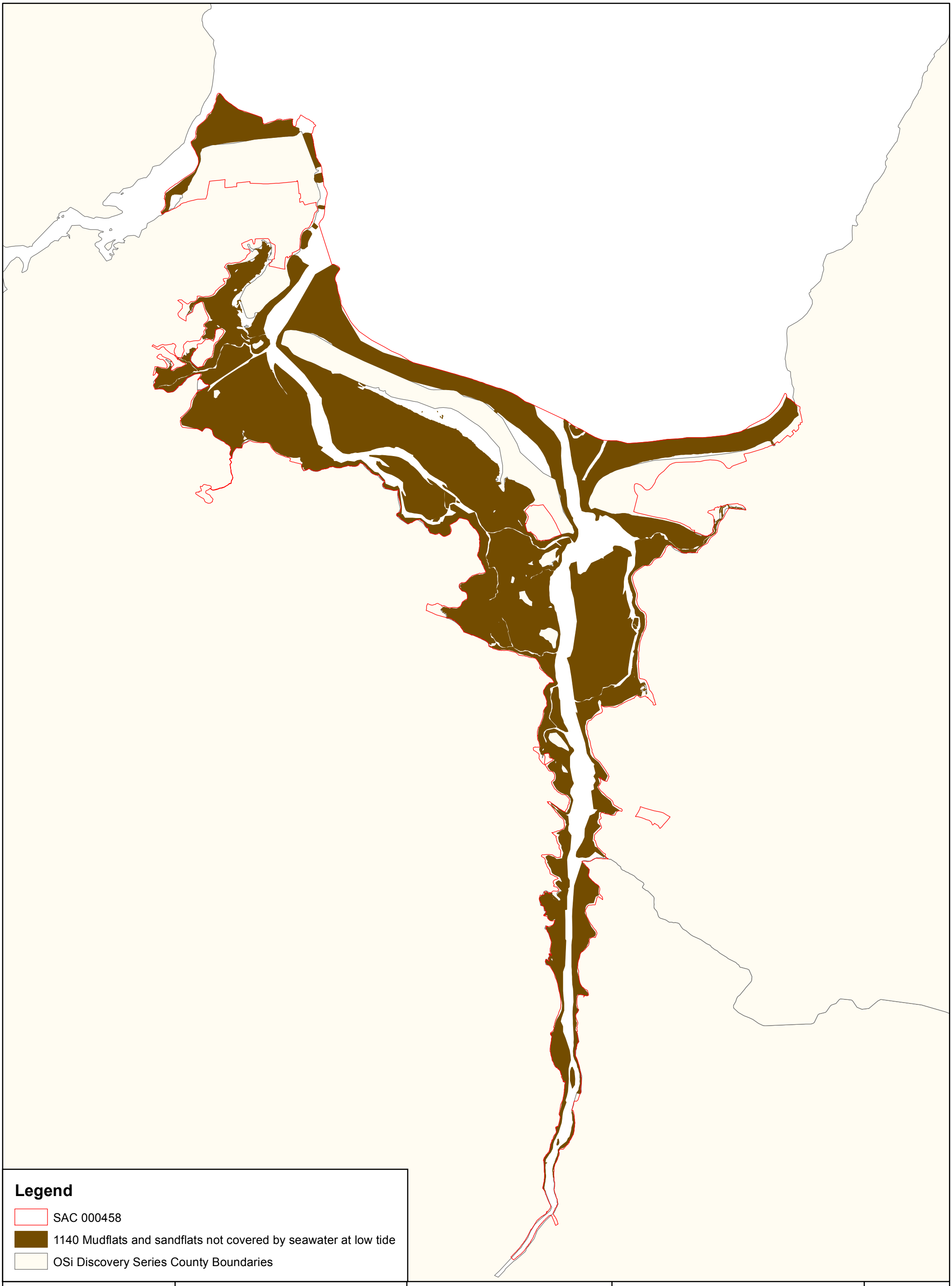
Map Version 1
Date: Aug 2012



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MAP 4:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 1.5 2 km

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Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar
comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis
le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012

Legend

- SAC 000458
- OSi Discovery Series County Boundaries

Marine Community Types

- Estuarine muddy sand dominated by *Hediste diversicolor* and *Heterochaeta costata* community complex
- Fine sand dominated by *Nephtys cirrosa* community complex
- Muddy sand to fine sand dominated by *Hydrobia ulvae*, *Pygospio elegans* and *Tubificoides benedii* community complex
- River
- *Zostera*-dominated community

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MAP 5:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

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Map Version 1
Date: Aug 2012

SMP: 0024

SMP: 0023

SMP: 0025

SMP: 0026

Legend

SAC 000458

OSi Discovery Series County Boundaries

SMP: 0026 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

Qualifying Interests

1310 *Salicornia* and other annuals colonising mud and sand

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

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

Non-Qualifying Interests

1410 Mediterranean salt meadows (Juncetalia maritimi)

Potential 1410 Mediterranean salt meadows (Juncetalia maritimi)

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MAP 6:
KILLALA BAY / MOY ESTUARY SAC CONSERVATION OBJECTIVES SALTMARSH HABITATS

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012

CMP: 130

CMP: 131

CMP: 132

Legend

SAC 000458

OSi Discovery Series County Boundaries

CMP: 131 Coastal Monitoring Project Site Codes

Qualifying Interests

1210 Annual vegetation of drift lines

2110 Embryonic shifting dunes

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

2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

2190 Humid dune slacks

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MAP 7:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 km

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Boundaries of designated areas are subject to revision.
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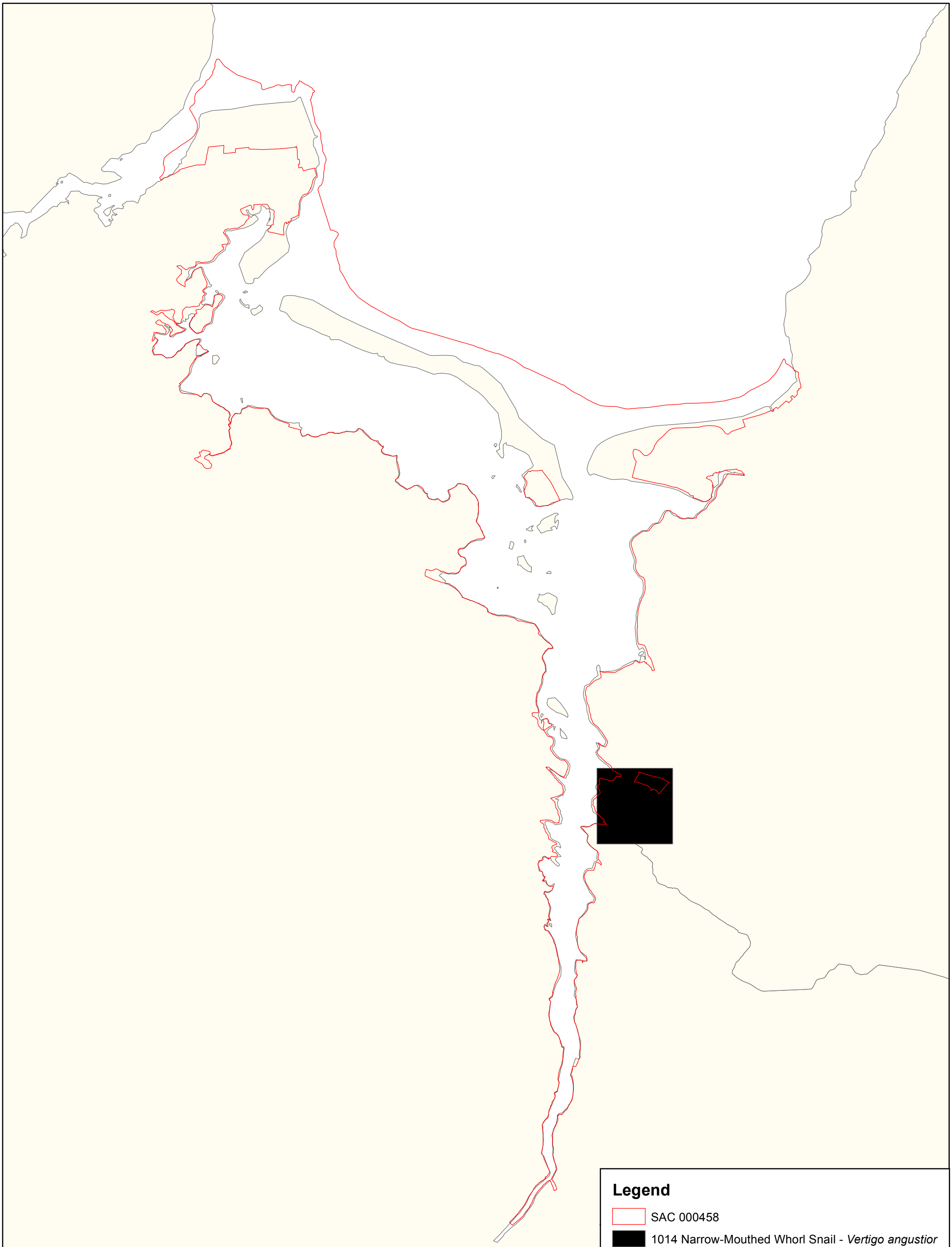
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012



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Arts, Heritage and the Gaeltacht

MAP 8:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
NARROW-MOUTHED WHORL SNAIL

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

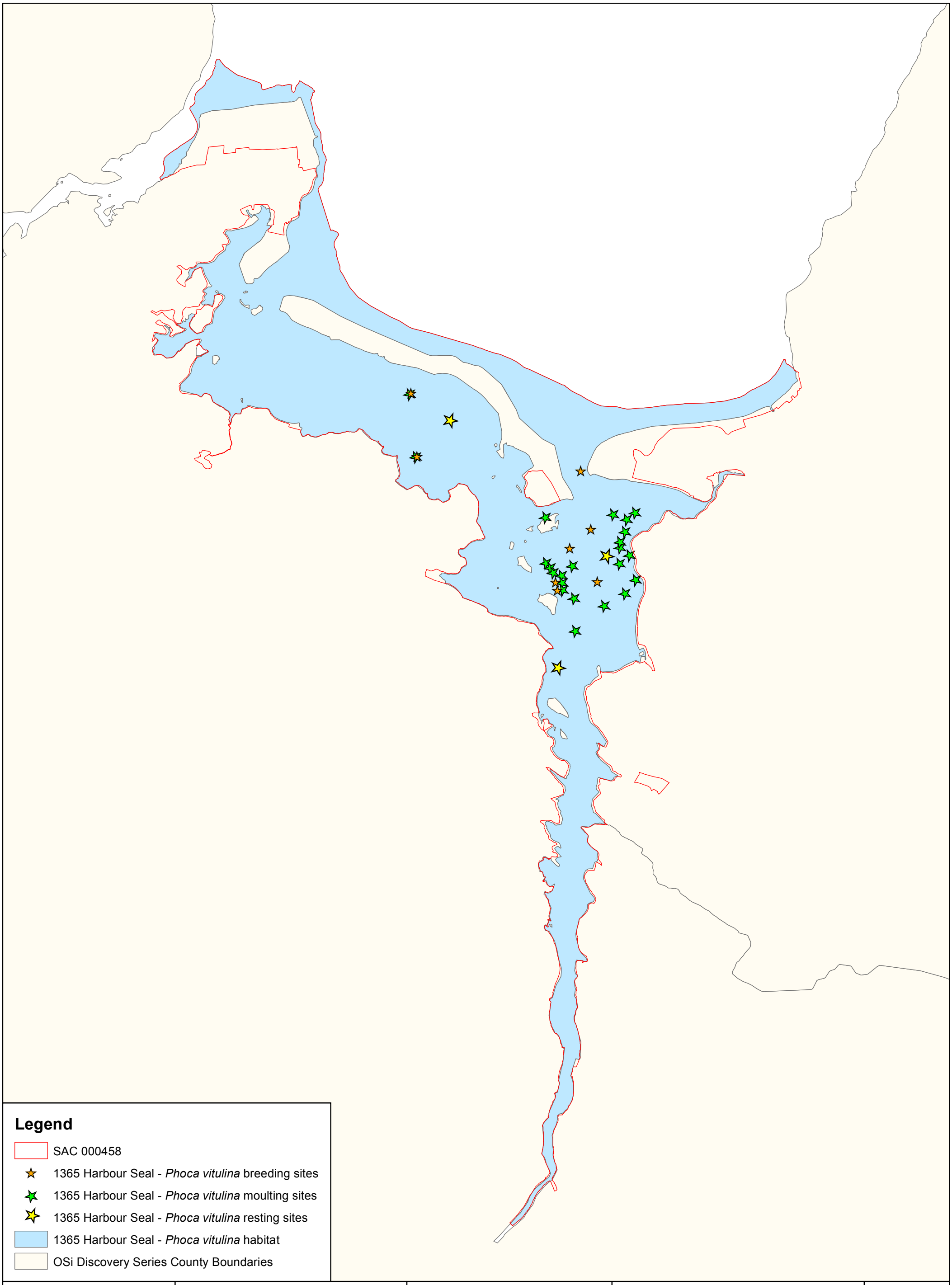
SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
Reproduced from Ordnance Survey material by permission
of the Government (Permit number EN 0059208).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar
comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis
le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012



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

MAP 9:
KILLALA BAY / MOY ESTUARY SAC
CONSERVATION OBJECTIVES
HARBOUR SEAL

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

SITE CODE: SAC 000458
CO.MAYO; version 1.01, CO. SLIGO; version 1.01

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

N

Map Version 1
Date: Aug 2012

Conservation objectives for Ardkill Turlough SAC [000461]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Ardkill Turlough SAC [000461]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Balla Turlough SAC [000463]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Balla Turlough SAC [000463]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bellacorick Iron Flush SAC 000466

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,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2019) Conservation Objectives: Bellacorick Iron Flush SAC 000466. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
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- 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***

000466	Bellacorick Iron Flush SAC

1528	Marsh Saxifrage *Saxifraga hirculus*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manuals, No. 88
Year :	2019
Title :	Results of a monitoring survey of the Annex II species *Saxifraga hirculus* (Marsh Saxifrage) in Ireland 2015–2018
Author :	O'Neill, F.H.; Hodd, R.L; Long, M.P.
Series :	Irish Wildlife Manuals, No. 112

Other References

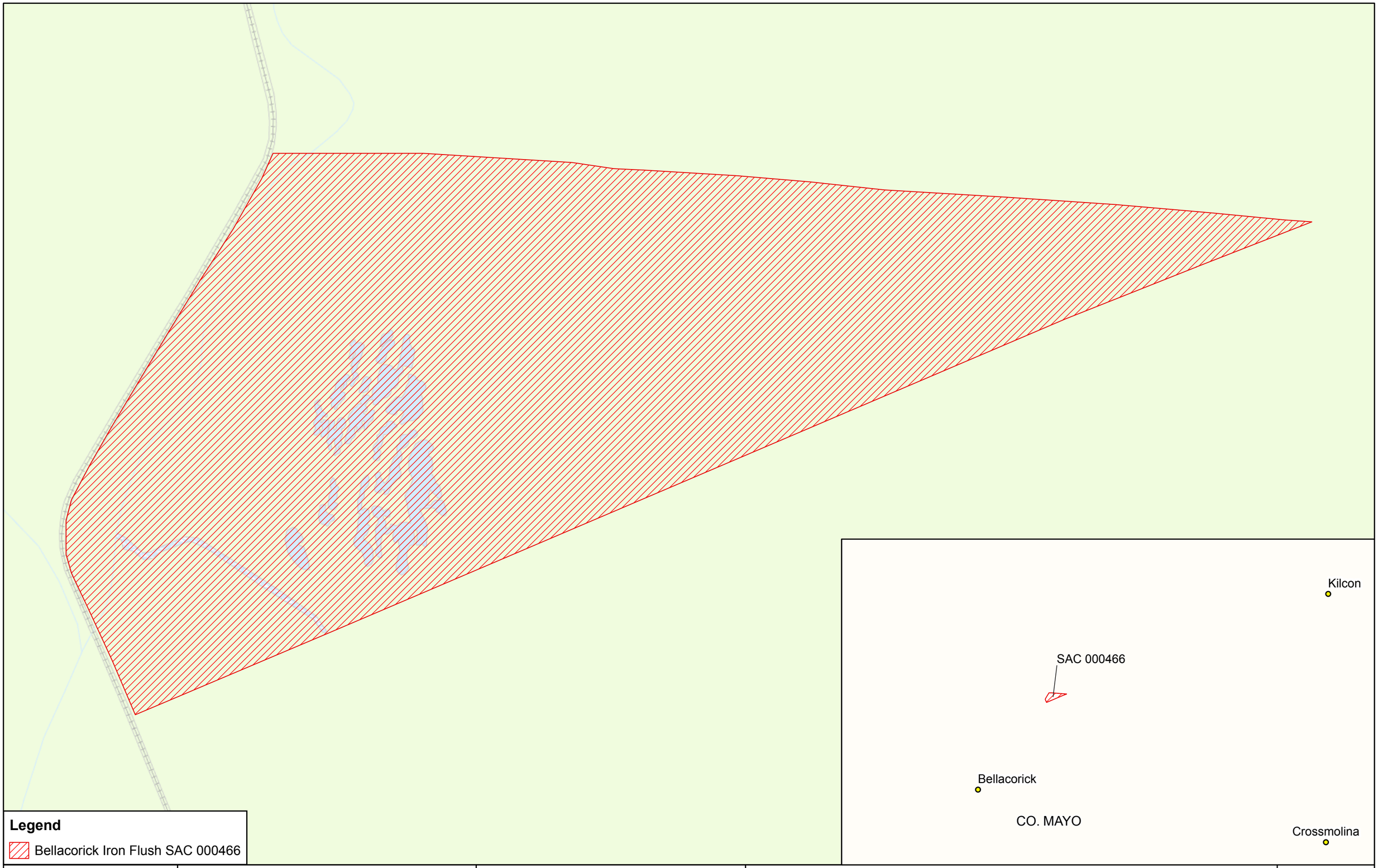
Year :	1958
Title :	*Saxifraga hirculus* in Co. Mayo (Dooleeg)
Author :	Scannell, M.J.P.
Series :	Irish Naturalists' Journal, 12: 248
Year :	1960
Title :	Notes on the vegetation of a mineral flush in Co. Mayo
Author :	King, A.L.K.; Scannell, M.J.P.
Series :	Irish Naturalists' Journal, 13: 137-140
Year :	1988
Title :	International Mires Research Group Field Excursion To Ireland 1988
Author :	Fojt, W.
Series :	Nature Conservancy Council
Year :	1991
Title :	Phytosociological and ecological studies of lowland blanket bog flushes in West Galway and North Mayo
Author :	Lockhart, N.D.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Galway
Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2012
Title :	Bellacorick Iron Flush vegetation study as part of hydro-geological investigations
Author :	BES (Biosphere Environmental Services)
Series :	Unpublished report for ESB International

1528 Marsh Saxifrage *Saxifraga hirculus*

To restore the favourable conservation condition of Marsh Saxifrage in Bellacorick Iron Flush SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No loss in geographical spread and number of known populations, subject to natural processes	The known population of marsh saxifrage (*Saxifraga hirculus*) in Bellacorick Iron Flush SAC occurs in a rich flush. The SAC is surrounded by drains and extensive areas of mechanically-cut peat. The population was surveyed by O'Neill et al. (2019; site SH03 Bellacorick) in 2018; previous surveys include Muldoon (2011), BES (2012) and an NPWS commissioned rare plant survey in 1995 (NPWS internal files). Surveys of the flush also include Fojt (1988) and Lockhart (1991). See also Scannell (1958) and King and Scannell (1960)
Number of rosettes	Number	No decline in number of rosettes, subject to natural processes	See Muldoon et al. (2015) and O'Neill et al. (2019) for full details on methodology used to calculate number of rosettes. Muldoon (2011) recorded 700 rosettes at Bellacorick and a target of 560 rosettes was set, i.e. 80% of that recorded to allow a margin of error over monitoring seasons (Muldoon et al., 2015). O'Neill et al. (2019) recorded a total count of 23 rosettes. While a decline of 97% is suggested from these figures, differences in survey intensity and weather conditions may play a role. Previous survey numbers have fluctuated, e.g. a count of 27–30 flowering stalks plus many vegetative rosettes was recorded in 1995 (NPWS internal files), an estimate of 300 individuals was made in 1999 (NPWS internal files) and 40 flowering heads (no individual rosette counts made) were recorded in 2012 (BES, 2012). Overall, however, the population may have reached an equilibrium with the conditions prevailing in the SAC (Lockhart, pers. comm.). See O'Neill et al. (2019) for further details
Density of rosettes (rosettes/square metre)	Mean number of rosettes in a representative number of 1m x 1m monitoring stops	No decline in density of rosettes, subject to natural processes	See Muldoon et al. (2015) and O'Neill et al. (2019) for full details on methodology used to calculate density of rosettes. Density of rosettes calculation was not undertaken by O'Neill et al. (2019) at Bellacorick (site code SH03) as the species occurs as isolated clumps. However, a total count of rosettes was conducted (O'Neill et al., 2019)
Number of flowering heads	Number	No decline in number of flowering heads, subject to natural processes	Number of flowering heads is estimated as an order of magnitude (10s, 100s, 1,000s, or 10,000s). See Muldoon et al. (2015) and O'Neill et al. (2019) for full details on methodology used to calculate number of flowering heads
Area of occupancy	Square metres	No decline in the area occupied by the population, subject to natural processes	See Muldoon et al. (2015) and O'Neill et al. (2019) for full details on methodology used to estimate area of occupancy. An area of occupancy of 950m² was recorded by Muldoon (2011) and a target of 855m² was set, i.e. 90% of that recorded to allow a margin of error over monitoring seasons (Muldoon et al., 2015). An area of occupancy of c.156m² was recorded by O'Neill et al. (2019) at Bellacorick in 2018. However, the core area of the population has remained largely unchanged since its discovery in the 1950s; see O'Neill et al. (2019) for further details

Hydrological conditions: wetness of substrate	Light pressure from hand onto substrate in a representative number of 1m x 1m monitoring stops	Water from the soil or peat substrate should cover the fingers of hand in at least 40% of monitoring stops	Marsh saxifrage (*Saxifraga hirculus*) requires the presence of groundwater close to the surface, but the species will not tolerate long periods of flooding and the water should be moving or flowing to some extent. Attribute and target based on O'Neill et al. (2019). At Bellacorick, this attribute failed when surveyed after a period of drought in August 2018 and no standing water or water visible with pressure was noted by O'Neill et al. (2019). While active drainage is not currently an issue at Bellacorick, significant drainage had occurred in the past (beginning in the 1950s for peat extraction) and water levels have not recovered (O'Neill et al., 2019)
Vegetation composition: positive indicator species	Occurrence in a representative number of 1m x 1m monitoring stops	Knotted pearlwort (*Sagina nodosa*) should be present in at least 40% of monitoring stops	Attribute and target based on O'Neill et al. (2019). Knotted pearlwort (*Sagina nodosa*) was absent from all monitoring stops at Bellacorick (O'Neill et al., 2019)
Vegetation composition: negative indicator species	Percentage cover in a representative number of 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (*Molinia caerulea*) should not exceed 5%	Attribute and target based on Muldoon et al. (2015) and O'Neill et al. (2019)
Vegetation composition: negative indicator species	Percentage cover in a representative number of 1m x 1m monitoring stops	Mean percentage cover of Yorkshire-fog (*Holcus lanatus*) should not exceed 15%	Attribute and target based on Muldoon et al. (2015) and O'Neill et al. (2019)
Vegetation structure: mean vegetation height	Centimetres in a representative number of 1m x 1m monitoring stops	Mean vegetation height should not exceed 20cm	See O'Neill et al. (2019) for full details on methodology used to calculate mean vegetation height (cm). At Bellacorick, O'Neill et al. (2019) recorded a mean vegetation height of 42cm and noted insufficient grazing, with tall, rank vegetation a feature of the habitat for the species
Vegetation structure: grazing level	Level in a representative number of 1m x 1m monitoring stops	Grazing should be at light to moderate levels (26-50%) to ensure an open vegetation structure and to allow flowering to occur	At each monitoring stop, grazing levels are assigned to one of four categories 0-25% (little/no grazing), 26-50%, 51-75% and 76-100% (heavy overgrazing). The median of each category is calculated and averaged among all stops to assign the grazing level to one of the four categories. See Muldoon et al. (2015) and O'Neill et al. (2019) for full details on methodology. At Bellacorick, grazing levels were found to be too low (0-25%) when surveyed by Muldoon (2011; see also Muldoon et al., 2015). In 2018, an insufficient level of grazing was recorded as a negative impact at Bellacorick (O'Neill et al., 2019). O'Neill et al. (2019) noted that it was probable that sheep grazing was being further discouraged by construction roads and traffic associated with a nearby wind farm development



Legend

Bellacorick Iron Flush SAC 000466

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

MAP 1:
BELLACORICK IRON FLUSH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000466; version 3.01. CO. MAYO

0 30 60 90 120 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: May 2019

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Mullet/Blacksod Bay Complex SAC 000470

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

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Citation:

NPWS (201п) Conservation Objectives: Mullet/Blacksod Bay Complex SAC 000470. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

Notes/Guidelines:

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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.
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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***

000470	Mullet/Blacksod Bay Complex SAC
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs
1310	*Salicornia* and other annuals colonising mud and sand
1355	Otter *Lutra lutra*
1395	Petalwort *Petalophyllum ralfsii*
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)*
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
21A0	Machairs (* in Ireland)
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
7230	Alkaline fens

Please note that this SAC overlaps with Blacksod Bay/Broadhaven SPA (004037), Termoncarragh Lake and Annagh Machair SPA (004093) and Mullet Peninsula SPA (004227). It adjoins West Connaught Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1996
Title :	Biomar survey of Irish machair sites
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	Survey of sensitive subtidal benthic marine communities in Mullet/Blacksod Bay Complex SAC, Rutland Island and Sound SAC, Mulroy Bay SAC
Author :	MERC
Series :	Unpublished report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments

Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	Mullet/Blacksod Bay Complex SAC (site code: 470) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2014
Title :	Mullet/Blacksod Bay Complex SAC (site code: 470) Conservation objectives supporting document- marine habitats 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 :	1991
Title :	The spatial organization of otters (*Lutra lutra*) in Shetland
Author :	Kruuk, H.; Moorhouse, A.
Series :	J. Zool, 224: 41-57
Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	1999
Title :	Diet of otters (*Lutra lutra*) on Inishmore, Aran Islands, west coast of Ireland
Author :	Kingston, S.; O'Connell, M.; Fairley, J.S.
Series :	Biol & Environ Proc R Ir Acad B 99B:173-182
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie. 27: 2620-2623
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press

Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Subtidal benthic investigations in Mullet/Blacksod Bay Complex cSAC (cSAC code: IE000470) and Blacksod Bay/Broadhaven SPA (site code: IE004037)
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2010
Title :	Reef investigations in Blacksod Bay cSAC (site code: IE000470) Co. Mayo
Author :	Aquafact
Series :	Unpublished report to the Marine Institue and NPWS
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2013
Title :	Benthic survey services framework. Blacksod Bay intertidal surveys 2009 & 2010
Author :	RPS
Series :	Unpublished report to the Marine Institute and NPWS
Year :	in prep.
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, A.
Series :	Unpublished report to NPWS
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Interpolated 2014
Title :	1994 BioMar Survey; 2008 sensitive species survey; 2009, 2010 intertidal and subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used to resolve any issues arising
Used For :	1140, 1170, marine community types (maps 3, 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 6)
Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1310 (map 7)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	2120, 2130, 2150, 21A0 (map 8)
Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	2120, 2130, 2150, 21A0 (map 8)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3150 (map 9)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of an 80m buffer on marine side of high water mark (HWM); creation of a 10m buffer on terrestrial side of HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Datasets combined with the derived EPA WFD Waterbodies data. 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
Used For :	1355 (map 10)
Year :	2014
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 11)

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSi data as 1,428ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Mobile sand with *Bathyporeia guilliamsoniana* community; Sand with *Angulus tenuis* and *Pygospio elegans* community complex. See map 6	Based on intertidal surveys undertaken in 2009 and 2010 (RPS, 2013). See marine supporting document for further information

1160 Large shallow inlets and bays

To maintain the favourable conservation condition of Large shallow inlets and bays in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 11,169ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the *Zostera*- and maërl-dominated communities and *Serpula vermicularis*-dominated community complex, subject to natural processes. See map 6	Based on dive surveys undertaken in 2008 (MERC, 2008). See marine supporting document for further details
Community structure: shoot density	Shoots per m^2	Conserve the high quality of *Zostera*-dominated community, subject to natural processes	Based on diver observation and underwater viewer (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the Maërl dominated community, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the *Serpula vermicularis*-dominated community complex, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Sand with *Angulus tenuis* and *Pygospio elegans* community complex; Sand with *Gastrosaccus spinifer* community complex; Fine sand with *Angulus fabula* community complex; Intertidal reef community complex; Sheltered subtidal reef community complex and *Laminaria*-dominated community complex. See map 6	Based on a BioMar survey in 1994 (Picton and Costello, 1997), a sensitive species survey in 2008 (MERC, 2008) and intertidal and subtidal surveys in 2009 and 2010 (Aquafact, 2010; RPS, 2013). See marine supporting document for further details

1170 Reefs

To maintain the favourable conservation condition of Reefs in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area estimated as 1,531ha from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on information from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013
Community extent	Hectares	Maintain the extent of the *Serpula vermicularis*-dominated community complex, subject to natural processes. See map 6	Based on dive surveys undertaken in 2008 (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the *Serpula vermicularis*-dominated community complex, subject to natural processes	Based on diver observation (MERC, 2008). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; Sheltered subtidal reef community; *Laminaria*-dominated community complex. See map 6	Reef mapping based on information from a 1994 BioMar survey (Picton and Costello, 1996), 2009 intertidal and subtidal reef surveys (Aquafact, 2010) and a walkover survey in 2013. See marine supporting document for further details

1310 Salicornia and other annuals colonising mud and sand

To maintain the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in Mullet/Blacksod Bay 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 sub-site mapped: Elly Harbour - 0.02ha. See map 7	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Habitat recorded at one of the four sub-sites surveyed and mapped, giving a total estimated area of 0.02ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 7 for known distribution	Based on data from McCorry and Ryle (2009). *Salicornia* is an annual species, so its distribution can vary significantly from year to year. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). Sediment supply is particularly important for this pioneer saltmarsh community, as the distribution of this habitat depends on accretion rates. See 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 and Ryle (2009). Creeks deliver sediment throughout saltmarsh system. At Elly Harbour there are signs of modification of the former saltmarsh structure such as drainage channels and old peat-cutting banks. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	This pioneer saltmarsh community requires regular tidal inundation. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). At Elly Harbour this habitat occurs in mosaic with other saltmarsh habitats. There are also notable successions to brackish and wet grassland vegetation communities around Leam Lough which increases the diversity of the site. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species including common glasswort (*Salicornia europaea*), common saltmarsh grass (*Puccinellia maritima*), sea aster (*Aster tripolium*) and annual sea-blite (*Suaeda maritima*)	Based on data from McCorry and Ryle (2009). Turf fucoids were recorded at all sub-sites. Saltmarsh flat-sedge (*Blysmus rufus*) was recorded at Doolough and Bunnahowen sub-sites and is also a species of local distinctiveness. See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. Doo Lough - 3.56ha, Cross Lough - 2.61ha, Aghleam - 3.85ha, Dooyork -0.14ha , Srah South - 2.23ha, Srah North - 1.63ha, Leam Lough -2.36ha, Termoncarragh Lough - 2.58ha. See map 8	Based on data from theCoastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was mapped at eight sub-sites, giving a total estimated area of 18.95ha. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). This habitat was recorded at all eight subsites. The shifting dunes at Aghleam are udergoing natural erosion. At Cross Lough the establishment of an equestrian centre has reduced the extent of this habitat. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. At Srah North, coastal protection measures in the form of fencing (access control and sand-trapping), marram planting and dune reconstruction using gabions and geotextile fabrics have been put in place. Sand and shingle extraction is known to occur at a number of locations throughout the Mullet sand dune sites. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). The flora of mobile dunes in this SAC also includes sea bindweed (*Calystegia soldanella*), which has a scattered distribution along the north-west coast. See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. Creeping thistle (*Cirsium arevense*) was recorded in mobile dune at Cross Lough. See coastal habitats supporting document for further details

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Mullet/Blacksod Bay 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 sub-sites mapped: Doo Lough - 46.35ha, Cross Lough - 184.74ha, Aghleam - 292.43ha, Dooyork - 3.73ha, Srah South - 9.10ha, Srah North - 5.99ha, Leam Lough - 170.63ha, Termoncarragh Lough - 224.11ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). This habitat was recorded from all eight sub-sites, giving a total estimated area of 937.07ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). At Doo Lough there is some erosion of this habitat at the seaward edge and poaching by livestock has caused erosion at the fixed dune edge. At Aghleam the extent of the fixed dunes has been reduced due to overgrazing. At Cross Lough the establishment of an equestrian centre on the fixed dunes has led to a modification and reduction in extent of this habitat. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. At Srah North, coastal protection measures in the form of fencing (access control and sand-trapping), marram planting and dune reconsutruction using gabions and geotextile fabrics have been put in place. Sand and shingle extraction is known to occur a number of locations throughout the Mullet sand dune sites. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008) Ryle et al. (2009) and Delaney et al. (2013). See 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). All of the sub-sites are grazed to varying extents. At Doo Lough, sustainable grazing regimes have led to the creation and maintenance of a large area of species-rich turf. The positive impact of grazing is also seen in parts of Aghleam, Leam Lough and Cross Lough. Parts of Doo Lough are overgrazed as are Srah North, Aghleam, Leam Lough, Cross Lough and Termoncarragh. At some areas of Srah South, undergrazing is an issue. See coastal habitats supporting document for further details

Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample 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). See coastal habitats supporting document for further details.
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. Common ragwort (*Senecio jacobaea*), creeping thistle (*Cirsium arvense*), perennial rye grass (*Lolium perenne*) and common nettle (*Urtica dioica*) were regularly recorded in the fixed dune habitat. New Zealand flax (*Phormium tenax*) was recorded at Leam Lough. See 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). Within Mullet/Blacksod Complex SAC, the levels of grazing are such that prevents scrub from becoming dominant. See 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 Mullet/Blacksod Bay 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 sub-sites mapped: Aghleam - 4.08ha, Termoncarragh Lough - 6.20ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Habitat was mapped at two sub-sites, giving a total estimated area of 10.29ha. However, there is some doubt over the validity of the record of this habitat at Termoncarragh, based on a subsequent site visit by NPWS staff. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 8 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: sward height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: 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). Rarer species in this habitat include Autumn lady's tresses (*Spiranthes spiralis*), lesser butterfly orchid (*Platanthera bifolia*) and field gentian *(Gentianella campestris*). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details
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 coastal habitats supporting document for further details

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs in Mullet/Blacksod Bay 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 sub-sites mapped: Doo Lough - 59.52ha, Cross Lough - 60.73ha, Aghleam - 138.59ha, Dooyork - 31.55ha, Srah South - 15.50ha, Srah North - 21.44ha, Leam Lough - 45.55ha, Termoncarragh Lough - 222.76ha. See map 8	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Eight sub-sites were mapped, giving a total estimated area of 595.64ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 8 for known distribution	The largest machair site is at Termoncarragh Lough. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Presence/absence of water abstraction or drainage works	Maintain natural hydrological regime	Based on data from Ryle et al. (2009), Delaney et al. (2013), Crawford et al. (1996) and Gaynor (2006). See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 20% of machair habitat, subject to natural processes	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Notable species include the Annex II liverwort species petalwort (*Petalophyllum ralfsii*). See conservation objective for petalwort (1395) and coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See coastal habitats supporting document for further details

3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation

To maintain the favourable conservation condition of Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation in Mullet/Blacksod Bay 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. See map 9	The selection of this SAC for habitat 3150 was based on data for Cross Lough. Little is known about the characteristics or ecology of this lake habitat type in Ireland. A working hypothesis of Irish lake habitats defines it as pondweed (*Potamogeton* spp.) dominated with circumneutral or higher pH, found in low-lying, large, naturally more productive catchments. It is likely that the coastal form inter-grades with or is related to lake habitats 3130 and 3140. Few, if any, Irish lakes are naturally "eutrophic" as defined using total phosphorus, chlorophyll *a* and water transparency (OECD, 1982). Lakes with habitat 3150 are considered to be associated with mesotrophic conditions as defined by OECD (1982). 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. For further information see NPWS (2013) and the lake habitats supporting document (O Connor, in prep.)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 9	As noted above, the habitat is considered to occur in Cross Lough. Cross Lough appears to be influenced by the sea, through spray, wind-borne materials and/or subsurface flows, and has a high chloride content. It is likely that this maritime influence increases the lake's productivity
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for 3150 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). The phytoplankton of Cross Lough is noted as being dominated by cyanobacteria. Pondweeds (*Potamogeton praelongus, P. filiformis* and *P. pectinatus*), *Littorella uniflora* and *Myriophyllum spicatum* have been recorded in Cross Lough
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Very little is known about the characteristic zonation of lake habitat 3150. Like the coastal forms of the hard water lake habitat (3140), coastal 3150 lakes may have compressed zonation (see Roden and Murphy, in prep.)
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. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time. Coastal lakes with 3150 may have naturally shallow maximum vegetation depth, as for the coastal form of the hard water habitat. Colonisation tends to be shallower in the machair form of hard water lakes, owing to cloudier water and shallower lake depth (Roden and Murphy, in prep.). For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
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 3150 is found on fine (silt and mud), neutral to alkaline, and more nutrient-rich substrates. Substratum particle size is likely to vary with depth and along the shoreline within a single lake. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140); however, targets have yet to be established for the remaining lake habitats. Habitat 3150 is associated with clear water; however, coastal examples such as Cross Lough may have naturally lower transparency owing to the influence of the sea producing greater phytoplankton biomass. The OECD fixed boundary system set transparency targets for mesotrophic lakes of 3-6m annual mean Secchi disk depth, and 1.5-3m annual minimum Secchi disk depth. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: nutrients	µg/l phosphorus; mg/l nitrogen	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	As a relatively-productive habitat, mesotrophic and Water Framework Directive 'good' status targets apply. Where a lake has nutrient concentrations that are lower than these targets, there should be no decline within class, i.e. no upward trend in nutrient concentrations. For the lake habitat 3150, annual average TP concentration should be ≤ 20µg/l TP, average annual total ammonia concentration should be ≤ 0.065mg/l N and annual 95th percentile for total ammonia should be ≤ 0.140mg/l N. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). See also the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including good chlorophyll *a* status	Mesotrophic and Water Framework Directive 'good' status targets apply to habitat 3150. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <10µg/l. The annual average chlorophyll *a* concentration should be 2.5-8.0µg/l and the annual peak chlorophyll *a* concentration should be 8.0-25.0µg/l (OECD, 1982). For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.). 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 good phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3150 is considered to require WFD good status. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and good 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 3150 should, ideally 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 3150 is considered to require good phytobenthos status. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep)
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain good 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 Water Framework Directive purposes using the 'Free Index'. The target for habitat 3150 is good status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥ 0.68, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Acidification status	pH units; mgl-1	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	The specific requirements of habitat 3150, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to habitat 3150, however eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards. See The European Communities Environmental Objectives (Surface Waters) Regulations 2009. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decreases 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. For further information see the lake habitats supporting document (O Connor, in prep.)
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. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
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. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)
Fringing habitat : area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3150	3150 lakes typically have well-developed reedswamp, fen and/or marsh communities around much of their shoreline. Wet woodland would have surrounded much of their shoreline in the past and has survived or re-colonised patches of many 3150 lake shores. These fringing habitats intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. For further information see the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, in prep.)

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full extent of this habitat within the SAC is currently unknown. The main area described is to the southwest of Termoncarragh Lake; however, other areas are known to occur. This habitat is found in mosaic with, and transitional to, other habitat types including saltmarsh and sand dunes (Crawford et al., 1996; McCorry and Ryle, 2009; Ryle et al., 2009; Delaney et al., 2013; NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of this habitat in this SAC is currently unknown- see note above
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be the limiting nutrient
Vegetation composition: typical species	Percentage	Maintain vegetation cover of typical species including brown mosses and vascular plants	Species recorded at Termoncarragh include jointed rush (*Juncus articulatus*), glaucous sedge (*Carex flacca*), few-flowered spike-rush (*Eleocharis quinqueflora*), common spike-rush (*E. palustris*), common butterwort (*Pinguicula vulgaris*) and lesser clubmoss (Selaginella selaginoides). Marsh helloborine (*Epipactis palustris*) has also been recorded here. Saline influences are demonstrated by the presence of species such as sea-milkwort (*Glaux maritima*) and sea arrowgrass (*Triglochin maritimum*) (NPWS internal files)
Vegetation composition: trees and shrubs	Percentage cover in local vicinity	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: disturbed bare ground	Percentage cover at a representative number of monitoring stops and in local vicinity	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive area of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)
Physical structure: drainage	Percentage cover in local vicinity	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on alkaline fen conservation assessment criteria in Perrin et al. (2014)

1355 Otter *Lutra lutra*

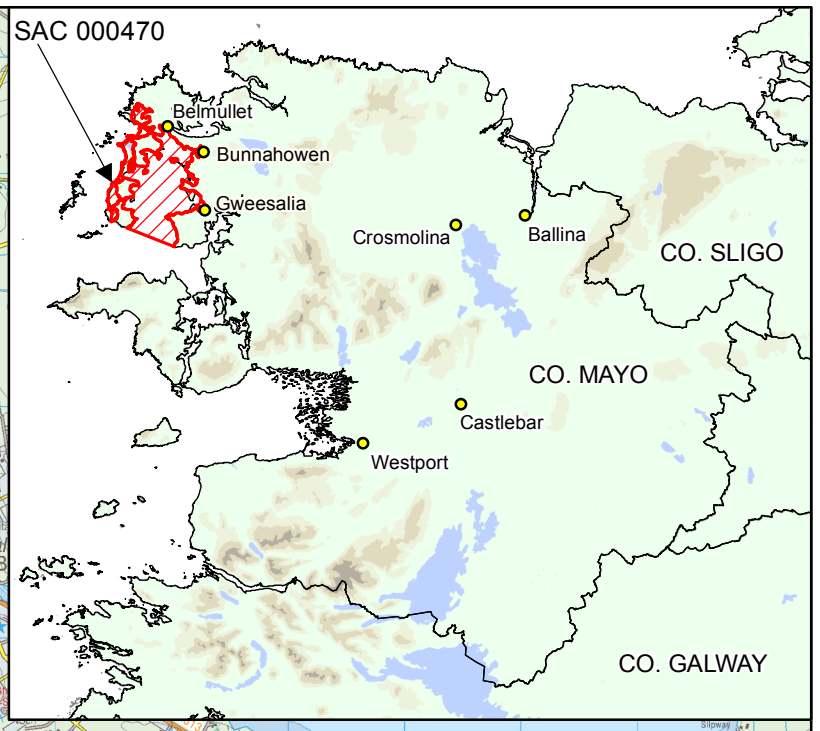
To maintain the favourable conservation condition of Otter in Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 168.7ha	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 929.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 31.0km	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/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 87.7ha	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, 2006; Kruuk and Moorhouse, 1991)
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; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 10	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 Mullet/Blacksod Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline. See map 11 for the two recorded locations	There are currently two known sub-populations in the SAC: (8a) Doolough machair and (8b) Dooyork machair. The population at Dooyork machair has not been seen since 1998. Data from unpublished NPWS surveys
Population size	Number of individuals	No decline. Current known population at Doolough machair estimated c.33 thalli; at Dooyork machair estimated to be c.3 thalli. Total c.36 thalli	Counts of thalli: for Doolough machair- from mean number of thalli recorded by Lockhart in 1999 (20 thalli); Holyoak in 1999 (77 thalli) and Lockhart in 2006 (3 thalli) = 33.33 thalli; for Dooyork machair- from mean number of thalli recorded by Lockhart in 1998 (6 thalli) and Lockhart in 1999 (0 thalli) = 3 thalli. Total number of thalli = 36.33 (c.36 thalli)
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Doolough machair and Dooyork machair currently unknown, but thought to be very small. Total estimated to be c.0.0005ha	The extent of suitable habitat at Doolough machair and at Dooyork machair has not been accurately measured using GPS, but is known to be very small (c.0.5m² and 4m² respectively)
Hydrological consitions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	*Petalophyllum ralfsii* grows in damp sand. Based on Campbell (2013)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain and enhance open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	*Petalophyllum ralfsii* grows in compacted, sandy ground, maintained by rabbit (*Oryctolagus cuniculus*) and cattle grazing. Recorded at Doolough machair on tightly cropped turf on sides of low sandhills at the highest part of the plain, above a flushed calcareous slope to the south-east (by Holyoak in 1999; Lockhart in 2006); recorded at Dooyork machair by Lockhart in 1998 on damp flats between low sandhills, which is unusual for *P. ralfsii*; not refound during a visit by Lockhart in 1999



Legend

Mullet/Blacksod Bay Complex SAC 000470

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MAP 1: MULLET/BLACKSOD BAY COMPLEX SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
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0 1.5 3 km

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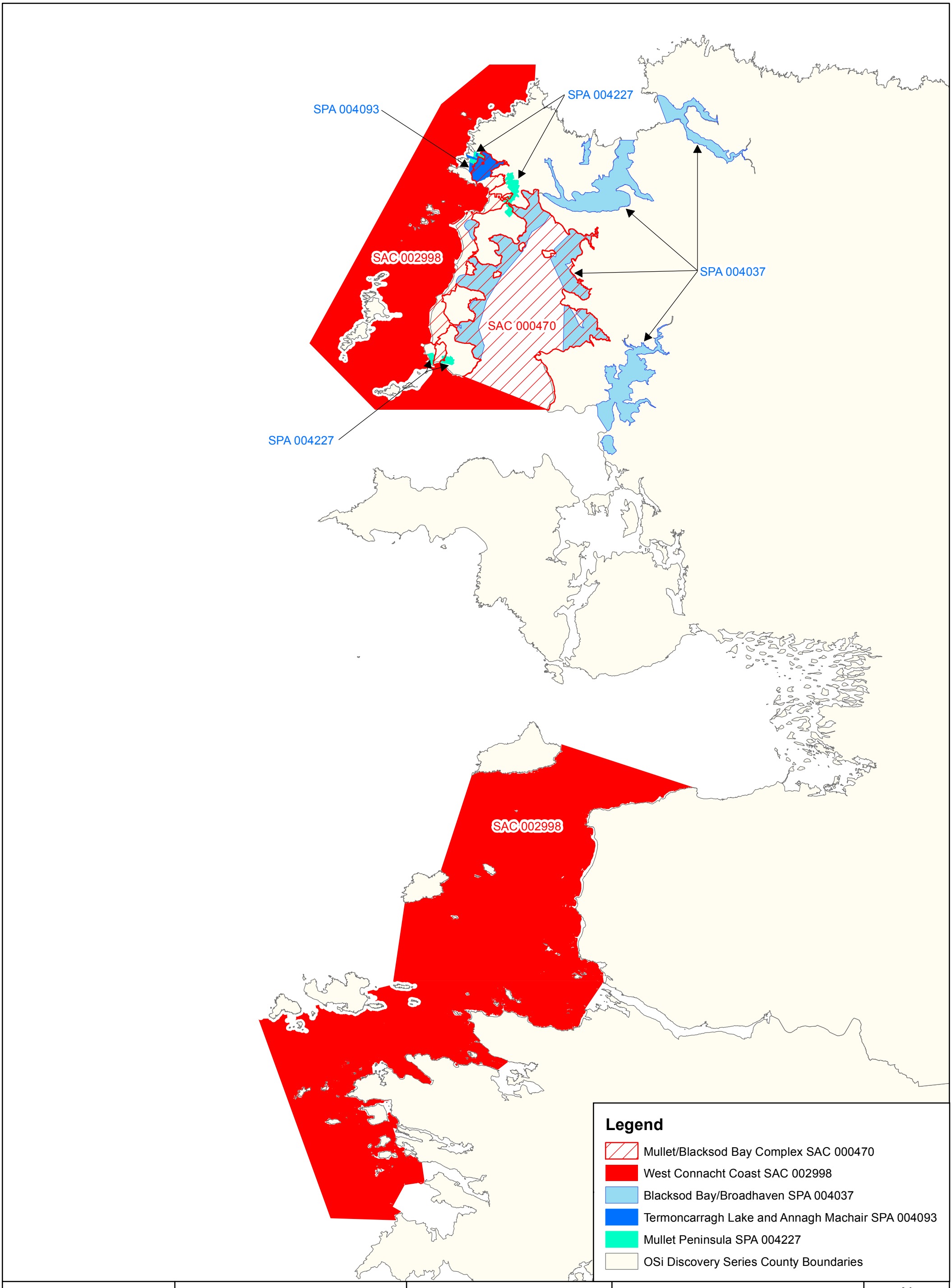

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MAP 2:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

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

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0 6.5 13 km

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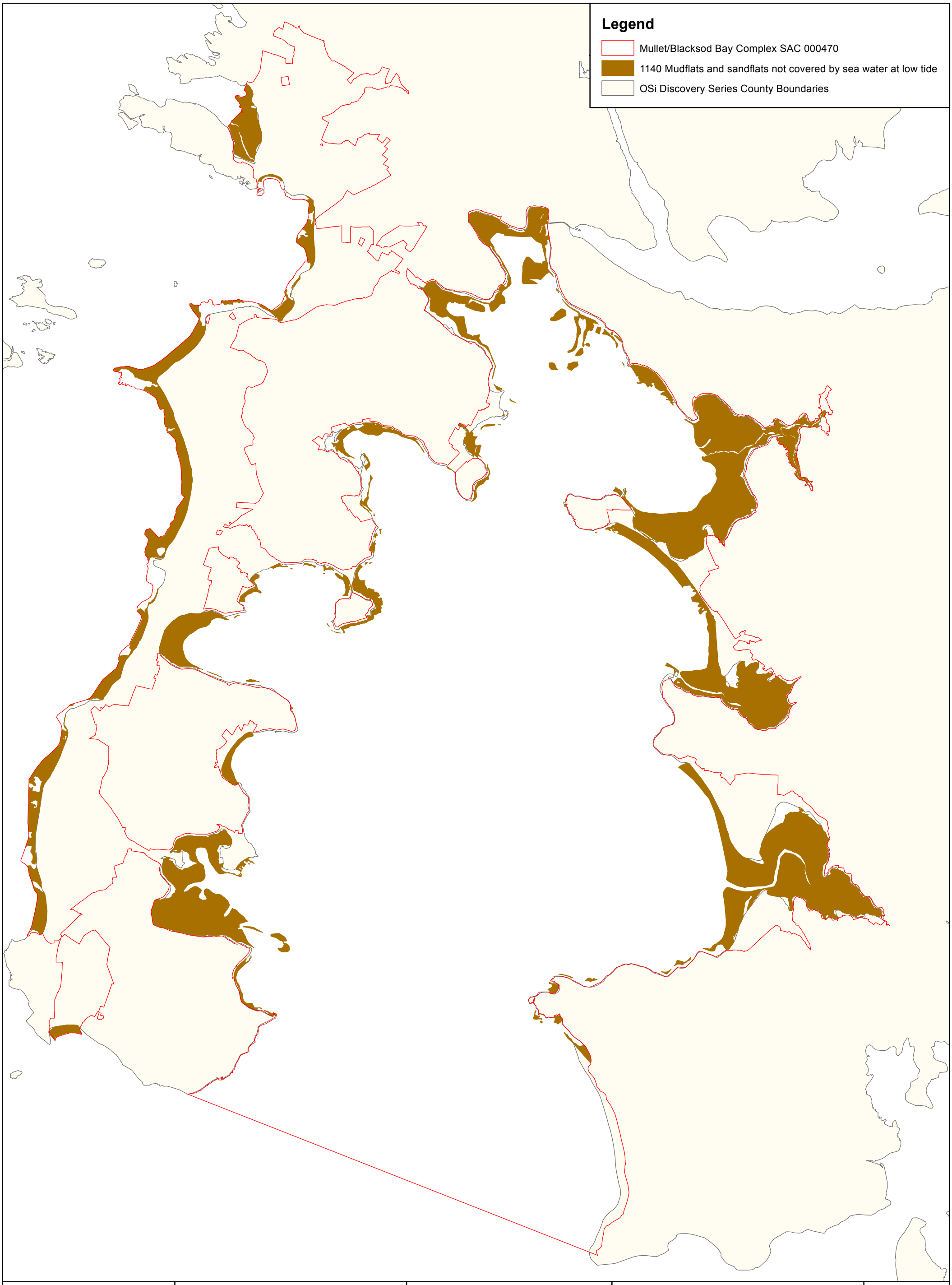

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MAP 3:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

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0 1 2 3 km

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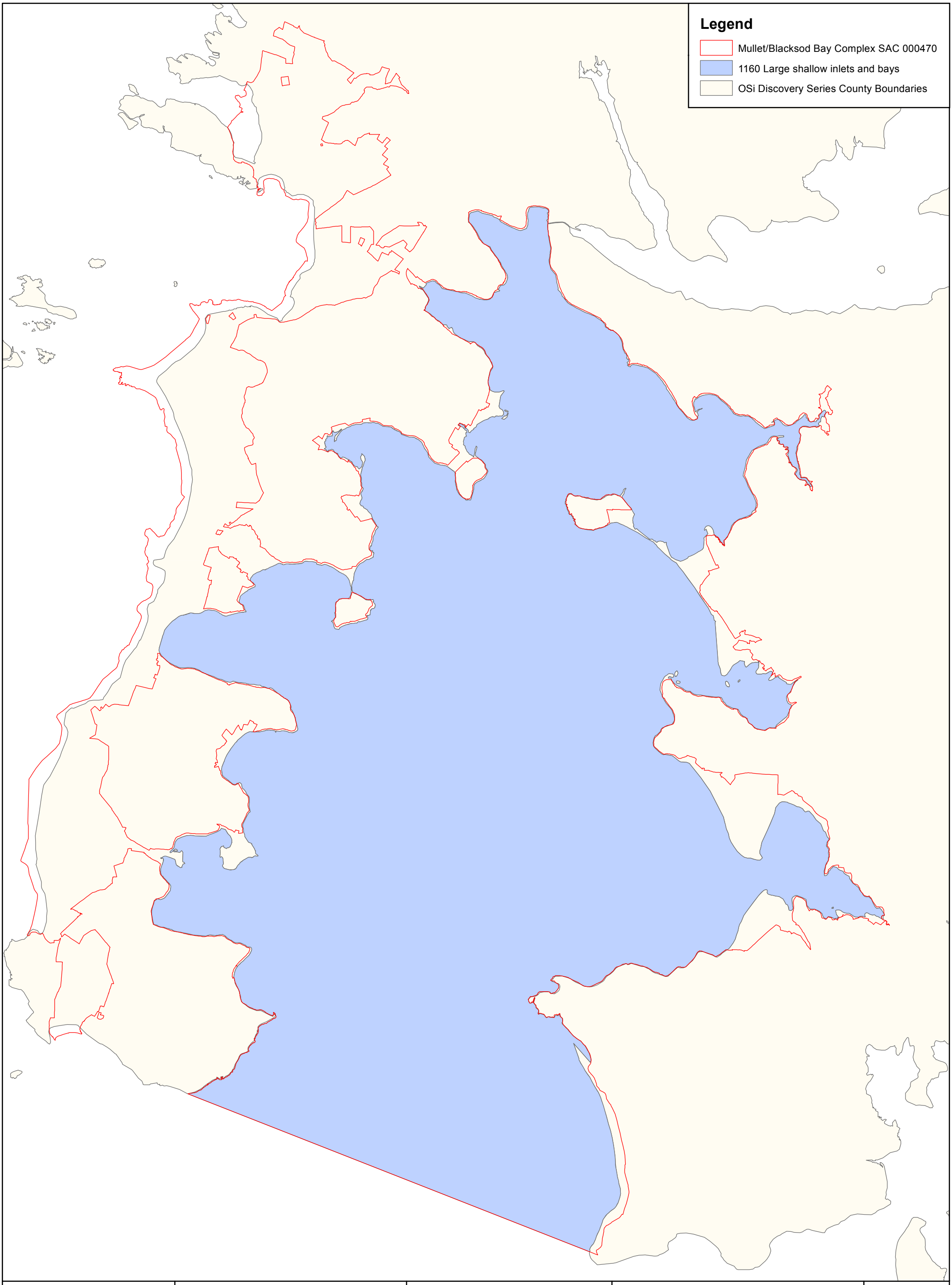

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MAP 4:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAYS

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MAP 5:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
REEFS

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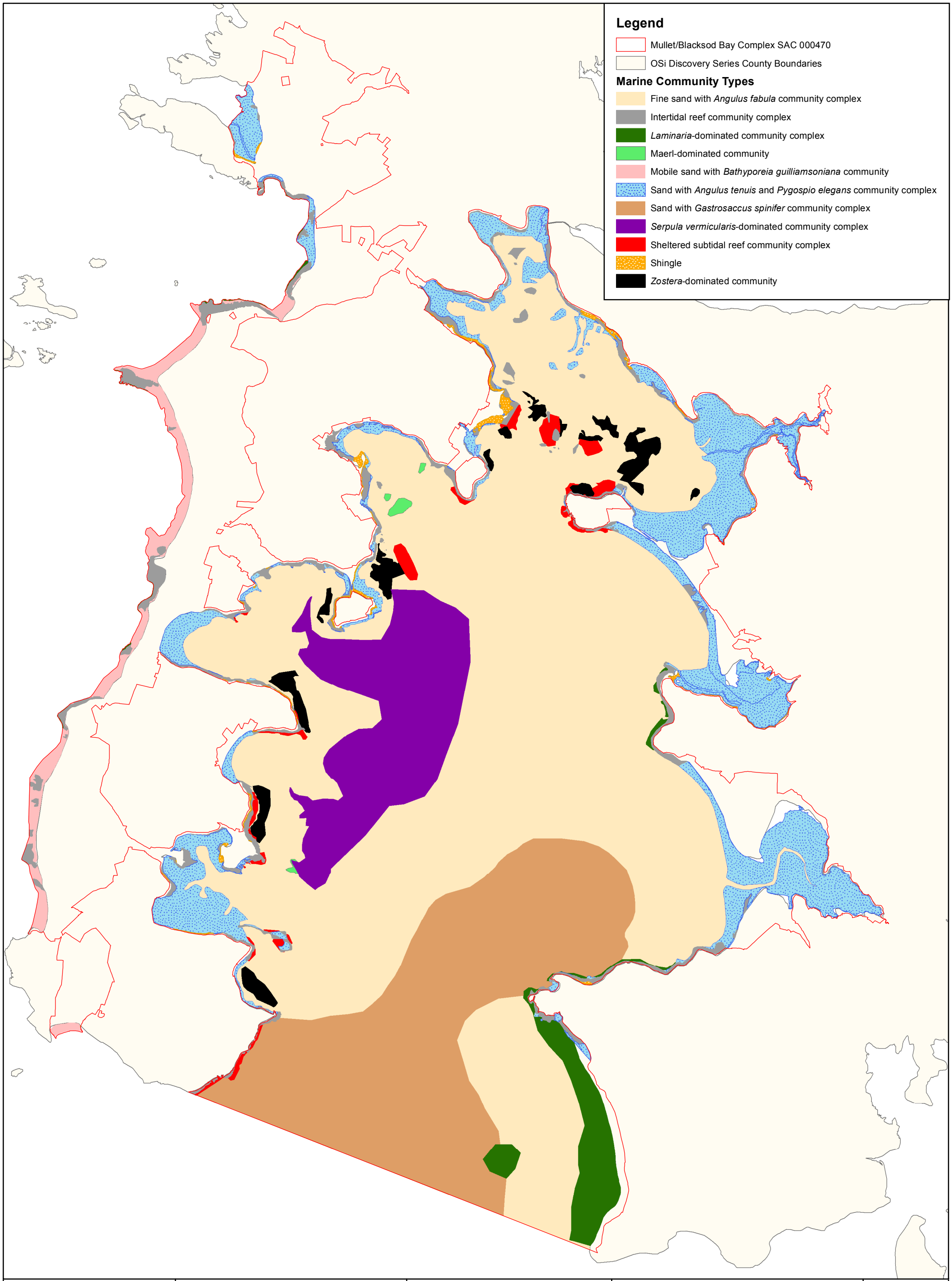

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MAP 6:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

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Mullet/Blacksod Bay Complex SAC 000470

OSi Discovery Series County Boundaries

SMP: 0113 Saltmarsh Monitoring Project Site Codes

Saltmarsh Habitats

Qualifying Interests

Salicornia and other annuals colonising mud and sand, *Salicornia* and other annuals colonising mud and sand

Non Qualifying Interests

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

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

1410 Mediterranean salt meadows (Juncetalia maritimi)

Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

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

Potential 1410 Mediterranean salt meadows (Juncetalia maritimi)

SMP: 0116

SMP: 0115

SMP: 0114

SMP: 0113

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MAP 7:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

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0 1 2 3 km

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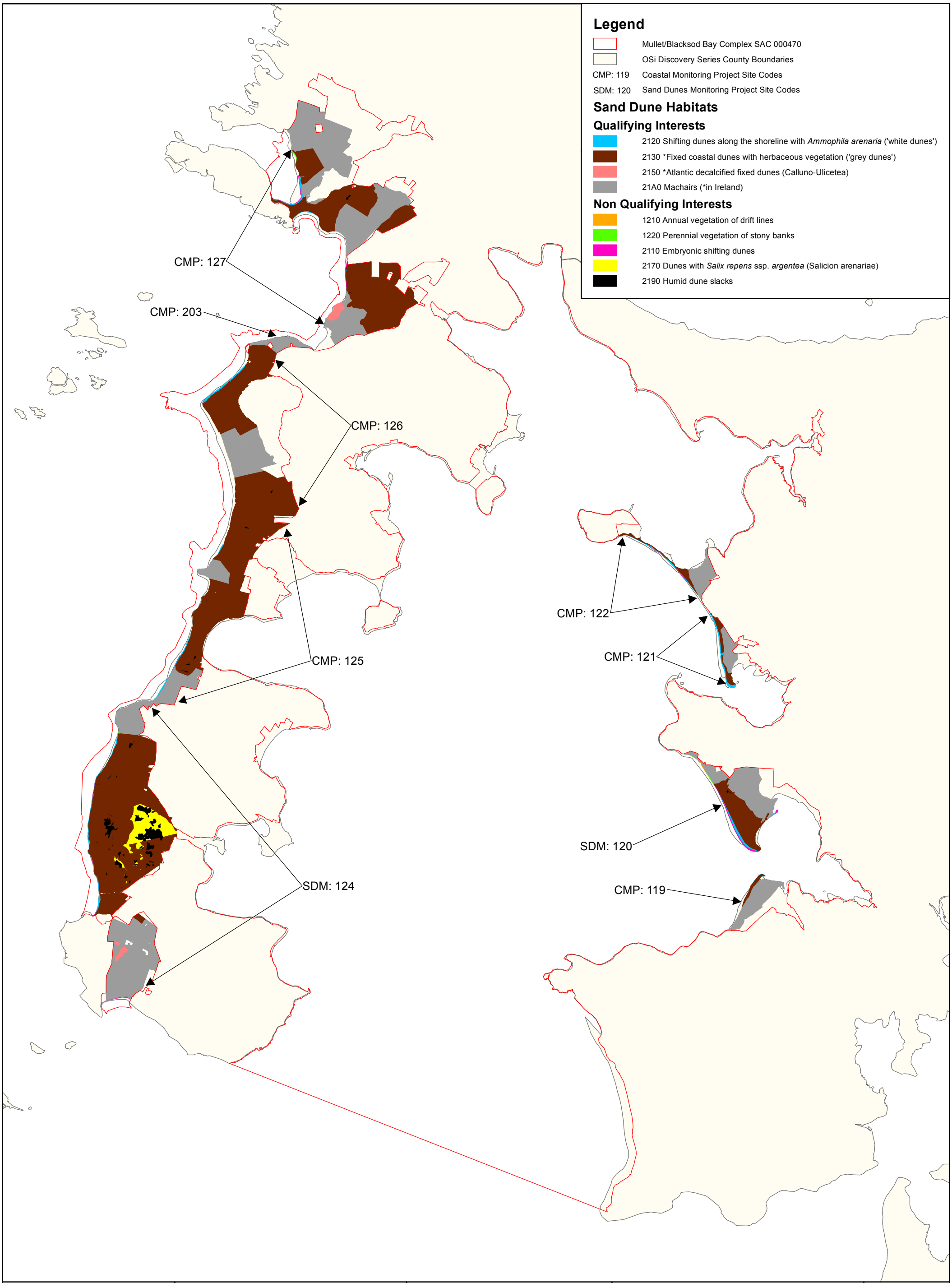

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MAP 8:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

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0 1 2 3 km

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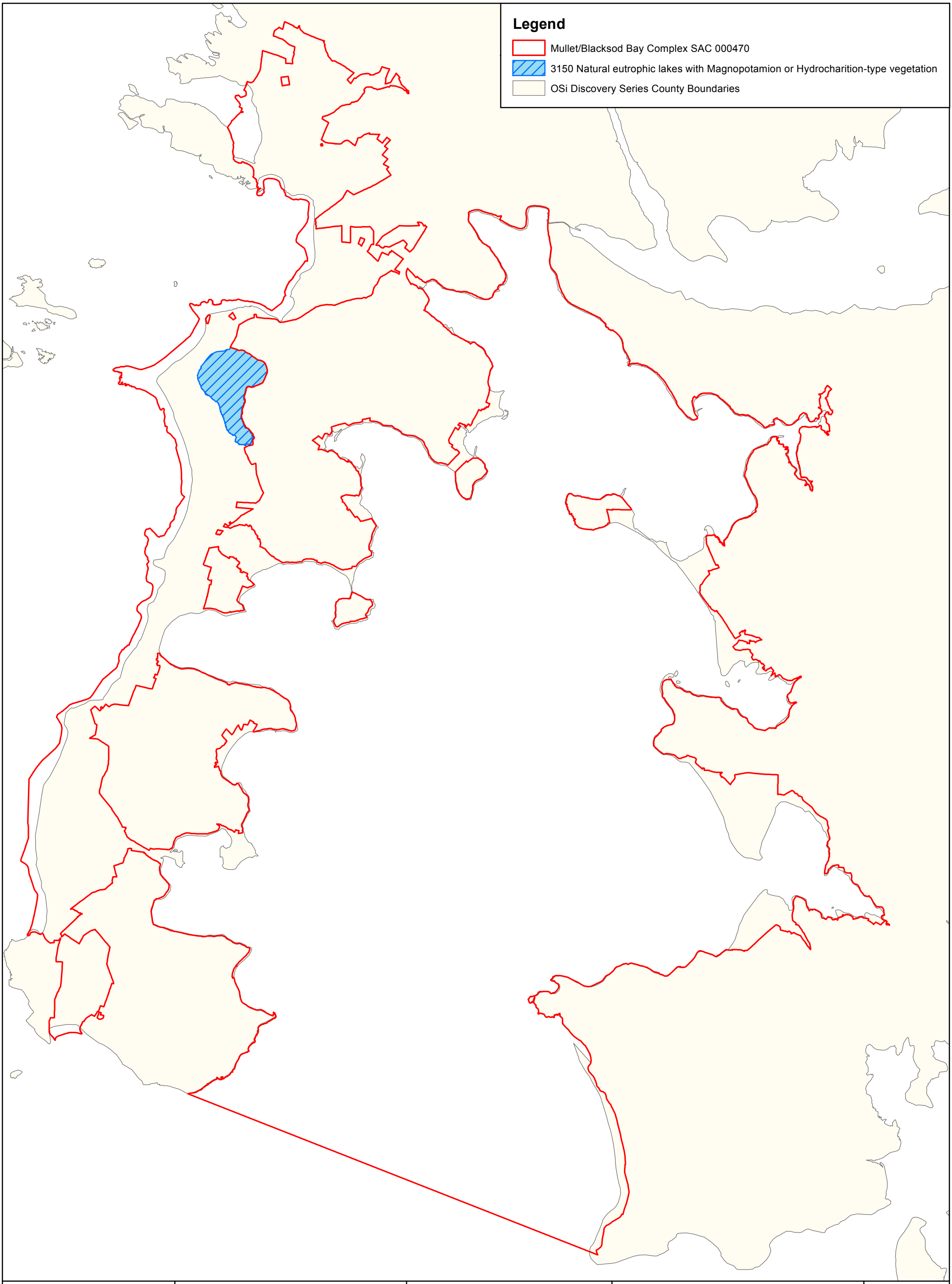

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MAP 9:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
LAKE HABITATS

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

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0 1 2 3 km

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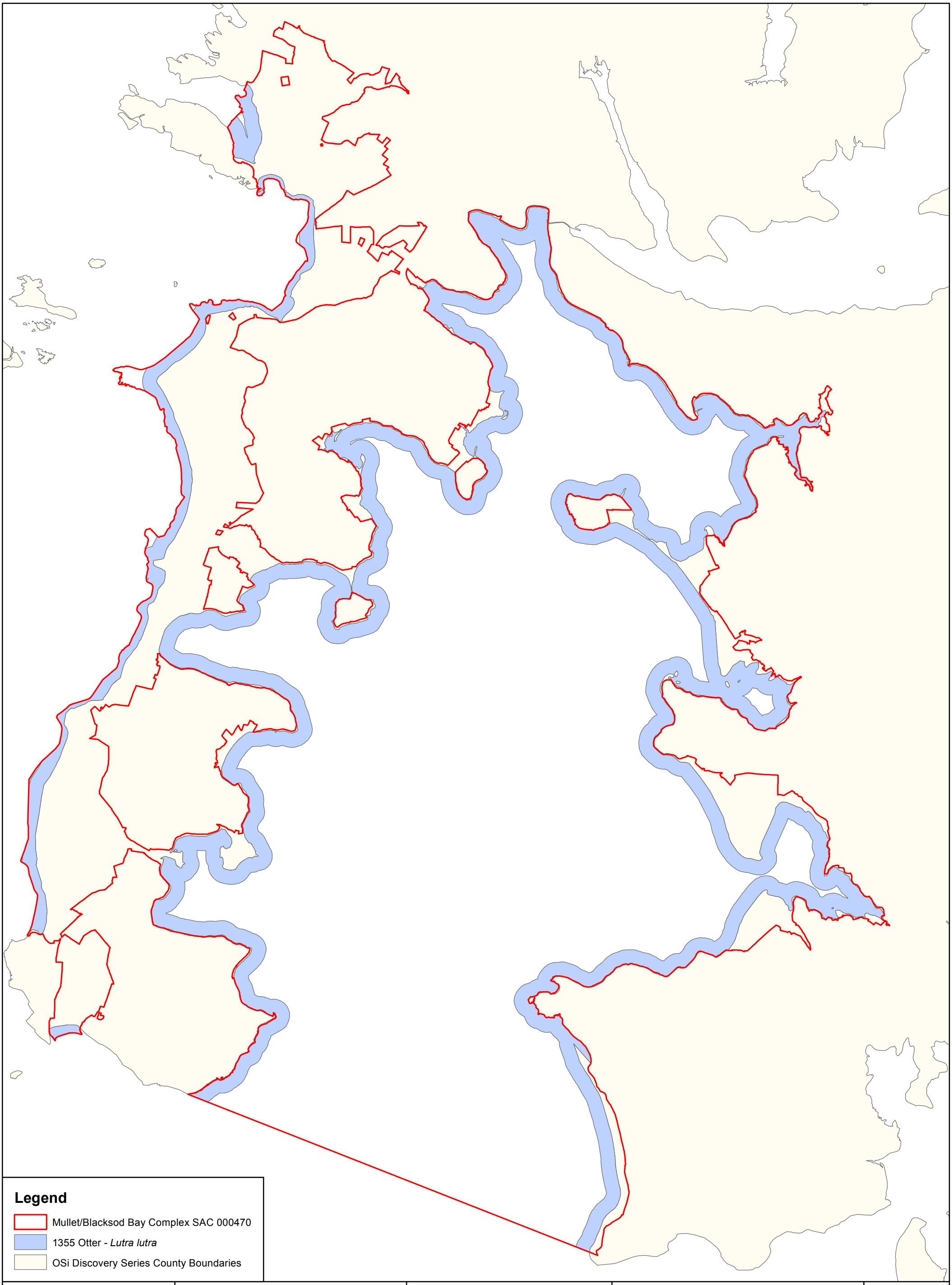
Map Version 1
Date: Dec 2014



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MAP 10:
MULLET/BLACKSOD BAY COMPLEX SAC
CONSERVATION OBJECTIVES
OTTER COMMUTING

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

SITE CODE:
SAC 000470; version 3.01. CO. MAYO

0 1 2 3 km

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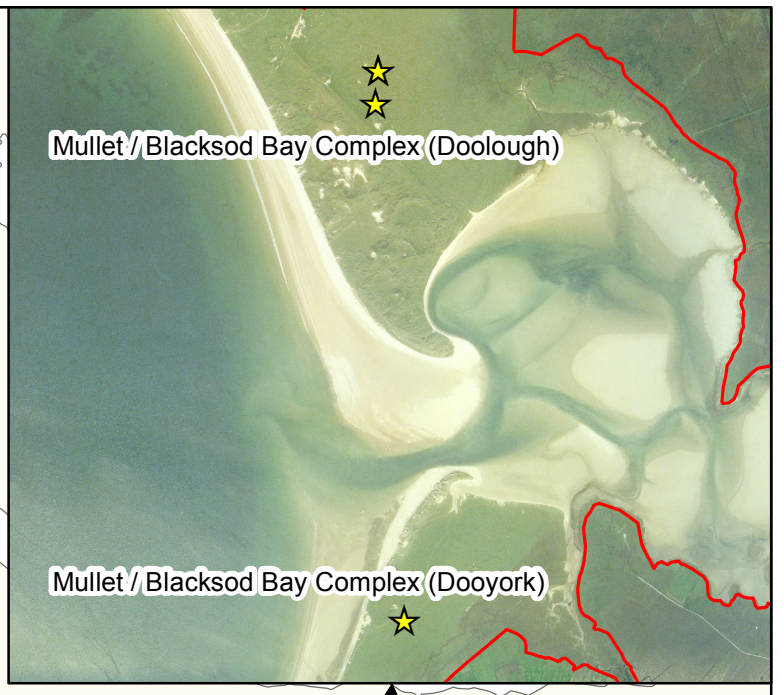
Map Version 1
Date: Dec 2014



Legend

- Mullet/Blacksod Bay Complex SAC 000470
- 1395 Petalwort - *Petalophyllum ralfsii*
- OSi Discovery Series County Boundaries

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Department of Arts, Heritage and the Gaeltacht

MAP 11: MULLET/BLACKSOD BAY COMPLEX SAC CONSERVATION OBJECTIVES PETALWORT

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

SITE CODE:
SAC 000470; version 3.01. CO. MAYO

0 1 2 3 km

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Map Version 1
Date: Dec 2014

Conservation objectives for Brackloon Woods SAC [000471]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Brackloon Woods SAC [000471]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Broadhaven Bay SAC 000472

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201п) Conservation Objectives: Broadhaven Bay SAC 000472. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000472	Broadhaven Bay SAC
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
8330	Submerged or partially submerged sea caves

Please note that this SAC overlaps with Blacksod Bay/Broadhaven Bay SPA (004037). It is adjacent to Mullet/Blacksod Bay Complex SAC (000470), Glenamoy Bog Complex SAC (000500), Erris Head SAC (001501) and West Connaught Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2007
Title :	Surveys of sensitive subtidal benthic communities
Author :	MERC
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Broadhaven Bay SAC (site code: 472) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2014
Title :	Broadhaven Bay SAC (site code: 472) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	1998
Title :	The saltmarshes of Ireland: an inventory and account of their geographical variation
Author :	Curtis, T.G.F.; Sheehy Skeffington, M.J.
Series :	Biology and Environment, Proceedings of the Royal Irish Academy 98B: 87-104
Year :	2010
Title :	Subtidal benthic investigations in Broadhaven Bay cSAC (site code: IE000472) and Blacksod/Broadhaven SPA (site code: IE004037)
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2010
Title :	Reef investigations in Broadhaven Bay cSAC (site code: IE000472) Co. Mayo
Author :	Aquafact
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2013
Title :	Benthic survey services framework. Blacksod Bay intertidal surveys 2009 & 2010
Author :	RPS
Series :	Unpublished report to the Marine Institute and NPWS

Spatial data sources

Year :	Interpolated 2014
Title :	1994 BioMar Survey; 2009 and 2010 intertidal surveys; 2007 and 2010 subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1140, 1170, marine community types (maps 3, 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 4)
Year :	Derived 2014
Title :	Coast of Ireland Oblique Imagery Survey 2003
GIS Operations :	Point dataset created from visual inspection of survey
Used For :	8330 (map 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 6)
Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1330 (map 7)

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Broadhaven Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSi data as 495ha
Community distribution	Hectares	Conserve the following community types in a natural condition: Coarse sediment to sandy mud with *Pygospio elegans* community complex; Sand with *Angulus tenuis* community complex. See map 6	Based on intertidal surveys in 2009 and 2010 (RPS, 2013). See marine supporting document for further information

1160 Large shallow inlets and bays

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 8,674ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community, subject to natural processes. See map 6	Based on a dive survey undertaken in 2007 (MERC, 2007). See marine supporting document for further details
Community structure: *Zostera* density	Shoots per m²	Conserve the high quality of *Zostera*-dominated community, subject to natural processes	Based on diver observation and underwater viewer (MERC, 2007). See marine supporting document for further details
Community distribution	Hectares	Conserve the following community types in a natural condition: Coarse sediment to sandy mud with *Pygospio elegans* community complex; Sand with *Angulus tenuis* community complex; Sand to coarse sediment with crustaceans and *Polyophthalmus pictus* community complex; Subtidal sand with polychaetes community complex; Fucoid-dominated reef community complex; Subtidal reef community complex. See map 6	Based on a BioMar survey in 1994 (Picton and Costello, 1997), a sensitive species survey in 2007 (MERC, 2007), intertidal and subtidal surveys in 2009 and 2010 (Aquafact, 2010; RPS, 2013) and an intertidal walkover undertaken in 2013. See marine supporting document for further information

1170 Reefs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area estimated as 1,103ha from 1994 BioMar survey (Picton and Costello, 1997) and intertidal and subtidal reef surveys in 2009 (Aquafact, 2010)
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on information from 1994 BioMar survey (Picton and Costello, 1997) and intertidal and subtidal reef surveys in 2009 (Aquafact, 2010). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community types in a natural condition: Fucoid-dominated reef community complex; Subtidal reef community complex. See map 6	Reef mapping based on information from 1994 BioMar survey (Picton and Costello, 1997) and intertidal and subtidal reef surveys in 2009 (Aquafact, 2010) and an intertidal walkover undertaken in 2013. See marine supporting document for further details

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To maintain the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in Broadhaven Bay SAC, which is defined by the following list of attributes and targets:

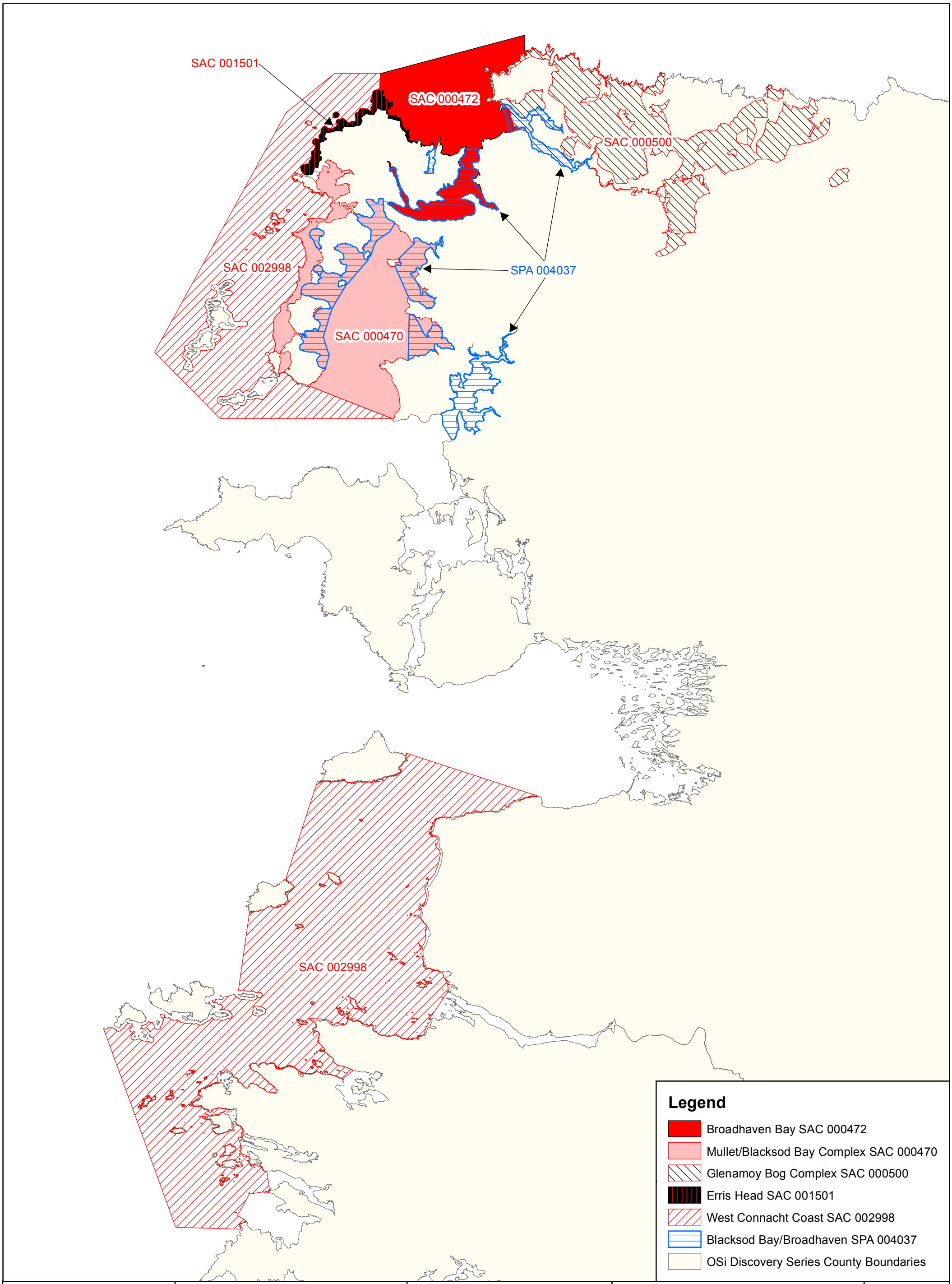
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. Potential area mapped: 13.46ha. See map 7	Based on data from Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). Although the site was not physically surveyed, 13.46ha of potential habitat were identified through an examination of orthophotographs (OSi 2005 Series). NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 7 for potential distribution	Based on data from Curtis and Sheehy Skeffington (1998) McCorry and Ryle (2009). Two saltmarsh sites are known to occur at Tallagh and Barnatra. Both sites are in sheltered locations in the inner part of the bay. See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from NPWS internal files. The natural functioning of the saltmarsh at Tallagh has been affected by a long established road. Some reclamation works have also been carried out at this site in the past. See coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession	Pools and channels occur at the saltmarshes at Barnatra and Tallagh. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from NPWS internal files. At both Barnatra and Tallagh, the saltmarshes merge into wet pasture and bog habitats. See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from NPWS internal files. The structure of the saltmarshes at Barnatra and Tallagh has been affected by grazing, which is heavy in places. See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% area outside creeks vegetated	See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)	Based on data from NPWS internal files. Turf fucoids are present. See coastal habitats supporting document for further details
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in this SAC. Prevent establishment of cordgrass	*Spartina* is thought to be absent from the SAC. See coastal habitats supporting document for further details

8330 Submerged or partially submerged sea caves

To maintain the favourable conservation condition of Submerged or partially submerged sea caves in Broadhaven Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	The distribution of sea caves remains stable, subject to natural processes. See map 4 for known caves	Sea cave distribution at this site was derived from an oblique aerial survey and therefore only detects the presence of sea caves visible intertidally in the flight path. NB other sea caves may occur within the SAC
Community structure	Biological composition	Human activities should occur at levels that do not adversely affect the ecology of sea caves in this SAC	

SAC 000472
Ross Port
Knocknalina
Belmullet
Ballina
Castlebar
Wesport
CO. SLIGO
CO. MAYO
CO. GALWAY
Benwee Head
An Bhinn Bhui
Hag Island
Kid Island
Rinnaglana
Stonefield
Carrowteige
Ceathrú Thaidhg
Gaves Hill
Cairn and Graveyard
Slugga
Currauntboy
An Corrán Buí
Rinroe Point
Sandhill Settlement
Ceann Iorrais
Erris Head
Pigeon Rock
Pigeon Rock
Oileán Dhaimhín
Illandavuck
Dubastuckaun
Ooghwee
Promontory Fort
Danish Cellar
Leamataggart
Pollnashantinny
BROAD HAVEN
Cuan an Inbhir
Gleann Lára
Glenlara
Fort
Cone Is.
Cone Is. Sth.
Ooghran Pt.
Promontory Fort
An Gort Breac
Gortbrack
Fohergarve
An Chéibh Bhán
Illanbaun
Illantreach
Promontory Fort
Dunveel Point
Pollacappul North
Promontory Fort
An Cluainín
Clooneen
Gort an Eadain
Slipway
Promontory Fort
Glash Island
Poll an Chapaill
Pollacappul
An Baile Glas
Ballyglass
Achadh Ghleisín
Aghaglasheen
Bun Thra
Bantrauve
Blind Harbour
An Tom Mhór
Toormore
Promontory Fort
Pier
Slipway
Lifeboat Sta.
Cnoc Seanbhotha
Knockshanbo
Enclosure
Barrow
Owendaff River
Crocán na Line
Knocknaline
Megalithic Tomb
Pre-bog Wall
Cairn
Talaith
Tallagh
Scairbheachaidh
Shanaghy
An tInbhear
Inver
Goat Mellle
Gortmelkia
Megalithic Tomb
Knockadoweer
Cnoc na Lobhar
Cloghbrack
Muingerroon North
An Carn
Water Towers
Maigh Reithin
Moyrahan
Cillín
Shanaghy Point
Beal an Mhuirthead
BELMULLET
Hospital
Meteorological Stn.
R313
Quay
Fire Sta.
Industrial Est.
Moyrahan Point
Inis Doire
Inishderry
Pickle Point
Binn na Sionnach
Binnashinriagh
An Ceathrú Mhór
Carrowmore
R314
Mound
Ait Tí Conáin
Aliconaun
An Chorrchoill
Corclogh
Standing Stone
An Tuar Glas
Toorglass
Souterrain
Cairn
Doire Chorb
Derrycorib
Doire na Madl
Derrynamaddel
Na Monga
Muinga
An Aird Mhór
Ardnamore
Faulagh
Fálach
Megalithic Tombs
Muingerroon
Barnatra
Barr na Trá
Carrowmore Lake
Sruwaddacon
Ross Port
Ros Dumha
Megalithic Circle
Megalithic Tomb
Doonearton
Dún Chearáin
Barnacuille
Greannichbeg
Graghil
Carnhill
Gort an Chairn
Church
Holy Well
Rollatomish
Poll an Tomais
Isleornmon
Oileán Chormaic
An Gort Breac Thuaidh
Gortbrack North
Megalithic Tomb
Megalithic Tomb
Stone Circle
Megalithic Tomb
Megalithic Tombs
Megalithic Tomb
Megalithic Tomb
Bellanabeal
Béal an Átha
Faulagh
Fálach
Barnatra
Barr na Trá
Pollagrraun
Carrowmore Br.
Muingerroon Br.
Cillín
Trig. Pillar
Pollagrraun
Pollagrraun Lough
Tawnykinlaun
Promontory Forts
Promontory Fort
Promontory Forts
Promontory Fort
Promontory Forts
Promontory Fort
Ballyglass
Pier
Slipway
Lifeboat Sta.
Cillín
Ross Port
Ros Dumha
Megalithic Tomb
Megalithic Circle
Megalithic Tomb
Megalithic Tombs
Megalithic Tomb
Megalithic Tomb
Megalithic Tomb



Legend

- Broadhaven Bay SAC 000472
- Mullet/Blacksod Bay Complex SAC 000470
- Glenamoy Bog Complex SAC 000500
- Erris Head SAC 001501
- West Connacht Coast SAC 002998
- Blacksod Bay/Broadhaven SPA 004037
- OSi Discovery Series County Boundaries

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MAP 2:
BROADHAVEN BAY SAC
CONSERVATION OBJECTIVES
ADJOINING / ADJACENT
OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000470; version 3.01, SAC 000472; version 3.01, SAC 000500; version 3.01, SAC 001501; version 3, SAC 002998; version 3. SPA 004037; version 2.01.

0 2 4 6 8 10 km

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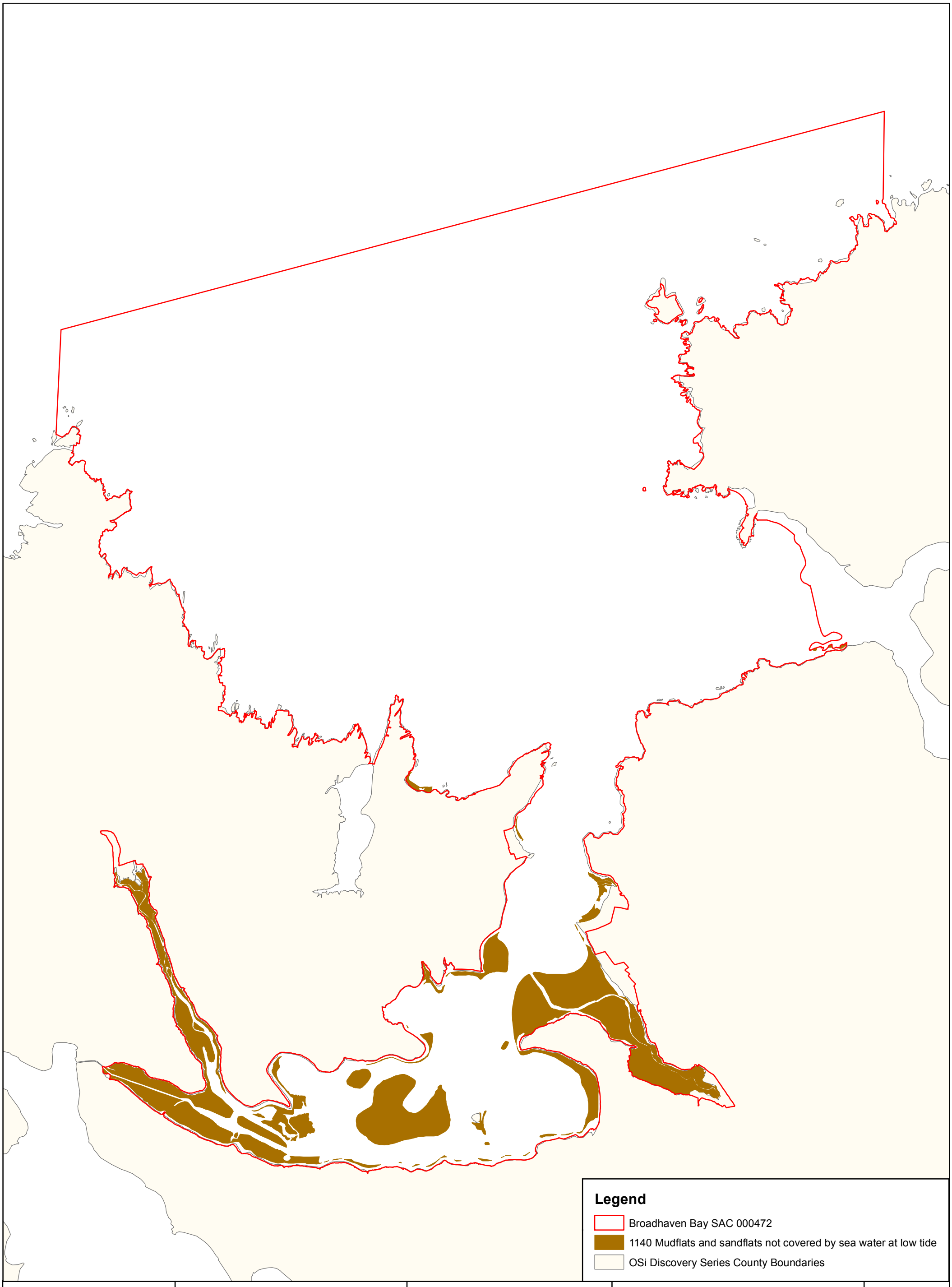
Map Version 1
Date: Feb 2014



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MAP 3:
BROADHAVEN BAY SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

SITE CODE:
SAC 000472; version 3.01. CO. MAYO

0 0.5 1 1.5 2 km

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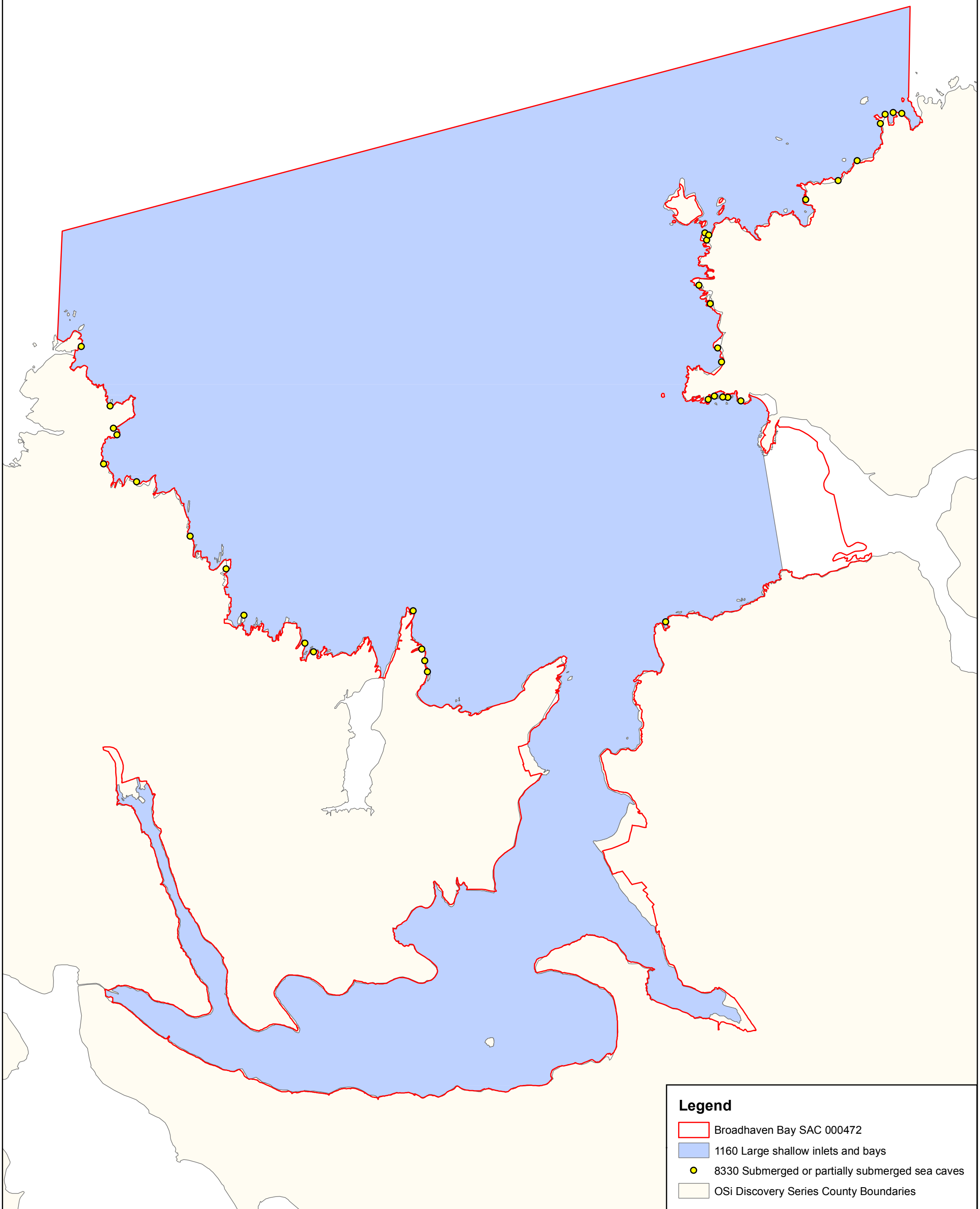
Map Version 1
Date: Feb 2014



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MAP 4: BROADHAVEN BAY SAC CONSERVATION OBJECTIVES LARGE SHALLOW INLETS AND BAYS & SEA CAVES

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

SITE CODE:
SAC 000472; version 3.01. CO. MAYO

0 0.5 1 1.5 2 km

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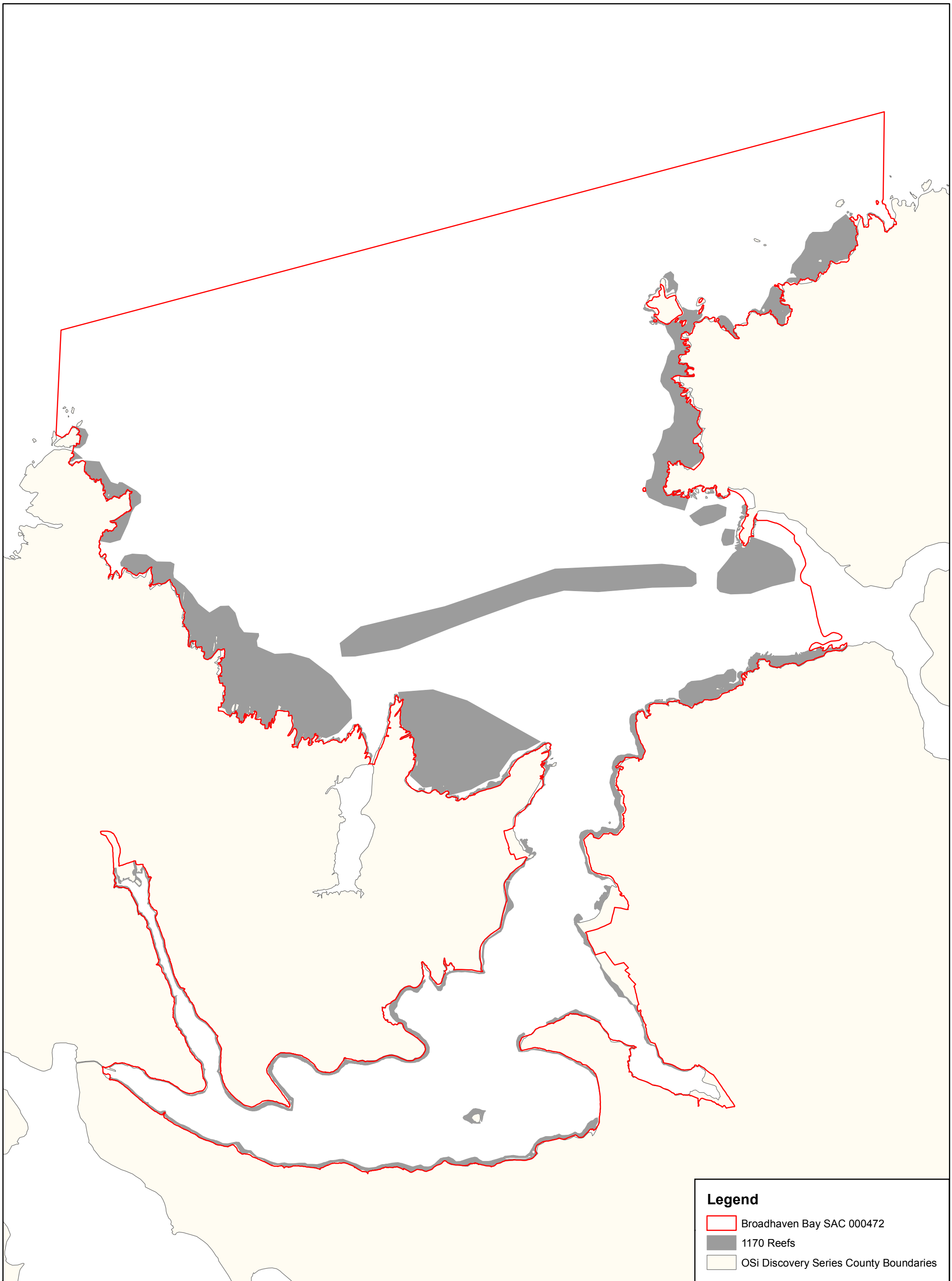
Map Version 1
Date: Feb 2014



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Department of Arts, Heritage and the Gaeltacht

MAP 5: BROADHAVEN BAY SAC CONSERVATION OBJECTIVES REEFS

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

SITE CODE:
SAC 000472; version 3.01. CO. MAYO

0 0.5 1 1.5 2 km

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Map Version 1
Date: Feb 2014

Legend

Broadhaven Bay SAC 000472

OSi Discovery Series County Boundaries

Marine Community Types

Coarse sediment to sandy mud with *Pygospio elegans* community complex

Fucoid-dominated reef community complex

Sand to coarse sediment with crustaceans and *Polyophthalmus pictus* community complex

Sand with *Angulus tenuis* community complex

Shingle

Subtidal reef community complex

Subtidal sand with polychaetes community complex

Zostera-dominated community

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MAP 6: BROADHAVEN BAY SAC CONSERVATION OBJECTIVES MARINE COMMUNITY TYPES

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

SITE CODE:
SAC 000472; version 3.01. CO. MAYO

0 0.5 1 1.5 2 km

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Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Feb 2014

Legend

Broadhaven Bay SAC 000472

OSi Discovery Series County Boundaries

Saltmarsh Habitats

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

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Department of Arts, Heritage and the Gaeltacht

MAP 7:
BROADHAVEN BAY SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

SITE CODE:
SAC 000472; version 3.01. CO. MAYO

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
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Date: Feb 2014

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Ballymaglancy Cave, Cong SAC 000474

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,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2018) Conservation Objectives: Ballymaglancy Cave, Cong SAC 000474. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000474	Ballymaglancy Cave, Cong SAC
1303	Lesser Horseshoe Bat *Rhinolophus hipposideros*
8310	Caves not open to the public

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2007
Title :	Protecting and managing underground sites for bats
Author :	Mitchell-Jones, A.J.; Bihari, Z.; Masing, M.; Rodrigues, L.
Series :	EUROBATS Publication Series No. 2
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2009
Title :	Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*
Author :	Knight, T.; Jones, G.
Series :	Endangered Species Research, 8: 79-86

Spatial data sources

Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roost identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8310, 1303 (map 2)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 2)

Conservation Objectives for : Ballymaglancy Cave, Cong SAC [000474]

8310 **Caves not open to the public**

Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Ballymaglancy Cave, Cong SAC. See map 2. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further details

Attribute	Measure	Target	Notes

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To restore the favourable conservation condition of Lesser Horseshoe Bat in Ballymaglancy Cave, Cong SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 50 bats for the winter roost (roost id. 245 in NPWS database). See map 2	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (*Rhinolophus hipposideros*). NPWS conduct annual counts at each qualifying roost. Qualified means from the 2013-2017 winter data have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean is usually set as the target figure for the roost. However, in the case of the winter roost (roost id. 245 in NPWS database) in Ballymaglancy Cave, Cong SAC, where a mean of 28 bats was recorded (2013-2017), the target is instead set at the MQS of 50 bats. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Winter roosts	Condition	No decline	Ballymaglancy Cave, Cong SAC has been selected for lesser horseshoe bat because of the presence of one internationally important winter roost (roost id. 245 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Mitchell-Jones et al., 2007)
Auxiliary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity and winter hibernation roosts. Such additional roosts within the SAC may be important as night roosts, satellite roosts, etc. Night roosts are also considered an integral part of core foraging areas and require protection (Knight and Jones, 2009). In addition, in response to weather conditions for example, bats may use different seasonal roosts from year to year; this is particularly noticeable in winter. A database of all known lesser horseshoe bat roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roost	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 2 which shows a 2.5km zone around the above roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roost. See map 2	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 2	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)

Baile Mhic
Fhlannchaidh

Cloghbrack

CO. MAYO

SAC 000474

Cong

CO. GALWAY

Legend

Ballymaglancy Cave, Cong SAC 000474

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Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

MAP 1:
BALLYMAGLANCY CAVE, CONG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000474; version 3.01. CO. GALWAY, CO.MAYO

0 25 50 75 100 Meters

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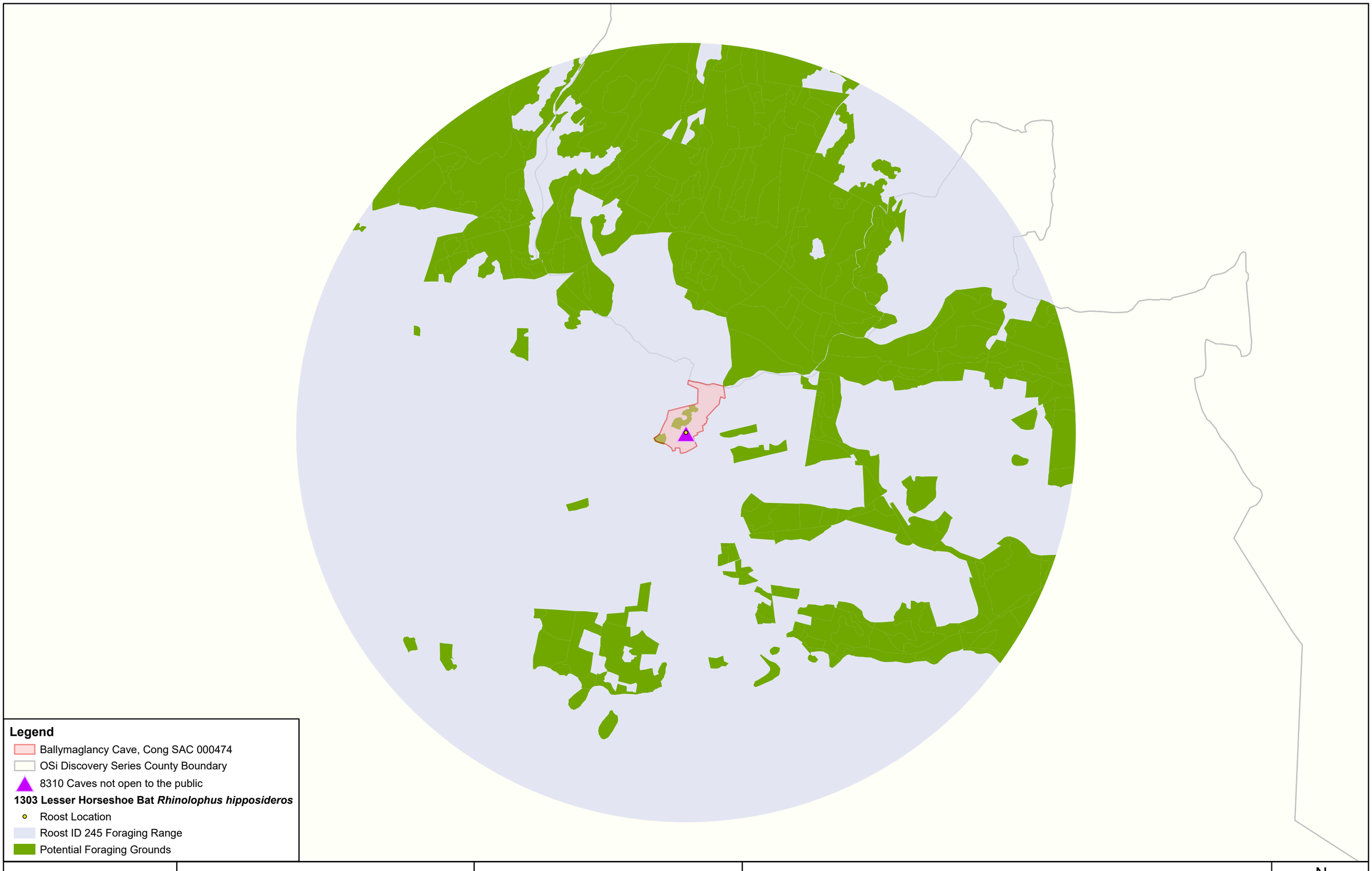
Map Version 1
Date: June 2018



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Department of Culture, Heritage and the Gaeltacht

MAP 2:
BALLYMAGLANCY CAVE, CONG SAC
CONSERVATION OBJECTIVES
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 000474; version 3.01. CO. GALWAY, CO.MAYO

0 0.25 0.5 0.75 1 Kilometers

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Map Version 1
Date: June 2018

Conservation objectives for Carrowkeel Turlough SAC [000475]

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.

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- 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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Carrowkeel Turlough SAC [000475]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Carrowmore Lake Complex SAC 000476

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Carrowmore Lake Complex SAC 000476. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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- the conservation status of its typical species is favourable.

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- 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***

000476	Carrowmore Lake Complex SAC
1393	Slender Green Feather-moss *Drepanocladus vernicosus*
1528	Marsh Saxifrage *Saxifraga hirculus*
7130	Blanket bogs (* if active bog)
7150	Depressions on peat substrates of the Rhynchosporion

Please note that this SAC overlaps with Carrowmore Lake SPA (004052) and adjoins Slieve Fyagh Bog SAC (000542). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjoining sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	1989
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.
Series :	A report commissioned by the Wildlife Service
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manual No. 88
Year :	2015
Title :	Monitoring methods for *Hamatocaulis vernicosus* (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Carrowmore Lake Complex SAC (site code: 476) Conservation objectives supporting document- blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1989
Title :	The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author :	Hedenäs, L.
Series :	Lindbergia, 15: 8-36

Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Datasets created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1393, 1528 (maps 3 and 4)

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Carrowmore Lake Complex SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 2,285ha, covering 63% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Carrowmore Lake Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Blanket bog habitat lies east of Carrowmore Lake. Three large areas of blanket bog are incorporated into the SAC at Glenturk, Carrowmore (or Glencullin) and Largan More. Further information can be found in Foss and McGee (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Foss and McGee, 1987; Douglas et al., 1989; NPWS internal files), four of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, 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). Rhododendron (*Rhododendron ponticum*) was recorded from blanket bog within the SAC (NPWS internal files)

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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). There are rare and threatened species in flushes within blanket bog in the SAC (NPWS internal files), including the Annex II and Annex IV listed, FPO listed and Near Threatened marsh saxifrage (*Saxifraga hirculus*) (Wyse Jackson et al., 2016) and the Annex II listed, FPO listed and Near Threatened slender green feather-moss (*Hamatocaulis* (*Drepanocladus*) *vernicosus*) (Lockhart et al., 2012). Although these species cannot be assigned specifically to blanket bog habitat, i.e. they are flush/fen species, they do occur in association with it (Muldoon et al., 2015; Campbell et al., 2015). See also the conservation objectives for marsh saxifrage (1528) and slender green feather-moss (1393)

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Carrowmore Lake Complex SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Carrowmore Lake Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	This habitat is scattered throughout the blanket bog in the SAC. It is best developed in areas of deep, quaking peat and around pools (Douglas et al., 1989; NPWS internal files). Further information can be found in Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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)

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

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

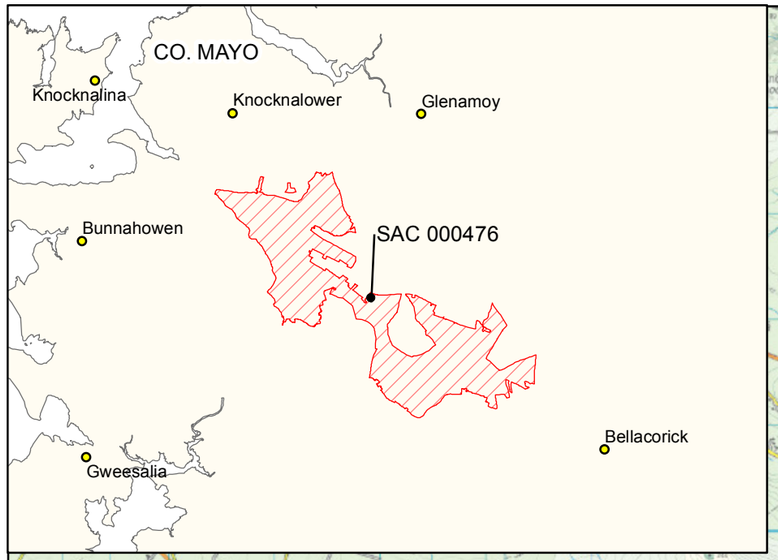
Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline, subject to natural processes. See map 3 for known locations at Largan More	(Please note that *Drepanocladus vernicosus* was reclassified as *Hamatocaulis vernicosus* by Hedenäs (1989)). The known population of slender green feather-moss (*Hamatocaulis vernicosus*) in Carrowmore Lake Complex SAC occurs in flushes, spring heads and beside water tracks within the blanket bog at Largan More. Data from NPWS surveys (NPWS internal files), Campbell (2013) and Campbell et al. (2015)
Population size	Number of individuals	No decline, subject to natural processes	The population at Largan More was estimated by Campbell (2013) to be 3,979,350 shoots (c.3,979,000 shoots). Counts of shoots were based on the mean of number of shoots in four 10cm x 10cm areas, extrapolated to 8,325 per m^2 in 478m^2 (Campbell, 2013). See Campbell et al. (2015) for further details
Population cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of slender green feather-moss (*Hamatocaulis vernicosus*) should be at least 24%	The mean percentage cover of slender green feather-moss (*Hamatocaulis vernicosus*) recorded in four 2m x 2m plots at Largan More was 29.5% (Campbell, 2013). The target cover figure is a c.20% reduction of the recorded cover to allow for a margin of error and variability over monitoring seasons. See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The extent of occupancy for the species at Largan More is estimated to be c.1,593m^2; however, only c.30% of this area is suitable habitat, i.e. c.478m^2 (0.048ha). See Campbell (2013) and Campbell et al. (2015) for further details
Hydrological conditions: water table level	Metres	Maintain suitable hydrological conditions	Slender green feather-moss (*Hamatocaulis vernicosus*) is mostly confined to mesotrophic fens, a transitional habitat between acid bog and base-rich fen. This appears to occur in at least two forms in Ireland: transitional flushes, where the plants can occur in lawns that rise and fall with fluctuating water table levels, such as at Largan More; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation composition: tree cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage tree cover should be less than 15%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0% tree cover at Largan More. See also Campbell et al. (2015)
Vegetation composition: shrub cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage shrub cover should be less than 20%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. Campbell (2013) recorded 0% shrub cover at Largan More. See also Campbell et al. (2015)
Vegetation composition: grass cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage grass species cover should be less than 25%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of grasses, maintained by a low grazing intensity by sheep and cattle at Largan More. Campbell (2013) recorded grass cover of 1-10% in four 2m x 2m plots at Largan More. See also Campbell et al. (2015)
Vegetation composition: bryophyte cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage bryophyte cover should be more than 50%	Campbell (2013) recorded bryophyte cover of 34-90% in four 2m x 2m plots at Largan More. See also Campbell et al. (2015)

Vegetation composition: cover of *Calliergonella cuspidata*	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of *Calliergonella cuspidata* should be less than 15%	*Calliergonella cuspidata*, a moss species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. Cover of *Calliergonella cuspidata* was 0-2% in four 2m x 2m plots recorded by Campbell (2013) at Largan More. See also Campbell et al. (2015)
Vegetation structure: vegetation height	Centimetres in a representative number 2m x 2m monitoring plots	Mean vegetation height should not exceed 40cm	Campbell (2013) recorded a mean vegetation height of 13.7cm in four 2m x 2m plots at Largan More. See also Campbell et al. (2015)

1528 Marsh Saxifrage *Saxifraga hirculus*

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

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No loss in geographical spread and number of populations, subject to natural processes. See map 4 for 1km grid square locations	Marsh saxifrage (*Saxifraga hirculus*) is known to occur in three flushes in Carrowmore Lake Complex SAC, at Largan Mor A, Largan Mor B and Largan Mor C. See Muldoon (2011) and Muldoon et al. (2015)
Population size: number of rosettes	Number	Maintain the size of each known population, subject to natural processes. The target numbers of rosettes are: at least 2,800 at Largan Mor A, at least 440 at Largan Mor B and at least 80 at Largan Mor C	The numbers of rosettes recorded were: 3,500 at Largan Mor A, 550 at Largan Mor B (Muldoon, 2011) and 100 at Largan Mor C (NPWS internal files). The target figures are a 20% reduction of the recorded numbers to allow for a margin of error and variability over monitoring seasons. See Muldoon et al. (2015) for further details
Population size: area of occupancy	Hectares	Maintain the area of occupancy of each known population, subject to natural processes. The target areas are: at least 0.0084ha at Largan Mor A, at least 0.00045ha at Largan Mor B and at least 0.00027ha at Largan Mor C	The areas of occupancy for the species estimated by Muldoon (2011) were: 93m² (0.0093ha) at Largan Mor A and 5m² (0.0005ha) at Largan Mor B. The area of occupancy at Largan Mor C has been estimated to be 3m² (0.0003ha) (NPWS internal files). The target area figures are a 10% reduction of the recorded areas to allow for a margin of error. See Muldoon et al. (2015) for further details
Hydrological conditions: water level	Occurrence of high or fluctuating water levels	Maintain the appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, marsh saxifrage (*Saxifraga hirculus*) is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation composition: postive indicator species	Occurrence in a number of 1m x 1m monitoring stops	Knotted pearlwort (*Sagina nodosa*) should be present in at least two of five 1m x 1m monitoring stops	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation composition: negative indicator species	Mean percentage cover in five 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (*Molinia caerulea*) should not exceed 5%; mean percentage cover of Yorkshire fog (*Holcus lanatus*) should not exceed 15%	Low cover of the negative indicator species purple moor-grass (*Molinia caerulea*) and Yorkshire fog (*Holcus lanatus*) should be maintained. See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: sward height	Centimetres	Maintain a mean vegetation height of less than 15cm	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing level	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	Low grazing was identified as an issue at Largan Mor A and Largan Mor B; however, vegetation height was within the target range at both sites. See Muldoon (2011) and Muldoon et al. (2015) for further details



Legend

Carrowmore Lake Complex SAC 000476

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

MAP 1:
CARROWMORE LAKE COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000476; version 3
CO. MAYO

0 1 2 3 4 km

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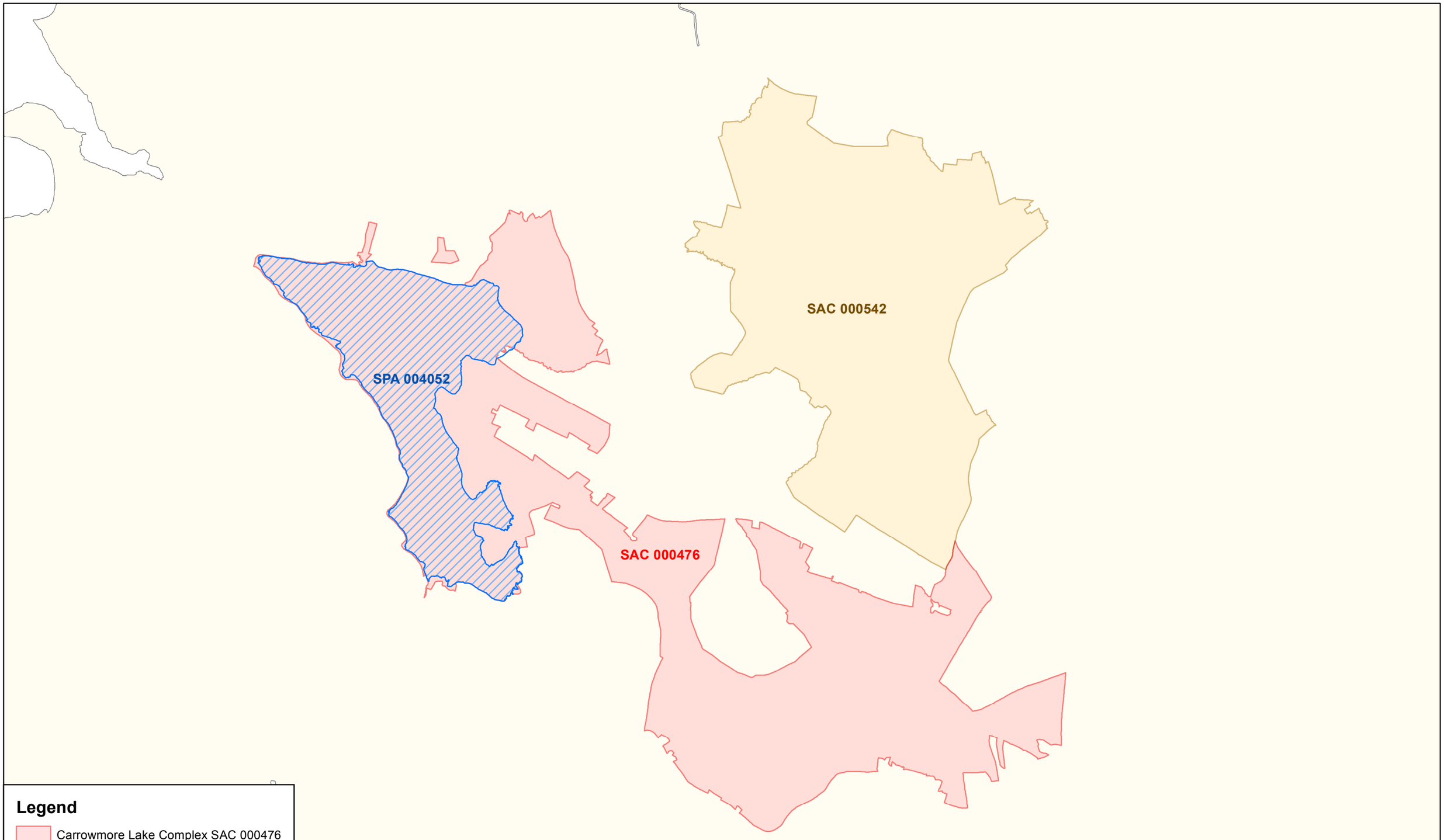
Map Version 1
Date: April 2017



Legend

- Carrowmore Lake Complex SAC 000476
- Slieve Fyagh Bog SAC 000542
- Carrowmore Lake SPA 004052

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

MAP 2:
CARROWMORE LAKE COMPLEX SAC
CONSERVATION OBJECTIVES
OVERLAPPING AND ADJACENT DESIGNATIONS

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

SITE CODE:
SAC 000476; version 3, SAC 000542; version 3.01,
SPA 004052; version 3
CO. MAYO

0 1 2 3 4 km

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Map Version 1
Date: April 2017

Legend

- 1393 Slender Green Feather-moss *Drepanocladus vernicosus*
- Carrowmore Lake Complex SAC 000476

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

MAP 3:
CARROWMORE LAKE COMPLEX SAC
CONSERVATION OBJECTIVES
SLENDER GREEN FEATHER MOSS
DREPANOCLADUS VERNICOSUS

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

SITE CODE:
SAC 000476; version 3
CO. MAYO

0 1 2 3 km

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1528 Marsh Saxifrage - *Saxifraga hirculus*

Carrowmore Lake Complex SAC 000476

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

MAP 4:
CARROWMORE LAKE COMPLEX SAC
CONSERVATION OBJECTIVES
MARSH SAXIFRAGE *SAXIFRAGA HIRCULUS*

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

SITE CODE:
SAC 000476; version 3,
CO. MAYO

0 0.5 1 1.5 2 km

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Map Version 1
Date: April 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Cloughmoyne SAC 000479

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

National Parks and Wildlife Service,
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Citation:

NPWS (2019) Conservation Objectives: Cloughmoyne SAC 000479. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000479	Cloughmoyne SAC

8240	Limestone pavements*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	National survey of limestone pavement and associated habitats in Ireland
Author :	Wilson, S.; Fernandez, F.
Series :	Irish Wildlife Manuals, No. 73
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS

Other References

Year :	1995
Title :	Wood bitter-vetch *Vicia orobus* DC. on lake islands and limestone heath in Cos Galway (H16, H17) and Mayo (H26)
Author :	Roden, C.
Series :	Irish Naturalists' Journal, 25(4): 128-134

Spatial data sources

Year :	2013
Title :	National Survey of Limestone Pavement and Associated Habitats in Ireland distribution data
GIS Operations :	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	8240 (map 2)

8240 Limestone pavements

To restore the favourable conservation condition of Limestone pavements* in Cloughmoyne 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	Limestone pavements* in Cloughmoyne SAC exhibits a good example of the shattered form of the habitat and occurs in intimate association with species-rich calcareous grassland, juniper (*Juniperus communis*) scrub and heath habitats. Therefore, these habitats cannot easily be mapped or considered separately. Wilson and Fernandez (2013) mapped the indicative area of limestone pavement, including mosaics with associated habitats, as 45.2ha in the SAC (see map 2). As part of the National Survey of Limestone Pavement and Associated Habitats (Wilson and Fernandez, 2013), the sub-site Cloughmoyne (site code NSLP26) was surveyed in detail. This survey should be consulted for further details
Habitat distribution	Occurrence	No decline. Map 2 shows indicative distribution, including mosaics with other habitats	See the notes for Habitat area above. Distribution based on data from Wilson and Fernandez (2013). This habitat can be split into exposed pavement and wooded pavement. In this SAC, the habitat is largely confined to hilly land in the east of the SAC where there are some typical clint and grike features in addition to mostly shattered pavement with loose limestone rubble (NPWS internal files)
Vegetation composition: positive indicator species	Number at a representative number of monitoring stops	At least seven positive indicator species present	Positive indicator species for exposed and wooded pavement are listed in Wilson and Fernandez (2013). Positive indicator species recorded by Wilson and Fernandez (2013) in exposed pavement in the SAC include herb-robert (*Geranium robertianum*), bloody crane's-bill (*G. sanguineum*), ivy (*Hedera helix*), wall lettuce (*Mycelis muralis*), wood sage (*Teucrium scorodonia*), wild madder (*Rubia peregrina*), blue moor-grass (*Sesleria caerulea*), burnet rose (*Rosa spinosissima*), juniper (*Juniperus communis*), maidenhair spleenwort (*Asplenium trichomanes*), wall-rue (*A. ruta-muraria*) and the mosses *Ctenidium molluscum, Fissidens dubius, Neckera crispa* and *Tortella tortuosa*
Vegetation composition: bryophyte layer	Percentage at a representative number of monitoring stops	Bryophyte cover at least 50% on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Collective cover of negative indicator species on exposed pavement not more than 1%	Negative indicator species are listed in Wilson and Fernandez (2013). Negative indicator species for wooded pavement overlap with non-native species (below)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1% on exposed pavement; on wooded pavement not more than 10% with no regeneration	Attribute and target based on Wilson and Fernandez (2013). Cotoneaster (*Cotoneaster* spp.) was recorded in the Cloughmoyne sub-site (NSLP26) by Wilson and Fernandez (2013)
Vegetation composition: scrub	Percentage at a representative number of monitoring stops	Scrub cover no more than 25% of exposed pavement	Attribute and target based on Wilson and Fernandez (2013). Scrub encroachment was recorded as a negative impact in the habitat in this SAC by Wilson and Fernandez (2013)
Vegetation composition: bracken cover	Percentage at a representative number of monitoring stops	Bracken (*Pteridium aquilinum*) cover no more than 10% on exposed pavement	Attribute and target based on Wilson and Fernandez (2013). There is some encroachment of bracken onto areas of the limestone pavement habitat in parts of the SAC (Wilson and Fernandez, 2013; NPWS internal files)
Vegetation structure: woodland canopy	Percentage at a representative number of monitoring stops	Canopy cover on wooded pavement at least 30%	Attribute and target based on Wilson and Fernandez (2013)

Vegetation structure: dead wood	Occurrence in a representative number of monitoring stops	Sufficient quantity of dead wood on wooded pavement to provide habitat for saproxylic organisms	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Physical structure: disturbance	Occurrence in a representative number of monitoring stops	No evidence of grazing pressure on wooded pavement	Attribute and target based on Wilson and Fernandez (2013)
Indicators of local distinctiveness	Occurrence	Indicators of local distinctiveness are maintained	This includes species on the Flora (Protection) Order, 2015 (FPO) and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.) and other rare or localised species, as well as archaeological and geological features, which often support distinctive species. Rare and threatened species recorded in the limestone pavement and associated calcareous grassland and heath habitats in the SAC include the FPO listed and Critically Endangered limestone fern (*Gymnocarpium robertianum*), the FPO listed and Vulnerable wood bitter-vetch (*Vicia orobus*), the Vulnerable green-winged orchid (*Anacamptis morio*) and the Near Threatened species spring gentian (*Gentiana verna*), autumn gentian (*G. amarella*), field gentian (*G. campestris*) and dense-flowered orchid (*Neotinea maculata*) (Roden, 1995; Wilson and Fernandez, 2013; Wyse Jackson et al., 2016; NPWS internal files)

CLOGHMOYNE

MOUNTHENRY

Cong

CO. MAYO

SAC 000479

Headford

CO. GALWAY

Oughterard

Carrowmoreknock

Legend

Cloughmoyne SAC 000479

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

MAP 1:
CLOUGHMOYNE SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000479; version 3.02. CO. MAYO

0 90 180 270 360 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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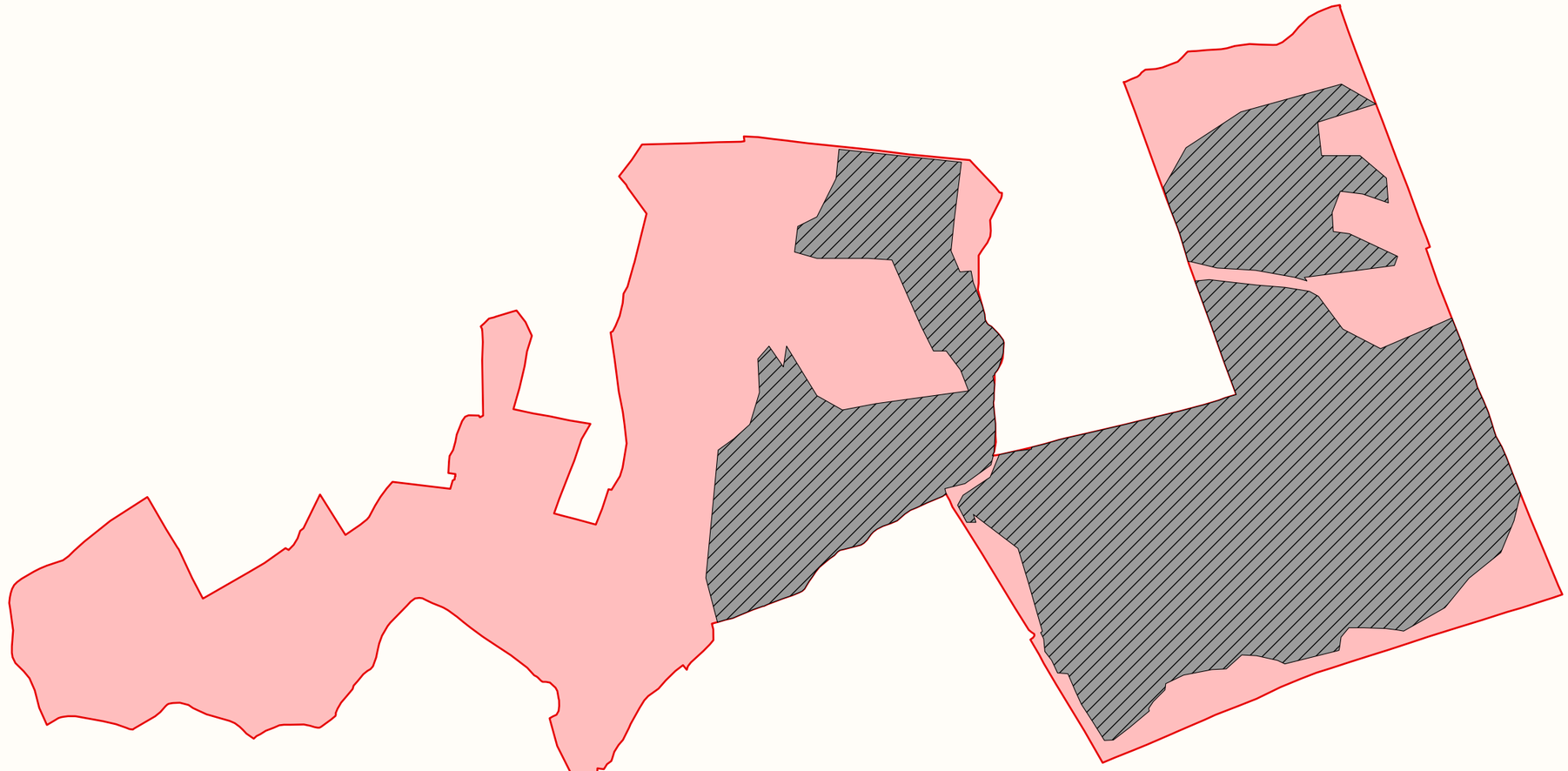
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh OSI-NMA-014. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

N

Map Version 1
Date: Feb 2019



Legend

- 8240 Limestone pavements
- Cloughmoyne SAC 000479
- OSi Discovery Series County Boundary

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Department of Culture, Heritage and the Gaeltacht

MAP 2:
CLOUGHMOYNE SAC
CONSERVATION OBJECTIVES
LIMESTONE PAVEMENT

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

SITE CODE:
SAC 000479; version 3.02. CO. MAYO

0 90 180 270 360 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Feb 2019

Conservation objectives for Clyard Kettle-holes SAC [000480]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*
7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Clyard Kettle-holes SAC [000480]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Cross Lough (Killadoon) SAC [000484]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
1220	Perennial vegetation of stony banks

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Cross Lough (Killadoon) SAC [000484]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Corraun Plateau SAC 000485

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Corraun Plateau SAC 000485. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000485	Corraun Plateau SAC
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
4060	Alpine and Boreal heaths
5130	*Juniperus communis* formations on heaths or calcareous grasslands
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
8220	Siliceous rocky slopes with chasmophytic vegetation

Please note that this SAC adjoins Owenduff/Nephin Complex SAC (000534). See map 2. The conservation objectives for this site should be used in conjunction with those for adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2012
Title :	The Conservation Status of Juniper Formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	National survey of upland habitats (pilot survey phase, 2009-2010), site report no. 2: Corraun Plateau cSAC (000485), Co. Mayo (revision)
Author :	Roche, J.R.; Perrin, P.M.; Barron, S.J.; Daly, O.H.
Series :	Unpublished report to NPWS
Year :	2014
Title :	National survey of upland habitats (phase 4, 2013-2014), summary report
Author :	Barron, S.J.; Perrin, P.M.
Series :	Unpublished report to NPWS
Year :	2016
Title :	Corraun Plateau SAC (site code: 485) Conservation objectives supporting document- upland habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Spatial data sources

Year :	2010
Title :	National Survey of Upland Habitats
GIS Operations :	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
Used For :	4010, 4030, 4060, 8110, 8220 (maps 3, 4, 5, 7 and 8)
Year :	2012
Title :	The conservation status of juniper formations in Ireland
GIS Operations :	Juniper formations polygon centroids clipped to SAC boundary
Used For :	5130 (map 6)

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Corraun Plateau SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Roche et al., 2014 & Perrin et al., 2014). The total current area of wet heath in the SAC stated by Roche et al. (2014) is 2082.4ha. It is the most extensive Annex I habitat at the SAC covering 53.57% of the SAC. Roche et al. (2014) report obvious losses of habitat since 1995 of approximately 8.07ha. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 3	Wet heath was recorded by Roche et al. (2014) throughout the SAC except on the higher ground. Extensive patches occur at on the eastern and southern slopes. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2014) recorded five different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Presence of cross-leaved heath (*Erica tetralix*) near each monitoring stop	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (*Empetrum nigrum*) at least 15%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Roche et al. (2014) and forming extensive carpets. A small population of *Rhododendron ponticum* was recorded from this habitat by 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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document 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	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. *Cladonia rangiferina* has been recorded from within the habitat. This species is listed on a preparatory list of rare and threatened lichens prepared by D. McFerran, National Museums Northern Ireland. This and any new records should be considered within this attribute. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat by Roche et al. (2014). No assessment of the conservation status of this community has been conducted but proposals for such an assessment are presented in Barron and Perrin (2014). See the uplands supporting document for further details

4030 European dry heaths

To restore the favourable conservation condition of European dry heaths in Corraun Plateau 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	Corraun Plateau SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Roche et al., 2014 & Perrin et al., 2014). The total current area of dry heath in the SAC stated by Roche et al. (2014) is 207.9ha. It covers 5.35% of the SAC. Roche et al. (2014) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current habitat distribution, subject to natural processes. See map 4	Dry heath was recorded by Roche et al. (2014) throughout the SAC, but was most abundant on the northern slopes of the SAC. A summary of the mapping methodology is presented in the uplands 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 uplands 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 dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities 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 *Campylopus* and *Polytrichum* mosses	Based on Perrin et al. (2014). See the uplands 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 present at each monitoring stop is at least two	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
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% for siliceous dry heath and 50-75% for calcareous dry heath	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
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 (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) is less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Roche et al. (2014) but did not form extensive carpets
Vegetation structure: 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%	Based on Perrin et al. (2014). See the uplands supporting document for further details

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
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 (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document 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	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. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat by Roche et al. (2014). No assessment of the conservation status of this community has been conducted but proposals for such an assessment are presented in Barron and Perrin (2014). See the uplands supporting document for further details

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in Corraun Plateau 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	Corraun Plateau SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Roche et al., 2014 & Perrin et al., 2014). The total current area of Alpine and Boreal heath in the SAC stated by Roche et al. (2014) is 278.3ha. It covers 7.16% of the SAC. Roche et al. (2014) report obvious losses of habitat since 1995 of approximately 0.45ha. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 5	Alpine and Boreal heath was recorded by Roche et al. (2014) on the high ground through the centre of the SAC, but was also recorded at lower elevations on the southern slopes. A summary of the mapping methodology is presented in the uplands 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 uplands 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 Alpine and Boreal heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities 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	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Roche et al. (2014)
Vegetation structure: signs of grazing	Percentage of leaves browsed 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	Based on Perrin et al. (2014). See the uplands supporting document for further details including 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 (*Empetrum nigrum*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning within the habitat	Based on Perrin et al. (2014). See the uplands supporting document for further details

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%	Based on Perrin et al. (2014). See the uplands supporting document 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	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. *Cladonia rangiferina* has been recorded from within the habitat. This species is listed on a preparatory list of rare and threatened lichens prepared by D. McFerran, National Museums Northern Ireland. This and any new records should be considered within this attribute. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat by Roche et al. (2014). No assessment of the conservation status of this community has been conducted but proposals for such an assessment are presented in Barron and Perrin (2014). See the uplands supporting document for further details

5130 Juniperus communis formations on heaths or calcareous grasslands

To restore the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in Corraun Plateau 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	*Juniperus communis* formations on heaths or calcareous grasslands occurs in close association with heath habitats, particularly Alpine and Boreal heaths (4060). Cooper et al. (2012) recorded the habitat on the southern facing slopes of the central section of the SAC
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 6 for survey location	See notes for area above
Juniper population size	Number per formation	At least 50 plants per formation	To classify as a juniper formation, at least 50 plants should be present (Cooper et al., 2012). At least 500 plants were recorded by Cooper et al. (2012)
Vegetation composition: typical species	Number per formation	At least 50% of the listed positive indicator species for the relevant vegetation group present	Cooper et al. (2012) lists positive indicator species for five vegetation groups. The formation described at this SAC by Cooper et al. (2012) falls into vegetation group 4 (*Calluna vulgaris*|*Erica cinerea* group). See Cooper et al. (2012) for positive indicator species
Vegetation composition: negative indicator species	Occurrence per formation	Negative indicator species, particularly non-native invasive species, absent or under control	Negative indicator species listed by Cooper et al. (2012)
Vegetation structure: cone-bearing plants	Percentage per formation	At least 10% of 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)

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 Corraun Plateau SAC, which is defined by the following list of attributes and targets:

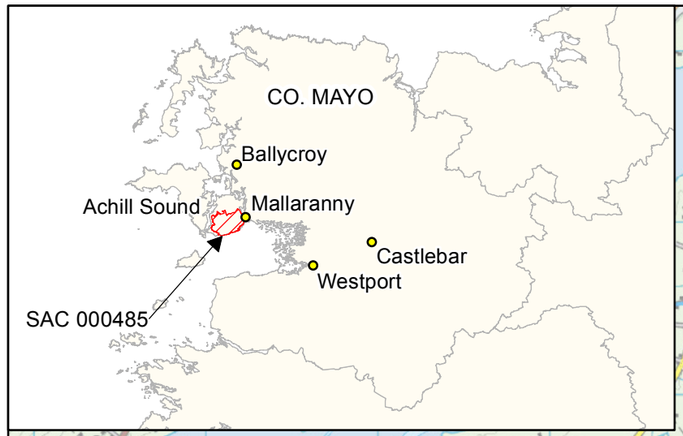
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Corraun Plateau SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Roche et al., 2014 & Perrin et al., 2014). The total current area of siliceous scree in the SAC stated by Roche et al. (2014) is 30.3ha. This covers 0.78% of the SAC. Roche et al. (2014) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 7	Siliceous scree was recorded by Roche et al. (2014) on the northern slopes of the SAC. A summary of the mapping methodology is presented in the uplands 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 uplands 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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Roche et al. (2014)
Vegetation composition: positive indicator species	Number of species in local vicinity of a representative number of monitoring stops	Number of positive indicator species present in vicinity of each monitoring stop in block scree is at least one	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014) and is the same as for 8220 Siliceous rocky slopes. Further details can be found in the uplands supporting document
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken, native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and scrub less than 25%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document 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	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. Hepatic mats of the *Calluna vulgaris-Herbertus aduncus* community were recorded within this habitat by Roche et al. (2014). No assessment of the conservation status of this community has been conducted but proposals for such an assessment are presented in Barron and Perrin (2014). See the uplands supporting document for further details

8220 Siliceous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Corraun Plateau 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	Corraun Plateau SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Roche et al., 2014 & Perrin et al., 2014). The total current area of siliceous rocky slopes in the SAC stated by Roche et al. (2014) is 15.0ha. This covers 0.39% of the SAC. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 8	Siliceous rocky slopes were recorded by Roche et al. (2014) with patches on the northern slopes and also in the south. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of monitoring stops	Number of positive indicator species present in vicinity of each monitoring stop is at least one	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Roche et al. (2014)
Vegetation composition: bracken, native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and scrub less than 25%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document 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	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. See the uplands supporting document for further details



MAP 1:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

Legend

Corraun Plateau SAC 000485

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

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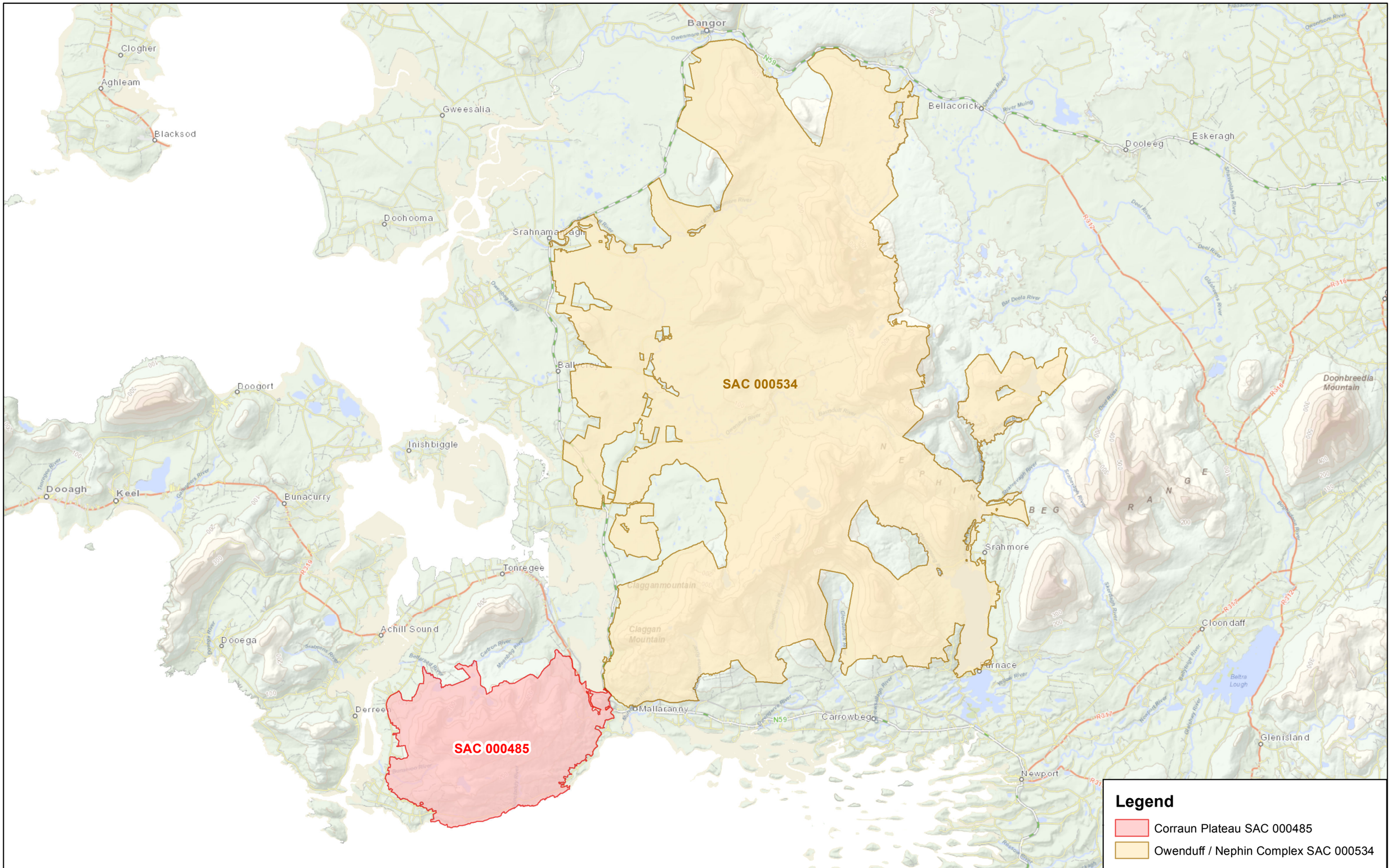
N

Map Version 1
Date: July 2016



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MAP 2:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
ADJACENT DESIGNATION

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

SITE CODE:
SAC 000485; version 3.01,
SAC 000534; version 3.01. Co. Mayo

0 1 2 3 4 5 km

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Map Version 1
Date: July 2016

Legend

Corraun Plateau SAC 000485

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 Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

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

MAP 3:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
WET HEATH

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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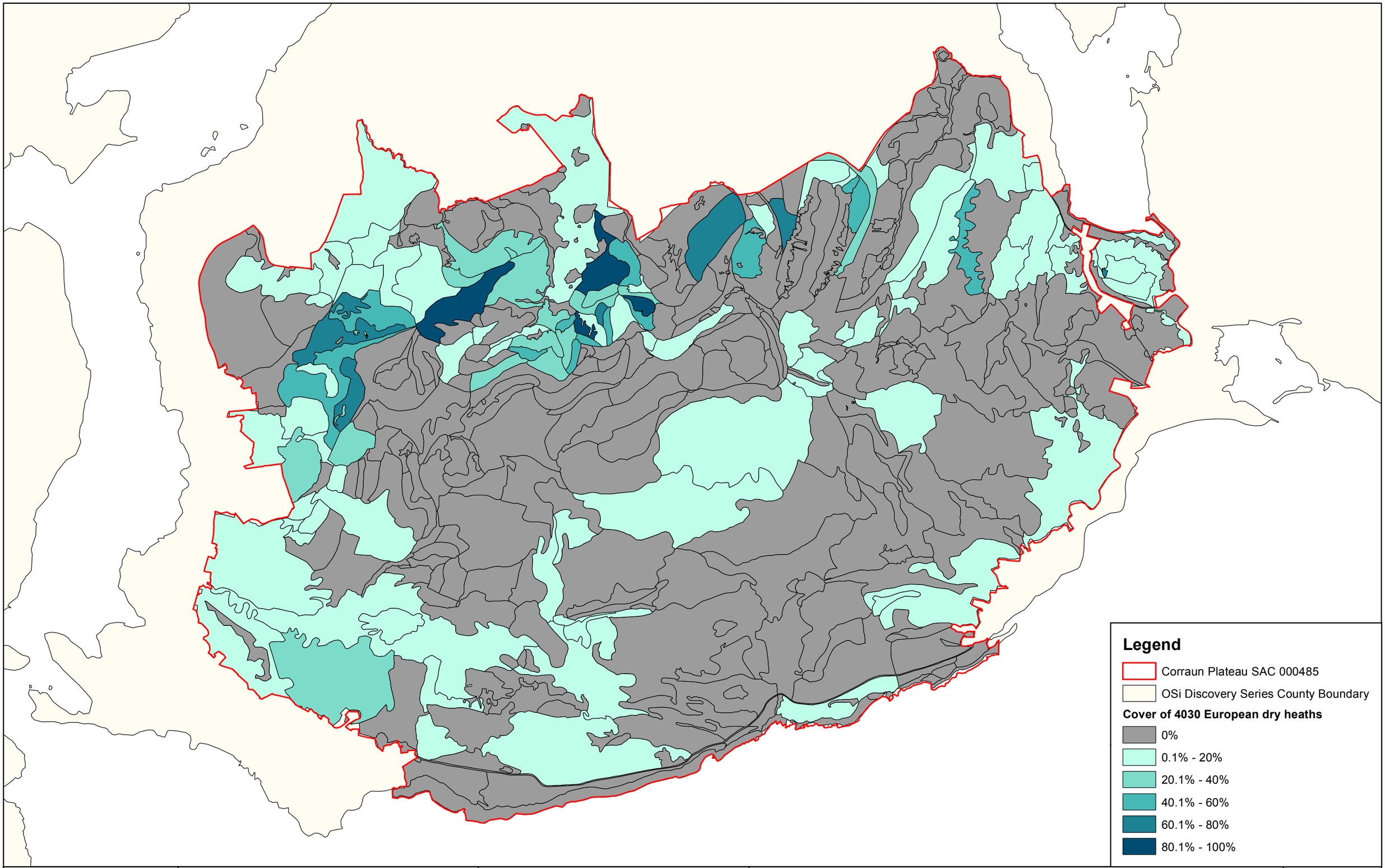
Map Version 1
Date: July 2016



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MAP 4:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
DRY HEATHS

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: July 2016

Legend

- Corraun Plateau SAC 000485
- OSi Discovery Series County Boundary

Cover of 4060 Alpine and Boreal heaths

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

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

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

MAP 5:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATHS

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: July 2016

MO04

Legend

Corraun Plateau SAC 000485

5130 *Juniperus communis* formations on heaths or calcareous grasslands Survey Sites

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MAP 6:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
JUNIPER FORMATIONS

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: July 2016

Legend

Corraun Plateau SAC 000485

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%

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

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

MAP 7:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
SILICEOUS SCREE

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: July 2016

Legend

Corraun Plateau SAC 000485

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 Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

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

MAP 8:
CORRAUN PLATEAU SAC
CONSERVATION OBJECTIVES
SILICEOUS ROCKY SLOPES

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

SITE CODE:
SAC 000485; version 3.01. Co. Mayo

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: July 2016

Conservation objectives for Doocastle Turlough SAC [000492]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Doocastle Turlough SAC [000492]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Duvillaun Islands SAC 000495

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

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Citation:

NPWS (2013) Conservation Objectives: Duvillaun Islands SAC 000495. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000495	Duvillaun Islands SAC
1364	Grey seal *Halichoerus grypus*

Please note that this SAC overlaps with Duvillaun Islands SPA (004111) and adjoins West Connacht Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2003
Title :	Grey seal population status at islands in the Inishkea group, as determined from breeding ground surveys in 2002
Author :	O Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2004
Title :	Harbour seal population assessment in the Republic of Ireland: August 2003
Author :	Cronin, M.; Duck, C.; O Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.
Series :	Irish Wildlife Manual No. 11
Year :	2004
Title :	Summary of National Parks and Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003
Author :	Lyons, D.O.
Series :	Irish Wildlife Manual No. 13
Year :	2007
Title :	Grey seal moult population survey in the Republic of Ireland, 2007
Author :	O Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2008
Title :	An assessment of the breeding population of grey seals in the Republic of Ireland, 2005
Author :	O Cadhla, O.; Strong, D.; O'Keeffe, C.; Coleman, M.; Cronin, M.; Duck, C.; Murray, T.; Dower, P.; Nairn, R.; Murphy, P.; Smiddy, P.; Saich, C.; Lyons, D.O.; Hiby, L.
Series :	Irish Wildlife Manual No. 34
Year :	2013
Title :	Duvillaun Islands SAC (site code: 495) Conservation objectives supporting document- marine species V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1998
Title :	Population biology of grey seals (*Halichoerus grypus*, Fabricius 1791) in western Ireland
Author :	Kiely, O.R.M.
Series :	Unpublished PhD thesis, National University of Ireland, University College Cork
Year :	1998
Title :	Grey seal (*Halichoerus grypus*) pup production at the Inishkea island group, Co. Mayo and the Blasket Islands, Co. Kerry
Author :	Kiely, O.; Myers, A.A.
Series :	Biology and Environment: Proc. Royal Ir. Acad. 98B (2): 113-122
Year :	2001
Title :	Grey seal interactions with fisheries in Irish coastal waters
Author :	BIM
Series :	Report to the European Commission DG XIV. Study 95/40

Year :	2007
Title :	Aerial surveying of grey seal breeding colonies on the Blasket Islands, Co. Kerry, the Inishkeas group, Co. Mayo and the Donegal coast, Ireland
Author :	Cronin, M.A.; Duck, C.D.; O Cadhla, O.
Series :	J. Nat. Conserv. 15(2): 77-83

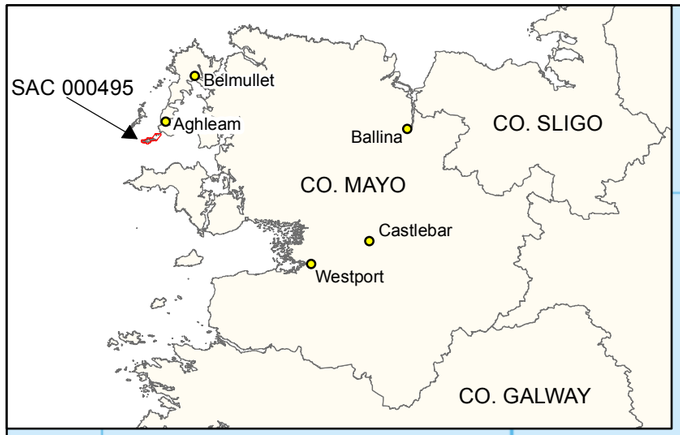
Spatial data sources

Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1364 (map 3)
Year :	2013
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1364 (map 3)

1364 Grey seal *Halichoerus grypus*

To maintain the favourable conservation condition of Grey Seal in Duvillaun Islands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 3	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve the breeding sites in a natural condition. See map 3 for known sites	Attribute and target based on background knowledge of Irish breeding populations, comprehensive breeding surveys in 1995 (Kiely, 1998; Kiely and Myers, 1998), 1998 and 1999 (BIM, 2001), 2002 (Ó Cadhla and Strong, 2003) and 2005 (Ó Cadhla et al., 2008) and unpublished NPWS records including those reported by Lyons (2004). See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve the moult haul-out sites in a natural condition. See map 3 for known sites	Attribute and target based on background knowledge of Irish breeding populations, review of data from Kiely (1998) and Lyons (2004), a national moult survey (Ó Cadhla and Strong, 2007) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve the resting haul-out sites in a natural condition. See map 3 for known sites	Attribute and target based on review data from Kiely (1998), BIM (2001), Lyons (2004), Cronin et al. (2004), Ó Cadhla et al. (2008) and unpublished NPWS records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the grey seal population at the site	See marine supporting document for further details



Gaghta Is.

Leamareha Is.

Duvillaun More

Duvillaun Beg

Keely Is.

Turduvillaun

Shraghy Is.

Drumacappul Is.

Holy Well

Early Christian Site

Holy Well

Promontory Fort

Gubnageeragh

Lough Duvillaun

Legend

Duvillaun Islands SAC 000495

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

MAP 1:
DUVILLAUN ISLANDS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000495; version 3.01. CO. MAYO

0 0.25 0.5 0.75 1 km

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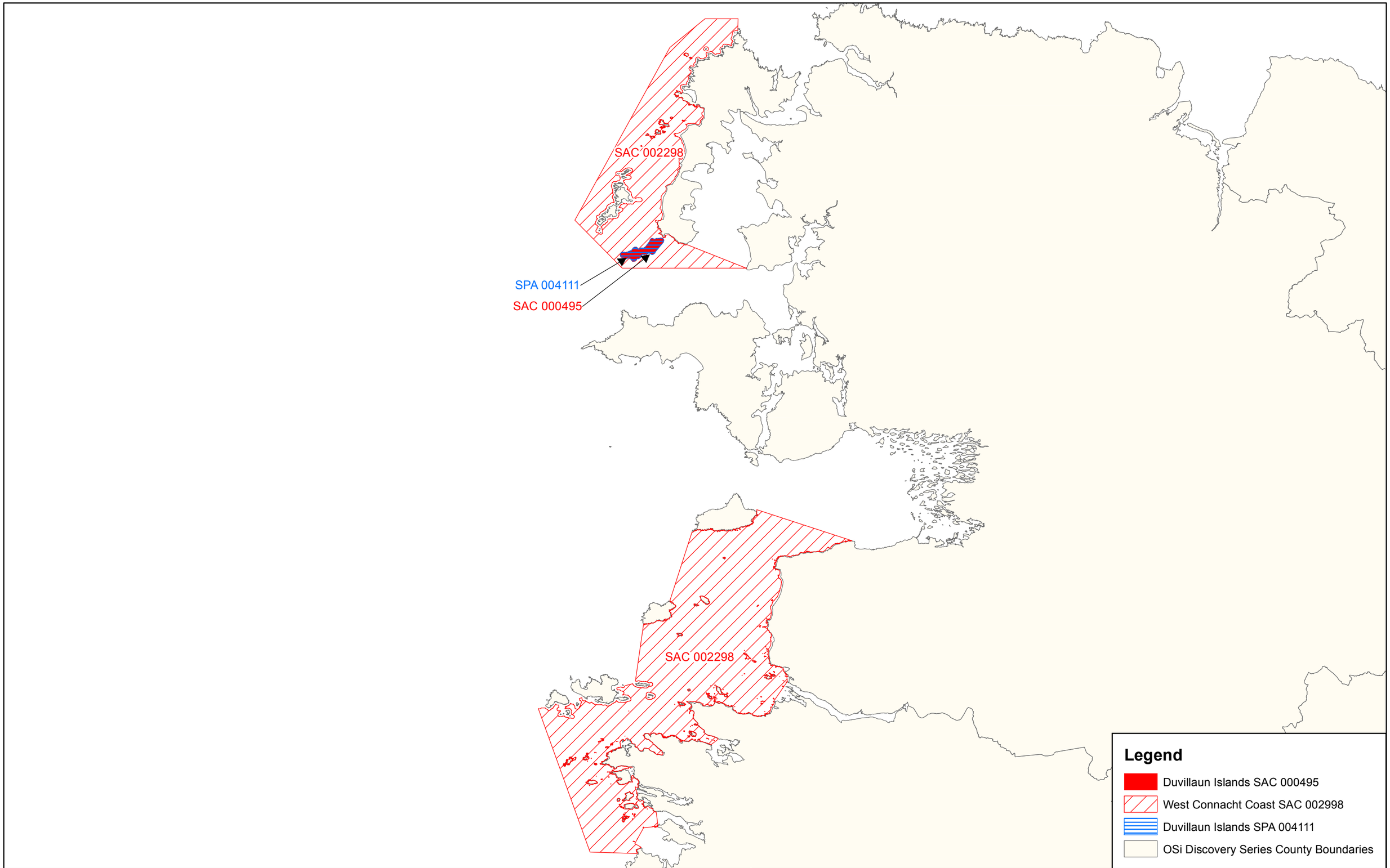
N

Map Version 1
Date: Dec 2013



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

MAP 2:
DUVILLAUN ISLANDS SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000495; version 3.01, SAC 002998; version 3.
SPA 004111; version 2. CO. MAYO

0 5 10 15 20 25 km

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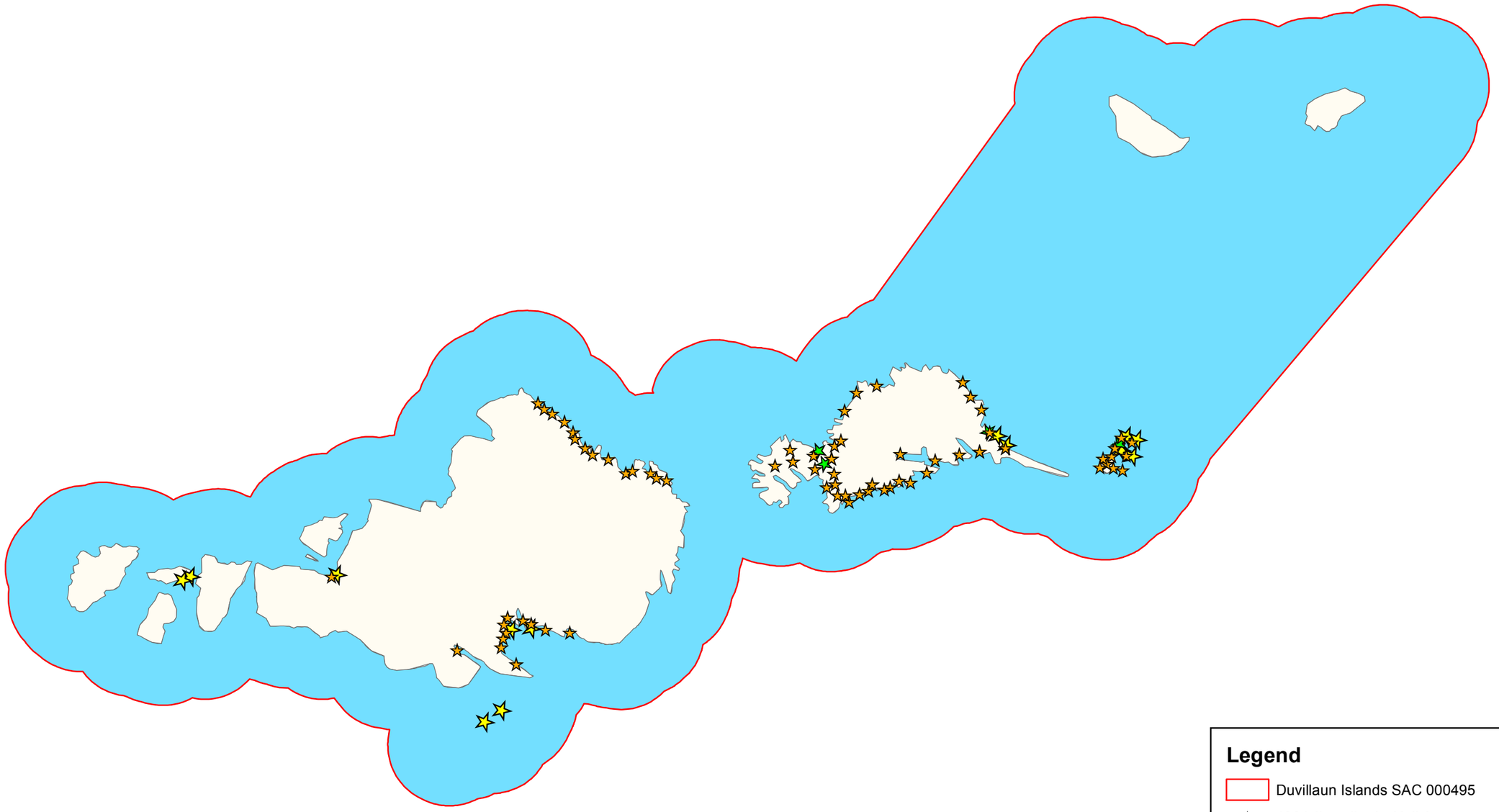
Map Version 1
Date: Dec 2013



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

MAP 3:
DUVILLAUN ISLANDS SAC
CONSERVATION OBJECTIVES
GREY SEAL

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

SITE CODE:
SAC 000495; version 3.01. CO. MAYO

0 0.2 0.4 0.6 0.8 1 km

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N

Map Version 1
Date: Dec 2013

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Flughany Bog SAC 000497

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Flughany Bog SAC 000497. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000497	Flughany Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Flughany Bog (SAC 000497), Co. Sligo, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	Flughany Bog SAC (site code: 497) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising potential
Used For :	7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Flughany Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 23.6ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 11.4ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 13.1ha. See map 2. However, it is estimated that only 9.2ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 20.6ha. Eco-hydrological assessments of the cutover estimates that an additional 3.0ha of bog forming habitats could be restored. The long term target for ARB is therefore 23.6ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB habitat at Flughany Bog is central and sub-central ecotopes and active flush. ARB currently occurs most abundantly on the south-eastern part of Flughany Bog. DRB occurs on both parts of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Flughany Bog SAC in 2012 (latest figure available) was 143.7ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	No natural marginal habitats exist around the margins of the bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 11.8ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 23.6ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in the southern part of Flughany Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Flughany Bog is noted for the presence of a number of flush systems and associated swallow-holes
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Flughany Bog suggests that the current level is approximately 8.2kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

Conservation Objectives for : Flughany Bog SAC [000497]

7120 **Degraded raised bogs still capable of natural regeneration**

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Flughany Bog SAC

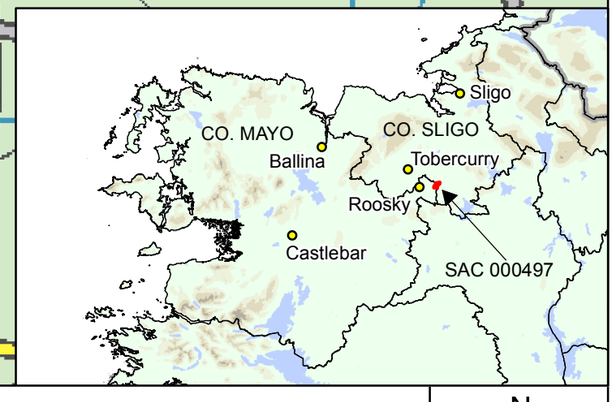
Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Flughany Bog SAC

Attribute	Measure	Target	Notes

Barrow
Ogham
Mountirvine
94
Flughany
Holy
Well
Friary
102
79
80
80
Cloonfeightrin
Cross Rds
oonfeightrin



Legend

Flughany Bog SAC 000497

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

MAP 1:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

0 100 200 300 400 500 m

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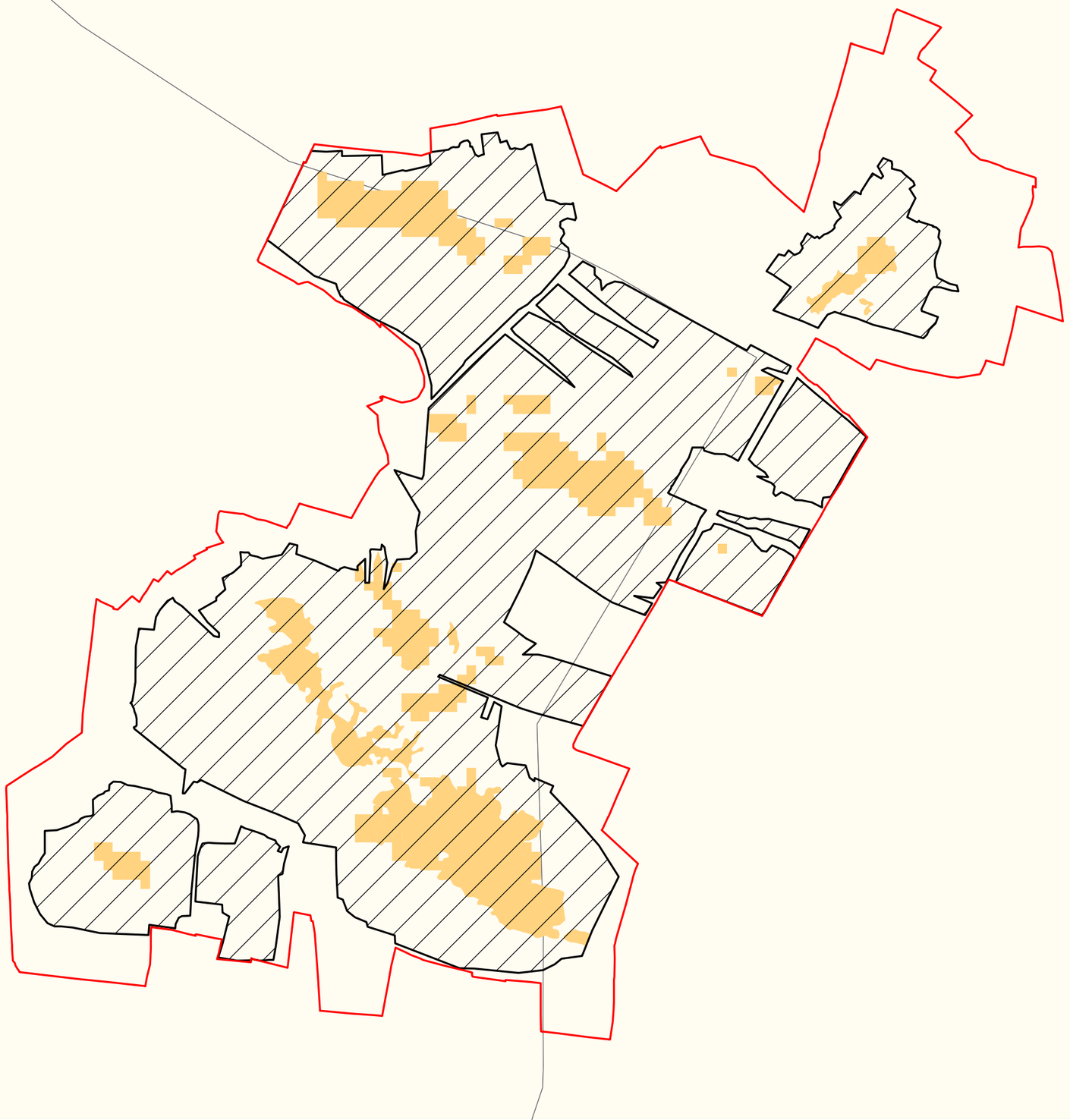
Map Version 1
Date: Jan 2016



Legend

- Flughany Bog SAC 000497
- High Bog Boundary
- Potential 7110 *Active Raised Bogs
- OSi Discovery Series County Boundary

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

MAP 2:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

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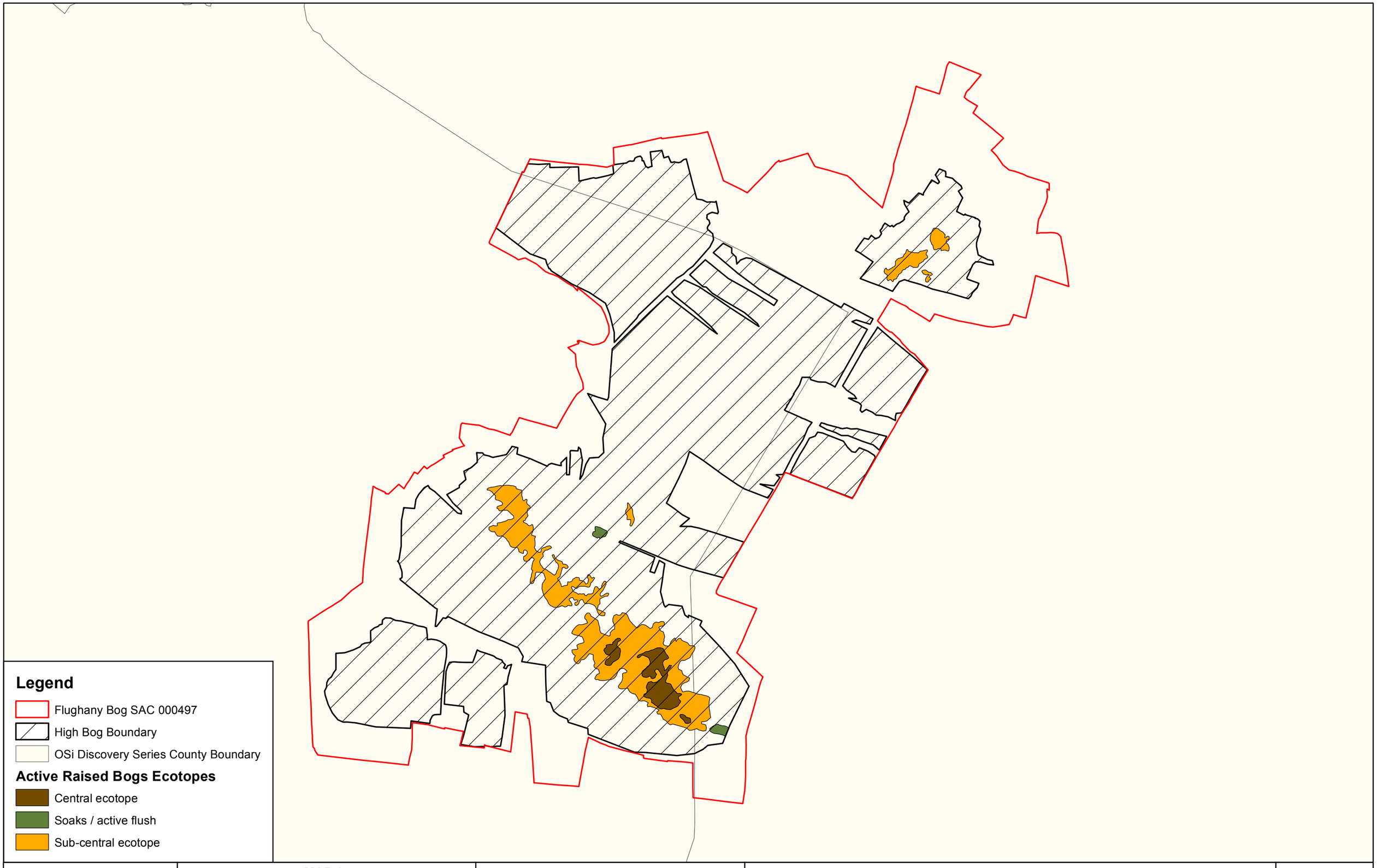
Map Version 1
Date: Jan 2016



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

MAP 3:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

0 100 200 300 400 500 m

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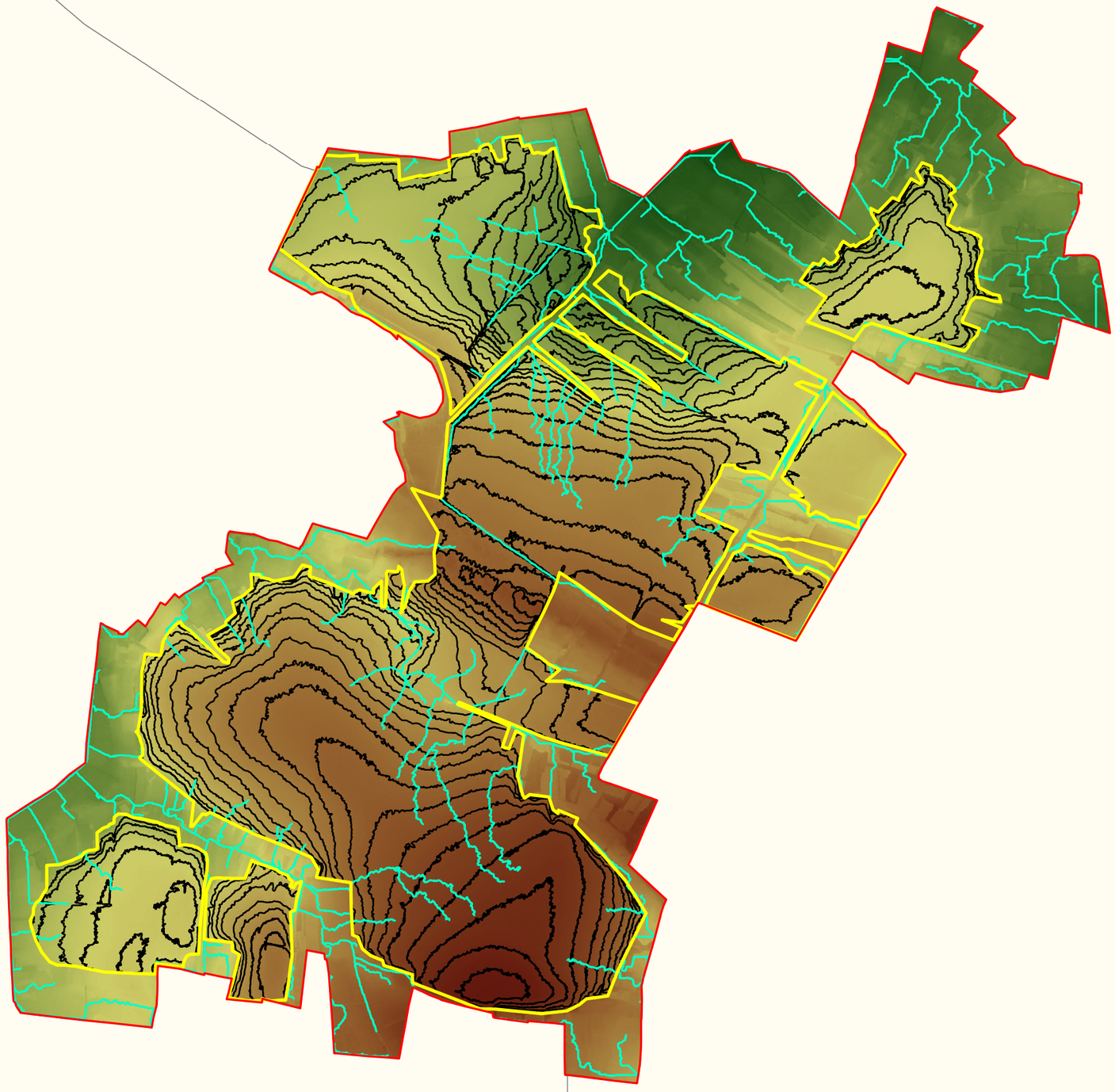
Map Version 1
Date: Jan 2016



Legend

- Flughany Bog SAC 000497
- OSi Discovery Series County Boundary
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

89.83 m

72.67 m

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

MAP 4:
FLUGHANY BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000497; version 3.01. Co. Mayo / Sligo

0 100 200 300 400 500 m

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Map Version 1
Date: Jan 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Glenamoy Bog Complex SAC 000500

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Glenamoy Bog Complex SAC 000500. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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- its natural range, and area it covers within that range, are stable or increasing, and
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- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000500	Glenamoy Bog Complex SAC
1106	Salmon *Salmo salar*
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts
1393	Slender Green Feather-moss *Drepanocladus vernicosus*
1395	Petalwort *Petalophyllum ralfsii*
1528	Marsh Saxifrage *Saxifraga hirculus*
21A0	Machairs (* in Ireland)
3160	Natural dystrophic lakes and ponds
4010	Northern Atlantic wet heaths with *Erica tetralix*
5130	*Juniperus communis* formations on heaths or calcareous grasslands
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion

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

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

NPWS Documents

Year :	1983
Title :	Report on the conservation value of Irish coastal sites: Machair in Ireland
Author :	Bassett, A.
Series :	Unpublished Report
Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	1989
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.
Series :	A report commissioned by the Wildlife Service
Year :	1998
Title :	Biomar survey of Irish machair sites 1996
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
Author :	Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.
Series :	Irish Wildlife Manual No. 53
Year :	2012
Title :	The conservation status of juniper formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments

Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manual No. 88
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Monitoring methods for *Petalophyllum ralfsii* (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 90
Year :	2015
Title :	Monitoring methods for *Hamatocaulis vernicosus* (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Glenamoy Bog Complex SAC (site code: 500) Conservation objectives supporting document-blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2017
Title :	Glenamoy Bog Complex SAC (site code: 500) Conservation objectives supporting document-coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

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

Year :	1989
Title :	The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author :	Hedenäs, L.
Series :	Lindbergia, 15: 8-36
Year :	1990
Title :	Ecology and conservation of Irish peatlands
Author :	Doyle, G.J. (Ed.)
Series :	Royal Irish Academy, Dublin
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2005
Title :	National inventory of sea cliffs and coastal heaths
Author :	Browne, A.
Series :	Unpublished Report to NPWS
Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished Ph.D. thesis, University College Cork
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

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

Spatial data sources

Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
GIS Operations :	Clipped to SAC boundary
Used For :	1230 (map 3)
Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	21A0 (map 3)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3160 (map 4)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1393, 1395, 1528 (maps 5 and 6)

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

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

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

21A0 Machairs (* in Ireland)

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

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

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

3160 Natural dystrophic lakes and ponds

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

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

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

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

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

4010 Northern Atlantic wet heaths with Erica tetralix

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

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

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

5130 Juniperus communis formations on heaths or calcareous grasslands

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

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

7130 Blanket bogs (* if active bog)

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

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

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

7140 Transition mires and quaking bogs

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

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

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

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Glenamoy Bog Complex SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Glenamoy Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	This habitat is typically confined to relatively small areas but is best represented around pool margins and in wet hollows in the SAC (NPWS internal files). Examples of this habitat can be found at Glenamoy Bog (Douglas et al., 1989). Further information can be found within Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) was recorded in this habitat by Doyle (1990)

1106 Salmon *Salmo salar*

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

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

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

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

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

1395 Petalwort *Petalophyllum ralfsii*

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

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No decline, subject to natural processes. See map 5 for recorded locations	The known population of petalwort (*Petalophyllum ralfsii*) in Glenamoy Bog Complex SAC is at Garter Hill, where it occurs on banks of water tracks and also on the sides of low sandhills in wetter flushed parts of the machair. Data from NPWS surveys (NPWS internal files) and Campbell (2013). See also Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The area of occupancy, estimated from polygons drawn around GPS co-ordinates taken from NPWS surveys and Campbell (2013), was 211,604m². However, only about 70% of this area is actually suitable habitat for petalwort (*Petalophyllum ralfsii*), which is 148,123m², i.e. c.14.8ha. See Campbell et al. (2015) for further details
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that the substrate is kept moist and damp throughout the year, but is not subject to prolonged inundation by flooding in winter	Petalwort (*Petalophyllum ralfsii*) grows on damp sandy substrate. Based on Campbell (2013) and Campbell et al. (2015)
Hydrological conditions: water table level	Centimetres in a representative number of 1m x 1m monitoring plots	Mean groundwater level should not be more than 80cm from ground surface	See Campbell et al. (2015) for further details
Physical structure: bare soil	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage cover of bare soil should be more than 5%	At Garter Hill, petalwort (*Petalophyllum ralfsii*) grows in compacted, sandy ground. See Campbell et al. (2015) for further details
Vegetation structure: vegetation height	Centimetres in a representative number of 1m x 1m monitoring plots	Mean vegetation height should be less than 6cm	At Garter Hill, petalwort (*Petalophyllum ralfsii*) habitat is maintained by rabbit (*Oryctolagus cuniculus*) and sheep grazing and some trampling. Campbell (2013) recorded a mean height of vegetation of 3cm at Garter Hill. See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage shrub cover should be less than 25%	See Campbell et al. (2015) for further details
Vegetation composition: grass cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage grass species cover should be less than 60%	See Campbell et al. (2015) for further details

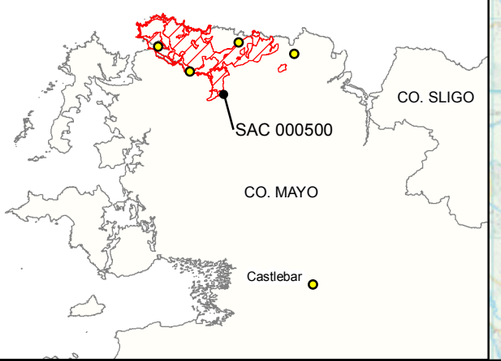
1528 Marsh Saxifrage *Saxifraga hirculus*

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

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No loss in geographical spread and number of populations, subject to natural processes. See map 6 for 1km grid square locations	The two known populations of marsh saxifrage (*Saxifraga hirculus*) in Glenamoy Bog Complex SAC occur at Barroosky and Aghoo. See Muldoon (2011) and Muldoon et al. (2015) for further details
Population size: number of rosettes	Number	Maintain the size of the known populations, subject to natural processes. The target numbers of rosettes are: at least 52,000 at Barroosky and at least 960 at Aghoo	The number of rosettes recorded by Muldoon (2011) were: 65,000 at Barroosky and 1,200 at Aghoo. The target figures are a 20% reduction of the recorded numbers to allow for a margin of error and variability over monitoring seasons. See Muldoon et al. (2015) for further details
Population size: area of occupancy	Hectares	Maintain the area of occupancy of the known populations, subject to natural processes. The target areas are: at least 0.2025ha at Barroosky and at least 0.017ha at Aghoo	The areas of occupancy estimated by Muldoon (2011) were: 2,250m² (0.2250ha) at Barroosky and at 189m² (0.019ha) at Aghoo. The target area figures are a 10% reduction of the recorded areas to allow for a margin of error. See Muldoon et al. (2015) for further details
Hydrological conditions: water level	Occurrence of high or fluctuating water levels	Maintain the appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, marsh saxifrage (*Saxifraga hirculus*) is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation composition: positive indicator species	Occurrence in a representative number of 1m x 1m monitoring stops	Knotted pearlwort (*Sagina nodosa*) should be present in at least two of five 1m x 1m monitoring stops	The presence of the positive indicator species knotted pearlwort (*Sagina nodosa*) should be maintained (Muldoon, 2011; Muldoon et al., 2015)
Vegetation composition: negative indicator species	Mean percentage cover in five 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (*Molinia caerulea*) should not exceed 5%; mean percentage cover of Yorkshire fog (*Holcus lanatus*) should not exceed 15%	Low cover of the negative indicator species purple moor-grass (*Molinia caerulea*) and Yorkshire fog (*Holcus lanatus*) should be maintained. Part of the surrounding bog at the Barroosky site has been reclaimed for low grade agricultural use. No improvements (e.g. fertilizer inputs) should be carried out on the site. Monitoring of purple moor-grass levels in particular is recommended at Barroosky. See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: sward height	Centimetres	Maintain a mean vegetation height of less than 15cm	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing level	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	The surrounding bog at the flush at Barroosky is overgrazed with high levels of poaching. Low grazing was identified as an issue at Aghoo. See Muldoon (2011) and Muldoon et al. (2015) for further details

ATLANTIC OCEAN
An tAigéan Atlantach

Banwee Head
An Bhinn Bhuí



Legend

Glenamoy Bog Complex SAC 000500

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 1:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000500; version 3.01.
CO. MAYO

0 0.9 1.8 2.7 3.6 4.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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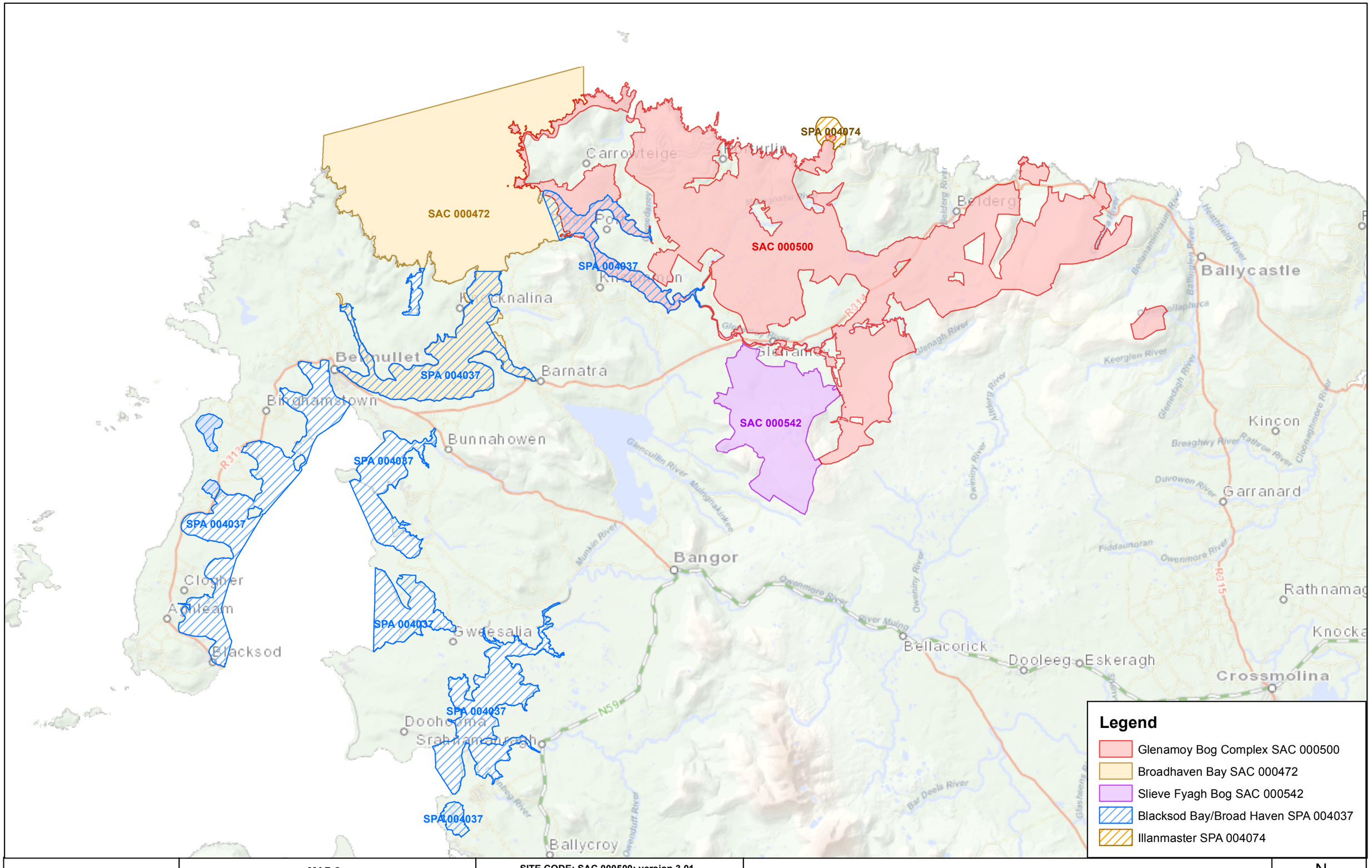
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: July 2016



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

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

MAP 2:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
OVERLAPPING/ADJOINING
AND ADJACENT DESIGNATIONS

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

SITE CODE: SAC 000500; version 3.01, SAC 000472; version 3.01, SAC 000542; version 3.01, SPA 004037; version 3.02, SPA 004074; version 3.
CO. MAYO

0 1.5 3 4.5 6 7.5 km

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

N

Map Version 1
Date: July 2016

Irish Sea Cliff Survey Site ID: 08005

SDM Site Code: 128

Legend

Glenamoy Bog Complex SAC 000500

Sand Dune Monitoring Project Survey Area

Qualifying Interests

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

21AO Machairs

Non-qualifying interests

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

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

2190 Humid dune slacks

OSi Discovery Series County Boundary

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

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

MAP 3:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
COASTAL HABITATS

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

SITE CODE:
SAC 000500; version 3.01.
CO. MAYO

0 0.7 1.4 2.1 2.8 3.5 km

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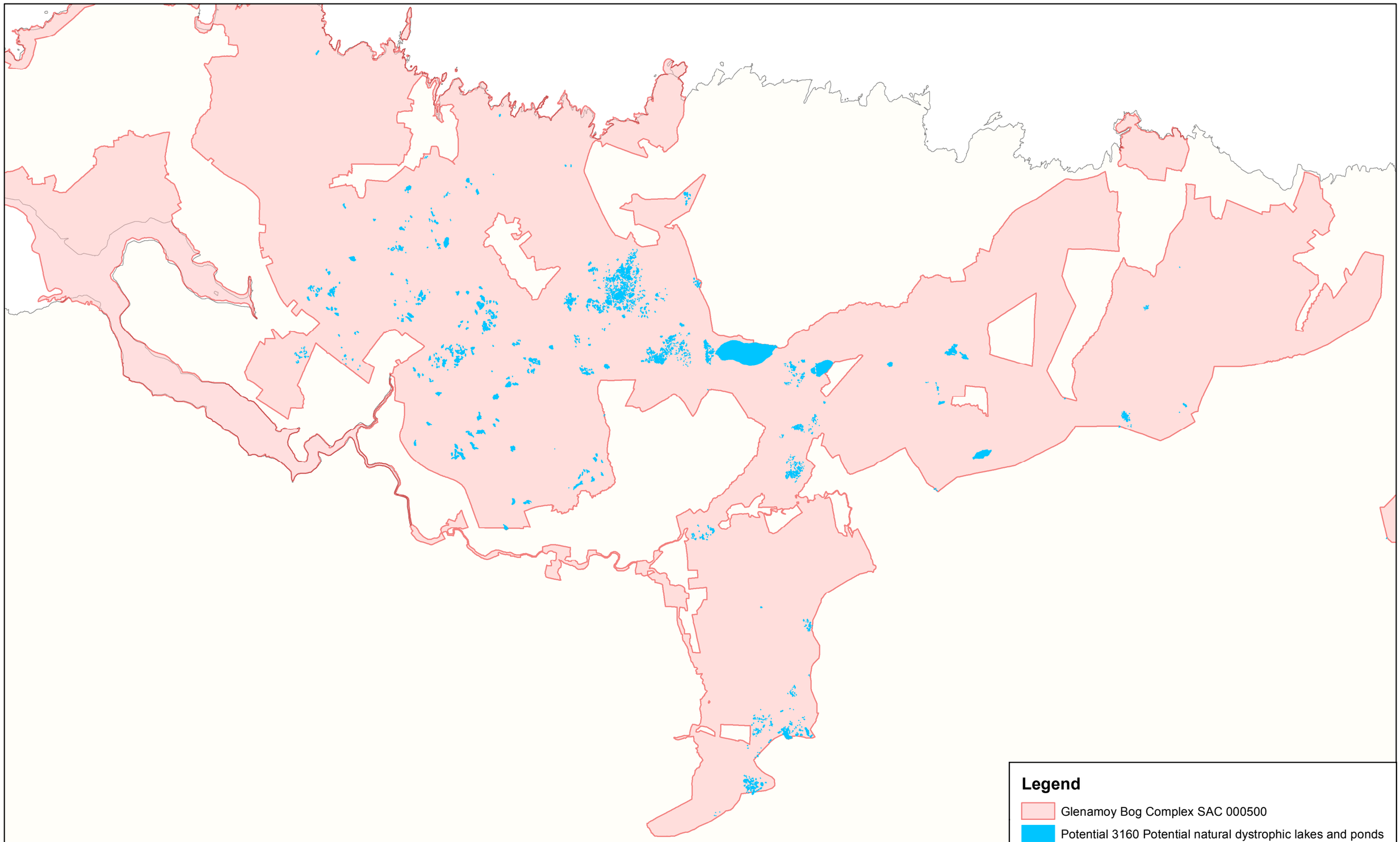
N

Map Version 1
Date: Oct 2016



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

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

MAP 4:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
SAC 000500; version 3.01.
CO. MAYO

0 0.75 1.5 2.25 3 3.75 km

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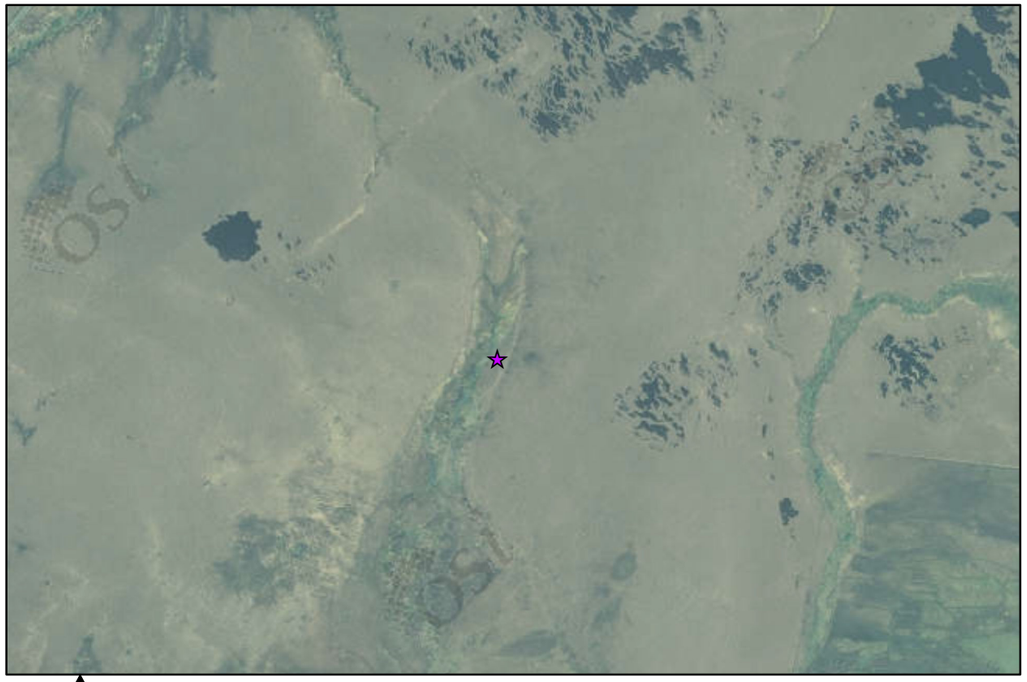
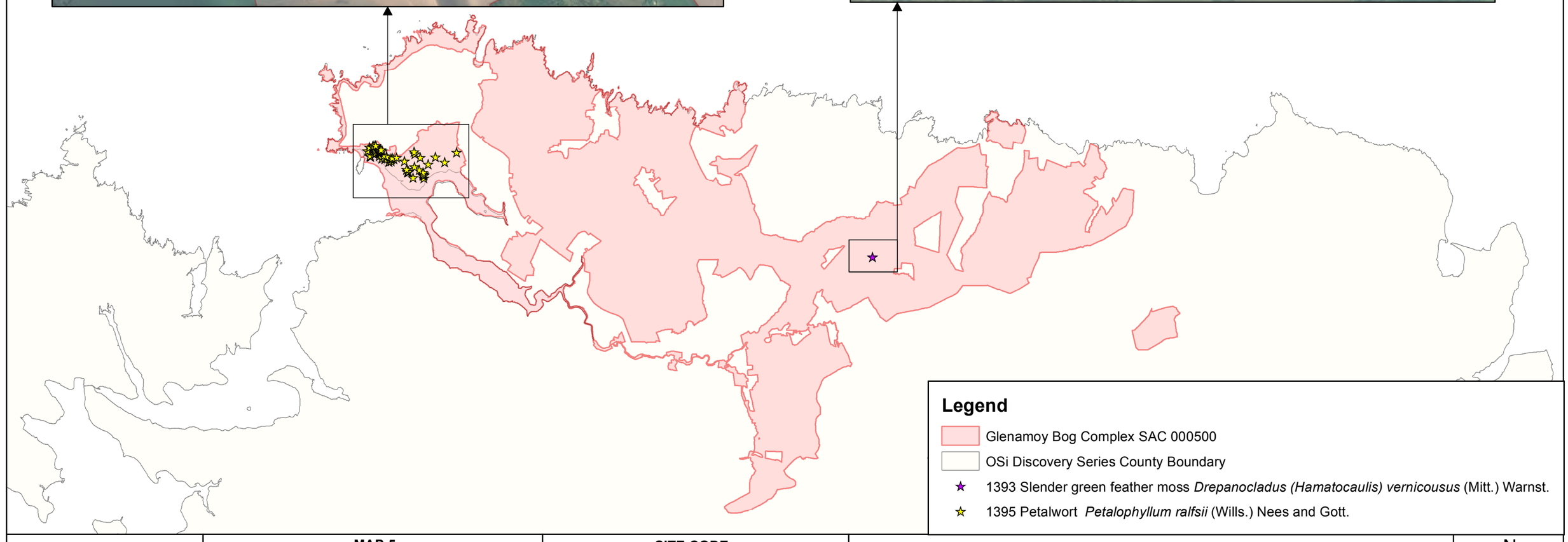
N

Map Version 1
Date: Oct 2016





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

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

MAP 5:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
SLENDER GREEN FEATHER MOSS
AND PETALWORT

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

SITE CODE:
SAC 000500; version 3.01.
CO. MAYO

0 1.5 3 4.5 6 7.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Oct 2016

Legend

- 1528 Marsh saxifrage *Saxifraga hirculus*
- Glenamoy Bog Complex SAC 000500
- OSi Discovery Series County Boundary

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

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

MAP 6:
GLENAMOY BOG COMPLEX SAC
CONSERVATION OBJECTIVES
MARSH SAXIFRAGE

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

SITE CODE:
SAC 000500; version 3.01.
CO. MAYO

0 0.9 1.8 2.7 3.6 4.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

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Map Version 1
Date: Oct 2016

Conservation objectives for Greaghans Turlough SAC [000503]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Greaghans Turlough SAC [000503]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Kilglassan/Caheravoostia Turlough Complex SAC [000504]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Kilglassan/Caheravoostia Turlough Complex SAC [000504]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Inishkea Islands SAC 000507

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201p) Conservation Objectives: Inishkea Islands SAC 000507. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000507	Inishkea Islands SAC
1364	Grey Seal *Halichoerus grypus*
1395	Petalwort *Petalophyllum ralfsii*
21A0	Machairs (* in Ireland)

Please note that this SAC overlaps with Inishkea Islands SPA (004004) and adjoins West Connacht Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2003
Title :	Grey seal population status at islands in the Inishkea group, as determined from breeding ground surveys in 2002
Author :	Ó Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2004
Title :	Harbour seal population assessment in the Republic of Ireland: August 2003
Author :	Cronin, M.; Duck, C.; O Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.
Series :	Irish Wildlife Manual No. 11
Year :	2004
Title :	Summary of National Parks and Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003
Author :	Lyons, D.O.
Series :	Irish Wildlife Manual No. 13
Year :	2004
Title :	Aerial surveying of grey seal breeding colonies on the Blasket Islands, Co. Kerry, the Inishkea Group, Co. Mayo and the Donegal coast during the 2003 breeding season
Author :	Cronin, M.; Ó Cadhla, O.
Series :	Unpublished report to NPWS
Year :	2007
Title :	Grey seal moult population survey in the Republic of Ireland, 2007
Author :	Ó Cadhla, O.; Strong, D.
Series :	Unpublished report to NPWS
Year :	2008
Title :	An assessment of the breeding population of grey seals in the Republic of Ireland, 2005
Author :	O Cadhla, O.; Strong, D.; O'Keeffe, C.; Coleman, M.; Cronin, M.; Duck, C.; Murray, T.; Dower, P.; Nairn, R.; Murphy, P.; Smiddy, P.; Saich, C.; Lyons, D.O.; Hiby, L.
Series :	Irish Wildlife Manual No. 34
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2013
Title :	Monitoring of the breeding population of grey seals in Ireland, 2009 - 2012
Author :	Ó Cadhla, O.; Keena, T.; Strong, D.; Duck, C.; Hiby, L.
Series :	Irish Wildlife Manual No. 74
Year :	2013
Title :	An aerial survey of harbour seals in Ireland. Part 1: Lough Foyle to Galway Bay. August 2011
Author :	Duck, C; Morris, C.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Inishkea Islands SAC (site code: 507) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Year :	2015
Title :	Inishkea Islands SAC (site code: 507) Conservation objectives supporting document- marine species V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1983
Title :	The grey seal (*Halichoerus grypus*) in Ireland
Author :	Summers, C.F.
Series :	Unpublished Report to the Minister for Fisheries, Forestry and Wildlife
Year :	1998
Title :	Population biology of grey seals (*Halichoerus grypus*, Fabricius 1791) in western Ireland
Author :	Kiely, O.R.M.
Series :	Unpublished PhD thesis, National University of Ireland, University College Cork
Year :	1998
Title :	Grey seal (*Halichoerus grypus*) pup production at the Inishkea island group, Co. Mayo and the Blasket Islands, Co. Kerry
Author :	Kiely, O.; Myers, A.A.
Series :	Biology and Environment: Proc. Royal Ir. Acad. 98B (2): 113-122
Year :	2001
Title :	Grey seal interactions with fisheries in Irish coastal waters
Author :	BIM
Series :	Report to the European Commission DG XIV. Study 95/40
Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2007
Title :	Aerial surveying of grey seal breeding colonies on the Blasket Islands, Co. Kerry, the Inishkeas group, Co. Mayo and the Donegal coast, Ireland
Author :	Cronin, M.A.; Duck, C.D.; Ó Cadhla, O.
Series :	J. Nat. Conserv. 15(2): 77-83
Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	21A0 (map 3)
Year :	2015
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1364, 1395 (maps 4 and 5)

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs in Inishkea Islands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-site mapped: Inishkea Islands - 115.65ha. See map 3	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). One sub-site was mapped, giving a total estimated area of 115.65ha. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	Based on data from Ryle et al. (2009). Iniskea North is low-lying and dominated by machair vegetation. At Inishkea South there is a small area of machair in the north-eastern part of the island. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009). The CMP noted that the machair at Inishkea North was severely eroded, which had been exacerbated by overgrazing. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). In places, the machair and heath habitats grade into saltmarsh, particularly along their fringes. Other habitats present within the SAC include open marine water, lowland dry grassland, wet grassland, boulder beaches, shingle and bedrock shores. See coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of Machair habitat, subject to natural processes	Based on data from Ryle et al. (2009). *Petalophyllum ralfsii* was recorded on the north island along a well worn sheep path- see the conservation objective for 1395. Bare ground cover greater than 10% was recorded by the CMP in monitoring stops on Inishkea South. See coastal habitats supporting document for further details
Vegetation structure: sward height	Centimeters	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). The machair on the Iniskea Islands was overgrazed. Inishkea North and South are grazed by rabbits (*Oryctolagus cuniculus*), barnacle geese (*Branta leucopsis*) and sheep. See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)	Based on data from Gaynor (2006) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. On Inishkea North, the negative indicators Yorkshire fog (*Holcus lanatus*) and ragwort (*Senecio jacobaea*) were noted by the CMP. On Inishkea South, thistles (*Cirsium* spp.) were present. See 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). See coastal habitats supporting document for further details
Vegetation composition: bryophytes	Percentage cover	Should always be at least an occasional component of the vegetation	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

1364 Grey Seal *Halichoerus grypus*

To maintain the favourable conservation condition of Grey Seal in Inishkea Islands SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the SAC should not be restricted by artificial barriers to site use. See map 4	See marine supporting document for further details
Breeding behaviour	Breeding sites	Conserve the breeding sites in a natural condition. See map 4 for known sites	Attribute and target based on background knowledge of Irish breeding populations, repeated breeding surveys in 1995, 1996 (Kiely, 1998; Kiely and Myers, 1998), 1998 and 1999 (BIM, 2001), 2002 (Ó Cadhla and Strong, 2003), 2003 (Cronin and Ó Cadhla, 2004; Cronin et al., 2007), 2005 (Ó Cadhla et al., 2008) and 2011 (Ó Cadhla et al., 2013), and unpublished NPWS records including those reported by Summers (1983) and Lyons (2004). See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	Conserve the moult haul-out sites in a natural condition. See map 4 for known sites	Attribute and target based on background knowledge of Irish populations, on review of data from Kiely (1998) and Lyons (2004), a national moult survey (Ó Cadhla and Strong, 2007) and unpublished NPWS records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	Conserve the resting haul-out sites in a natural condition. See map 4 for known sites	Attribute and target based on review of data from Kiely (1998), BIM (2001), Lyons (2004), Cronin et al. (2004), Ó Cadhla et al. (2008), Duck and Morris (2013) and unpublished NPWS. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the grey seal population at the site	See marine supporting document for further details

1395 Petalwort *Petalophyllum ralfsii*

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

Attribute	Measure	Target	Notes
Distribution of populations	Number and geographical spread of populations	No decline. See map 5 for recorded location	The population at North Inishkea was recorded at intervals along a well-worn sheep track traversing the lower edge of machair plain, c.100m from the sea by N. Lockhart of NPWS in July 1998. The islands have not been comprehensively searched for the species since that time
Population size	Number of individuals	No decline. The population has been estimated at a miniumum of 7 thalli	Lockhart recorded a minimum of 7 thalli in July 1998
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at North Inishhea currently unknown, but thought to be very small, c.0.00003ha	The extent of suitable habitat around the recorded location at North Inishkea has not been accurately measured using GPS, but is known to be very small (c.0.25m²)
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter	*Petalophyllum ralfsii* grows in damp sand. Based on Campbell (2013)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	*Petalophyllum ralfsii* grows in compacted, sandy ground, maintained by grazing and trampling (by sheep). Only recorded along sheep track but plenty of other potentially suitable habitat available (Lockhart, 1998, unpublished data)

Legend

Inishkea Islands SAC 000507

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MAP 1:
INISHKEA ISLANDS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000507; version 3.01. CO. MAYO

0 0.25 0.5 0.75 1 km

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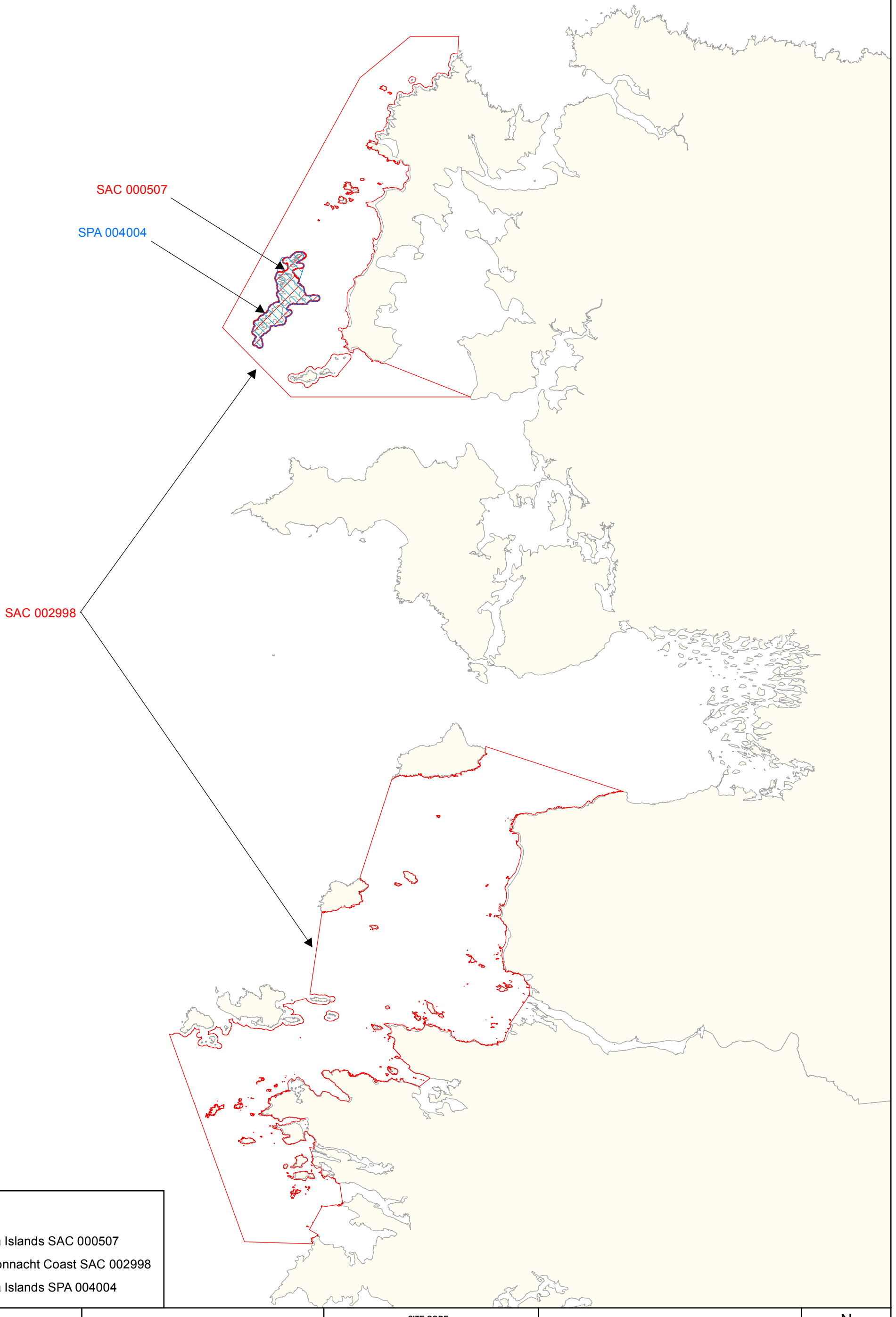
Map Version 1
Date: April 2015



Legend

- Inishkea Islands SAC 000507
- West Connacht Coast SAC 002998
- Inishkea Islands SPA 004004

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MAP 2: INISHKEA ISLANDS SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000507; version 3.01, SAC 002998; version 3.03
SPA 004004; version 2. COUNTIES MAYO / GALWAY

0 2.5 5 7.5 10 km

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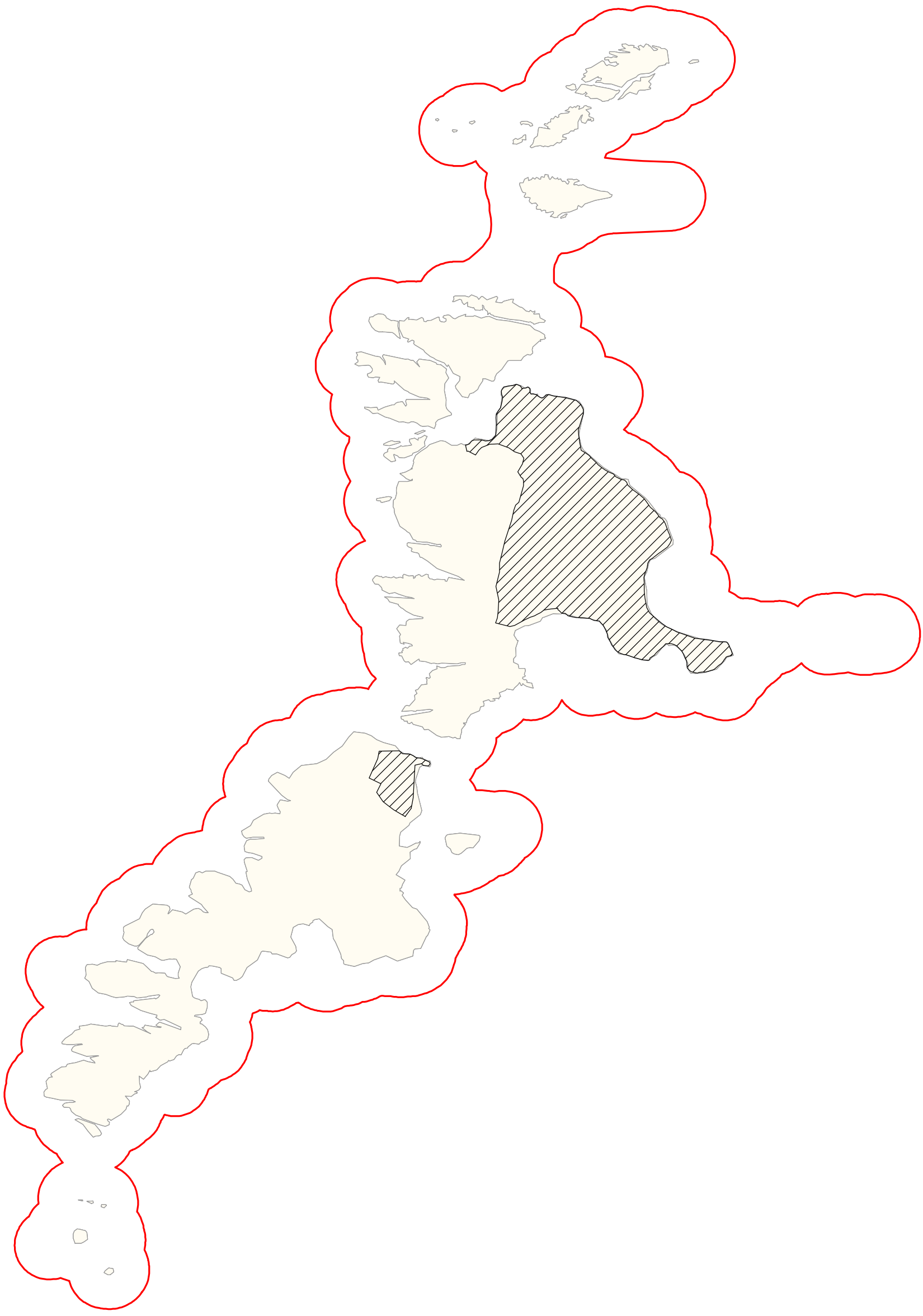
Map Version 1
Date: April 2015



Legend

- Inishkea Islands SAC 000507
- 21A0 *Machairs
- OSi Discovery Series County Boundary

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MAP 3:
INISHKEA ISLANDS SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

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

SITE CODE:
SAC 000507; version 3.01. CO. MAYO

0 0.25 0.5 0.75 1 km

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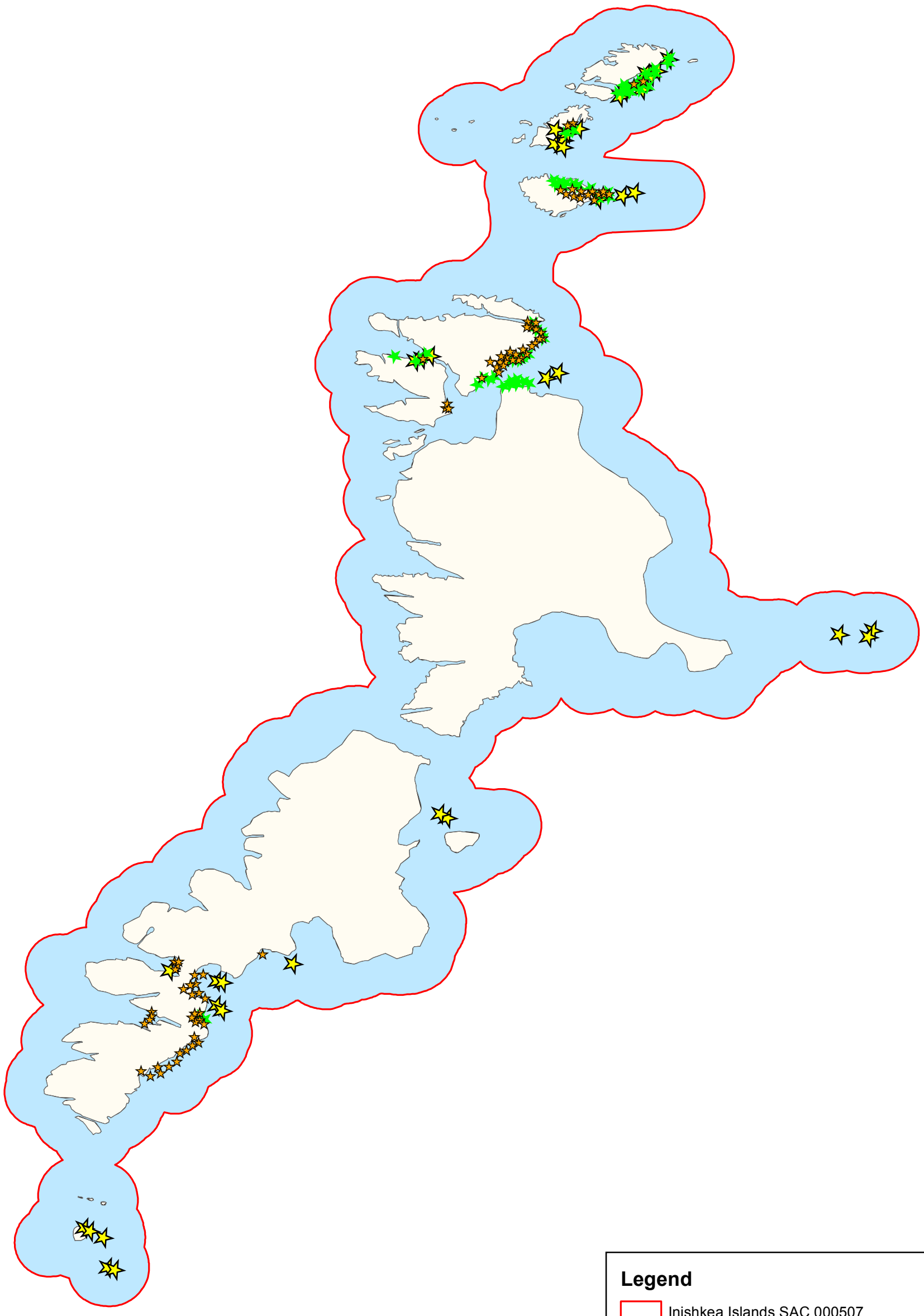
Map Version 1
Date: April 2015



Legend

- Inishkea Islands SAC 000507
- 1364 Grey Seal - *Halichoerus grypus* breeding sites
- 1364 Grey Seal - *Halichoerus grypus* moulting sites
- 1364 Grey Seal - *Halichoerus grypus* resting sites
- 1364 Grey Seal - *Halichoerus grypus* habitats
- OSi Discovery Series County Boundary

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MAP 4:
INISHKEA ISLANDS SAC
CONSERVATION OBJECTIVES
GREY SEAL

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

SITE CODE:
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0 0.25 0.5 0.75 1 km

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Map Version 1
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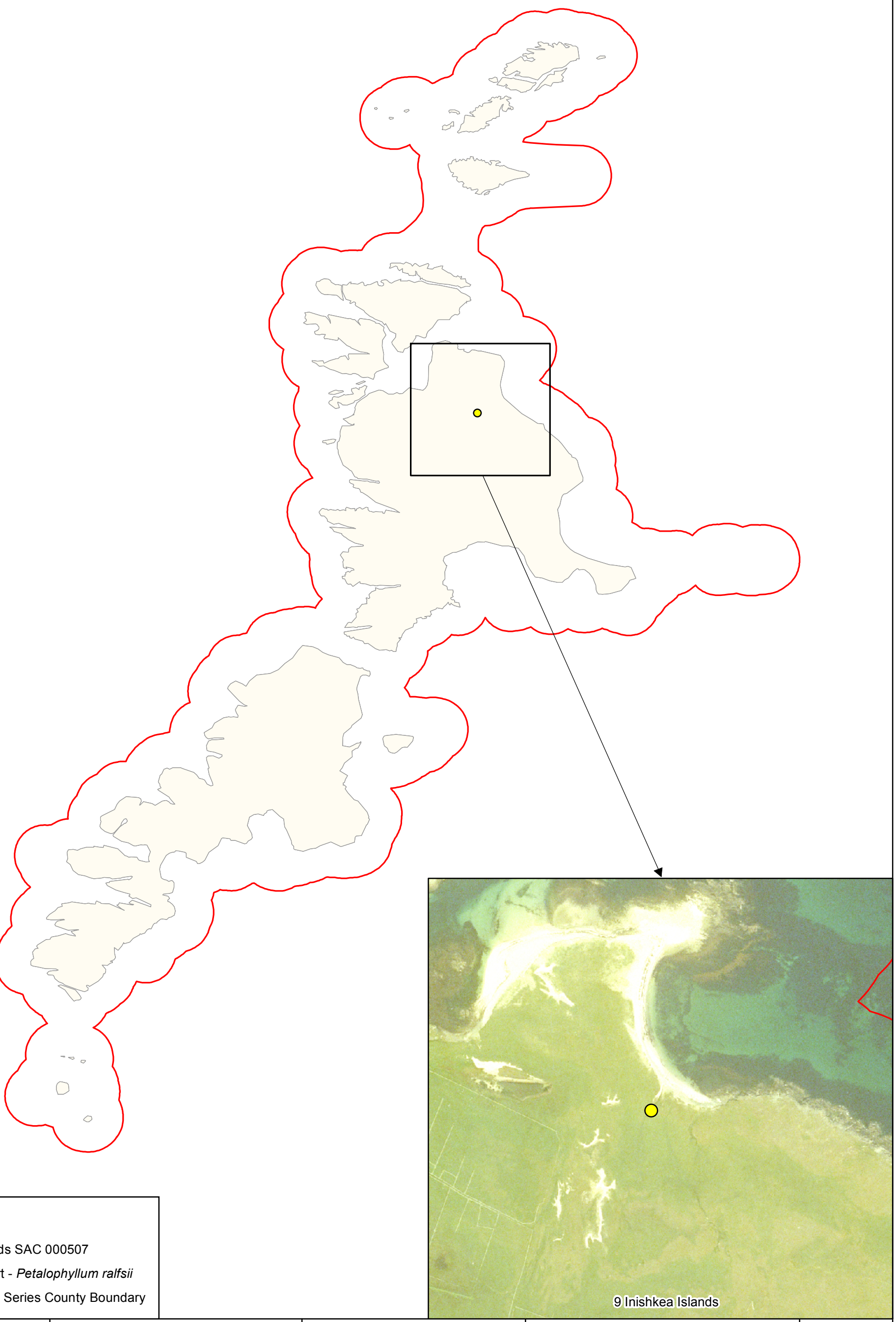

Legend

- Inishkea Islands SAC 000507
- 1395 Petalwort - *Petalophyllum ralfsii*
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 5: INISHKEA ISLANDS SAC CONSERVATION OBJECTIVES PETALWORT

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

SITE CODE:
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0 0.25 0.5 0.75 1 km

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Date: April 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lackan Saltmarsh and Kilcummin Head SAC 000516

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

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

National Parks and Wildlife Service,
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Citation:

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

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000516	Lackan Saltmarsh and Kilcummin Head SAC
1310	*Salicornia* and other annuals colonising mud and sand
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1410	Mediterranean salt meadows (Juncetalia maritimi)
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)*

Please note that this SAC overlaps with Killala Bay/Moy Estuary SPA (004036). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2007
Title :	Saltmarsh Monitoring Project 2006
Author :	McCorry, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2016
Title :	Lacken Saltmarsh and Kilcummin Head SAC (site code: 516) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin

Spatial data sources

Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1310, 1330, 1410 (map 3)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	2120, 2130 (map 4)

1310 Salicornia and other annuals colonising mud and sand

To restore the favourable conservation condition of *Salicornia* and other annuals colonising mud and sand in Lackan Saltmarsh and Kilcummin Head 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: Lackan - 0.001ha	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). *Salicornia* and other annuals colonising mud and sand was surveyed at the sub-site Lackan (site ID: SMP0022) to give a total estimated area of 0.001ha in Lackan Saltmarsh and Kilcummin Head SAC. This extent is too small to be mapped. NB further unsurveyed areas may be present within the SAC. See the Lackan Saltmarsh and Kilcummin Head 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	Based on data from McCorry (2007) and McCorry and Ryle (2009). *Salicornia* is an annual species, so its distribution can vary significantly from year to year. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007) and McCorry and Ryle (2009). Sediment supply is particularly important for this pioneer saltmarsh community, as its distribution depends on accretion rates. Within the estuary and along the margins of the Cloonalaghan River, sediments originating from the river have built up to form an extensive saltmarsh (Ryle et al., 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). Creeks deliver sediment throughout the saltmarsh system. At Lackan, the creek network is well-developed and many of the creeks contain very soft mud and are unusually deep. 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). This pioneer saltmarsh community requires regular 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). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007) and McCorry and Ryle (2009). 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	Maintain the presence of species-poor communities with typical species listed in McCorry and Ryle (2009)	Based on data from McCorry (2007) and McCorry and Ryle (2009). There is frequent glasswort (*Salicornia* sp.) and occasional annual sea-blite (*Suaeda maritima*) associated with some areas. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). No common cordgrass (*Spartina anglica*) was recorded in this habitat in the SAC. See the coastal habitats supporting document for further details

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To maintain the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Lackan Saltmarsh and Kilcummin Head 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 (Lackan) and potential areas mapped: 32.70ha. See map 3	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). The sub-site Lackan (site ID: SMP0022) that supports Atlantic Salt Meadows (ASM) was mapped (32.43ha) and additional areas of potential ASM habitat (0.27ha) were identified from an examination of aerial photographs, giving a total estimated area of 32.70ha within Lackan Saltmarsh and Kilcummin Head SAC. NB further unsurveyed areas may be present within the SAC. See the Lackan Saltmarsh and Kilcummin Head SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for known distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). The saltmarsh is mostly contained in one large main unit. A band of saltmarsh extends along the north-western and north-eastern shorelines of Lackan Bay, which eventually narrows out and transitions to sand dune and sandy beach habitats. NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007) and McCorry and Ryle (2009). Erosion and accretion mainly affects the ASM at this SAC. 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). The original creek network has been affected by drainage and some of the channels in the mid-eastern part of the saltmarsh have been artificially deepened and straightened in the past. 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). There have been drainage and land reclamation works in the past with regularly-spaced drains across the north-western section of the saltmarsh linking with drains from adjacent wet grassland on slopes to the Cloonalaghan River. 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). Natural transitions occur between saltmarsh types as well as to other coastal habitats such as sand dunes. See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007) and McCorry and Ryle (2009). Sheep grazing has created a typical low sward (1-2cm high). 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). There are vehicle tracks and wheel ruts on the ASM at the north-western and north-eastern corners of the saltmarsh where minor roads allow access to the sandflats and Lackan Bay. 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). ASM vegetation is dominated by a thrift (*Armeria maritima*) and sea plantain (*Plantago maritima*) sward. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). No common cordgrass (*Spartina anglica*) was recorded in this habitat in the SAC. 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 Lackan Saltmarsh and Kilcummin Head 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 (Lackan): 65.03ha. See map 3	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). The sub-site Lackan (site ID: SMP0022) that supports Mediterranean Salt Meadows (MSM) was mapped to give a total estimated area of 65.03ha within Lackan Saltmarsh and Kilcummin Head SAC. NB further unsurveyed areas may be present within the SAC. See the Lackan Saltmarsh and Kilcummin Head SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for known distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). MSM habitat dominates the western side of Cloonalaghan River and the southern part of the saltmarsh. NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007) and McCorry and Ryle (2009). Some minor erosion and accretion occurs within the MSM further up the Cloonalaghan River channel from the ASM habitat. 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). The creek and pan topography in the MSM is very well-developed with frequent pans and a dense network of creeks. 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). Natural transitions occur between saltmarsh types as well as to other coastal habitats such as sand dunes. See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry (2007) and McCorry and Ryle (2009). The grazing level is low in the MSM as the dense patches of sea rush (*Juncus maritimus*) present protect the other vegetation. 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 MSM habitat has suffered some damage due to heavy cattle poaching. 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). Sea rush (*Juncus maritimus*) occurs on slightly elevated sites and its sharp stems protect succulent plants such as common scurvygrass (*Cochlearia officinalis*) and sea aster (*Aster tripolium*) from grazing. Sea club-rush (*Bolboschoenus maritimus*) and common reed (*Phragmites australis*) are present in the ditches. This limited species diversity is typical of MSM habitat. See the coastal habitats supporting document for further details

Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). No common cordgrass (*Spartina anglica*) was recorded in this habitat in the SAC. See the coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Lackan Saltmarsh and Kilcummin Head SAC, which is defined by the following list of attributes and targets:

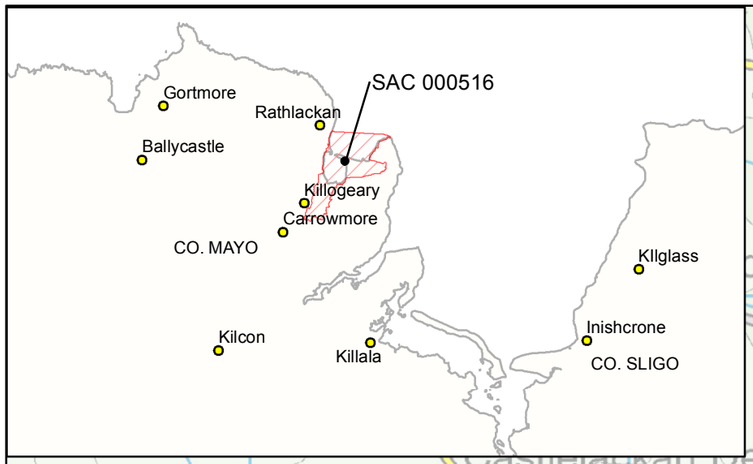
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Lackan (including Rathlackan) - 2.82ha. See map 4	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Shifting dunes along the shoreline with *Ammophila arenaria* was mapped at the sub-site Lackan (including Rathlackan; CMP site ID: 129) to give a total estimated area of 2.82ha within Lackan Saltmarsh and Kilcummin Head SAC. This habitat is very difficult to measure in view of its dynamic nature. See the Lackan Saltmarsh and Kilcummin Head 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 known distribution	Based on data from Ryle et al. (2009). 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). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. The sandhills at the Rathlackan sub-site, on the north-west side of Lackan Saltmarsh and Kilcummin Head SAC, are badly eroded, which has resulted in the availability of sediment that may be re-worked to form temporary foredune habitat. There appears to have been some attempts at dune protection through the planting of marram grass and lyme-grass (*Leymus arenarius*) on heaped banks of sand and cobbles. 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 Gaynor (2008) and Ryle et al. (2009). Mobile dunes at Rathlackan extend around the seaward edge of the spit. Behind the dunes, there are sheltered intertidal sandflats which in turn are backed by extensive saltmarsh. See the coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). Although mobile dunes occur along the full northern edge of the spit in the SAC, the characteristic vegetation of marram (*Ammophila arenaria*) is frequently quite sparse and/or has an unhealthy appearance, reflecting the general lack of sediment mobility along the seaward edge of the dunes. Only at the western tip of the spit, where accreting or locally recycled sediment accumulates, is there a substantial band of healthy marram. 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 (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009). The mobile dune habitat at Rathlackan is characterised by the presence of marram grass (*Ammophila arenaria*). Lyme-grass (*Leymus arenarius*) is also present in places. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes)* in Lackan Saltmarsh and Kilcummin Head SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Lackan (including Rathlackan) - 95.18ha. See map 4	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Fixed coastal dunes with herbaceous vegetation was mapped at the sub-site Lackan (including Rathlackan; CMP site ID: 129) to give a total estimated area of 95.18ha within Lackan Saltmarsh and Kilcummin Head SAC. See the Lackan Saltmarsh and Kilcummin Head 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 known distribution	Based on data from Ryle et al. (2009). 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). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. The north-facing (seaward) side of the Lackan dunes has a highly eroded dune face which, coupled with the lack of any substantially accreting habitat and no significant foredune development, suggests the system is being depleted of sediment. 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). The outer zone of Lackan Saltmarsh and Kilcummin Head SAC is dominated by a sand dune system and a sandy beach. The sand dunes are dominated by fixed dunes. Behind the dunes, there are sheltered intertidal sandflats which in turn are backed by extensive saltmarsh. See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008) and Ryle et al. (2009). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008) and Ryle et al. (2009). Different levels of grazing have resulted in varying sward heights in the fixed dune habitat at this 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 range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008) and Ryle et al. (2009). The more commonly noted species in the fixed dunes included sand sedge (*Carex arenaria*), glaucous sedge (*C. flacca*), red fescue (*Festuca rubra*), lady's bedstraw (*Galium verum*), cat's ear (*Hypochaeris radicata*), common bird's-foot trefoil (*Lotus corniculatus*), field wood-rush (*Luzula campestris*), mouse-ear-hawkweed (*Pilosella officinarum*), ribwort plantain (*Plantago lanceolata*), yellow-rattle (*Rhinanthus minor*), wild thyme (*Thymus polytrichus*) and Germander speedwell (*Veronica chamaedrys*). 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 Gay nor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. At Lackan Saltmarsh and Kilcummin Head SAC, the localised proliferation of species such as creeping thistle (*Cirsium arvense*), spear thistle (*C. vulgare*) and common ragwort (*Senecio jacobaea*) in the fixed dunes may be indicative of recent overgrazing and intensive management. 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). At Lackan Saltmarsh and Kilcummin Head SAC, there were occasional stunted hawthorn (*Crataegus monogyna*) shrubs in the fixed dune grassland, although the total shrub and tree cover was insignificant. See the coastal habitats supporting document for further details



Legend

Lackan Saltmarsh and Kilcummin Head SAC 000516

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

MAP 1:
LACKAN SALTMARSH AND KILCUMMIN HEAD SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000516; version 3.
CO. MAYO

0 0.25 0.5 0.75 1 km

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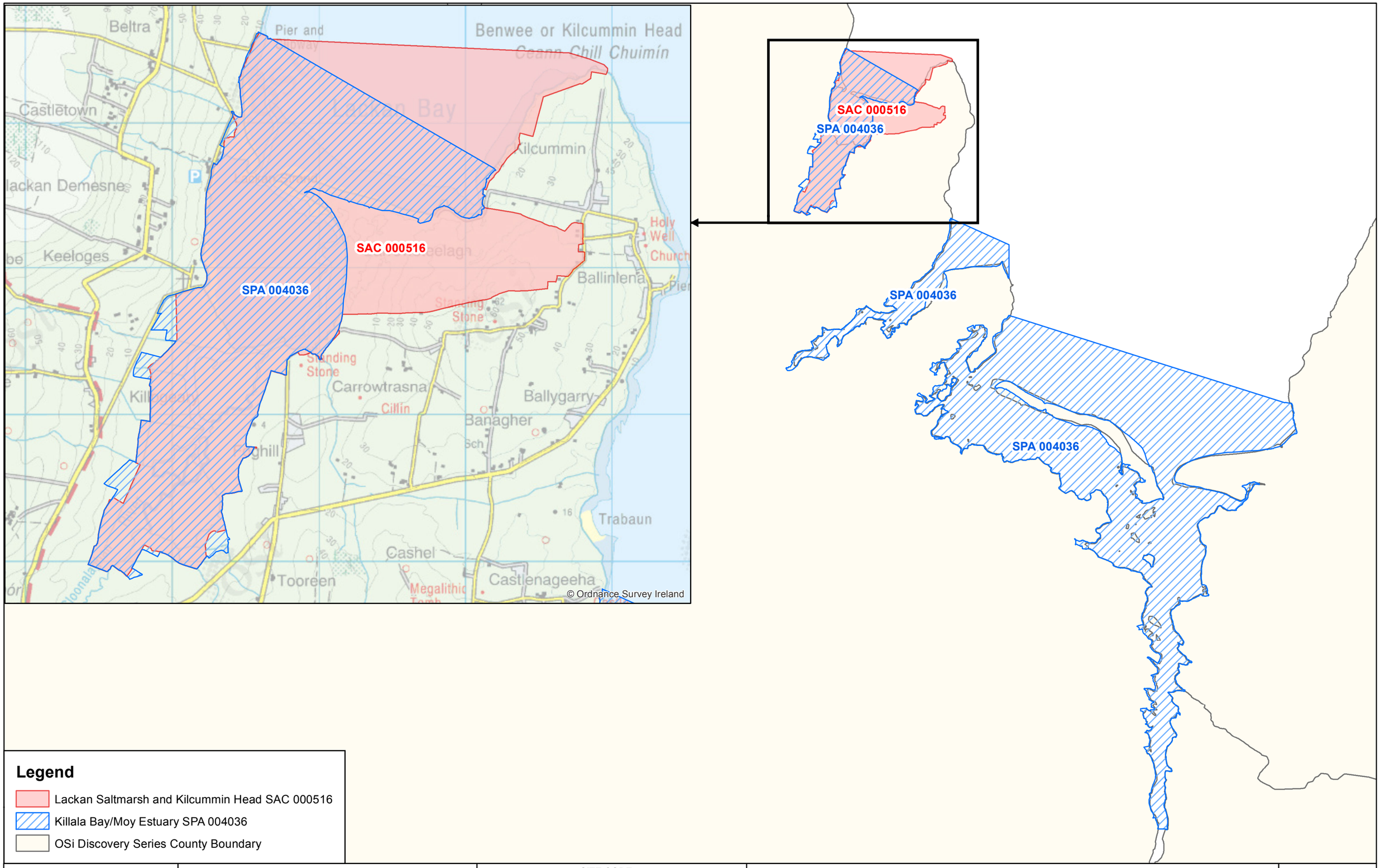
Map Version 1
Date: Oct 2016



Legend

- Lackan Saltmarsh and Kilcummin Head SAC 000516
- Killala Bay/Moy Estuary SPA 004036
- OSi Discovery Series County Boundary

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
LACKAN SALTMARSH AND KILCUMMIN HEAD SAC
CONSERVATION OBJECTIVES
OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000516; version 3. SPA 004036; version 3.
CO. MAYO

0 1 2 3 4 km

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Map Version 1
Date: Oct 2016

SMP Site Code: SMP0022

Legend

- Lackan Saltmarsh and Kilcummin Head SAC 000516
- Saltmarsh Monitoring Project Study Area
- 1330 / 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1410 Mediterranean salt meadows (*Juncetalia maritimi*)
- Potential 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- OSi Discovery Series County Boundary

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 3:
LACKAN SALTMARSH AND KILCUMMIN HEAD SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

SITE CODE:
SAC 000516; version 3.
CO. MAYO

0 0.2 0.4 0.6 0.8 km

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Map Version 1
Date: Oct 2016

CMP Site Code: 129

CMP Site Code: 129

Legend

- Lackan Saltmarsh and Kilcummin Head SAC 000516
- Coastal Monitoring Project Survey Area

Qualifying Interests

- 2120, Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")
- 2130, Fixed dunes with herbaceous vegetation ("grey dunes")

Non Qualifying Interests

- 2110 Embryonic shifting dunes
- OSi Discovery Series County Boundary

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

MAP 4:
LACKAN SALTMARSH AND KILCUMMIN HEAD SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

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

SITE CODE:
SAC 000516; version 3.
CO. MAYO

0 0.15 0.3 0.45 0.6 km

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Map Version 1
Date: Oct 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Gall Bog SAC 000522

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

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

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Citation:

NPWS (2017) Conservation Objectives: Lough Gall Bog SAC 000522. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000522	Lough Gall Bog SAC
7130	Blanket bogs (* if active bog)
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Lough Gall Bog SAC (site code: 522) Conservation objectives supporting document- blanket bog and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Lough Gall Bog SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 297ha, covering 82% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Lough Gall Bog SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur throughout the SAC and is the dominant habitat present. Further information can be found within Foss and McGee (1987), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Foss and McGee, 1987; NPWS internal files), one of which corresponds to a community recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)

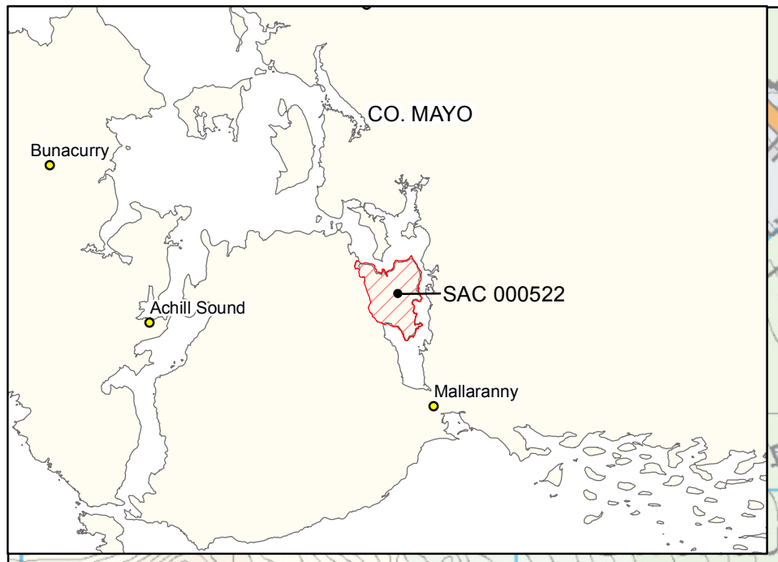
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Attribute and target based on Perrin et al. (2014)
Vegetation structure: signs of browsing	Percentage of shoots browsed at a representative number of 2m x 2m monitoring stops	Last complete growing season's shoots of ericoids, crowberry (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) has been recorded within the SAC (NPWS internal files), but this species cannot be specifically assigned to blanket bog

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Lough Gall Bog SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Lough Gall Bog SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur scattered throughout blanket bog areas and is well-represented in locations with deep quaking peat (NPWS internal files). Foss and McGee (1987) note the presence of this habitat in the north-east of the SAC. Further information can be found in Foss and McGee (1987), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) is present within the SAC (NPWS internal files), but this species cannot be specifically assigned to this habitat



Gubna
Gubnastacky
Gubdermot
An Abhainn Dubh
L Namuck
L Gall
Assaundoo
Carton River
N59
452
© Ordnance Survey Ireland

Legend

Lough Gall Bog SAC 000522

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 1:
LOUGH GALL BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000522; version 1.01
Co. Mayo

0 0.2 0.4 0.6 0.8 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: Jan 2017

Conservation objectives for Shrule Turlough SAC [000525]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Shrule Turlough SAC [000525]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Moore Hall (Lough Carra) SAC 000527

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,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2018) Conservation Objectives: Moore Hall (Lough Carra) SAC 000527. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

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- 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***

000527	Moore Hall (Lough Carra) SAC

1303	Lesser Horseshoe Bat *Rhinolophus hipposideros*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2007
Title :	Protecting and managing underground sites for bats
Author :	Mitchell-Jones, A.J.; Bihari, Z.; Masing, M.; Rodrigues, L.
Series :	EUROBATS Publication Series No. 2
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust

Spatial data sources

Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roosts identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 2)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost locations
Used For :	1303 (map 2)

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To maintain the favourable conservation condition of Lesser Horseshoe Bat in Moore Hall (Lough Carra) SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 129 bats for the summer roost (roost id. 684 in NPWS database); minimum number of 455 bats for the winter roost (roost id. 684). See map 2	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (*Rhinolophus hipposideros*). NPWS conduct annual counts at each qualifying roost. Qualified means from the most recent available five years of data (collected between 2012-2017) have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean is set as the target figure for the roost. The roost in Moore Hall (Lough Carra) SAC (roost id. 684 in NPWS database) is a qualifying summer and winter roost and, as such, separate targets have been set for each season using the summer and winter count data. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Winter roosts	Condition	No decline	Moore Hall (Lough Carra) SAC has been selected for lesser horseshoe bat because of the presence of one internationally important winter roost (roost id. 684 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Mitchell-Jones et al., 2007)
Summer roosts	Condition	No decline	Moore Hall (Lough Carra) SAC has been selected for lesser horseshoe bat because of the presence of one internationally important summer roost (roost id. 684 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Kelleher and Marnell, 2006)
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roosts	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 2 which shows a 2.5km zone around the above roosts and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roosts. See map 2	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts. See map 2	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)

MUCKLOON or
MOOREHALL

Ballycarra
Ballyhean
Killavally
Mayo
CO. MAYO
Ballyglass
SAC 000527
Partry

Legend

Moore Hall (Lough Carra) SAC 000527

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

MAP 1:
MOORE HALL (LOUGH CARRA) SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000527; version 3.01 CO. MAYO

0 20 40 60 80 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: June 2018

SAC 000527

SAC 000527

Bat Site Code: 684

684

Legend

- Moore Hall (Lough Carra) SAC 000527
- OSi Discovery Series County Boundary

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

- Roost Location
- Bat Site Code 684 Foraging Range
- Potential Foraging Grounds

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

MAP 2:
MOORE HALL (LOUGH CARRA) SAC
CONSERVATION OBJECTIVES ADJACENT
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 000527; version 3.01.
CO. MAYO

0 0.45 0.9 1.35 1.8 2.25 Kilometers

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: June 2018

Conservation objectives for Oldhead Wood SAC [000532]

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.

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- 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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
4030	European dry heaths
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Oldhead Wood SAC [000532]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Owenduff/Nephin Complex SAC 000534

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Owenduff/Nephin Complex SAC 000534. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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- 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***

000534	Owenduff/Nephin Complex SAC
1106	Salmon *Salmo salar*
1355	Otter *Lutra lutra*
1393	Slender Green Feather-moss *Drepanocladus vernicosus*
1528	Marsh Saxifrage *Saxifraga hirculus*
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 Isoeto-Nanojuncetea
3160	Natural dystrophic lakes and ponds
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
4010	Northern Atlantic wet heaths with *Erica tetralix*
4060	Alpine and Boreal heaths
5130	*Juniperus communis* formations on heaths or calcareous grasslands
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs

Please note that this SAC overlaps with Owenduff/Nephin Complex SPA (004098) and is adjacent to Carrowmore Lake Complex SAC (000476), Corraun Plateau SAC (000485), Clew Bay Complex SAC (001482) and Blacksod Bay/Broad Haven SPA (004037). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1987
Title :	The vegetation of Irish rivers
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	1989
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.
Series :	A report commissioned by the Wildlife Service
Year :	1999
Title :	A survey of the rare and protected flora of County Mayo
Author :	McKee, A-M.
Series :	Unpublished report to Duchas
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Conservation Plan for 2006-2011. Owenduff/Nephin Complex cSAC and SPA Site Codes 000534 and 004098 Co. Mayo
Author :	NPWS
Series :	Conservation Plan
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2012
Title :	The conservation status of juniper formations in Ireland
Author :	Cooper, F.; Stone, R.E.; McEvoy, P.; Wilkins, T.; Reid, N.
Series :	Irish Wildlife Manual No. 63
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76

Year :	2013
Title :	A survey of red grouse (*Lagopus lagopus scoticus*) in the Owenduff/Nephin Complex Special Protection Area, County Mayo
Author :	Murray, T.; Clotworthy, C.; Bleasdale, A.
Series :	Irish Wildlife Manual No. 77
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manual No. 88
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Monitoring methods for *Hamatocaulis vernicosus* (Mitt.) Hedenäs (Slender green feather-moss) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 91
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Owenduff/Nephin Complex SAC (site code: 534) Conservation objectives supporting document- blanket bogs and associated habitats 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 :	1989
Title :	The genera *Scorpidium* and *Hamatocaulis*, gen. nov., in northern Europe
Author :	Hedenäs, L.
Series :	Lindbergia, 15: 8-36
Year :	1989
Title :	Three new localities for *Saxifraga hirculus* L. in Ireland
Author :	Lockhart, N.
Series :	Irish Naturalists' Journal, 23(2): 65-69
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 :	1998
Title :	Studies in Irish Limnology
Author :	Giller, P.S. (ed.)
Series :	Marine Institute, Dublin
Year :	1998
Title :	Studies of Irish Rivers and Lakes
Author :	Moriarty, C. (ed.)
Series :	Marine Institute, Dublin
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2005
Title :	Lichens. An illustrated guide to the British and Irish species
Author :	Dobson, F.S.
Series :	The Richmond Publishing Co. Ltd., Slough
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press

Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2012
Title :	Rare and threatened bryophytes of Ireland
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	National Museums Northern Ireland
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished Ph.D. thesis, University College Cork
Year :	2012
Title :	Lichens of Ireland. An illustrated introduction to over 250 species
Author :	Whelan, P.
Series :	The Collins Press, Wilton, Cork
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2013
Title :	Management strategies for the protection of high status water bodies
Author :	Ní Chatháin, B.; Moorkens, E.; Irvine, K.
Series :	Strive Report Series No. 99. EPA, Wexford

Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2014
Title :	The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots in upland UK
Author :	Marshall, M.R.; Ballard, C.E.; Frogbrook, Z.L.; Solloway, I.; McIntyre, N.; Reynolds, B.; Wheater, H.S.
Series :	Hydrological Processes, 28: 2617–2629
Year :	2014
Title :	Identifying the role of environmental drivers in organic carbon export from a forested peat catchment
Author :	Ryder, E.; de Eyto, E.; Dillane, M.; Poole, R.; Jennings, E.
Series :	Science of the Total Environment, 490: 28–36.
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford
Year :	2015
Title :	The fecundity of wild Irish Atlantic salmon *Salmo salar* L. and its application for stock assessment purposes
Author :	de Eyto, E.; White, J.; Boylan, P.; Clarke, B.; Cotter, D.; Doherty, D.; Gargan, P.; Kennedy, R.; McGinnity, P.; O'Maoiléidigh, N.; O'Higgins, K.
Series :	Fisheries Research, 164: 159–169.
Year :	2016
Title :	A narrative for conserving freshwater and wetland habitats in England
Author :	Mainstone, C.; Hall, R.; Diack, I.
Series :	Natural England Research Reports Number 064
Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitats and to resolve any issues arising
Used For :	3110, 3160 (map 3)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1393, 1528 (maps 4 and 5)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of 10m buffer on the terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Creation of 20m buffer applied to river and stream centreline data; These datasets combined with the derived OSI 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2010
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	Creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets combined with the derived OSi Discovery Series river and canal datasets. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)

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 Owenduff/Nephin 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 Lough Feeagh and other larger lakes (e.g. Bunaveela, Anaffrin) in Owenduff/Nephin Complex SAC (see map 3). The SAC was formerly selected for lake habitat 3130, based on an older interpretation of that habitat where it was associated with uplands (see O Connor, 2015). In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha were mapped as potential 3110. Lake habitat 3160 is likely to co-occur with this habitat in many lakes in the SAC, particularly at higher altitude (above 200m), owing to the base-poor geology (quartzite and schist) and blanket peats. 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 (see map 3)
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). Douglas et al. (1989) provide some records for lake macrophytes from the SAC. Lough Feeagh is a Water Framework Directive (WFD) monitoring lake and regular macrophyte surveys are conducted by the Environmental Protection Agency (EPA). EPA data indicate Lough Feeagh has limited submerged vegetation: quillwort (*Isoetes lacustris*), shoreweed (*Littorella uniflora*) and bulbous rush (*Juncus bulbosus*). There has been extensive study of the Burrishoole catchment, including Lough Feeagh, by the Marine Institute (formerly the Salmon Research Agency). This had concentrated particularly on fish and water quality, but also acidification, climate change, organic carbon, etc. (e.g. Cross et al., 1998 in Giller, 1998; Whelan et al., 1998 in Moriarty, 1998; Ryder et al., 2014; de Eyto et al., 2015)
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)
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. Data on macrophyte depth in Lough Feeagh will be available from EPA monitoring

Hydrological regime: water level fluctuations	Metres	Maintain/restore 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 likely that the hydrological regimes of many of the lakes are still 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 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 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). Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; 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 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Lough Feeagh passed the nutrient conditions target in 2007-09 and 2010-12 (McGarrigle et al., 2010; Bradley et al., 2015)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Lough Feeagh passed the target and had high chlorophyll *a* status in 2007-09 and 2010-12 (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

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, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Restore 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 ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Lough Feeagh failed the target in 2010-12, having good macrophyte status (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 *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. See McGarrigle et al. (2010) and Bradley et al. (2015) for WFD acidification status in the 2007-09 and 2010-12 periods
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 lakes with habitat 3110, where the peatland in the lake's catchment is intact. Free et al. (2006) reported colour of 80mg/l PtCo in Lough Feeagh. Overgrazing and other peatland degradation is likely to have increased colour in some lakes in Owenduff/Nephin 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. Ryder et al. (2014) investigated OC losses from forestry in the Burrishoole. Overgrazing and other peatland degradation is also likely to have increased DOC in some lakes in Owenduff/Nephin Complex 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 Owenduff/Nephin Complex SAC
Fringing habitat: area and condition	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

3160 Natural dystrophic lakes and ponds

To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Owenduff/Nephin 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	Owenduff/Nephin Complex SAC has both lowland blanket bog pool systems and upland lakes with habitat 3160. The habitat is likely to be found in many lakes in the SAC, where it may co-occur with lake habitat 3110, and all lakes, with the exception of Lough Feeagh, have been mapped as potential 3160 (see map 3). Many of the bog pools are not mapped in the 1:5,000 OSi data (map 3). Lake habitat 3160 is of high conservation value in the SAC. For further information on the distribution, vegetation and morphology of the habitat in the SAC, see Foss and McGee (1987) and Douglas et al. (1989). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, all lakes and ponds in the SAC, with the exception of Lough Feeagh, have been mapped as potential 3160 (see map 3). Atlantic blanket bog pools, including interconnecting pool systems, were recorded at Uggool, Sheeanmore and Altnabrocky, Owenglass West and East, Bellagaravaun, and other areas of the SAC (Foss and McGee, 1987; Douglas et al., 1989)
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see the Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015). Douglas et al. (1989) recorded many-stalked spike-rush (*Eleocharis multicaulis*), bogbean (*Menyanthes trifoliata*) and the bog mosses *Sphagnum auriculatum* and *S. cuspidatum* in pools, and some water lobelia (*Lobelia dortmanna*) and pipewort (*Eriocaulon aquaticum*), the latter of which is Near Threatened in Ireland (Wyse Jackson et al., 2016). Great sundew (*Drosera anglica*) and round-leaved sundew (*D. rotundifolia*) were abundant in shallower interconnecting pools. Bulbous rush (*Juncus bulbosus*) was recorded in lakes with rock basins
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3160 (see O Connor, 2015). Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3160. 3160 lakes and pools naturally have very clear water and, therefore, maximum depth can be large within undisturbed peatland and uplands. Pressures such as overgrazing, forestry and peat-cutting may have reduced vegetation depth in some lakes in Owenduff/Nephin Complex 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 lake habitat 3160 is associated with nutrient-poor peat and silt substrates
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3160. Lake habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; 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 ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status

Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds should, therefore, be trace/absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, lake habitat 3160 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for 3160 lakes and pools is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥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 lake habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of 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 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and pools where the peatland in the lake's catchment is intact. Overgrazing and other peatland degradation is likely to have increased colour in some lakes and pools in Owenduff/Nephin 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 Owenduff/Nephin Complex SAC
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	Lakes with 3160, particularly in uplands, are likely to be fringed by acid grassland, heath and rock communities. 3160 pools intergrade with blanket bog communities in Owenduff/Nephin Complex SAC. Spring-fed flushes are also a feature of the SAC. Quaking bog is also associated with pool systems in the SAC. Fringing habitats support the structure and functions of the lake/pool habitat. They are also dependent on the lake/pool, particularly its water levels, and can support wetland communities and species of conservation concern

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Owenduff/Nephin 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	The description of habitat 3260 covers from upland rivers with bryophytes and macroalgae to lowland depositing rivers with pondweeds and starworts. Owenduff/Nephin Complex SAC was selected for highly oligotrophic, base-poor rivers, with limited aquatic vegetation. The main rivers in the SAC are the Owenduff and its tributaries to the south, and parts of the Owenmore and tributaries to the north-east. The Owenduff system was rated as of unique conservation importance and had communities dominated by mosses, liverworts and algae (Heuff, 1987). It is likely that most streams and rivers in the SAC have been negatively impacted by overgrazing in the Nephins and Nephin Begs (see NPWS, 2006; Murray et al., 2013)
Habitat distribution	Occurrence	No decline, subject to natural processes	Further study is needed of Irish sub-types and their conservation value to interpret the broad description of 3260 (European Commission, 2013). As noted above, the SAC was selected for a species-poor sub-type dominated by bryophytes and algae and with limited vascular plants. The uncommon river lichens *Ephebe lanata* and *Porpidia hydrophila* are known from the Altaconey and Srahmore rivers in the SAC (see Dobson (2005) and Whelan (2012) for notes on ecology). *Bryum riparium*, an endangered bryophyte of damp rock near streams and waterfalls occurs in the SAC (Lockhart et al., 2012). Ivy-leaved bellflower (*Wahlenbergia hederacea*) occurs at a number of sites along the Owenduff (including near Lagduff and Srahduggan) and on the Tarsaghaunmore tributary (see McKee, 1999). This is an important outlying population of a Near Threatened species (Wyse Jackson et al., 2016) otherwise concentrated in the south-west and east
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	High conservation value sub-types are associated with natural hydrology. 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, 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. Peatlands also have slow-flowing or ponded streams and rivers, with biotic communities likely to resemble those in associated lakes. Many of the rivers and streams in the SAC are naturally very flashy, although some more ponded and slow-flowing stretches occur in areas of relatively flat bog. It is likely that the hydrological regimes of many of the rivers are still altered owing to historic overgrazing (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	The groundwater contribution to rivers in the SAC is likely to be small, owing to the geology and dominance of blanket peat soils. Even small groundwater contributions, however, can significantly alter the hydrochemistry, particularly where there is basic bedrock and/or subsoils
Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes	Many of the high conservation value sub-types are dominated by coarse substrata, and it is likely that bedrock, boulders, cobbles and coarse gravels were naturally abundant in many rivers in this SAC. The size and distribution of particles is largely determined by the river flow. 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. The geomorphology, including channel shape and substratum, of many streams and rivers in the SAC are likely to be significantly altered as a result of overgrazing
Water quality	Various	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The specific targets may vary among sub-types. The rivers within Owenduff/Nephin Complex SAC are naturally very nutrient-poor and, therefore, typically require Water Framework Directive high status, in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos. The occurrence of high status river sites downstream of areas of previously severe overgrazing damage is unexpected and suggests the metrics may not be sensitive to such impacts. 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-types should be present and in good condition	The sub-types of this habitat are poorly understood and their typical species have not yet been fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates. As noted above, rare lichens, bryophytes and the vascular plant species ivy-leaved bellflower (*Wahlenbergia hederacea*) are associated with rivers, streams and riparian areas in Owenduff/Nephin Complex SAC
Floodplain connectivity: area	Hectares	The area of active floodplain at, and upstream of, the habitat, necessary to support all sub-types 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). The hydro-morphological impacts associated with overgrazing may have impacted on floodplain connectivity in Owenduff/Nephin Complex SAC

Fringing habitats: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	Riparian habitats (including those along lake shores), particularly natural/semi-natural woodlands and wetlands, are an integral part of the structure and functioning of river systems, even where they do not form part of a natural floodplain. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers 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). Rivers and streams in Owenduff/Nephin Complex SAC are often fringed by acid wet grassland, and also blanket bog, heath and flush/poor fen

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Northern Atlantic wet heaths with *Erica tetralix* has not been mapped in detail for Owenduff/Nephin Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 4,524ha, covering 17% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Owenduff/Nephin Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur in mosaic with blanket bog within the SAC and is present on the lower slopes of mountains (NPWS, 2006). Further information can be found within NPWS (2006) 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	A variety of wet heath vegetation communities have been noted within the SAC (NPWS, 2006), two of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of monitoring stops	Cross-leaved heath (*Erica tetralix*) 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 *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* 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 (*Empetrum nigrum*) 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). Rhododendron (*Rhododendron ponticum*) was recorded from wet heaths in the SAC (NPWS internal files)

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 (*Pteridium aquilinum*) 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 (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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	This includes species listed in the Flora (Protection) Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) is present within the SAC (NPWS, 2006), but cannot be assigned specifically to wet heath

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in Owenduff/Nephin 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	Alpine and Boreal heaths have not been mapped in detail for Owenduff/Nephin Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 1,150ha, covering 4% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Owenduff/Nephin Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs on summits and ridges above 400-500m where it forms a mosaic with bare rock (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of Alpine and Boreal heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: 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)
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 (*Empetrum nigrum*) 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	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened Alpine clubmoss (*Diphasiastrum alpinum*) (Wyse Jackson et al., 2016) was recorded from the Nephin Beg Range by Praeger (NPWS, 2006). This species is known to be associated with this habitat type

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 Owenduff/Nephin 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	*Juniperus communis* formations on heaths or calcareous grasslands habitat has not been mapped in detail for Owenduff/Nephin Complex SAC and thus the total area of the qualifying habitat is unknown. It has been noted that the habitat is rare within the SAC (Foss and McGee, 1987; Douglas et al., 1990) and is largely confined to ungrazed islands within larger dystophic and oligotrophic lakes, and may also occur near well-drained areas of bog surrounding rock outcrops in the SAC, and often occurs in a mosaic with wet heath (NPWS, 2006; NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See notes on habitat area above
Juniper population size	Number per formation	At least 50 plants per formation	To classify as a juniper (*Juniperus communis*) 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. Rhododendron (*Rhododendron ponticum*) has been reported from some of the lake islands that support juniper (*Juniperus communis*) scrub in the SAC (NPWS internal files)
Vegetation structure: cone-bearing plants	Percentage per formation	At least 10% of juniper plants are bearing cones	Attribute and target based on Cooper et al. (2012)
Vegetation structure: seedling recruitment	Percentage per formation	At least 10% of juniper plants are seedlings	Attribute and target based on Cooper et al. (2012)
Vegetation structure: dead juniper	Percentage per formation	Mean percentage of each juniper plant dead less than 10%	Attribute and target based on Cooper et al. (2012)

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs in Owenduff/Nephin Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Owenduff/Nephin Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 18,393ha, covering 68% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Owenduff/Nephin Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat covers most of the western and northern parts of the SAC, as well as much of the upland areas in the east and south. Large areas of intact blanket bog are also present in the centre of the SAC. Further information can be found within Foss and McGee (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Foss and McGee, 1987; Douglas et al., 1989; NPWS internal files), five of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, 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). Rhododendron (*Rhododendron ponticum*) and the non-native moss *Campylopus introflexus* are present within blanket bog in the SAC (NPWS, 2006; NPWS internal files)

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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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	Several rare and threatened species are present in blanket bog flushes in the SAC including the Annex II and Annex IV listed, Flora (Protection) Order, 2015 (FPO) and Near Threatened (NT) marsh saxifrage (*Saxifraga hirculus*), the FPO and Vulnerable (VU) marsh clubmoss (*Lycopodiella inundata*), the FPO and NT bog orchid (*Hammarbya paludosa*), the Annex II listed, FPO and NT slender green feather-moss (*Hamatocaulis (Drepanocladus) vernicosus*) and the VU moss *Tomentypnum nitens* (NPWS, 2006; Lockhart et al., 2012; Campbell et al., 2015; Muldoon et al., 2015; Wyse Jackson et al., 2016; NPWS internal files). Although some of these species cannot be assigned specifically to blanket bog habitat (i.e. they are flush/fen species) they do occur in association with the habitat. The NT brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) is also present within the SAC (NPWS, 2006), but cannot be assigned specifically to blanket bog

7140 Transition mires and quaking bogs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Transition mires and quaking bogs have not been mapped in detail for Owenduff/Nephin Complex SAC and thus the total area of the qualifying habitat is unknown. Further details on this and the following attributes can be found in the Owenduff/Nephin Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs in locations where bog vegetation merges with base-rich flushes, and at the interface between water bodies and adjacent bog. Examples can be found at Owenglass West, Uggool, Sheeanmore and Lagduff. Further information can be found within Foss and McGee (1987), Douglas et al. (1989), NPWS (2006) 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	Douglas et al. (1989) recorded one transition mire vegetation community that corresponds to a community recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least three for infilling pools and flushes and at least six for fens	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: number of core positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	At least one core positive indicator species present	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of positive indicator species is at least 25%	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 15cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples of the habitat, not to infilling pool examples

Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Attribute and target based on Perrin et al. (2014)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species listed in the Flora (Protection) Order, 2015 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*), the FPO listed and Near Threatened bog orchid (*Hammarbya paludosa*), the Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) and the Vulnerable moss *Tomentypnum nitens* (Lockhart et al., 2012) are present within the SAC (NPWS, 2006; NPWS internal files), but cannot be assigned specifically to transition mires. The Annex II and FPO listed and Near Threatened slender green feather-moss (*Hamatocaulis* (*Drepanocladus*) *vernicosus*) (Lockhart et al., 2012) occurs in the habitat in the SAC (Campbell et al., 2015). See also the conservation objective for slender green feather-moss (1393)

1106 Salmon *Salmo salar*

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

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

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter in Owenduff/Nephin 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 840.63ha along river banks/lake shoreline/ around pools	No field survey. Areas mapped to include 10m terrestrial buffer along shorelines and river banks identified as critical for otters (NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 382.65km	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 540.66ha	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; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase	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

1393 Slender Green Feather-moss *Drepanocladus vernicosus*

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

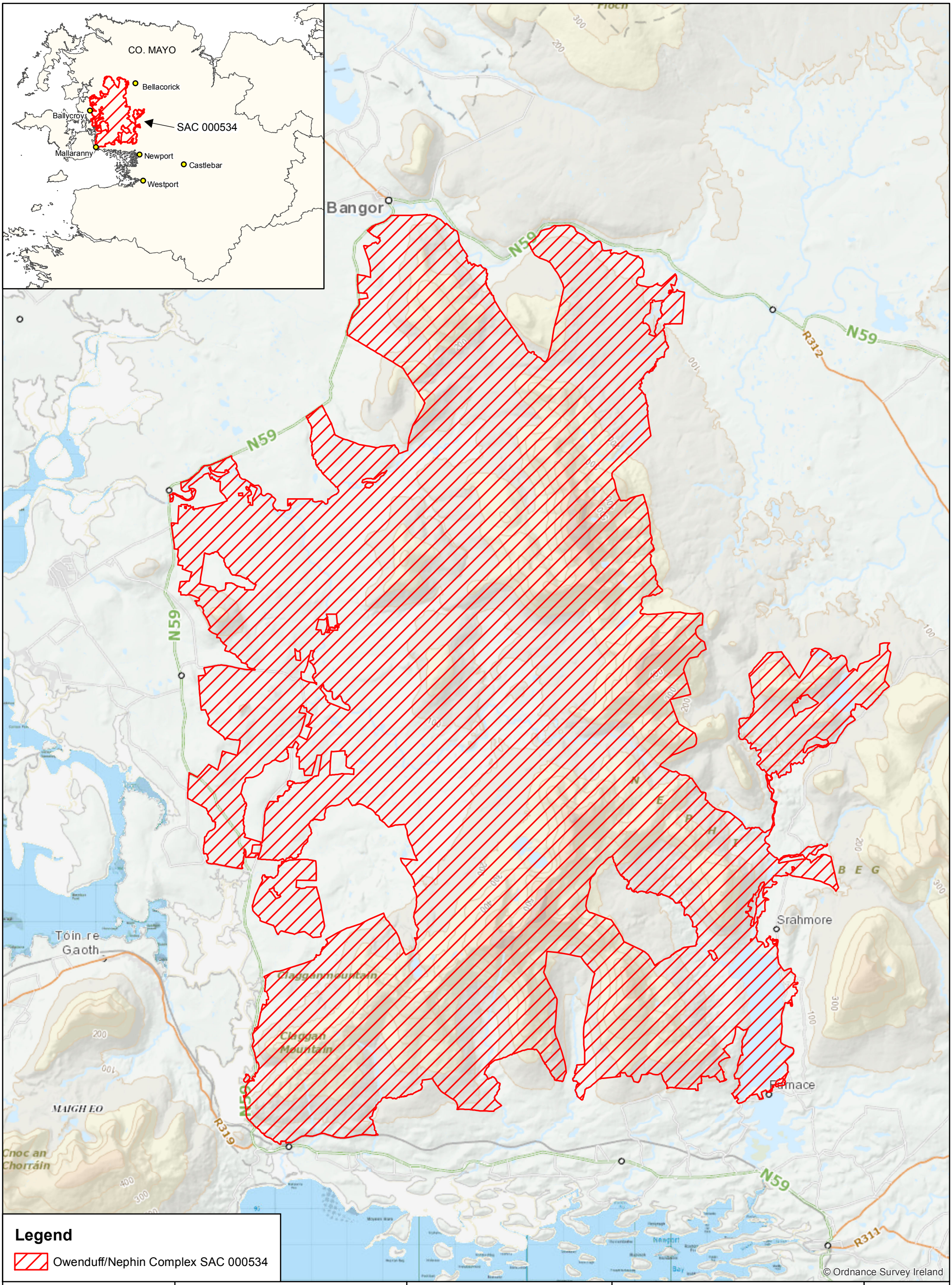
Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No decline, subject to natural processes. See map 4 for known location at Uggool	(Please note that *Drepanocladus vernicosus* was reclassified as *Hamatocaulis vernicosus* by Hedenäs (1989)). The known population of slender green feather-moss (*Hamatocaulis vernicosus*) in Owenduff/Nephin Complex SAC occurs in a flush within the blanket bog at Uggool, in the vicinity of marsh saxifrage (*Saxifraga hirculus*). Data from NPWS survey by N. Lockhart in 1999 (NPWS internal files). See also Campbell et al. (2015)
Population size	Number of individuals	No decline, subject to natural processes	Lockhart estimated the population to be c.320 shoots (NPWS internal files). This is likely to be an underestimate. See Campbell et al. (2015) for futher details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The extent of occupancy for the species at Uggool was estimated by Lockhart to be one square metre; however, only about 4% of this area was suitable i.e. 0.04m² (c.0.000004ha) (NPWS internal files). This is likely to be an underestimate. See Campbell et al. (2015) for further details
Hydrological conditions: water table level	Metres	Maintain suitable hydrological conditions	Slender green feather-moss (*Hamatocaulis vernicosus*) is mostly confined to mesotrophic fens, a transitional habitat between acid bog and base-rich fen. This appears to occur in at least two forms in Ireland: upland transitional flushes, where the plants can occur in lawns that rise and fall with fluctuating water table levels, such as at Uggool; and wet lowland sedge meadows, where plants can be inundated in winter, but may be subject to some desiccation in the summer. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation composition: tree cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage tree cover should be less than 15%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage shrub cover should be less than 20%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of trees and shrubs. See Campbell et al. (2015) for further details
Vegetation composition: grass cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage grass species cover should be less than 25%	Slender green feather-moss (*Hamatocaulis vernicosus*) grows in moss-dominated, open communities, generally with a low cover of grasses, maintained by a low grazing intensity by sheep at Uggool. See Campbell et al. (2015) for further details
Vegetation composition: bryophyte cover	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage bryophyte cover should be more than 50%	In 1999, Lockhart recorded slender green feather-moss (*Hamatocaulis vernicosus*) at the edge of spring-dominated vegetation, which occurs at the edge of a swelling lawn of mosses, with *Aneura pinguis*, *Cratoneuron filicinum*, *Palustriella commutata*, *Philonotis fontana*, *Scorpidium revolvens* and *Warnstorfia exannulata* (NPWS internal files). See Campbell et al. (2015) for further details
Vegetation composition: cover of *Calliergonella cuspidata*	Percentage cover in a representative number of 2m x 2m monitoring plots	Mean percentage cover of *Calliergonella cuspidata* should be less than 15%	*Calliergonella cuspidata*, a moss species often associated with high nutrient conditions, is usually present, but with low cover and never dominant. See also Campbell et al. (2015)

Vegetation structure: vegetation height	Centimetres in a representative number 2m x 2m monitoring plots	Mean vegetation height should not exceed 40cm	See Campbell et al. (2015) for further details

1528 Marsh Saxifrage *Saxifraga hirculus*

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

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No loss in geographical spread and number of populations, subject to natural processes. See map 5 for 1km grid square locations	Marsh saxifrage (*Saxifraga hirculus*) is known to occur in the Owenduff/Nephin Complex SAC in five flushes at Sheean A, Sheean B, Sheean, C, Sheean D and Uggool. See Lockhart (1989), Muldoon (2011) and Muldoon et al. (2015) for further details
Population size: number of rosettes	Number	Maintain the size of each known population, subject to natural processes. The target numbers of rosettes are: at least 151,200 rosettes at Sheean A, at least 36,000 rosettes at Sheean B, at least 104,000 rosettes at Sheean C, at least 19,200 rosettes at Sheean D and at least 24,000 rosettes at Uggool	The number of rosettes recorded by Muldoon (2011) were: 189,000 at Sheean A, 45,000 at Sheean B, 130,000 at Sheean C, 24,000 at Sheean D and 30,000 at Uggool. The target figures are a 20% reduction of the recorded number to allow for a margin of error and variability over monitoring seasons. See Muldoon et al. (2015) for further details
Population size: area of occupancy	Hectares	Maintain the area of occupancy of each known population, subject to natural processes. The target areas of occupancy are: at least 0.162ha at Sheean A, at least 0.042ha at Sheean B, at least 0.078ha at Sheean C, at least 0.051ha at Sheean D and at least 0.029ha at Uggool	The areas of occupancy for the species estimated by Muldoon (2011) were: 1,800m² (0.1800ha) at Sheean A, 470m² (0.047ha) at Sheean B, 870m² (0.087ha) at Sheean C, 570m² (0.057ha) at Sheean D and 315m² (0.032ha) at Uggool. The target area figures are a 10% reduction of the recorded areas to allow for a margin of error. See Muldoon et al. (2015) for further details
Hydrological conditions: water level	Occurrence of high or fluctuating water levels	Maintain the appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, marsh saxifrage (*Saxifraga hirculus*) is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation composition: positive indicator species	Occurrence in a number of 1m x 1m monitoring stops	Knotted pearlwort (*Sagina nodosa*) should be present in at least two of five 1m x 1m monitoring stops	The presence of the positive indicator species knotted pearlwort (*Sagina nodosa*) should be maintained (Muldoon, 2011; Muldoon et al., 2015)
Vegetation composition: negative indicator species	Mean percentage cover in five 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (*Molinia caerulea*) should not exceed 5%; mean percentage cover of Yorkshire fog (*Holcus lanatus*) should not exceed 15%	Low cover of the negative indicator species purple moor-grass (*Molinia caerulea*) and Yorkshire fog (*Holcus lanatus*) should be maintained. Cover of Yorkshire fog was greater than 15% at Uggool (Muldoon, 2011). See Muldoon et al. (2015) for further details
Vegetation structure: sward structure	Centimetres in five 1m x 1m monitoring stops	Maintain a mean vegetation height of less than 15cm	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing level	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	See Muldoon (2011) and Muldoon et al. (2015) for further details



Legend

Owenduff/Nephin Complex SAC 000534

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MAP 1:
OWENDUFF/NEPHIN COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000534; version 1.09. CO. MAYO

0 1 2 3 4 km

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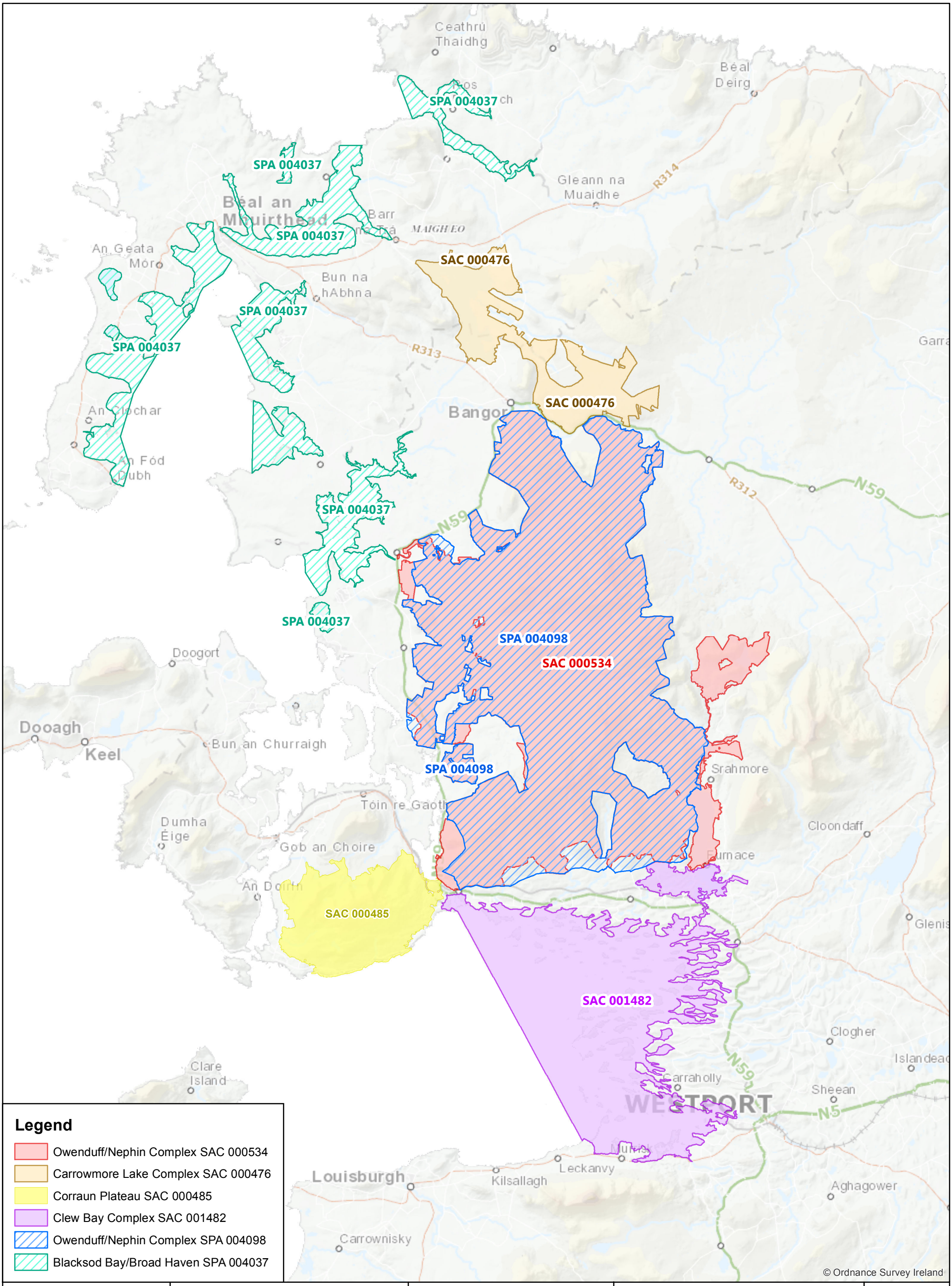

Legend

- Owenduff/Nephin Complex SAC 000534
- Carrowmore Lake Complex SAC 000476
- Corraun Plateau SAC 000485
- Clew Bay Complex SAC 001482
- Owenduff/Nephin Complex SPA 004098
- Blacksod Bay/Broad Haven SPA 004037

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

MAP 2: OWENDUFF/NEPHIN COMPLEX SAC CONSERVATION OBJECTIVES ADJACENT / ADJOINING AND OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000534; version 1.09. SAC 000476; version 1.02. SPA 004098; version 2. SPA 004037; version 2.02. SAC 001482; version 1.05. SAC 000485; version 3.02.
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0 2 4 6 8 km

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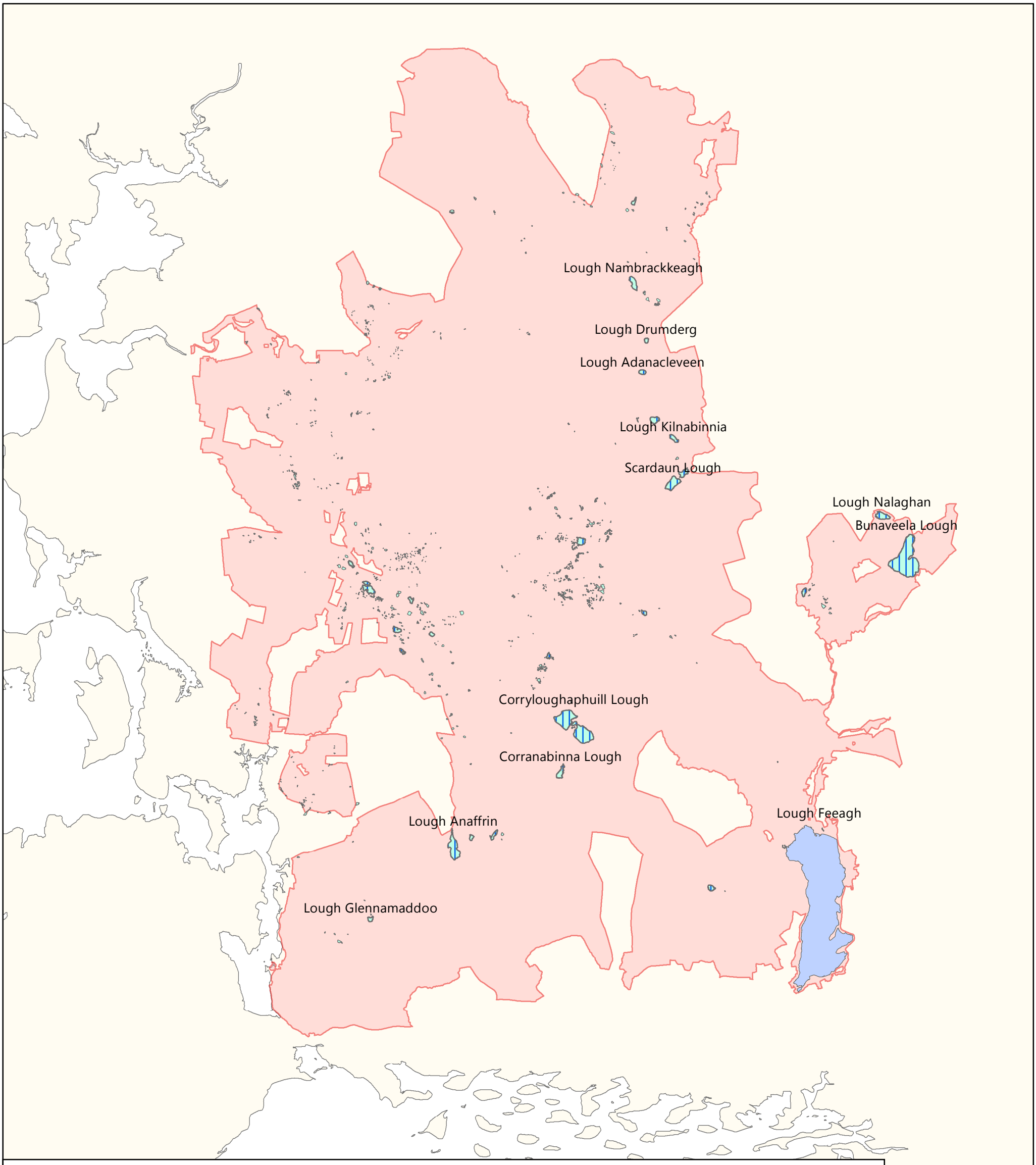

Legend

- Owenduff/Nephin Complex SAC 000534
- OSi Discovery Series County Boundary

Indicative Lake Habitats

- Potential 3110 Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae
- Potential 3110 / Potential 3160 Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae / Potential natural dystrophic lakes and ponds
- Potential 3160 Potential natural dystrophic lakes and ponds

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MAP 3:
OWENDUFF/NEPHIN COMPLEX SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
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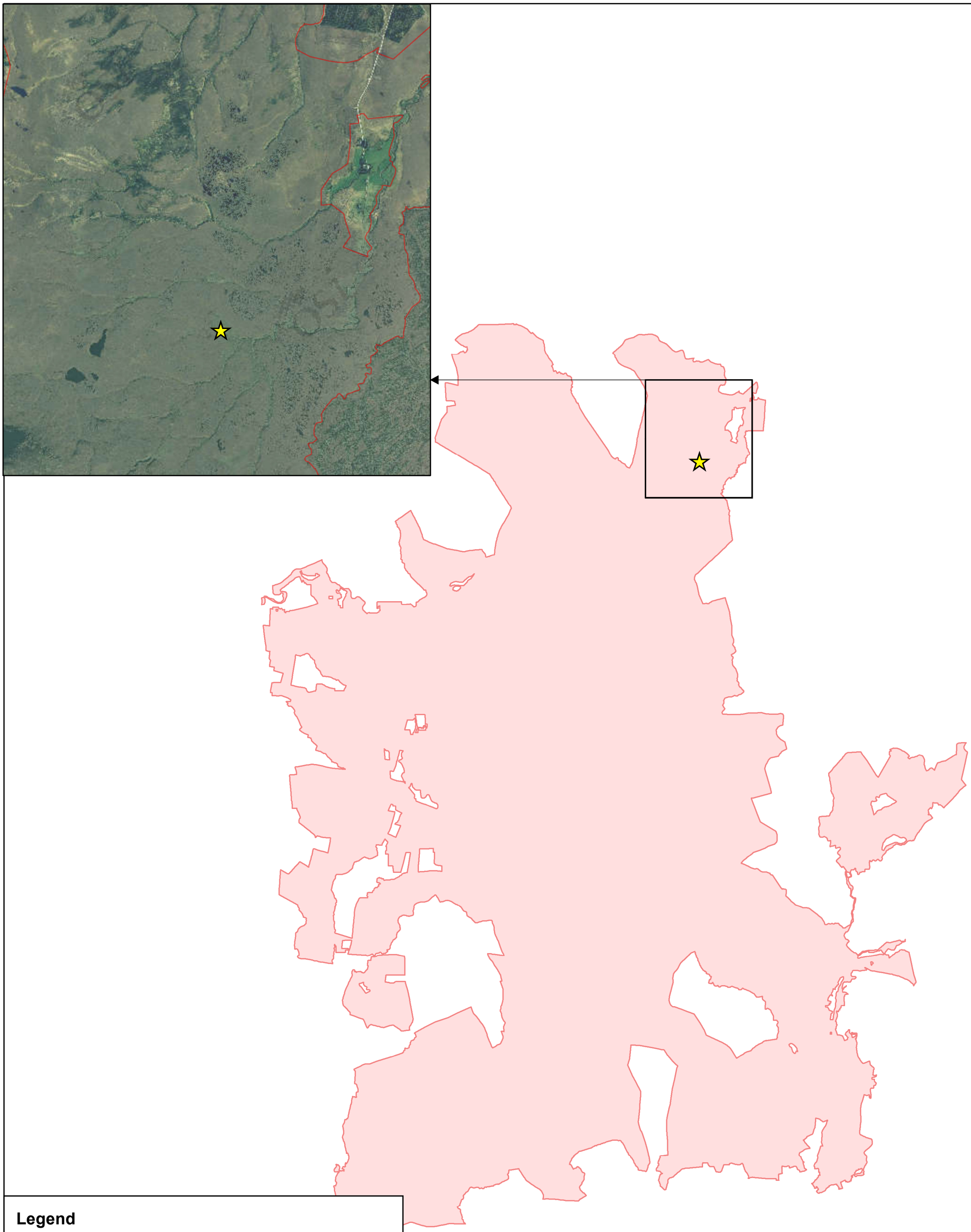

Legend

- 1393 Slender Green Feather-moss *Hamatocaulis vernicosus*
- Owenduff/Nephin Complex SAC 000534
- OSi Discovery Series County Boundary

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MAP 4: OWENDUFF/NEPHIN COMPLEX SAC CONSERVATION OBJECTIVES SLENDER GREEN FEATHER-MOSS

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

SITE CODE:
SAC 000534; version 1.09. CO. MAYO

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Date: March 2017

Legend

- 1538 Marsh Saxifrage *Saxifraga hirculus*
- Owenduff/Nephin Complex SAC 000534
- OSi Discovery Series County Boundary

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MAP 5: OWENDUFF/NEPHIN COMPLEX SAC CONSERVATION OBJECTIVES MARSH SAXIFRAGE

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

SITE CODE:
SAC 000534; version 1.09. CO. MAYO

0 1 2 3 4 km

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Map Version 1
Date: March 2017

Conservation objectives for Skealoghan Turlough SAC [000541]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Skealoghan Turlough SAC [000541]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Slieve Fyagh Bog SAC 000542

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Slieve Fyagh Bog SAC 000542. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000542	Slieve Fyagh Bog SAC
7130	Blanket bogs (* if active bog)

Please note that this SAC adjoins Carrowmore Lake Complex SAC (000476) and Glenamoy Bog Complex SAC (000500). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	1989
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II
Author :	Doughlas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A; Van Doorsleer, L.
Series :	A report commissioned by the Wildlife Service
Year :	2012
Title :	Ireland Red List no. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Slieve Fyagh Bog SAC (site code: 542) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

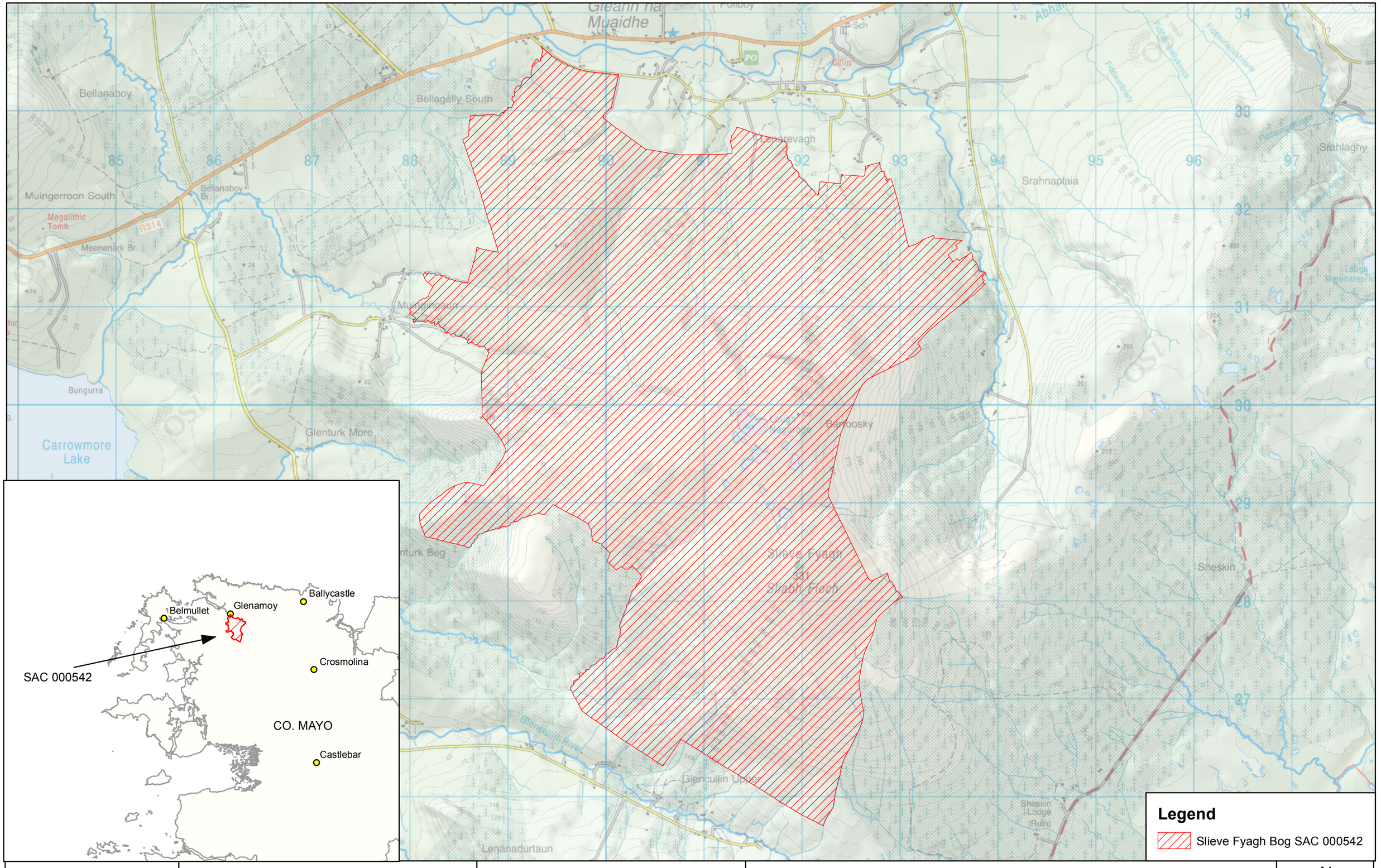
Year :	1988
Title :	The Irish red data book 1. Vascular plants
Author :	Curtis, T.G.F; McGough, H.N.
Series :	Wildlife Service, Dublin

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs in Slieve Fyagh Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Slieve Fyagh Bog SAC, but from current available data the total area of the qualifying habitat is approximately 1,700 ha. Further information can be found in Foss and McGee (1987) and Douglas et al. (1989). Further details on this and the following attributes can be found in the Slieve Fyagh Bog SAC conservation objectives supporting document for upland habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	Extensive areas of blanket bogs were recorded by Foss and McGee (1987) and Douglas et al. (1989) throughout this SAC. Further information can be found within these sources and the uplands 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 uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the upland habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Douglas et al. (1989) recorded different active blanket bogs communities within this SAC. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least seven	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands 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 or lichens, excluding *Sphagnum fallax*, at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially 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%	Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details

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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document 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	This includes species listed in the Flora (Protection) Order, 2015 and/or the red data lists, Curtis and McGough (1988) and Lockhart et al. (2012). See the uplands supporting document for further details



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

MAP 1:
SLIEVE FYAGH BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000542; version 3.01. CO. MAYO.

0 0.35 0.7 1.05 1.4 1.75 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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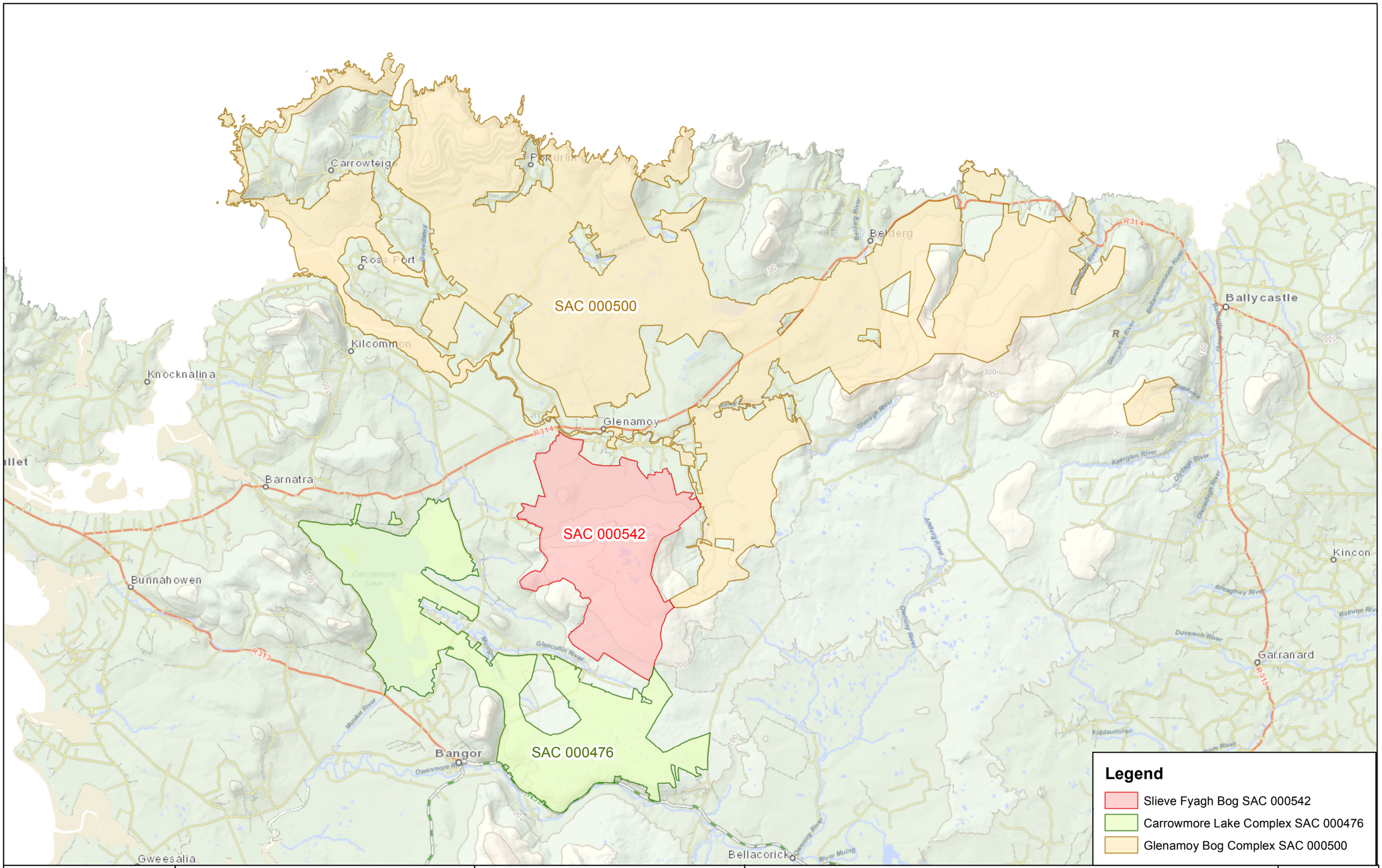
N

Map Version 1
Date: July 2016



An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
SLIEVE FYAGH BOG SAC
CONSERVATION OBJECTIVES
ADJOINING / ADJACENT AND
OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 000542; version 3.01. SAC 000500; version 3.01.
SAC 000476; version 3. CO. MAYO.

0 1 2 3 4 5 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: July 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bellanagare Bog SAC 000592

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201p) Conservation Objectives: Bellanagare Bog SAC 000592. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000592 Bellanagare Bog SAC

7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Bellanagare Bog (SAC 000592), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2015
Title :	Bellanagare Bog SAC (site code: 592) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Bellanagare Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 139.1ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 49.6ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 105.4ha. See map 2. However, it is estimated that only 73.8ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 123.4ha. Eco-hydrological assessments of the cutover estimates that an additional 15.7ha of bog forming habitats could be restored. The long term target for ARB is therefore 139.1ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2013	The ARB habitat at Bellanagare includes central and sub-central ecotope, as well as active flush and a soak system. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Bellanagare Bog SAC in 2012 (latest figure available) was 879.1ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat cutting around margins of Bellanagare Bog. No natural marginal habitats exist along these margins. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 69.6ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 139.1ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	Hummock and hollow microtopography is well developed on Bellanagare Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	High quality ARB is present in the form of active flush, particularly a flush in the mid-eastern lobe, which is essentially an infilling lake or soak where the *Sphagnum* cover is 76-90%
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Bellanagare Bog suggests that the current level is approximately 10.1kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

Conservation Objectives for : Bellanagare Bog SAC [000592]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Bellanagare Bog SAC

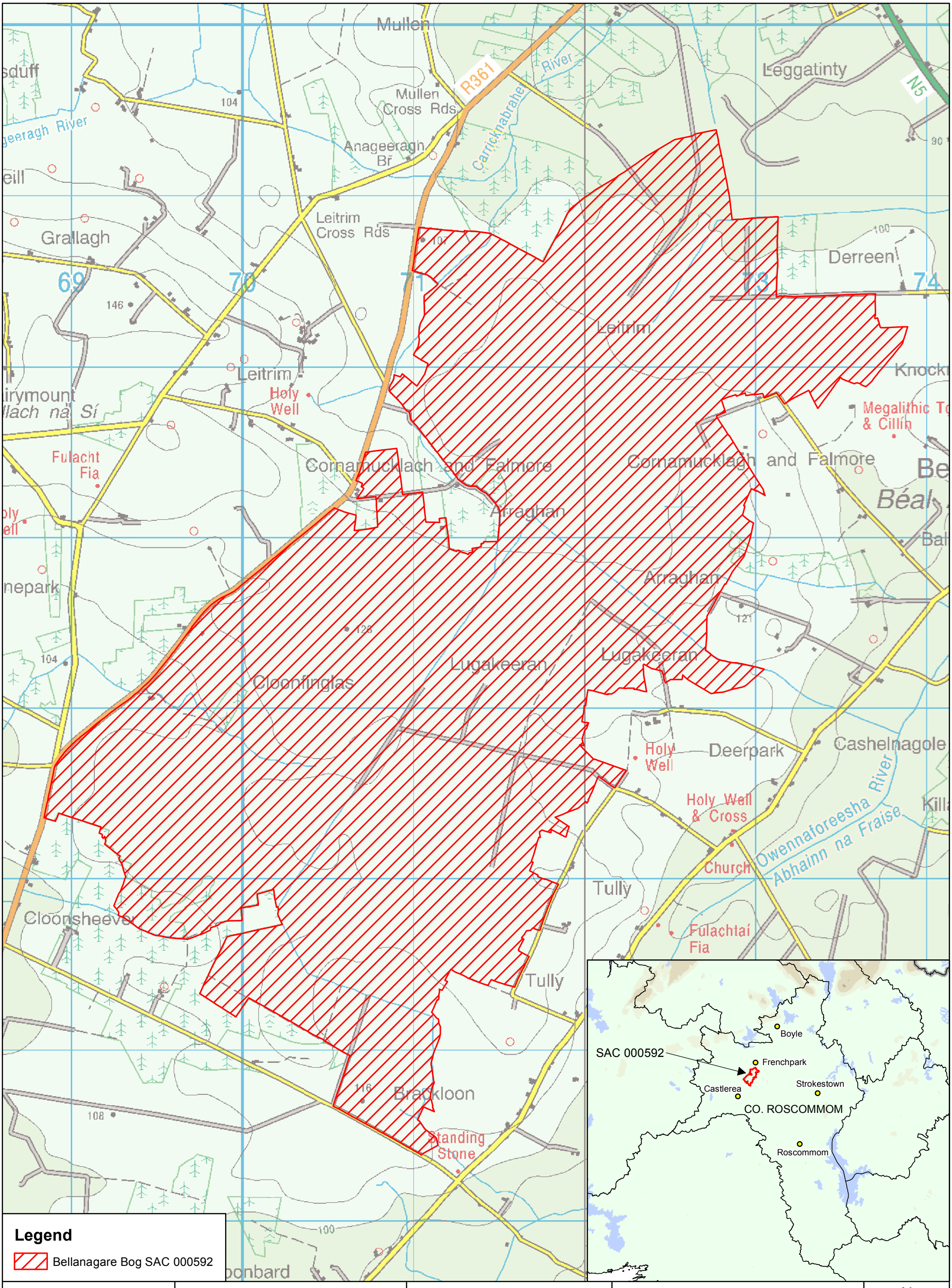
Attribute	Measure	Target	Notes

Conservation Objectives for : Bellanagare Bog SAC [000592]

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

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Bellanagare Bog SAC

Attribute	Measure	Target	Notes



Legend

Bellanagare Bog SAC 000592

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

MAP 1: BELLANAGARE BOG SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 000592; version 3.01. Co. Roscommon

0 250 500 750 1,000 m

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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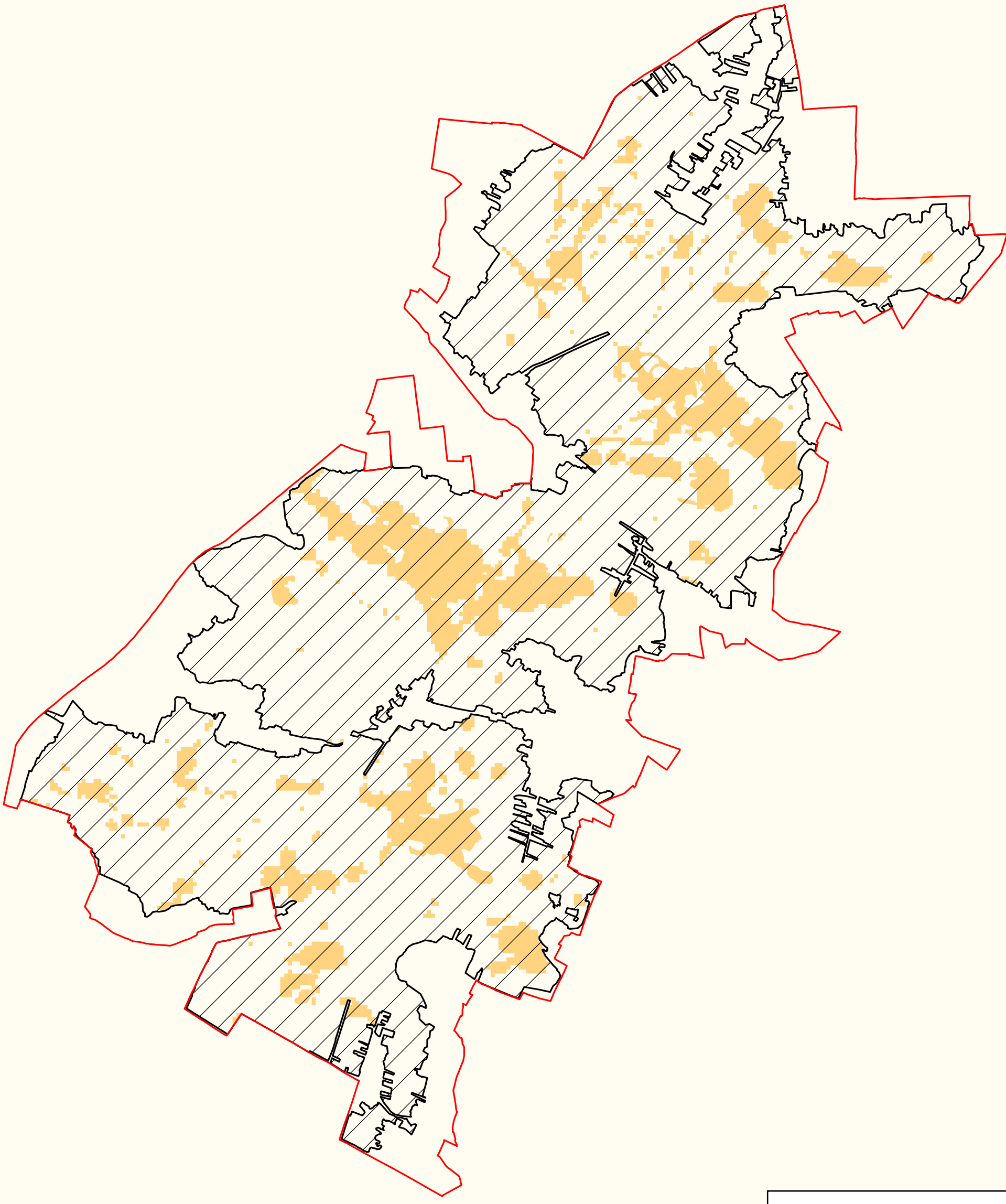
Map Version 1
Date: Nov 2015



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

MAP 2:
BELLANAGARE BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000592; version 3.01. Co. Roscommon

0 250 500 750 1,000 m

The mapped boundaries are of an indicative and general nature only.
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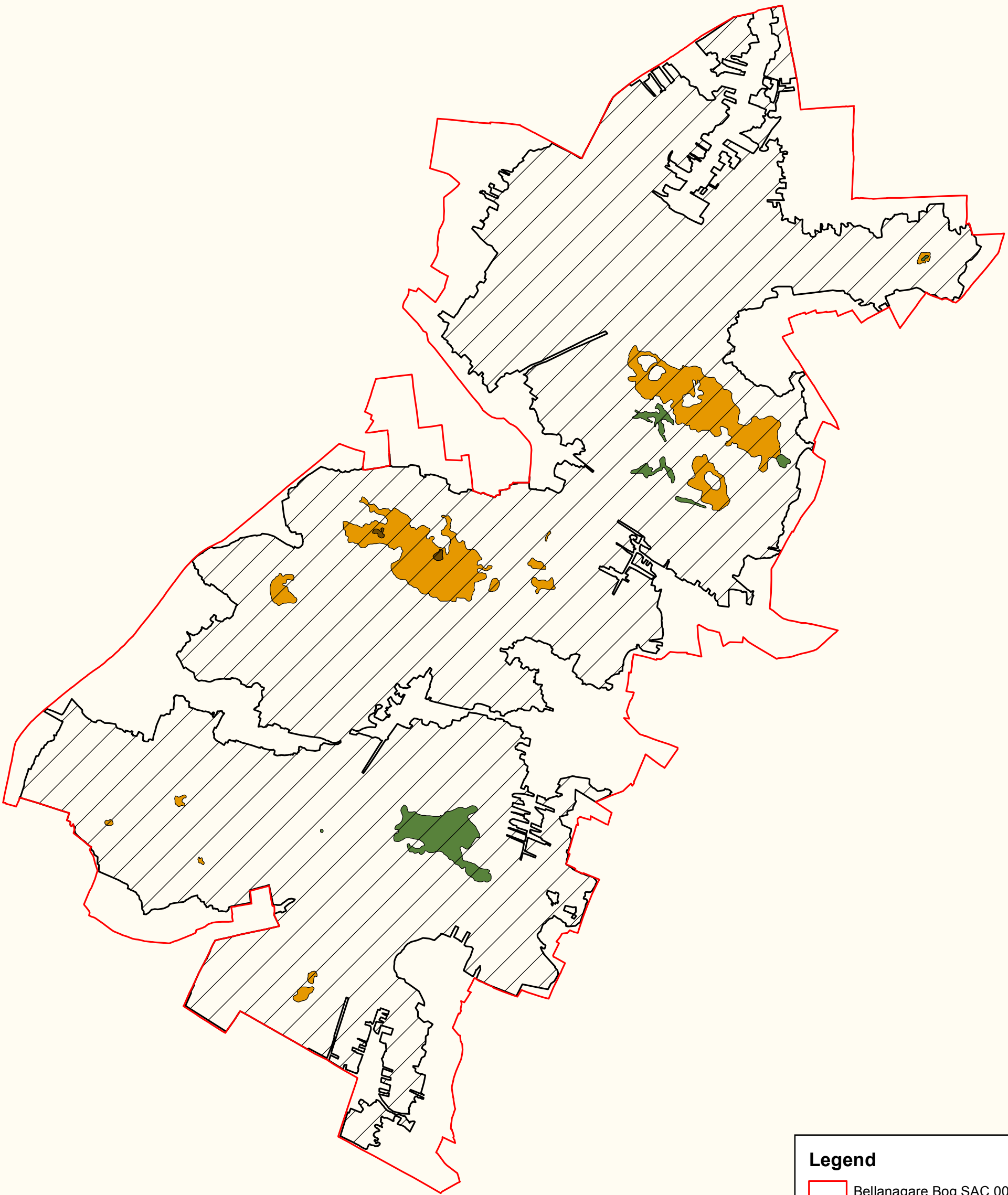
Map Version 1
Date: Nov 2015



Legend

- Bellanagare Bog SAC 000592
- High Bog Boundary

Active Raised Bog Ecotopes

- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
BELLANAGARE BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 000592; version 3.01. Co. Roscommon

0 200 400 600 800 1,000 m

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Map Version 1
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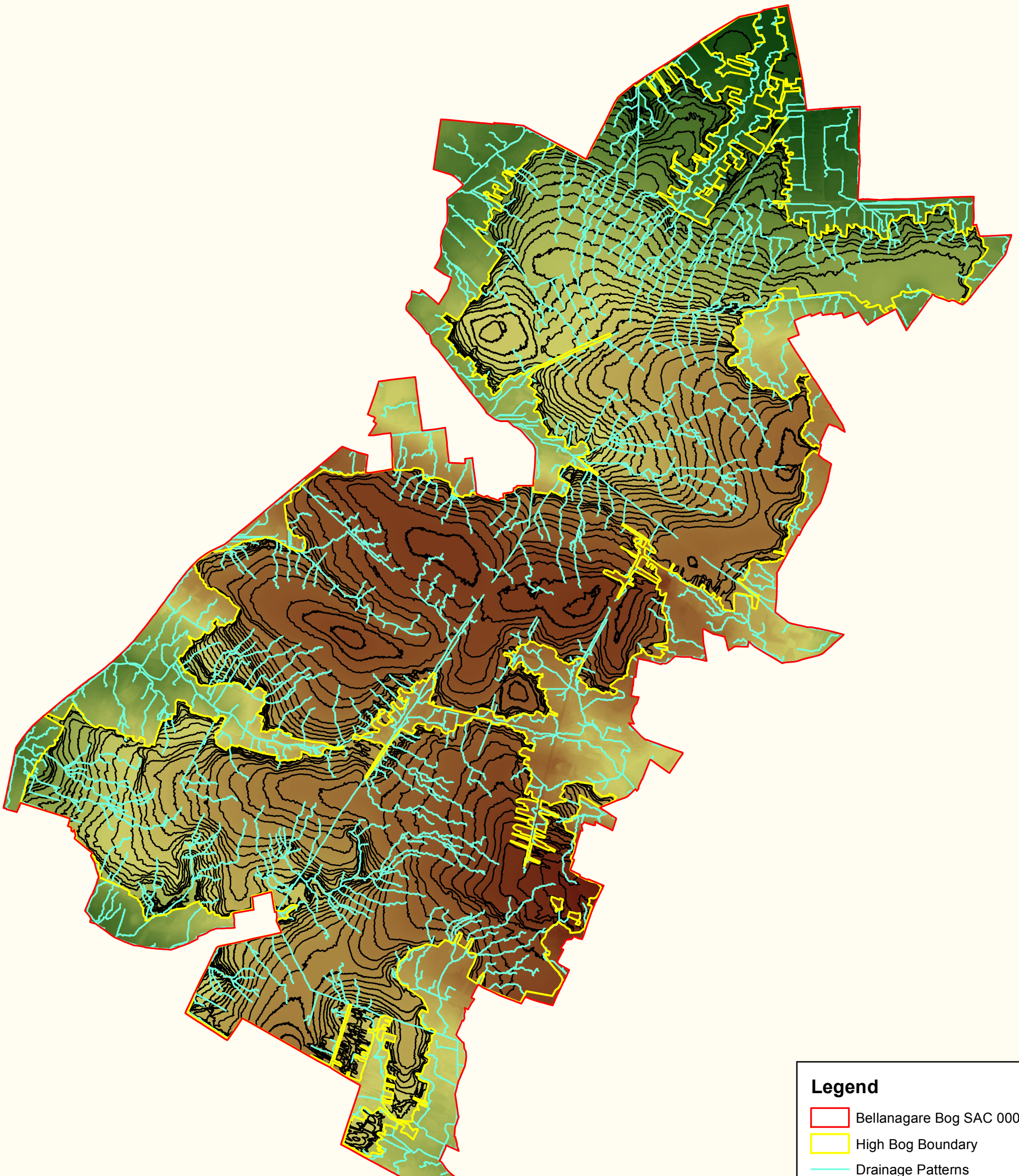

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Department of
Arts, Heritage and the Gaeltacht

MAP 4:
BELLANAGARE BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000592; version 3.01. Co. Roscommon

0 250 500 750 1,000 m

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Map Version 1
Date: Nov 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Callow Bog SAC 000595

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016c) Conservation Objectives: Callow Bog SAC 000595. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
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Introduction

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

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- 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:

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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***

000595 Callow Bog SAC

7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Callow Bog (SAC 000595), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	Callow Bog SAC (site code: 595) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
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Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

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GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Callow Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 53.4ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 11.4ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 48.4ha. See map 2. However, it is estimated that only 33.9ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 45.3ha. Eco-hydrological assessments of the cutover estimates that an additional 8.1ha of bog forming habitats could be restored. The long term target for ARB is therefore 53.4ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB occurs in four of the six sections of Callow Bog. DRB occurs on all sections of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Callow Bog SAC in 2012 (latest figure available) was 352ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around the margins of Callow Bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 26.7ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 53.4ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in the ARB areas of Callow Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range

Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	These include features of geological, topographical, archaeological and hydrological interest as well as noteworthy species of flora and fauna
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Callow Bog suggests that the current level is approximately 9.1kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

Conservation Objectives for : Callow Bog SAC [000595]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Callow Bog SAC

Attribute	Measure	Target	Notes

Conservation Objectives for : Callow Bog SAC [000595]

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Callow Bog SAC

Attribute	Measure	Target	Notes

Legend

Callow Bog SAC 000595

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Department of Arts, Heritage and the Gaeltacht

MAP 1:
CALLOW BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000595; version 3. Co. Roscommon

0 250 500 750 1,000 m

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N

Map Version 1
Date: Jan 2016

Legend

- Callow Bog SAC 000595
- High Bog Boundary
- Potential *7110 Active Raised Bogs
- OSi Discovery Series County Boundary

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MAP 2:
CALLOW BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
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0 250 500 750 1,000 m

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Map Version 1
Date: Jan 2016

Legend

- Callow Bog SAC 000595
- High Bog Boundary
- OSi Discovery Series County Boundary

Active Raised Bogs Ecotopes

- Central ecotope
- Sub-central ecotope

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MAP 3:
CALLOW BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
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0 250 500 750 1,000 m

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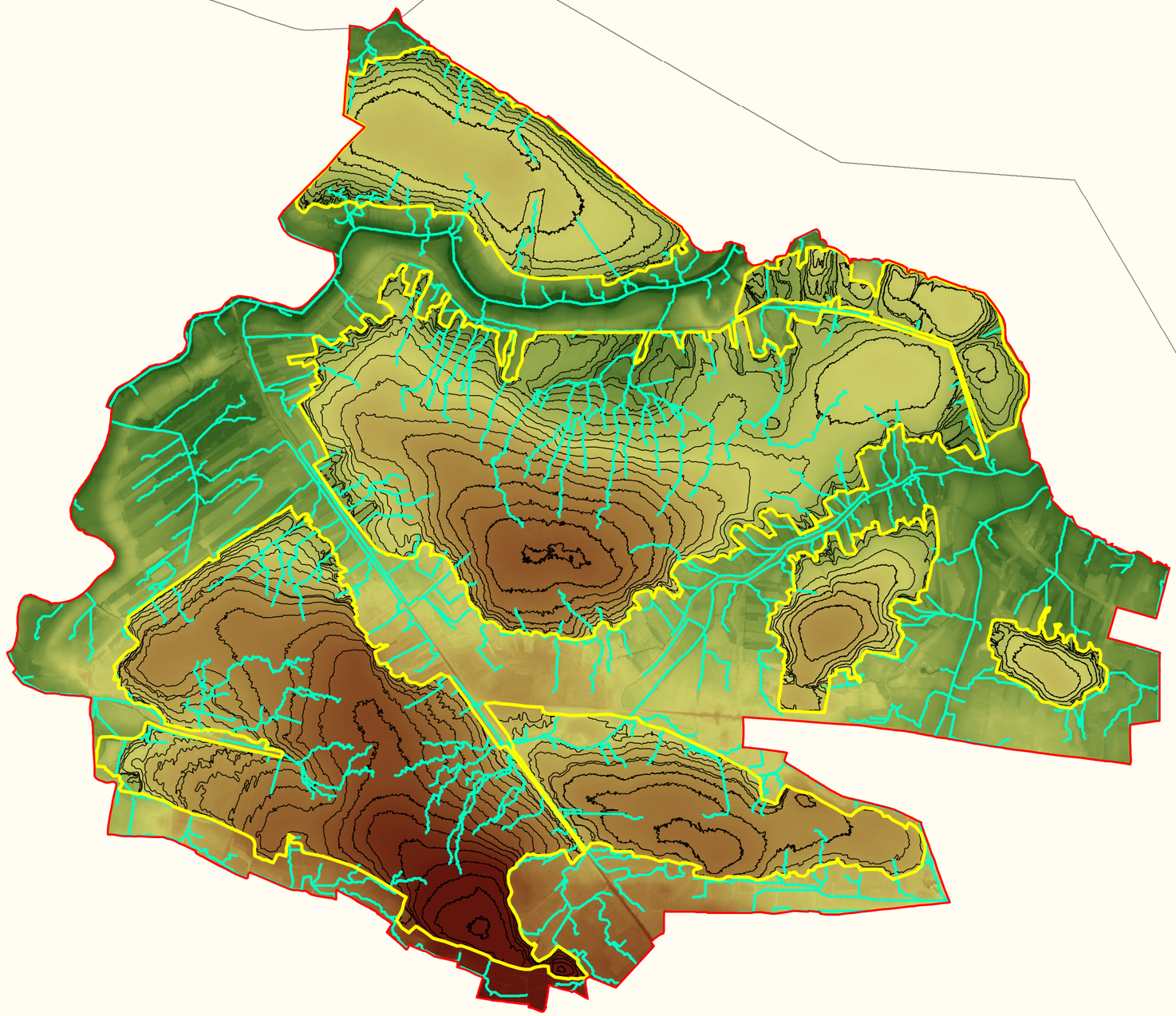
Map Version 1
Date: Jan 2016



Legend

- Callow Bog SAC 000595
- OSi Discovery Series County Boundary
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

78.44 m

62.93 m

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Department of Arts, Heritage and the Gaeltacht

MAP 4:
CALLOW BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000595; version 3. Co. Roscommon

0 250 500 750 1,000 m

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Map Version 1
Date: Jan 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Carrowbehy/Caher Bog SAC 000597

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Citation:

NPWS (201p) Conservation Objectives: Carrowbehy/Caher Bog SAC 000597. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000597	Carrowbehy/Caher Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Carrowbehy Bog (SAC 000597), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2015
Title :	Carrowbehy/Caher Bog SAC (site code: 597) Conservation objectives supporting document-raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising potential
Used For :	7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Carrowbehy/Caher Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 92.3ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 69.9ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 35.6ha. See map 2. However, it is estimated that only 17.8ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 87.7ha. Eco-hydrological assessments of the cutover estimates that an additional 4.6ha of bog forming habitats could be restored. The long term target for ARB is therefore 92.3ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB currently occurs on all four sections of Carrowbehy/Caher bog. DRB also occurs on these four parts, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Carrowbehy/Caher Bog SAC in 2012 (latest figure available) was 204.6ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	Studies suggest that the ARB is threatened due to water loss arising from past drainage and turf cutting, in particular along the southern margin of Carrowbehy/Caher Bog. The most intact margins of the bog include a narrow transitional zone between the bog and an esker to the north, while an example of a poor fen is found in a slight depression beside a major drainage channel at the north-eastern end of the SAC. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Maintain at least 57.7ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be central ecotope/active flush/soaks/bog woodland. Target area of active raised bog for the site has been set at 92.3ha (see area target above). As the current area (57.7ha) of central ecotope/active flush/soaks exceeds the 50% target, this area is set as the target
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	Hummock and hollow microtopography is well developed on Carrowbehy/Caher bog where interconnecting linear pools occur

Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. Sphagnum cover and distribution also varies naturally across a site
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Infilling lakes, swallow holes, a number of flush/ soak systems are the main features of local distinctiveness on Carrowbehy/Caher Bog
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding, and burning evidence
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5kg N/ha/yr (Bobbink & Hettelingh 2011). The latest N deposition figures for the area around Carrowbehy/Caher bog suggests that the current level is approximately 9.8kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

Conservation Objectives for : Carrowbehy/Caher Bog SAC [000597]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Carrowbehy/Caher Bog SAC

Attribute	Measure	Target	Notes

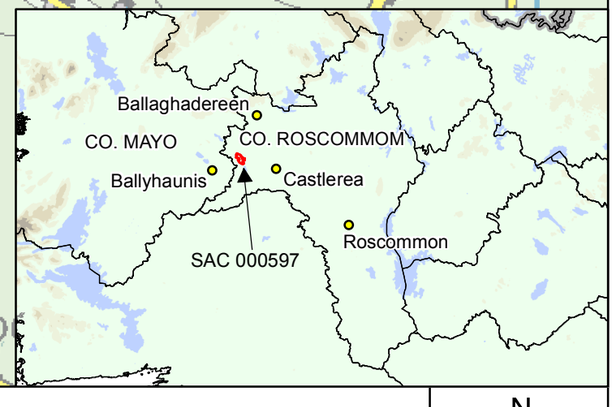
Conservation Objectives for : Carrowbehy/Caher Bog SAC [000597]

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Carrowbehy/Caher Bog SAC

Attribute	Measure	Target	Notes

Derrylahan
Urrasaun
Cillin
Sch
Eloonmaul
Caher
94
Derreenamackaun
84
Tully
Cross Rds
Lecarrow
Taghnoose
95
83
90
Clooncan
Derrylahan
Cillín
Cloonelt
98
104
82
Loughanboy
95
96
Taghnarra
92
Clo



Legend

Carrowbehy/Caher Bog SAC 000597

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

MAP 1:
CARROWBEHY/CAHER BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000597; version 3.01. Co. Roscommom

0 200 400 600 800 1,000 m

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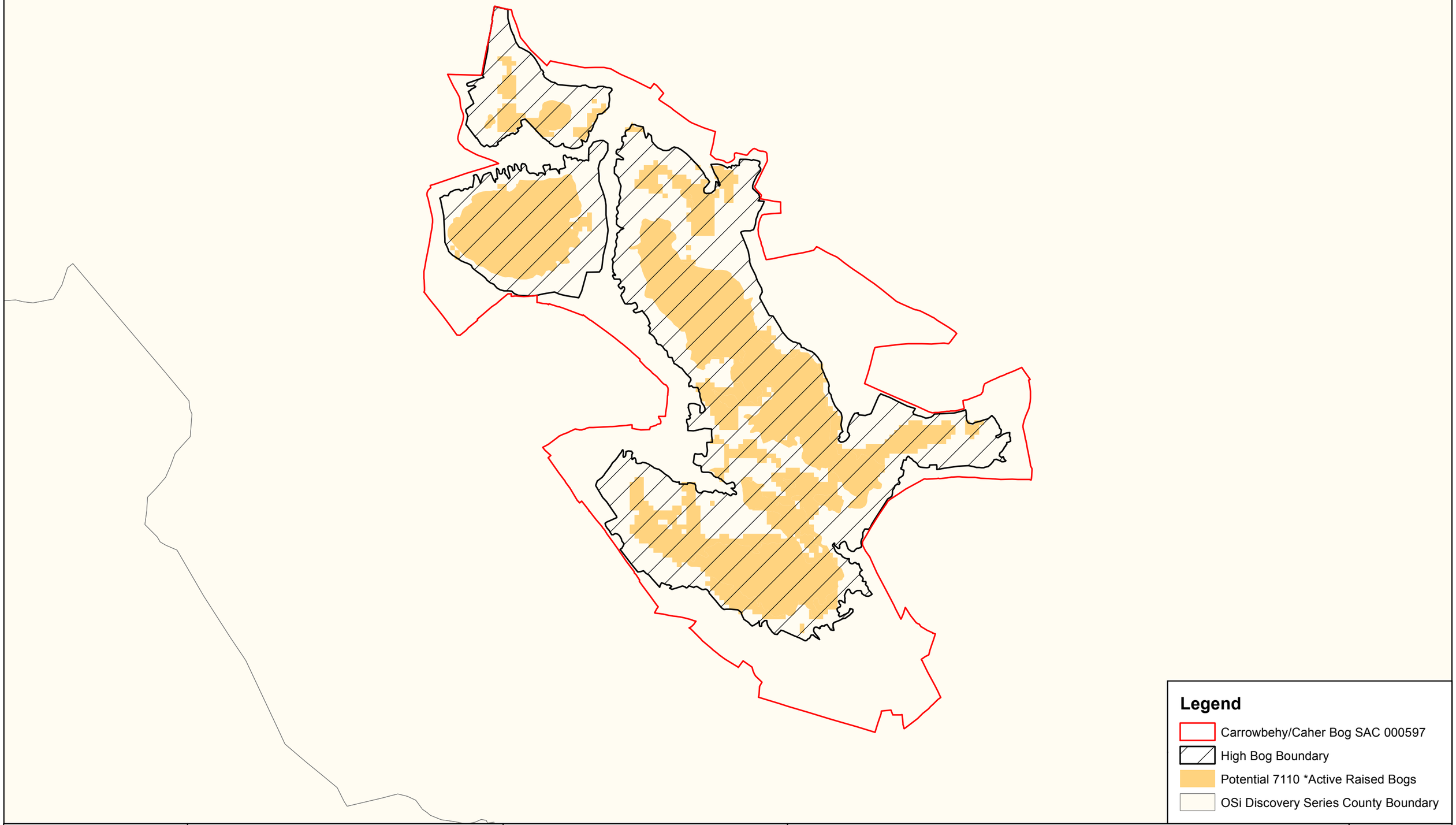
Map Version 1
Date: Oct 2015



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MAP 2:
CARROWBEHY/CAHER BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000597; version 3.01. Co. Roscommom

0 200 400 600 800 1,000 m

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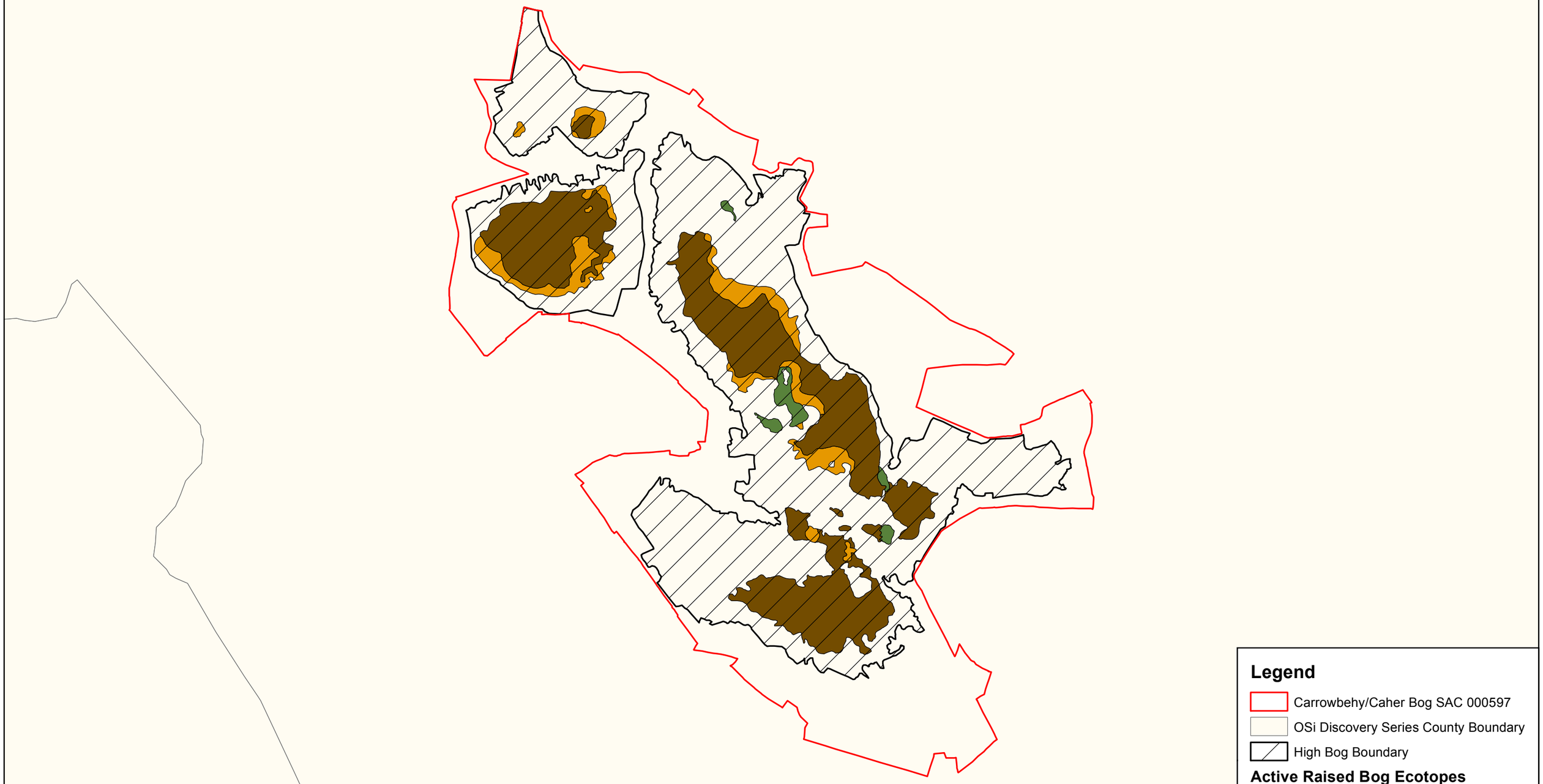
Map Version 1
Date: Oct 2015



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Department of Arts, Heritage and the Gaeltacht

MAP 3:
CARROWBEHY/CAHER BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 000597; version 3.01. Co. Roscommom

0 200 400 600 800 1,000 m

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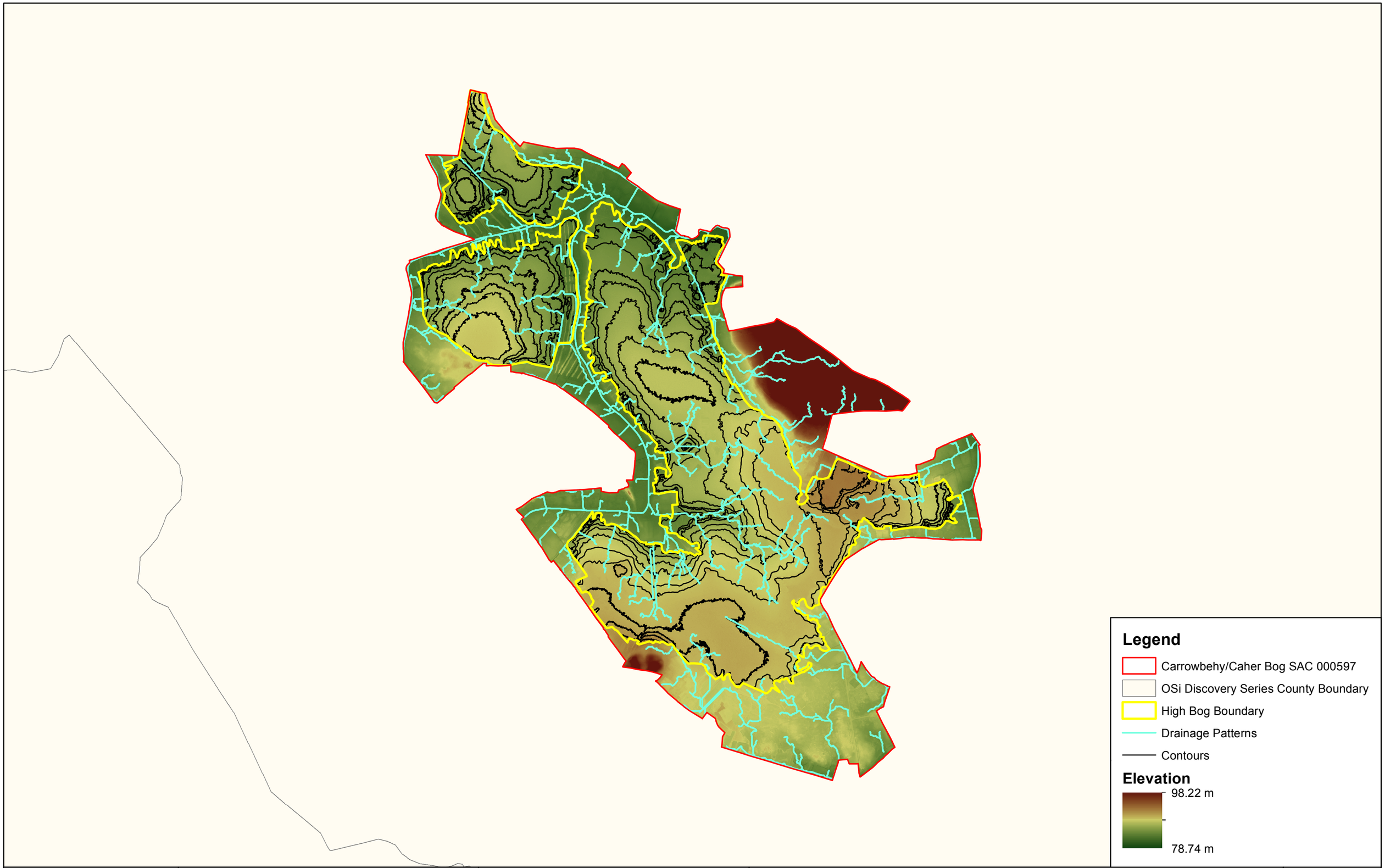
Map Version 1
Date: Oct 2015



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MAP 4:
CARROWBEHY/CAHER BOG SAC
CONSERVATION OBJECTIVES
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000597; version 3.01. Co. Roscommom

0 200 400 600 800 1,000 m

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Oct 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Cloonchambers Bog SAC 000600

An Roinn
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Arts, Heritage and the Gaeltacht

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201c) Conservation Objectives: Cloonchambers Bog SAC 000600. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000600	Cloonchambers Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Cloonchambers Bog (SAC 000600), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	Cloonchambers Bog SAC (site code: 600) Conservation objectives supporting document-raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Cloonchambers Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 32.1ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 7.7ha in 2012 by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 42.2ha. See map 2. However, it is estimated that only 21.1ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 28.8ha. Eco-hydrological assessments of the cutover estimates that an additional 3.3ha of bog forming habitats could be restored. The long term target for ARB is therefore 32.1ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB occurs at a number of locations on Cloonchambers Bog. DRB occurs on all lobes of the bog, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Cloonchambers Bog SAC in 2012 (latest figure available) was 195.8ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around margins of Cloonchambers Bog. No natural marginal habitats exist along these margins. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 16.1ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the SAC has been set at 32.1ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks and hollows) is moderately well developed on some areas of Cloonchambers Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Cloonchambers Bog is noted for the presence of an extensive flush system with fen vegetation, a rare feature of Irish raised bogs
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Cloonchambers Bog suggests that the current level is approximately 10.2kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

Conservation Objectives for : Cloonchambers Bog SAC [000600]

7120 **Degraded raised bogs still capable of natural regeneration**

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Cloonchambers Bog SAC

Attribute	Measure	Target	Notes

Conservation Objectives for : Clooncchambers Bog SAC [000600]

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Clooncchambers Bog SAC

Attribute	Measure	Target	Notes

Cloonbonniff
Sch
Cillín
River Suck
An tSuca
Creglahan
86
Cloonsuck
80
81
Leveelick
Cloonchambers
Cloonconra
92
Br. Ht.
2.74m
116MP
115MP
LC
117MP
Churchquarter
Roadquarter
81
N60
Graveyard
Fortaugustus
Standing
Stone
84

Ballyhaunis
CO. ROSCOMMON
Castlerea
Roscommon
SAC 000600

Legend

Cloonchambers Bog SAC 000600

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MAP 1:
CLOONCHAMBERS BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000600; version 3. Co. Roscommon

0 100 200 300 400 500 m

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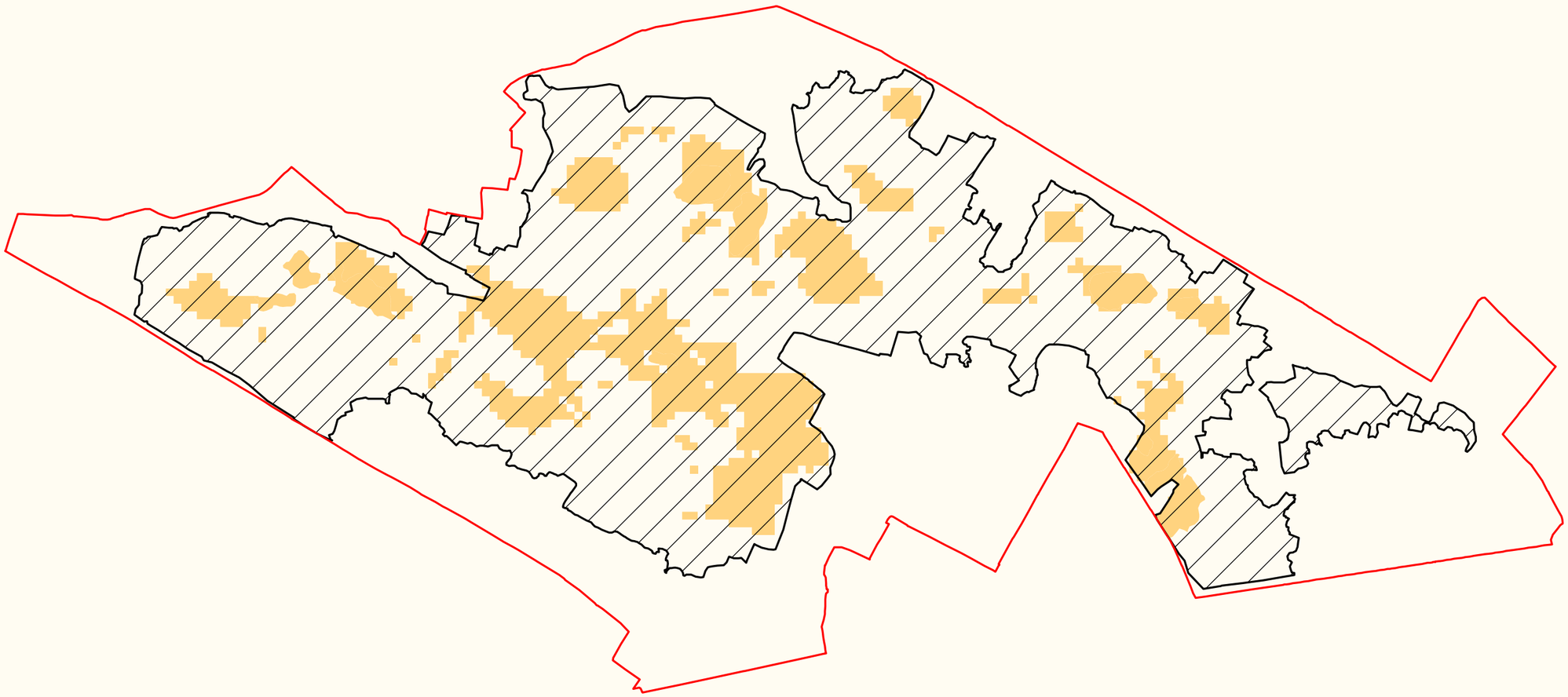
Map Version 1
Date: Jan 2016



Legend

- Cloonchambers Bog SAC 000600
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
CLOONCHAMBERS BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 000600; version 3. Co. Roscommon

0 100 200 300 400 500 m

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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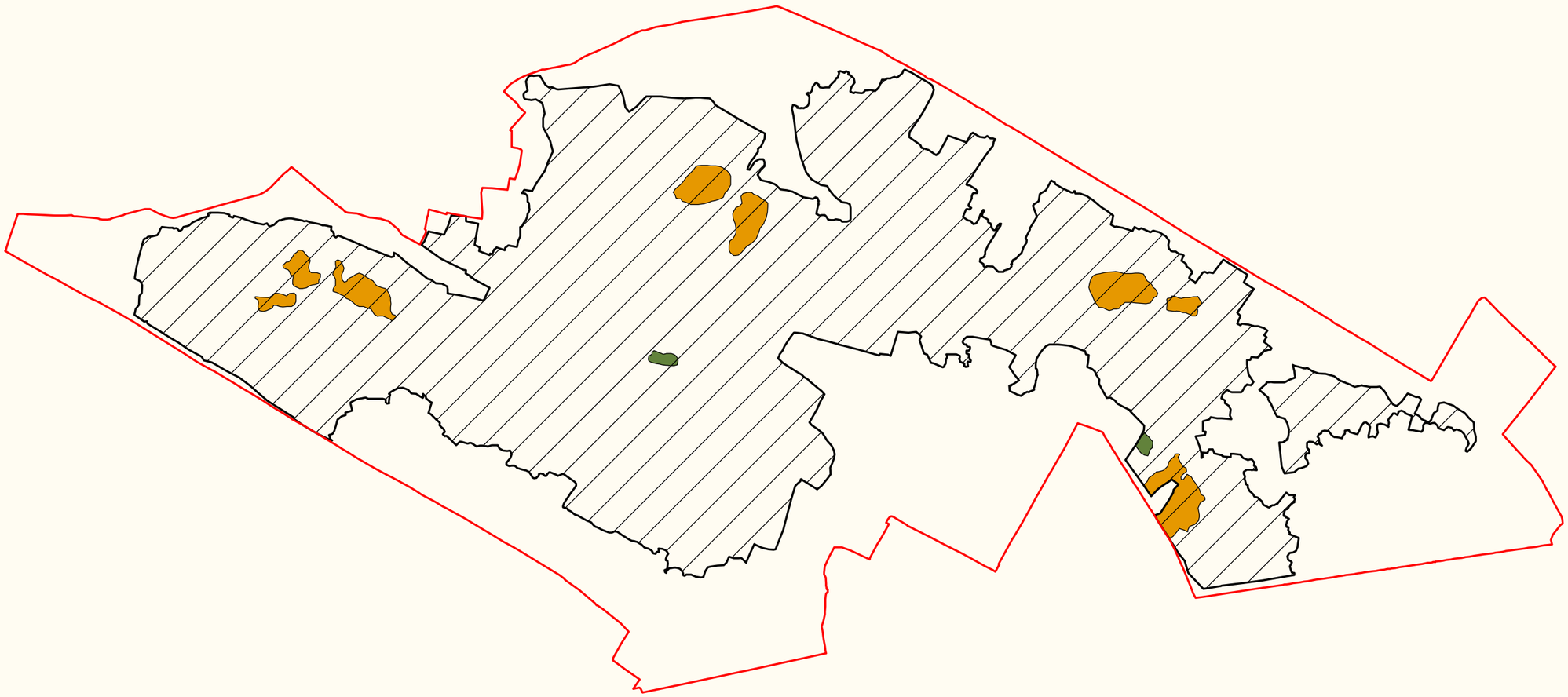
Map Version 1
Date: Jan 2016



Legend

- Cloonchambers Bog SAC 000600
- High Bog Boundary
- OSi Discovery Series County Boundary

Active Raised Bogs Ecotopes

- Soaks / active flush
- Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
CLOONCHAMBERS BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 000600; version 3. Co. Roscommon

0 100 200 300 400 500 m

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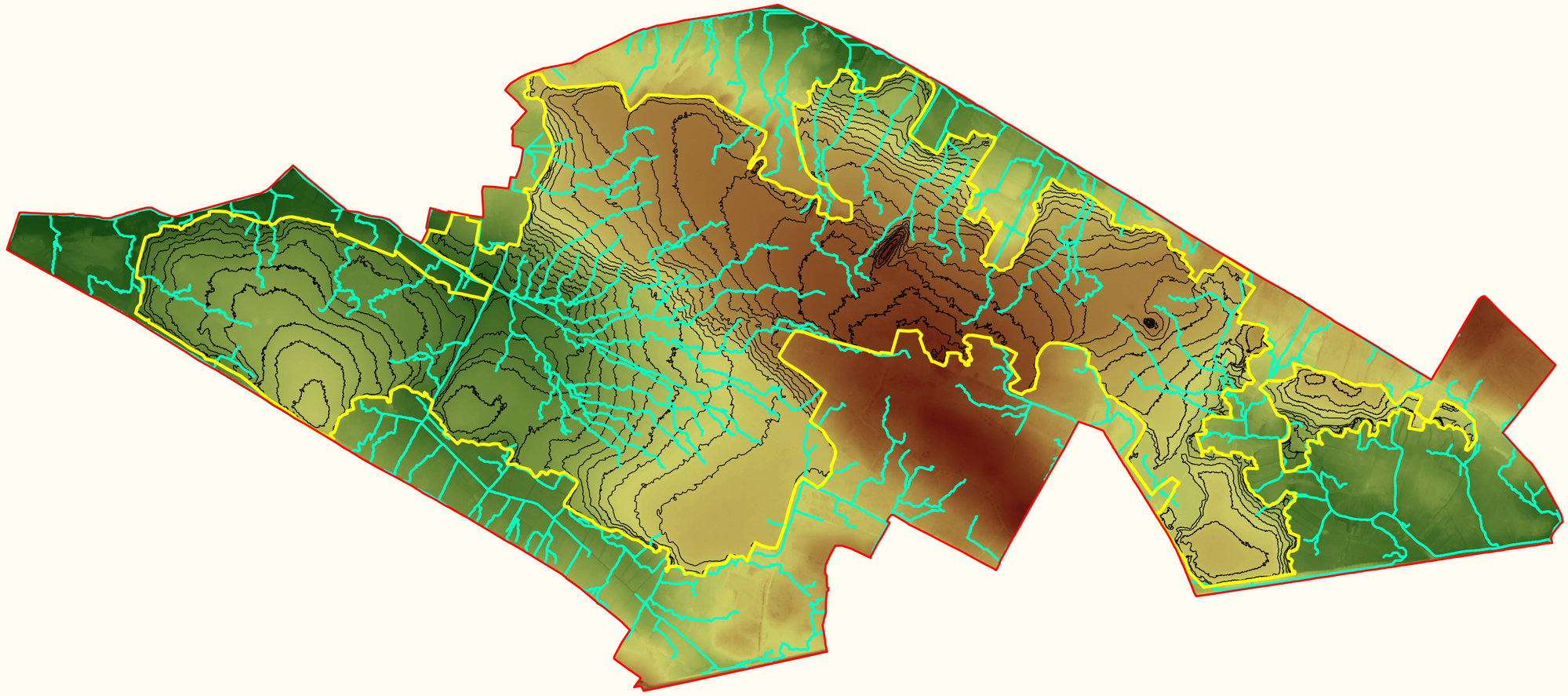
Map Version 1
Date: Jan 2016



Legend

- Cloonchambers Bog SAC 000600
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

89.31 m

74.35 m

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Department of Arts, Heritage and the Gaeltacht

MAP 4:
CLOONCHAMBERS BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000600; version 3. Co. Roscommon

0 100 200 300 400 500 m

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: Jan 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Derrinea Bog SAC 000604

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201p) Conservation Objectives: Derrinea Bog SAC 000604. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000604	Derrinea Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Derrinea Bog (SAC 000604), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2015
Title :	Derrinea Bog SAC (site code: 604) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising 7110 ecotopes (map 4)
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Derrinea Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 24.7ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 17.1ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 9.8ha. However, it has been estimated that only 6.8ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 23.9ha. See map 2. Eco-hydrological assessments of the cutover estimates that an additional 0.8ha of bog forming habitats could be restored. The long term target for ARB is therefore 24.7ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB currently occurs in the central area of Derrinea Bog. DRB surrounds the ARB areas, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Derrinea Bog SAC in 2012 (latest figure available) was 53.8ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	Only remnant semi-natural exist along the eastern and northern margin of Derrinea Bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 12.4ha of central ecotope/active flush/soaks/bog woodland	At least 50% of ARB habitat should be central ecotope/active flush/soaks/bog woodland. Target area of active raised bog for the site has been set at 24.7ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in the central part of Derrinea Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as Sphagnum austinii are particularly good peat formers. Sphagnum cover and distribution also varies naturally across a site
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range

Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Derrinea Bog supports three pools, two of which are larger and these are infilling with rafts of Rhynchosporion vegetation. Surrounding the pools, quaking flats have good bog moss cover
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding, and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*). No non-native invasive species were recorded on Derrinea Bog following a survey in 2012 (Fernandez et al. 2014)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh 2011). The latest N deposition figures for the area around Derrinea Bog suggests that the current level is approximately 9.4kg N/ha/yr (Henry and Aherne 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

Conservation Objectives for : Derrinea Bog SAC [000604]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Derrinea Bog SAC

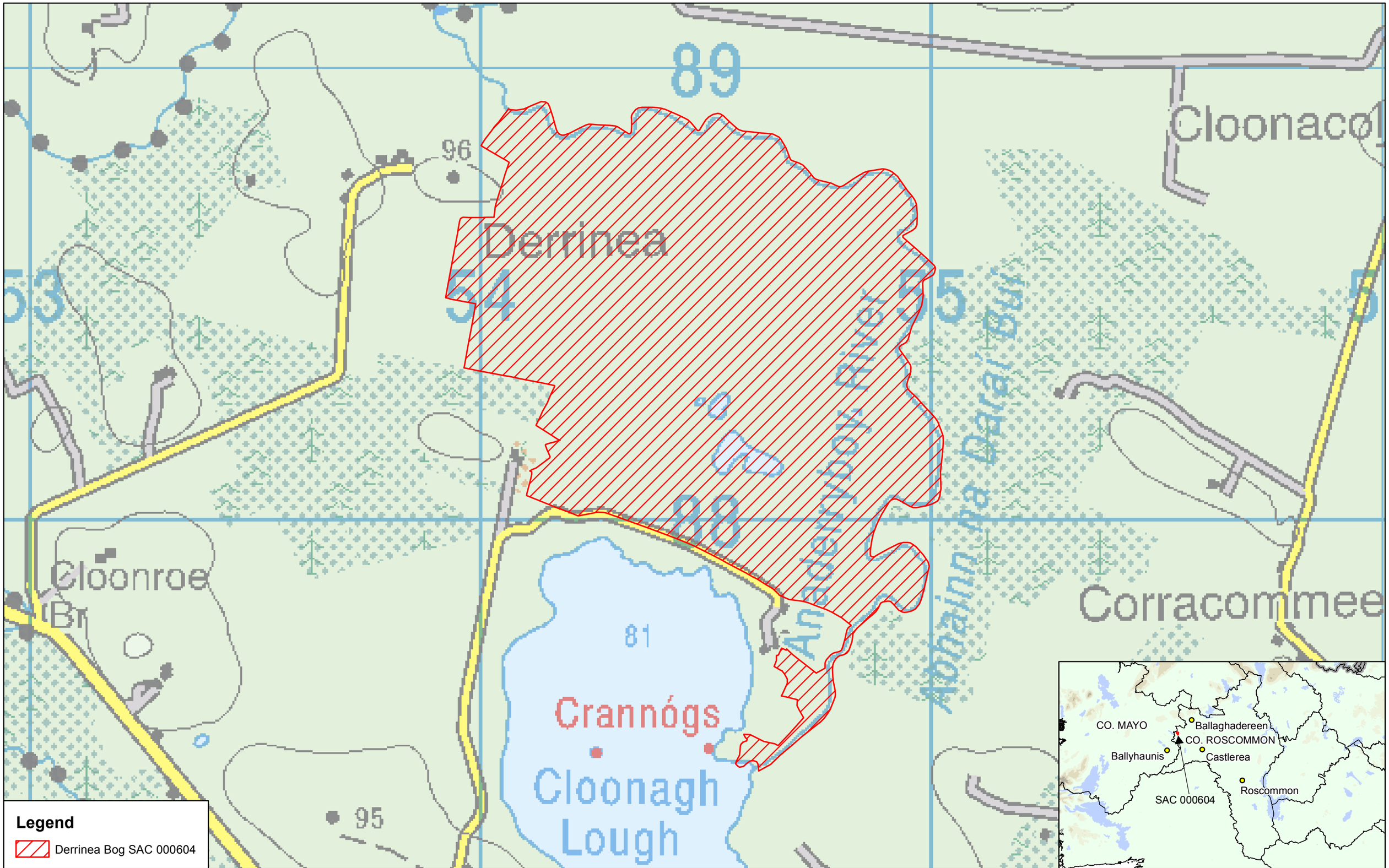
Attribute	Measure	Target	Notes

Conservation Objectives for : Derrinea Bog SAC [000604]

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Derrinea Bog SAC

Attribute	Measure	Target	Notes



Legend

Derrinea Bog SAC 000604

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Department of Arts, Heritage and the Gaeltacht

MAP 1:
DERRINEA BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000604; version 3.01. Co. Roscommon

0 100 200 300 400 500 m

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Map Version 1
Date: Oct 2015

Legend

- Derrinea Bog SAC 000604
- High Bog Boundary
- Potential 7110 *Active Raised Bogs
- OSi Discovery Series County Boundary

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Department of
Arts, Heritage and the Gaeltacht

MAP 2:
DERRINEA BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
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0 100 200 300 400 500 m

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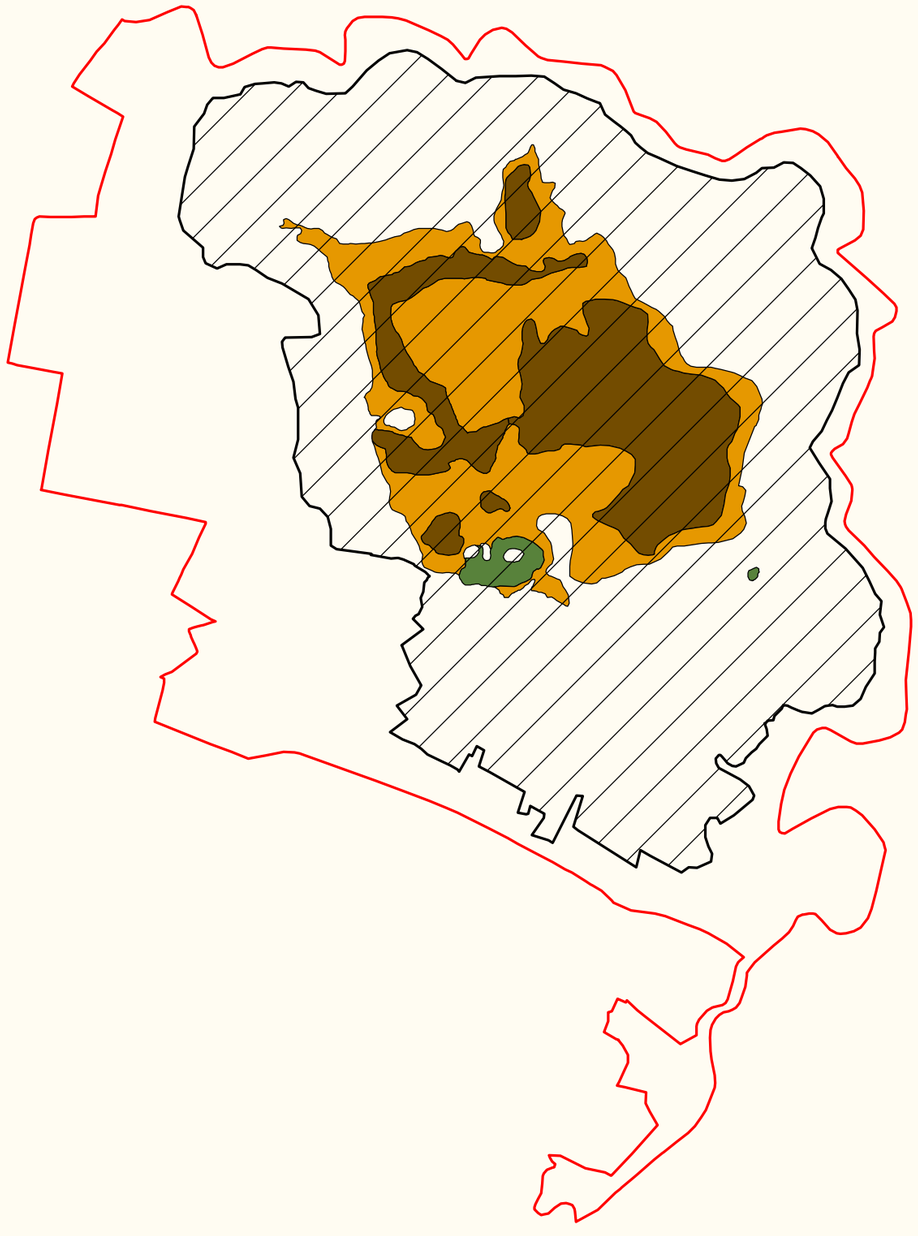
Map Version 1
Date: Oct 2015



Legend

- Derrinea Bog SAC 000604
- OSi Discovery Series County Boundary
- High Bog Boundary

Active Raised Bog Ecotopes

- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
DERRINEA BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 000604; version 3.01. Co. Roscommon

0 100 200 300 400 500 m

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Map Version 1
Date: Oct 2015

Legend

- Derrinea Bog SAC 000604
- OSi Discovery Series County Boundary
- High Bog Boundary
- Drainage Patterns
- Countors

Elevation

90.12 m

78.16 m

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MAP 4:
DERRINEA BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
SAC 000604; version 3.01. Co. Roscommon

0 100 200 300 400 500 m

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Map Version 1
Date: Oct 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Errit Lough SAC 000607

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

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Citation:

NPWS (2017) Conservation Objectives: Errit Lough SAC 000607. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000607	Errit Lough SAC
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3140 (map 2)

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

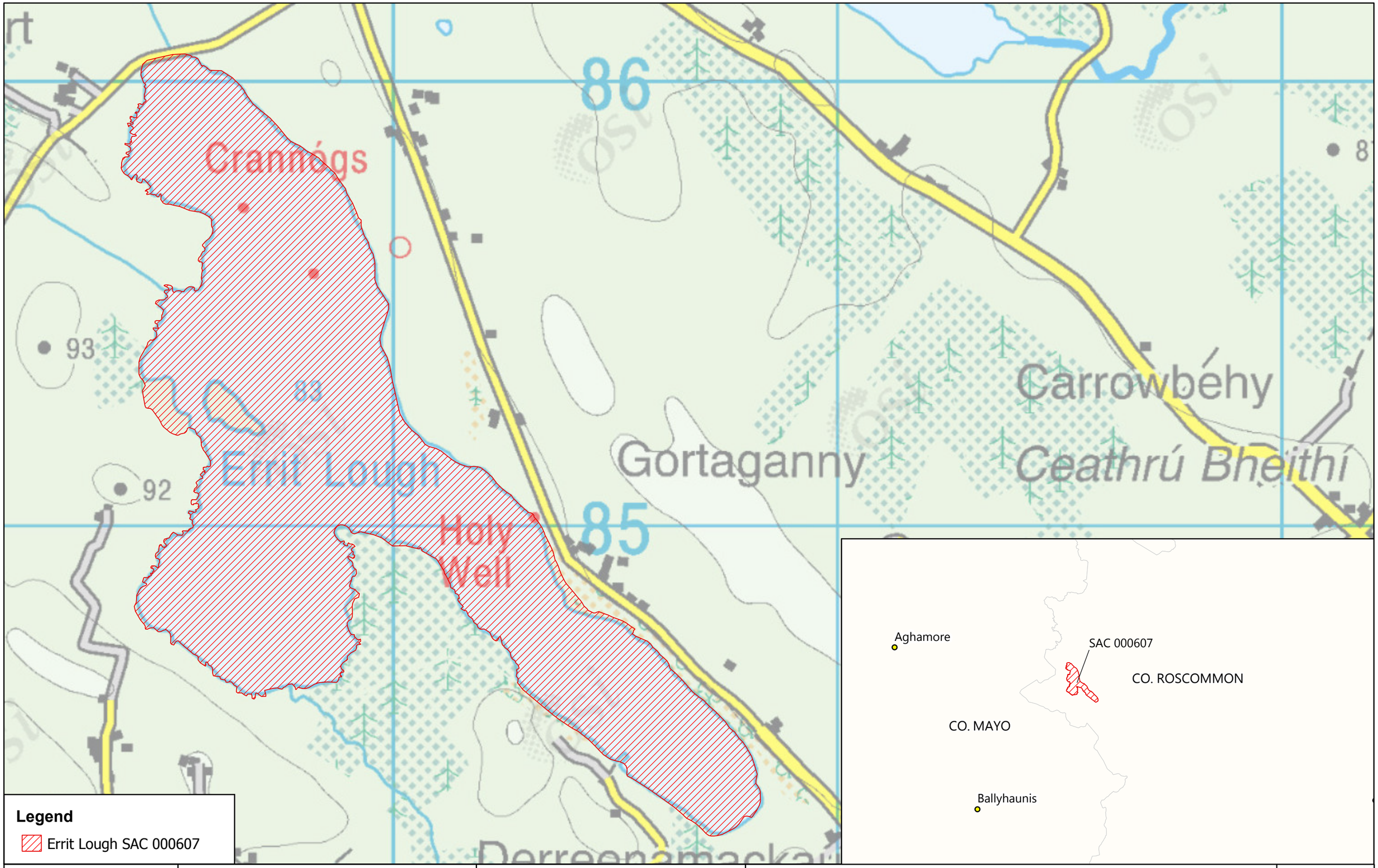
To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Errit Lough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Errit Lough is a marl lake containing lake habitat 3140. Its vegetation was surveyed in August 1978 (Heuff, 1984) and again in 2012 (Roden and Murphy, in prep.). 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, lake habitat 3140 occurs in Errit Lough in the SAC. See map 2
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of 3140 typical species (cyanobacteria, algae, higher plants and water beetles), see the Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). Heuff (1984) includes general descriptions of the vegetation of Errit Lough and data for three relevés. *Chara* spp. dominate and vascular species include *Littorella uniflora, Nuphar lutea* and *Potamogeton perfoliatus* (Heuff, 1984). In 2012, Roden and Murphy (in prep.) recorded the following species in Errit Lough: *Chara aculeolata, C. contraria, C. curta, C. rudis, C. virgata, Elodea canadensis, Equisetum fluviatile, Littorella uniflora, Nuphar lutea, Potamogeton gramineus, P. praelongus, P. zizii, Schoenoplectus lacustris* and *Utricularia* sp.
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of 3140 is described in Roden and Murphy (2013). Heuff (1984) recorded the zonation at Errit Lough: sparse reedbeds on the sheltered south-western shore, a *Chara aculeolata* zone to 1m water depth, with *C. rudis* at the southern end of the lake, a *C. curta*-dominated zone with some *Littorella uniflora* from 1-2m, a *C. globularis* zone from 2-3m followed by a sparse band of *Nuphar lutea*, and *Potamogeton perfoliatus* at 4m. Roden and Murphy (in prep.) stated charophyte zones were not well-developed in Errit in 2012, with only *C. aculeolata* and *C. rudis* forming substantial beds and no charophytes below 3m. Krustenstein was well-developed on rocks in shallow water. *Littorella uniflora* and *Scorpidium* sp. were recorded at some shallow-water stations, rather than the typical charophytes (Roden and Murphy, in prep.). The condition of Errit may have deteriorated 1978 to 2012

Vegetation distribution: maximum depth	Metres	Maintain/restore maximum depth of vegetation, subject to natural processes	Maximum vegetation depth is expected to be deep in clear, hard water lakes, and extremely clear marl lakes can have charophyte vegetation to more than 9m (e.g. Lough Rea has charophytes to 10-11m, Coolorta >9m) (Roden and Murphy, in prep.). The indicative target of >6m for lake habitat 3140 may need to be modified based on the habitat sub-type/form and/or the specific lake in question (Roden and Murphy, 2013, in prep.). In this SAC, the maximum depth of vegetation at Errit Lough was 4m in 1978 (Heuff, 1984) and 3-3.5m in 2012 (Roden and Murphy, in prep.). The water is highly coloured in Errit Lough, and this appears to limit vegetation development in deeper water. The areas of drained peatland (for turf-cutting and conifer forest) in the catchment of Errit Lough are likely to artificially increase the lake's water colour
Hydrological regime: water level fluctuations	Metres	Maintain appropriate hydrological regime necessary to support the habitat	The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action and turbidity, up-root vegetation, alter the substratum and lead to nutrient release from sediment. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	The hard water lake habitat (3140) is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial. The exposed eastern shore of Errit Lough is stony/rocky, while much of the lake has sandy marl (Heuff, 1984). Roden and Murphy (in prep.) also recorded peat
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. A target of >6m has been set for hard water lakes (3140) (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms (Roden and Murphy, in prep.). Secchi depth at Errit Lough was 2.7m in 2001 (Free et al., 2006) and 3m in 2012 (Roden and Murphy, in prep.)
Water quality: nutrients	µg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	Lake habitat 3140 is typically associated with high water quality, as demonstrated by naturally low dissolved nutrients. The target for Errit Lough is Water Framework Directive (WFD) High Status or oligotrophic (OECD, 1982). Annual average total phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.04mg/l N and annual 95th percentile for total ammonia should be ≤0.09mg/l N. Where nutrient concentrations are lower than the targets, there should be no upward trend in concentrations. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Free et al. (2006) measured <10µg/l TP in Errit Lough in April 2001

Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Lake habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD High Status or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. Annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll *a* concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Free et al. (2006) measured 6.3µg/l chlorophyll *a* in Errit Lough in April 2001
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, the default target for lake habitat 3140 is WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in hard water lakes (3140) should, therefore, be trace/absent (<5% cover). EPA phytobenthos status can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, the default target for lake habitat 3140 is high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for hard water lakes (3140). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	The specific requirements of lake habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to lake habitat 3140; however, eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). 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	Restore appropriate water colour to support the habitat	Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). Lake habitat 3140 is typically associated with very clear waters and expected colour would be <10mg/l PtCo or, more likely, <5mg/l PtCo. Free et al. (2006) recorded colour of 46mg/l PtCo in Errit Lough and Roden and Murphy (in prep.) noted high water colour in 2012, a very shallow euphotic zone, low Secchi depth and stated peat-staining from disturbed bogland may have reduced water transparency

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. As noted above, increased water colour, low transparency and shallow vegetation zones at Errit Lough appear to be linked to peatland disturbance
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. Fringing fen habitats can be particularly important around hard water lakes, notably the Annex I habitats alkaline fen, *Cladium* fen and petrifying springs (habitat codes 7230, 7210 and 7220 respectively). Sparse reedbeds (*Schoenoplectus lacustris, Phragmites australis*) and marginal swamp (*Carex rostrata, Eleocharis palustris*) occur on the south-west shore of Errit Lough (Heuff, 1984). Deciduous woodland, heath and wet grassland also fringe Errit Lough



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Department of Culture, Heritage and the Gaeltacht

MAP 1:
ERRIT LOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000607 ; version 3. CO. ROSCOMMON

0 100 200 300 400 Meters

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Map Version 1
Date: Nov 2017

Legend

- 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
- Errit Lough SAC 000607
- OSi Discovery Series County Boundary

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

MAP 2:
ERRIT LOUGH SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
SAC 000607; version 3.
CO. ROSCOMMON

0 125 250 375 500 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Nov 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Cloonshanville Bog SAC 000614

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

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Citation:

NPWS (2016) Conservation Objectives: Cloonshanville Bog SAC 000614. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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Favourable conservation status of a habitat is achieved when:

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- 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.
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Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000614	Cloonshanville Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
91D0	Bog woodland*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Cloonshanville Bog (SAC 000614), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	Cloonshanville Bog SAC (000614) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Cloonshanville Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 44.0ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 20.1ha in 2012 by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 45.2ha. See map 2. However, it is estimated that only 22.6ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 42.7ha. Eco-hydrological assessments of the cutover estimates that an additional 1.3ha of bog forming habitats could be restored. The long term target for ARB is therefore 44.0ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2012	ARB, including bog woodland, covers 20.1 ha (13.7%) of the high bog area. A small area of central ecotope is found in the north-west corner of the bog. Sub-central ecotope of somewhat lower quality is more widespread across the bog. The most notable actively peat-forming feature of the site is an extensive active flush that bisects the high bog, this area features two areas of bog woodland
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Cloonshanville Bog SAC in 2012 (latest figure available) was 146.4ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around margins of Cloonshanville Bog. An interesting area of fen occurs in a former lake basin to the east of the high bog
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 22.0ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 44.0ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed on Cloonshanville Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	The large flush and associated bog woodland are features of local distinctiveness on Cloonshanville Bog
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Cloonshanville Bog suggests that the current level is approximately 9.6kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Cloonshanville Bog SAC

Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Cloonshanville Bog SAC

Attribute	Measure	Target	Notes

91D0 Bog woodland

To maintain the favourable conservation condition of Bog woodland in Cloonshanville Bog 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. At least 2.2ha. See map 4	Bog woodland occurs on Cloonshanville Bog and is regarded as a component of the Active Raised Bog (ARB) habitat (7110) of that bog. Thus, the conservation objective and supporting document for ARB (7110) are also relevant to this habitat and common attributes have not been repeated here. The latest survey for bog woodland in Cloonshanville Bog SAC is reported in Fernandez et al. (2014)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4	Bog woodland occurs in extensive active flush that occurs at the centre of the high bog at Cloonshanville
Vegetation composition: positive indicator species	Number in a representative number of monitoring stops	Birch (*Betula pubescens*), bog moss (*Sphagnum* species) and at least five other species present	Bog woodland is typically species-poor but with a characteristic and distinctive flora. Positive indicator species are listed in bog woodland monitoring survey (Cross and Lynn, 2013)
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Both native and non-native invasive species absent or under control. Total cover should be less than 10%	Negative indicator species include bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*), which can become invasive if the site begins drying out
Woodland structure: cover and height of birch	Percentage cover and metres at a representative number of monitoring stops	A minimum 30% cover of birch (Betula pubescens) with a median canopy height of 4m	Attribute and target based on Cross and Lynn (2013)
Woodland structure: dwarf shrub cover	Percentage cover at a representative number of monitoring stops	Dwarf shrub cover not more than 50%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: ling cover	Percentage cover at a representative number of monitoring stops	Ling (*Calluna vulgaris*) cover not more than 40%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: bryophyte cover	Percentage cover at a representative number of monitoring stops	Bryophyte cover at least 50%, with bog moss (*Sphagnum* spp.) cover at least 25%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: tree size classes	Occurrence	Each size class present	Size classes are defined in Cross and Lynn (2013). The presence of all size classes suggests that a woodland has good structural variety with trees of varying ages
Woodland structure: senescent and dead wood	Occurrence	Senescent or dead wood present	Mature and veteran trees and dead wood are important for bryophytes, lichens, saproxylic organisms and some bird species. Their retention within a woodland is important to ensure continuity of habitats/niches and propagule sources over time. However, as birch (*Betula pubescens*) trees seldom exceed 30cm in diameter in this habitat and dead wood rots quickly and is engulfed by bog mosses (*Sphagnum* spp.), volume of dead wood may not be as high in bog woodland as in other woodland types

Sheevanman

Carrowbane

Curraghnabraher

Cloonshanville

Mantuar

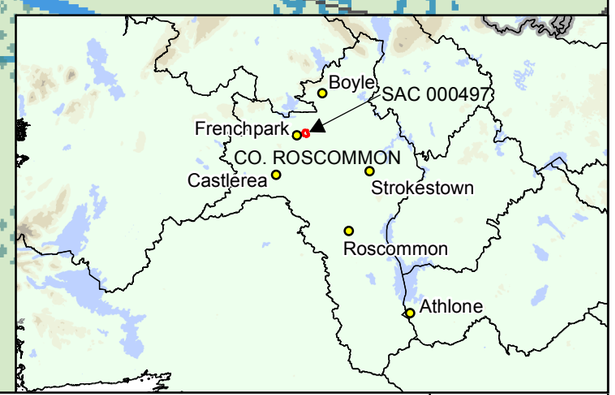
Frenchpark

Dún Gar

Priory

Cross

Breedoge R.



Legend

Cloonshanville Bog SAC 000614

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

MAP 1:
CLOONSHANVILLE BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000614; version 3.01. Co. Roscommon

0 100 200 300 400 500 m

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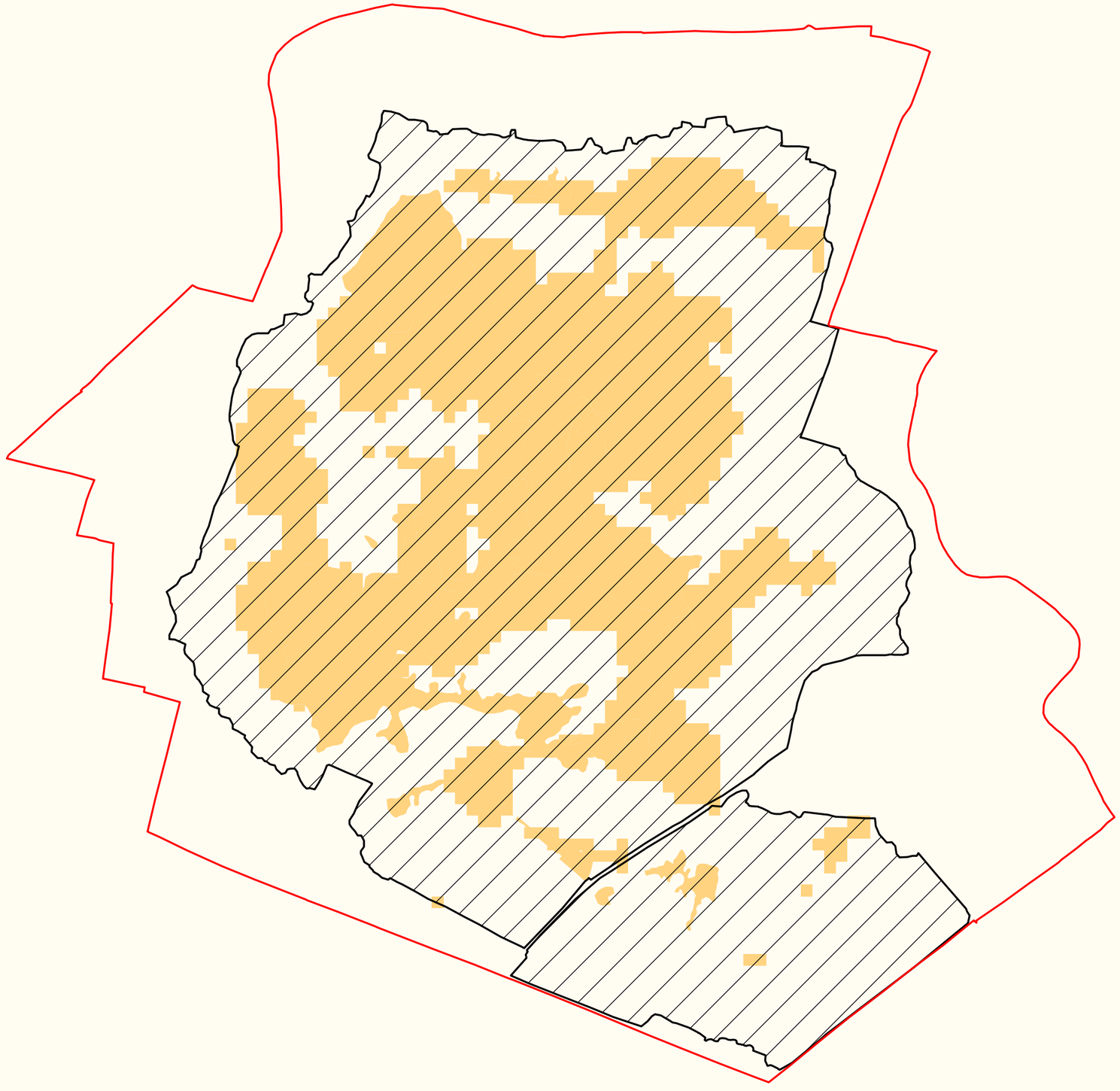
Map Version 1
Date: Jan 2016



Legend

- Cloonshanville Bog SAC 000614
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
CLOONSHANVILLE BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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0 100 200 300 400 500 m

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N

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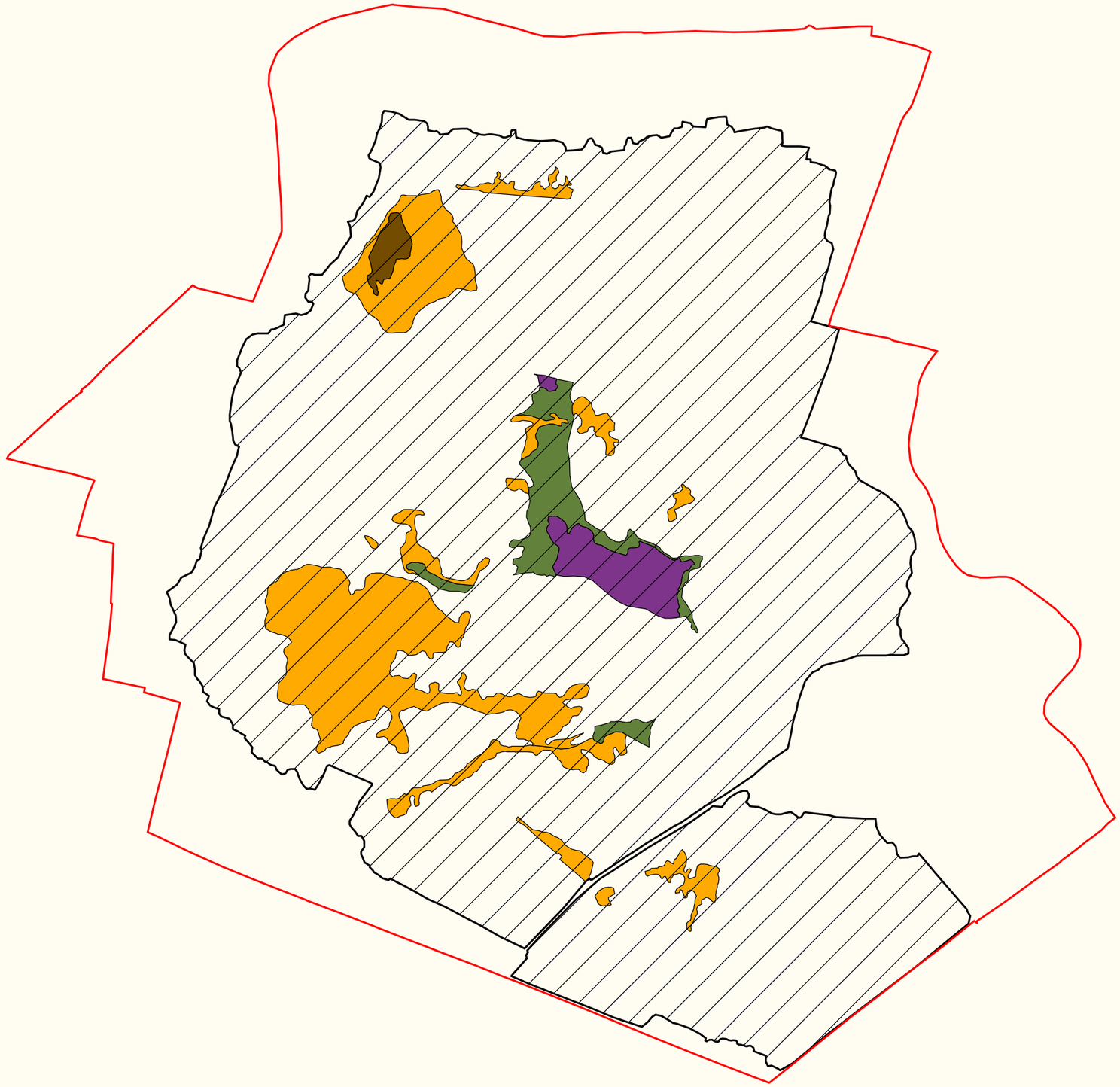

Legend

- Cloonshanville Bog SAC 000614
- High Bog Boundary

Active Raised Bogs Ecotopes

- Bog Woodland
- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
CLOONSHANVILLE BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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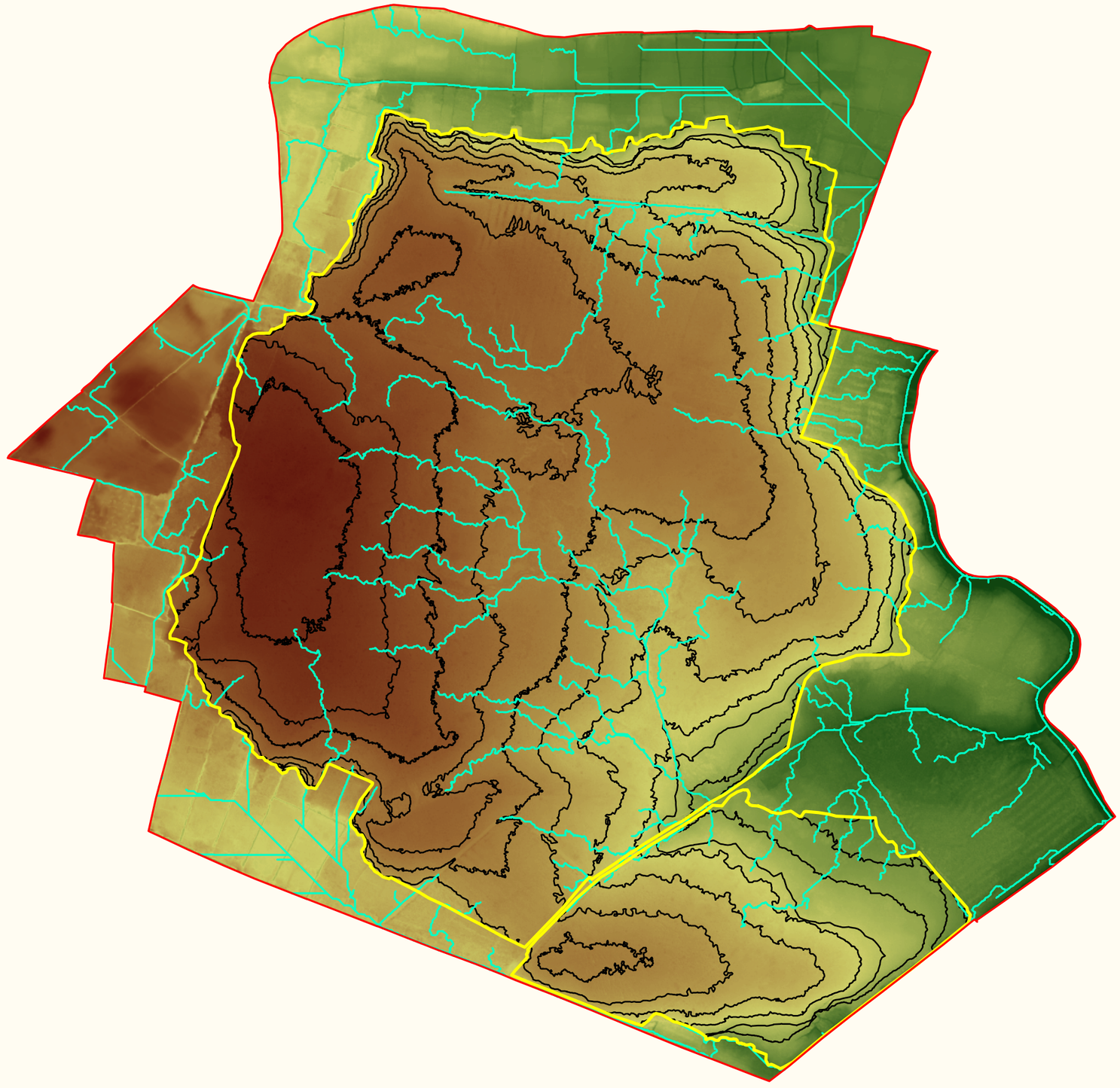

Legend

- Cloonshanville Bog SAC 000614
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

73.04 m

63.76 m

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

MAP 4:
CLOONSHANVILLE BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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Map Version 1
Date: Jan 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Hoe Bog SAC 000633

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Cultúir, Oidhreachta agus Gaeltachta

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Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000633	Lough Hoe Bog SAC
1013	Geyer's Whorl Snail *Vertigo geyeri*
1092	White-clawed Crayfish *Austropotamobius pallipes*
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
7130	Blanket bogs (* if active bog)

Please note that this SAC is adjacent to River Moy SAC (002298). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.

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

NPWS Documents

Year :	1989
Title :	A survey to locate blanket bogs of scientific interest in County Kerry and County Sligo
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to NPWS
Year :	1998
Title :	Conservation management of the white-clawed crayfish, *Austropotamobius pallipes*
Author :	Reynolds, J.D.
Series :	Irish Wildlife Manual No. 1
Year :	2005
Title :	Conservation Plan for 2005-2010. Lough Hoe Bog cSAC Site Code 000633 Cos. Sligo and Mayo
Author :	NPWS
Series :	Conservation Plan
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (*Austropotamobius pallipes*) in Irish lakes
Author :	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manual No.45
Year :	2011
Title :	Monitoring and condition assessment of populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Irish Wildlife Manual No. 55
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS

Year :	2017
Title :	Lough Hoe Bog SAC (site code: 633) Conservation objectives supporting document- blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	1996
Title :	Notes on some non-marine Mollusca from Co. Sligo and Co. Leitrim, including a new site for *Vertigo geyeri* Lindholm
Author :	Cawley, M.
Series :	Irish Naturalists' Journal, 25: 183-185
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2002
Title :	A survey of the white-clawed crayfish (*Austropotamobius pallipes*) Lereboullet and of water quality in two catchments of eastern Ireland
Author :	Demers, A.; Reynolds, J.D.
Series :	Bulletin Francais de la Peche et de la Pisciculture, 367: 729-740
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford

Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110 (map 3)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1013, 1092 (maps 4 and 5)

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 Lough Hoe Bog 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 likely to occur in larger upland lakes in the SAC, such as Loughs Hoe, Alone, Fossea and Nalackagh. The exact distribution of 3110 is unknown, as no specific information on lake vegetation is available. Habitat 3110 may co-occur with lake habitat 3160 in upland lakes, which is also likely to occur in smaller lakes and ponds. There are also calcareous influences- Lough Talt has marginal calcareous springs and may be dominated by lake habitat 3140 (nb 3140 and 3160 are not qualifying interests). In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as 'potential 3110' (see map 3). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the exact distribution of lake habitat 3110 in Lough Hoe Bog SAC is not known. On map 3, all lakes larger than 1ha (based on 1:5,000 data), other than Lough Talt, have been mapped as potential 3110. All of these are above 200m altitude, with seven lakes over 300m
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 lake habitat 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). Douglas et al. (1989) recorded bottle sedge (*Carex rostrata*), water horsetail (*Equisetum fluviatile*), bulbous rush (*Juncus bulbosus*), water lobelia (*Lobelia dortmanna*), bogbean (Menyanthes trifoliata), common reed (*Phragmites australis*), bog pondweed (*Potamogeton polygonifolius*) and common club-rush (*Schoenoplectus lacustris*), amongst others, in the 3110 lakes in Lough Hoe Bog 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 3110 (see O Connor, 2015)
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. Water clarity is expected to be high in upland 3110 lakes, resulting in a large maximum depth of vegetation
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that 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 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). Habitat 3110 is associated with very clear water, particularly upland examples. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; 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 lake habitat 3110, annual average total phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/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 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 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, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 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 lake habitat 3110, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	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 Lough Hoe Bog SAC, active blanket bog and heath communities dominate upland lake shorelines. Transition mire, fen, flush and grassland may also occur. 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

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Lough Hoe Bog SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 1,176ha, covering 37% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Lough Hoe Bog SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat mostly occurs in the Co. Sligo section of the SAC, with large expanses present here. In the Co. Mayo section, the habitat occurs at the edge of the SAC at Bunnyconnellan East, south of Fossea Lough, on the flatter ground in the vicinity of Loughalacka, and to the north and west of the lake at Derrynabaunshy (Douglas et al., 1989; NPWS, 2005; NPWS internal files). Further information can be found within Douglas et al. (1989), NPWS (2005), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Douglas et al., 1989; NPWS internal files), two of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: 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 *Sphagnum fallax*, 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 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). The non-native moss *Campylopus introflexus* was recorded from the SAC (Douglas et al., 1989), but this species cannot be assigned specifically to blanket bog

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: 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 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	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: 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)

1013 Geyer's Whorl Snail *Vertigo geyeri*

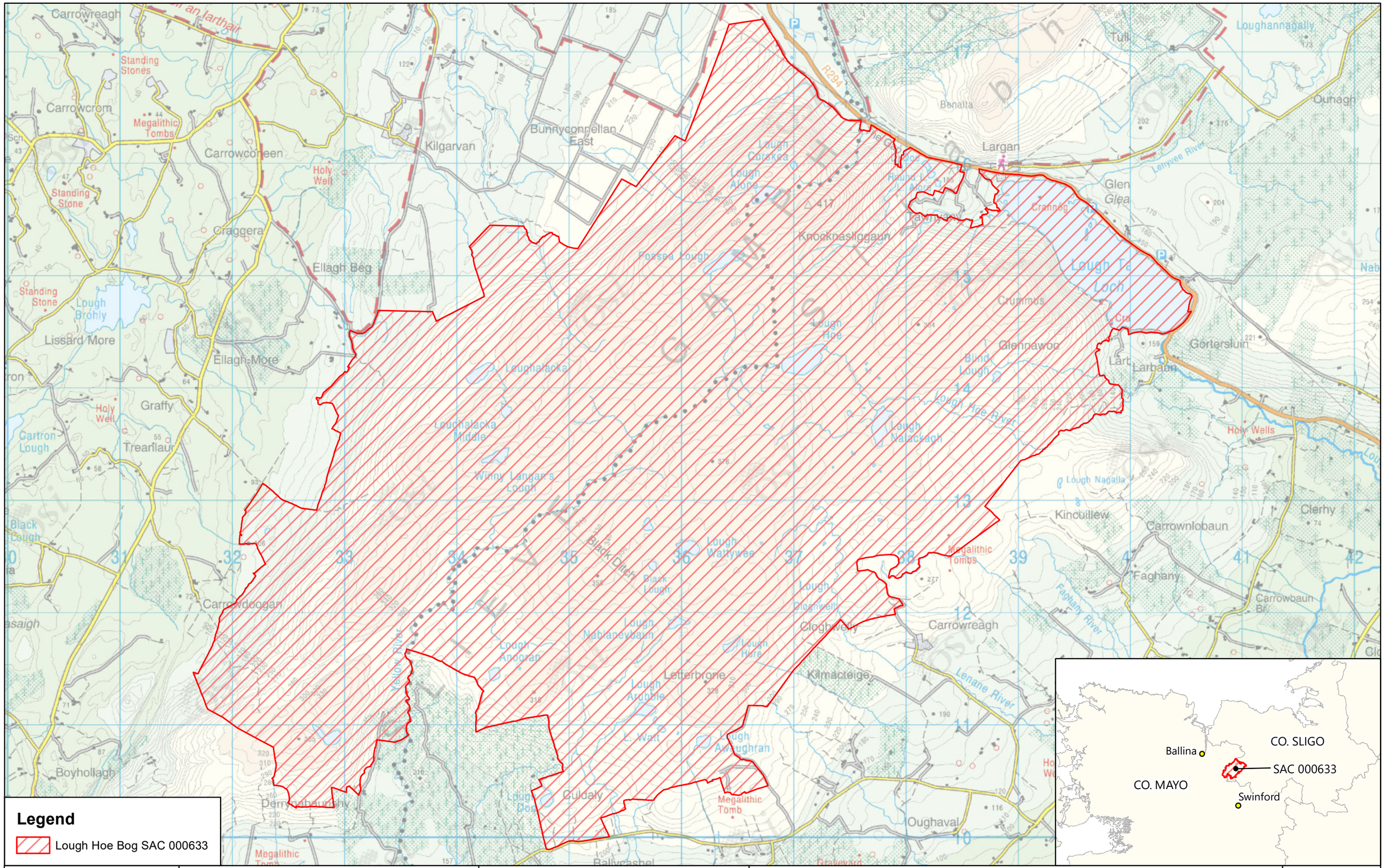
To restore the favourable conservation condition of Geyer's Whorl Snail in Lough Hoe Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: occupied sites	Number of occupied 1km grid squares	Restore at least one sub-population	Geyer's whorl snail (*Vertigo geyeri*) has been recorded in two separate areas on the shore of Lough Talt in Lough Hoe Bog SAC within a single 1km square, G3915 (Cawley, 2006; site code VgCAM7 in Moorkens and Killeen, 2011). See map 4. The last record from the eastern side was in 2005. The current status of the population on the western shore is uncertain. The habitats occupied by Geyer's whorl snail (*V. geyeri*) in the SAC are areas of fen and flush close to the shore of Lough Talt
Occurrence in suitable habitat	Number of positive records in a representative number of samples	No decline, subject to natural processes	Positive samples mean the confirmed presence of snails (living or recently dead adults and/or juveniles). See Moorkens and Killeen (2011)
Habitat area	Hectares	Area of suitable habitat stable or increasing, subject to natural processes; at least 1ha of suitable habitat in at least sub-optimal condition	Apparently suitable conditions for the species are present at several places, with the largest area on the east shore of Lough Talt. Two less extensive areas are found on the west shore. Optimal habitat in the SAC is defined (by Moorkens and Killeen, 2011) as flushed fen grassland with sedge/moss lawns 5-15cm tall, containing species such as *Carex lepidocarpa, Pinguicula vulgaris, Briza media, Equisetum palustre, Juncus articulatus* and the mosses *Drepanocladus revolvens* and *Campylium stellatum*, with scattered tussocks of *Schoenus nigricans* no more than 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 vegetation height is less than 5 or more than 15cm tall, or the water table is below 5cm, or ground is flooded at time of sampling
Habitat quality: soil wetness	Percentage of a representative number of sampling stops	At least 67% of a representative number of sampling stops in areas of optimal habitat should be classified as optimal wetness as defined by Moorkens and Killeen (2011); at least 25% should be optimal wetness in areas of sub-optimal habitat	The soil wetness should be assessed using the criteria described in Moorkens and Killeen (2011)

1092 White-clawed Crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed Crayfish in Lough Hoe Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number of occupied 1km grid squares	No decline. See map 5	The records for white-clawed crayfish (*Austropotamobius pallipes*) in Lough Hoe SAC all come from Lough Talt. This lake overlaps five 1km grid squares and the species has been recorded from three of these squares, G3815, G3914, G3915. See map 5. There is no reason to suppose it is not present in G4014 and G4015, but this needs confirmation
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs should be present in all occupied 1km squares, subject to natural processes and availability of suitable habitat	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No non-indigenous crayfish species	Non-indigenous crayfish species (NICS) are identified as a major direct threat to the white-clawed crayfish (*Austropotamobius pallipes*) and as a disease vector, in particular crayfish plague (*Aphanomyces astaci*), which is fatal to white-clawed crayfish. Ireland is currently free of NICS. See Reynolds (1998) for further details
Disease	Occurrence	No instances of disease	There have been outbreaks of crayfish plague (*Aphanomyces astaci*) in Ireland since 2015 and it is thought that human activity, especially the carrying of disease vectors on contaminated equipment, has introduced and spread the disease. Strict biosecurity is required
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available throughout the area of occupied habitat



Legend

Lough Hoe Bog SAC 000633

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Department of Culture, Heritage and the Gaeltacht

MAP 1:
LOUGH HOE BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000633; version 3. CO. SLIGO / CO. MAYO

0 0.5 1 1.5 2 km

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Map Version 1
Date: Aug 2017

SAC 002298

SAC 002298

SAC 002298

SAC 000633

SAC 002298

Legend

- Lough Hoe Bog SAC 000633
- River Moy SAC 002298
- OSi Discovery Series County Boundary

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Department of
Culture, Heritage and the Gaeltacht

MAP 2:
LOUGH HOE BOG SAC
CONSERVATION OBJECTIVES
ADJACENT, ADJOINING AND
OVERLAPPING DESIGNATIONS
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000633; version 3. SAC 002298; version 3.01
CO. SLIGO / CO. MAYO

0 3 6 9 12 km

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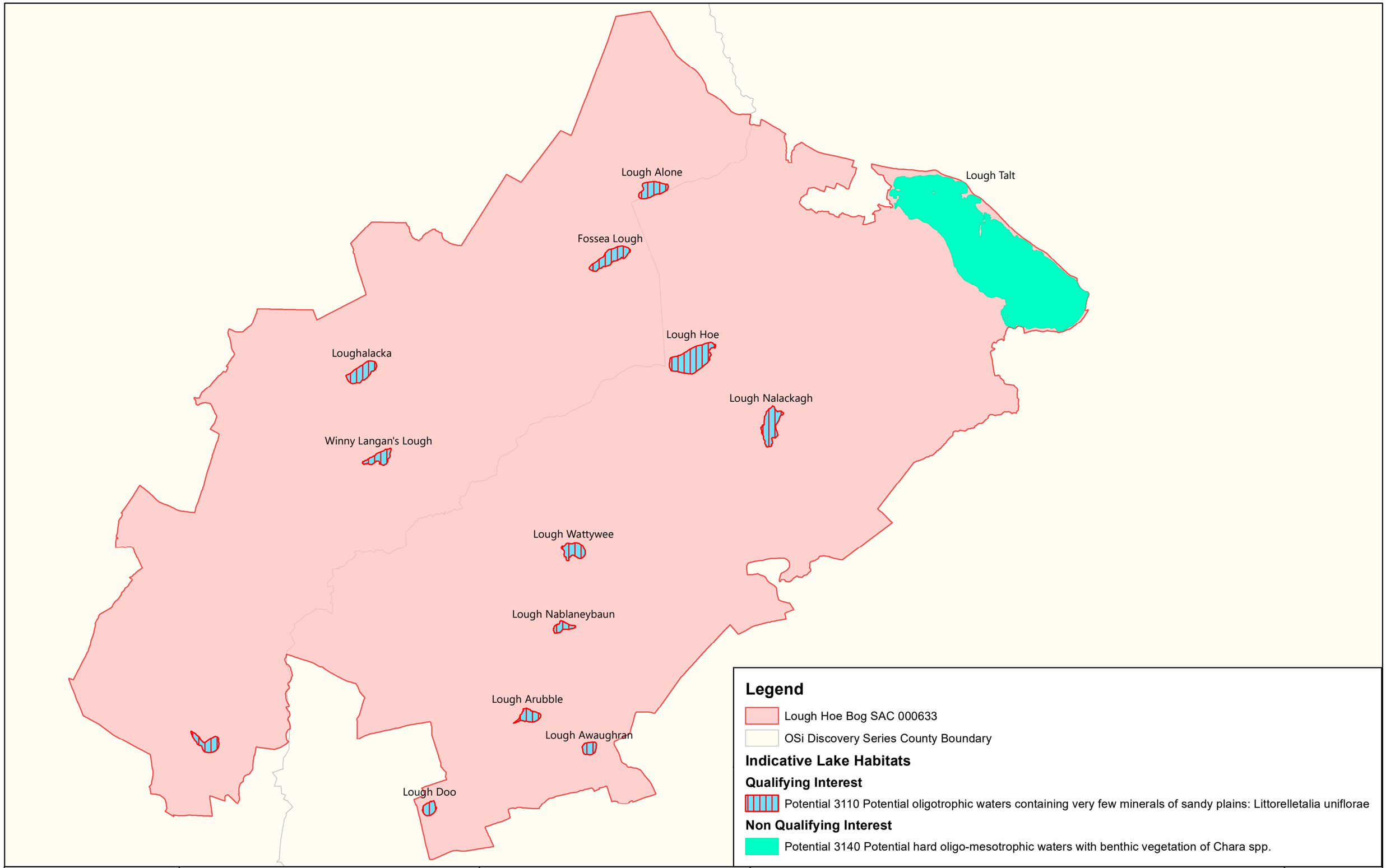
Map Version 1
Date: Aug 2017



Legend

Lough Hoe Bog SAC 000633

OSi Discovery Series County Boundary

Indicative Lake Habitats

Qualifying Interest

Potential 3110 Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae

Non Qualifying Interest

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

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MAP 3:
LOUGH HOE BOG SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
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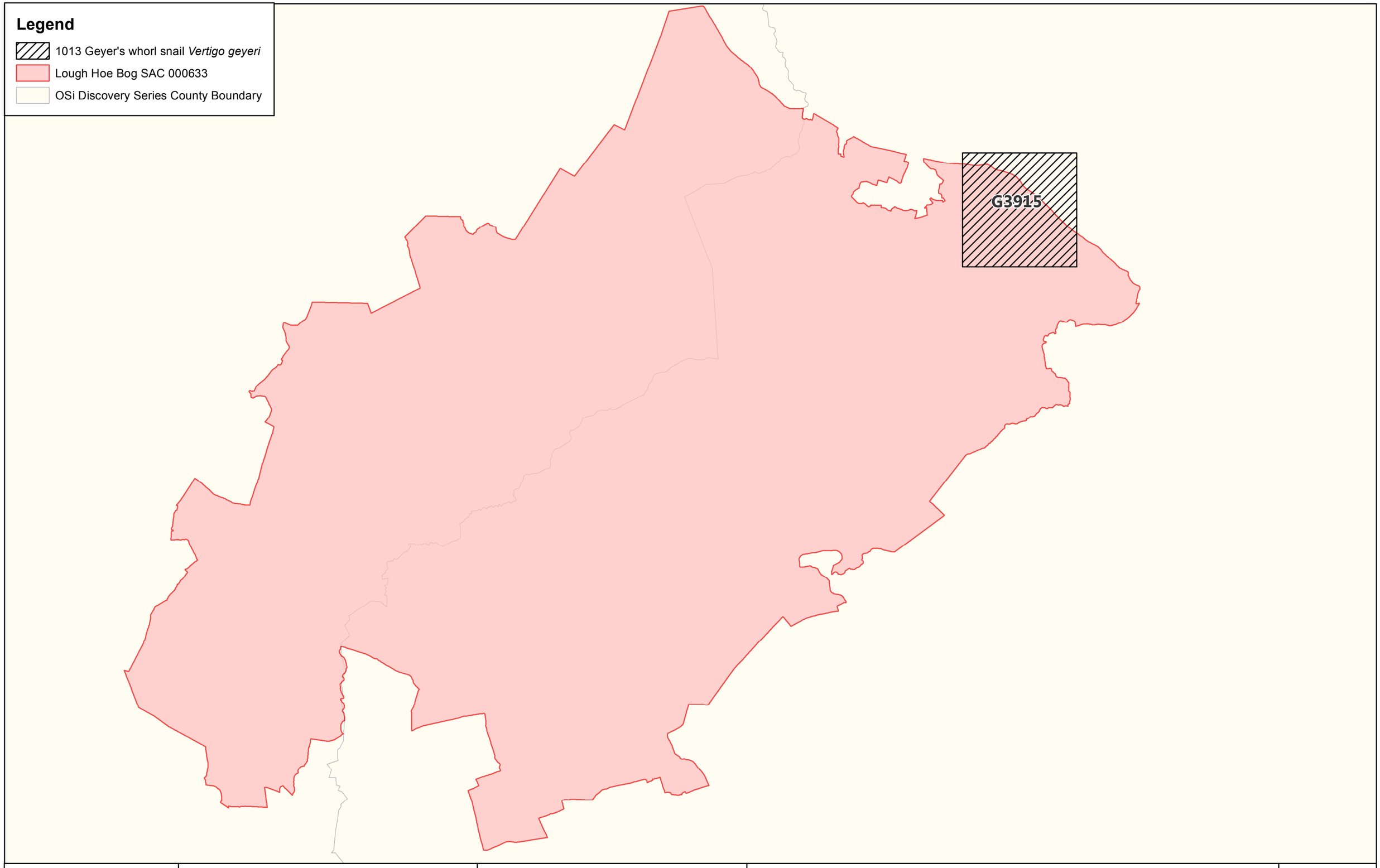
Map Version 1
Date: Aug 2017



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MAP 4:
LOUGH HOE BOG SAC
CONSERVATION OBJECTIVES
GEYER'S WHORL SNAIL

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

SITE CODE:
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0 0.5 1 1.5 2 km

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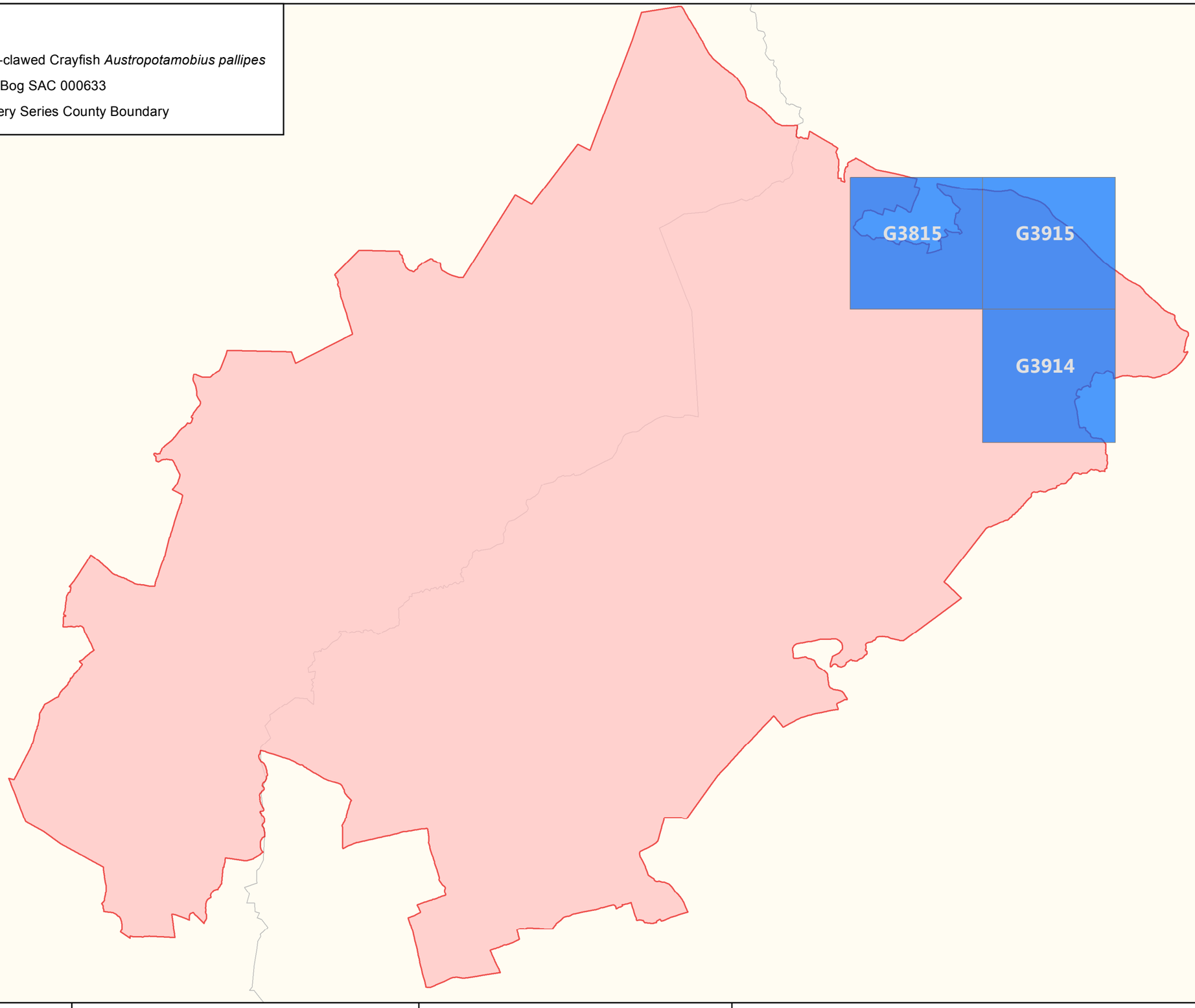
Map Version 1
Date: Aug 2017

Legend

- 1092 White-clawed Crayfish *Austropotamobius pallipes*
- Lough Hoe Bog SAC 000633
- OSi Discovery Series County Boundary



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

MAP 5:
LOUGH HOE BOG SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000633; version 3.
CO. SLIGO / CO. MAYO

0 0.5 1 1.5 2 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: Aug 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Nabrickkeagh Bog SAC 000634

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,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2019) Conservation Objectives: Lough Nabrickkeagh Bog SAC 000634. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000634	Lough Nabrickkeagh Bog SAC

7130	Blanket bogs (* if active bog)

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1989
Title :	A survey to locate blanket bogs of scientific interest in County Kerry and County Sligo
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to NPWS
Year :	2005
Title :	Conservation Plan for 2005-2010. Lough Nabrickkeagh Bog cSAC Site Code 000634 Co. Sligo
Author :	NPWS
Series :	Conservation Plan
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2011
Title :	Ireland Red List No. 6: Damselflies and Dragonflies (Odonata)
Author :	Nelson, B.; Ronayne, C.; Thompson, R.
Series :	Ireland Red Lists series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manuals, No. 79
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS
Year :	2019
Title :	Lough Nabrickkeagh Bog SAC (000634) Conservation objectives supporting document- blanket bog and supporting habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Lough Nabrickkeagh Bog SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 193ha, covering 71% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Lough Nabrickkeagh Bog SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur throughout the SAC (Douglas et al., 1989; NPWS, 2005). Further information can be found within Douglas et al. (1989), NPWS (2005) 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 pH and nutrient status within natural ranges	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Douglas et al., 1989; NPWS internal files), three of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stop	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 *Sphagnum fallax*, 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 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation 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 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	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: 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 on the Flora (Protection) Order, 2015 and/or Red Lists (Regan et al., 2010; Nelson et al., 2011; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.)

Legend

Lough Nabrickkeagh Bog SAC 000634

Largan

Crannóg

Glen Glea

Lemnee River

Lough Ta

Ounagh

Lough Nabrickkeagh

Gortersluin

Mullaraney

Larbaun

202 176 204 179 159 221 254

CO. MAYO

SAC 000634

SAC 000634

CO. SLIGO

Cloonacool

Tobercurry

Banada

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

MAP 1:
LOUGH NABRICKKEAGH BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000634; version 3.02
CO. SLIGO

0 0.15 0.3 0.45 0.6 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Jan 2019

Conservation objectives for Templehouse and Cloonacleigha Loughs SAC [000636]

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.

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:

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- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

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- 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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Templehouse and Cloonacleigha Loughs SAC [000636]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Turloughmore (Sligo) SAC [000637]

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.

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- 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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3180	Turloughs*

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Turloughmore (Sligo) SAC [000637]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Rusheenduff Lough SAC [001311]

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.

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- 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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

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

* denotes a priority habitat

Code	Common Name	Scientific Name
1833	Slender Naiad	*Najas flexilis*

Citation: *NPWS (2020) Conservation objectives for Rusheenduff Lough SAC [001311]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

National Parks and Wildlife Service

Conservation Objectives

Clew Bay Complex SAC 001482

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

Introduction

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

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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***

001482 Clew Bay Complex SAC

QI	Description
1013	Geyer's whorl snail *Vertigo geyeri*
1140	Mudflats and sandflats not covered by seawater at low tide
1150	* Coastal lagoons
1160	Large shallow inlets and bays
1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1355	Otter *Lutra lutra*
1365	Common seal *Phoca vitulina*
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")

Supporting documents, relevant reports & publications (listed by date)

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

Title: Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive
Year: in prep
Author: Roden, C.M.; Oliver, G.
Series: Unpublished report to the EPA

Title: Clew Bay Complex SAC (001482): Conservation objectives supporting document - marine habitats and species [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: Clew Bay Complex SAC (001482): Conservation objectives supporting document - coastal habitats [Version 1]
Year: 2011
Author: NPWS
Series: Unpublished Report to NPWS

Title: Otter tracking study of Roaringwater Bay
Year: 2010
Author: De Jongh, A.; O'Neill, L.
Series: Unpublished Draft Report to NPWS

Title: Subtidal benthic surveys (Clew Bay)
Year: 2009
Author: Aquafact
Series: Unpublished Report to NPWS

Title: Saltmarsh Monitoring Report 2007-2008
Year: 2009
Author: McCorry, M.; Ryle, T.
Series: Unpublished Report to NPWS

Title: Clew Bay baseline intertidal survey
Year: 2009
Author: RPS
Series: Unpublished Report to NPWS

Title: Coastal Monitoring Project 2004-2006
Year: 2009
Author: Ryle, T.; Murray, A.; Connolly, C.; Swann, M.
Series: Unpublished Report to NPWS

Title: The phytosociology and conservation value of Irish sand dunes
Year: 2008
Author: Gaynor, K.
Series: Unpublished PhD thesis, National University of Ireland, Dublin

Title: Saltmarsh Monitoring Report 2006

Year: 2007

Author: McCorry, M.

Series: Unpublished Report to NPWS

Title: Inventory of Irish coastal lagoons

Year: 2007

Author: Oliver, G.

Series: Unpublished Report to NPWS

Title: A Survey of Intertidal Mudflats and Sandflats in Ireland

Year: 2006

Author: Aquafact

Series: Unpublished Report to NPWS

Title: Otter Survey of Ireland 2004/2005

Year: 2006

Author: Bailey, M.; Rochford, J.

Series: Irish Wildlife Manuals No. 23

Title: Otters - ecology, behaviour and conservation

Year: 2006

Author: Kruuk, H.

Series: Oxford University Press

Title: Survey of sensitive subtidal benthic marine communities

Year: 2006

Author: MERC

Series: Unpublished Report to NPWS

Title: Harbour seal population assessment in the Republic of Ireland: August 2003

Year: 2004

Author: Cronin, M.; Duck, C.; Ó Cadhla, O.; Nairn, R.; Strong, D.; O'Keeffe, C.

Series: Irish Wildlife Manuals No. 11

Title: Summary of National Parks & Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003

Year: 2004

Author: Lyons, D.O.

Series: Irish Wildlife Manuals No. 13

Title: Broadscale mapping of candidate marine Special Area of Conservation. Clew Bay Complex, cSAC (001482)

Year: 2003

Author: SSI; Aquafact

Series: Unpublished Report to NPWS

Title: A Survey of selected littoral and sublittoral sites in Clew Bay, Co. Mayo

Year: 1999

Author: Aquafact

Series: Unpublished Report to NPWS

Title: National Shingle Beach Survey of Ireland 1999

Year: 1999

Author: Moore, D.; Wilson, F.

Series: Unpublished Report to NPWS

Title: Aquatic vegetation of Irish coastal lagoons

Year: 1998

Author: Hatch, P.; Healy, B.

Series: Bulletin of the Irish Biogeographical Society. 21: 2-21

Title: A survey of the vegetation of Irish coastal lagoons

Year: 1996

Author: Hatch, P.

Series: Unpublished Report to NPWS

Title: The spatial organization of otters (*Lutra lutra*) in Shetland

Year: 1991

Author: Kruuk, H.; Moorhouse, A.

Series: J. Zool, 224: 41-57

Title: Otter survey of Ireland

Year: 1982

Author: Chapman, P.J.; Chapman, L.L.

Series: Unpublished Report to Vincent Wildlife Trust

Title: Lough Furnace, County Mayo; physical and chemical studies of an Irish saline lake, with reference to the biology of *Neomysis integer*

Year: 1977

Author: Parker, M.M.

Series: Unpublished PhD thesis, University of Dublin, Trinity College.

Spatial data sources

Year:	Interpolated 2011
Title:	Intertidal and subtidal surveys 1999, 2006, 2009; broadscale mapping 2003
GIS operations:	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data; expert opinion used as necessary to resolve any issues arising
Used for:	Marine community types, 1140 (maps 2 & 4)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary
Used for:	1160, 1365 (maps 3 & 9)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; Saltmarsh and Sand Dune CO datasets erased out if applicable
Used for:	Marine community types base data (map 4)
Year:	Revision 2011
Title:	Inventory of Irish Coastal Lagoons. Version 3
GIS operations:	Clipped to SAC boundary
Used for:	1150 (map 5)
Year:	Revision 2010
Title:	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Sand Dune CO data investigated and resolved with expert opinion used
Used for:	1330 (map 6)
Year:	2009
Title:	Coastal Monitoring Project 2004-2006. Version 1
GIS operations:	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used for:	1210, 2110, 2120 (map 7)
Year:	2005
Title:	OSi Discovery series vector data
GIS operations:	Creation of an 80m buffer on the marine side of the high water mark (HWM); creation of a 10m buffer on the terrestrial side of the HWM; combination of 80m and 10m HWM buffer datasets; creation of a 10m buffer on the landward side of the river banks data; creation of a 20m buffer applied to river centerline and stream data; combination of 10m river banks and 20m river and stream centerline buffer datasets; combined river and stream buffer dataset clipped to HWM; combination of HWM buffer dataset with river and stream buffer dataset; overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary; expert opinion used as necessary to resolve any issues arising
Used for:	1355 (map 8)

Year:	2011
Title:	NPWS rare and threatened species database
GIS operations:	Dataset created from spatial references in database records; expert opinion used as necessary to resolve any issues arising
Used for:	1365 (map 9)

1013 Geyer's whorl snail *Vertigo geyeri*

The status of Geyer's whorl snail as a qualifying Annex II species for Clew Bay Complex SAC is currently under review. The outcome of this review will determine whether a site-specific conservation objective is set for this species.

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 2	Habitat area was estimated using OSI data as 1277ha. See marine supporting document for further details
Community distribution	Hectares	The following sediment communities should be maintained in a natural condition: Intertidal sandy mud with *Tubificoides benedii* and *Pygospio elegans* community complex; Sandy mud with polychaetes and bivalves community complex; and Fine sand dominated by *Nephtys cirrosa* community. See map 4	The likely area of sediment communities was derived from a combination of intertidal and subtidal surveys undertaken in 1999, 2006 and 2009. See marine supporting document for further details

1150 * Coastal lagoons

To maintain the favourable conservation condition of Lagoons in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 5 for mapped lagoons	The main lagoon is Furnace Lough. Claggan Lagoon has also been mapped, however, further information is required on this lagoon. NB there maybe other lagoons within the SAC. The following targets and notes concentrate on the largest lagoon, Furnace Lough
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area of surveyed lagoons is 163.3ha. Furnace Lough- 162.1ha; Claggan Lagoon- 1.2ha. See map 5	Areas calculated from spatial data derived from Oliver, 2007. NB there maybe other lagoons within the SAC
Salinity regime	Practical salinity units (psu)	Maintain current spatial and temporal variation in salinity regime	Furnace Lough is a natural, deep (up to 21m), stratified lagoon with natural periodic overturns and anoxia. It has permanent open connection to the sea through which seawater enters when tides exceed MHWN though this connection is somewhat constricted by weirs. There are major freshwater inputs at the northern end from the large Lough Feeagh/Burrishoole catchment area. The surface layer is oligohaline to mesohaline (0.5-12.0 psu) for most of the time but salinity varies from north (fresh water) to south (high salinity) and summer to winter. The waters are sharply stratified, a permanant halocline runs from 1-3m down to 8m, below which the water is of constant salinity (approx. 20psu), anaerobic and stagnant (Parker, 1977). See Oliver (2007) and Roden and Oliver (in prep.) for further information
Hydrological regime	Metres	Maintain current annual water level fluctuations	This is to ensure maintenance of the current communities of the lagoon margins and the current hydrological functioning of the lagoon itself, especially the salinity regime
Hydrological regime	Discharge (m^3/second)	Maintain/restore freshwater discharge regime	There is evidence that the original hydrological regime in the Burrishoole catchment has been impacted due to overgrazing and afforestation resulting in changes to run-off regimes with associated increased siltation and eutrophication. The extent to which these changes have impacted on Lough Furnace is unclear but needs further study

1150 * Coastal lagoons

To maintain the favourable conservation condition of Lagoons in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Barrier	Weir function	Maintain current weir structure at Furnace Lough to ensure maintenance of the current salinity regime	In Furnace Lough, input to and output of saline water is affected to an unknown degree by two weirs. The effect of the weirs needs to be quantified to determine their effect on the salinity regime of the lagoon. These weirs or some similar type structures are shown on the first edition of the 6" OS maps and therefore have been in place for over 170 years
Water quality: chlorophyll a	µg/L	Maintain annual median chlorophyll in Furnace Lough at less than 2.5µg/L	These limits are needed to ensure that excessive shading from phytoplankton does not reduce submergent macrophytes colonisation of the littoral zone the lagoon (J. Ryan, pers comm). The current median levels are less than the target but summer levels are elevated (Roden and Oliver, in prep.) and should be closely monitored
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Maintain annual median MRP in Furnace Lough at less than 0.01mg/L	These limits are needed to ensure that excessive shading from phytoplankton does not reduce submergent macrophytes colonisation of the littoral zone areas of the lagoon (J. Ryan, pers comm). The current median levels in Furnace Lough are 0.005mg/L (Roden and Oliver, in prep). It is possible that the target may be exceeded during periods of overturn. Collection of data on nutrient levels close to the halocline would be useful for the assessment of this possibility
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Maintain annual median DIN (Dissolved inorganic nitrogen) in Furnace Lough at less than 0.15mg/L	These limits are needed to ensure that excessive shading from phytoplankton does not reduce submergent macrophytes colonisation of the littoral zone of the lagoon (J. Ryan, pers comm). The current median levels of DIN in Furnace Lough are less than 0.1mg/L (Roden and Oliver, in prep)
Water quality: Biological Oxygen Demand (BOD)	mg/L	Maintain annual median BOD (Biological Oxygen Demand) in Furnace Lough at less than 2.0mg/L	These limits are needed to ensure that excessive shading from phytoplankton does not reduce submergent macrophytes colonisation of the littoral zone of the lagoon (J. Ryan, pers comm). The current annual median levels of BOD in Furnace Lough are just below the target (Roden and Oliver, in prep) and should be closely monitored. The relationship between organic matter, mainly peat silt, imput from L. Feeagh and BOD in the surface waters and anoxia in the deeper waters warrants further investigation

1150 * Coastal lagoons

To maintain the favourable conservation condition of Lagoons in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Depth of submergent macrophyte colonisation	Metres	Maintain/increase the depth of submergent macrophyte colonisation of the lagoon	Increased depth of colonisation increases both the extent and diversity of submergent macrophytes. In comparison with similar lagoons the extent of submergent macrophyte colonisation in Furnace Lough appears to be restricted probably due to high water colour. However data on the depth of colonisation and water colour and the relationship between them is lacking. It is also possible that anoxia may be a problem, at least in some areas. These issues need to be investigated
Typical plant species	Number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species in Furnace Lough listed in Oliver (2007), Hatch (1996) and Hatch and Healy (1998). A very limited number of plant species are currently listed for the site based on a series of shallow water transects. A snorkelling survey of this complex lagoon is required establish if that list is fully representative of the flora of the lagoon
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species in Furnace Lough listed in Oliver (2007), which rated the aquatic fauna as of moderate-high conservation value based on its high diversity and the presence of rare and unexpected crustaceans
Negative indicator species	Number and % cover	Negative indicator species absent or under control	Eutrophication would favour phytoplankton blooms at the expense of submerged macrophytes

1160 Large shallow inlets and bays

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSI data as 10189ha. See marine supporting document for further details.
Community extent	Hectares	Maintain the natural extent of the *Zostera* dominated and maërl dominated communities. See map 4	The likely extent of the *Zostera* dominated and maërl dominated communities was derived from the acoustic survey and the dive survey undertaken in 2006. See marine supporting document for further details
Shoot density	Shoots per m^2	Maintain the high quality of *Zostera* dominated community	2006 diver observation and underwater viewer. See marine supporting document for further details
Community structure	Biological composition	Maintain the high quality of maërl dominated communities	Area established from an acoustic mapping survey 2003 and a 2006 diver observation and underwater viewer. See marine supporting document for further details
Community distribution	Hectares	The following communities should be maintained in a natural condition: Sandy mud with polychaetes and bivalves community complex; Fine sand dominated by *Nephtys cirrosa* community; Intertidal sandy mud with *Tubificoides benedii* and *Pygospio elegans* community complex; Shingle; and Reef. See map 4	The likely area of sediment communities was derived from a combination of acoustic mapping survey in 2003, intertidal data from 1999, 2006 and 2009 and subtidal data obtained in 1999 and 2009. See marine supporting document for further details

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of driftlines in Clew Bay 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 sub-sites mapped: Bartraw - 0.04ha and Rosmurrevagh - 0.08ha. See map 7	Current area unknown. Two sub-sites (Bartraw and Rosmurrevagh) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 0.12ha. NB further unsurveyed areas maybe present in the site. 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 coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Current distribution unknown. Majority of habitat found at Bartraw and Rosmurrevagh, although there may be additional patches distributed throughout the site. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	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 can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: *Cakile maritima, Honckenya peploides*, *Salsola kali* and *Atriplex* spp.	Based on data from Ryle et al. (2009) . See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Clew Bay 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	Current area unknown, but Clew Bay is considered to have the largest shingle reserves in the country. It was recorded from Clew Bay Complex, Bartraw and Rosmurrevagh during the National Shingle Beach Survey (Moore and Wilson, 1999), but the extent was not mapped. The Coastal Monitoring Project mapped 0.48ha of this habitat at Bartraw and 0.01ha at Rosmurrevagh (Ryle et al., 2009). The extent is considerably greater than this figure, as substantial shingle deposits are known to occur in association with many of the drumlins in Clew Bay. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution unknown at present, although the habitat has been recorded at Clew Bay Complex (Moore and Wilson, 1999), as well as Bartraw and Rosmurrevagh (Moore and Wilson, 1999; Ryle et al., 2009). See coastal habitats supporting document for further details
Physical structure: Functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Site represents the only known example of incipient gravel barrier formation in the country. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities with typical species: *Honckenya peploides*, *Beta vulgaris* ssp. *maritima*, *Crithmum maritimum*, *Tripleurospermum maritimum*, *Glaucium flavum* and *Silene uniflora*	Based on data from Moore and Wilson (1999) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Atlantic salt meadows in Clew Bay 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 sub-sites mapped: Mallaranny - 19.76ha, Tooreen - 1.06ha, Rosmurrevagh - 6.40ha, Tierna - 0.39ha, Rockfleet Castle - 0.37ha, Rosharnagh East - 0.03ha, Caraholly - 0.36ha, Kiladangan - 0.96ha, Annagh Island - 5.23ha, Bartraw - 0.38ha. See map 6	Based on data from the Saltmarsh Monitoring Project (McCorry, 2007). Ten sub-sites were mapped (34.94ha) and additional areas of potential saltmarsh (3.92ha) were identified for an examination of aerial photographs, giving a total estimated area of 38.86ha. NB further unsurveyed areas maybe present within the site. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 6 for known distribution	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions	See coastal habitats backing 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). The efficiency of sediment circulation throughout a saltmarsh depends on the creek pattern. See coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% area outside creeks vegetated.	Based on data from McCorry (2007). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)	Based on data from McCorry (2007). See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Atlantic salt meadows in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur	Based on data from McCorry (2007). See coastal habitats supporting document for further details

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in Clew Bay 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. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in west estimated at 70% (Bailey and Rochford, 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 233.1ha above high water mark (HWM); 47.3ha along river banks/ around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 2426.7ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 10.2km	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/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 141.3ha	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, 2006; Kruuk and Moorhouse, 1991)
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 8	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

1365 Common seal *Phoca vitulina*

To maintain the favourable conservation condition of Harbour seal in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use	See marine supporting document for further details
Breeding behaviour	Breeding sites	The breeding sites should be maintained in a natural condition. See map 9	Attribute and target based on background knowledge of Irish breeding populations, review of data from Lyons (2004) and unpublished National Parks and Wildlife Service records. See marine supporting document for further details
Moulting behaviour	Moult haul-out sites	The moult haul-out sites should be maintained in a natural condition. See map 9	Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004), Cronin et al. (2004) and unpublished National Parks and Wildlife Service records. See marine supporting document for further details
Resting behaviour	Resting haul-out sites	The resting haul-out sites should be maintained in a natural condition. See map 9	Attribute and target based on background knowledge of Irish populations, review of data from Lyons (2004) and unpublished National Parks and Wildlife Service records. See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	See marine supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in Clew Bay 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 sub-sites mapped: Bartraw - 0.02ha and Rosmurrevagh - 1.38ha. See map 7	Current area unknown. Two sub-sites (Bartraw and Rosmurrevagh) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 1.40ha. NB further unsurveyed areas maybe present in the site. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7 for known distribution	Mobile dunes are well developed at Rosmurrevagh, while those at Bartraw have been compromised by the installation of coastal protection works. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	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. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of *Elytrigia* and/or *Leymus* should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species: *Elytrigia juncea* and/or *Leymus arenarius*	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (Hippophae rhamnoides) should be absent or effectively controlled. See coastal habitats supporting document for further details

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

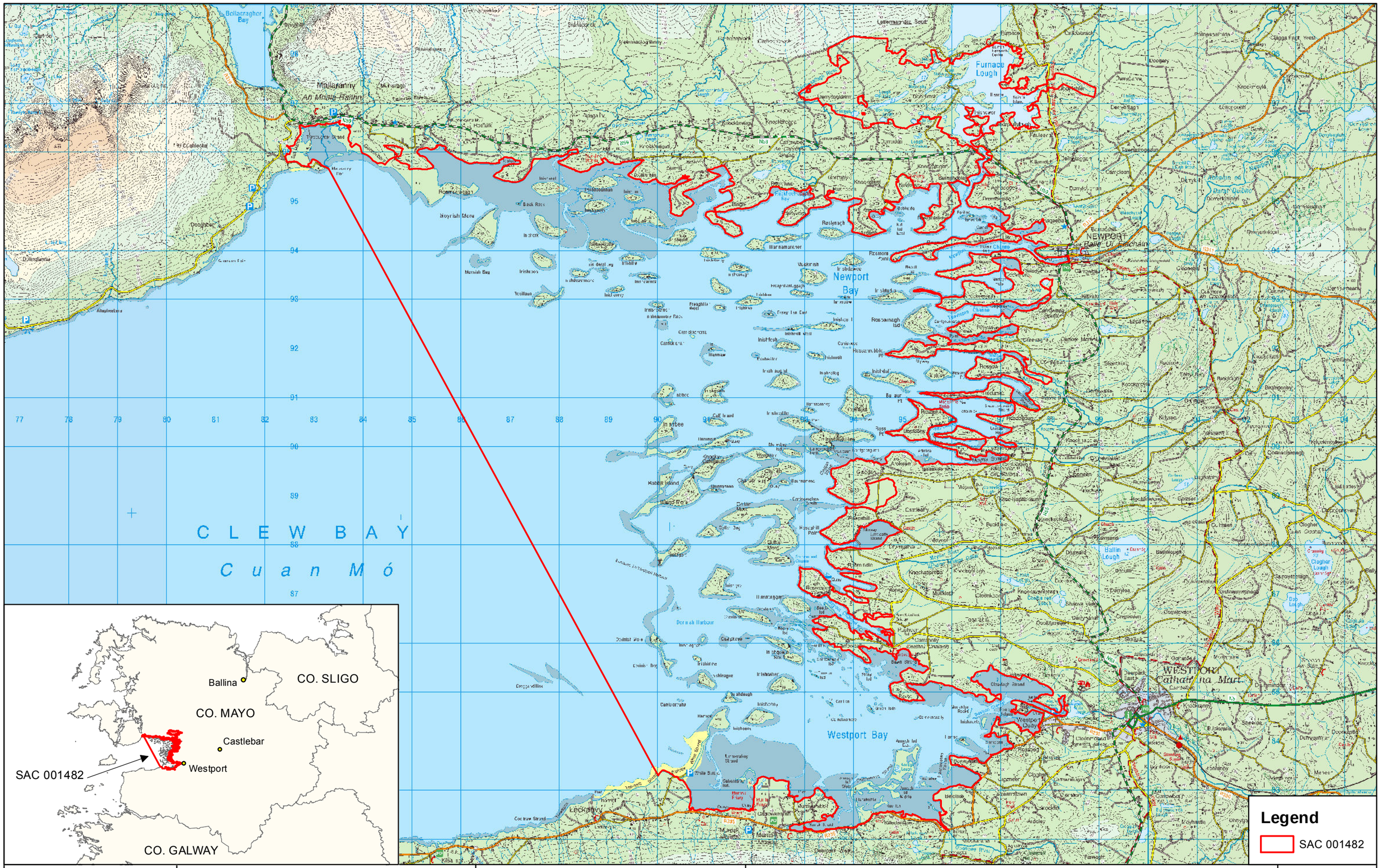
To restore the favourable conservation condition of Shifting dunes along the shoreline with Ammophila arenaria in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Bartraw - 0.18ha and Rosmurrevagh - 0.36ha. See map 7	Current area unknown. Two sub-sites (Bartraw and Rosmurrevagh) were mapped during the Coastal Monitoring Project (Ryle et al., 2009), giving a total estimated area of 0.54ha. NB further unsurveyed areas maybe present in the site. Habitat is very difficult to measure in view of its dynamic nature. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 7 for known distribution	Mobile dunes are well developed at Rosmurrevagh, while those at Bartraw have been compromised by the installation of coastal protection works. See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. *Ammophila* reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of *Ammophila* and/or *Leymus* should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by *Ammophila arenaria* and/or *Leymus arenarius*	Based on data from Gaynor (2008) and Ryle et al. (2009). See coastal habitats supporting document for further details

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

To restore the favourable conservation condition of Shifting dunes along the shoreline with Ammophila arenaria in Clew Bay Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea-buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See coastal habitats supporting document for further details



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MAP 1: CLEW BAY COMPLEX CONSERVATION OBJECTIVES SAC DESIGNATION

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

COUNTY MAYO

0 1 2 3 4 km

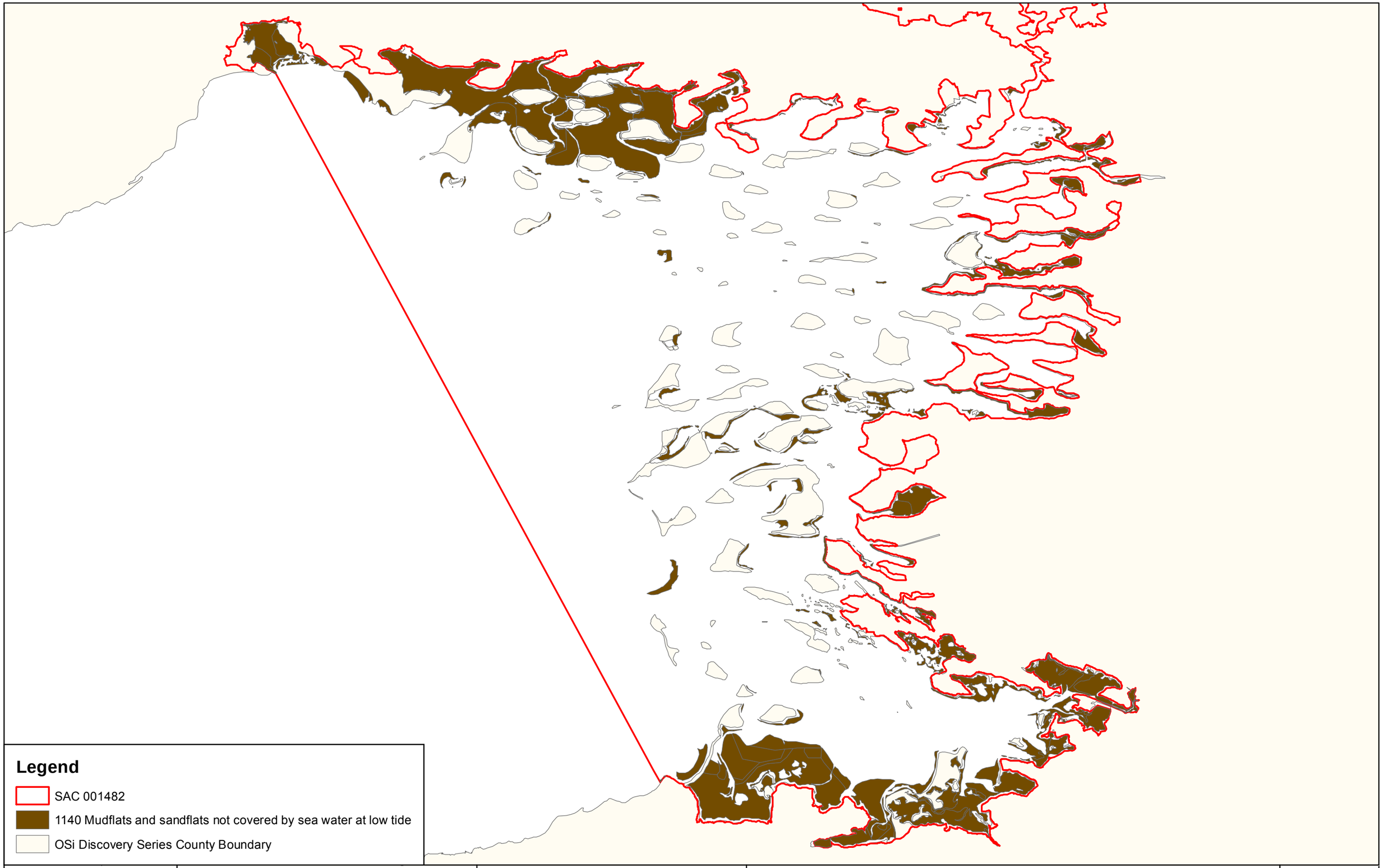
N

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059208).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011



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MAP 2:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

COUNTY MAYO

0 1 2 3 km

N

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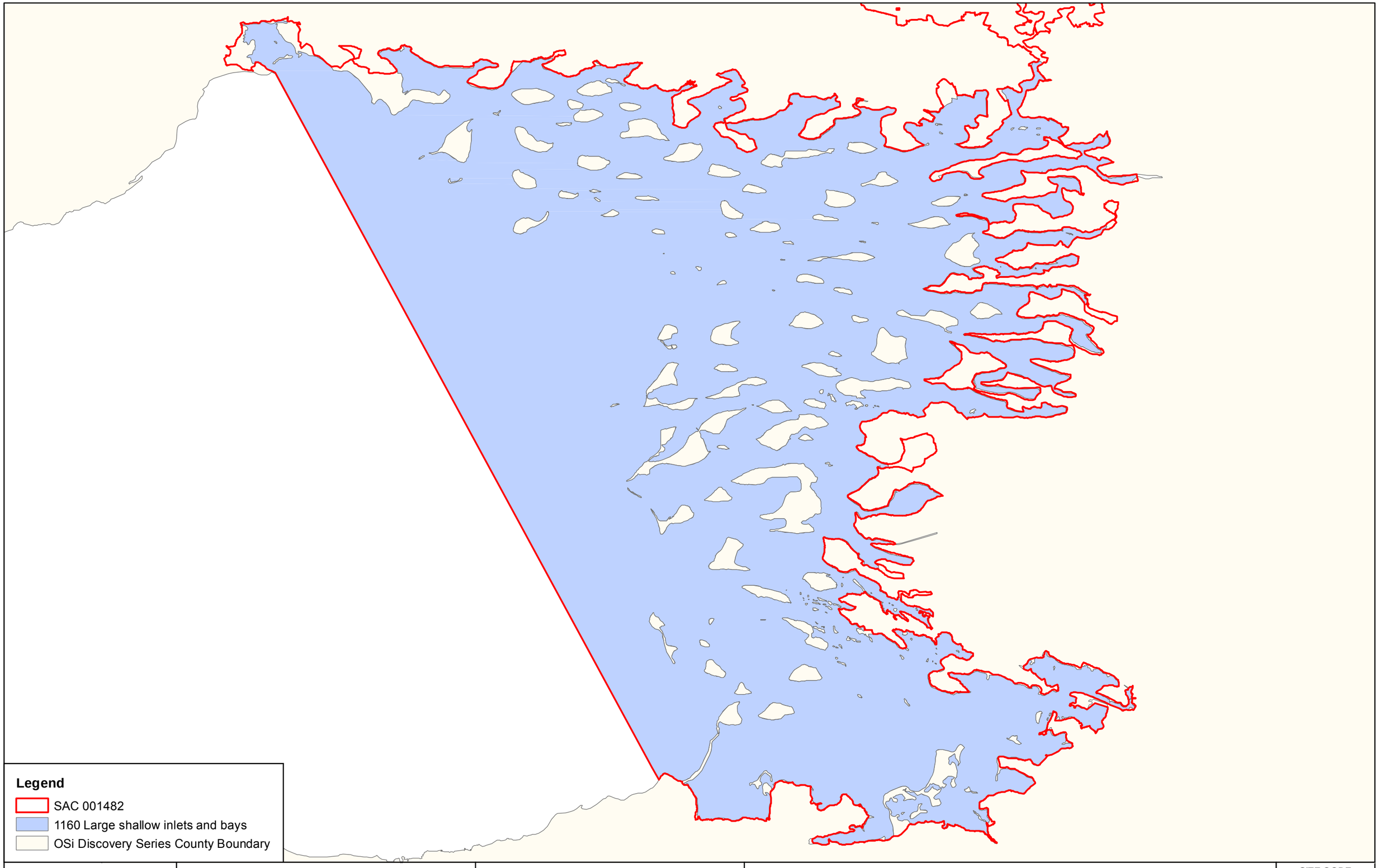
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011



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MAP 3:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
LARGE SHALLOW INLETS AND BAYS

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

COUNTY MAYO

0 1 2 3 km

N

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SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011

Legend

- SAC 001482
- OSi Discovery Series County Boundary

Marine Community Types

- Fine sand dominated by *Nephtys cirrosa* community
- Intertidal sandy mud with *Tubificoides benedii* and *Pygospio elegans* community complex
- Maerl dominated community
- Reef
- Sandy mud with polychaetes and bivalves community complex
- Shingle
- *Zostera* community

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MAP 4:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

COUNTY MAYO

0 1 2 3 km

N

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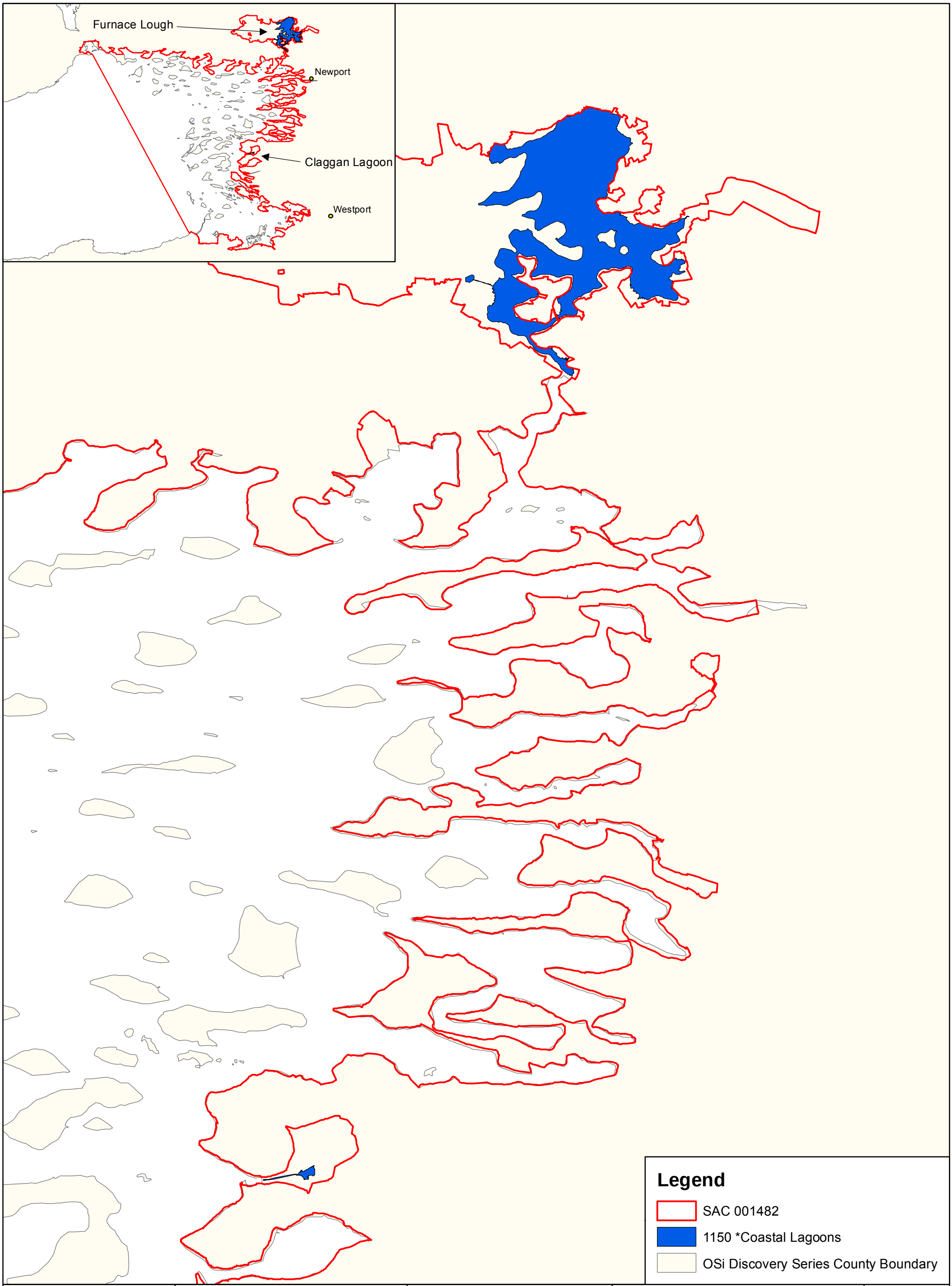
SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011



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MAP 5: CLEW BAY COMPLEX CONSERVATION OBJECTIVES COASTAL LAGOONS

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

COUNTY MAYO

0 0.5 1 km

N

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Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011

SMP0011
SMP0012
SMP0013
SMP0014
SMP0015
SMP0016
SMP0017
SMP0018
SMP0019
SMP0020

Legend

SAC 001482

OSi Discovery Series County Boundary

Saltmarsh Habitats

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (Qualifying Interest)

1330 / 1410 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (Qualifying Interest) / Mediterranean salt meadows (Juncetalia maritimi)

Potential 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) (Qualifying Interest)

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

1310 *Salicornia* and other annuals colonising mud and sand

1410 Mediterranean salt meadows (Juncetalia maritimi)

Potential 1410 Mediterranean salt meadows (Juncetalia maritimi)

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MAP 6:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

COUNTY MAYO

0 1 2 3 km

N

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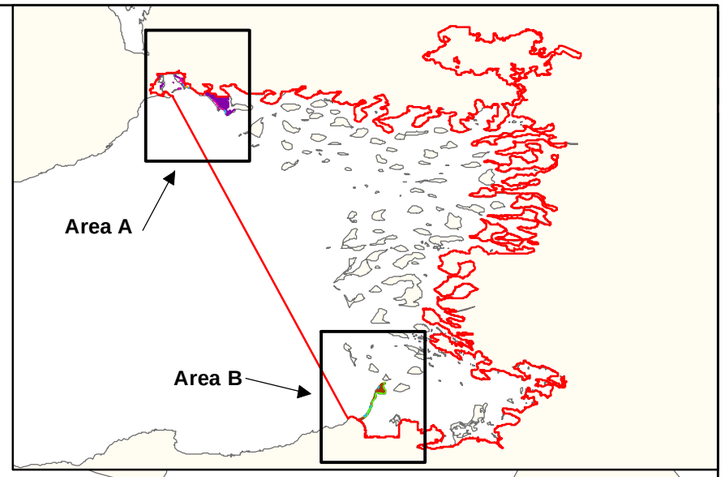
SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011

Area A

Area B



CMP SITE:111

CMP SITE:112

Legend

- SAC 001482
- OSi Discovery Series County Boundary

Coastal Habitats

- 1210 Annual vegetation of drift lines (Qualifying Interest)
- 1220 Perennial vegetation of stony banks (Qualifying Interest)
- 2110 Embryonic shifting dunes (Qualifying Interest)
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') (Qualifying Interest)
- 21AO Machairs (*in Ireland)
- 2130 *Fixed coastal dunes with herbaceous vegetation ('grey dunes')

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MAP 7:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
COASTAL HABITATS

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

COUNTY MAYO

0 0.25 0.5 0.75 1 km

N

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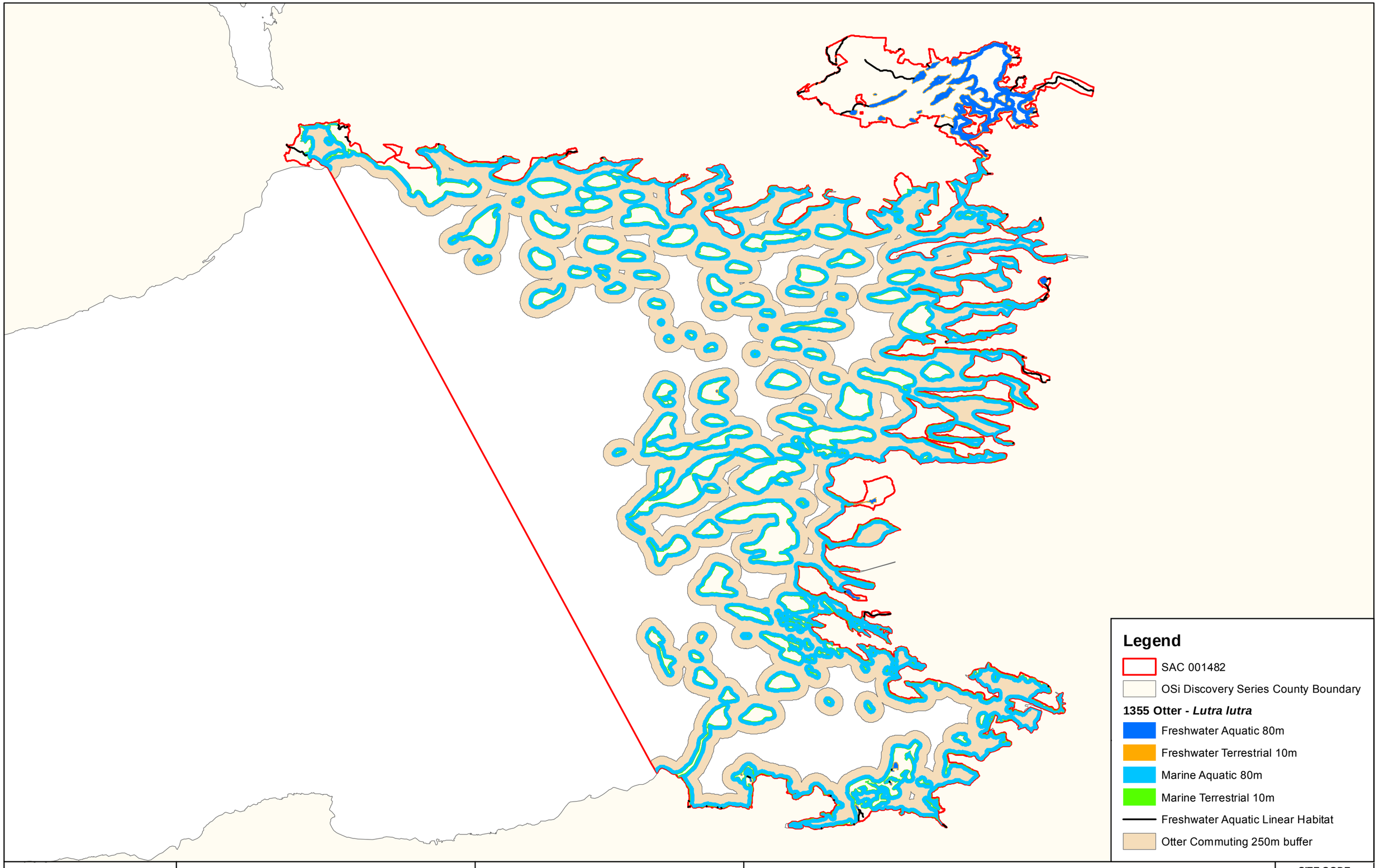
SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011



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MAP 8:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
OTTER

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

COUNTY MAYO

0 1 2 3 4 km

N

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SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011

Legend

- SAC 001482
- 1365 Common (Harbour) Seal - *Phoca vitulina* Breeding Sites
- 1365 Common (Harbour) Seal - *Phoca vitulina* Moulting Sites
- 1365 Common (Harbour) Seal - *Phoca vitulina* Resting Sites
- 1365 Common (Harbour) Seal - *Phoca vitulina* Habitat
- OSi Discovery Series County Boundary

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MAP 9:
CLEW BAY COMPLEX
CONSERVATION OBJECTIVES
COMMON HARBOUR SEAL

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

COUNTY MAYO

0 1 2 3 km

N

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059208)

SITE CODE

SAC 001482
Version 1.05

Map Version 1
Date: June 2011

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Produced by: National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: natureconservation@environ.ie

Citation:
NPWS (2011) Conservation Objectives: Clew Bay Complex SAC 001482. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editors: Rebecca Jeffrey & Naomi Kingston
ISSN 2009-4086

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Doogort Machair/Lough Doo SAC 001497

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

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

National Parks and Wildlife Service,
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Citation:

NPWS (2017) Conservation Objectives: Doogort Machair/Lough Doo SAC 001497. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001497	Doogort Machair/Lough Doo SAC
1395	Petalwort *Petalophyllum ralfsii*
21A0	Machairs (* in Ireland)

Please note that this SAC overlaps with Doogort Machair SPA (004235). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1998
Title :	Biomar survey of Irish machair sites 1996
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	1998
Title :	Biomar Survey of Irish machair sites, 1996. Vol. 2: plant communities
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 4
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2015
Title :	Monitoring methods for *Petalophyllum ralfsii* (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 90
Year :	2017
Title :	Doogort Machair/Lough Doo SAC (site code: 1497) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QI selected; clipped to SAC boundary; Expert opinion used as necessary to resolve any issues arising
Used For :	21A0 (map 3)
Year :	2016
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 4)

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs (* in Ireland) in Doogort Machair/Lough Doo 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: Lough Doo - 88.2ha. See map 3	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Machair habitat was recorded and mapped at the sub-site Lough Doo (CMP site ID: 114) to give a total estimated area of 88.2ha within Doogort Machair/Lough Doo SAC. See the Doogort Machair/Lough Doo SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for known distribution	Based on data from Ryle et al. (2009). The machair can be divided into three distinct areas. The first consists of an area of flat, relatively dry machair, which is located between Lough Nambrack and Barnynagappul Strand. The second area consists of wet machair and is found on slopes reaching down towards both Lough Doo and Lough Nambrack. A third area of machair, located in a wide belt at the back of Gubnahardia Strand stretching from Caraun Point to Ridge Point, is composed of a mosaic of wet and dry areas, with low hummocks throughout. 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). 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). Two small lakes lie at the back of the machair, Lough Doo and Lough Nambrack, with associated freshwater marshes. The flushed slopes adjacent to the lakes are very calcareous and tufa encrustation is evident in places. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). This coastal SAC contains a good diversity of habitats in a small area. The inland machair plain grades into blanket bog and is adjoined by two small lakes with freshwater marsh habitat. See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of machair habitat, subject to natural processes	Based on data from Ryle et al. (2009). The machair area includes an area of bare sand of approximately 6ha. 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). The machair sward is generally close-cropped and overgrazed. It is part of an unenclosed commonage used for grazing sheep and cattle. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2006), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details

Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Negative indicators recorded in this SAC include cock's-foot (*Dactylis glomerata*), common nettle (*Urtica dioica*) and common ragwort (*Senecio jacobaea*). 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). 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). Doogort Machair/Lough Doo SAC is relatively species-rich and bryophytes are abundant. There is frequently a carpet of mosses and liverworts covering the machair surface. Petalwort (*Petalophyllum ralfsii*), a liverwort species listed on Annex II of the EU Habitats Directive, has also been recorded on the machair in this SAC. See the conservation objective for petalwort (1395) and the coastal habitats supporting document for further details

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in Doogort Machair/Lough Doo 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. See map 4 for recorded locations	The known population of *Petalophyllum ralfsii* in Doogort Machair/Lough Doo SAC is at Doogort Machair. It has been recorded from three locations, where it occurs on compact sandy soil on tightly grazed low sandhills and hummocks on the machair. Data from NPWS surveys and Campbell et al. (2015)
Population size	Number of individuals	No decline. The population at Doogort Machair is estimated to be at least 258 thalli	Campbell and Lockhart recorded 43 *Petalophyllum ralfsii* thalli (in October 2010) in an area of 25cm x 50cm at one location. Therefore the population is estimated to be a minimum of 258 thalli in 0.75m². Numbers of thalli can vary from year to year. See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Doogort Machair currently unknown, but is estimated to be at least c.0.00008ha	The extent of suitable habitat at Doogort Machair has not been accurately measured using GPS, but is estimated to be at least of 0.75m² (c.0.00008ha), i.e. a minimum area of 50cm x 50cm at each of the three mapped points. This is an underestimate and suitable habitat within the SAC is likely to be more widespread. See Campbell et al. (2015) for further details
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	*Petalophyllum ralfsii* grows on damp sandy substrate. Based on Campbell (2013) and Campbell et al. (2015)
Vegetation: open structure	Height and percentage cover of vegetation	Maintain open, low vegetation, with a high percentage cover of bryophytes (small acrocarps and liverwort turf) and bare ground	At Doogort Machair, *Petalophyllum ralfsii* grows in compacted, sandy ground, maintained by heavy sheep grazing and trampling (by sheep). See Campbell et al. (2015) for further details

Ridge Point
Altderg
Gubnahardia Strand
Caraun Point
Porteen
Carricklea
Cillin
Promontory Fort
Promontory Fort
Quay and Slipway
Pollawaddy
Barnynagappul Strand
Sand Hills
Lough Doo
Lough Nambrack
Achill Cycle Hub Routes
Lough Gall
Valley
Sch
Dooniver or Sruhill Lough
Ship Point
Tonatanvally
Tóin an tSeanbhaile
agowa
eggancarragh
Cua
11
10
09
08
SAC 001497
Ballycroy
CO. MAYO
Bunacurry
Achill Sound

Legend

Doogort Machair/Lough Doo SAC 001497

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

MAP 1:
DOOGORT MACHAIR / LOUGH DOO SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001497; version 3.01.
CO. MAYO

0 0.15 0.3 0.45 0.6 0.75 km

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N

Map Version 1
Date: Oct 2016

Ridge Point
Altderg
Gubnahardia Strand
Caraun Point
Portcun
Carricklea
Cillín
Promontory Fort
Promontory Fort
Barnynagappul Strand
Dooagh
Dumha Acha
Doogort
Dumha Goirt
Achill Cycle Hub Routes
Lough Gall
Valley
Sch
Dooniver or Sruhill Lough
11
10
09

Legend

- Doogort Machair/Lough Doo SAC 001497
- Doogort Machair SPA 004235

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MAP 2:
DOOGORT MACHAIR / LOUGH DOO SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING AND OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 001497; version 3.01.
SPA 004235; version 3.01.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

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

N

Map Version 1
Date: Aug 2016

Legend

Doogort Machair/Lough Doo SAC 001497

Coastal Monitoring Project Survey Area

Annex I Qualifying Interest

21AO Machair

Annex I Non qualifying Interest

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

OSi Discovery Series County Boundary

CMP Site Code: 114

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MAP 3:
DOOGORT MACHAIR / LOUGH DOO SAC
CONSERVATION OBJECTIVES
MACHAIR

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

SITE CODE:
SAC 001497; version 3.01.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

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

N

Map Version 1
Date: Oct 2016

Legend

- Doogort Machair/Lough Doo SAC 001497
- 1395 Petalwort *Petalophyllum ralfsii*
- OSi Discovery Series County Boundary

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MAP 4:
DOOGORT MACHAIR / LOUGH DOO SAC
CONSERVATION OBJECTIVES
PETALWORT

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

SITE CODE:
SAC 001497; version 3.01.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Oct 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Erris Head SAC 001501

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

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

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Citation:

NPWS (2016) Conservation Objectives: Erris Head SAC 001501. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001501	Erris Head SAC
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts
4060	Alpine and Boreal heaths

Please note that this SAC overlaps with Mullet Peninsula SPA (004227) and Termoncarragh Lake and Annagh Machair SPA (004093) and adjoins Broadhaven Bay SAC (000472) and West Connaght Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
Author :	Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.
Series :	Irish Wildlife Manual No. 53
Year :	2012
Title :	Ireland Red List no. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Erris Head SAC (site code: 1501) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1986
Title :	An outline of the flora of Mayo
Author :	Synnott, D.
Series :	Glasra, 9: 13-117
Year :	1988
Title :	The Irish red data book 1. Vascular plants
Author :	Curtis, T.G.F.; McGough, H.N.
Series :	Wildlife Service, Dublin
Year :	2005
Title :	National inventory of sea cliffs and coastal heaths
Author :	Browne, A.
Series :	Unpublished Report to NPWS

Spatial data sources

Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
GIS Operations :	Clipped to SAC boundary
Used For :	1230 (map 3)

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

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

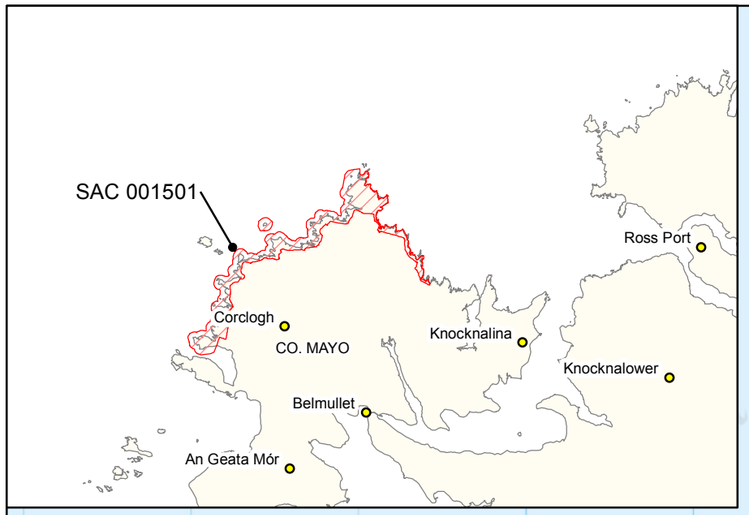
Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable, subject to natural processes, including erosion. For the sub-site mapped (Glenlara), total length of cliff sections: 24.12km. See map 3	Based on data from the Irish Sea Cliff Survey (ISCS) (Barron et al., 2011). Cliffs are linear features and are therefore measured in kilometres. The sub-site Glenlara (site ID: 08007) was identified using a combination of aerial photos and the DCENR helicopter viewer. The length of cliff was measured (in sections) to give a total estimated area of 24.12km within the SAC. The length of cliff is likely to be underestimated. See the Erris Head SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	Sea cliffs are known to occur along the coastline from Illaunbaun to Termoncarragh. Hard cliffs have been noted in this SAC and it is thought that all of the cliffs are of the hard type (Browne, 2005; Barron et al., 2011). See the coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes, including groundwater quality, due to artificial structures	Based on data from Barron et al. (2011). Maintaining natural geomorphological processes, including natural erosion, is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes, and in some cases tufa formations, that can be associated with sea cliffs. Hydrological features such as flushes were noted at Erris Head SAC. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	Based on data from Barron et al. (2011). Alpine and Boreal heath and coastal grassland occur adjacent to sea cliff vegetation at Erris Head SAC. See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Barron et al. (2011). Land use in the SAC consists mainly of sheep grazing. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011)	The presence of species such as roseroot (*Rhodiola rosea*) and rock sea-spurrey (*Spergularia rupicola*) suggest that there is typical cliff vegetation for such an exposed site. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details

4060 Alpine and Boreal heaths

To maintain the favourable conservation condition of Alpine and Boreal heaths in Erris Head 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	Alpine and Boreal heath has not been mapped in detail for Erris Head SAC and thus the total area of qualifying habitat is unknown. It occurs inland from the tops of the sea cliffs and grades into coastal grassland in places (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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	The diversity of Alpine and Boreal heath communities within this SAC is unknown. Information on 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). Alpine and Boreal heath is not necessarily rich in lichen and bryophyte species, but a minimum amount should still be present
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. Bearberry (*Arctostaphylos uva-ursi*), crowberry (*Empetrum nigrum*) and juniper (*Juniperus communis*) are listed as being present in the Alpine and Boreal heath in this SAC (NPWS internal files; Synnott, 1986)
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). A lower cover of dwarf shrubs could indicate that the habitat is transitioning to another vegetation type such as grassland
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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation structure: signs of grazing	Percentage of leaves browsed 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). The specific graminoids are stiff sedge (*Carex bigelowii*), wavy hair-grass (*Deschampsia flexuosa*), sheep's-fescue (*Festuca ovina*) and viviparous sheep's-fescue (*Festuca vivipara*). High levels of grazing of these species would be undesirable as grazing is not required to maintain this habitat
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 (*Empetrum nigrum*) 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). Alpine and Boreal heath does not require burning for the maintenance of the habitat

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). Disturbance can include hoof marks, wallows, human foot prints and vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for heaths and peatlands
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 (Curtis and McGough, 1988; Lockhart et al., 2012)



Ceann Iorrais
Erris Head

BROAD HAVEN
Cuan an Inbhir

Eagle Island

Pigeon Rock

Oileán Dhabhaic
Illandavuck

Gubastuckaun

Danish Cellar

Leamataggart

Pollnashantinny

Carrickhest

Carricknaweeloge

Spinkadoon

Glendorragh Point

Gleann Lára
Glenlara

Cone Is.

Cone Is. Sth.

Ooghran Pt.

Promontory Fort

Cross Rock

Illanleamnahelty

Achadh Dúin
Aghadoon

An Gort Breac
Gortbrack

Eochain na gCailleac
Aughernagalliagh

Fohergarve

An tOileán Bán
Illanbaun

Illanfreach

Duveel Point

Doonamo Point

Scotch Port Rock

An Ghleadraigh
Gladree

An Cluainín
Clooneen

Gort an Eadain

Achadh Ghlaisín
Aghaglasheen

Slipway

Poll an Chapaill
Pollacappul

Blind Harbour

Cnoc Seanbhotha
Knockshanbo

Tearmann Caithreach
Termoncarragh

Port Point

An Ghléib

Fortified House

Church and Cross

An Chorrchloch
Corclogh

An Tóin Mhór
Tonmore

Barr Thrá
Bartrauve

Annagh Head

Termoncarragh Lake

Coimin an Mhása

Tóin an Mhása
Tonamace

Coimin Ard Eoghain
Carrick

Talach
Tallagh

Pre-bog Wall

Cairn

Megalithic Tomb

Annagh Island

An tEanach
Annagh

An Más

Ard Eoghain
Ardowen

Cross-Slab and Graveyard

Imleach Cais

Pier

Legend

Erris Head SAC 001501

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

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

MAP 1:
ERRIS HEAD SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001501; version 3.
CO. MAYO

0 0.35 0.7 1.05 1.4 1.75 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: Oct 2016

Legend

- Termoncarragh Lake and Annagh Machair SPA 004093
- Mullet Peninsula SPA 004227
- Erris Head SAC 001501
- West Connacht Coast SAC 002998
- Broadhaven Bay SAC 000472
- OSi Discovery Series County Boundary

SAC 002998
SAC 001501
SAC 001501
SAC 000472
SPA 004227
SPA 004227
SPA 004227
SPA 004093
SPA 004227
SAC 000472
SAC 002998

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
ERRIS HEAD SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING AND
OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 001501; version 3. SAC 000472; version 3.01
SAC 002998; version 3.03. SPA 004093; version 3
SPA 004227; version 3. CO. MAYO

0 0.4 0.8 1.2 1.6 2 km

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

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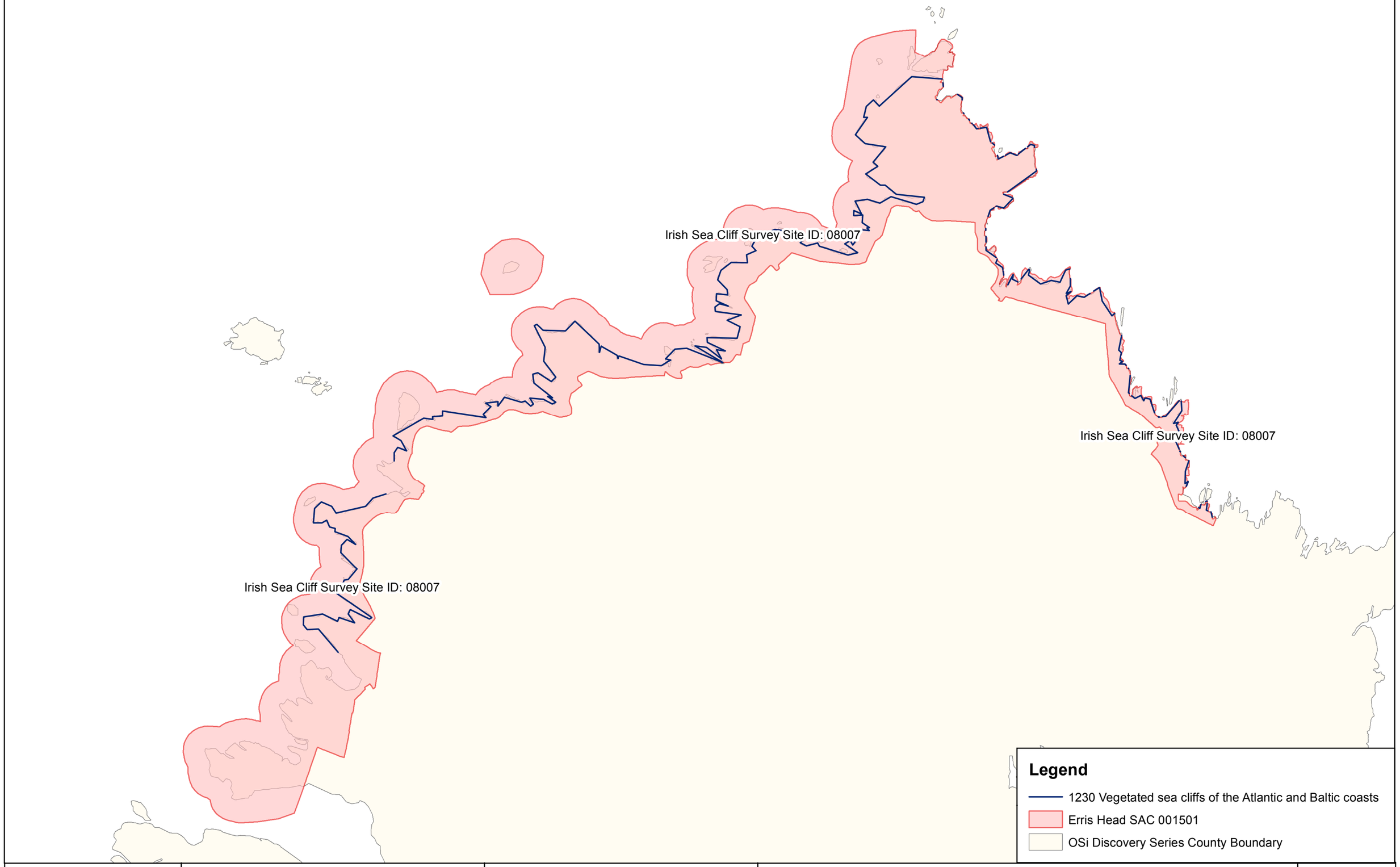
Map Version 1
Date: Oct 2016



An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 3:
ERRIS HEAD SAC
CONSERVATION OBJECTIVES
VEGETATED SEA CLIFFS

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

SITE CODE:
SAC 001501; version 3.
CO. MAYO

0 0.3 0.6 0.9 1.2 1.5 km

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Map Version 1
Date: Oct 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Keel Machair/Menaun Cliffs SAC 001513

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

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Culture, Heritage and the Gaeltacht

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Citation:

NPWS (2018) Conservation Objectives: Keel Machair/Menaun Cliffs SAC 001513. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001513	Keel Machair/Menaun Cliffs SAC
1220	Perennial vegetation of stony banks
1395	Petalwort *Petalophyllum ralfsii*
21A0	Machairs (* in Ireland)
4060	Alpine and Boreal heaths

Please note that this SAC is adjacent to Achill Head SAC (002268). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.

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

NPWS Documents

Year :	1998
Title :	Biomar survey of Irish machair sites 1996
Author :	Crawford, I.; Bleasdale, A.; Conaghan, J.
Series :	Irish Wildlife Manual No. 3
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring methods for *Petalophyllum ralfsii* (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland
Author :	Campbell, C.; Hodgetts, N.; Lockhart, N.
Series :	Irish Wildlife Manual No. 90
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites in Ireland
Author :	Martin, J.R.; Daly, O.H.; Devaney F.M.
Series :	Irish Wildlife Manual No. 98
Year :	2018
Title :	Keel Machair/Menaun Cliffs SAC (site code: 1513) Conservation objectives supporting document: coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 106B(3): 311-321
Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Dublin
Year :	2013
Title :	Conservation of selected legally protected and Red Listed bryophytes in Ireland
Author :	Campbell, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Spatial data sources

Year :	2017
Title :	Vegetated Shingle Monitoring Project
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220, 21A0 (map 3)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1395 (map 4)

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Keel Machair/Menaun Cliffs 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 Vegetated Shingle Monitoring Project (VSM) (Martin et al., 2017). Perennial vegetation of stony banks was not recorded in the sub-site Trawmore, Keel (VSM site code 006) during the VSM and thus the total area of the qualifying habitat within Keel Machair/Menaun Cliffs SAC is unknown. Martin et al. (2017) did note extensive areas of shingle beach in the sub-site during the VSM; however, no areas of the shingle were vegetated. NB further unsurveyed areas may be present within the SAC. See the Keel Machair/Menaun Cliffs SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline, subject to natural processes, including erosion and succession	The full distribution of the habitat in the SAC is unknown at present. It is possible that the habitat on the shingle beach in the Trawmore, Keel sub-site has been temporarily lost due to natural erosion and will re-establish in the future (Martin et al., 2017). See the coastal habitats supporting document for further details. NB further unsurveyed areas may be present within the SAC
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain, or where necessary restore, the natural circulation of sediment and organic matter, without any physical obstructions	Rock armour is present within the Trawmore, Keel sub-site, but its impact on the formation of the habitat is considered to be minimal (Martin et al., 2017). See the coastal habitats supporting document for further details
Physical structure: disturbance	Percentage	No more than 20% of the habitat affected by disturbance	Based on data from Martin et al. (2017). Disturbance can include damage from heavy trampling, vehicle damage and removal of substrate. 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 Martin et al. (2017). See the coastal habitats supporting document for further details
Vegetation composition: communities and typical species	Occurrence	Maintain the typical species within the range of vegetated shingle communities	Based on data from Martin et al. (2017) where information on the vegetated shingle communities and associated typical species lists are presented. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species cover in any individual monitoring stop should not be more than 25%; no negative indicator species should be present in more than 60% of monitoring stops	Based on data from Martin et al. (2017) where the list of negative indicator species for the habitat is also presented. Negative indicators include species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details

Vegetation composition: non-native species	Percentage	Non-native species cover in any individual monitoring stop should not be more than 1%; non-native species should not be present in more than 20% of monitoring stops; cover of non-native species across the whole site should not be more than 1%	Based on data from Martin et al. (2017). See the coastal habitats supporting document for further details

21A0 Machairs (* in Ireland)

To restore the favourable conservation condition of Machairs* in Keel Machair/Menaun Cliffs 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: Trawmore, Keel - 79.52ha. See map 3	Based on data from the Vegetated Shingle Monitoring Project (VSM) (Martin et al., 2017). Machair habitat was surveyed and mapped at the sub-site Trawmore, Keel (VSM site code 006) to give a total estimated area of 79.52ha within Keel Machair/Menaun Cliffs SAC. See the Keel Machair/Menaun Cliffs SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 3 for recorded distribution	Based on data from Martin et al. (2017). The habitat extends along the coast from Keel village in the west to just short of the foothills of Menaun cliffs in the south-east, and landwards to the shores of Keel Lough. 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	Dunes are naturally dynamic systems that require continuous supply and circulation of sand. 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 Crawford et al. (1998), Gaynor (2006, 2008), Ryle et al. (2009) and Martin et al. (2017). 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 Ryle et al. (2009), Delaney et al. (2013) and Martin et al. (2017). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of machair habitat, subject to natural processes	Based on Delaney et al. (2013) and Martin et al. (2017). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward. The mean sward height should be at least 8cm in July/August	Based on Delaney et al. (2013) and Martin et al. (2017). A mean vegetation height of 2.2cm was recorded by the VSM in the habitat in the Trawmore, Keel sub-site indicating that grazing levels are too high. See the coastal habitats supporting document for further details
Vegetation composition: flowering/fruiting	Percentage	Positive indicator species should be flowering or fruiting in more than 40% of monitoring stops	Based on Delaney et al. (2013) and Martin et al. (2017). The list of positive indicator species is presented in Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Occurrence	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: negative indicator species	Percentage	Negative indicator species cover in any individual monitoring stop should not be more than 25%; no negative indicator species should be present in more than 60% of monitoring stops; cover of negative indicator species across the whole site should not be more than 5%	Based on Delaney et al. (2013) and Martin et al. (2017). Negative indicators include species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details

Vegetation composition: non-native species	Percentage	Non-native species should not be present in more than 20% of monitoring stops	Based on Delaney et al. (2013) and Martin et al. (2017). The non-native species New Zealand willowherb (*Epilobium brunnescens*) was recorded by the VSM within the machair habitat in the Trawmore, Keel sub-site. See coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on Delaney et al. (2013) and Martin et al. (2017). 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, with a minimum cover of 1% within each monitoring stop	Based on Ryle et al. (2009), Delaney et al. (2013) and Martin et al. (2017). The Annex II and Flora (Protection) Order, 2015 listed liverwort petalwort (*Petalophyllum ralfsii*) has been recorded from the machair in the SAC (see Campbell et al., 2015). See the coastal habitats supporting document for further details. See also the conservation objective for petalwort (1395) in this volume

4060 Alpine and Boreal heaths

To maintain the favourable conservation condition of Alpine and Boreal heaths in Keel Machair/Menaun Cliffs SAC, which is defined by the following list of attributes and targets:

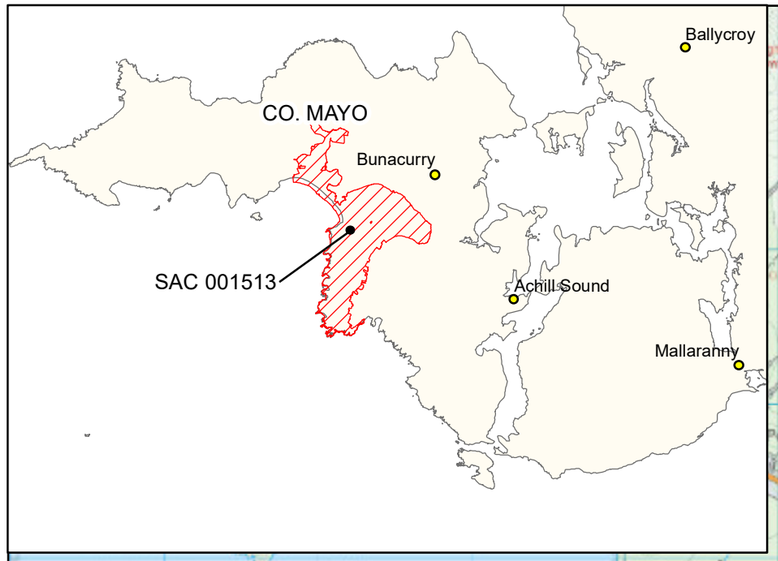
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alpine and Boreal heath has not been mapped in detail for Keel Machair/Menaun Cliffs SAC and thus the total area of qualifying habitat is unknown. It is documented that the habitat occurs around the summit of Menaun in a mosaic with blanket bog with numerous rock outcrops. At lower altitudes, the habitat merges with extensive areas of dry heath dominated by ling (*Calluna vulgaris*) (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes on Habitat area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	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	The entire diversity of Alpine and Boreal heath communities within this SAC is unknown. Information on 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). Alpine and Boreal heath is not necessarily rich in lichen and bryophyte species, but a minimum amount should still be present
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. Bearberry (*Arctostaphylos uva-ursi*), crowberry (*Empetrum nigrum*), juniper (*Juniperus communis*. subsp. *nana*), bilberry (*Vaccinium myrtillus*) and the Near Threatened dwarf willow (*Salix herbacea*) (Wyse Jackson et al., 2016) have been reported from the Alpine and Boreal heath in this SAC (NPWS internal files)
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). A lower cover of dwarf shrubs could indicate that the habitat is transitioning to another vegetation type such as grassland
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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
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). The specific graminoids are stiff sedge (*Carex bigelowii*), wavy hair-grass (*Deschampsia flexuosa*), sheep's-fescue (*Festuca ovina*) and viviparous sheep's-fescue (*Festuca vivipara*). High levels of grazing of these species would be undesirable as grazing is not required to maintain this habitat
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 (*Empetrum nigrum*) 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). Alpine and Boreal heath does not require burning for the maintenance of the habitat
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). Disturbance can include hoof marks, wallows, human footprints and vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for heaths and peatlands
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). The Near Threatened dwarf willow (*Salix herbacea*) (Wyse Jackson et al., 2016) has been reported from the habitat in the SAC (NPWS internal files). Part of the heath vegetation on Menaun contains Northern Atlantic hepatic mat communities (NPWS internal files)

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in Keel Machair/Menaun Cliffs 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 4 for recorded locations	The known population of petalwort (*Petalophyllum ralfsii*) in Keel Machair/Menaun Cliffs SAC occurs at Keel Machair on tightly sheep-grazed turf on the edges of channelised and semi-natural water tracks and on small, partly bare patches of damp unshaded sand on the western and more calcareous side of the machair plain. Data from NPWS surveys (NPWS internal files). See Campbell et al. (2015) for further details
Area of suitable habitat	Hectares	No decline, subject to natural processes	The extent of suitable habitat at Keel Machair has not yet been accurately measured using GPS, but is estimated to be c.10,300m² (1.03ha) based on NPWS surveys (NPWS internal files). See Campbell et al. (2015) for further details
Hydrological conditions: soil moisture	Occurrence of damp soil conditions	Maintain hydrological conditions so that the substrate is kept moist and damp throughout the year, but is not subject to prolonged inundation by flooding in winter	Petalwort (*Petalophyllum ralfsii*) 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 Keel Machair, petalwort (*Petalophyllum ralfsii*) grows in compacted, sandy ground. There is some threat from potential over-use by vehicles, dumping and mowing at this location (NPWS internal files). 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	Very short vegetation, heavily grazed by sheep, has been reported in petalwort (*Petalophyllum ralfsii*) habitat at Keel Machair (NPWS internal files). See Campbell et al. (2015) for further details
Vegetation composition: shrub cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage shrub cover should be less than 25%	See Campbell et al. (2015) for further details
Vegetation composition: grass cover	Percentage cover in a representative number of 1m x 1m monitoring plots	Mean percentage grass species cover should be less than 60%	Part of this site is managed as a 9-hole pitch and putt course; low intensity management, with only the greens and tees re-seeded, has enabled petalwort (*Petalophyllum ralfsii*) to survive. Any intensification or expansion should be discouraged (NPWS internal files). See Campbell et al. (2015) for further details



Legend

Keel Machair/Menaun Cliffs SAC 001513

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Department of Culture, Heritage and the Gaeltacht

MAP 1:
KEEL MACHAIR / MENAUN CLIFFS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001513; version 3.02
CO. MAYO

0 0.5 1 1.5 2 km

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N

Map Version 1
Date: Aug 2017

SAC 002268

SAC 001513

Legend

- Keel Machair/Menaun Cliffs SAC 001513
- Achill Head SAC 002268

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MAP 2:
KEEL MACHAIR/MENAUN CLIFFS SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING AND
OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 001513; version 3.02, SAC 002268; version 3.02
CO. MAYO

0 1 2 3 4 km

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Map Version 1
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Legend

Keel Machair/Menaun Cliffs SAC 001513

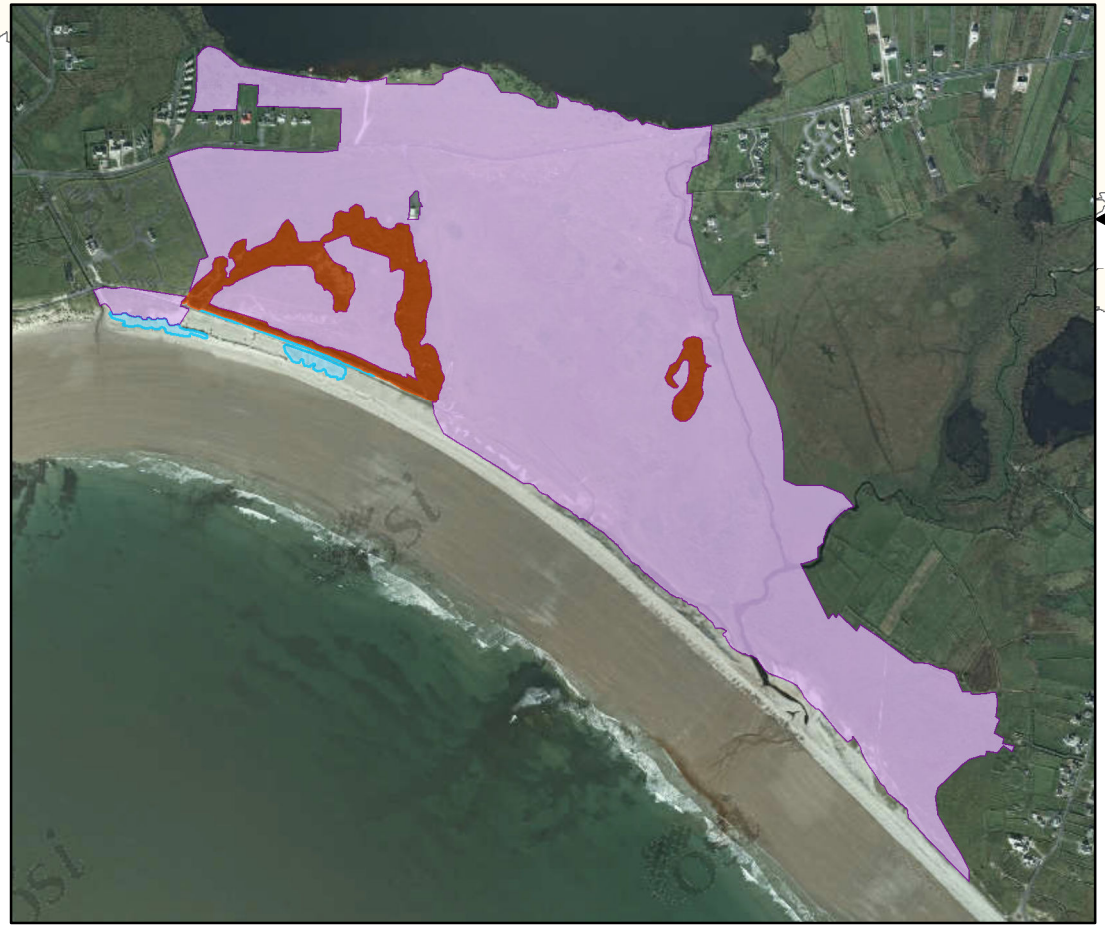
Annex I Qualifying Interest

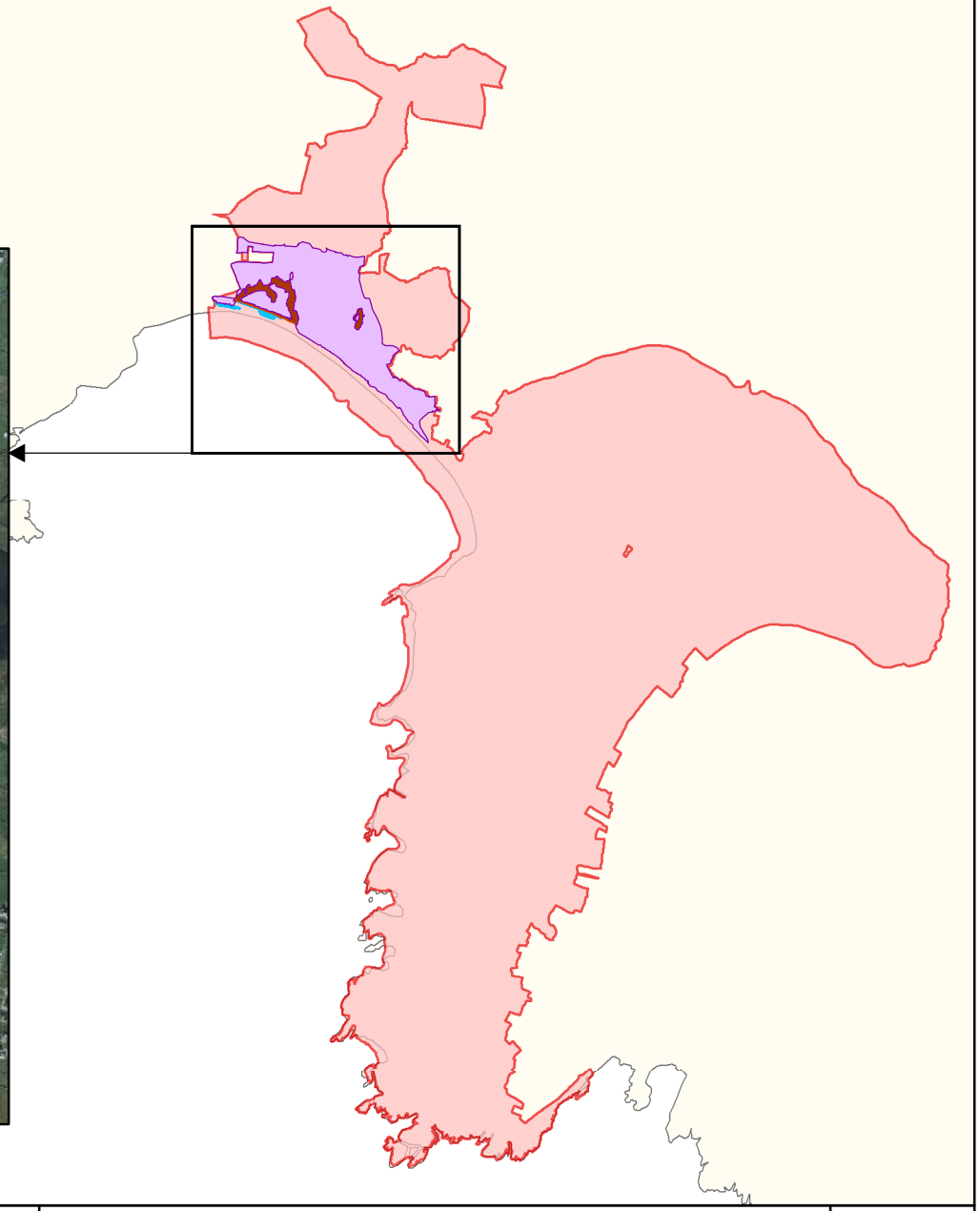
21A0* Machair

Annex I Non Qualifying Interest

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

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





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MAP 3:
KEEL MACHAIR/MENAUN CLIFFS SAC
CONSERVATION OBJECTIVES
COASTAL HABITATS

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

SITE CODE:
SAC 001513; version 3.02,
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0 0.5 1 1.5 2 km

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- Keel Machair/Menaun Cliffs SAC 001513
- 1395 Petalwort *Petalophyllum ralfsii*

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MAP 4:
KEEL MACHAIR/MENAUN CLIFFS SAC CONSERVATION OBJECTIVES PETALWORT

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

SITE CODE:
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0 0.5 1 1.5 2 km

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Map Version 1
Date: Aug 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Cahasy, Lough Baun and Roonah Lough SAC 001529

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

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Regional, Rural and Gaeltacht Affairs

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Citation:

NPWS (2017) Conservation Objectives: Lough Cahasy, Lough Baun and Roonah Lough SAC 001529. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001529	Lough Cahasy, Lough Baun and Roonah Lough SAC
1150	Coastal lagoons*
1220	Perennial vegetation of stony banks
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

Please note that this SAC adjoins 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

NPWS Documents

Year :	1999
Title :	National Shingle Beach Survey of Ireland 1999
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
Year :	2007
Title :	Inventory of Irish coastal lagoons (version 2)
Author :	Oliver, G.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
Series :	Unpublished report to NPWS
Year :	2013
Title :	Monitoring survey of Annex I sand dune habitats in Ireland
Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2017
Title :	Lough Cahasy, Lough Baun and Roonah Lough SAC (site code: 1529) Conservation objectives supporting document- coastal lagoons V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2017
Title :	Lough Cahasy, Lough Baun and Roonah Lough SAC (site code: 1529) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin
Year :	2013
Title :	Monitoring and assessment of Irish lagoons for the purposes of the EU Water Framework Directive, 2009-2011. Parts 1 and 2
Author :	Roden, C.M; Oliver, G.A.
Series :	Unpublished report to the Environmental Protection Agency

Spatial data sources

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 3)
Year :	Revision 2012
Title :	National Shingle Beach Survey
GIS Operations :	Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220 (map 4)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1220, 2120 (map 4)

1150 Coastal lagoons

To restore the favourable conservation condition of Coastal lagoons* in Lough Cahasy, Lough Baun and Roonah Lough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area: 40.2ha. See map 3	Area calculated from spatial data derived from Oliver (2007) for Roonah Lough (site code IL072). See the Lough Cahasy, Lough Baun and Roonah Lough 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 Roonah Lough (site code IL072) in Oliver (2007). See the lagoon supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	Roonah Lough is recorded as an oligohaline 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 Roonah Lough lagoon 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 lagoons and sea, including where necessary, appropriate management	Roonah Lough is described as a sedimentary lagoon with a cobble barrier. See the lagoon supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2013). See 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	Where 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^2	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 lagoon 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 unnatural encroachment by reedbeds. See the lagoon supporting document for further details

1220 Perennial vegetation of stony banks

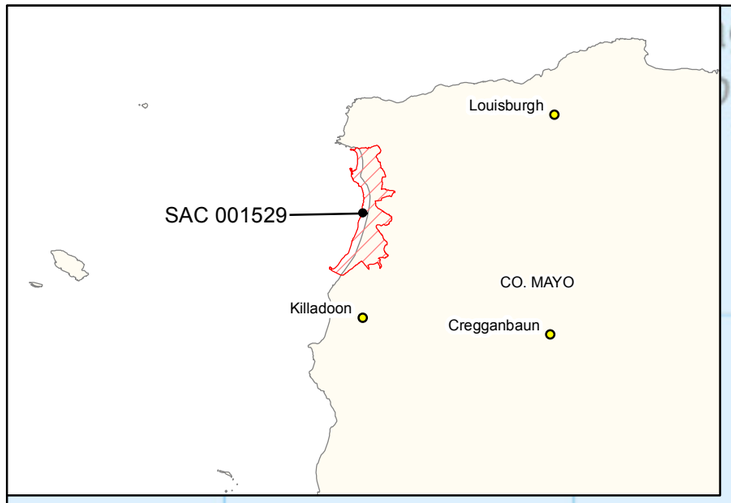
To maintain the favourable conservation condition of Perennial vegetation of stony banks in Lough Cahasy, Lough Baun and Roonah Lough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	During the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999) perennial vegetation of stony banks was recorded as being present, but its extent was not mapped, from two sub-sites, White Strand (NSBS site ID: 0054) and Sruhir Strand (NSBS Site ID: 0055). Thus, the current area of the qualifying habitat within Lough Cahasy, Lough Baun and Roonah Lough SAC is unknown. During the Coastal Monitoring Project (CMP) (Ryle et al., 2009), an area of vegetated shingle was noted within the sub-site Lough Cahasy (CMP site ID: 109). NB further unsurveyed areas may be present within the SAC. See the Lough Cahasy, Lough Baun and Roonah Lough 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 recorded locations	The full distribution of perennial vegetation of stony banks within the SAC is unknown at present, although the habitat has been recorded at White Strand and Sruhir Strand by Moore and Wilson (1999) and within the Lough Cahasy sub-site by Ryle et al. (2009). See map 4 for the NSBS point locations. NB further unsurveyed areas may be present within the SAC. 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 Moore and Wilson (1999) and Ryle et al. (2009). The shingle beaches at White Strand and Sruhir Strand consist of an extensive and high boulder/shingle ridge along much of the shoreline, most of which is largely unvegetated. 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 Moore and Wilson (1999). 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 typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore and Wilson (1999) and Ryle et al. (2009). The shingle beaches at White Strand and Sruhir Strand have sparse vegetation due to the exposed location and dynamic nature. The occurrence of typical species was infrequent, only occurring as scattered individuals. 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 Moore and Wilson (1999). Negative indicators include non-native species indicative of changes in nutrient status and species not considered characteristic of the habitat. 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 Lough Cahasy, Lough Baun and Roonah Lough 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: Lough Cahasy - 0.9ha. See map 4	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Shifting dunes along the shoreline with *Ammophila arenaria* was mapped at the sub-site Lough Cahasy (CMP site ID: 109) to give a total estimated area of 0.9ha within Lough Cahasy, Lough Baun and Roonah Lough SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Lough Cahasy, Lough Baun and Roonah Lough 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 known distribution	Based on data from Ryle et al. (2009). The mobile dunes are not extensive and are mainly confined to a narrow band along Gortnagarryan Strand. 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). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. The CMP considers that the mobile dunes in the SAC will persist owing to the continuous input of fresh sand from longshore drift. 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 Gaynor (2008) and Ryle et al. (2009). See the coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009). 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 (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009). 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 (*Hippophae rhamnoides*) should be absent or effectively controlled. The occurrence of the negative indicator species common ragwort (*Senecio jacobea*) in the mobiles dunes in the SAC was negligible. See the coastal habitats supporting document for further details



Legend

Lough Cahasy, Lough Baun and Roonah Lough SAC 001529

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

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

MAP 1:
LOUGH CAHASY, LOUGH BAUN AND ROONAH LOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001529; version 3.
CO. MAYO

0 0.2 0.4 0.6 0.8 1 km

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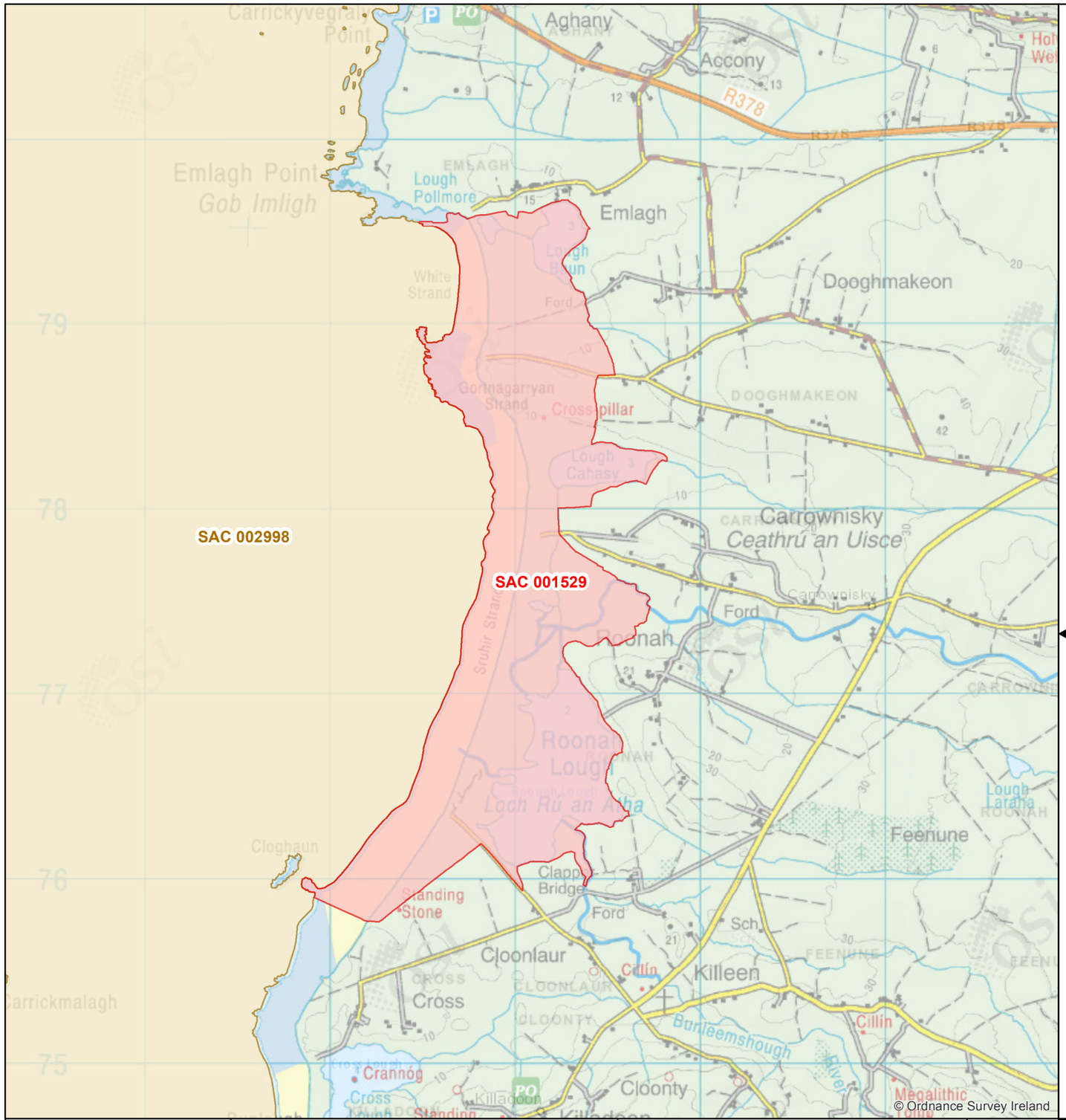
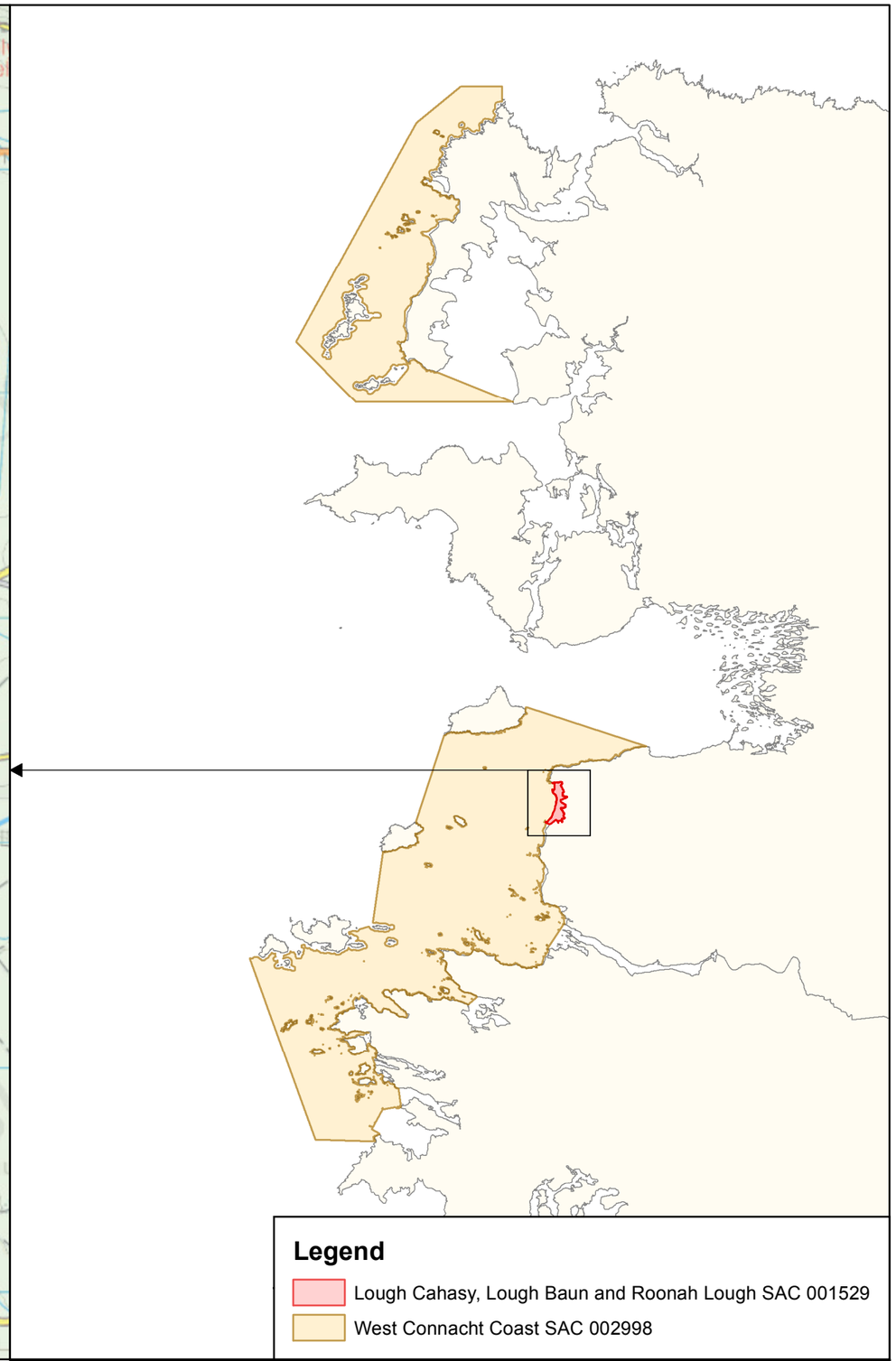
N

Map Version 1
Date: Nov 2016





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

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

MAP 2:
LOUGH CAHASY, LOUGH BAUN AND ROONAH LOUGH SAC
CONSERVATION OBJECTIVES
ADJACENT DESIGNATION

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

SITE CODE:
SAC 001529; version 3.
SAC 002998; version 3.03
CO. MAYO

0 0.25 0.5 0.75 1 1.25 km

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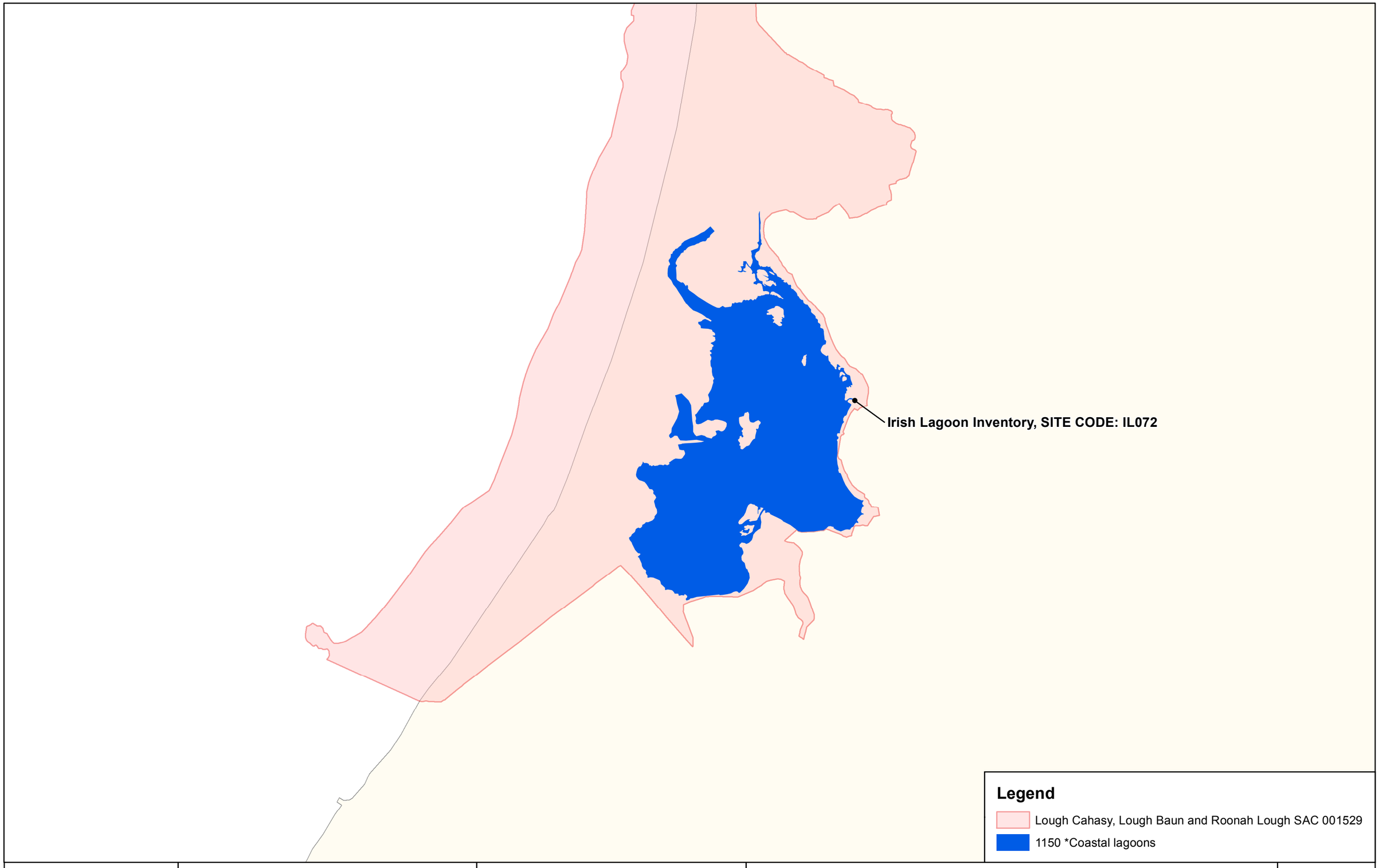
N

Map Version 1
Date: Nov 2016



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

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

MAP 3:
LOUGH CAHASY, LOUGH BAUN AND ROONAH LOUGH SAC
CONSERVATION OBJECTIVES
COASTAL LAGOONS

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

SITE CODE:
SAC 001529; version 3.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

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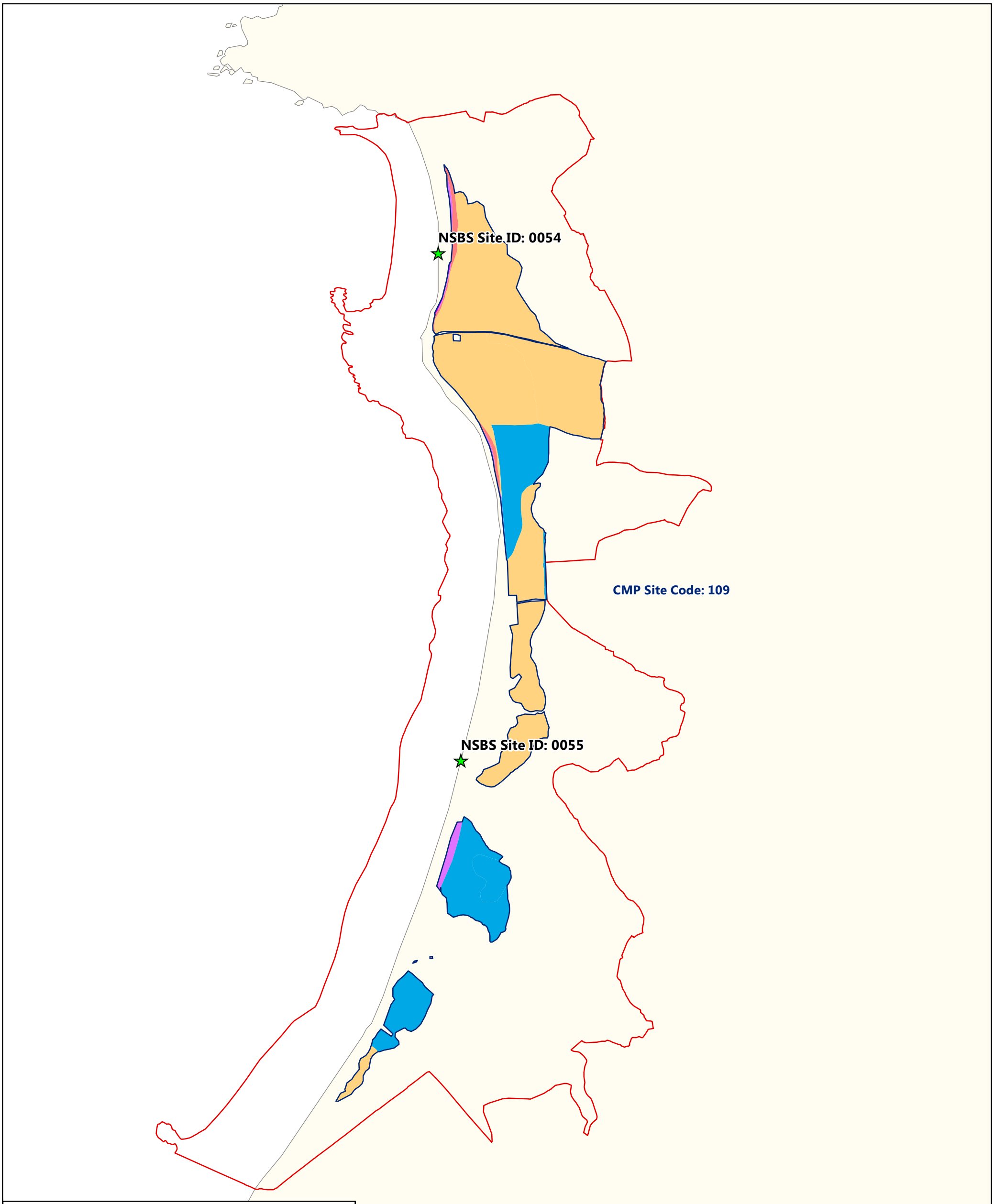
Map Version 1
Date: Nov 2016



Legend

- Lough Cahasy, Lough Baun and Roonah Lough SAC 001529
- Coastal Monitoring Project Survey Area

Annex I Qualifying Interests

- 1220 Perennial vegetation of stony banks
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

Annex I Non-qualifying Interests

- 1210 Annual vegetation of drift lines
- 2110 Embryonic shifting dunes
- 2130 *Fixed dunes with herbaceous vegetation (`grey dunes`)
- 21AO *Machair
- OSi Discovery Series County Boundary

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 4:
LOUGH CAHASY, LOUGH BAUN AND ROONAH LOUGH SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS
Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 001529; version 3.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

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

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Map Version 1
Date: Nov 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Mocorha Lough SAC 001536

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

National Parks and Wildlife Service,
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Citation:

NPWS (2019) Conservation Objectives: Mocorha Lough SAC 001536. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001536	Mocorha Lough SAC

7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1979
Title :	A Preliminary Report on Areas of Scientific Interest in County Mayo
Author :	Goodwillie, R.N.
Series :	Unpublished Report
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessments for three fen habitat types - 7230 – Alkaline fens, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae and 7140 – Transition mires and quaking bogs
Author :	Kimberley, S.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manuals, No. 79
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS
Year :	2018
Title :	Backing document – National Conservation Status Assessments (NCAs) for three fen habitat types: 7140 – Transition mires and quaking bogs, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae, 7230 – Alkaline fens
Author :	Long, M.P.; Crowe, O.; Kimberley, S.; Denyer, J.
Series :	Unpublished report to NPWS
Year :	2019
Title :	The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments
Author :	NPWS
Series :	Conservation assessments

Other References

Year :	2004
Title :	Common Standards Monitoring guidance for lowland wetland habitats
Author :	JNCC
Series :	Joint Nature Conservation Committee, Peterborough

7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* in Mocorha Lough 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	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* has not been mapped in detail for Mocorha Lough SAC and thus the total current area of the priority qualifying habitat in the SAC is unknown. The SAC supports a good example of *Cladium* fen in a calcareous lake basin which is considered one of the largest stands in the west of Ireland. It occurs in association with common reed (*Phragmites australis*) swamp, black bog-rush (*Schoenus nigricans*) dominated fen and other wetland vegetation. Wet grassland, which floods at times, is found adjacent to the wetland habitats. The lake basin is mostly overgrown with the swamp and fen vegetation, with very little open water remaining (Goodwillie, 1979; NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for Habitat area above
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	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
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Fen habitats require high groundwater levels (i.e. water levels at or above the ground surface) for a large proportion of the calendar year (i.e. duration of mean groundwater level). Fen groundwater levels are controlled by regional groundwater levels in the contributing catchment area (which sustain the hydraulic gradients of the fen groundwater table). Regional abstraction of groundwater may affect fen groundwater levels
Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	Drainage, either within or surrounding the fen habitat, can result in the drawdown of the alkaline fen groundwater table. The depth, geometry and density of drainage (hydromorphology) will indicate the scale and impact on fen hydrology. Drainage can result in loss of characteristic species and transition to drier habitats
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and 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 under natural conditions. Water supply should be also relatively calcium-rich
Vegetation composition: typical species	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical species including brown mosses and vascular plants	For lists of typical vascular plant and bryophyte species, including high quality indicator species, see the Article 17 conservation status assessment for *Cladium* fens (NPWS, 2019) and the fen habitats supporting document (Long et al., 2018)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. See JNCC (2004) and Kimberley (2013)
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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances

Vegetation composition: 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). Scrub and trees will tend to invade if fen conditions become drier
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 not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands
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; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.)

Knockroe
Sch.
43
56
Megalithic Tomb
39
33
42
51
40
Creggnanagh
30
Knocknageeha
40
Gortjordan
32
Pollnabur
Knockanaplawy
55
35
33
32
30
37
30
Houndswood South
42
Ballinrobe
Kilconly
CO. MAYO
SAC 001536
Cong
CO. GALWAY
Headford

Legend

Mocorha Lough SAC 001536

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

MAP 1:
MOCORHA LOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001536; version 3.01. CO. MAYO

0 110 220 330 440 Meters

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Map Version 1
Date: Feb 2019

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Urlaur Lakes SAC 001571

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
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: Urlaur Lakes SAC 001571. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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- 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.

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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.
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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***

001571 Urlaur Lakes SAC

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

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3140 (map 2)

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

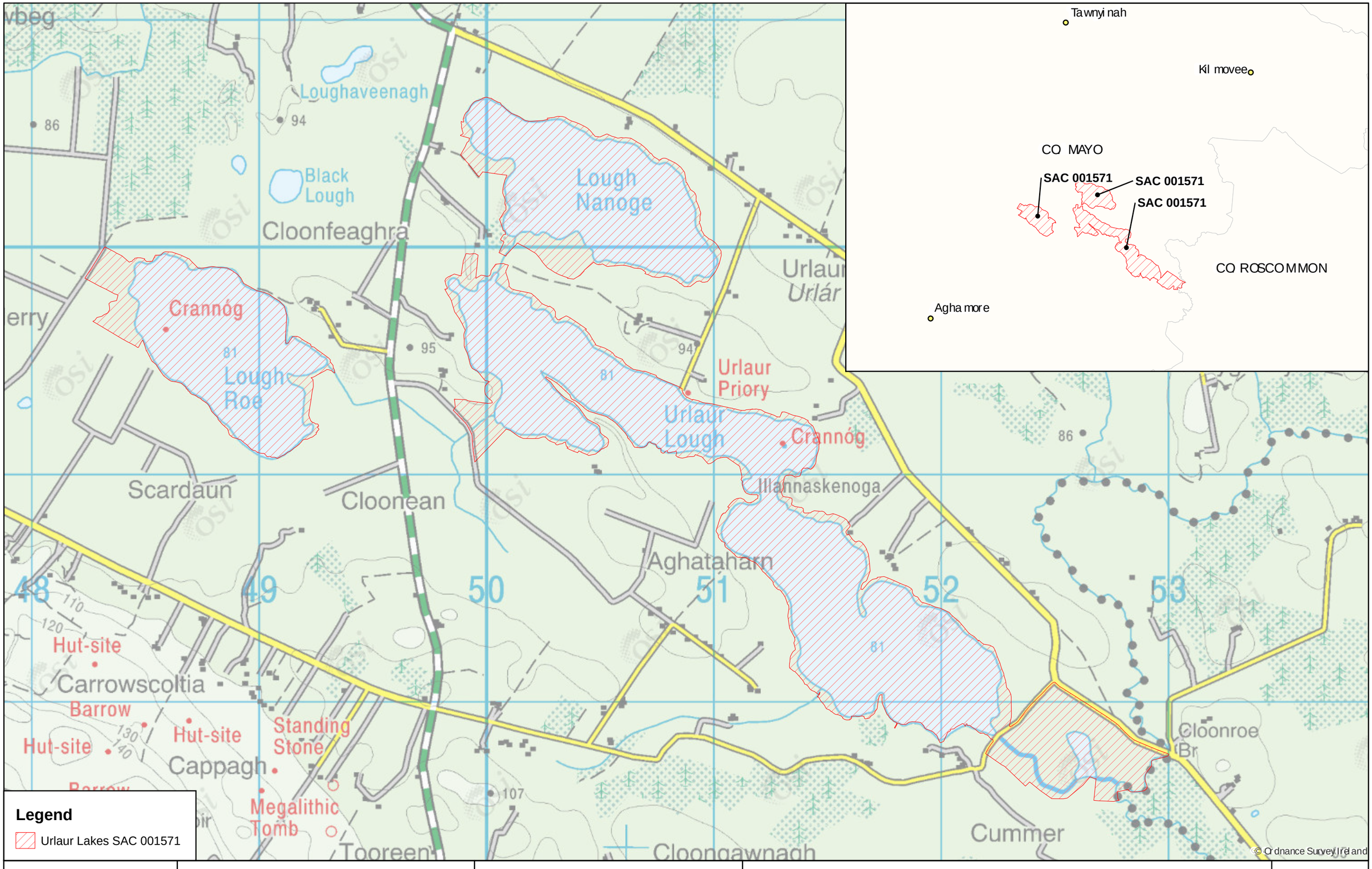
To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Urlaur Lakes SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Urlaur Lakes SAC contains three marl lakes with habitat 3140 (Urlaur Lough, Lough Nanoge and Lough Roe). The vegetation of Urlaur Lough was surveyed in 2012 and assessed as being in poor conservation condition (Roden and Murphy, in prep.). Urlaur Lough is on the Water Framework Directive (WFD) monitoring programme and regular macrophyte surveys are conducted by the Environmental Protection Agency (EPA). 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, lake habitat 3140 occurs in Urlaur Lough, Lough Nanoge and Lough Roe in the SAC. See map 2
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of 3140 typical species (cyanobacteria, algae, higher plants and water beetles), see the Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). Roden and Murphy (in prep.) recorded krustenstein, *Chara aspera, C. contraria, C. curta, C. virgata, Ophrydium versatile, Baldellia ranunculoides, Callitriche hermaphroditica, Eleocharis palustris, Elodea canadensis, Fontinalis antipyretica, Hippuris vulgaris, Lemna trisulca, Littorella uniflora, Potamogeton berchtoldii, P. perfoliatus, Ranunculus flammula, Utricularia minor* and *U. vulgaris* in Urlaur Lough. NPWS site files also note *Cladium mariscus, Equisetum fluviatile, Nuphar lutea, Nymphaea alba, Phragmites australis* and *Schoenplectus lacustris* in the SAC (NPWS internal files)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 is described in Roden and Murphy (2013). Urlaur Lough had few charophyte bands in 2012: *Chara contraria* or *C. curta* and *C. virgata* extending to c.2m; common *Elodea canadensis* at the base of the euphotic zone and well-developed krustenstein on occasional boulders (Roden and Murphy, in prep.)
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation, subject to natural processes	Maximum vegetation depth is expected to be deep in clear, hard water lakes, and extremely clear marl lakes can have charophyte vegetation to more than 9m (e.g. Lough Rea has charophytes to 10-11m, Coolorta >9m) (Roden and Murphy, in prep.). The indicative target of >6m for lake habitat 3140 may need to be modified based on the habitat sub-type/form and/or the specific lake in question (Roden and Murphy, 2013, in prep.). In this SAC, the maximum depth of vegetation at Urlaur Lough was very shallow at 2-2.1m in 2012 (Roden and Murphy, in prep.). The water is highly coloured in Urlaur Lough and this may contribute to the limited vegetation development. Areas of drained peatland (for turf-cutting, conifer forest, agricultural use) in the catchments of Urlaur Lough, Lough Nanoge and Lough Roe are likely to artificially increase the lakes' water colour

Hydrological regime: water level fluctuations	Metres	Maintain appropriate hydrological regime necessary to support the habitat	The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action and turbidity, up-root vegetation, alter the substratum and lead to nutrient release from sediment. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	The hard water lake habitat (3140) is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial. Roden and Murphy (in prep.) recorded sand, mud and occasional shoreline boulders at Urlaur Lough. The EPA have recorded cobble and gravel on the shoreline and silt at depth in Urlaur Lough. NPWS site files note stony, gravelly and sandy shorelines at Lough Nanoge (NPWS internal files)
Water quality: transparency	Metres	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. A target of >6m has been set for hard water lakes (3140) (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms (Roden and Murphy, in prep.). Secchi depth at Urlaur Lough was 1.5m in 2001 (Free et al., 2006) and 1.54m in 2012 (Roden and Murphy, in prep.)
Water quality: nutrients	µg/l P; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	Lake habitat 3140 is typically associated with high water quality, as demonstrated by naturally low dissolved nutrients. The target for Loughs Urlaur, Nanoge and Roe is WFD High Status or oligotrophic (OECD, 1982). Annual average total phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.04mg/l N and annual 95th percentile for total ammonia should be ≤0.09mg/l N. Where nutrient concentrations are lower than the targets, there should be no upward trend in concentrations. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Free et al. (2006) measured <10µg/l TP in Urlaur Lough in April 2001. Urlaur Lough failed to reach the target in 2010-12, however, having good nutrient status (Bradley et al., 2015)

Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain/restore appropriate water quality to support the habitat, including high chlorophyll *a* status	Lake habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD High Status or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. Annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll *a* concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. In Urlaur Lough, Free et al. (2006) measured 7.7µg/l chlorophyll *a* in April 2001 and chlorophyll *a* status was high in 2010-12 (Bradley et al., 2015)
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Restore appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, the default target for lake habitat 3140 is WFD high status. Urlaur Lough failed to reach the target in 2010-12, having good phytoplankton composition status (Bradley et al., 2015)
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain/restore trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in hard water lakes (3140) should, therefore, be trace/absent (<5% cover). EPA phytobenthos status can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, the default target for lake habitat 3140 is high phytobenthos status. Phytobenthos status was high in Urlaur Lough in 2010-12 (Bradley et al., 2015); however, filamentous algae were recorded by the EPA in the lake in 2001 and 2011
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Restore high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for hard water lakes (3140). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Urlaur Lough failed to reach the target in 2010-12, having good macrophyte status (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	The specific requirements of lake habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. Acidification is not considered a threat to lake habitat 3140; however, eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). 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 colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). Lake habitat 3140 is typically associated with very clear waters and expected colour would be <10mg/l PtCo or, more likely, <5mg/l PtCo. Free et al. (2006) recorded colour of 33mg/l PtCo in Urlaur Lough

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. As noted above, increased water colour, low transparency and shallow vegetation zones at Urlaur Lough may be linked to peatland disturbance
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. Fringing fen habitats can be particularly important around hard water lakes, notably the Annex I habitats alkaline fen, *Cladium* fen and petrifying springs (habitat codes 7230, 7210 and 7220). Reedbeds (*Schoenoplectus lacustris, Phragmites australis*), swamp (*Carex rostrata, Cladium mariscus, Typha latifolia, Equisetum fluviatile*), fen/flush, heath, revegetated cutaway bog, scrub and calcareous grassland have been recorded on the shores of Urlaur, Nanoge and Roe. Transition mire/quaking bog may also occur



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Legend

Urlaur Lakes SAC 001571

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

MAP 1:
URLAUR LAKES SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001571; version 3. CO. MAYO

0 200 400 600 800 Meters

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

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Map Version 1
Date: Nov 2017

Legend

- Urlaur Lakes SAC 001571
- 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
- OSi Discovery Series County Boundary

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Department of
Culture, Heritage and the Gaeltacht

MAP 2:
URLAUR LAKES SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABTIATS

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

SITE CODE:
SAC 001571; version 3. CO. MAYO

0 200 400 600 800 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

Map Version 1
Date: Nov 2017

Conservation objectives for Bricklieve Mountains and Keishcorran SAC [001656]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	Description
3180	Turloughs*
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*
6510	Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)

* denotes a priority habitat

Code	Common Name	Scientific Name

1065	Marsh Fritillary	*Euphydryas aurinia*
1092	White-clawed Crayfish	*Austropotamobius pallipes*

Citation: *NPWS (2020) Conservation objectives for Bricklieve Mountains and Keishcorran SAC [001656]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Knockalongy and Knockachree Cliffs SAC [001669]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

ADD HABITATS

Code	**Common Name**	**Scientific Name**
1421	Killarney Fern	*Trichomanes speciosum*

Citation: *NPWS (2020) Conservation objectives for Knockalongy and Knockachree Cliffs SAC [001669]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Carra/Mask Complex SAC [001774]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	Description
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 Isoeto-Nanojuncetea
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
4030	European dry heaths
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*
7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*
7230	Alkaline fens
8240	Limestone pavements*

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*

* denotes a priority habitat

Code	Common Name	Scientific Name
1303	Lesser Horseshoe Bat	*Rhinolophus hipposideros*
1355	Otter	*Lutra lutra*
1393	Slender Green Feather-moss	*Drepanocladus vernicosus*

Citation: *NPWS (2020) Conservation objectives for Lough Carra/Mask Complex SAC [001774]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Unshin River SAC [001898]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*

* denotes a priority habitat

Code	Common Name	Scientific Name
1106	Salmon	*Salmo salar*
1355	Otter	*Lutra lutra*

Citation: *NPWS (2020) Conservation objectives for Unshin River SAC [001898]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Cloonakillina Lough SAC 001899

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

National Parks and Wildlife Service,
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Citation:

NPWS (2019) Conservation Objectives: Cloonakillina Lough SAC 001899. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001899	Cloonakillina Lough SAC

7140	Transition mires and quaking bogs

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1992
Title :	Owenmore River Catchment. Proposed Arterial Drainage Environmental Impact Assessment - Botanical and Ornithological Surveys.
Author :	Goodwillie, R.N.; Buckley, P.; Douglas, C.
Series :	Unpublished report
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	Conservation status assessments for three fen habitat types - 7230 – Alkaline fens, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae and 7140 – Transition mires and quaking bogs
Author :	Kimberley, S.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manuals, No. 79
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red List Series, NPWS
Year :	2018
Title :	Backing document – National Conservation Status Assessments (NCAs) for three fen habitat types: 7140 – Transition mires and quaking bogs, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae, 7230 – Alkaline fens
Author :	Long, M.P.; Crowe, O.; Kimberley, S.; Denyer, J.
Series :	Unpublished report to NPWS

Year :	in prep.
Title :	The Status of EU Protected Habitats and Species in Ireland (2013-2018). Habitat Assessments
Author :	NPWS
Series :	Conservation assessments

Other References

Year :	1993
Title :	Notes on the flora of the Owenmore Catchment Cos Sligo (H28) and East Mayo (H26)
Author :	Douglas, C.; Goodwillie, R.; Mooney, E.
Series :	Irish Naturalists' Journal, 24(5): 218-220
Year :	2004
Title :	Common Standards Monitoring guidance for lowland wetland habitats
Author :	JNCC
Series :	Joint Nature Conservation Committee, Peterborough
Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2018
Title :	Irish Vegetation Classification: Technical Progress Report No. 4
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre

Conservation Objectives for : Cloonakillina Lough SAC [001899]

7140 Transition mires and quaking bogs

To maintain the favourable conservation condition of Transition mires and quaking bogs in Cloonakillina Lough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Transition mires and quaking bogs have not been mapped in detail for Cloonakillina Lough SAC and thus the total current area of the qualifying habitat in the SAC is unknown. The habitat occurs as a scraw (floating vegetation), with some open pools, covering the western half of the Cloonakillina Lough basin. Cloonakillina Lough has undergone rapid succession from open water to transition mire since it was mapped in 1915, most likely due to drainage and lowering of the water table in the area (NPWS internal files). The SAC contains an interesting variety of stages in mire development, and transition mire occurs in association with areas of open water, fen grassland, reed swamp and wet woodland (NPWS internal files). See also Goodwillie et al. (1992)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for Habitat area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013). See also Bobbink and Hettelingh (2011)
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	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
Ecosystem function: hydrology - water levels	Centimetres; duration of water levels	Maintain appropriate water levels necessary to support the natural structure and functioning of the habitat	Maintenance of a permanently high water level, remaining close to the peat surface all year, with water level fluctuations within natural ranges, is required for this wetland habitat. See Kimberley (2013) and Long et al. (2018)
Ecosystem function: hydrology - flow patterns	Flow direction	Maintain appropriate topography and water movement regime necessary to support the natural structure and functioning of the habitat	Maintenance, both within and surrounding the habitat, of topography and flow patterns within natural ranges is essential in order to ensure the hydrological integrity of this wetland habitat
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality to support the natural structure and functioning of the habitat	The surface water conditions necessary to maintain transition mires range from acidic to slightly base-rich. The vegetation typically has intimate mixtures of species considered to be acidophile and others considered calciphile. In other cases, these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The entire diversity of transition mire vegetation communities present in the SAC is currently unknown. Information on vegetation communities associated with this habitat in the uplands is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification)

Vegetation composition: typical vascular plants and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical vascular plant and bryophyte species	For lists of typical vascular plant and bryophyte species, including high quality indicators, see the Article 17 conservation status assessment for transition mires and quaking bogs (NPWS, in prep.) and the fen habitats supporting document (Long et al., 2018). See also Perrin et al. (2014) and JNCC (2004). In this SAC, the habitat is species-rich with typical species recorded including bog myrtle (*Myrica gale*), bogbean (*Menyanthes trifoliata*), marsh pennywort (*Hydrocotyle vulgaris*), marsh lousewort (*Pedicularis palustris*) marsh cinquefoil (*Comarum palustre*), *Sphagnum contortum* and *S. squarrosum* and a diverse range of sedges including slender sedge (*Carex lasiocarpa*), lesser tussock-sedge (*C. diandra*), bottle sedge (*C. rostrata*), common sedge (*C. nigra*), bog sedge (*C. limosa*) and bog cotton (*Eriophorum angustifolium*) (Goodwillie et al., 1992; NPWS internal files)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicator species that could suggest drying out include ling (*Calluna vulgaris*) and birch (*Betula pubescens*)
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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
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). Drainage can result in loss of characteristic species and transition to drier habitats. Cloonakillina Lough SAC contains a dynamic hydrological and ecological system susceptible to drainage (NPWS internal files)
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). Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands
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; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.). The Near Threatened slender tufted-sedge (*Carex acuta*) (Wyse Jackson et al., 2016) has been recorded in the habitat in the SAC (Goodwillie et al., 1992; Douglas et al., 1993)

CLOONAKILLINA

Cloonakillina Lough

Cloonakillina Lough

Cloonakillina Lough

Killavil

Doocastle

CO. SLIGO

CO. MAYO

SAC 001899

Roosky

Legend

Cloonakillina Lough SAC 001899

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

MAP 1:
CLOONAKILLINA LOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001899; version 3.01. CO. MAYO

0 100 200 300 400 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh OSI-NMA-014. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: Feb 2019

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bellacorick Bog Complex SAC 001922

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

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Culture, Heritage and the Gaeltacht

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Department of Culture, Heritage and the Gaeltacht,

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Citation:

NPWS (2017) Conservation Objectives: Bellacorick Bog Complex SAC 001922. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001922	Bellacorick Bog Complex SAC
1013	Geyer's Whorl Snail *Vertigo geyeri*
1528	Marsh Saxifrage *Saxifraga hirculus*
3160	Natural dystrophic lakes and ponds
4010	Northern Atlantic wet heaths with *Erica tetralix*
7130	Blanket bogs (* if active bog)
7150	Depressions on peat substrates of the Rhynchosporion
7230	Alkaline fens

Please note that this SAC is adjacent to River Moy SAC (002298). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.

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

NPWS Documents

Year :	1987
Title :	A survey to locate blanket bogs of scientific interest in County Mayo. Part I
Author :	Foss, P.; McGee, E.
Series :	A report commissioned by the Wildlife Service
Year :	1989
Title :	Survey to locate blanket bogs of scientific interest in Mayo. Part II
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.; Van Doorsleer, L.
Series :	A report commissioned by the Wildlife Service
Year :	2011
Title :	Monitoring and condition assessment of populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Irish Wildlife Manual No. 55
Year :	2011
Title :	Implementation of a *Vertigo* monitoring programme: *Vertigo angustior* monitoring at Fermoyle
Author :	Moorkens, E.A.; Killeen, I.J.
Series :	Unpublished report to NPWS
Year :	2011
Title :	Implementation of a *Vertigo* monitoring programme: *Vertigo geyeri* monitoring at Brackloon
Author :	Moorkens, E.A.; Killeen, I.J.
Series :	Unpublished report to NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manual No. 88

Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Bellacorick Bog Complex SAC (site code: 1922) Conservation objectives supporting document-blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2005
Title :	Widespread occurrence of *Vertigo geyeri* (Gastropoda: Vertiginidae) in north and west Ireland
Author :	Holyoak, G.A.
Series :	Irish Naturalists' Journal, 28: 141-150
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin

Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished Ph.D. thesis, University College Cork
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3160 (map 3)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1013 (map 4)

3160 Natural dystrophic lakes and ponds

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Bellacorick Bog Complex SAC has some of the most extensive extant areas of lowland blanket bog pool systems. Habitat 3160 is likely to occur in all pools and lakes and all are mapped as potential 3160 (map 3). Although there are more than 5,700 lake/pool polygons, many pools are not mapped in the 1:5,000 OSi data (see map 3). The habitat is of high conservation value in the SAC, owing to the area, extent and morphological diversity of pools. For further information on the distribution, vegetation and morphology of the habitat in the SAC, see Foss and McGee (1987) and Douglas et al. (1989). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the habitat is widespread in the SAC (see map 3). All lake/pond polygons have been mapped as potential 3160
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see the Article 17 habitat assessment for 3160 (NPWS, 2013) and O Connor (2015). Douglas et al. (1989) state that pools and lakes typically have many-stalked spike-rush (*Eleocharis multicaulis*), bogbean (*Menyanthes trifoliata*), the bog mosses *Sphagnum denticulatum* and *S. cuspidatum*, with great sundew (*Drosera anglica*) and round-leaved sundew (*D. rotundifolia*) in shallower interconnecting pools. Pipewort (*Eriocaulon aquaticum*), bulbous rush (*Juncus bulbosus*) and water lobelia (*Lobelia dortmanna*) also occur in pools and lakes, while bladderworts (*Utricularia* spp.), broad-leaved pondweed (*Potamogeton natans*), common reed (*Phragmites australis*) and bottle sedge (*Carex rostrata*) were also recorded
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	Further work is necessary to describe the characteristic zonation and other spatial patterns in lake habitat 3160 (see O Connor, 2015). Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. Further work is necessary to develop indicative targets for lake habitat 3160. 3160 lakes and pools naturally have very clear water and, therefore, maximum depth can be large

Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. The hydrological regime of 3160 lakes and pools is integrally linked to that of the surrounding blanket bog, transition mire/quaking bog and other peatland habitats. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that lake 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. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; 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 ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 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 ≥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 pHs 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and pools where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes

Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	3160 lakes and pool intergrade with blanket bog communities in this SAC. Spring-fed, species-rich flushes are a significant feature, occurring throughout the complex and supporting poor and rich fen and swamp carr communities. Quaking bog is also associated with pool systems in the SAC. These habitats support the structure and functions of the lake habitat. The fringing habitats are also dependent on the lake/pool, particularly its water levels, and can support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Northern Atlantic wet heaths with *Erica tetralix* has not been mapped in detail for Bellacorick Bog Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 187ha, covering 2% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Bellacorick Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs occasionally on sloping ground and on elevated mounds of mineral soil that are scattered throughout the lowland blanket bog-covered plains. These are particularly evident in the Owenboy Nature Reserve and along some of the steeper stream valley sides (NPWS internal files). Further information can be found within Foss and McGee (1987), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Wet heath vegetation communities have been recorded in this SAC (Douglas et al., 1989; NPWS internal files), one of which corresponds to a community recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of monitoring stops	Cross-leaved heath (*Erica tetralix*) 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 *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* 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 (*Empetrum nigrum*) at least 15%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented

Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) 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 (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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	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)

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Bellacorick Bog Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 6,286ha, covering 66% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Bellacorick Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur throughout the SAC. Further information can be found within Foss and McGee (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Foss and McGee, 1987; Douglas et al., 1989; NPWS internal files), five of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, 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). Rhododendron (*Rhododendron ponticum*) occurs within this habitat in the SAC (NPWS internal files)

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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) was recorded from the Bellacorick Bog area (Douglas et al., 1989), but this species cannot be assigned specifically to blanket bog

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Bellacorick Bog Complex SAC and thus the total area of the qualifying habitat in the SAC is unknown. Further details on this and the following attributes can be found in the Bellacorick Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs in locations supporting pools and wet quaking peat (NPWS internal files). Further information can be found within 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: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) was recorded from the Bellacorick Bog area (Douglas et al., 1989), but this species cannot be assigned specifically to this habitat

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Bellacorick Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fens has not been mapped in detail for Bellacorick Bog Complex SAC and thus the total area of the qualifying habitat in the SAC is unknown. Further details on this and the following attributes can be found in the Bellacorick Bog Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur throughout the SAC, but is most well-developed along the eastern margin. Further information can be found within Foss and McGee (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	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	The diversity of alkaline fen habitats in this SAC is unknown. 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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata) 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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) 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)
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 (*Juncus effusus*) and common reed (*Phragmites australis*) 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). The FPO listed and Near Threatened marsh saxifrage (*Saxifraga hirculus*) (Wyse Jackson et al., 2016) is present within the SAC (Muldoon et al., 2015), but this species cannot be assigned specifically to alkaline fens. Bryophytes present include the FPO and Critically Endangered moss *Paludella squarrosa*, the FPO and Endangered liverwort *Leiocolea rutheana*, the Vulnerable mosses *Tomentypnum nitens* and *Sphagnum warnstorfii*, and the Near Threatened moss *Sphagnum teres* (Lockhart et al., 2012), but again these species cannot be assigned specifically to alkaline fens. Further information can be found within Foss and McGee (1987), Douglas et al. (1989) and NPWS internal files

1013 Geyer's Whorl Snail *Vertigo geyeri*

To maintain the favourable conservation condition of Geyer's Whorl Snail in Bellacorick Bog Complex SAC, which is defined by the following list of attributes and targets:

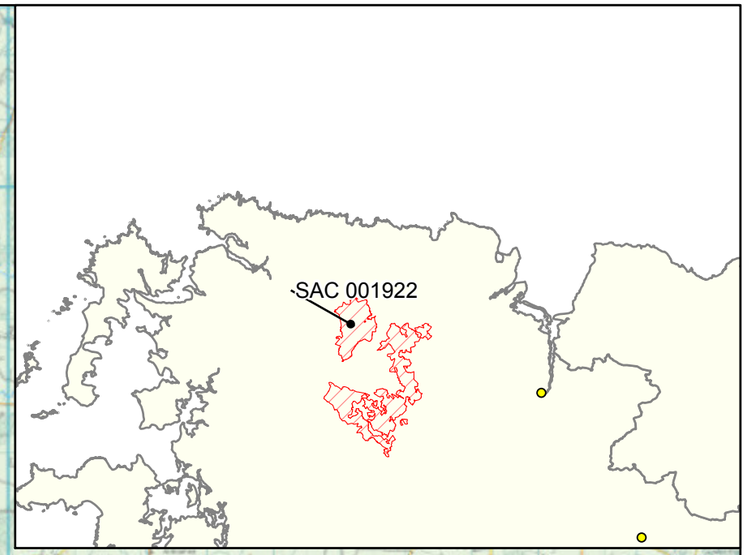
Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. There are three known sites for this species in the SAC within the 1km grid squares G0522, G0718 and G0818. See map 4	There have been records of Geyer's whorl snail (*Vertigo geyeri*) from three 1km grid squares within the Bellacorick Bog Complex SAC boundary (G0522, G0718 and G0818). This corresponds to the three discrete occupied parts of the SAC at Fermoyle (G0522; site code VgCAM16 in Moorkens and Killeen (2011)); Coolturk (G0718; Holyoak (2005)) and Brackloon (G0818; site code VgCAM3 in Moorkens and Killeen (2011))
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	No decline. A minimum of 50% positive samples in optimum habitat areas; 25% in areas described as sub-optimal	Positive samples mean the confirmed presence of snails (living or recently dead adults and/or juveniles). 50% of samples taken from optimal habitat polygons and 25% of sample from sub-optimal polygons should be positive for the species. Samples should be spread throughout the sub-sites with a minimum of eight in Fermoyle and four in Brackloon. Note that as Coolturk has not been surveyed in detail, no minimum sampling level has been specified. The habitats occupied by Geyer's whorl snail (*Vertigo geyeri*) in this SAC are areas of fen and flush. See the notes on habitat area below for definitions of optimal and sub-optimal habitats at Fermoyle and at Brackloon. See also Moorkens and Killeen (2011)
Habitat area - Fermoyle	Hectares	Stable or increasing, subject to natural processes. No less than 25.0ha of at least sub-optimal habitat	Suitable conditions for the species can be found throughout the southern portion of the SAC, with the largest known extent in the fen at Fermoyle. Moorkens and Killeen (2011) give a target figure of 25.0ha of habitat in at least sub-optimal condition, and describe the methodology that should be used to assess the target. Optimal habitat is defined for Fermoyle as flush areas of fen and bog with *Schoenus nigricans, Carex viridula, C. pulicaria*, other low carices, *C. rostrata, Menyanthes trifoliata, Campylium stellatum, Juncus articulatus, Eriophorum angustifolium* and orchids. Vegetation height mostly 10-30cm with higher *S. nigricans* tussocks. 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 with more *S. nigricans* tussocks with mosses between them, or overall sward height is >30cm, or the water table is <5cm or ground is flooded at the time of sampling
Habitat area - Brackloon	Hectares	Stable or increasing, subject to natural processes. No less than 0.6ha of at least sub-optimal habitat	The amount of suitable habitat at Brackloon is not precisely known, but Moorkens and Killeen (2011) give a target figure of 0.6ha of habitat for this sub-site in at least sub-optimal condition, and describe the methodology that should be used to assess the target. Optimal habitat is defined for Brackloon as a mosaic of spring flush vegetation 5-55cm tall, containing species such as *Carex viridula, Equisetum* spp., *Menyanthes trifoliata, Platanthera bifolia* and mosses, with scattered tussocks of *Schoenus nigricans* no greater than 50cm 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 (or with *Myrica gale, Hydrocotyle vulgaris, Eriophorum angustifolium, Drosera rotundifolia* and *D. intermedia*), but either vegetation height is greater than 50cm, or the water table is below 5cm or ground is flooded at the time of sampling

Habitat area - Coolturk	Hectares	Stable or increasing, subject to natural processes	The amount of suitable habitat at Coolturk is currently unknown
Habitat quality: soil wetness	Percentage of a representative number of monitoring stops	At each sub-site, at least 67% of a representative number of sampling stops in areas of optimal habitat should be classified as optimal wetness as defined by Moorkens and Killeen (2011); at least 25% in areas of sub-optimal habitat	The soil wetness should be assessed using the methodology described in Moorkens and Killeen (2011). In optimal areas, 67% of stops should meet the soil wetness criterion of Moorkens and Killeen (2011); in sub-optimal habitat at least 25% should be optimal wetness

1528 Marsh Saxifrage *Saxifraga hirculus*

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

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread of populations	No loss in geographical spread and number of populations, subject to natural processes	The known populations of marsh saxifrage (*Saxifraga hirculus*) in Bellacorick Bog Complex SAC occur in five flushes: Formoyle, Sheskin A, Sheskin B, Sheskin C and Croaghaun East. See Muldoon (2011) and Muldoon et al. (2015) for further details. The exact locations are not mapped here on account of the presence of sensitive associated species
Population size: number of rosettes	Number	Maintain the size of the known populations, subject to natural processes. The target numbers of rosettes are: at least 136 in Formoyle, at least 288 in Sheskin A, at least 93 in Sheskin B, at least 800 in Sheskin C and at least 1,600 in Croaghaun East	The number of rosettes recorded were: 170 in Formoyle, 360 in Sheskin A, 116 in Sheskin B (Muldoon, 2011), 1,000 in Sheskin C and 2,000 in Croaghaun East (NPWS internal files). The target figures are a c.20% reduction of the recorded numbers to allow a margin of error and variability over monitoring seasons. See Muldoon et al. (2015) for further details
Population size: area of occupancy	Hectares	Maintain the areas of occupancy of the known populations, subject to natural processes. The target areas are: at least 0.0066ha in Formoyle, at least 0.0014ha in Sheskin A, at least 0.0071ha in Sheskin B, at least 0.09ha in Sheskin C and at least 0.1093ha in Croaghaun East	The areas of occupancy were estimated as: 73m² (0.0073ha) in Formoyle, 16m² (0.0016ha) in Sheskin A, 79.4m² (0.0079ha) in Sheskin B (Muldoon, 2011), 1,000m² (0.1ha) in Sheskin C and 1,214m² (0.1214ha) in Croaghaun East (NPWS internal files). The target area figures are a 10% reduction of the recorded areas to allow for a margin of error. See Muldoon et al. (2015) for further details
Hydrological conditions: water level	Occurrence of high or fluctuating water levels	Maintain the appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, marsh saxifrage (*Saxifraga hirculus*) is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation composition: positive indicator species	Occurrence in a representative number of 1m x 1m monitoring stops	Knotted pearlwort (*Sagina nodosa*) should be present in at least two of five 1m x 1m monitoring stops	The presence of the positive indicator species knotted pearlwort (*Sagina nodosa*) should be maintained (Muldoon, 2011; Muldoon et al., 2015)
Vegetation composition: negative indicator species	Mean percentage cover in five 1m x 1m monitoring stops	Mean percentage cover of purple moor-grass (*Molinia caerulea*) should not exceed 5%; mean percentage cover of Yorkshire fog (*Holcus lanatus*) should not exceed 15%	Low cover of the negative indicator species purple moor-grass (*Molinia caerulea*) and Yorkshire fog (*Holcus lanatus*) should be maintained. See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing level	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	Undergrazing is a minor issue at Sheskin A and Sheskin B. See Muldoon (2011) and Muldoon et al. (2015) for further details



Legend

Bellacorick Bog Complex SAC 001922

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MAP 1:
BELLACORICK BOG COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001922; version 3.
CO. MAYO

0 1 2 3 4 5 6 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Sept 2017

SAC 001922

SAC 002298

Legend

- Bellacorick Bog Complex SAC 001922
- River Moy SAC SAC 002298
- OSi Discovery Series County Boundary

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Department of
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MAP 2:
BELLACORICK BOG COMPLEX SAC CONSERVATION OBJECTIVES ADJACENT, ADJOINING AND OVERLAPPING DESIGNATIONS

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

SITE CODE: SAC 001922; version 3.
SAC 002298; version 1.14, 1.09, 1.03
CO. MAYO, CO. SLIGO, CO. ROSCOMMON

0 4 8 12 16 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: Sept 2017

Legend

Bellacorick Bog Complex SAC 001922

OSi Discovery Series County Boundary

Indicative Lake Habitats

Potential 3160 Potential natural dystrophic lakes and ponds

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MAP 3:
BELLACORICK BOG COMPLEX SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
SAC 001922; version 3
CO. MAYO

0 2 4 6 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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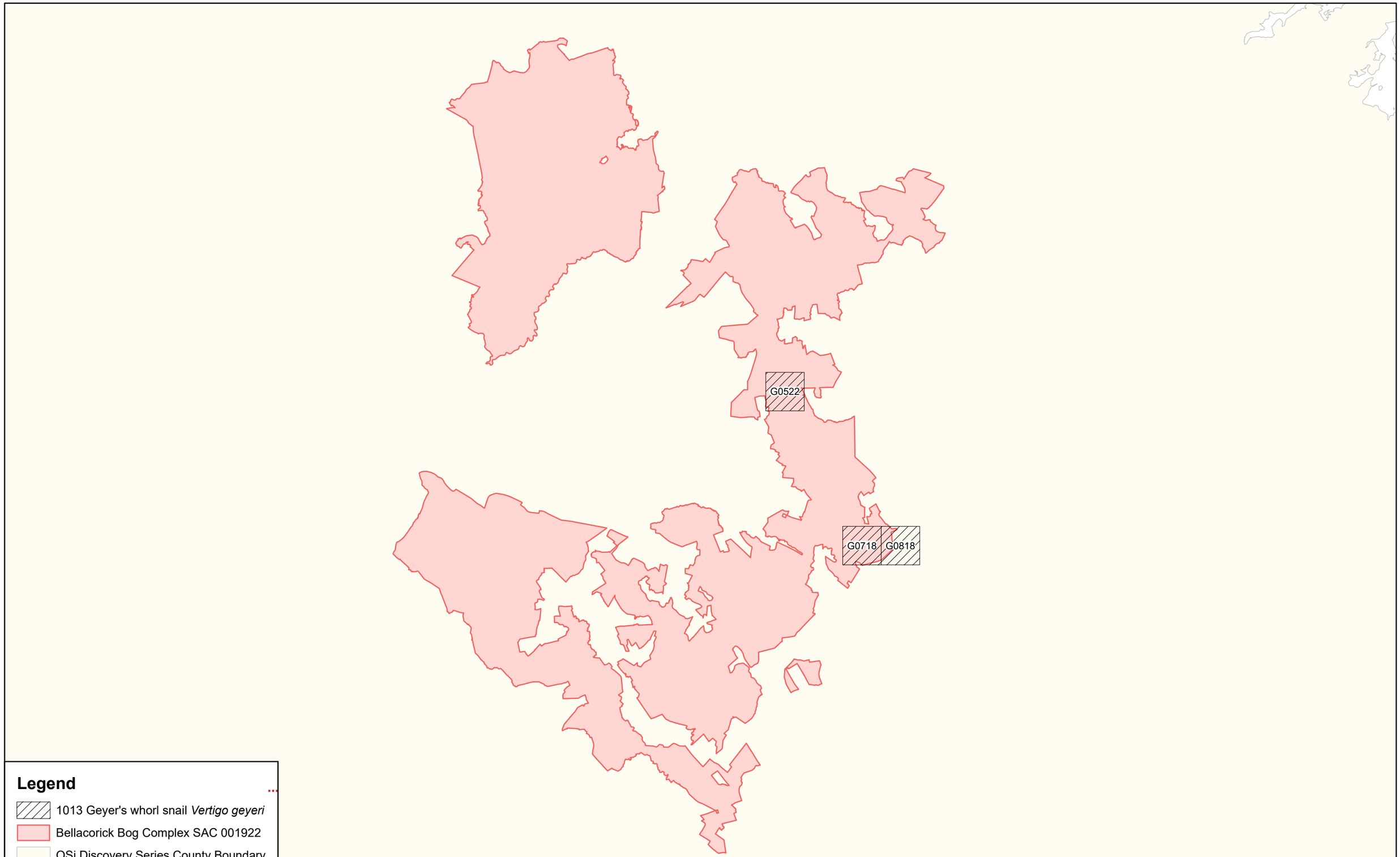
Map Version 1
Date: Sept 2017



Legend

- 1013 Geyer's whorl snail *Vertigo geyeri*
- Bellacorick Bog Complex SAC 001922
- OSi Discovery Series County Boundary

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MAP 4:
BELLACORICK BOG COMPLEX SAC
CONSERVATION OBJECTIVES
GEYER'S WHORL SNAIL

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

SITE CODE:
SAC 001922; version 3.
CO. MAYO

0 1 2 3 4 5 6 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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Map Version 1
Date: Sept 2017

ISSN 2009-4086

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

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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

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

001932 Mweelrea/Sheeffry/Erriff Complex SAC

1013	Geyer's Whorl Snail *Vertigo geyeri*
1014	Narrow-mouthed Whorl Snail *Vertigo angustior*
1029	Freshwater Pearl Mussel *Margaritifera margaritifera*
1106	Salmon *Salmo salar*
1150	Coastal lagoons*
1210	Annual vegetation of drift lines
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1355	Otter *Lutra lutra*
1395	Petalwort *Petalophyllum ralfsii*
1410	Mediterranean salt meadows (Juncetalia maritimi)
1833	Slender Naiad *Najas flexilis*
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)*
2170	Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae)
21A0	Machairs (* in Ireland)
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 Isoeto-Nanojuncetea
3160	Natural dystrophic lakes and ponds
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
4060	Alpine and Boreal heaths
5130	*Juniperus communis* 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 Rhynchosporion
7220	Petrifying springs with tufa formation (Cratoneurion)*
7230	Alkaline fens
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
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, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

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

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

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

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

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

Year :	2006
Title :	The vegetation of Irish machair
Author :	Gaynor, K.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, vol 106B, No. 3: 311-321
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Dublin
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Addressing the conservation and rehabilitation of *Margaritifera margaritifera* populations in the Republic of Ireland within the framework of the habitats and species directive
Author :	Moorkens, E.
Series :	Journal of Conchology, 40: 339
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished Ph.D. thesis, University College Cork
Year :	2013
Title :	Monitoring and Assessment of Irish Lagoons for the purpose of the EU Water Framework Directive
Author :	Roden, C.M.; Oliver, G.
Series :	Unpublished Report to the EPA

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

Spatial data sources

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 3)
Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Coastal CO data investigated and resolved with expert opinion used
Used For :	1330, 1410 (map 4)
Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary; overlapping regions with Saltmarsh CO data investigated and resolved with expert opinion used
Used For :	1210, 2110, 2120, 2150, 2170, 21A0 (map 5)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110, 3130, 3160 (map 6)
Year :	2011
Title :	National Survey of Upland Habitats
GIS Operations :	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
Used For :	4010, 4030, 4060, 6430, 7130, 7140, 7150, 7230, 8110, 8210, 8220 (maps 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18)
Year :	Derived 2012
Title :	Internal NPWS files
GIS Operations :	Dataset created from spatial reference contained in files
Used For :	7220 (map 14)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1013, 1014, 1029, 1395 (maps 19, 20 and 22)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas data
GIS Operations :	Relevant catchment boundary identified. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 20)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	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
Used For :	1355 (map 21)

Year :	2010
Title :	EPA WFD Waterbodies data
GIS Operations :	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
Used For :	1355 (map 21)
Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	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
Used For :	1355 (map 21)
Year :	2013
Title :	Najas flexilis data
GIS Operations :	Lake habitat for species clipped to SAC boundary
Used For :	1833 (map 23)

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:

Attribute	Measure	Target	Notes
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 *a*	µg/L	Annual median chlorophyll *a* 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^2	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 (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* 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 (*Salsola kali*). 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:

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: 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 (*Juncus gerardii*) and sea milkwort (*Glaux maritima*), with sea plantain (*Plantago maritima*), buck's-horn plantain (*P. coronopus*), common saltmarsh-grass (*Puccinellia maritima*), red fescue (*Festuca rubra*), thrift (*Armeria maritima*), sea arrowgrass (*Triglochin maritimum*), creeping bent (*Agrostis stolonifera*), brookweed (*Samolus valerandi*) and sea arrowgrass (*Triglochin maritimum*). 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 - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) 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 (*Spartina anglica*) 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 (*Juncus maritimus*) 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 (*Juncus maritimus*) is relatively high. Other species that occur frequently amongst the sea rush include red fescue (*Festuca rubra*), thrift (*Armeria maritima*), autumn hawkbit (*Leontodon autumnalis*), sea plantain (*Plantago maritima*) and white clover (*Trifolium repens*). 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 (*Agrostis stolonifera*). Turf fucoids were also recorded in the MSM habitat. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) 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 (*Spartina anglica*) 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 (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). All of the shoots of sand couch grass (*Elytrigia juncea*) 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 (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)	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 (*Hippophae rhamnoides*) 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 *Ammophila arenaria* 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 (*Ammophila arenaria*) 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 (*Ammophila arenaria*) 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 (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See 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 (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	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 (*Hippophae rhamnoides*) 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:

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). 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 (*Hippophae rhamnoides*) 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 *Salix repens* ssp. *argentea* (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 *Salix repens*	Percentage cover; centimetres	Maintain more than 10% cover of creeping willow (*Salix repens*); 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 (*Salix repens*) 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 (*Hippophae rhamnoides*) 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 (*Salix repens*), 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

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 (*Agrostis stolonifera*), daisy (*Bellis perennis*), sand sedge (*Carex arenaria*), glaucous sedge (*C. flacca*), common mouse-ear (*Cerastium fontanum*), lady's bedstraw (*Galium verum*), fairy flax (*Linum catharticum*), common bird's-foot trefoil (*Lotus corniculatus*), red bartsia (*Odontites vernus*), ribwort plantain (*Plantago lanceolata*), selfheal (*Prunella vulgaris*) and white clover (*Trifolium repens*). 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 (*Lolium perenne*) 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 *Climacium dendroides*, *Homalothecium lutescens*, *Rhytidiadelphus triquetrus*, *Thuidium tamariscinum* and *Syntrichia ruralis* subsp. *ruraliformis* have been recorded from the machair. Petalwort (*Petalophyllum ralfsii*), 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, Lugacolliwee 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 *Najas flexilis* 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 ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. 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	µg/l P; 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. 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 >10µg/l (McGarrigle et al., 2010)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/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 ≥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 *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/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 Isoëto-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 *Najas flexilis* (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 *Najas flexilis*
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 *Najas flexilis* (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 *Najas flexilis* 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 *Najas flexilis* 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 *Najas flexilis* 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 *Najas flexilis* 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 *Najas flexilis* 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 ≥6m annual mean Secchi disk depth, and ≥3m 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	µg/l P; 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. 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 *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* 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 *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. 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 *Najas flexilis* (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 *Najas flexilis*, 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/Alkalisation 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:

Attribute	Measure	Target	Notes
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 Srahroosky, 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 Srahroosky, 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 ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; 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 ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The Environmental Protection Agency (EPA) has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, lake habitat 3160 requires WFD high status

Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 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 ≥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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain/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

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-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 (*Margaritifera margaritifera*) 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 (*Margaritifera margaritifera*)). 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 (*Margaritifera margaritifera*) 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 *Fissidens viridulus, Fontinalis squamosa, Juncus bulbosus, Myriophyllum alterniflorum* and *Potamogeton natans. Callitriche hermaphroditica, C. stagnalis, J. bulbosus, M. alterniflorum* and *P. polygonifolius* were recorded in the Bundorragha in 2014 (M. Wyse Jackson, pers. comm.). Red-listed bryophytes in/near rivers include *Hygrohypnum duriusculum* (CR) (fast-flowing upland stream, Mweelrea); *Bryum riparium* (EN) and *Fissidens serrulatus* (VU) (Lockhart et al., 2012). Scarce lichens recorded in the Erriff include *Dermatocarpon meiophyllizum, Catillaria chalybeia* var. *chloropoliza, Pertusaria excludens* and *Porpidia hydrophila* (NPWS internal files). Giavarini (2009) recorded *Dermatocarpon luridum, Lecidea lithophila* and *Porpidia hydrophila* 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: area and condition	Hectares	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 *Erica tetralix* 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 (*Erica tetralix*) 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 *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* 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 (*Empetrum nigrum*) 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 *Campylopus introflexus* was recorded in 8.6% of the wet heath monitoring stops, but its cover was not sufficient to cause the stops to fail. Rhododendron (*Rhododendron ponticum*) 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 (*Pteridium aquilinum*) 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 (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 *Mastigophora woodsii* and the Near Threatened moss *Sphagnum subsecundum* (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 *Campylopus* and *Polytrichum* 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 (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) 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 *Campylopus introflexus* 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 (*Pteridium aquilinum*) 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 (*Juncus effusus*) 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 (*Calluna vulgaris*) 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 (*Empetrum nigrum*) 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 (*Calluna vulgaris*) 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 *Mastigophora woodsii* and the Vulnerable and FPO liverworts *Bazzania pearsonii* and *Scapania ornithopodioides* (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 (*Pseudorchis albida*) (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 *Campylopus introflexus* 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 (*Empetrum nigrum*) 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	*Juniperus communis* 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 *Juniperus communis* 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 (*Juniperus communis*) 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)

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 Ougher, 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 *Sphagnum fallax*, 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 *Campylopus introflexus* formed extensive carpets within this habitat. Rhododendron (*Rhododendron ponticum*) 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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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:

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). 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, Srahrooskey, 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: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) 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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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

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 3,070m² (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.20m², 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.50m² 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.3,000m² 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 *Palustriella falcata-Carex panicea* 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 *Didymodon tophaceus* was found at both Dooaghtry Coast sites (PS027a, b). The high quality indicator moss *Catoscopium nigritum* (Near Threatened, Lockhart et al., 2012) was recorded at the Dooaghtry Flush site (PS028), along with the positive indicators bog pimpernel (*Anagallis tenella*), long-stalked yellow sedge (*Carex lepidocarpa*), carnation sedge (*C. panicea*), grass-of-parnassus (*Parnassia palustris*), common butterwort (*Pinguicula vulgaris*), brookweed (*Samolus valerandi*), the bryophytes *Aneura pinguis, Bryum pseudotriquetrum, Campylium stellatum, Jungermannia atrovirens, Palustriella falcata, Philonotis calcarea, Scorpidium cossonii* and *S. scorpioides*, the stonewort *Chara vulgaris* and lesser clubmoss (*Selaginella selaginoides*) (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 (*Acer pseudoplatanus*) 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 (*Apium nodiflorum*) and the potentially negative woody species creeping willow (*Salix repens*) 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 Corragaun 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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) 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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) 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 (*Juncus effusus*) and common reed (*Phragmites australis*) 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 (*Hammarbya paludosa*) (Wyse Jackson et al., 2016) and the Near Threatened moss *Sphagnum platyphyllum* (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 (*Epilobium brunnescens*) was recorded within two siliceous screes monitoring stops. One monitoring stop failed due to excessive cover of the species. Pirri-pirri-bur (*Acaena novae-zelandiae*) 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 (*Pteridium aquilinum*), 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 *Mastigophora woodsii* and the Near Threatened moss *Grimmia donniana* (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 *Saxifraga* species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and *Saxifraga* 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 (*Epilobium brunnescens*) 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 (*Pteridium aquilinum*), 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 (*Saussurea alpina*) (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 (*Epilobium brunnescens*) was recorded within three siliceous scree monitoring stops, two of which failed due to excessive cover of the species. Cotoneaster (*Cotoneaster* 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 (*Pteridium aquilinum*), 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 (*Vertigo geyeri*) 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 *Carex lepidocarpa, Parnassia palustris, Pinguicula vulgaris, Juncus articulatus, Eriophorum* sp. and the mosses *Scorpidium revolvens* and *Campylium stellatum*, with scattered tussocks of *Schoenus nigricans* ≤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 *Schoenus nigricans* 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 (*Vertigo angustior*) 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 (*Festuca rubra*) and silverweed (*Potentilla anserina*), 10-25cm in height OR damp grassland dominated by yellow flag (*Iris pseudacorus*), 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/m² throughout the lower sections and are up to 500 mussels/m² 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 *Myriophyllum* 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 trance levels, and *Myriophyllum* 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

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 salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The 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 (*Lepeophtheirus salmonis*)
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)

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 (*Petalophyllum ralfsii*) 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 (*Petalophyllum ralfsii*) at Dooaghtry, estimated from polygons drawn around GPS co-ordinates taken from NPWS surveys and Campbell (2013), is c.159,648m². However, only c.60% of this area is suitable for petalwort, i.e. c.95,790m² (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 (*Petalophyllum ralfsii*) 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 (*Petalophyllum ralfsii*) 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 (*Petalophyllum ralfsii*) habitat is maintained by rabbit (*Oryctolagus cuniculus*) 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

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 *Najas flexilis* within Lough Nahaltora, subject to natural processes. See map 23 for known location	A population of *Najas flexilis* (slender naiad) occurs in Lough Nahaltora in Mweelrea/Sheeffry/Erriff Complex SAC. A record for *Najas flexilis* 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 *Najas flexilis* for further details
Population depth	Metres	No change to the depth range of *Najas flexilis* within Lough Nahaltora, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population abundance	Square metres	No change to the cover abundance of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Habitat extent	Hectares	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See the *Najas flexilis* 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 *Najas flexilis* supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the population of the species	See the *Najas flexilis* supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the population of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Water colour	mg/l PtCo	Maintain/restore appropriate water colour to support the population of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the population of *Najas flexilis*	See the *Najas flexilis* 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 *Najas flexilis*	See the *Najas flexilis* supporting document for further details

Legend

Mweelrea/Sheeffry/Erriff Complex SAC 001932

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MAP 1:
MWEELREA / SHEEFRY / ERRIFF COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001932 version 3.01
CO. MAYO

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017

SAC 002998

SAC 002998

SAC 001932

Legend

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

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MAP 2:
MWEELREA / SHEEFFRY / ERRIFF COMPLEX SAC
CONSERVATION OBJECTIVES
ADJACENT DESIGNATIONS

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

SITE CODE:SAC 001932; version 3.01.
SAC 002998; version 3.03. CO. MAYO

0 4 8 12 16 20 km

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

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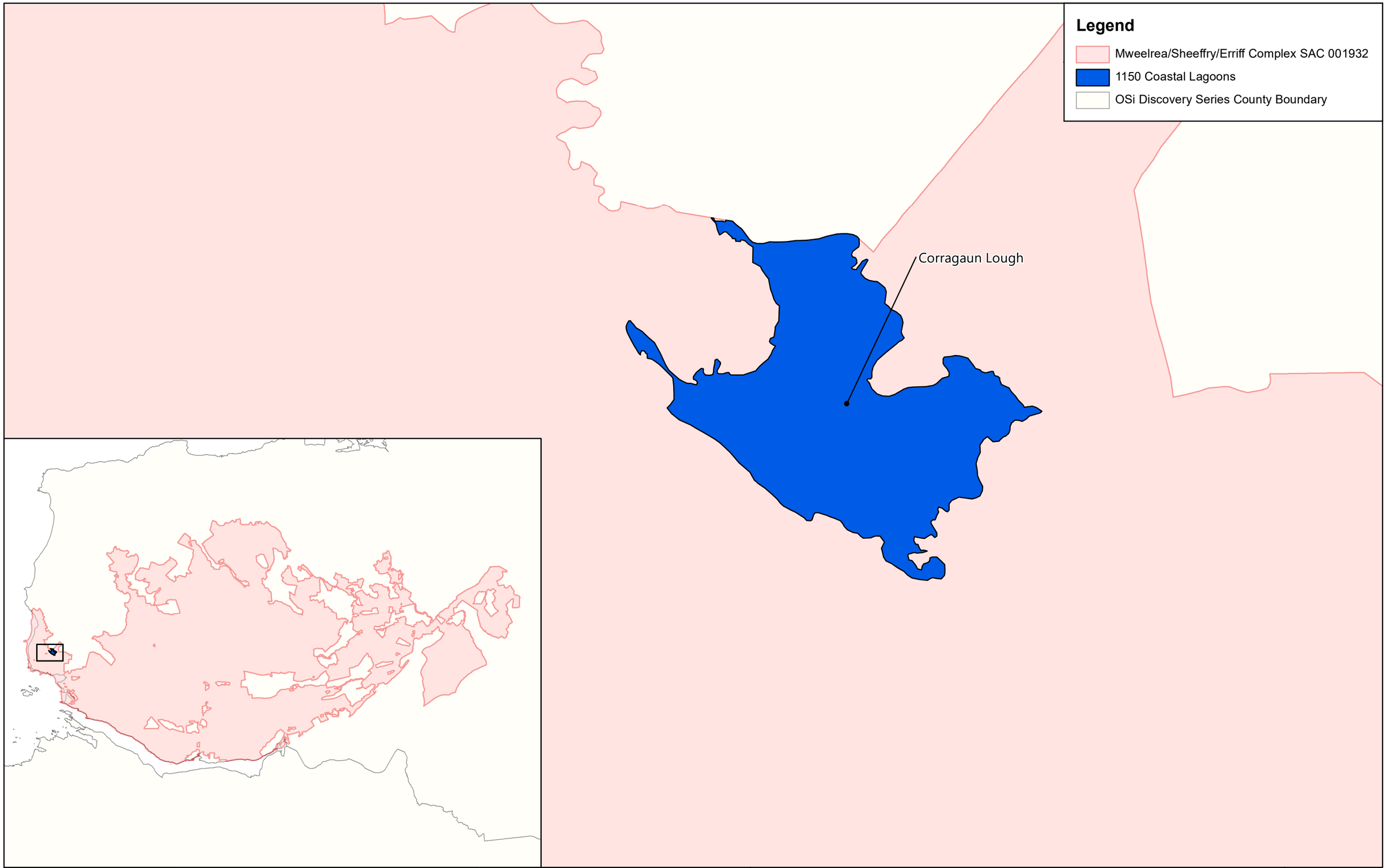
Map Version 1
Date: Aug 2017



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MAP 3:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
COASTAL LAGOON

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 0.05 0.1 0.15 0.2 0.25 km

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

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Map Version 1
Date: Aug 2017

SMP Site Code: SMP0010

SMP Site Code: SMP0010

SMP Site Code: SMP0010

SMP Site Code: SMP0106

Legend

- Coastal Monitoring Project Boundary
- Saltmarsh Monitoring Project Boundary
- Mweelrea/Sheeffry/Erriff Complex SAC 001932

Qualifying Interests

- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 1330 / 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- 1410 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- Potential 1330 Potential Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Potential 1330 / 1410 Potential Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) / Mediterranean salt meadows (*Juncetalia maritimi*)
- OSi Discovery Series County Boundary

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MAP 4:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 2 4 6 8 10 km

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

N

Map Version 1
Date: Aug 2017

Legend

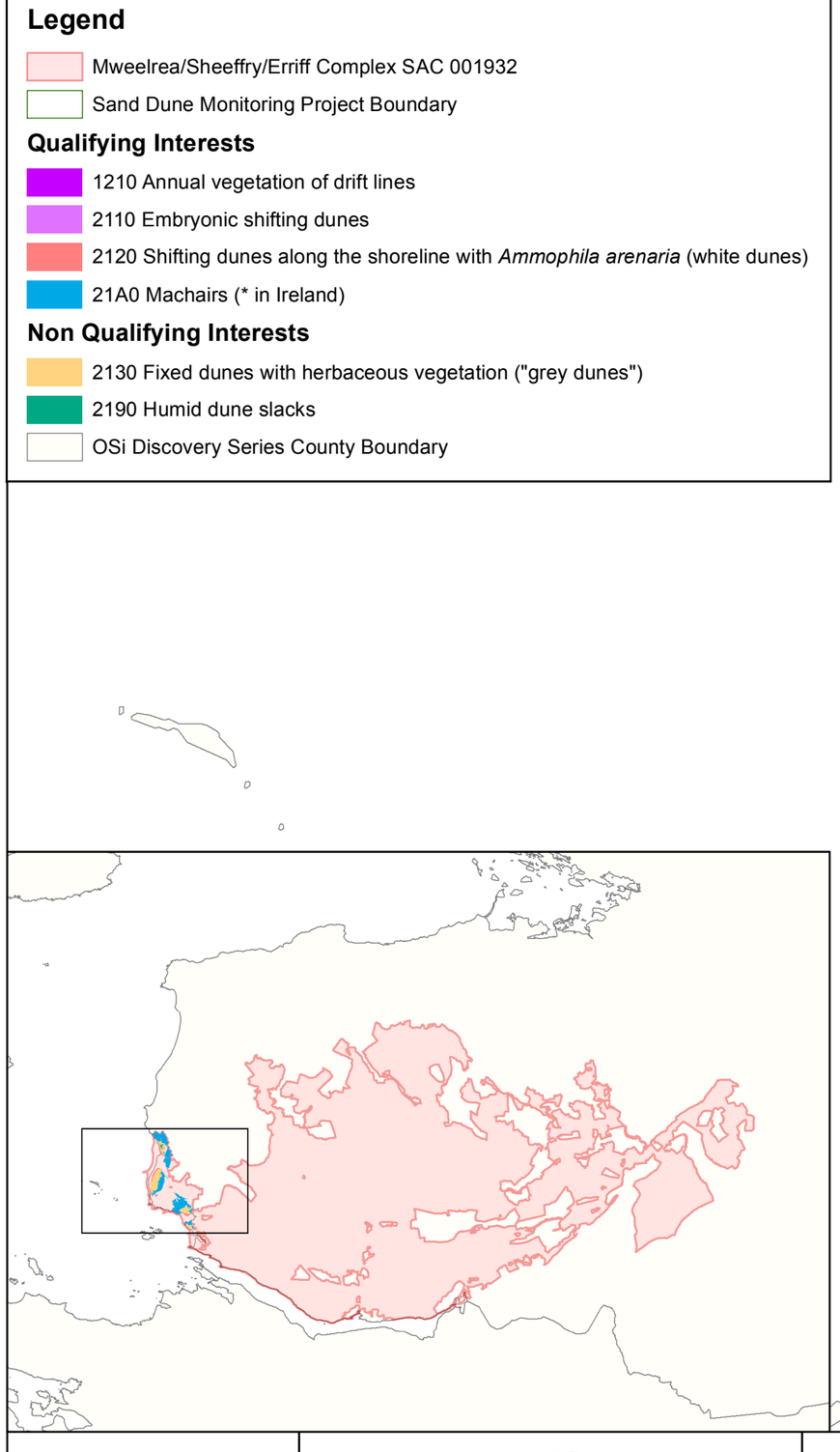
- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- Sand Dune Monitoring Project Boundary

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



Sand Dune Monitoring Project, SITE CODE: 108

Sand Dune Monitoring Project, SITE CODE: 108

Sand Dune Monitoring Project, SITE CODE: 108

Sand Dune Monitoring Project, SITE CODE: 108

Sand Dune Monitoring Project, SITE CODE: 108

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MAP 5:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
SAND DUNE HABITATS

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 0.2 0.4 0.6 0.8 1 km

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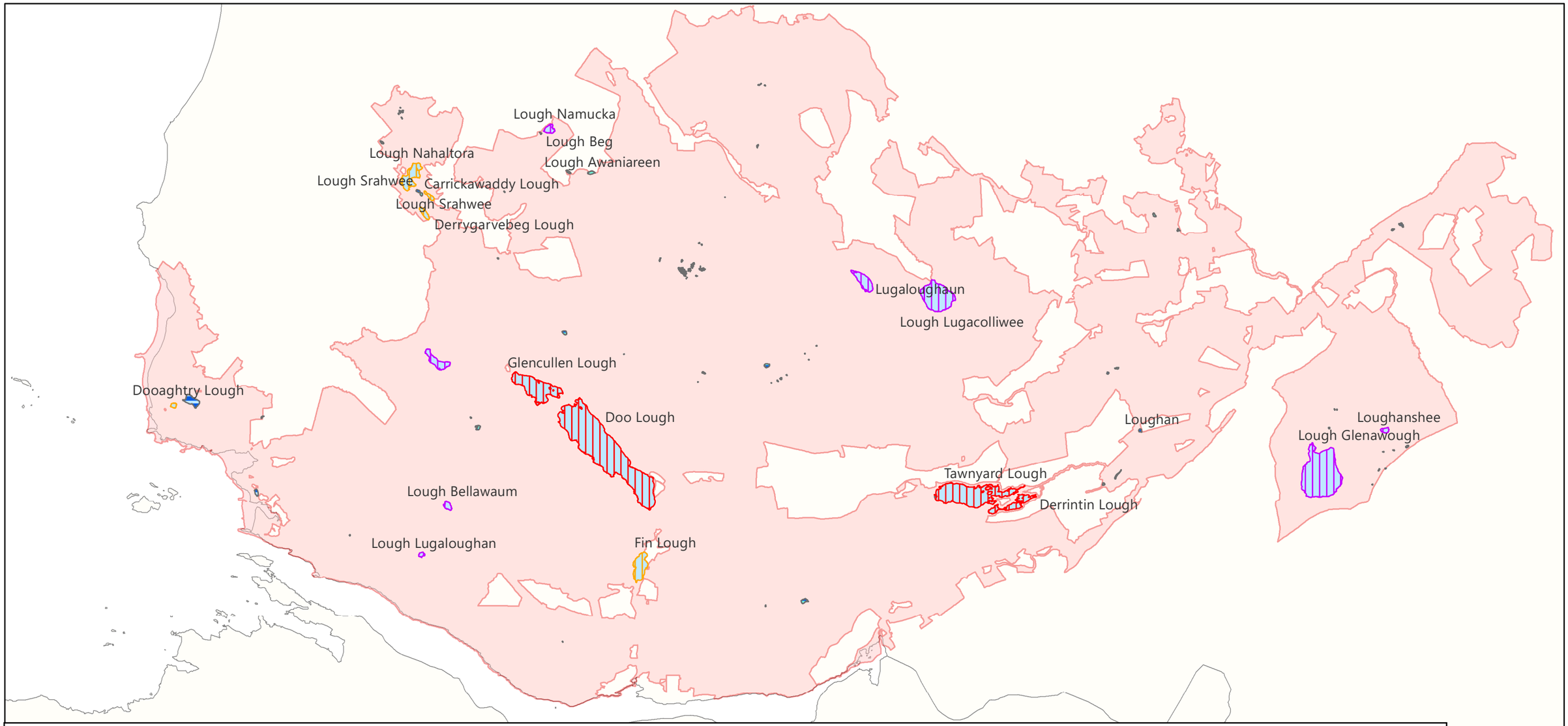
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017



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

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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

0 1 2 3 4 km

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

N

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%

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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

0 1 2 3 4 5 km

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

N

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%

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MAP 8:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
DRY HEATH

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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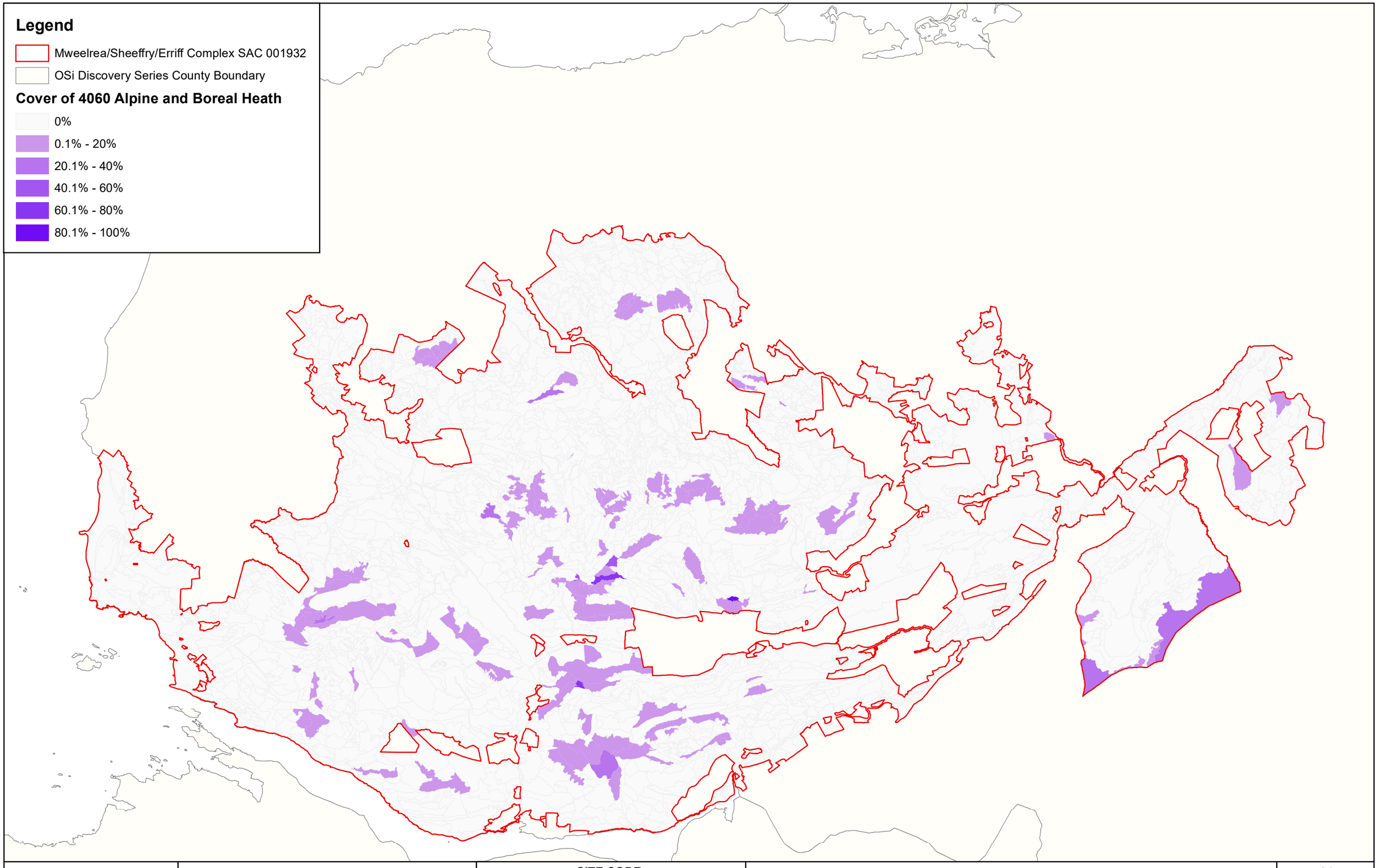
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017



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MAP 9:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
ALPINE AND BOREAL HEATH

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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

N

Map Version 1
Date: Aug 2017

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%

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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

0 1 2 3 4 5 km

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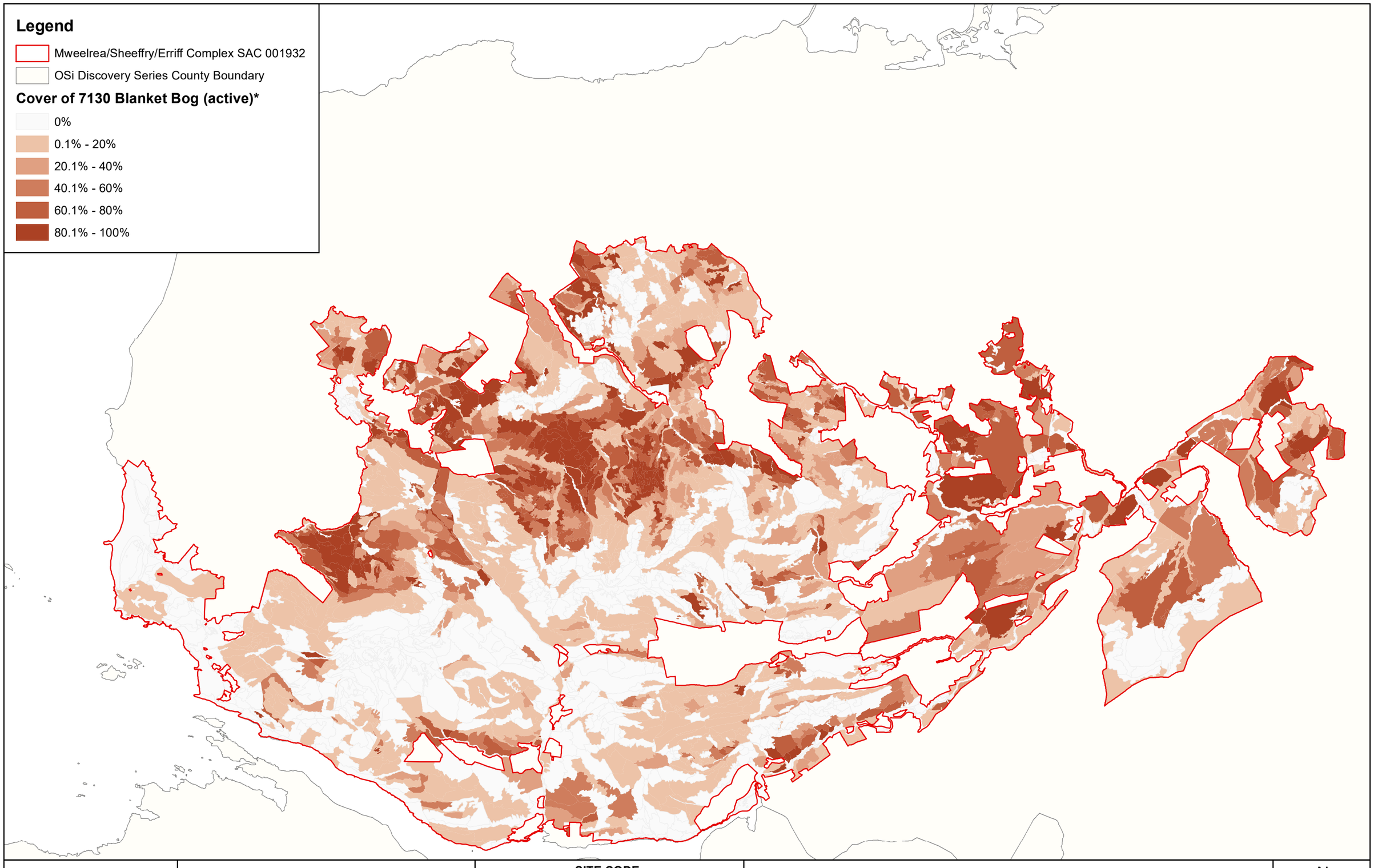
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017



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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

0 0.9 1.8 2.7 3.6 4.5 km

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

N

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%

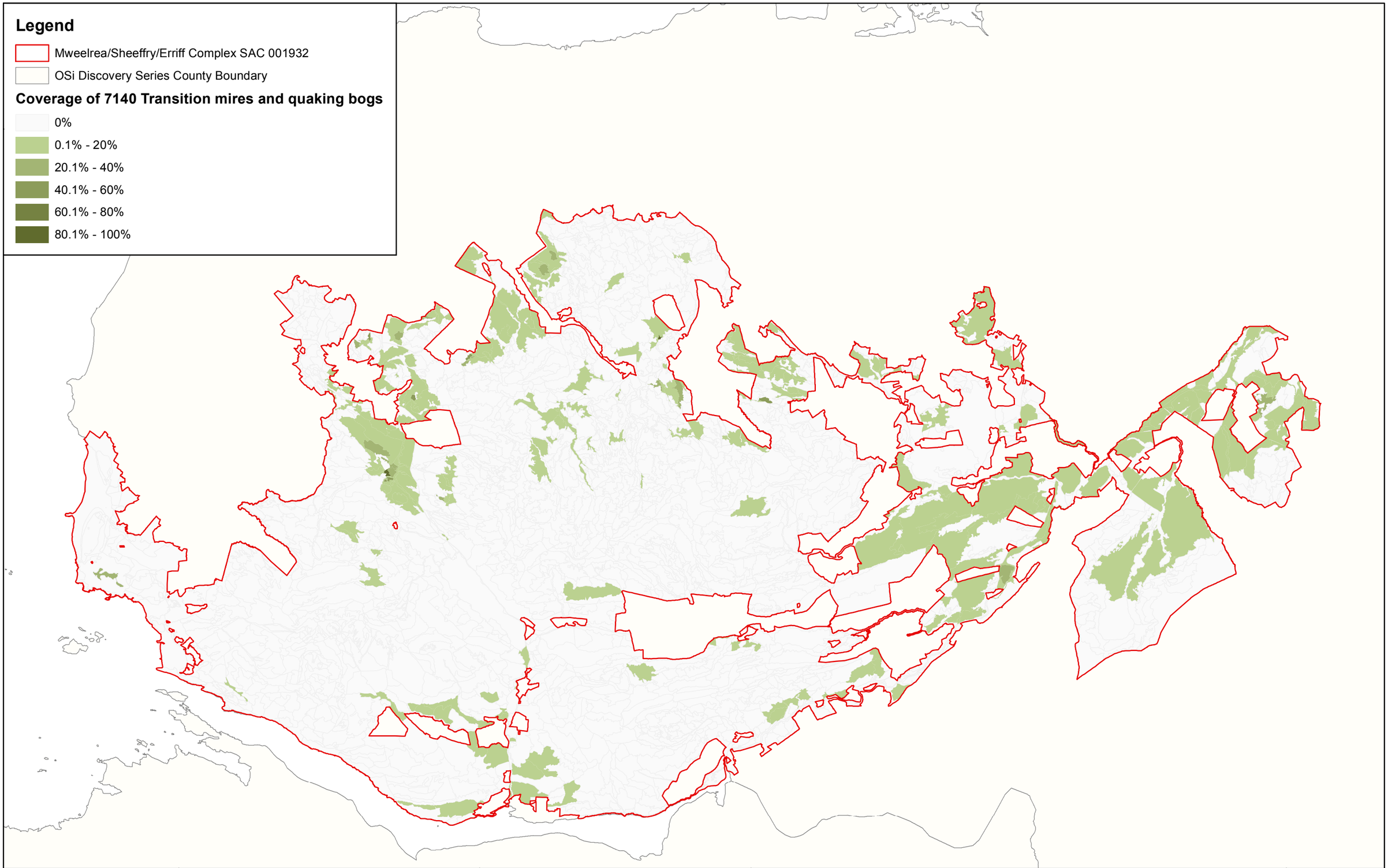
0.1% - 20%

20.1% - 40%

40.1% - 60%

60.1% - 80%

80.1% - 100%



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MAP 12:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
TRANSITION MIRES AND QUAKING BOGS

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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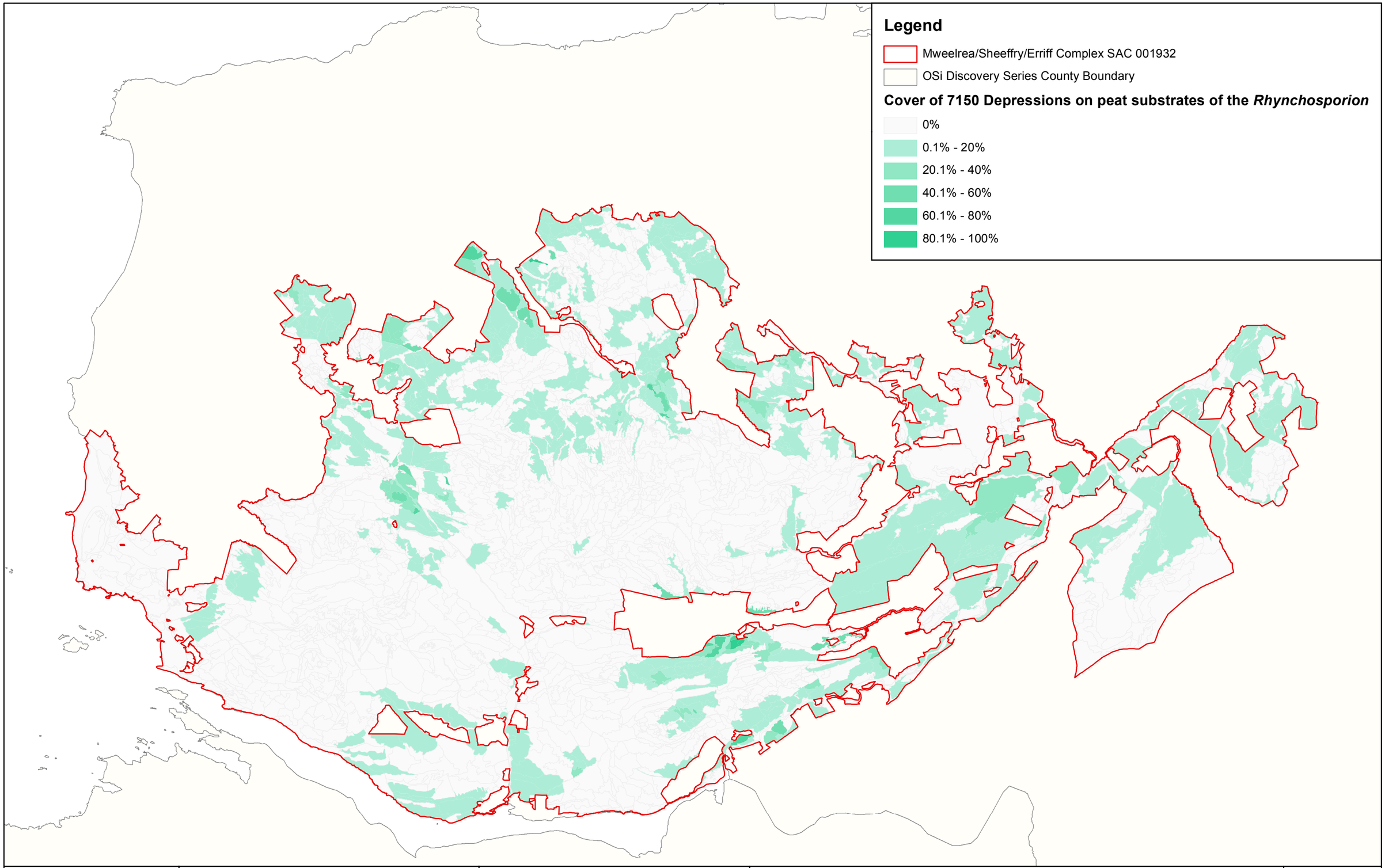
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017



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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:
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CO. MAYO

0 1 2 3 4 5 km

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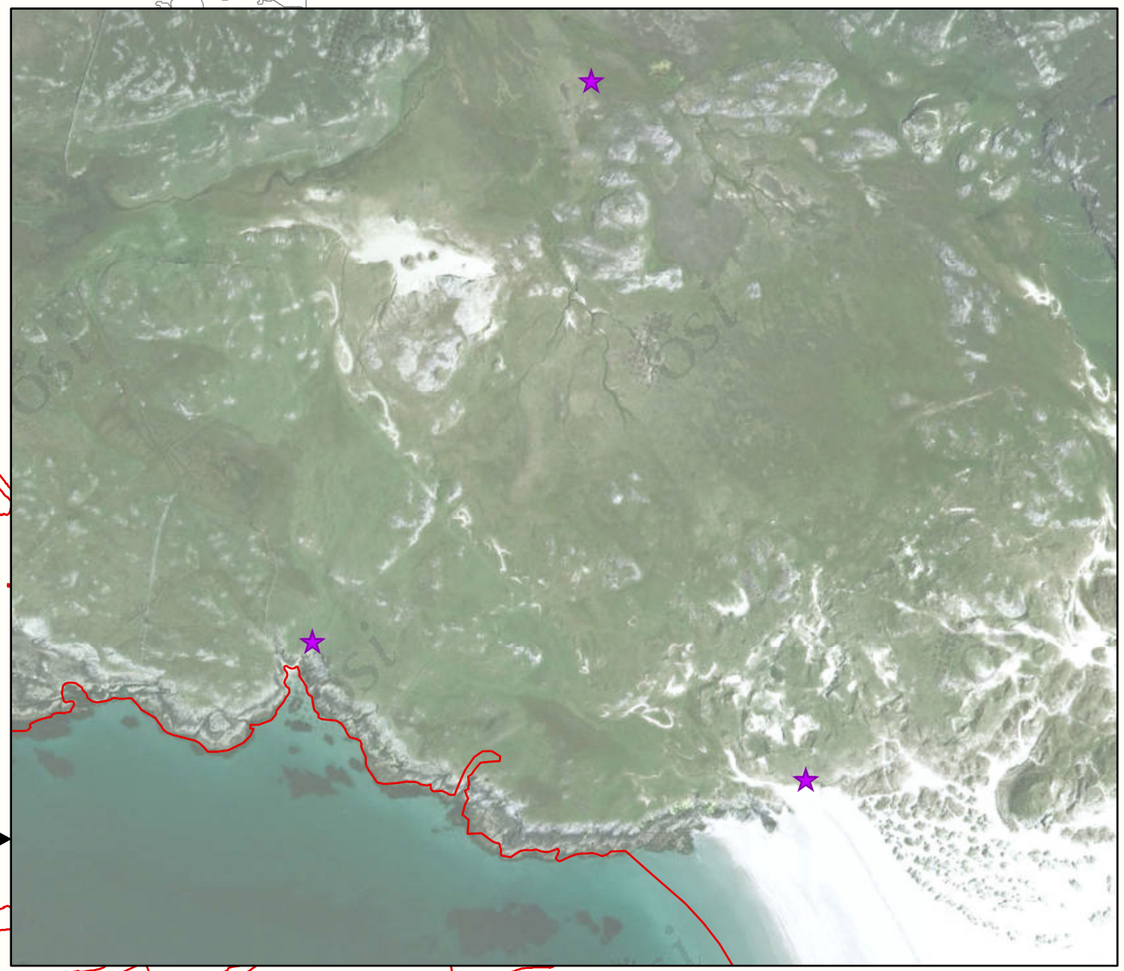
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

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



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Department of Culture, Heritage and the Gaeltacht

MAP 14:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
PETRIFYING SPRINGS

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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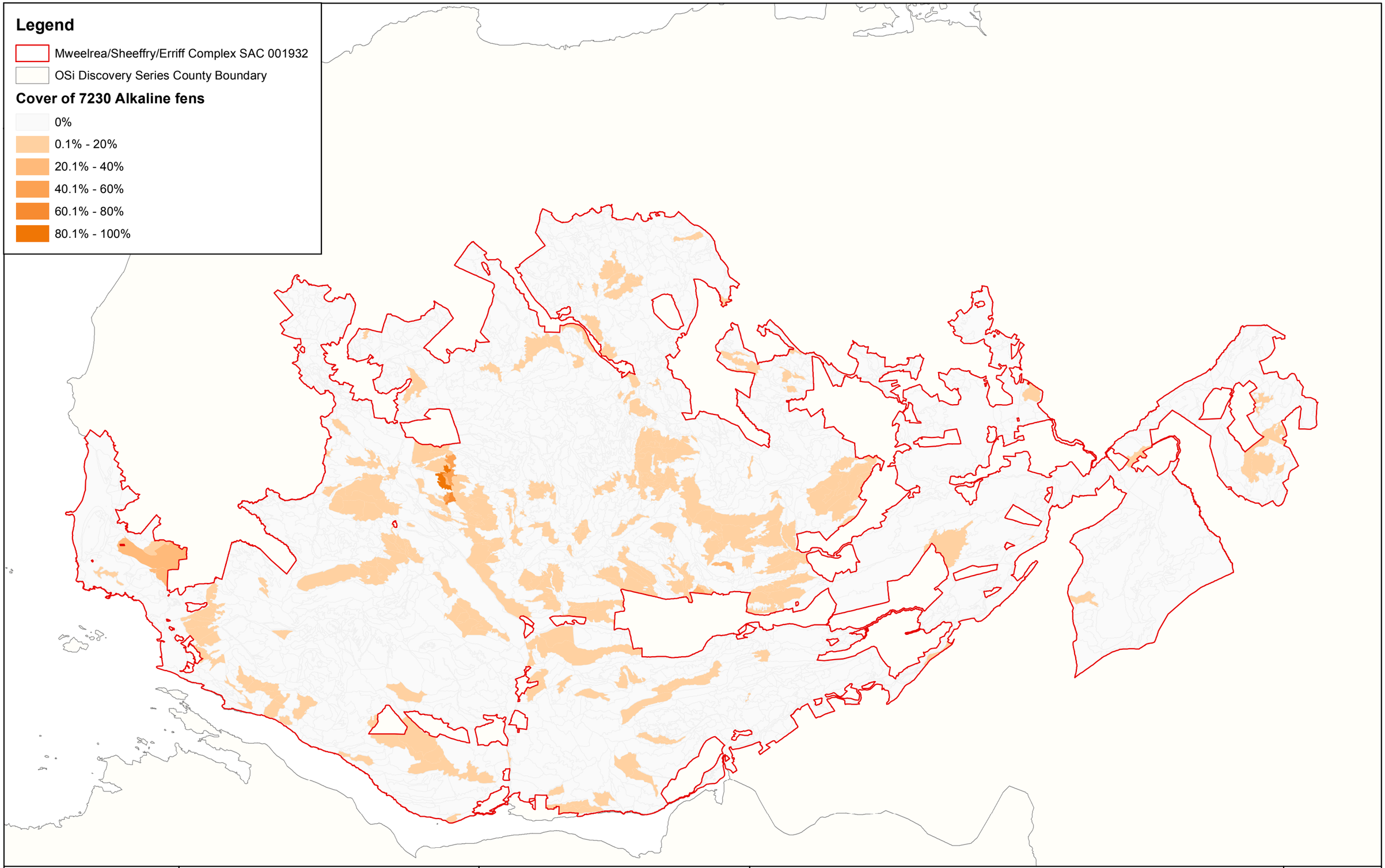
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Aug 2017



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MAP 15:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
ALKALINE FEN

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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

N

Map Version 1
Date: Aug 2017

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%

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MAP 16:
MWEELREA/SHEEFFRY/ERRIFF SAC
CONSERVATION OBJECTIVES
SILICEOUS SCREE

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

SITE CODE:
SAC 001932; version 3.01
CO. MAYO

0 1 2 3 4 5 km

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

N

Map Version 1
Date: Aug 2017

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%

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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

0 1 2 3 4 5 km

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

N

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%

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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

0 1 2 3 4 5 km

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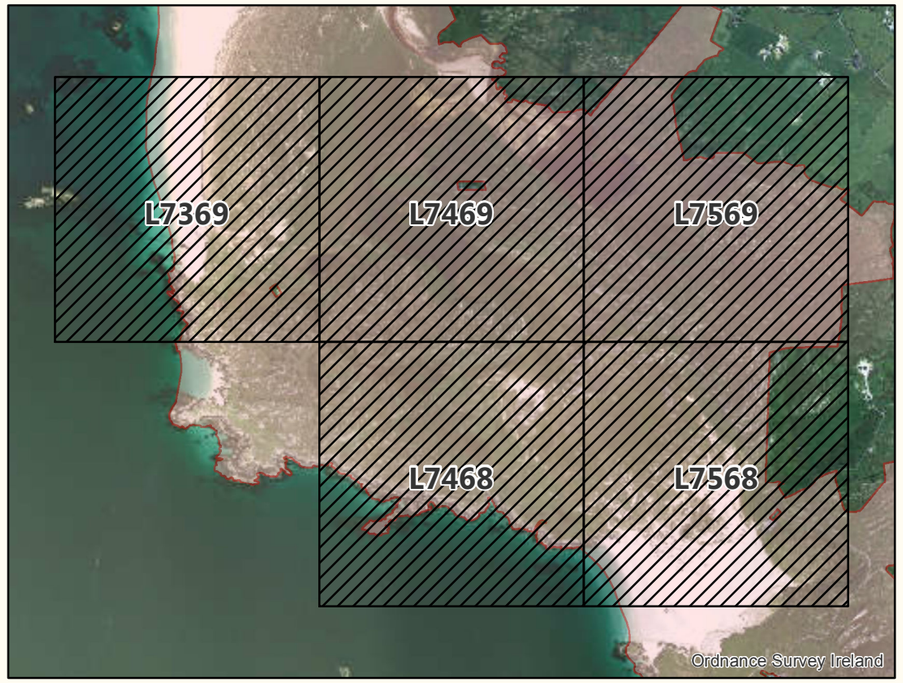
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

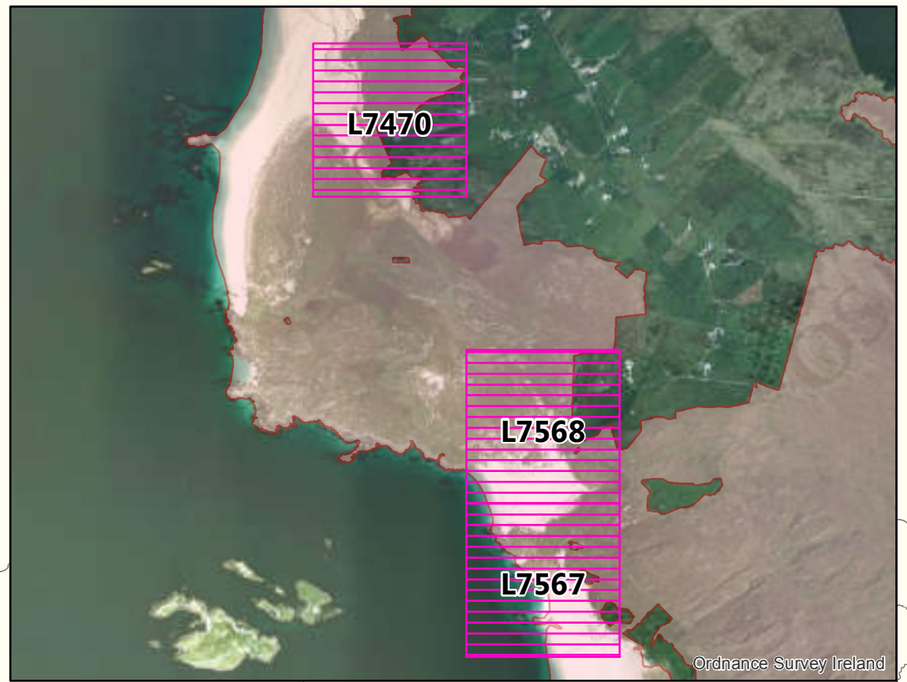
N

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*





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MAP 19:
MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC
CONSERVATION OBJECTIVES
GEYER'S WHORL SNAIL &
NARROW-MOUTHED WHORL SNAIL

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

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

0 2 4 6 8 10 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Aug 2017

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

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MAP 20:
MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC CONSERVATION OBJECTIVES FRESHWATER PEARL MUSSEL - *MARGARITIFERA MARGARITIFERA*

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

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

0 1 2 3 4 5 km

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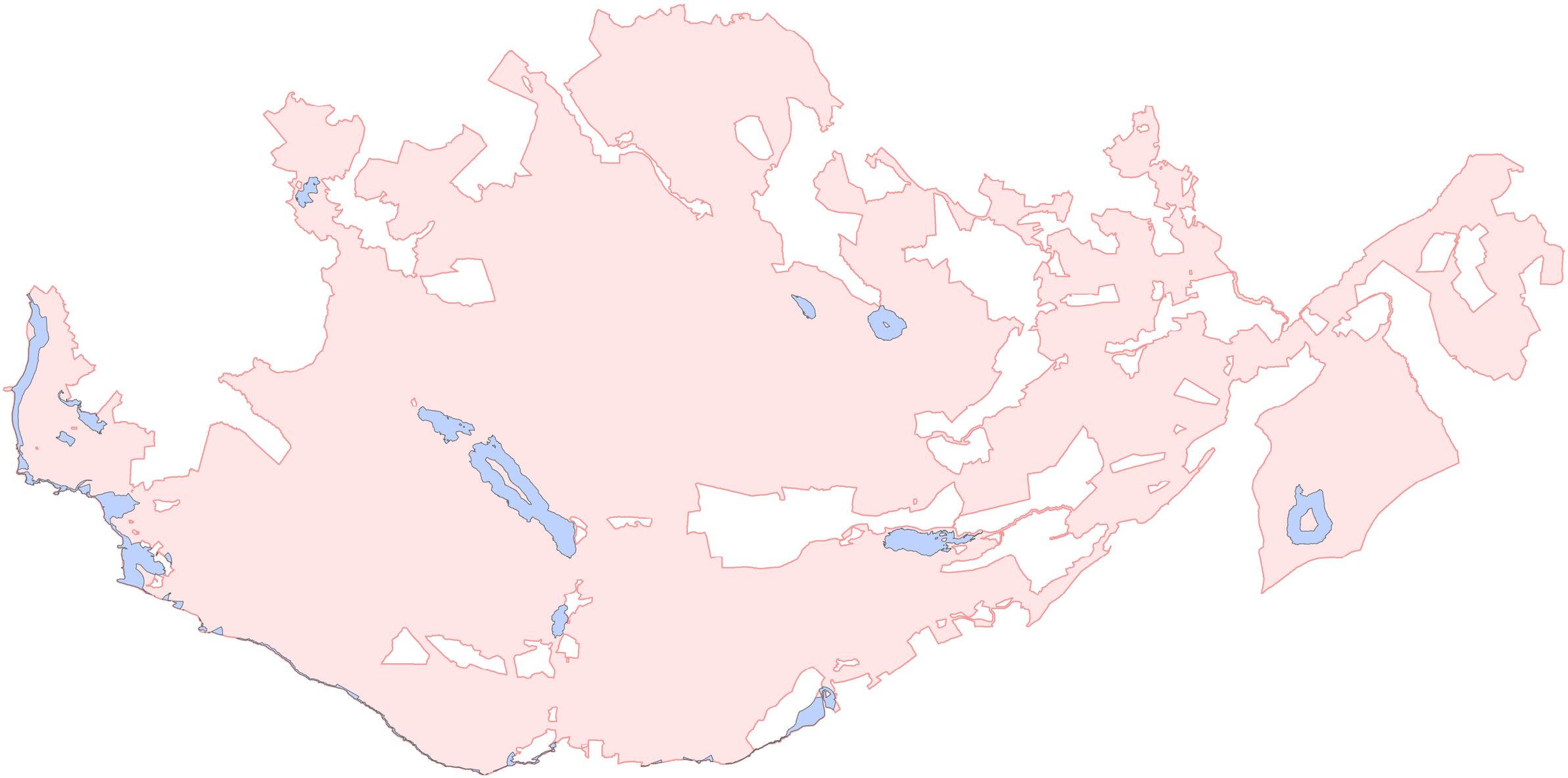
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Aug 2017

Legend

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



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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

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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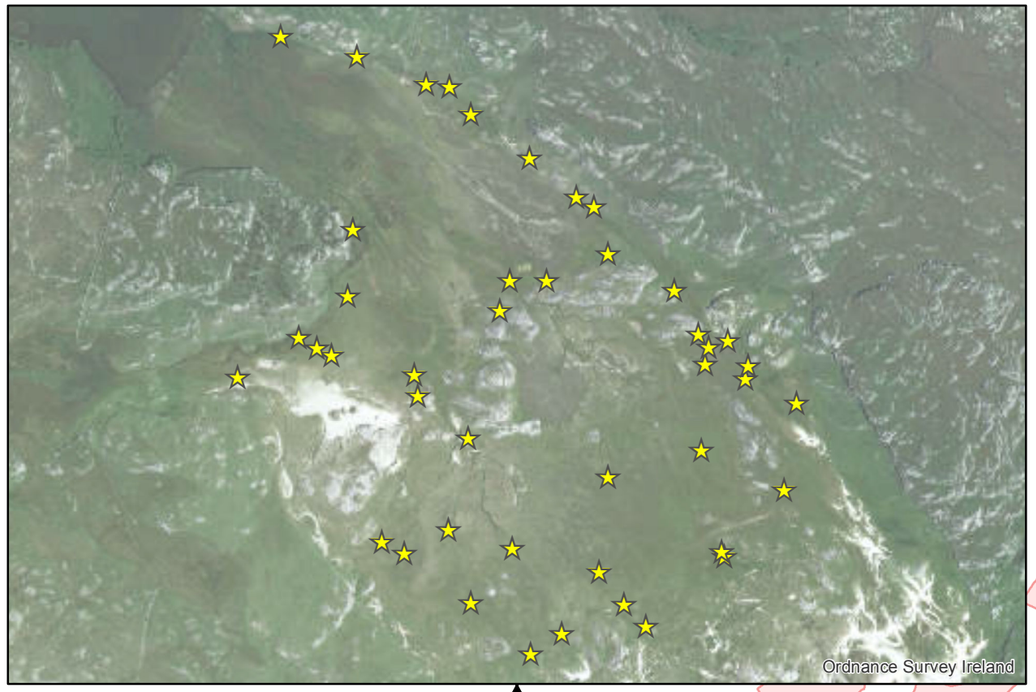
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Aug 2017

Legend

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



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

MAP 22:
MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC
CONSERVATION OBJECTIVES
PETALWORT

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

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

0 1 2 3 4 5 km

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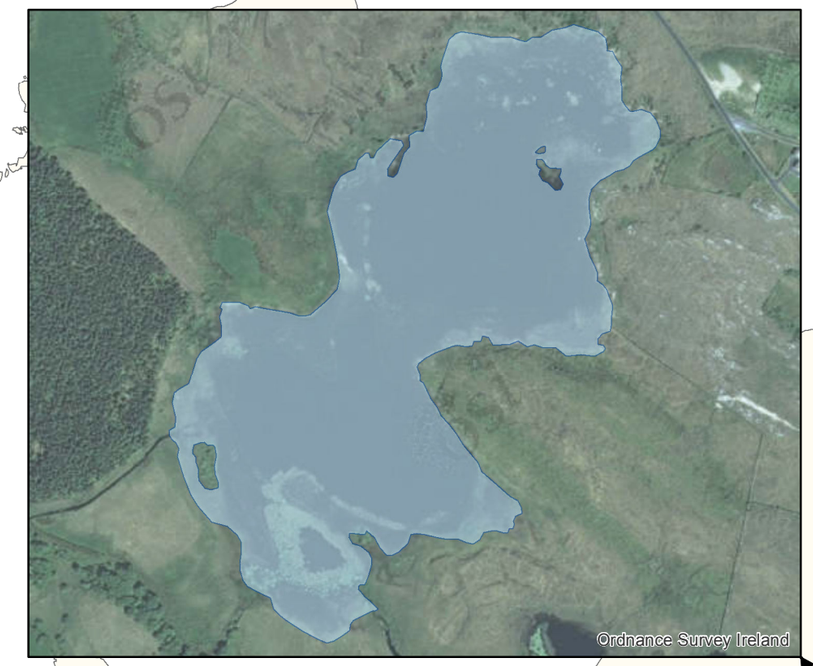
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Aug 2017



Legend

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

An Roinn
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Department of
Culture, Heritage and the Gaeltacht

MAP 23:
MWEELREA/SHEEFFRY/ERRIFF COMPLEX SAC
CONSERVATION OBJECTIVES
SLENDER NAIAD

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

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

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Aug 2017

Conservation objectives for Croaghaun/Slievemore SAC [001955]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Code	**Description**
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
4060	Alpine and Boreal heaths
7130	Blanket bogs (* if active bog)
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
8220	Siliceous rocky slopes with chasmophytic vegetation

* denotes a priority habitat

Citation: *NPWS (2020) Conservation objectives for Croaghaun/Slievemore SAC [001955]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Bellacragher Saltmarsh SAC 002005

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Bellacragher Saltmarsh SAC 002005. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002005	Bellacragher Saltmarsh SAC
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
1410	Mediterranean salt meadows (Juncetalia maritimi)

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2007
Title :	Saltmarsh Monitoring Project 2006
Author :	McCorry, M.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Saltmarsh monitoring project 2007-2008
Author :	McCorry, M.; Ryle, T.
Series :	Unpublished report to NPWS
Year :	2016
Title :	Bellacragher Saltmarsh SAC (site code: 2005) Conservation objectives supporting document-coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Spatial data sources

Year :	Revision 2010
Title :	Saltmarsh Monitoring Project 2007-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1330, 1410 (map 2)

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Bellacragher Saltmarsh SAC, which is defined by the following list of attributes and targets:

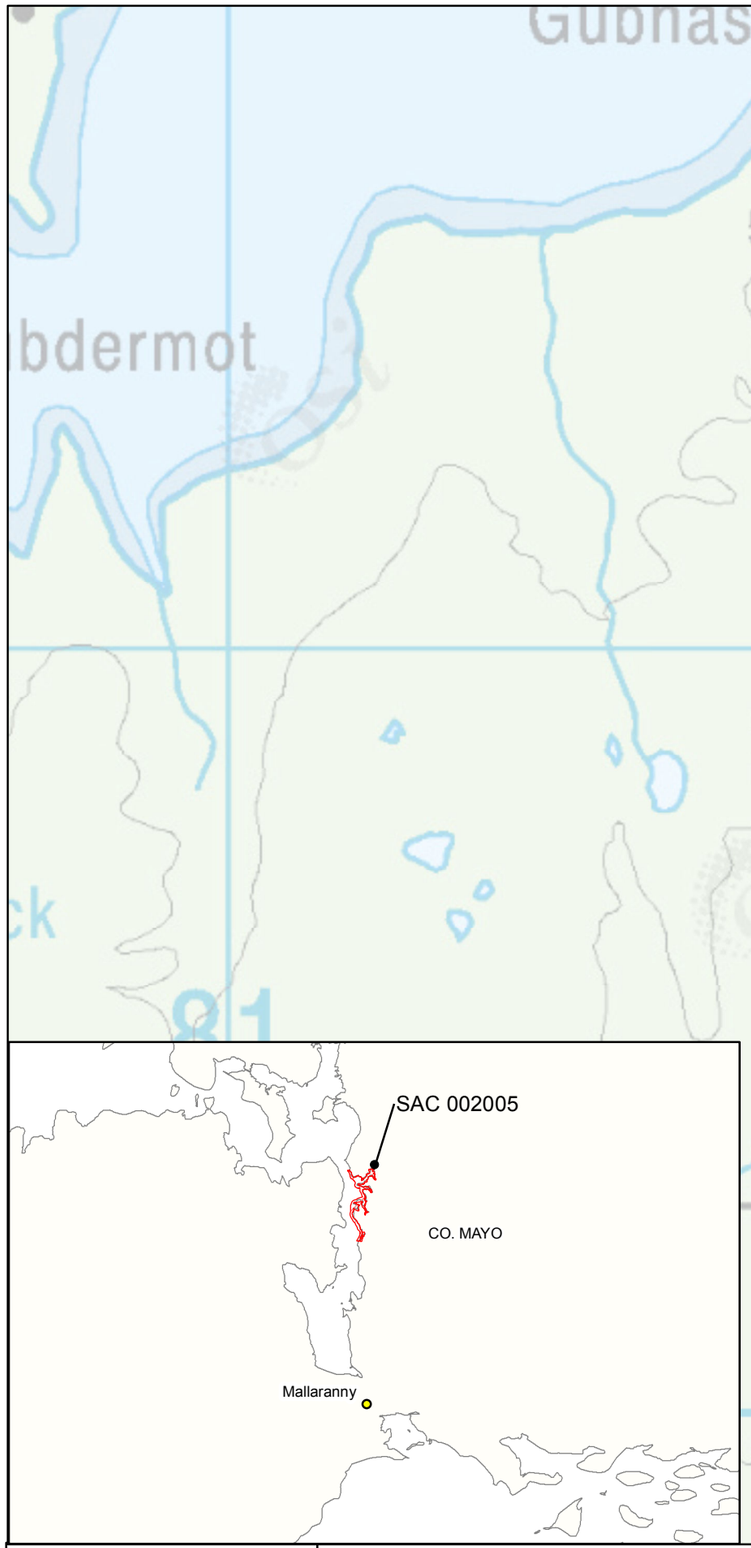
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Bellacragher Bay - 0.80ha. See map 2	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). The sub-site Bellacragher Bay (site ID: SMP0021) that supports Atlantic salt meadows (ASM) was mapped to give a total estimated area of 0.80ha within Bellacragher Saltmarsh SAC. NB further unsurveyed areas may be present within the SAC. See the Bellacragher Saltmarsh 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 2 for known distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (2007) and McCorry and Ryle (2009). The saltmarsh occurs mostly on a peat substrate, though some patches occur on the stony shoreline. Within the SAC it mainly occurs as a thin band of vegetation generally between 3-6m wide on a thin band of mud/peat generally overlaying rocky/shingle deposits. 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). The ASM structure is poorly developed, which is typical of these fringe marshes and no creek or pans are present. 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 saltmarsh vegetation that occurs on peat generally transitions to blanket bog, wet heath, wet grassland, dry grassland, bracken (*Pteridium aquilinum*) scrub and mosaics of these habitats. The seaward edge of the saltmarsh usually borders intertidal mud or rocky shoreline. 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 saltmarsh is mainly grazed by sheep and some areas are noticeably close-cropped. 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). There are signs of erosion around the edge of the shoreline, some of which is caused by overgrazing by sheep with bare ground (<10%) significant in places. 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). The species typical of ASM are present including saltmarsh rush (*Juncus gerardii*), common saltmarsh-grass (*Puccinellia maritima*), red fescue (*Festuca rubra*), buck's-horn plantain (*Plantago coronopus*), sea plantain (*P. maritima*) and thrift (*Armeria maritima*). A feature of the marsh is the presence of 'turf fucoids', a term given to various species of brown algae which occur in miniature forms on saltmarshes, especially in western Ireland. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). Common cordgrass (*Spartina anglica*) was not recorded in Bellacragher Saltmarsh SAC. See the coastal habitats supporting document for further details

1410 Mediterranean salt meadows (Juncetalia maritimi)

To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Bellacragher Saltmarsh 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: Bellacragher Bay - 0.88ha. See map 2	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry, 2007; McCorry and Ryle, 2009). The sub-site Bellacragher Bay (site ID: SMP0021) that supports Mediterranean salt meadows (MSM) was mapped to give a total estimated area of 0.88ha within Bellacragher Saltmarsh SAC. NB further unsurveyed areas may be present within the SAC. See the Bellacragher Saltmarsh SAC conservation objective supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from McCorry (2007) and McCorry and Ryle (2009). NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry (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). 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). MSM 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). Patches of sea rush (*Juncus maritimus*) occur in rocky and muddy areas in narrow bands at the foot of peat cliff faces and may form mosaics with ASM in places. There are also natural transitions from MSM to wet and dry grassland, blanket bog and wet heath. 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). MSM generally is not significantly overgrazed in the SAC. 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). Sheep grazing is causing some localised damage to MSM in the SAC although the area affected is generally quite small (<5%). 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). MSM habitat is dominated by dense sea rush (*Juncus maritimus*) which forms some of the largest areas of saltmarsh vegetation. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry (2007) and McCorry and Ryle (2009). Common cordgrass (*Spartina anglica*) was not recorded in Bellacragher Saltmarsh SAC. See the coastal habitats supporting document for further details



Gubnastacky

bdermot

Claggan mountain

5

69

126

22

10

20

30

50

60

81

82

83

Legend

Bellacragher Saltmarsh SAC 002005

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

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

MAP 1:
BELLACRAGHER SALTMARSH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002005; version 3.
CO. MAYO

0 0.1 0.2 0.3 0.4 0.5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: Oct 2016

SMP Site Code: SMP0021

Legend

Bellacragher Saltmarsh SAC 002005

Saltmarsh Monitoring Project Survey

Annex I Habitats

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

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

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

OSi Discovery Series County Boundary

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

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

MAP 2:
BELLACRAGHER SALTMARSH SAC
CONSERVATION OBJECTIVES
SALTMARSH HABITATS

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

SITE CODE:
SAC 002005; version 3.
CO. MAYO

0 0.04 0.08 0.12 0.16 0.2 km

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N

Map Version 1
Date: Oct 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Ox Mountains Bogs SAC 002006

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Ox Mountains Bogs SAC 002006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
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Introduction

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

Notes/Guidelines:

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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***

002006	Ox Mountains Bogs SAC
1013	Geyer's Whorl Snail *Vertigo geyeri*
1528	Marsh Saxifrage *Saxifraga hirculus*
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
3160	Natural dystrophic lakes and ponds
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion

Please note that this SAC adjoins River Moy SAC (002298). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent site as appropriate.

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

NPWS Documents

Year :	1989
Title :	A survey to locate blanket bogs of scientific interest in County Kerry and County Sligo
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to NPWS
Year :	2011
Title :	Monitoring and condition assessment of populations of *Vertigo geyeri*, *Vertigo angustior* and *Vertigo moulinsiana* in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Irish Wildlife Manual No. 55
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	National survey of upland habitats (phase 3, 2012-2013) Site report no. 10: Ox Mountains Bogs cSAC (002006), Cos. Mayo and Sligo
Author :	Perrin, P.M; Roche, J.R.; Barron, S.J.; Daly, O.H.; Hodd, R.L.; Muldoon, C.S.; Leydon, K.L.
Series :	Unpublished report to NPWS
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Monitoring recommendations for Marsh Saxifrage (*Saxifraga hirculus* L.) in the Republic of Ireland
Author :	Muldoon, C.S.; Waldren, S.; Lynn, D.
Series :	Irish Wildlife Manual No. 88
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Ox Mountains Bogs SAC (site code: 2006) Conservation objectives supporting document-upland habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1982
Title :	Eutrophication of waters. Monitoring assessment and control
Author :	OECD
Series :	OECD, Paris
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19 (3): 264–273
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2011
Title :	Conservation biology of *Saxifraga hirculus* L. in Ireland
Author :	Muldoon, C.S.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished PhD thesis, University College Cork
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	European Commission

Year :	2014
Title :	New vice-county record for Marsh Saxifrage (*Saxifraga hirculus*) in Sligo (H28)
Author :	Muldoon, C.; Hodd, R.; Lockhart, N.; Douglas, C.; Roche, J.
Series :	Irish Naturalists' Journal, 33 (2): 130-131
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110, 3160 (map 3)
Year :	2013
Title :	National Survey of Upland Habitats
GIS Operations :	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
Used For :	4010, 4030, 7130, 7140, 7150 (maps 4-8)
Year :	2016
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1013 (map 9)

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 Ox Mountains Bogs 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 occurs in Lough Easky. It may also be present in other lakes in the SAC, where it is likely to co-occur with habitat 3160, however the exact distribution of habitat 3110 in the SAC is unknown. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as 'potential 3110' (see map 3). 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 distribtion	Occurrence	No decline, subject to natural processes	As noted above, the exact distribution of habitat 3110 in the SAC is not known. In map 3, all lakes larger than 1ha (based on 1:5,000 data) have been mapped as potential 3110
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the remaining four Annex I lake habitats
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. An indicative target has not yet been set for this lake habitat type. Indicative targets will be developed for the other lake habitats with time
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that the 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 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. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; mg/l N	Maintain 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 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 lake habitat 3110, annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to the lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/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 EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 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, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 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 lake habitat 3110, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3110	Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet-woodland that intergrade with and support the structure and functions of the lake habitat. In this SAC, blanket bog and heath communities are likely to dominate shorelines. Poor fen and flush may also occur. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

3160 Natural dystrophic lakes and ponds

To maintain the favourable conservation condition of Natural dystrophic lakes and ponds in Ox Mountains Bogs 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	This SAC has extensive blanket bog pool systems. Douglas et al. (1989) said the interconnecting pool system in Letterunshin, NW of L. Easky was the largest recorded in the blanket bog survey and of very high scientific and conservation value. Not all of the pools are mapped in the 1:5,000 OSi data. The 201 pools less than 1ha in area have been mapped as potential 3160 (see map 3). As all lakes in the SAC are surrounded by blanket bog and wet heath, 3160 likely also occurs in the larger lakes. The habitat is considered to be of high conservation value in the site. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, the habitat is widespread and of high conservation value in the SAC (see map 3)
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see Article 17 habitat assessment for 3160 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however, significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other four Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target has not yet been set for this lake habitat type. Lakes in the SAC typically have very clear water and, therefore, maximum depth is expected to be large
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes and pools must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced. Owing to their size and the sensitivity of peatland, 3160 lakes and pools can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates

Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A specific target has yet to be established for this Annex I lake habitat. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P; mg/l N	Maintain 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 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 TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3160 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and pools 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 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 ≥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 EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for lake habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and pools where the peatland in the catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	Most 3160 lake and pool shorelines intergrade with blanket bog, flush, poor-fen or heath habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of wet heath stated by Perrin et al. (2013) is 1083.2ha, covering 10.2% of the SAC. Perrin et al. (2013) report obvious losses of habitat since 1995 of less than 0.01ha through landslides. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 4	Wet heath was recorded by Perrin et al. (2013) throughout the SAC mainly on the lower slopes. Extensive patches occur on the slopes above Cloonacool, and Carrowneden in the east. It also occurs through Fiddenderry and on the slopes above Easkey Lough. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded six different wet heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Cross-leaved heath (*Erica tetralix*) present near each monitoring stop	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). Further details can be found in the uplands supporting document
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* and pleurocarpous mosses at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: ericoid species and crowberry	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of ericoid species and crowberry (*Empetrum nigrum*) at least 15%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013) at two monitoring stops with extensive carpets at one of these. Scattered non-native conifers were also recorded

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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of 2m x 2m monitoring stops	No signs of burning in sensitive areas, into the moss, liverwort or lichen layer or exposure of peat surface due to burning	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Percentage cover in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document 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	Perrin et al. (2013) 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. See the uplands supporting document for further details

4030 European dry heaths

To maintain the favourable conservation condition of European dry heaths in Ox Mountains Bogs 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	Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of dry heath stated by Perrin et al. (2013) is 332.9ha, covering 3.1% of the SAC. It occurs at low frequency throughout the SAC, but is locally abundant on the rocky slopes above Easky Lough and above Cloonacool. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 5	Dry heath was recorded by Perrin et al. (2013) throughout the SAC, but was most abundant on the eastern slopes above Easky Lough. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded three different dry heath communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities 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 *Campylopus* and *Polytrichum* mosses	Based on Perrin et al. (2014). See the uplands supporting document for further details
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	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
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	Based on Perrin et al. (2014). The list of positive indicator species for this habitat, which is composed of dwarf shrubs, is presented in Perrin et al. (2014). See the uplands supporting document for further details
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 (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) is less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. Scattered non-native conifers were observed within the habitat but this was limited to a few individuals

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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation composition: soft rush	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of soft rush (*Juncus effusus*) less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: senescent ling	Percentage cover at a representative number of 2m x 2m monitoring stops	Senescent proportion of ling (*Calluna vulgaris*) cover less than 50%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 showing signs of browsing	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: burning	Occurrence in local vicinity of a representative number of monitoring stops	No signs of burning in sensitive areas	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
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 (*Calluna vulgaris*) should occur throughout, with at least 10% of cover in the mature phase	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document 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	Perrin et al. (2013) 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. See the uplands supporting document for further details

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area increasing, subject to natural processes	Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). Perrin et al. (2013) state that the current total area of blanket bog is 7249.6ha (68.5% of the SAC). This comprises 7097.3ha of active blanket bog area and 152.3ha of inactive blanket bog. Perrin et al. (2014) also report obvious losses of habitat since 1995 of approximately 5.8ha. However, this is almost certainly an under-estimate, as chronic losses due to erosion since 1995 cannot be quantified (106.6ha were mapped as eroding blanket bog by Perrin et al. (2013)). 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. A summary of the mapping methodology and a brief discussion of restoration potential are presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 6	Blanket bog was recorded by Perrin et al. (2013) across the SAC and was by far the most dominant habitat type. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog	At least 99% of the total Annex I blanket bog area is active	From the habitat areas given by Perrin et al. (2013) above, 97.9% of the Annex I blanket bog habitat is currently actively peat-forming. See the uplands supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the uplands supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded six different active blanket bog communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these communities 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 at each monitoring stop is at least seven	Based on Perrin et al. (2014). The list of positive indicator species for this habitat is presented in Perrin et al. (2014). See the uplands 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 or lichens, excluding *Sphagnum fallax*, at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially 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%	Based on Perrin et al. (2014). The list of negative indicator species is given in Perrin et al. (2014). See the uplands supporting document for further details

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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013) with extensive carpets recorded
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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	Based on Perrin et al. (2014). The list of sensitive areas is presented in Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: drainage	Occurrence in local vicinity of a representative number of monitoring stops	Area showing signs of drainage from heavy trampling, tracking or ditches less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document 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	Perrin et al. (2013) 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. See the uplands supporting document for further details

7140 Transition mires and quaking bogs

To maintain the favourable conservation condition of Transition mires and quaking bogs in Ox Mountains Bogs 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	Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of transition mires and quaking bogs in the SAC stated by Perrin et al. (2013) is 36.6ha. This covers 0.3% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 7	Transition mire was recorded by Perrin et al. (2013) scattered throughout the SAC. It is frequent in the small valleys of the upland plateau, along the eastern fringes of the SAC, through Letterunshion Bog and the southern section of Fiddenderry. A summary of the mapping methodology is presented in the uplands 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 uplands supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Perrin et al. (2013) recorded three different transition mire communities within this SAC. Data on the abundance of these communities is reproduced in the uplands supporting document. Further information on these vegetation communities is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at least three for in-filling pools and flushes and at least six for fens	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
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	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. No non-native species were recorded within this habitat by Perrin et al. (2013)
Vegetation structure: height	Percentage 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%	Based on Perrin et al. (2014). This attribute is only applicable to fen and flush examples, not to in-filling pool examples. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details

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%	Based on Perrin et al. (2014). See the uplands supporting document 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	Perrin et al. (2013) 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. See the uplands supporting document for further details

7150 Depressions on peat substrates of the Rhynchosporion

To maintain the favourable conservation condition of Depressions on peat substrates of the Rhynchosporion in Ox Mountains Bogs 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	Ox Mountains Bogs SAC was surveyed as part of the National Survey of Upland Habitats (NSUH; see Perrin et al., 2013; 2014). The total current area of Depressions on peat surfaces of the Rhynchosporion in the SAC stated by Perrin et al. (2013) is 49.6ha. This covers 0.5% of the SAC. Perrin et al. (2013) report no significant losses of area since 1995. A summary of the mapping methodology is presented in the uplands supporting document
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes. See map 8	Rhynchosporion depressions were recorded by Perrin et al. (2013) scattered through the western portion of the SAC, particularly through Letterunshion Bog and at Tawnamore. A summary of the mapping methodology is presented in the uplands 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 uplands 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	Based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Further details can be found in the uplands supporting document
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 35%	Based on Perrin et al. (2014). See the uplands supporting document for further details, including the list of potentially 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%	Based on Perrin et al. (2014), where the list of negative indicator species is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details. *Campylopus introflexus* was recorded within this habitat by Perrin et al. (2013) but did not form extensive carpets
Vegetation composition: native trees and scrub	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* cover is crushed, broken and/or pulled up	Based on Perrin et al. (2014). See the uplands supporting document for further details
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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) showing signs of browsing collectively less than 33%	Based on Perrin et al. (2014). See the uplands supporting document for further details

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	Based on Perrin et al. (2014), where the list of sensitive areas is also presented. See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
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%	Based on Perrin et al. (2014). See the uplands supporting document for further details
Physical structure: erosion	Occurrence in local vicinity of a representative number of monitoring stops	Less than 5% of the greater bog mosaic comprises erosion gullies and eroded areas	Based on Perrin et al. (2014). See the uplands supporting document 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	Perrin et al. (2013) 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. See the uplands supporting document for further details

1013 Geyer's Whorl Snail *Vertigo geyeri*

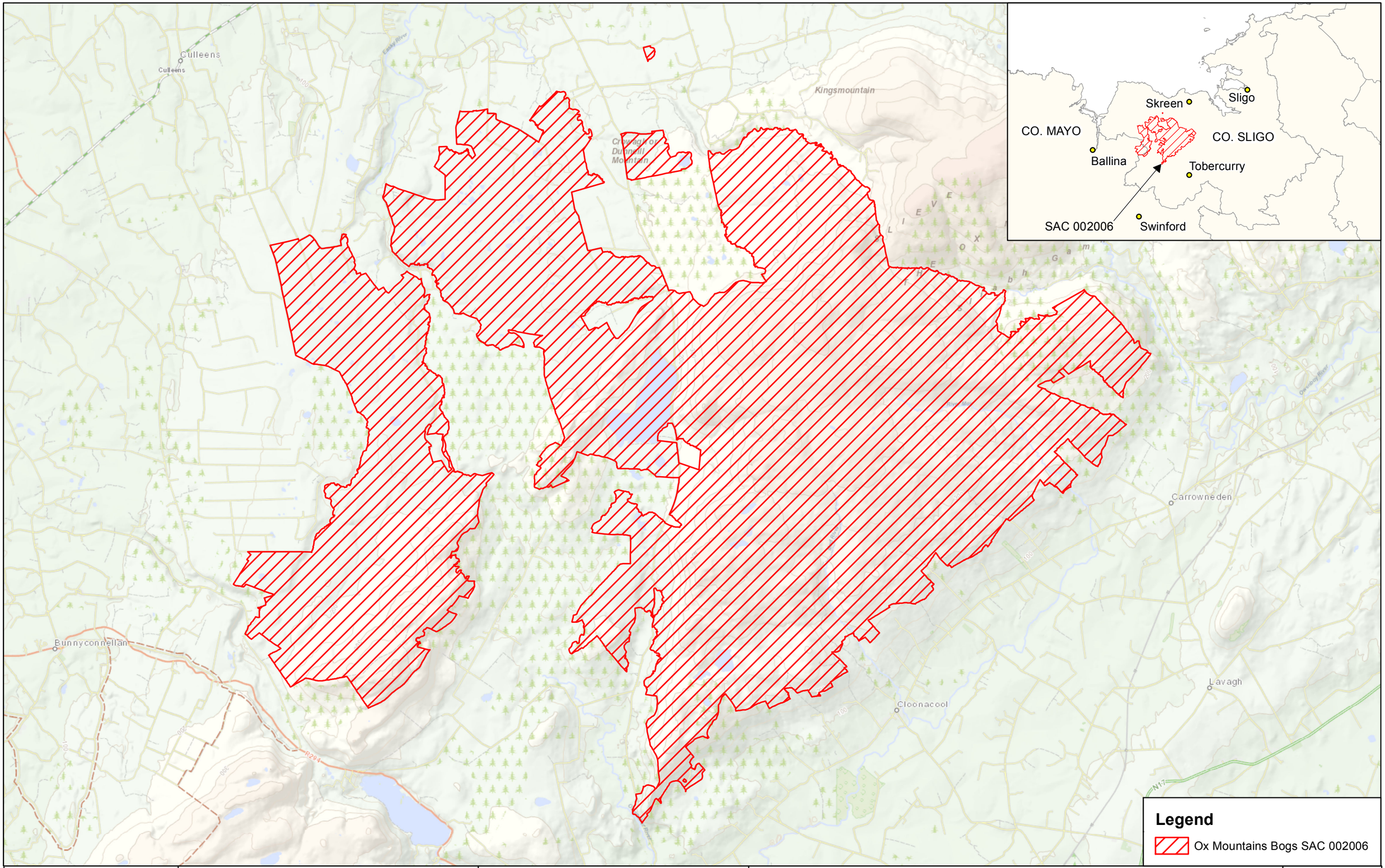
To maintain the favourable conservation condition of Geyer's Whorl Snail in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: occupied sites	Number	No decline. There is one known site for this species in this SAC within the 1km square G4429. See map 9	From Moorkens and Killeen (2011) (site code VgCAM21)
Presence in suitable habitat	Occurrence	Snails (living or recently dead adults and/or juveniles) are present in at least 60% of samples defined as suitable habitat	Based on Moorkens and Killeen (2011)
Species abundance	Number of individuals per sample	No decline in adult abundance in appropriate number of samples	Based on Moorkens and Killeen (2011). There should be at least five adults detected in 40% of samples
Habitat area	Hectares	Stable or increasing, subject to natural processes. Suitable habitat is defined as areas of flushed fen with small sedges and saturated mosses	Based on Moorkens and Killeen (2011). Optimal habitat is defined as flushed fen with sedge/moss lawns and mounds 5-20cm tall, containing a high diversity of plant species such as small-fruited yellow-sedge (*Carex viridula*), grass-of-Parnassus (*Parnassia palustris*), marsh horsetail (*Equisetum palustre*), jointed rush (*Juncus articulatus*) and the mosses *Scorpidium revolvens* and *Campylium stellatum*, with scattered tussocks of black bog-rush (*Schoenus nigricans*) no greater than 80cm tall
Habitat quality: optimal habitat	Hectares	At least 0.3ha of optimal habitat present	Based on Moorkens and Killeen (2011). There should be at least 0.3ha of optimal habitat present at the site to maintain the species. See description of optimal habitat above
Habitat quality: soil wetness	Water table level	Water table should be between 0-5cm of the soil surface, but not above ground level at time of sampling	Based on Moorkens and Killeen (2011)

1528 Marsh Saxifrage *Saxifraga hirculus*

To maintain the favourable conservation condition of *Saxifraga hirculus* in Ox Mountains Bogs SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number and geographical spread	No loss in geographical spread and number of populations, subject to natural processes	Three populations of *Saxifraga hirculus*, in three flushes (A-C) lying in close proximity to each other, were discovered in the Ox Mountains Bogs SAC in June 2012. See Muldoon et al. (2014) for further details
Population size: number of rosettes	Number	Maintain the size of each population, subject to natural processes. The target numbers of rosettes are: >40,000 rosettes in Flush A; >4,800 rosettes in Flush B; >480 rosettes in Flush C	The number of rosettes was estimated to be: c.50,000 in Flush A; c.6,000 in Flush B and c.600 in Flush C. The target figures are a 20% reduction of the recorded number to allow for a margin of error and variability over monitoring seasons
Population size: area of occupancy	Hectares	Maintain the extent of each population, subject to natural processes. The target areas are: > 0.0234 ha (> 234 m²) in Flush A, > 0.0053 ha (> 52.5 m²) in Flush B and > 0.0016 ha (> 16.2 m²) in Flush C	The area of cover of *Saxifraga hirculus* was estimated as 260 m² in Flush A, 58.3 m² in Flush B and 18 m² in Flush C. The target area figures are a 10% reduction of the recorded areas to allow for a margin of error
Hydrological conditions: water levels	Occurrence of high or fluctuating water levels	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	In Ireland, *Saxifraga hirculus* is now restricted to mineral flushes in blanket bog where rising groundwater forms small streams and seepage areas suitable for the species. Based on Muldoon (2011) and Muldoon et al. (2015)
Vegetation structure: sward height	Centimetres	Maintain a mean vegetation height of less than 15cm	See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation composition: associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the populations of *Saxifraga hirculus*	Presence of knotted pearlwort (*Sagina nodosa*), a positive indicator species and low cover of purple moor-grass (*Molinia caerulea*) and Yorkshire-fog (*Holcus lanatus*), both negative indicator species, should be maintained. See Muldoon (2011) and Muldoon et al. (2015) for further details
Vegetation structure: grazing levels	Evidence of grazing	Maintain grazing at light to moderate levels to ensure an open vegetation structure and to allow flowering to occur	See Muldoon (2011) and Muldoon et al. (2015) for further details



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MAP 1:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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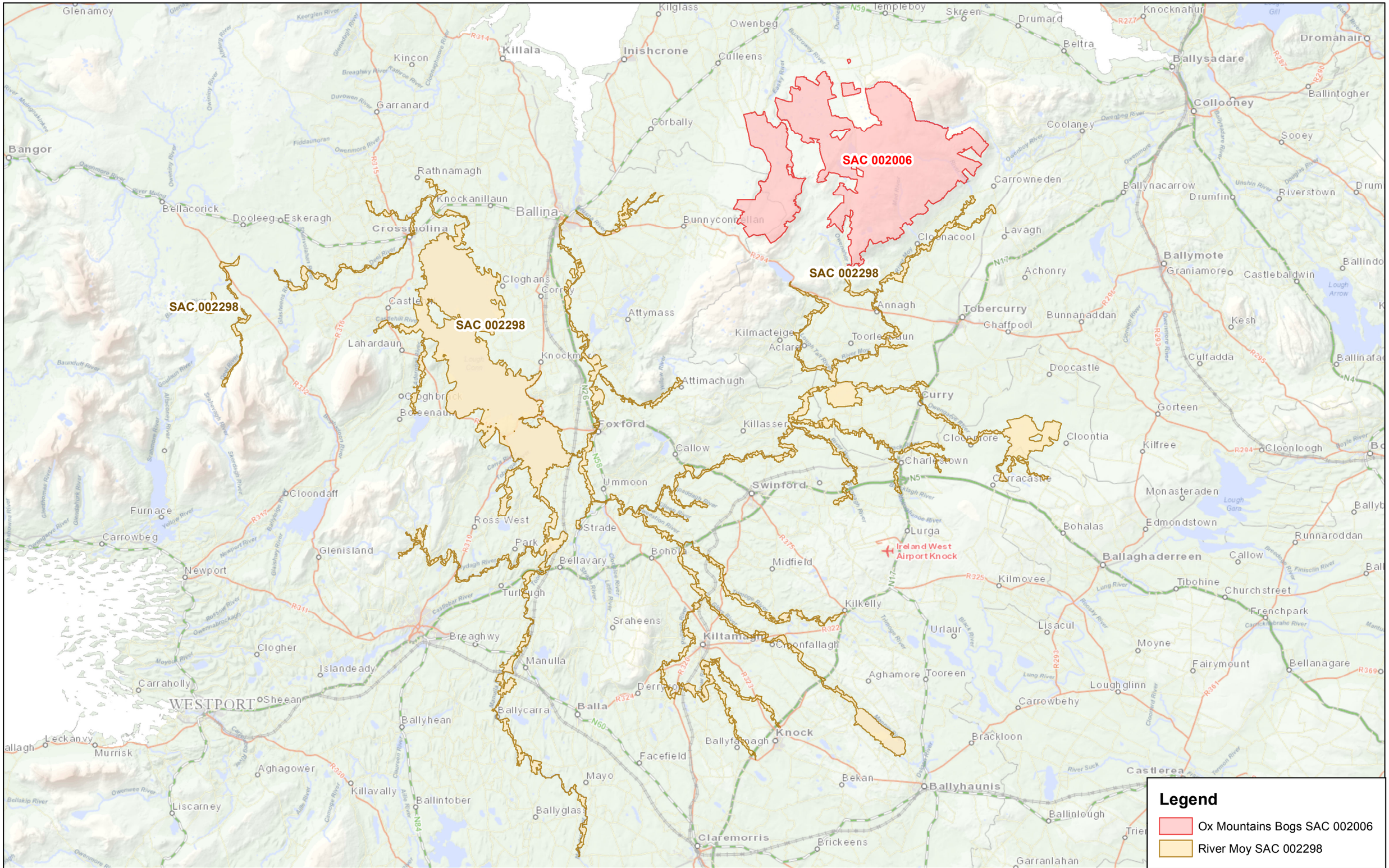
Map Version 1
Date: July 2016



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MAP 2: OX MOUNTAINS BOGS SAC CONSERVATION OBJECTIVES ADJACENT DESIGNATIONS

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

SITE CODE:
SAC 002006; version 3.01,
SAC 002298; version 3.01.
Counties Sligo / Mayo / Roscommon

0 4.5 9 13.5 km

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Legend

- Ox Mountains Bogs SAC 002006
- OSi Discovery Series County Boundaries

Lake Habitats

- 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Potential 3110 / Potential 3160, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Natural dystrophic lakes and ponds
- Potential 3160 Natural dystrophic lakes and ponds

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MAP 3:
OX MOUNTAINS BOGS SAC CONSERVATION OBJECTIVES LAKE HABITATS

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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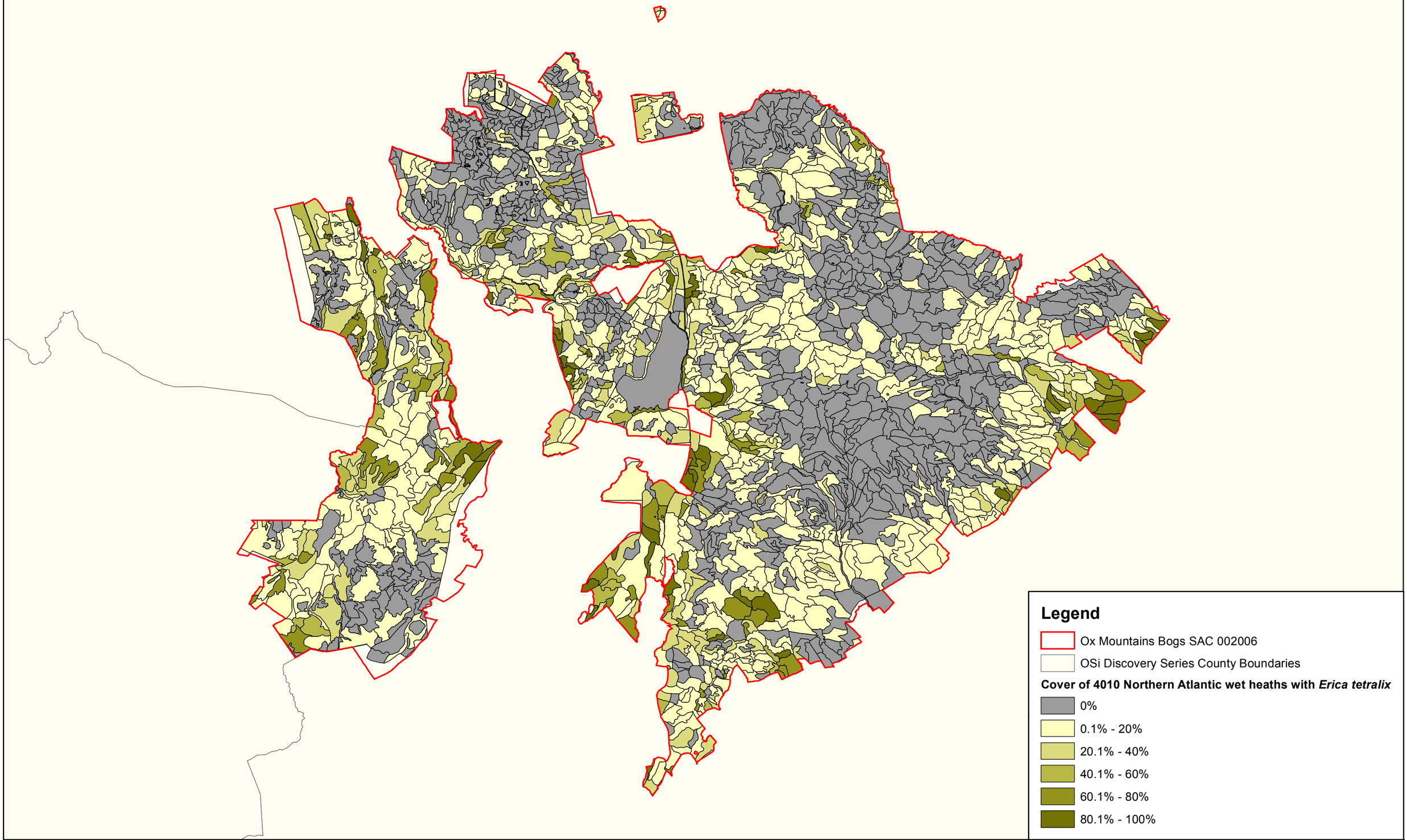

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MAP 4:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
WET HEATH

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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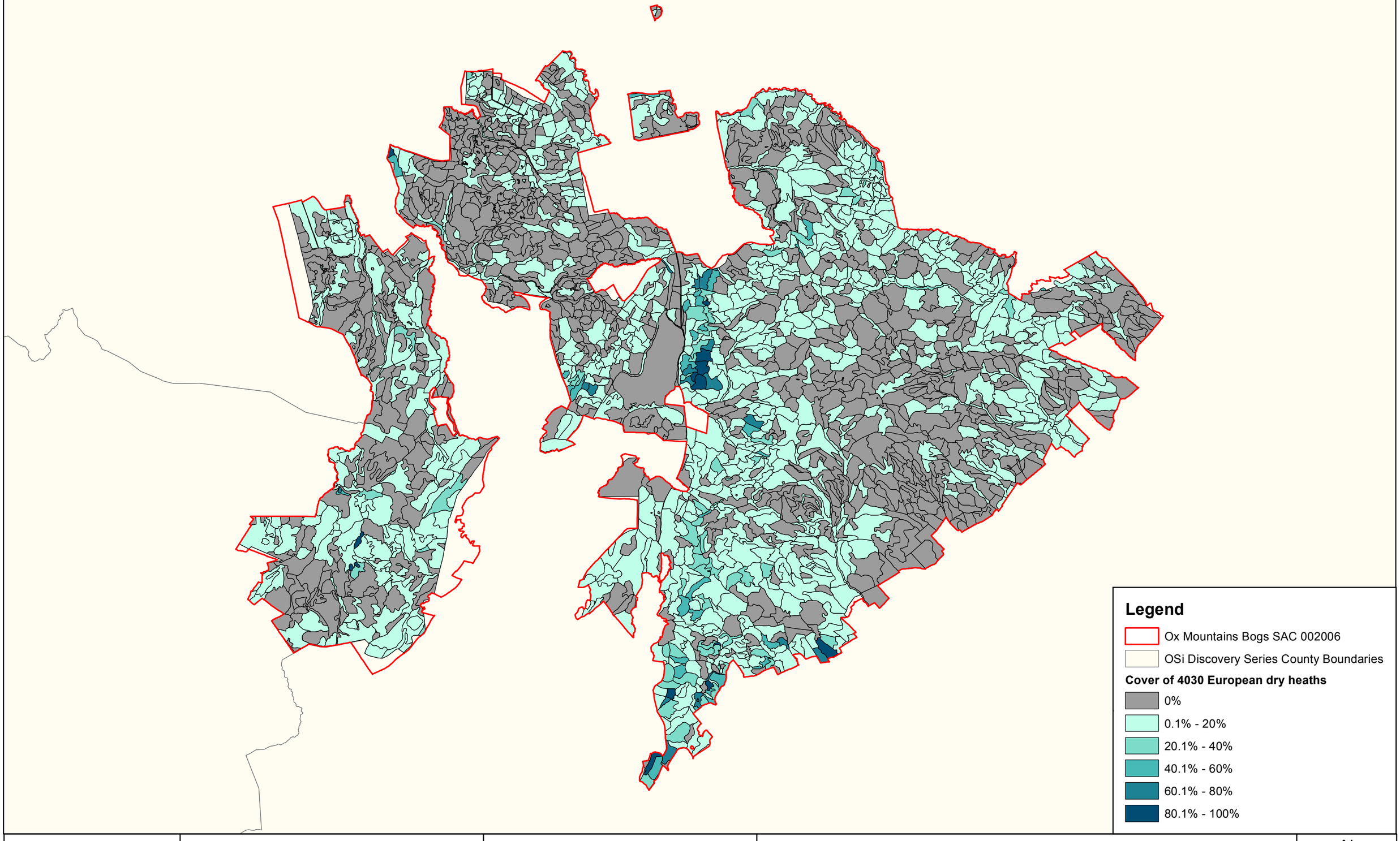
Date: July 2016



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MAP 5:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
DRY HEATHS

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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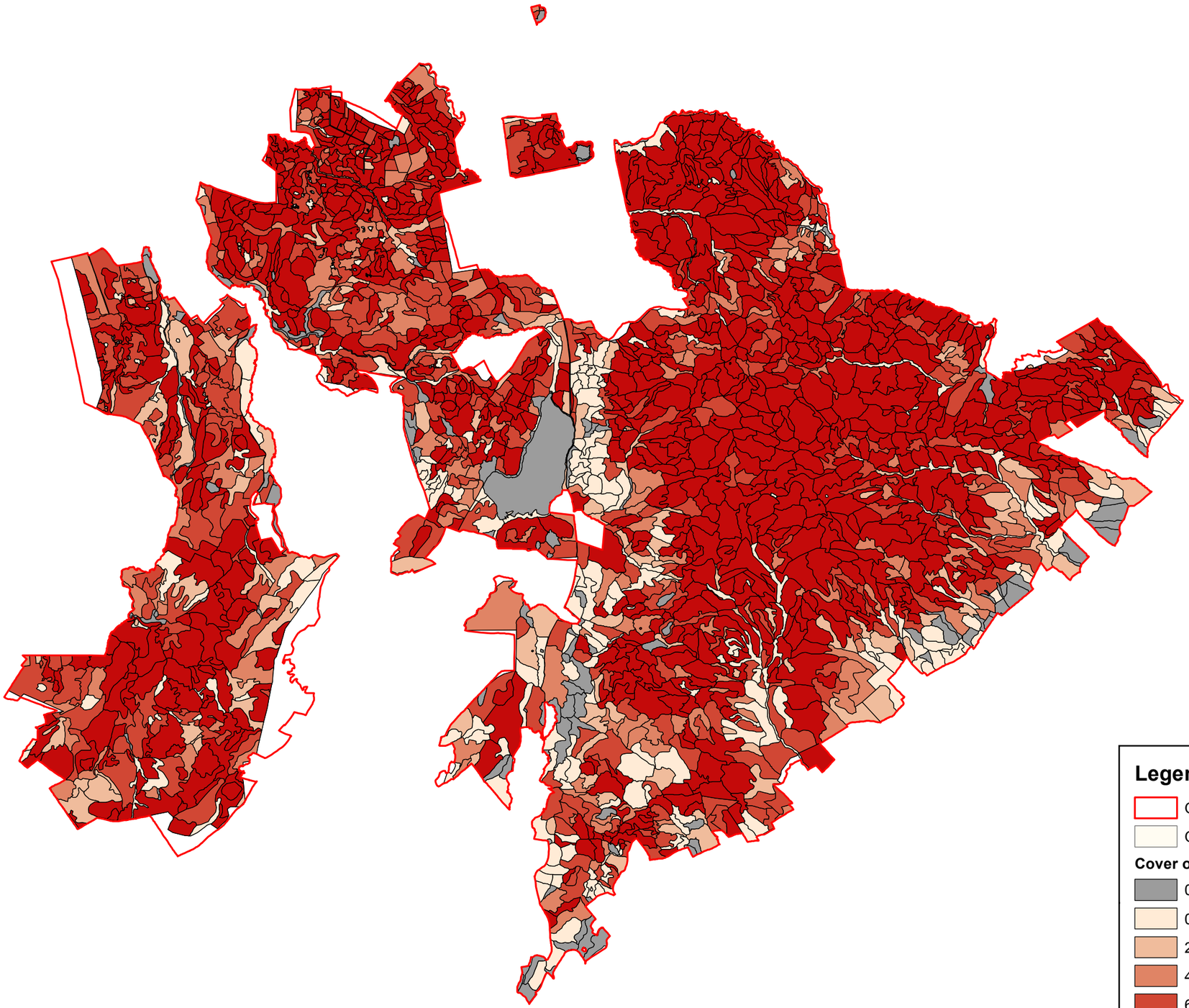
Map Version 1
Date: July 2016



Legend

- Ox Mountains Bogs SAC 002006
- OSi Discovery Series County Boundaries

Cover of 7130 Blanket bogs (* if active bog)

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

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MAP 6:
OX MOUNTAINS BOGS SAC CONSERVATION OBJECTIVES BLANKET BOGS (* IF ACTIVE BOG)

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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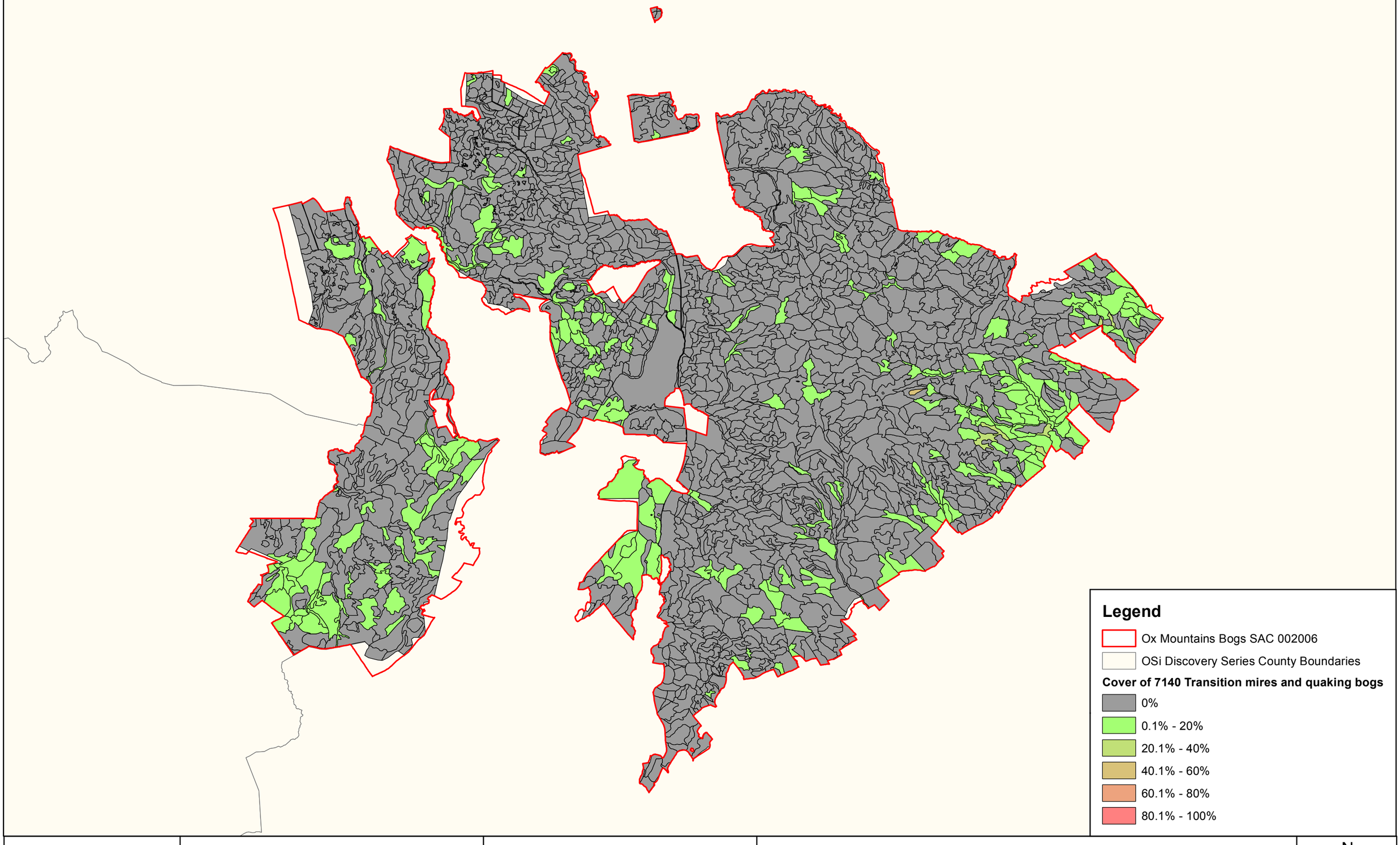
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: July 2016



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MAP 7:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
TRANSITION MIRES

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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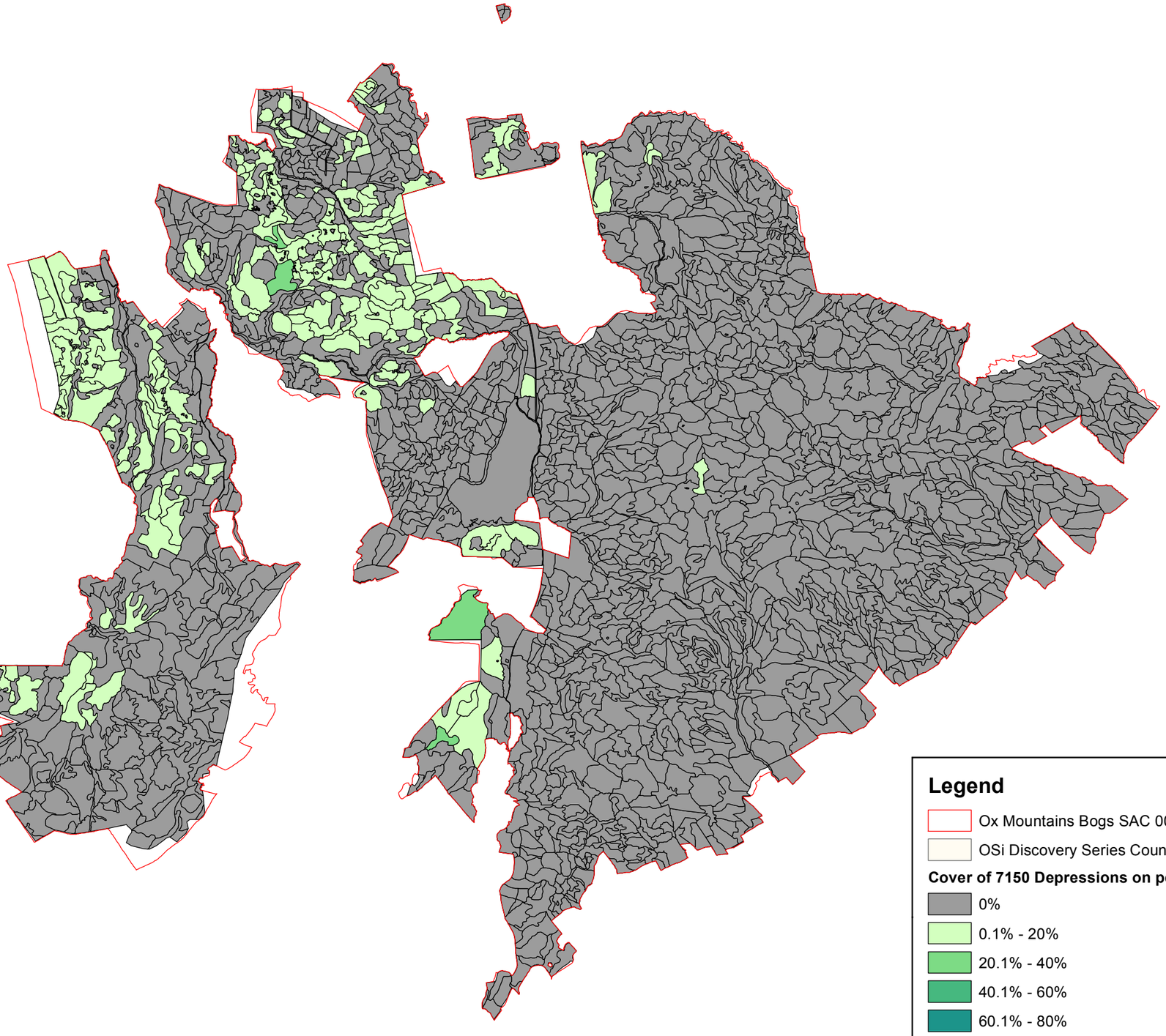
Map Version 1
Date: July 2016



Legend

- Ox Mountains Bogs SAC 002006
- OSi Discovery Series County Boundaries

Cover of 7150 Depressions on peat substrates of the Rhynchosporion

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

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MAP 8:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
RHYNCHOSPORION DEPRESSIONS

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

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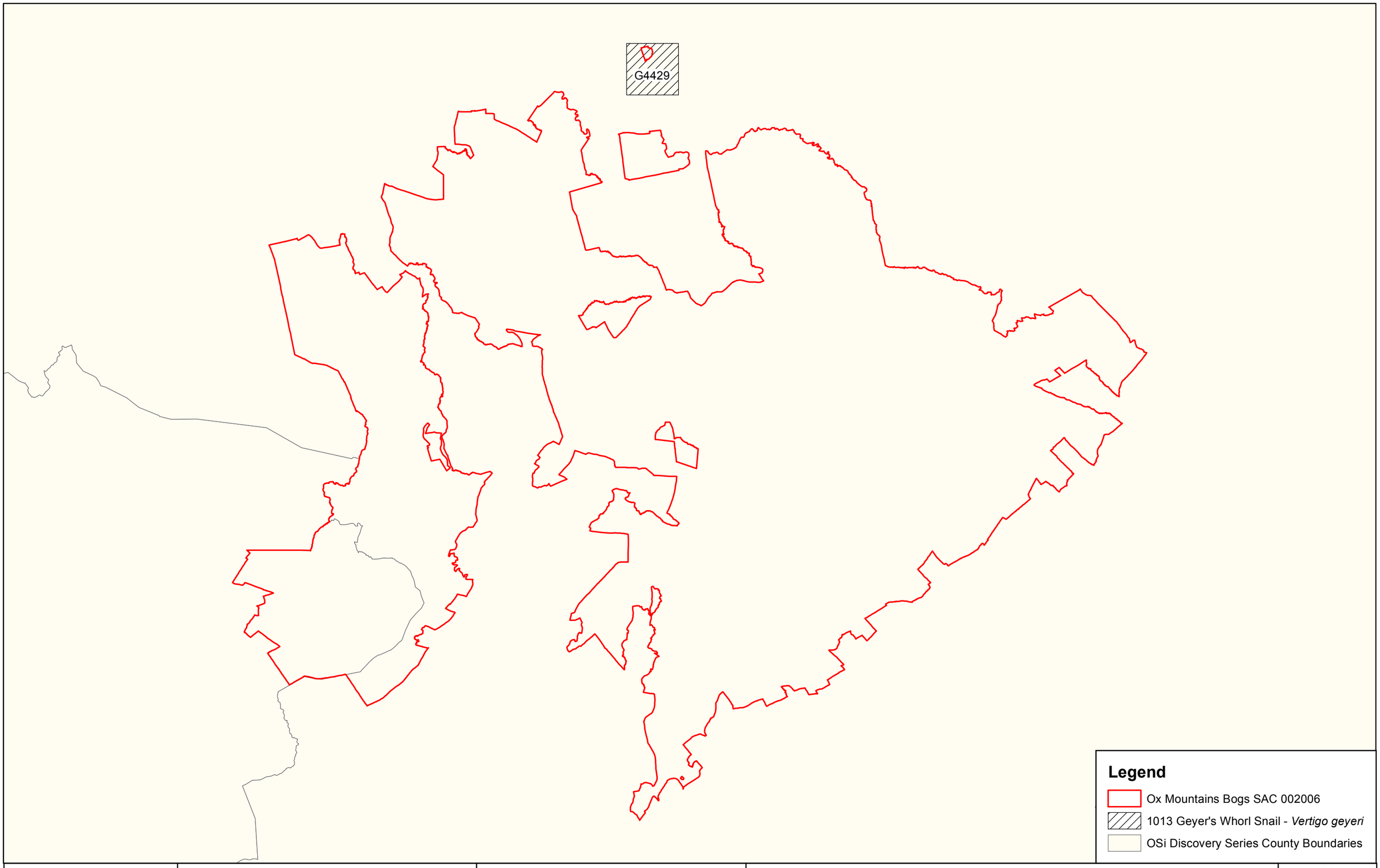
Map Version 1
Date: July 2016



Legend

- Ox Mountains Bogs SAC 002006
- 1013 Geyer's Whorl Snail - *Vertigo geyeri*
- OSi Discovery Series County Boundaries

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MAP 9:
OX MOUNTAINS BOGS SAC
CONSERVATION OBJECTIVES
GEYER'S WHORL SNAIL

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

SITE CODE:
SAC 002006; version 3.01. Counties Sligo / Mayo

0 1 2 3 4 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Map Version 1
Date: July 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Maumturk Mountains SAC 002008

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

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

National Parks and Wildlife Service,
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Citation:

NPWS (2017) Conservation Objectives: Maumturk Mountains SAC 002008. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002008	Maumturk Mountains SAC
1106	Salmon *Salmo salar*
1833	Slender Naiad *Najas flexilis*
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
4010	Northern Atlantic wet heaths with *Erica tetralix*
4060	Alpine and Boreal heaths
7130	Blanket bogs (* if active bog)
7150	Depressions on peat substrates of the Rhynchosporion
8220	Siliceous rocky slopes with chasmophytic vegetation

Please note that this SAC is adjacent to Lough Corrib SAC (000297), The Twelve Bens/Garraun Complex SAC (002031), Connemara Bog Complex SAC (002034), Lough Corrib SPA (004042) and Connemara Bog Complex SPA (004181). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1989
Title :	A survey to locate blanket bogs in Co. Galway. Part 2
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to the Wildlife Service
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Maumturk Mountains SAC (site code: 2008) Conservation objectives supporting document-blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2017
Title :	Maumturk Mountains SAC (site code: 2008) Conservation objectives supporting document-*Najas flexilis* V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

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

Year :	1983
Title :	Flora of Connemara and the Burren
Author :	Webb, D.A.; Scannell, M.J.P.
Series :	Royal Dublin Society, Dublin and Cambridge University Press, Cambridge
Year :	1986
Title :	A survey of the flora of some mountain ranges in the west of Ireland
Author :	Roden, C.M.
Series :	The Irish Naturalists' Journal, 22: 52-59
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2008
Title :	Water Quality in Ireland 2004-2006
Author :	Clabby, K.J.; Bradley, C.; Craig, M.; Daly, D.; Lucey, J.; McGarrigle, M.; O'Boyle, S.; Tierney, D.; Bowman, J.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2013
Title :	A report on the aquatic macrophytes in 12 lakes along the Maam Cross to Ballynahinch Road
Author :	Roden, C.
Series :	Unpublished report to RPS Group
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford

Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110 (map 3)
Year :	2013
Title :	Najas flexilis data
GIS Operations :	Lake habitat for species clipped to SAC boundary
Used For :	1833 (map 4)

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 Maumturk Mountains 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 Loughs Shindilla, Loughanillaun, Maumwee and others in Maumturk Mountains SAC. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha were mapped as potential 3110 (see map 3). Lake habitat 3130 may also occur in lakes on marble formations, such as Loughs Lehanagh and Derryneen, both of which have slender naiad (*Najas flexilis*), a characteristic species of lake habitat 3130. 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, habitat 3110 is likely to be widespread in lakes in the SAC, and all lakes larger than 1ha have been mapped as potential 3110 (see map 3)
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). Environmental Protection Agency (EPA) biologists have recorded waterwort (*Elatine hexandra*), pipewort (*Eriocaulon aquaticum*), quillwort (*Isoetes lacustris*), bulbous rush (*Juncus bulbosus*), shoreweed (*Littorella uniflora*), water lobelia (*Lobelia dortmanna*), alternate water-milfoil (*Myriophyllum alterniflorum*), broad-leaved pondweed (*Potamogeton natans*) and bladderwort (*Utricularia* sp.) in Loughs Loughanillaun, Maumwee and Shindilla. See the Maumturk Mountains SAC conservation objectives supporting document for slender naiad (*Najas flexilis*) (1833) for information on Lehanagh and Derryneen Loughs. See also Webb and Scannell (1983)
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)
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. See the slender naiad (*Najas flexilis*) supporting document for information on Lehanagh and Derryneen Loughs. Loughanillaun ('Anillaun'), Maumwee and Shindilla Loughs are Water Framework Directive (WFD) monitoring lakes and information on vegetation depth may be available from the EPA
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that 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 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). Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Maumwee Lough had transparency of 7.1m in 2007 (McGarrigle et al., 2010)
Water quality: nutrients	µg/l P; 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Loughs Maumwee and Loughanillaun were at high nutrient status in the 2007-09 and 2010-12 reporting periods, however, Shindilla Lough exceeded the TP target in 2004-06 and 2007-09 (Clabby et al., 2008; McGarrigle et al., 2010; Bradley et al., 2015)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain/restore appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Loughanillaun, Maumwee and Shindilla Loughs were oligotrophic in 2004-06 (Clabby et al., 2008) and had high chlorophyll *a* status in 2007-09 (McGarrigle et al., 2010), however, Loughanillaun declined to good chlorophyll *a* status in 2010-12 (Bradley et al., 2015)
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain/restore 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. Phytoplankton composition was high at Maumwee Lough and good at Shindilla Lough 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. Phytobenthos status was high at Maumwee and Shindilla Loughs 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 ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. All three monitored lakes had high macrophyte status in 2007-09 and 2010-12 (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 *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. All three monitored lakes passed in 2007-09 and 2010-12 (McGarrigle et al., 2010; Bradley et al., 2015). Maumwee Lough is an acid sensitive water monitoring site
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 lake habitat 3110, where the peatland in the lake's catchment is intact. Free et al. (2006) reported colour of 20mg/l PtCo in Loughanillaun, 26mg/l PtCo in Maumwee and 27mg/l PtCo in Shindilla Lough
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.

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area and condition	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 Maumturk Mountains SAC, active blanket bog and heath communities are likely to dominate lake shorelines. Transition mire, fen, flush and grassland may also occur. 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

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Northern Atlantic wet heaths with *Erica tetralix* has not been mapped in detail for Maumturk Mountains SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 4,460ha, covering 33% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Maumturk Mountains SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs on the lower slopes of the mountains and in other areas with gentle/ moderately sloping ground in the SAC. It occurs in association with other habitats including blanket bog, dry heath and upland grassland (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of wet heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of monitoring stops	Cross-leaved heath (*Erica tetralix*) 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 *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* 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 (*Empetrum nigrum*) at least 15%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: dwarf shrub species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of dwarf shrubs less than 75%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) 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 (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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	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). There are recent records for the FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) from wet heath habitat along the shores of Maumwee Lough at Lackavrea (O. Daly, pers. comm.)

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in Maumturk Mountains 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	Alpine and Boreal heaths habitat has not been mapped in detail for Maumturk Mountains SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 1,301ha, covering 10% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Maumturk Mountains SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs on summits and ridges within the SAC. Examples are present at Knocknahillion and on a hill west of Corcogemore (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The diversity of Alpine and Boreal heath communities within this SAC is unknown. Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: 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)
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 (*Empetrum nigrum*) 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). The Near Threatened alpine clubmoss (*Diphasiastrum alpinum*) (Wyse Jackson et al., 2016) was recorded from this habitat. Further information can be found in Roden (1986)

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for Maumturk Mountains SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 1,926ha, covering 14% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Maumturk Mountains SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat typically occurs in areas of lower ground along the western, eastern and south-eastern sections of the SAC. An excellent example of this habitat type is found at Caher (Douglas et al., 1989; NPWS internal files). Further information can be found within Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Douglas et al., 1989; NPWS internal files), three of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species less than 75%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 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). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) has been recorded from blanket bog in the SAC (NPWS internal files). The FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) and the FPO listed and Near Threatened slender cottongrass (*Eriophorum gracile*) (Wyse Jackson et al., 2016) have been recorded within the SAC (NPWS internal files), but these species cannot be assigned specifically to blanket bog

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for Maumturk Mountains SAC and thus the total area of the qualifying habitat in the SAC is unknown. Further details on this and the following attributes can be found in the Maumturk Mountains SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur amongst wet areas in lowland blanket bog in the SAC. The best examples of this habitat occur at Caher and to the south-east of Maam bridge (Douglas et al., 1989; NPWS internal files). Further information can be found within Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at each monitoring stop is at least five	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) and the FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) have been recorded from the SAC (NPWS internal files), but these species cannot be assigned specifically to this habitat

8220 Siliceous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Maumturk Mountains 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	Siliceous rocky slopes with chasmophytic vegetation has not been mapped in detail for Maumturk Mountains SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 202ha, covering c.1% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in the Maumturk Mountains SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is present amongst the steep slopes and corries of the Maumturk Mountains, Teernakill South, Lackavrea and Knocknagur (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
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)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), 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). The Near Threatened beech fern (*Phegopteris connectilis*) (Wyse Jackson et al., 2016) has been recorded within the SAC (NPWS internal files), but this species cannot be assigned specifically to this habitat

1106 Salmon *Salmo salar*

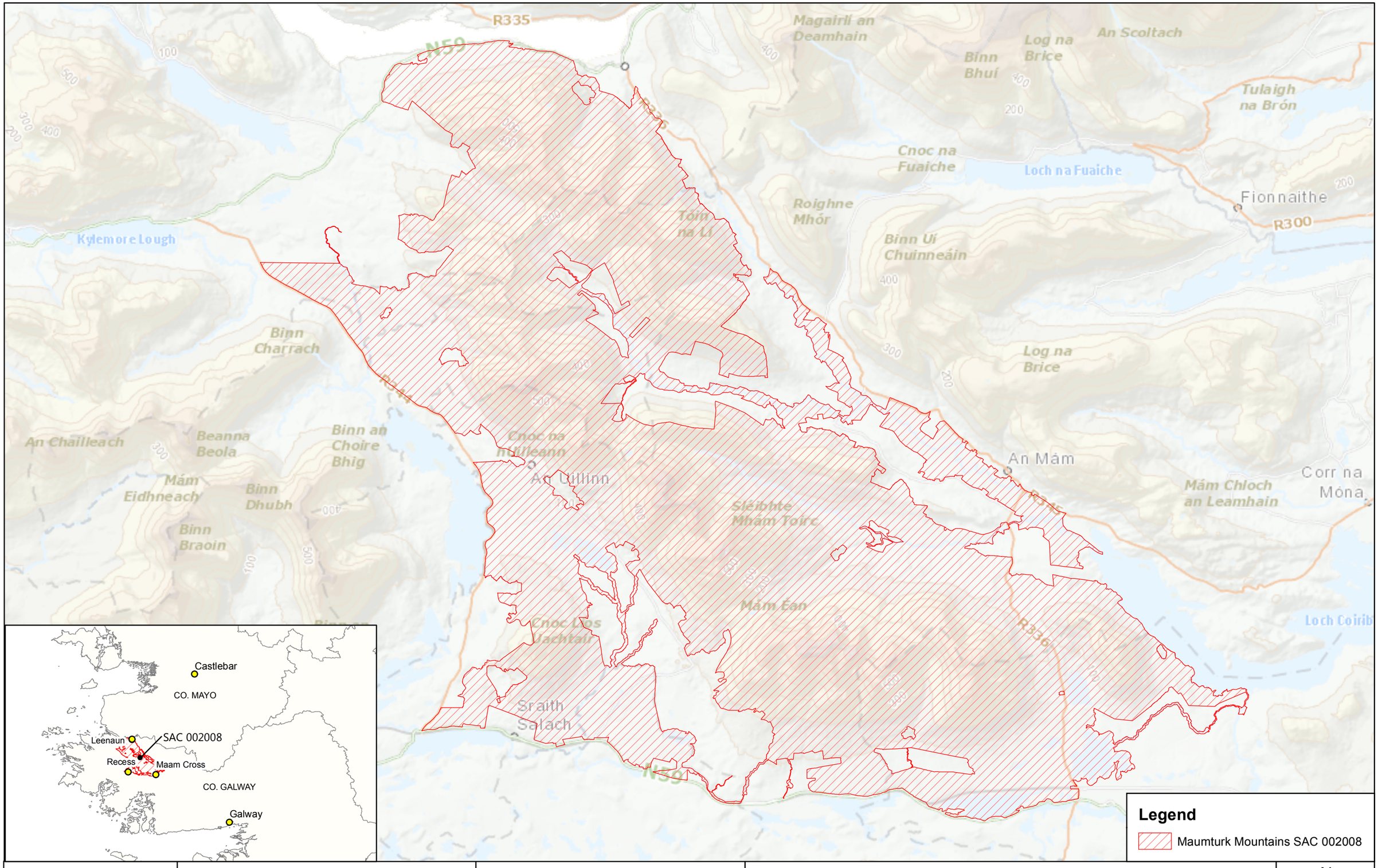
To maintain the favourable conservation condition of Atlantic Salmon in Maumturk Mountains SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. Rivers in the Corrib catchment are currently achieving CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
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)

1833 Slender Naiad *Najas flexilis*

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

Attribute	Measure	Target	Notes
Population extent	Hectares; distribution	No change to the spatial extent of *Najas flexilis* within Loughs Lehanagh and Derryneen, subject to natural processes. See map 4 for known locations	The selection of Maumturk Mountains SAC for *Najas flexilis* (slender naiad) was based on its presence in Lehanagh Lough. In 2013, Dr Cilian Roden discovered a small population in Derryneen Lough in the SAC (Roden, 2013). It is possible that the species occurs in other lakes within the SAC. See the Maumturk Mountains SAC conservation objectives supporting document for *Najas flexilis* for further details
Population depth	Metres	No change to the depth range of *Najas flexilis* within each lake, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population abundance	Square metres	No change to the cover abundance of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Habitat extent	Hectares	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See the *Najas flexilis* supporting document for further details
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the populations of the species	See the *Najas flexilis* supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the populations of the species	See the *Najas flexilis* supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the populations of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Water colour	mg/l PtCo	Maintain appropriate water colour to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details



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

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

MAP 1:
MAUMTURK MOUNTAINS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002008; version 1.1 CO. GALWAY

0 0.8 1.6 2.4 3.2 4 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

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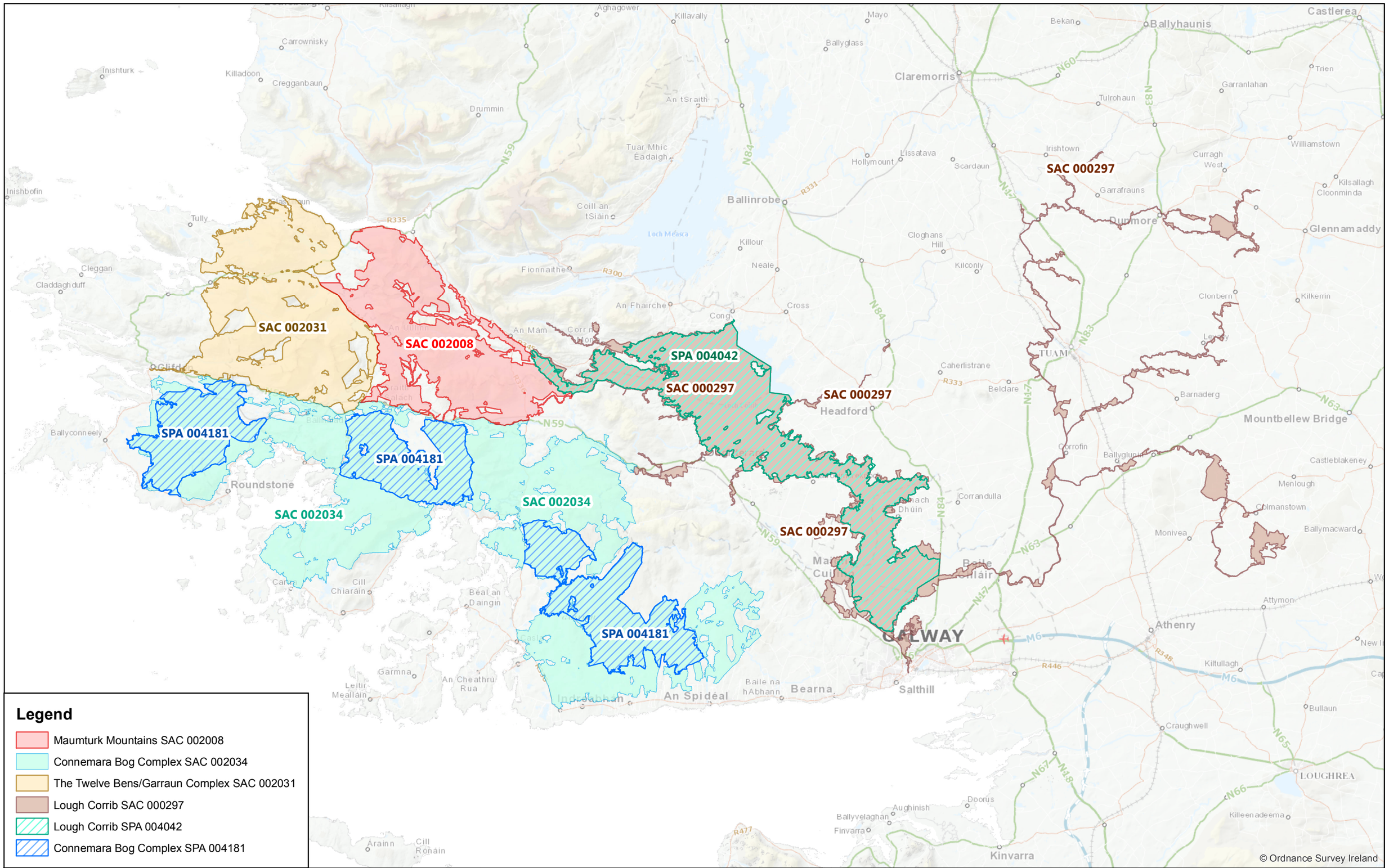
Map Version 1
Date: March 2017



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

MAP 2:
MAUMTURK MOUNTAINS SAC CONSERVATION OBJECTIVES ADJOINING / ADJACENT AND OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 002008; version 1.1. SAC 002031; version 1.15.
SAC 002034; version 1.18. SPA 004042; version 2.02.
SAC 000297; version 1.27. SPA 004181; version 1.
CO. GALWAY / CO. MAYO / CO. ROSCOMMON

0 3 6 9 12 15 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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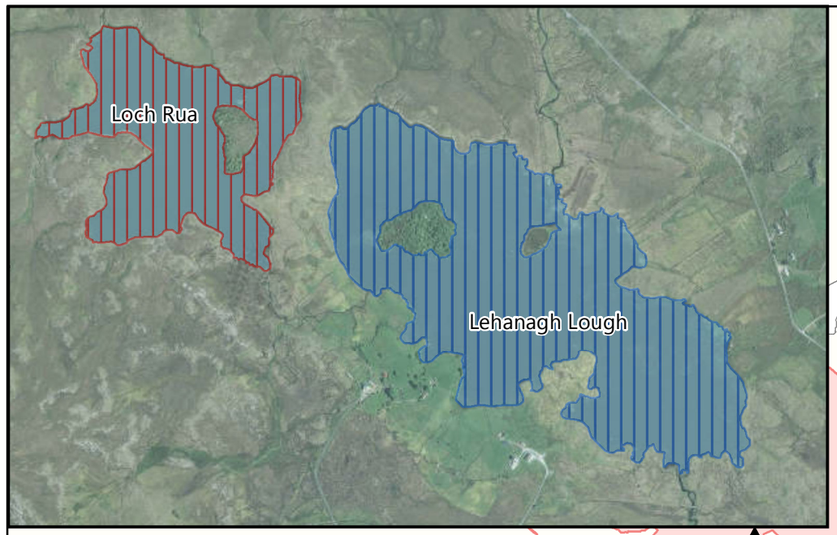
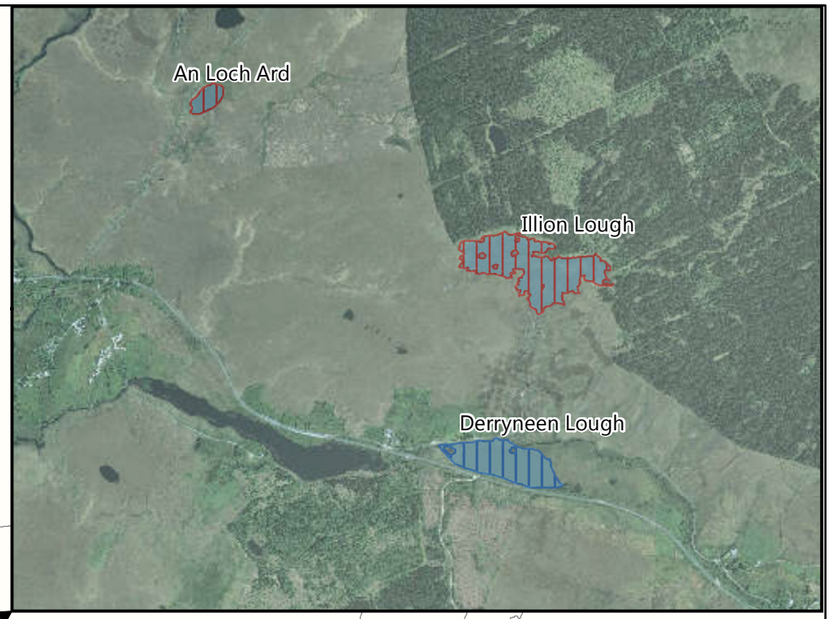
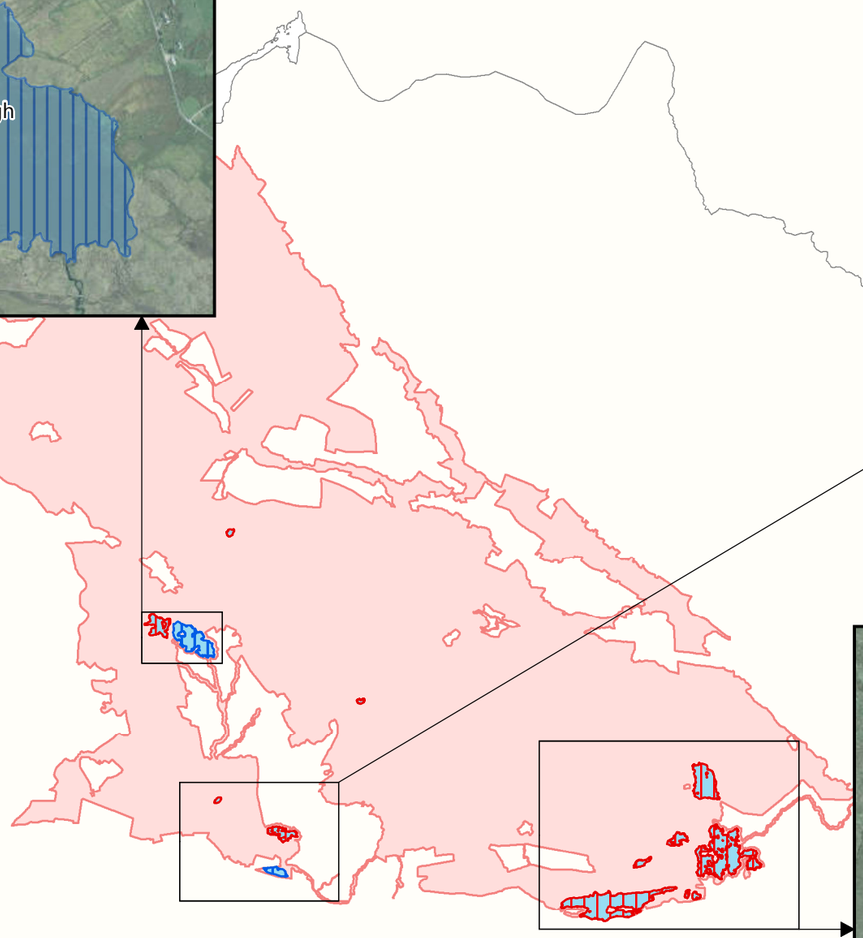
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

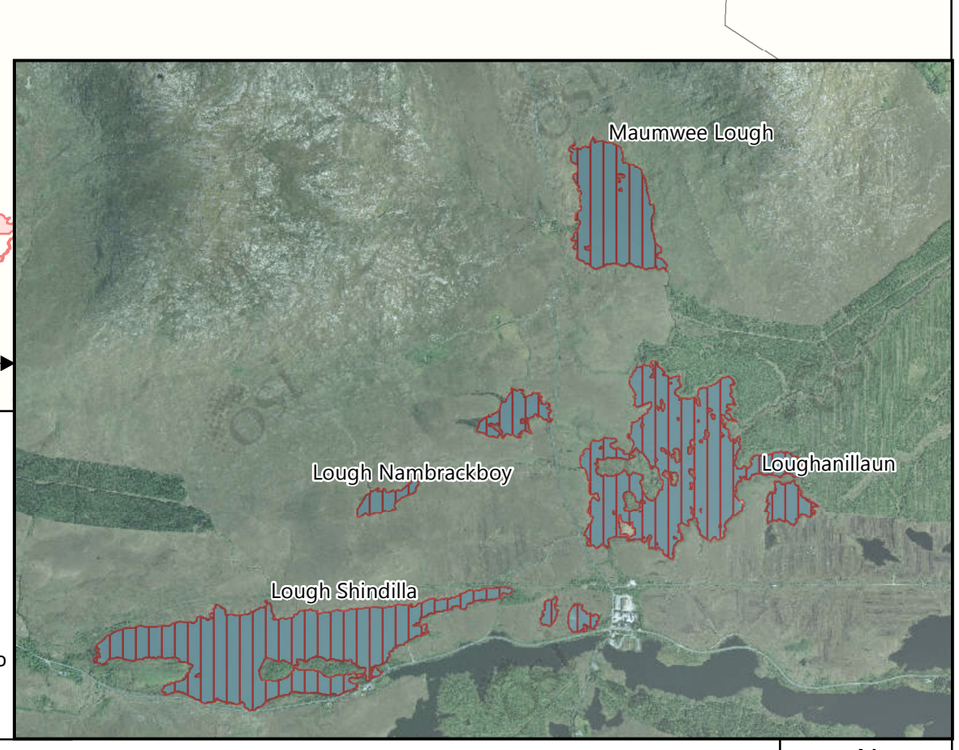
N

Map Version 1
Date: March 2017









Legend

Maumturk Mountains SAC 002008

OSi Discovery Series County Boundary

Indicative Lake Habitats

Potential 3110 Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae

Potential 3110 / Potential 3130* Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae / Potential oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
*Habitat 3130 not a qualifying interest

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MAP 3:
MAUMTURK MOUNTAINS SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
SAC 002008; version 1.1. CO. GALWAY.

0 2 4 6 8 km

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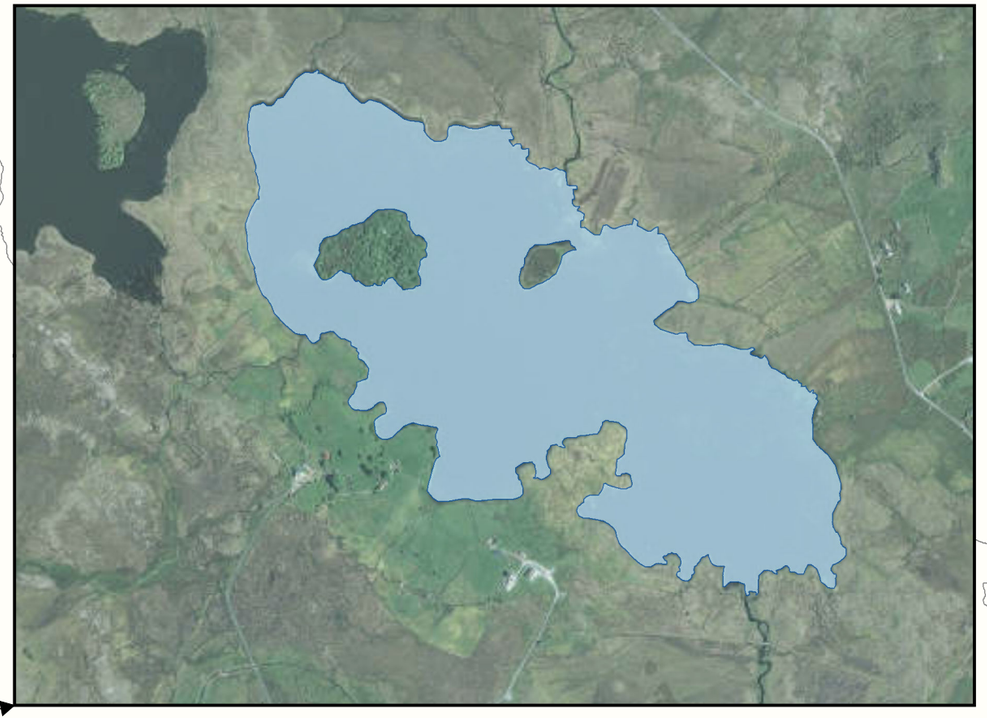
N

Map Version 1
Date: March 2017



Legend

- 1833 Slender Naiad *Najas flexilis*
- Maumturk Mountains SAC 002008
- OSi Discovery Series County Boundary

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MAP 4:
MAUMTURK MOUNTAINS SAC CONSERVATION OBJECTIVES SLENDER NAIAD

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

SITE CODE:
SAC 002008; version 1.1. CO. GALWAY.

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas

N

Map Version 1
Date: March 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

The Twelve Bens/Garraun Complex SAC 002031

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

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

National Parks and Wildlife Service,
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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2017) Conservation Objectives: The Twelve Bens/Garraun Complex SAC 002031. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002031	The Twelve Bens/Garraun Complex SAC
1029	Freshwater Pearl Mussel *Margaritifera margaritifera*
1106	Salmon *Salmo salar*
1355	Otter *Lutra lutra*
1833	Slender Naiad *Najas flexilis*
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 Isoeto-Nanojuncetea
4060	Alpine and Boreal heaths
7130	Blanket bogs (* if active bog)
7150	Depressions on peat substrates of the Rhynchosporion
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)
8210	Calcareous rocky slopes with chasmophytic vegetation
8220	Siliceous rocky slopes with chasmophytic vegetation
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

Please note that this SAC is adjacent to Maumturk Mountains SAC (002008), Connemara Bog Complex SAC (002034) and West Connacht Coast SAC (002998). See map 2. The conservation objectives for this site should be used in conjunction with those for the adjacent sites as appropriate.

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1987
Title :	Survey to locate lowland blanket bogs of scientific interest in Connemara, Co. Galway
Author :	Douglas, C.; Grogan, H.
Series :	Unpublished report to the Wildlife Service
Year :	1989
Title :	A survey to locate blanket bogs in Co. Galway. Part 2
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to the Wildlife Service
Year :	2002
Title :	*Najas flexilis* in Donegal
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2004
Title :	The distribution of *Najas flexilis* in Ireland 2002-2004
Author :	Roden, C.M.
Series :	Unpublished report to NPWS
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	Rapid assessment of rivers with prior records of *Margaritifera margaritifera*
Author :	Moorkens, E.; Killeen, I.
Series :	Unpublished report to NPWS
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished report to NPWS
Year :	2008
Title :	Survey of Dawros river
Author :	Moorkens, E.
Series :	unpublished report to NPWS

Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: fisheries survey. Stage 1 report
Author :	Paul Johnston Associates
Series :	Unpublished report to NPWS
Year :	2009
Title :	NS II Freshwater Pearl Mussel Sub-basin Management Plans: Report on Biological Monitoring of Surface Water Quality in Dawros Catchment, Co. Galway
Author :	Williams, L.
Series :	Unpublished report to NPWS
Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46
Year :	2010
Title :	Second draft Dawros freshwater pearl mussel sub-basin management plan (2009-2015). March 2010
Author :	NPWS
Series :	Unpublished document to the Department of Environment, Heritage and Local Government
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Catchment Assessment Report Manual
Author :	Monaghan, F.
Series :	Unpublished report to NPWS
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 3. Species assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	Targeted survey of *Najas flexilis*
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2016
Title :	Survey and Condition Assessment of the population of the freshwater pearl mussel *Margaritifera margaritifera* in the Dawros River, County Galway
Author :	Moorkens, E.
Series :	Unpublished report to NPWS
Year :	2017
Title :	The Twelve Bens/Garraun Complex SAC (site code: 2031) Conservation objectives supporting document- blanket bogs and associated habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2017
Title :	The Twelve Bens/Garraun Complex SAC (site code: 2031) Conservation objectives supporting document- *Najas flexilis* V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1970
Title :	The lichens and lichen parasites of Derryclare Wood, Connemara
Author :	Folan, A.C.M.; Mitchell, M.E.
Series :	Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science, 70: 163-170
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 :	1987
Title :	An account of the flora and vegetation of Derryclare Wood, Connemara (Co. Galway), Western Ireland
Author :	Ferguson, D.K.; Westhoff, V.
Series :	Proceedings of the Koninklijke Nederlandee Akadamie van Wetenschappen, Series C 90(2): 139-172
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 :	1999
Title :	Diet of otters (*Lutra lutra*) on Inishmore, Aran Islands, west coast of Ireland
Author :	Kingston, S.; O'Connell, M.; Fairley, J.S.
Series :	Biology and Environment: Proceedings of the Royal Irish Academy, 99B: 173-182
Year :	1999
Title :	Derryclare Woods: a multidisciplinary study of its structure and age
Author :	Fahy, O.; Fuller, M.; Gabbett, M.; Gormally, M.; Sheehy Skeffington, M.
Series :	Report to the Heritage Council, Kilkenny
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623
Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2003
Title :	Survey of the Pearl Mussel Population - 2003. Dawros River Co. Galway
Author :	Aster Environmental Consultants
Series :	Report to The Heritage Council, Kilkenny
Year :	2004
Title :	The ecology of *Najas flexilis*
Author :	Wingfield, R.A.; Murphy, K.J.; Hollingsworth, P.; Gaywood, M.J.
Series :	Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)
Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press
Year :	2006
Title :	The status of host fish populations and fish species richness in European freshwater pearl mussel (*Margaritifera margaritifera*) streams
Author :	Geist, J.; Porkka, M.; Kuehn, R.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 16: 251-266

Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264–273
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2010
Title :	Addressing the conservation and rehabilitation of *Margaritifera margaritifera* populations in the Republic of Ireland within the framework of the habitats and species directive
Author :	Moorkens, E.
Series :	Journal of Conchology, 40: 339
Year :	2010
Title :	Water quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	EPA, Wexford
Year :	2014
Title :	Assessing near-bed velocity in a recruiting population of the endangered freshwater pearl mussel (*Margaritifera margaritifera*) in Ireland
Author :	Moorkens, E.; Killeen, I.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems, 24(6): 853-862
Year :	2014
Title :	The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots in upland UK
Author :	Marshall, M.R.; Ballard, C.E.; Frogbrook, Z.L.; Solloway, I.; McIntyre, N.; Reynolds, B.; Wheater, H.S.
Series :	Hydrological Processes, 28: 2617–2629
Year :	2015
Title :	Water quality in Ireland 2010-2012
Author :	Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series :	EPA, Wexford
Year :	2016
Title :	The Status of Irish Salmon Stocks in 2015 with Precautionary Catch Advice for 2016
Author :	SSCS (Standing Scientific Committee on Salmon)
Series :	Independent Scientific Report to Inland Fisheries Ireland

Spatial data sources

Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110, 3130 (map 3)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0 (map 4)
Year :	2017
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 5)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas data
GIS Operations :	Relevant catchment boundaries identified. Expert opinion used as necessary to resolve any issues arising
Used For :	1029 (map 5)
Year :	2010
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	Creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets combined with the derived OSi Discovery Series river and canal datasets. 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
Used For :	1355 (map 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of a 10m buffer on the terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Creation of a 20m buffer applied to river and stream centreline data; These datasets combined with the derived OSI 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2013
Title :	Najas flexilis data
GIS Operations :	Lake habitat for species clipped to SAC boundary
Used For :	1833 (map 7)

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 The Twelve Bens/Garraun 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 The Twelve Bens/Garraun Complex SAC, notably in Loughs Inagh, Derryclare, Fee, Nahillion and Muck. In line with Article 17 reporting (NPWS, 2013), all lakes larger than 1ha have been mapped as potential 3110 (see map 3). It is likely, however, that the habitat also occurs in many of the smaller lakes and ponds in the SAC. In lakes/ponds in blanket bog, lake habitat 3160 may co-occur. Lake habitat 3110 is likely to co-occur with lake habitat 3130 in Pollacappul and Kylemore Loughs. 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 3)
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 Heuff (1984) and The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for *Najas flexilis* for information on Pollacappul and Kylemore Loughs. Derryclare, Kylemore and Pollacappul 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)
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 Twelve Bens/Garraun Complex 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 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 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). Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Heuff (1984) recorded transparency greater than lake depth (1.75m) in Pollacappul and 2.2m in Kylemore. Roden (2004) stated transparency in Pollacappul was excellent. Free et al. (2006) give Secchi depth of 4.1m in Kylemore
Water quality: nutrients	µg/l P; 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 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Derryclare, Kylemore and Pollacappul all had high nutrient status in 2007-09 and 2010-12 (McGarrigle et al., 2010; Bradley et al., 2015)
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Derryclare, Kylemore and Pollacappul all had high chlorophyll *a* status in 2007-09 and 2010-12 (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. Kylemore 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, habitat 3110 requires high phytobenthos status. Kylemore had high phytobenthos status in 2010-12 (Bradley et al., 2015)

Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain/restore 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 ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Kylemore Lough failed the target in 2007-2009 and 2010-2012, having good macrophyte status (McGarrigle et al., 2010; Bradley et al., 2015). Derryclare and Pollacappul had high macrophyte status in both periods
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For 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 ≤100mg/l calcium carbonate). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. See McGarrigle et al. (2010) and Bradley et al. (2015) for acidification status for the WFD monitoring lakes in the SAC in the 2007-09 and 2010-12 periods
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 PtCo 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 27mg/l PtCo in Derryclare, 25mg/l PtCo in Fee, 21mg/l PtCo in Inagh and 23mg/l PtCo in Kylemore. Overgrazing and other peatland degradation 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 The Twelve Bens/Garraun 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 and condition	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 The Twelve Bens/Garraun Complex 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 Isoëto-Nanojuncetea in The Twelve Bens/Garraun 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 Pollacappul Lough, and possibly also Kylemore Lough in The Twelve Bens/Garraun Complex SAC (see map 3). In both lakes, habitat 3130 is likely to co-occur with lake habitat 3110. 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) and The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for *Najas flexilis* (1833)
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 *Najas flexilis* (slender naiad) is considered to be characteristic of the habitat and occurs in Pollacappul and Kylemore Loughs. As noted above, Pollacappul and Kylemore have been mapped as potential 3130, but the habitat may be more widespread in the SAC (see map 3). See O Connor (2015) and The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for *Najas flexilis* 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 Twelve Bens/Garraun Complex SAC *Najas flexilis* conservation objectives supporting document. Kylemore and Pollacappul 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 3130 (see O Connor, 2015)
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. Pollacappul is a relatively shallow lake, Kylemore is deeper. 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 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 *Najas flexilis* 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 *Najas flexilis* supporting document
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. Specific targets have yet to be established for lake habitat 3130 (O Connor, 2015). Habitat 3130 is associated with clear water, as evidenced by the growth of the character species *Najas flexilis* 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 ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Heuff (1984) recorded transparency greater than lake depth (1.75m) in Pollacappul and 2.2m in Kylemore. Roden (2004) stated transparency in Pollacappul was excellent. Free et al. (2006) give Secchi depth of 4.1m in Kylemore
Water quality: nutrients	µg/l P; 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 lake habitat 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 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 ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Kylemore and Pollacappul had high nutrient status in 2007-09 and 2010-12 (McGarrigle et al., 2010; Bradley et al., 2015)

Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* 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 *a* concentration must be <5.8µg/l. The annual average chlorophyll *a* concentration should be <2.5µg/l and the annual peak chlorophyll *a* concentration should be ≤8.0µg/l. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Kylemore and Pollacappul had high chlorophyll *a* status in 2007-09 and 2010-12 (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 3130 requires WFD high status. Kylemore 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 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, lake habitat 3130 requires high phytobenthos status. Kylemore had high phytobenthos status in 2010-12 (Bradley et al., 2015)
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain/restore 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. Kylemore failed the target in 2007-2009 and 2010-2012, having good macrophyte status (McGarrigle et al., 2010; Bradley et al., 2015). Pollacappul had high macrophyte status in both periods
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 *Najas flexilis* (Wingfield et al., 2004). The specific requirements of lake habitat 3130, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. In line with targets for *Najas flexilis*, 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/Alkalisation 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. See McGarrigle et al. (2010) and Bradley et al. (2015) for acidification status for the WFD monitoring lakes in the SAC in the 2007-09 and 2010-12 periods

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 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. Free et al. (2006) reported colour of 23mg/l PtCo in Kylemore. Overgrazing and other peatland degradation may have increased colour in some lakes in The Twelve Bens/Garraun Complex 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 the 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 and condition	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 The Twelve Bens/Garraun Complex 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

4060 Alpine and Boreal heaths

To restore the favourable conservation condition of Alpine and Boreal heaths in The Twelve Bens/Garraun 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	Alpine and Boreal heaths habitat has not been mapped in detail for The Twelve Bens/Garraun Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 225ha, covering c.1% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs at high altitudes throughout the SAC, and is associated with exposed rock and scree. It is present on several hillsides and summits including Benglenisky, Benbaun, Muckanaght, Bencullagh, Maumonght, Benbrack, Knockbrack, Bengooria, Doughruagh and Altnagaighera (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of Alpine and Boreal heath vegetation communities have been recorded in this SAC (NPWS internal files; R. Hodd, pers. comm.), two of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: 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)
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 (*Empetrum nigrum*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened alpine clubmoss (*Diphasiastrum alpinum*) (Wyse Jackson et al., 2016) is present within the SAC (NPWS internal files). This species is known to be associated with this habitat type. The FPO listed and Vulnerable bryophytes *Adelanthus lindenbergianus* and *Bazzania pearsonii*, the FPO and Near Threatened *Mastigophora woodsii* and the FPO and Endangered *Plagiochila carringtonii* (Lockhart et al., 2012) are all associated with this habitat (NPWS internal files). Hepatic mats are present in this habitat in the SAC (R. Hodd, pers. comm.)

7130 Blanket bogs (* if active bog)

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Blanket bog has not been mapped in detail for The Twelve Bens/Garraun Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 5,325ha, covering 33% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur throughout the SAC. It is best developed in low-lying basins and is present on the flanks of mountains up to an altitude of c.200m. Examples of this habitat can be found at Glenmore, Kylemore, Tooreenacoona, Owenglin, east of the Dawros River, on the western slopes of Bealnascalpa Mountain and on the flanks of Cregg Hill (NPWS internal files). Further information can be found in Douglas and Grogan (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	At least 99% of the total Annex I blanket bog area is active	See the blanket bogs and associated habitats supporting document for further details
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Further details and a brief discussion of restoration potential is presented in the blanket bogs and associated habitats supporting document
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	A variety of blanket bog vegetation communities have been recorded in this SAC (Douglas and Grogan, 1987; Douglas et al., 1989; NPWS internal files), six of which correspond to communities recorded in the National Survey of Upland Habitats and listed in the provisional list of vegetation communities described in Perrin et al. (2014). Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species present at each monitoring stop is at least seven	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, 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). Rhododendron (*Rhododendron ponticum*) was recorded as encroaching on this habitat (Douglas et al., 1989; NPWS internal files)
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: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO listed and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) is present within the SAC (NPWS internal files), but this species cannot be specifically assigned to this habitat

7150 Depressions on peat substrates of the Rhynchosporion

To restore the favourable conservation condition of Depressions on peat substrates of the Rhynchosporion in The Twelve Bens/Garraun Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for The Twelve Bens/Garraun Complex SAC and thus the total area of the qualifying habitat in the SAC is unknown. Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat is documented to occur around pools, in wet hollows, quaking areas and in flushed areas within the SAC (NPWS internal files). Examples of this habitat can be found at Tooreenacoona, Glenmore, Kylemore and Owenglin. Further information can be found within Douglas and Grogan (1987), Douglas et al. (1989), NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
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: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) at least 10%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: potential dominant species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of each of the potential dominant species individually less than 35%	Attribute and target based on Perrin et al. (2014). See the blanket bogs and associated habitats supporting document for the list of potential dominant species
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened brown beak-sedge (*Rhynchospora fusca*) (Wyse Jackson et al., 2016) can be specifically assigned to this habitat in the SAC (Douglas et al., 1989). The FPO and Vulnerable marsh clubmoss (*Lycopodiella inundata*) (Wyse Jackson et al., 2016) is present within the SAC (NPWS internal files), but this species cannot be specifically assigned to this habitat

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 The Twelve Bens/Garraun 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	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) has not been mapped in detail for The Twelve Bens/Garraun Complex SAC but from current available data the total area of the qualifying habitat is estimated to be approximately 162ha, covering 1% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs on hillsides throughout the SAC. Example locations include Bencullagh, Muckanaght, Benbaun, Bengower, Derryclare and Doughruagh (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
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)
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 (*Pteridium aquilinum*), 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The FPO listed and Vulnerable parsley fern (*Cryptogramma crispa*) (Wyse Jackson et al., 2016) and the Near Threatened beech fern (*Phegopteris connectilis*) (Wyse Jackson et al., 2016) have previously been recorded within the SAC (NPWS internal files), but these species cannot be assigned specifically to this habitat. Hepatic mats are present within this habitat in the SAC (R. Hodd, pers. comm.)

8210 Calcareous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Calcareous rocky slopes with chasmophytic vegetation in The Twelve Bens/Garraun 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	Calcareous rocky slopes with chasmophytic vegetation has not been mapped in detail for The Twelve Bens/Garraun Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 105ha, covering c.1% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs throughout the SAC. Locations where this habitat is present include the northern slopes of Muckanaght, west of Bengower, Benbaun, Barrlugwaum on the south-east slopes of Benchoona, Altnagaighera, Garraun, Doughruagh and Benlettery (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
Vegetation composition: positive indicator fern and *Saxifraga* species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and *Saxifraga* 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)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), 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). The Vulnerable alpine saw-wort (*Saussurea alpina*) and holly-fern (*Polystichum lonchitis*), and the Near Threatened beech fern (*Phegopteris connectilis*) and Irish saxifrage (*Saxifraga rosacea* subsp. *rosacea*) (Wyse Jackson et al., 2016) were recorded within this habitat in the SAC (NPWS internal files). The Near Threatened bryophytes *Mnium thomsonii* and *Eremonotus myriocarpus* (Lockhart et al., 2012) are present within the SAC (NPWS internal files) and are known to be associated with this habitat type

8220 Siliceous rocky slopes with chasmophytic vegetation

To restore the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in The Twelve Bens/Garraun 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	Siliceous rocky slopes with chasmophytic vegetation has not been mapped in detail for The Twelve Bens/Garraun Complex SAC, but from current available data the total area of the qualifying habitat is estimated to be approximately 121ha, covering c.1% of the SAC (NPWS internal files). Further details on this and the following attributes can be found in The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for blanket bogs and associated habitats
Habitat distribution	Occurrence	No decline, subject to natural processes	The habitat occurs throughout the SAC including the slopes of Bengower, Benbreen, Bencollaghduff, Bencorr, Bencorrbeg, Derryclare, Bencullagh, Muckanaght, Benbaun, Doughruagh, Benchoona and Garraun (NPWS internal files). Further information can be found within NPWS internal files and the blanket bogs and associated habitats supporting document
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	See the blanket bogs and associated habitats supporting document for further details
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). New Zealand willowherb (*Epilobium brunnescens*) is present within this habitat in the SAC (NPWS internal files)
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), 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 (FPO) and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened beech fern (*Phegopteris connectilis*) (Wyse Jackson et al., 2016) and the Vulnerable bryophytes *Arctoa fulvella*, *Dicranodontium uncinatum* and *Lophozia opacifolia* (Lockhart et al., 2012) are present within the SAC (NPWS internal files). These species are known to be associated with this habitat type. The FPO listed and Vulnerable parsley fern (*Cryptogramma crispa*) (Wyse Jackson et al., 2016) has previously been recorded within the SAC (NPWS internal files), but it cannot be assigned specifically to this habitat. Hepatic mats are present in this habitat in the SAC (R. Hodd, pers. comm.)

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

To maintain the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in The Twelve Bens/Garraun 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; at least 9.5ha for the sub-site (Derryclare Wood, NSNW site code 1601) surveyed. See map 4 for surveyed area	The best examples of old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in The Twelve Bens/Garraun Complex SAC occur at Kylemore and Derryclare Woods, but scattered fragments also occur near Salrock House at the head of Killary Bay Little, in steep ravines north of Ballinahinch Lake and on islands in Lough Inagh and Derryclare Lough (NPWS internal files). As part of the National Survey of Native Woodlands (NSNW), Derryclare Wood (NSNW site code 1601) was surveyed by Perrin et al. (2008). Derryclare Wood is also a statutory Nature Reserve (Statutory Instrument No. 177 of 1980) and is well-studied. Map 4 shows tha woodland area surveyed by the NSNW, including the area classified as 91A0 (9.5ha). NB further unsurveyed areas are present within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes. The surveyed woodland location is shown on map 4	Distribution based on Perrin et al. (2008). It is important to note that there are additional areas of oak woodland, which were not mapped by the NSNW, present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008) and NPWS internal files. See also Fahy et al. (1999)
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008) and NPWS internal files. See also Ferguson and Westhoff (1987)
Woodland structure: natural regeneration	Seedling:sapling:pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak (*Quercus petraea*) generally regenerates poorly. In suitable sites, ash (*Fraxinus excelsior*) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources

Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (Perrin and Daly, 2010), archaeological and geological features as well as red data and other rare or localised species. Perrin and Daly (2010) identified Derryclare Wood (NSNW site code 1601) as possible ancient woodland. There is a well-developed fungus and lichen flora present (Folan and Mitchell, 1970). Many rare and protected bryophytes occur in the Kylemore woods, e.g. the Endangered liverwort *Cephalozia crassifola* and the Near Threatened bryophytes *Lejeunea hibernica, L. eckloniana, Grimmia funalis* and *Telaranea europaea* (Lockhart et al., 2012). *Lejeunea hibernica* and *L. eckloniana* are listed on the Flora (Protection) Order, 2015
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008) and NPWS internal files
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common non-native invasive species in this woodland type: beech (*Fagus sylvatica*), sycamore (*Acer pseudoplatanus*) and rhododendron (*Rhododendron ponticum*). The woods at Kylemore are infested with rhododendron. Beech is also present and substantial areas of the woods are underplanted with conifers (NPWS internal files)

1029 Freshwater Pearl Mussel *Margaritifera margaritifera*

To restore the favourable conservation condition of Freshwater Pearl Mussel in The Twelve Bens/Garraun Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Kilometres	Maintain distribution at 6.43km. See map 5	The conservation objective applies to the Dawros freshwater pearl mussel (*Margaritifera margaritifera*) population in The Twelve Bens/Garraun Complex SAC, which is of international importance and one of eight Irish populations prioritised for conservation action (Moorkens, 2010; NPWS, 2010). It is listed on the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (Statutory Instrument No. 296 of 2009). The distribution and abundance of the species in the Dawros was mapped in 2003 and 2008 (Aster, 2003; Moorkens, 2008; Moorkens and Killeen, 2008). The species is known to extend from above Tullywee Bridge to the tidal limit downstream of Dawros Bridge; however, the stretch upstream of Tullywee Bridge has been little surveyed and requires further investigation. The target is for the species to be sufficiently widespread to maintain itself on a long-term basis as a viable component of the Dawros system. See NPWS (2010) for further information
Population size	Number of adult mussels	Restore Dawros population to at least 800,000 adult mussels	Aster (2003) estimated a population of between 10,750 and 19,322 per linear kilometre of the Dawros River. Moorkens (2008) estimated the total Dawros population at 800,000 to 1 million. Aster (2003) mapped the distribution and abundance from downstream of Tullywee Bridge to Dawros Bridge and categorised mussels as frequent or abundant throughout most of this length. The maximum density recorded in 2008 was 256 per square metre and an average abundance of 148 mussels per linear metre calculated from 9 samples (Moorkens, 2008; Moorkens and Killeen, 2008). NPWS (2013) in producing a national population estimate, assumed that all priority populations had declined at a rate of 1% per year from 2007 to 2012. The target is for the species to be sufficiently abundant to maintain itself on a long-term basis as a viable component of the Dawros 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. Size profile studies in the Dawros by Ross (1988) and Moorkens (2008) are summarised in NPWS (2010). In 2008, the smallest mussel was 22mm, and the Dawros failed both targets with 3.7% ≤65mm and 1.86% ≤30mm (Moorkens, 2008; Moorkens and Killeen, 2008). No juveniles were found in 2016, and 10% was ≤65mm (Moorkens, 2016). The Dawros population is unsustainable owing to lack of survival of juvenile mussels. 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 Dawros 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 Dawros passed both targets in 2008 (Moorkens, 2008; Moorkens and Killeen, 2008; NPWS, 2010). The occurrence of dead and moribund mussels in 2016 indicated an unnatural decline in adult numbers (Moorkens, 2016). 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 Dawros system
Suitable habitat: extent	Kilometres	Restore suitable habitat in more than 4.8km in the Dawros system (see map 5) and any additional stretches necessary for salmonid spawning	The extent of the mussel habitat in the Dawros system downstream of Tullywee Bridge is well-documented and corresponds with its distribution (Aster, 2003; Moorkens, 2008; Moorkens and Killeen, 2008). Stretches upstream of Tullywee Bridge require further survey. Most of the mapped habitat in the Dawros system is occupied by adult mussels; however, it is unsuitable for juvenile recruitment (Moorkens, 2008, 2016; Moorkens and Killeen, 2008; NPWS, 2010). Hydromorphological changes, including bank erosion/slumping and siltation, are key impacts on the Dawros mussel habitat. 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 Dawros system
Suitable habitat: condition	Kilometres	Restore condition of suitable habitat	The species' habitat is a combination of 1) the area of habitat adult and juvenile mussels can occupy; 2) the area of spawning and nursery habitats the 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 those spawning areas that can regularly contribute juvenile fish to areas occupied by adult mussels should be considered. The availability of mussel and fish spawning/nursery habitats is determined by flow and substratum conditions. It is highly sensitive to hydromorphological changes, sedimentation and nutrient enrichment. Pressures throughout the catchment (map 5) contribute to such impacts. The habitat in the Dawros cannot support sufficient juvenile survival. 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 Dawros 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 Dawros system failed the macroinvertebrate target, but passed the diatom target (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 Dawros 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 Dawros failed both targets in 2009 (NPWS, 2010). Up to 70% algal cover was recorded in mussel habitat, while high macrophyte cover (particularly *Myriophyllum*) was frequent (Williams, 2009; NPWS, 2010). In 2016, 91% of quadrats were in moderate or poor condition, mostly owing to algal cover (Moorkens, 2016). Bacterial and fungal growth and detritus accumulation also require further investigation in the Dawros, given the loading of organic fine sediment entering the river (Williams, 2009; Monaghan, 2012). 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 Dawros 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 Dawros failed the target for the Sub-basin Management Plan, with fine sediment recorded throughout the mussel habitat in 2008 and 2009 (Moorkens, 2008; Moorkens and Killeen, 2008; Williams, 2009; NPWS, 2010). There was a clear relationship between heavy siltation and higher macrophyte cover abundance. In 2016, the Dawros passed the target and silt plumes were restricted to marginal areas, suggesting siltation is episodic and deposited fine sediments are periodically flushed-out by high flows (Moorkens, 2016). Sufficient survival 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 Dawros 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 Dawros failed the redox target in 2008, with an average loss of 35% redox potential at 5cm (Moorkens, 2008; Moorkens and Killeen, 2008; NPWS, 2010). In 2016, 92% of redox measurements in the Dawros passed the target and the overall average was 16% (Moorkens, 2016). 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 Dawros system
Hydrological regime: flow variability	Metres per second	Restore appropriate hydrological regime	The availability of suitable freshwater pearl mussel habitat is largely determined by flow (catchment geology being the other important factor). In order to restore the habitat for the species, 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 sediment 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 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 Dawros 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 densities and biomass of host fish were associated with high numbers of juvenile mussels. Fish movements 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 Dawros (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 an integral part of the structure and functioning of river systems. Fringing habitats aid in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling and to the aquatic food web (e.g. allochthonous matter such as leaf fall), and provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates. Shade may also be important in suppressing algal and macrophyte growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern. 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 Dawros system

1106 Salmon *Salmo salar*

To maintain the favourable conservation condition of Atlantic Salmon in The Twelve Bens/Garraun Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee on Salmon (SSCS) annual model output of CL attainment levels. See SSCS (2016). Attainment of CL estimates are derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Owenglin River is currently achieving CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	The target is the threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
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)

1355 Otter *Lutra lutra*

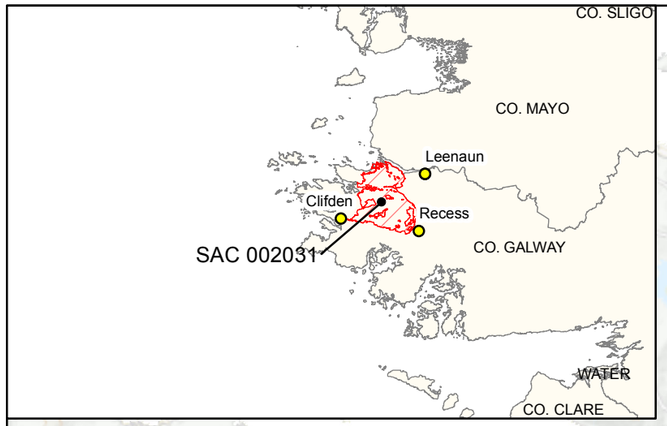
To maintain the favourable conservation condition of Otter in The Twelve Bens/Garraun Complex SAC, which is defined by the following list of attributes and targets:

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 854.66ha	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above high water mark (HWM) and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 53.81ha	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 382.7km	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 540.7ha	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; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 6	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

1833 Slender Naiad *Najas flexilis*

To maintain the favourable conservation condition of Slender Naiad in The Twelve Bens/Garraun 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 *Najas flexilis* within Pollacappul and Kylemore Loughs, subject to natural processes. See map 7 for known locations	The selection of The Twelve Bens/Garraun Complex SAC for *Najas flexilis* (slender naiad) was based on its presence in Loughs Pollacappul and Kylemore. Pollacappul is considered to support a large population of the species, while the species' status in considered uncertain in Kylemore Lough (Roden and Murphy, 2014). See The Twelve Bens/Garraun Complex SAC conservation objectives supporting document for *Najas flexilis* for further details
Population depth	Metres	No change to the depth range of *Najas flexilis* within the lakes, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See the *Najas flexilis* supporting document for further details
Population abundance	Square metres	No change to the cover abundance of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Habitat extent	Hectares	No decline, subject to natural processes	See the *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain/restore appropriate natural hydrological regime necessary to support the habitat for the species	See the *Najas flexilis* supporting document for further details
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the populations of the species	See the *Najas flexilis* supporting document for further details
Water quality	Various	Maintain/restore appropriate water quality to support the populations of the species	See the *Najas flexilis* supporting document for further details
Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the populations of *Najas flexilis*, subject to natural processes	See the *Najas flexilis* supporting document for further details
Water colour	mg/l PtCo	Maintain appropriate water colour to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Associated species	Species composition and abundance	Maintain appropriate associated species and vegetation communities to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the populations of *Najas flexilis*	See the *Najas flexilis* supporting document for further details



Glassillaun
Tully
R335
N59
R336
Kylemore Lough
Cleggan
hduff
R379
N59
Tóin na Lí
Binn Charrach
R344
Beanna Beola
An Chailleach
Binn an Choire Bhig
Cnoc na hUilleann
An Uillinn
Mám Eidhneach
Binn Dhubh
Binn Braoin
Sléibhte Mhám To
Mám Éa
Clifden
Binn an Doirn
Cnoc Lios Uachtair
C O N n a
N59
Sraith Salach
N59
Ballinafad
R341

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Legend

The Twelve Bens/Garraun Complex SAC 002031

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MAP 1:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002031; version 3.01. CO. GALWAY

0 1 2 3 4 5 km

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

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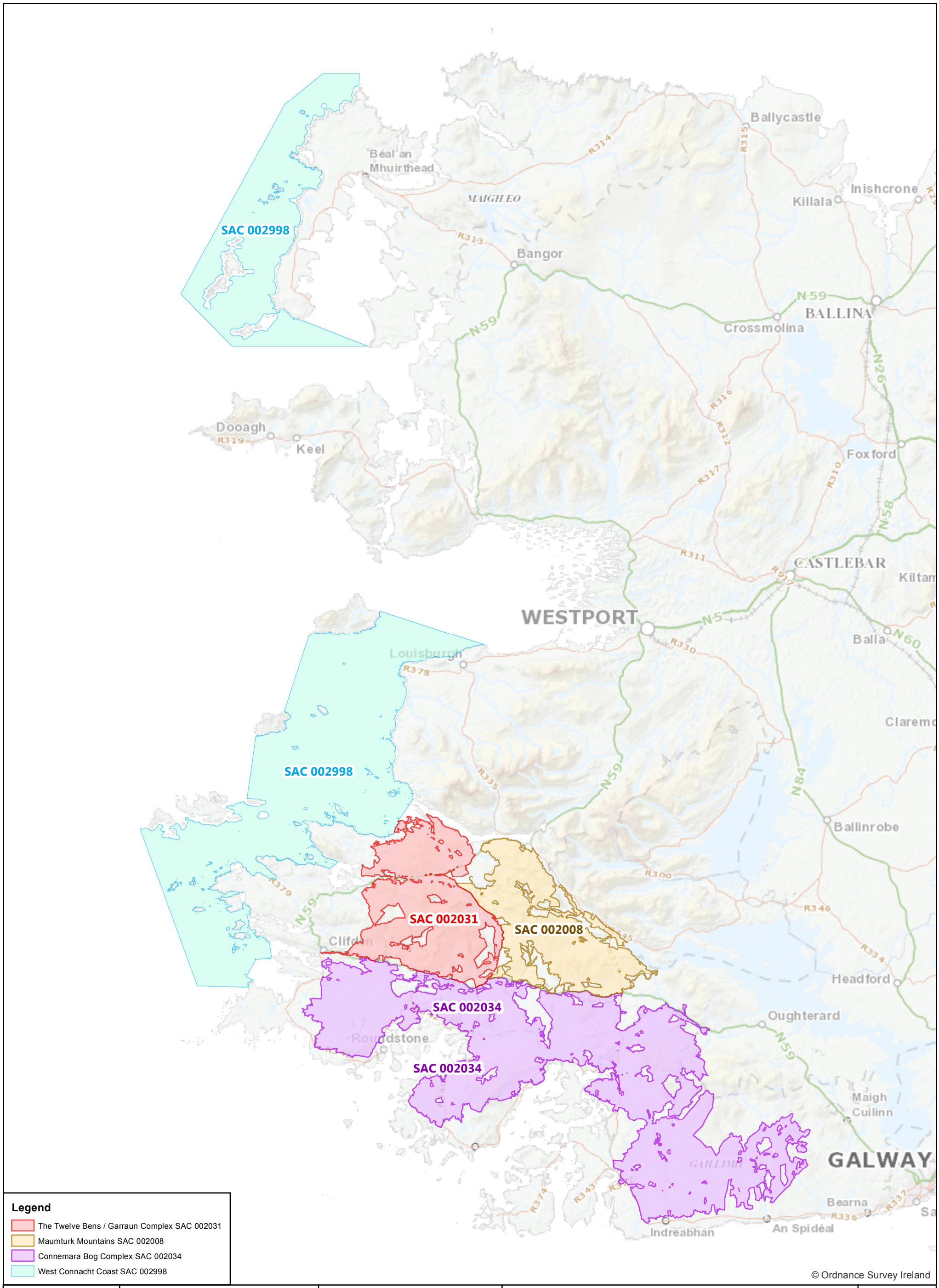
Map Version 1
Date: May 2017


SAC 002998
SAC 002998
SAC 002031
SAC 002008
SAC 002034
SAC 002034
Béal an Mhuirthead
MAIGH EO
Ballycastle
Killala
Inishcrone
Bangor
BALLINA
Crossmolina
Dooagh
Keel
Foxford
CASTLEBAR
WESTPORT
Louisburgh
Balla
Ballinrobe
Clifden
Roundstone
Oughterard
Maigh Cuilinn
GALWAY
Indreabhán
An Spidéal
Bearna
Headford
N59
N5
N26
N58
N60
N84
R314
R315
R313
R316
R312
R317
R310
R311
R917
R330
R378
R335
R379
R300
R346
R334
R336
R337
R343
R374
R319
Legend
The Twelve Bens / Garraun Complex SAC 002031
Maumturk Mountains SAC 002008
Connemara Bog Complex SAC 002034
West Connacht Coast SAC 002998
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MAP 2:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING AND
OVERLAPPING DESIGNATIONS
Map to be read in conjunction with the NPWS Conservation Objectives Document.
SITE CODE:
SAC 002031; version 3.01. SAC 002998; version 3.03
SAC 002008; version 3. SAC 002034 version 3.01.
CO. GALWAY
0 2.5 5 7.5 10 12.5 km
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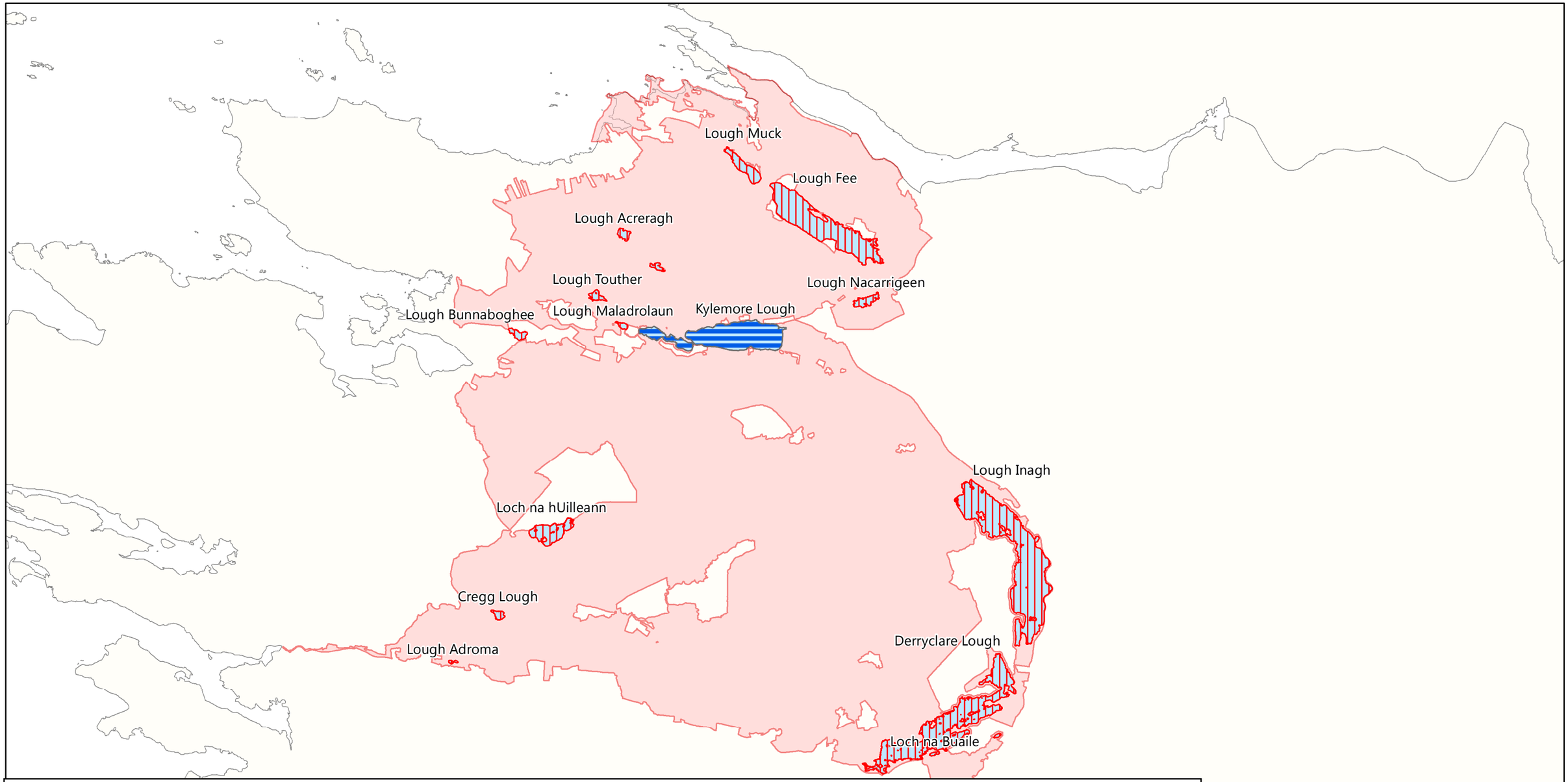
Map Version 1
Date: May 2017



Legend

The Twelve Bens / Garraun Complex SAC 002031

OSi Discovery Series County Boundary

Indicative Lake Habitats

Potential 3110 Potential oligotrophic waters containing very few minerals of sandy plains: Littorelletalia uniflorae

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

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MAP 3:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

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0 1 2 3 4 5 km

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Map Version 1
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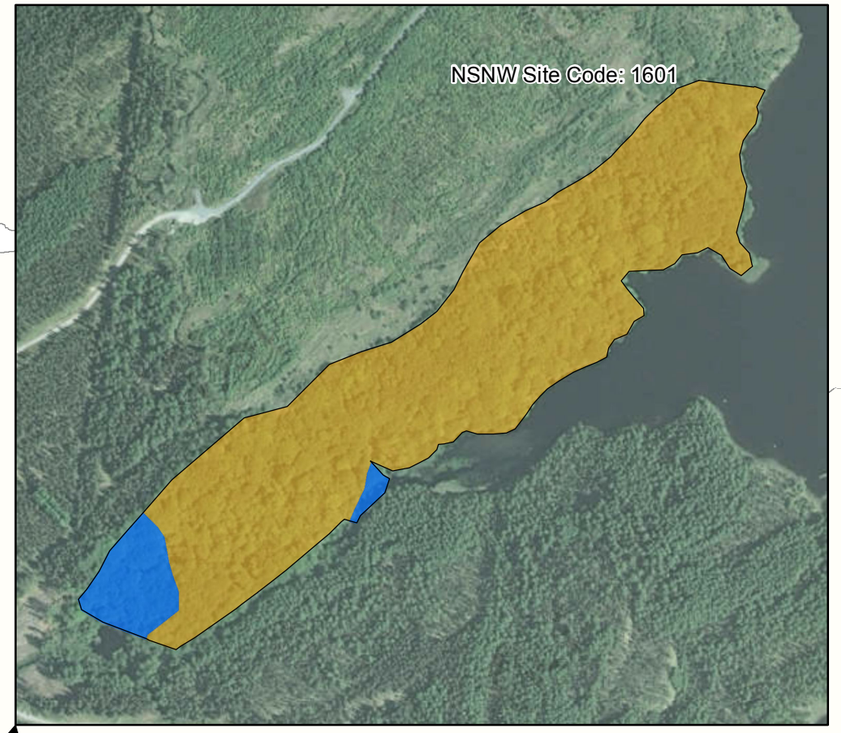

Legend

Woodland Habitats Qualifying Interests

91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

Woodland Habitats Non Qualifying Interests

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion,Alnion incanae, Salicion albae*)

The Twelve Bens / Garraun Complex SAC 002031

OSi Discovery Series County Boundary

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MAP 4:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
WOODLAND HABITATS

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

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Date: May 2017

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- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Distribution Target
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Suitable Habitat Target
- 1029 Freshwater Pearl Mussel *Margaritifera margaritifera* Catchment
- The Twelve Bens / Garraun Complex SAC 002031
- OSi Discovery Series County Boundary

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MAP 5:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
FRESHWATER PEARL MUSSEL

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

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- 1355 Otter *Lutra lutra* Commuting 250m
- The Twelve Bens / Garraun Complex SAC 002031
- OSi Discovery Series County Boundary

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MAP 6:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
OTTER COMMUTING

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

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SAC 002031; version 3.01. CO. GALWAY

0 1 2 3 4 km

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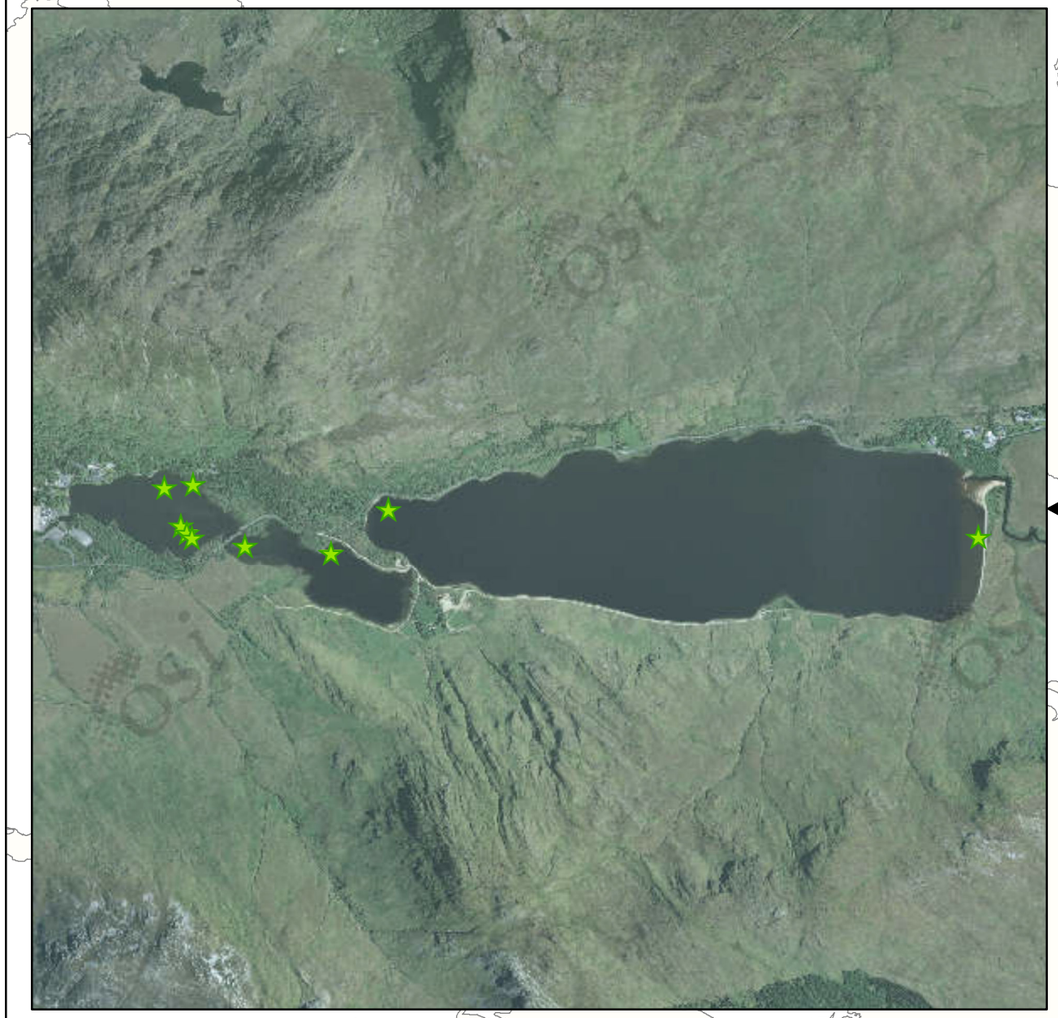
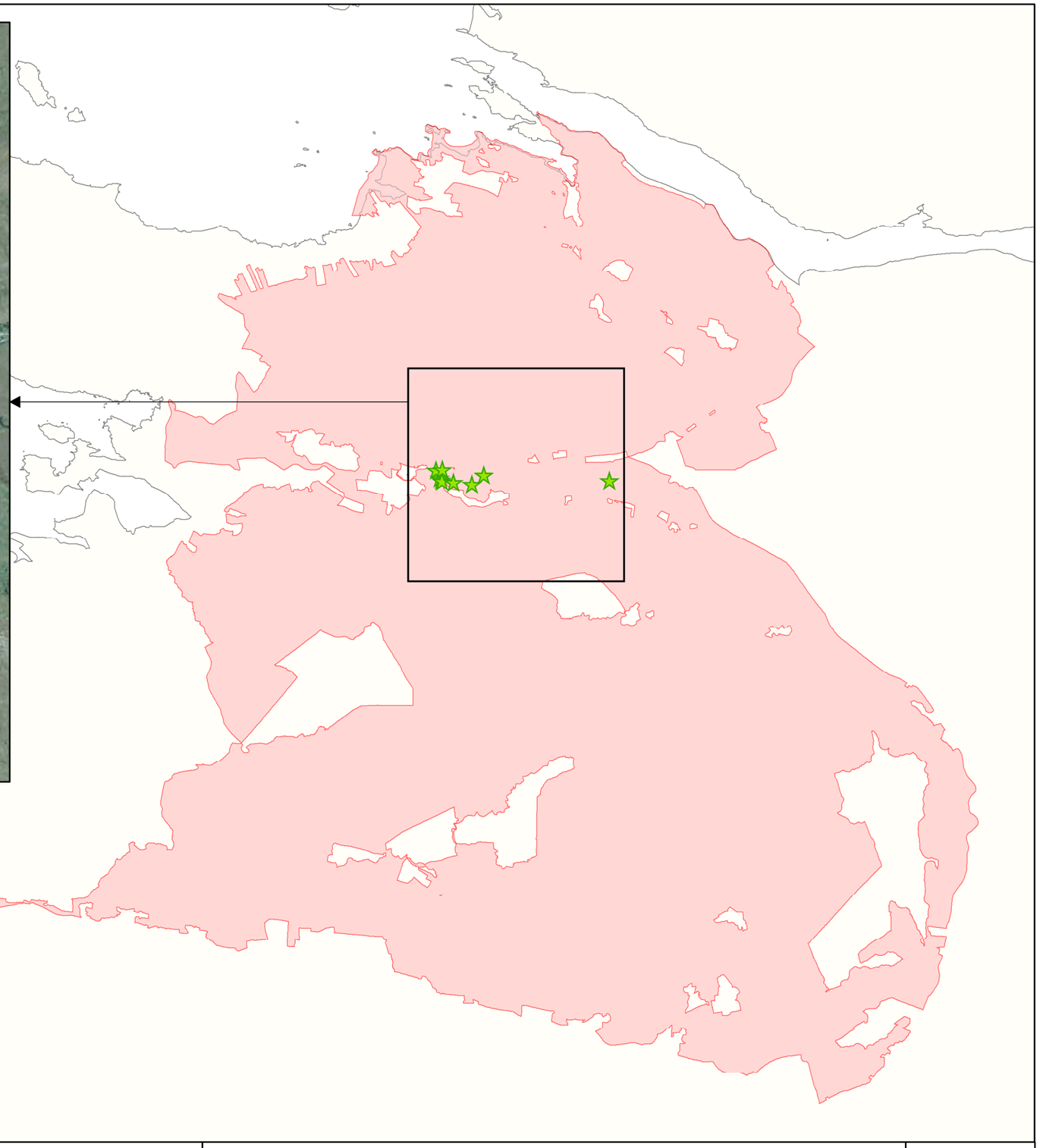
Map Version 1
Date: May 2017





Legend

- 1833 Sender Naiad *Najas flexilis*
- The Twelve Bens / Garraun Complex SAC 002031
- OSi Discovery Series County Boundary

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MAP 7:
THE TWELVE BENS / GARRAUN COMPLEX SAC
CONSERVATION OBJECTIVES
SLENDER NAIAD

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

SITE CODE:
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0 1 2 3 4 5 km

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Map Version 1
Date: May 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Connemara Bog Complex SAC 002034

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

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201p) Conservation Objectives: Connemara Bog Complex SAC 002034. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002034	Connemara Bog Complex SAC
1065	Marsh Fritillary *Euphydryas aurinia*
1106	Salmon *Salmo salar*
1150	Coastal lagoons*
1170	Reefs
1355	Otter *Lutra lutra*
1833	Slender Naiad *Najas flexilis*
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 Isoeto-Nanojuncetea
3160	Natural dystrophic lakes and ponds
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
4010	Northern Atlantic wet heaths with *Erica tetralix*
4030	European dry heaths
6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
7130	Blanket bogs (* if active bog)
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion
7230	Alkaline fens
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

Please note that this SAC overlaps with Connemara Bog Complex SPA (004181). It adjoins Lough Corrib SAC (000297), Maumturk Mountains SAC (002008), The Twelve Bens/Garraun Complex SAC (002031) and Kilkieran Bay and Islands SAC (002111). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjoining sites as appropriate.

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

NPWS Documents

Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	1987
Title :	Survey to locate lowland blanket bogs of scientific interest in Connemara, Co. Galway
Author :	Douglas, C.; Grogan, H.
Series :	Unpublished report to the Wildlife Service
Year :	1989
Title :	A survey to locate blanket bogs in Co. Galway. Part 2
Author :	Douglas, C.; Garvey, L.; Kelly, L.; O'Sullivan, A.
Series :	Unpublished report to the Wildlife Service
Year :	1998
Title :	Survey of Irish coastal lagoons, 1996 and 1998
Author :	Healy, B.; Roden, C.; Oliver, G.; Good, J.
Series :	Unpublished report to NPWS
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2007
Title :	Inventory of Irish coastal lagoons (version 2)
Author :	Oliver, G.
Series :	Unpublished report to NPWS
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished Report to NPWS
Year :	2009
Title :	NS II freshwater pearl mussel sub-basin management plans: Report on biological monitoring of surface water quality in the Owenriff catchment (Corrib sub-catchment), Co. Galway
Author :	Williams, L.
Series :	Unpublished report to NPWS
Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46

Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2013
Title :	Irish semi-natural grasslands survey 2007-2012
Author :	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
Series :	Irish Wildlife Manual No. 78
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manual No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2015
Title :	Connemara Bog Complex SAC (site code: 2034) Conservation objectives supporting document- coastal lagoons V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Connemara Bog Complex SAC (site code: 2034) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2015
Title :	Connemara Bog Complex SAC (site code: 2034) 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 :	1991
Title :	The spatial organization of otters (*Lutra lutra*) in Shetland
Author :	Kruuk, H.; Moorhouse, A.
Series :	J. Zool, 224: 41-57
Year :	1991
Title :	Records of aquatic plants from Connemara and the Burren
Author :	Preston, C.D.; Stewart, N.F.; Webster, S.D.
Series :	Irish Naturalists' Journal 23(11): 464-467
Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	1999
Title :	Diet of otters (*Lutra lutra*) on Inishmore, Aran Islands, west coast of Ireland
Author :	Kingston, S.; O'Connell, M.; Fairley, J.S.
Series :	Biol & Environ Proc R Ir Acad B 99B:173-182
Year :	2000
Title :	Colour in Irish lakes
Author :	Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.
Series :	Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie. 27: 2620-2623
Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London
Year :	2002
Title :	Deterioration of Atlantic soft water macrophyte communities by acidification, eutrophication and alkalinisation
Author :	Arts, G.H.P.
Series :	Aquatic Botany, 73: 373-393
Year :	2003
Title :	Ecology of watercourses characterised by Ranunculion fluitantis and Callitricho-Batrachion Vegetation
Author :	Hatton-Ellis, T.W.; Grieve, N.
Series :	Conserving Natura 2000 Rivers Ecology Series No. 11. English Nature, Peterborough
Year :	2004
Title :	The ecology of *Najas flexilis*
Author :	Wingfield, R.A.; Murphy, K.J.; Hollingsworth, P.; Gaywood, M.J.
Series :	Scottish Natural Heritage Commissioned Report No. 017 (ROAME No. F98PA02)

Year :	2006
Title :	Otters - ecology, behaviour and conservation
Author :	Kruuk, H.
Series :	Oxford University Press
Year :	2006
Title :	A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)
Author :	Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.
Series :	EPA, Wexford
Year :	2009
Title :	The identification, characterization and conservation value of isoetid lakes in Ireland
Author :	Free G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W.
Series :	Aquatic Conservation: Marine and Freshwater Ecosystems 19 (3): 264–273
Year :	2010
Title :	Second draft Owenriff freshwater pearl mussel sub-basin management plan (2009-2015). March 2010
Author :	Department of the Environment, Heritage and Local Government
Series :	Unpublished report
Year :	2012
Title :	Subtidal reef survey of Salt Lake, Connemara Bog Complex
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	The impact of conifer plantation forestry on the ecology of peatland lakes
Author :	Drinan, T.J.
Series :	Unpublished PhD thesis, University College Cork
Year :	2013
Title :	Monitoring and assessment of Irish lagoons for the purposes of the EU Water Framework Directive, 2009-2011. Parts 1 and 2
Author :	Roden, C.M; Oliver, G.A.
Series :	Unpublished report to the Environmental Protection Agency
Year :	2013
Title :	Management strategies for the protection of high status water bodies
Author :	Ní Chatháin, B.; Moorkens, E.; Irvine, K.
Series :	Strive Report Series No. 99. EPA, Wexford
Year :	2013
Title :	Interpretation manual of European Union habitats- Eur 28
Author :	European Commission- DG Environment
Series :	Reference document
Year :	in prep.
Title :	Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes
Author :	Roden, C.; Murphy, P.
Series :	Unpublished report to NPWS

Spatial data sources

Year :	Revision 2011
Title :	Inventory of Irish Coastal Lagoons. Version 3
GIS Operations :	Clipped to SAC boundary
Used For :	1150 (map 3)
Year :	Interpolated 2015
Title :	1994, 1995 BioMar surveys; 2011 subtidal reef survey
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1170, marine community types (maps 4 and 5)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 5)
Year :	2008
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3110, 3160 (map 6)
Year :	Revision 2012
Title :	Margaritifera Sensitive Areas
GIS Operations :	Relevant catchment boundaries identified. Expert opinion used as necessary to resolve any issues arising
Used For :	3260 (map 7)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0 (map 8)
Year :	2013
Title :	Najas flexilis data
GIS Operations :	Lake habitat for species clipped to SAC boundary
Used For :	1833 (map 9)

1150 Coastal lagoons

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to slight natural variation. Favourable reference area 151.4ha. See map 3	Area calculated from spatial data derived from Oliver (2007) for IL061 (Loch Doire Bhanbh), IL062 (Loch an tSáile) and IL063 (Loch Conaortha). Area of Ardbear Salt Lake calculated using the same methodology. See lagoons supporting document for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	IL061 (Loch Doire Bhanbh), IL062 (Loch an tSáile) and IL063 (Loch Conaortha) listed in Oliver (2007) and Ardbear Salt Lake in Healy et al. (1998). See lagoons supporting document for further details
Salinity regime	Practical salinity units (psu)	Median annual salinity and temporal variation within natural ranges	Loch Doire Bhanbh and Ardbear Salt Lake are recorded as polyhaline lagoons, Loch an tSáile as oligohaline/mesohaline and Loch Conaortha as mesohaline. See lagoons supporting document for further details
Hydrological regime	Metres	Annual water level fluctuations and minima within natural ranges	Maximum depth of Loch Doire Bhanbh is recorded as 3m, Loch an tSáile as 13m, Loch Conaortha as 5m; the average depth of Ardbear Salt Lake is between 4 -6m with a maximum depth of 27m. See lagoons supporting document for further details
Barrier: connectivity between lagoon and sea	Permeability	Appropriate hydrological connections between lagoons and sea, including where necessary, appropriate management	Loch Doire Bhanbh is described as a saltmarsh lagoon, Loch an tSáile and Loch Conaortha as rock/peat barrier lagoons and Ardbear Salt Lake as having a rock barrier. See lagoons supporting document for further details
Water quality: Chlorophyll *a*	µg/L	Annual median chlorophyll *a* within natural ranges and less than 5µg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Molybdate Reactive Phosphorus (MRP)	mg/L	Annual median MRP within natural ranges and less than 0.1mg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Water quality: Dissolved Inorganic Nitrogen (DIN)	mg/L	Annual median DIN within natural ranges and less than 0.15mg/L	Target based on Roden and Oliver (2013). See lagoons supporting document for further details
Depth of macrophyte colonisation	Metres	Macrophyte colonisation to at least 4m depth	It is expected that macrophyte colonisation would extend down to the full depths of Loch Doire and Loch Conaortha. In Loch an tSáile and Ardbear Salt Lake macrophytes would be expected to extend to 4m depth; thereafter the dark water colour prohibits growth. See lagoons supporting document for further details
Typical plant species	Number and m^2	Maintain number and extent of listed lagoonal specialists, subject to natural variation	Species listed in Oliver (2007),Healy et al. (1997) and MERC (2012). See lagoons supporting document for further details
Typical animal species	Number	Maintain listed lagoon specialists, subject to natural variation	Species listed in Oliver (2007) and Healy et al. (1997). See lagoons supporting document for further details. The conservation objective and supporting document for reefs (1170) gives information on the *Serpula vermicularis*-dominated community complex
Negative indicator species	Number and percentage cover	Negative indicator species absent or under control	Low salinity, shallow water and elevated nutriennt levels increase the threat of unnatural encroachment by reedbeds. See lagoons supporting document for further details

1170 Reefs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area estimated as 6ha from a 2011 subtidal reef survey (MERC, 2012) and an intertidal walkover in 2014
Distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes. See map 4	Based on information from a 2011 subtidal reef survey (MERC, 2012) and an intertidal walkover in 2014
Community extent	Hectares	Maintain the extent of the *Serpula vermicularis*-dominated community complex, subject to natural processes. See map 5	The likely extent of the *Serpula vermicularis*-dominated community complex was derived from dive surveys undertaken in 2011 (MERC, 2012). See marine supporting document for further details
Community structure	Biological composition	Conserve the high quality of the *Serpula vermicularis*-dominated community complex, subject to natural processes	Based on 2011 diver observation (MERC, 2012). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community type in a natural condition: Intertidal reef community complex. See map 5	Based on information from 1994 and 1995 BioMar surveys (Picton and Costello, 1997) and an intertidal walkover in 2014. See marine 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 Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	This SAC has a very large number of lakes and ponds (more than 1,100, based on 1:5,000 OSi data). Most are surrounded by peatland and are likely to contain lake habitats 3110 and/or 3160. Records for *Najas flexilis* indicates lake habitat 3130 also occurs in some lakes. The exact distribution of habitat 3110 in the site is unknown, but it is considered to be widespread and of high conservation value, particularly in Roundstone Blanket Bog (see indicative distribution in map 6). 3110 lakes in the SAC typically have shallow margins, often with rock outcrops along the shore, and a mixed rocky/peaty/sandy substratum. 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, it is likely that the habitat is widespread and of high conservation value 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 Article 17 habitat assessment for 3110 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). The only known Irish sites for *Luronium natans* are in the SAC, and include at least three lakes (Rich et al., 1995; Curtis et al., 2012). The status of *Luronium natans* in Ireland is currently uncertain, as it is unclear whether it is native to these sites, or was introduced. The protected *Pilularia globulifera* is known from a number of lakes in the SAC and is likely to be widespread
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however significant further work is necessary to describe the characteristic zonation and other spatial patterns in the remaining four Annex I lake habitats
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. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time. Lakes in the SAC typically have very clear water and, therefore, maximum depth is expected to be large
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that 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 appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140), however specific targets have yet to be established for the remaining lake habitats. Habitat 3110 is associated with very clear water. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m
Water quality: nutrients	µg/l P; mg/l N	Maintain 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 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 lake habitat 3110, annual average TP concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll status	Oligotrophic and WFD 'high' status targets apply to the lake habitat 3110. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l. The annual average chlorophyll a concentration should be <2.5µg/l and the annual peak chlorophyll a concentration should be ≤8.0µg/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 EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3110 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in the oligotrophic soft water habitat should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, habitat 3110 requires high phytobenthos status
Water quality: macrophyte status	EPA macrophyte metric (The Free Index)	Maintain high macrophyte status	Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for the lake habitat. The EPA monitors macrophyte status for Water Framework Directive purposes using the 'Free Index'. The target for lake habitat 3110 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged *Sphagnum* mosses and *Juncus bulbosus* (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For this habitat, 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 ≤100mg/l CaCO3). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 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 lake habitat 3110, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat	Area	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, 3110 lakes are most likely to be fringed by poor fen, flush, blanket bog and heath communities. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

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 Isoeto-Nanojuncetea in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	This SAC has a very large number of lakes and ponds (>1,100, based on 1:5,000 OSi data). Most are likely to contain lake habitats 3110 and/or 3160; however, records of *Najas flexilis* demonstrate that lake habitat 3130 also occurs. The indicative distribution of habitat 3130 in the SAC is based on records for this characteristic species (see maps 6 and 9). Potential 3130 lakes are also identified overlying lake marbles or the Metagabbro Suite. The habitat is likely to be more widespread, as a result of basic influences from such geologies or coastal sands. 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) and the *Najas flexilis* supporting document
Habitat distribution	Occurrence	No decline, subject to natural processes	The characteristics and distribution of habitat 3130 in Ireland are not yet fully understood. The Annex II macrophyte slender naiad (*Najas flexilis*) is considered to be characteristic of the habitat and has been recorded from 11 lakes across the SAC
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant species, see Article 17 habitat assessment for lake habitat 3130 (NPWS, 2013b), O Connor (2015) and the *Najas flexilis* supporting document
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however significant further work is necessary to describe the characteristic zonation and other spatial patterns in the remaining four lake habitats
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. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced

Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that the soft water lake habitat with base-rich influences (3130) is associated with a range of substrate types that are more productive/base-rich relative to the substratum of 3110. Substratum particle size is likely to vary with depth and along the shoreline within a single lake, however it should be noted that *Najas flexilis* is typically found on soft substrata of mud, silt or fine sand (Preston and Croft, 2001, Roden, 2002; 2004)
Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140), however specific targets have yet to be established for the remaining lake habitats. Habitat 3130 is associated with clear water, as evidenced by the growth of the character species *Najas flexilis* at depths of up to 10m. The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth, and ≥3m annual minimum Secchi disk depth. There is likely to be some variation across lakes with habitat 3130 in Secchi depth and site-specific conditions should also be considered
Water quality: nutrients	µg/l P; mg/l N	The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition	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. 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 TP concentration should be ≤10µg/l TP, average annual total ammonia should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. Where nutrient concentrations are lower, there should be no upward trend in nutrient concentrations. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	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 a concentration must be <5.8µg/l. The annual average chlorophyll *a* should be <2.5µg/l and the annual peak chlorophyll *a* should be <8.0µg/l. Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. 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, habitat 3130 is considered to require 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 lake 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 soft water lake habitat with base-rich influences (3130). The EPA monitors macrophyte status for Water Framework Directive purposes using the 'Free Index'. The target for 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 habitat 3130. Acidification reduces the abundance and reproductive capacity of *Najas flexilis* (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 Najas flexilis, 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/Alkalisation status is high. Maximum pH should be <9.0 pH units, in line with the surface water standards. See The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased 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
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 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. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves

3160 Natural dystrophic lakes and ponds

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	This SAC has a very large number of lakes and ponds (more than 1,100 from 1:5,000 OSi data). Most are surrounded by peatland and are likely to contain lake habitats 3110 and/or 3160. The selection of the SAC for habitat 3160 was based on its widespread distribution in areas of low-lying blanket bog; dystrophic ponds being found wherever the peat is deep and the water table high. The habitat is considered to be of high conservation value in the SAC. 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. For further information on the distribution, vegetation and morphology of the habitat in the site, see Douglas and Grogan (1987) and Douglas et al. (1989). 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, it is likely that the habitat is widespread and of high conservation value in the site (see map 6)
Typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	For lists of typical plant and invertebrate species, see Article 17 habitat assessment for 3160 (NPWS, 2013) and the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 has been described (Roden and Murphy, 2013; in prep.), however significant further work is necessary to describe the characteristic zonation and other spatial patterns in the other Annex I lake habitats. Spatial patterns are likely to be relatively simple in 3160 lakes and ponds, with limited zonation
Vegetation distribution: maximum depth	Metres	Maintain maximum depth of vegetation, subject to natural processes	The maximum depth of vegetation is likely to be specific to the lake shoreline in question. An indicative target of >6m has been developed for hard water lakes (3140) (see Roden and Murphy, 2013; in prep.). Indicative targets will be developed for the other lake habitats with time. Lakes in the SAC typically have very clear water and, therefore, maximum depth is expected to be large
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat	Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment. The hydrological regime of the lakes 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. Owing to their size and the sensitivity of peatland, 3160 lakes and ponds can easily be damaged or destroyed by drainage
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Research is required to further characterise the substratum types (particle size and origin) and substratum quality (notably pH, calcium, iron and nutrient concentrations) favoured by each of the five Annex I lake habitats in Ireland. It is likely that habitat 3160 is associated with nutrient-poor peat and silt substrates

Water quality: transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target has been set for hard water lakes (3140), however specific targets have yet to be established for the remaining lake habitats. Habitat 3160 is associated with very clear water. The OECD fixed boundary system set transparency targets for ultra-oligotrophic lakes of ≥12m annual mean Secchi disk depth, and ≥6m annual minimum Secchi disk depth
Water quality: nutrients	µg/l P or mg/l N	Maintain 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 Water Framework Directive '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 ponds, annual average TP concentration should be ≤5µg/l TP, average annual total ammonia concentration should be ≤0.040mg/l N and annual 95th percentile for total ammonia should be ≤0.090mg/l N. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton biomass	µg/l Chlorophyll *a*	Maintain appropriate water quality to support the habitat, including high chlorophyll *a* status	Oligotrophic and Water Framework Directive 'high' status targets apply to habitat 3160. The average growing season (March-October) chlorophyll *a* concentration must be <5.8µg/l (The European Communities Environmental Objectives (Surface Waters) Regulations 2009). Where a lake has a chlorophyll *a* concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. The OECD targets may be more appropriate for habitat 3160: annual average chlorophyll *a* concentration <1µg/l and annual peak chlorophyll *a* concentration ≤2.5µg/l. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009
Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, habitat 3160 requires WFD high status
Water quality: attached algal biomass	Algal cover and EPA phytobenthos metric	Maintain trace/ absent attached algal biomass (<5% cover) and high phytobenthos status	Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in 3160 lakes and ponds should, therefore, be trace/ absent (<5% cover). EPA phytobenthos can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, 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 Water Framework Directive purposes using the 'Free Index'. The target for 3160 lakes and ponds is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009

Acidification status	pH units; mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. Although EC (2013) describes habitat 3160 as having pH 3-6, Drinan (2012) found mean pHs of 5.16 and 5.62 in upland and lowland 3160 lakes, respectively. The target for habitat 3160 is pH >4.5 and <9.0, in line with the surface water standards for soft waters (where water hardness is ≤100mg/l CaCO3). See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. The specific requirements of lake habitat 3160, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Increased water colour and turbidity decrease light penetration and can reduce the area of available habitat for lake macrophytes, particularly at the lower euphotic depths. The primary source of increased water colour in Ireland is disturbance to peatland. No habitat-specific or national standards for water colour currently exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free, et al., 2000) and 33mgl PtCo (Free et al., 2006). It is likely that the water colour in all Irish lake habitats would naturally be <50mg/l PtCo. Water colour can be very low (<20mg/l PtCo or even <10mg/l PtCo) in 3160 lakes and ponds, where the peatland in the lake's catchment is intact
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc.
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate units	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Fringing habitat	Area	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3160	Most 3160 lake and pond shorelines intergrade with blanket bog, flush, poor fen or heath habitats and these support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and can support wetland communities and species of conservation concern

3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

To maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Connemara Bog 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	Selection of this SAC for 3260 used a broad interpretation and little is known of the distribution of high conservation value sub-types. Rivers and streams are widespread and abundant in the SAC (see map 7). Note: rooted macrophytes should be absent or trace (<5% cover) in freshwater pearl mussel (*Margaritifera margaritifera*) habitat. The SAC overlaps with three *Margaritifera* sensitive areas: Owenriff (priority SAC catchment), Knock and Ballynahinch/Recess (see map 7). Mussels occur within the SAC in the Derrygauna River (tributary of the Owenriff), and the Owentooey and Recess Rivers. Within the Owenriff catchment, the freshwater pearl mussel (1029) conservation objective for Lough Corrib SAC (000297) takes precedence, because the mussel requires environmental conditions close to natural background levels
Habitat distribution	Occurrence	No decline, subject to natural processes	The description of 3260 is broad, from upland bryophyte/macroalgal dominated river stretches, to lowland depositing rivers with pondweeds and starworts (EC, 2013), and further study is needed of Irish sub-types and their conservation value. As noted above, little is known about the distribution of the habitat and its sub-types in the site. Heuff (1987) surveyed the Vougheen Stream, the outflow from Lough Cam (both in Roundstone Blanket Bog) and the Owenboliska. Rivers in the SAC are, naturally, very nutrient-poor, with five High Status sites on four rivers noted by Ni Chathain et al. (2013). Rivers and streams can be peaty and slow-flowing in flat blanket bog, and spatey, often with cascades, in more sloping areas. They are frequently base-poor, but *Margaritifera* rivers tend to have base-rich influences. See Williams (2009) and DEHLG (2010) for information on macrophytes in the Owenriff catchment
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regimes	Any high conservation value sub-types in the site will be associated with natural hydrology. 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 of the sub-types of this 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. Peatlands can also have slow-flowing or ponded streams and rivers, with biotic communities likely to resemble those in associated lakes
Hydrological regime: groundwater discharge	Metres per second	Maintain appropriate hydrological regimes	The groundwater contribution to rivers in the SAC is likely to be small, owing to the geology and dominance of blanket peat soils. Even small groundwater contributions, however, can significantly alter the hydrochemistry, particularly where there is basic bedrock (e.g. lake marbles or the Metagabbro Suite) and/or subsoils

Substratum composition: particle size range	Millimetres	Maintain appropriate substratum particle size range, quantity and quality, subject to natural processes	Although many of the high conservation value sub-types are dominated by coarse substrata, for certain sub-types, notably tidal forms, fine substrata are required. Peat is a common substratum in gently sloping rivers within the site. The size and distribution of particles is largely determined by the river flow. 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
Water quality	Various	Maintain 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 considered to be naturally very nutrient poor and, therefore, to typically require Water Framework Directive high status, in terms of nutrient and oxygenation standards, and EQRs (Ecological Quality Ratios) for macroinvertebrates and phytobenthos
Vegetation composition: typical species	Occurrence	Typical species of the relevant habitat sub-type should be present and in good condition	The sub-types of this habitat are poorly understood and their typical species have not yet been fully defined. The typical species may include higher plants, bryophytes, macroalgae and microalgae, and invertebrates. The only known Irish sites for *Luronium natans* are in the SAC, and although generally considered to be a lake species, it has been found in two streams (Rich et al., 1995; Curtis et al., 2012). The status of *Luronium natans* in Ireland is currently uncertain, as it is unclear whether it is native to these sites, or was introduced (Preston and Croft, 2001). The uncommon pondweed hybrid, *Potamogeton* x *sparganiifolius* is known from the Owenmore (Ballynahinch) River (Preston et al., 1991)
Floodplain connectivity: area	Hectares	Area of active floodplain at, and upstream of the habitat, necessary to support all sub-types 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)
Riparian habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the habitat and its sub-types	Riparian habitats, including those along lake fringes, even where they do not form part of a natural floodplain, are an integral part of the structure and functioning of river systems. Fringing habitats can contribute to the aquatic food web (e.g. allochthonous matter such as leaf fall), provide habitat (refuge and resources) for certain life-stages of fish, birds and aquatic invertebrates, assist in the settlement of fine suspended material, protect banks from erosion and contribute to nutrient cycling. Shade may also be important in suppressing algal growth in enriched rivers and moderating temperatures. Equally, fringing habitats are dependent on rivers/lakes, particularly their water levels, and support wetland communities and species of conservation concern

4010 Northern Atlantic wet heaths with Erica tetralix

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Stable or increasing, subject to natural processes	Northern Atlantic wet heaths with *Erica tetralix* has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It occurs in mosaic/in association with with other habitats, including other heath habitats (4030), blanket bogs (7130), lakes (3110, 3160), rocky outcrops and grasslands. Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files; commonage framework plans for part or all of the following agricultural units: GA2, GA4, GA5, GA6, GA7, GA8, GA9, GA11, GA15, GA16, GA18, GA21
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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 in NPWS (2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: cross-leaved heath	Occurrence within 20m of a representative number of 2m x 2m monitoring stops	Presence of cross-leaved heath (*Erica tetralix*) near 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 given
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of *Cladonia* and *Sphagnum* species, *Racomitrium lanuginosum* 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 (*Empetrum nigrum*) 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 is also given
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)

Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) 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 (*Juncus effusus*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: *Sphagnum* condition	Condition at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 2m x 2m 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 is also presented
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014)
Physical structure: drainage	Percentage cover 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 book (Curtis and McGough, 1988)

4030 European dry heaths

To restore the favourable conservation condition of European dry heaths in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	European dry heaths has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It occurs in mosaic/in association with other habitats, including other heath habitats (4010, 4060), rocky outcrops and grasslands. Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files; commonage framework plans for part or all of the following agricultural units: GA2, GA4, GA5, GA6, GA7, GA8, GA9, GA11, GA15, GA16, GA18, GA21
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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 in NPWS (2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on these communities 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 least three, excluding *Campylopus* and *Polytrichum* mosses	Attribute and target based on Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number 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 given
Vegetation structure: 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 (*Myrica gale*), creeping willow (*Salix repens*) and western gorse (*Ulex gallii*) 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 is also given
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 20%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: bracken	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of bracken (*Pteridium aquilinum*) 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 (*Juncus effusus*) 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 (*Calluna vulgaris*) 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 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 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 should occur throughout, with at least 10% of cover in the mature phase	Attribute and target based on Perrin et al. (2014)
Vegetation 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 book (Curtis and McGough, 1988)

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

To maintain the favourable conservation condition of *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	This Annex I grassland habitat has not been mapped for this SAC and thus the total area of the qualifying habitat is unknown. It is likely to occur as rather small fragmented areas on wet acid soils (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note for area above
Vegetation composition: typical species	Number at a representative number of monitoring stops	At least seven positive indicator species present, including one "high quality" species as listed in O'Neill et al. (2013)	List of positive indicator species, including high quality species, identified by O'Neill et al. (2013). Note that purple moor-grass (*Molinia caerulea*) is a positive indicator species, but not necessarily an essential component of the habitat
Vegetation composition: negative indicator species	Percentage at a representative number of monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: non-native species	Percentage at a representative number of monitoring stops	Cover of non-native species not more than 1%	List of negative indicator species identified by O'Neill et al. (2013)
Vegetation composition: moss species	Percentage at a representative number of monitoring stops	Hair mosses (*Polytrichum* spp.) not more than 25% cover	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: woody species and bracken	Percentage at a representative number of monitoring stops	Cover of woody species and bracken (*Pteridium aquilinum*) not more than 5% cover	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: broadleaf herb: grass ratio	Percentage at a representative number of monitoring stops	Broadleaf herb component of vegetation between 40 and 90%	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: sward height	Percentage at a representative number of monitoring stops	At least 30% of sward between 10 and 80cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage at a representative number of monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare ground	Percentage	Not more than 10% bare ground	Attribute and target based on O'Neill et al. (2010)
Physical structure: bare soil	Percentage at a representative number of monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Square metres	Area showing signs of serious grazing or other disturbance less than 20m²	Attribute and target based on O'Neill et al. (2013)

7130 Blanket bogs (* if active bog)

To restore the favourable conservation condition of Blanket bogs in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Stable or increasing, subject to natural processes	Blanket bogs has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It occurs in mosaic/in association with other habitats, including lakes (3110, 3160), heath habitats (4010, 4030), transition mires (7150) and rocky outcrops. Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files; commonage framework plans for part or all of the following agricultural units: GA2, GA4, GA5, GA6, GA7, GA8, GA9, GA11, GA15, GA16, GA18, GA21
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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 in NPWS (2013)
Ecosystem function: peat formation	Active blanket bog as a proportion of the total area of Annex I blanket bog habitat	Active bog at least 99% of the total Annex I blanket bog area	Blanket bogs are considered active when "still supporting a significant area of vegetation that is normally peat forming" (EC, 2013)
Ecosystem function: hydrology	Flow direction, water levels, occurrence of drains and erosion gullies	Natural hydrology unaffected by drains and erosion	Drains and erosion gullies can affect the natural hydrologial processes of blanket bog
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: positive indicator species	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive indicator species 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 given
Vegetation composition: lichens and bryophytes	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of bryophytes or lichens, excluding *Sphagnum fallax*, 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)
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 given
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and scrub	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: *Sphagnum* condition	Condition of *Sphagnum* at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 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	Occurrence 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). The greater bog mosaic incorporates the blanket bog itself and associated vegetation types as well as non-vegetation cover types that appear to have been derived from former blanket bog including gravel, rock and running water
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 book (Curtis and McGough, 1988)

7140 Transition mires and quaking bogs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Transition mires and quaking bogs has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It occurs in mosaic/in association with other habitats including blanket bogs (7130) and heath habitats (4010) and fen (7230). Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files; commonage framework plans for part or all of the following agricultural units: GA2, GA4, GA5, GA6, GA7, GA8, GA9, GA11, GA15, GA16, GA18, GA21
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes	See note on area above
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 in NPWS (2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on vegetation communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species	Number at a representative number of 2m x 2m monitoring stops	Number of positive indicator species at least three for in-filling 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 given
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 given
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 given
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 given
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)
Vegetation structure: height	Percentage 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 book (Curtis and McGough, 1988)

7150 Depressions on peat substrates of the Rhynchosporion

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Depressions on peat substrates of the Rhynchosporion has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It overlaps with blanket bogs (7130). Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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 in NPWS (2013)
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 given
Vegetation composition: *Rhynchospora* spp.	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of white beaked sedge (*Rhynchospora alba*) and brown beaked sedge (*R. fusca*) 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 35%	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 given
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and scrub	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: *Sphagnum* condition	Condition of *Sphagnum* at a representative number of 2m x 2m monitoring stops	Less than 10% of the *Sphagnum* 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 (*Empetrum nigrum*) and bog-myrtle (*Myrica gale*) 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 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	Occurrence 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). The greater bog mosaic incorporates the blanket bog itself, associated vegetation types as well as non-vegetation cover types that appear to have been derived from former blanket bog including gravel, rock and running water
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 book (Curtis and McGough, 1988)

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fens has not been mapped in detail for this SAC and thus total area of the qualifying habitat is unknown. It occurs in mosaic/in association with other habitats including blanket bogs (7130), transition mires (7140) and heath habitats (4010). Further information can be found in Douglas and Grogan (1987); Douglas et al. (1989); NPWS internal files; commonage framework plans for part or all of the following agricultural units: GA2, GA4, GA5, GA6, GA7, GA8, GA9, GA11, GA15, GA16, GA18, GA21
Habitat distribution	Occurrence	No decline from current distribution, subject to natural processes	See note on area above
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 in NPWS (2013)
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on the communities associated with this habitat is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species (brown mosses)	Number 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 given
Vegetation composition: number of positive indicator species (vascular plants)	Number at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species at least two for small-sedge flushes and at least three for black bog-rush (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014) where the list of positive indicator species for this habitat is also given
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 (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014) where the list of positive indicator species for this habitat is also given
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 given
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014)
Vegetation composition: native trees and scrub	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	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percebntage 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	Occurrence in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover 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 and/or the red data book (Curtis and McGough, 1988

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

To maintain the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes. See map 8 for surveyed areas	This SAC includes a number of areas of this Annex I woodland type, some of which have been recently surveyed and mapped by the National Survey of Native Woodlands (NSNW) (Perrin et al., 2008): sites no. 1600, 1602, 1930. NB there are other areas of this habitat within the SAC, such as on lake islands (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes. Surveyed locations are shown on map 8	See note on area above
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al (2008)
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Based on data from Perrin et al. (2008)
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak (*Quercus petraea*) generally regenerates poorly. In suitable sites, ash (*Fraxinus excelsior*) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands (see Perin and Daly, 2010), archaeological and geological features as well as red-data and other rare or localised species. Shannawoneen (site 1600) and Ballynahinch (site 1602) woods are is listed as possible ancient woodlands by Perrin and Daly (2010)
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008)

Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common non-native invasive species in this woodland type: beech (*Fagus sylvatica*), sycamore (*Acer psudoplatanus*) and rhododendron (Rhododendron ponticum). Rhododendron and beech were noted in woodlands surveyed in this SAC by Perrin et al. (2008)

1065 Marsh Fritillary *Euphydryas aurinia*

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

Attribute	Measure	Target	Notes
Distribution: occupied 1km squares	Number	No decline, subject to natural processes	The presence of marsh fritillary has not been mapped in this SAC so current distribution is unknown
Proof of breeding: larval webs	Number at a representative number of sub-sites	Proof of breeding, confirmed by detection of webs	There is currently no survey data for sub-sites within the SAC
Potential habitat: area	Hectares	Area of potential habitat stable or increasing, subject to natural processes	Potential habitat for marsh fritillary is defined as areas of vegetation where devil's-bit scabious (*Succisa pratensis*) is present, with mean height less than 50cm and with less than 10% cover of scrub more than 1m tall. There is no figure available for the total area of suitable habitat in the SAC

1106 Salmon *Salmo salar*

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

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. There are no barriers to migration on the Cashla system. A new proposed regional water supply scheme below Glenicmurrin Lake will have a fish pass incorporated. On the Owenboliska River, there is a fish pass in place at the water regulating sluice below Boliska Lake. There are no barriers to migration on the Owenmore system
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit 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 of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2015). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Owenmore and Cashla rivers are currently exceeding CL while the Owenboliska is below CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	Target is 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 (*Lepeophtheirus salmonis*). Marine salmon farming takes place in the estuary of the Owenmore River
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. The habitat for salmon is good in the Owenmore and Cashla catchments and improvements in spawning areas and input of gravel has been ongoing in both catchments. Funding has been approved for habitat improvement works in the upper reaches of the Owenboliska system
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)

1355 Otter *Lutra lutra*

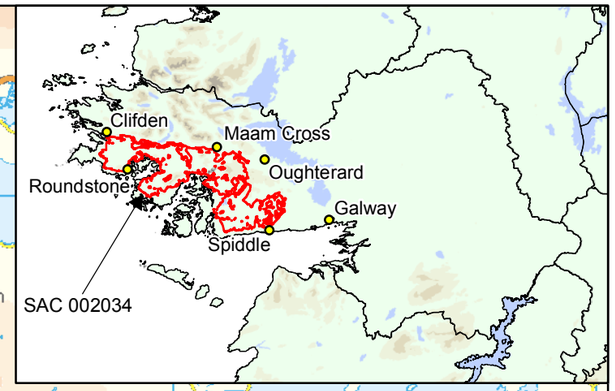
To maintain the favourable conservation condition of Otter in Connemara Bog Complex SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 2194.8ha	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 139.0ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 564.0km	River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 3908.6ha	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, 2006; Kruuk and Moorhouse, 1991)
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; Reid et al., 2013) and wrasse and rockling in coastal waters (Kingston et al., 1999)

1833 Slender Naiad *Najas flexilis*

To maintain the favourable conservation condition of Slender Naiad in Connemara Bog 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 *Najas flexilis* within each lake, subject to natural processes. See map 9 for known locations	See *Najas flexilis* supporting document for further details
Population depth	Metres	No change to the depth range of *Najas flexilis* within each lake, subject to natural processes	See *Najas flexilis* supporting document for further details
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	See *Najas flexilis* supporting document for further details
Population abundance	Square metres	No change to the cover abundance of Najas flexilis, subject to natural processes	See *Najas flexilis* supporting document for further details
Species distribution	Occurrence	No decline, subject to natural processes	See *Najas flexilis* supporting document for further details
Habitat extent	Hectares; distribution	No decline, subject to natural processes	See *Najas flexilis* supporting document for further details
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	See *Najas flexilis* supporting document for further details
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the populations of the species	See *Najas flexilis* supporting document for further details
Water quality	Various	Maintain appropriate water quality to support the populations of the species	See *Najas flexilis* supporting document for further details
Acidification status	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the populations of *Najas flexilis*, subject to natural processes	See *Najas flexilis* supporting document for further details
Water colour	mg/L PtCo	Maintain appropriate water colour to support the populations of *Najas flexilis*	See *Najas flexilis* supporting document for further details
Associated species	Species composition; abundance	Maintain appropriate associated species and vegetation communities to support the populations of *Najas flexilis*	See *Najas flexilis* supporting document for further details
Fringing habitat: area	Hectares	Maintain the area and condition of fringing habitats necessary to support the populations of *Najas flexilis*	See *Najas flexilis* supporting document for further details



Legend

Connemara Bog Complex SAC 002034

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Department of Arts, Heritage and the Gaeltacht

MAP 1:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002034; version 3.01. CO. GALWAY

0 2.5 5 7.5 10 km

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Map Version 1
Date: June 2015

SAC 002031

SAC 002008

SAC 000297

SPA 004181

SPA 004181

SAC 002034

SAC 002111

SPA 004181

Legend

- Connemara Bog Complex SAC 002034
- Lough Corrib SAC 000297
- Maumturk Mountains SAC 002008
- The Twelve Bens/Garraun Complex SAC 002031
- Kilkieran Bay and Islands SAC 002111
- Connemara Bog Complex SPA 004181
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 002034; version 3.01, SAC 000297; version 3.04, SAC 002008; version 3, SAC 2031; version 3.01, SAC 002111; version 3.02. SPA 004181; version 1.
CO. GALWAY / CO. MAYO, CO. ROSCOMMON

0 5 10 15 km

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Map Version 1
Date: June 2015

Legend

- Connemara Bog Complex SAC 002034
- 1150 *Coastal lagoons
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
COASTAL LAGOONS

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

SITE CODE:
SAC 002034; version 3.01. CO. GALWAY

0 1 2 3 km

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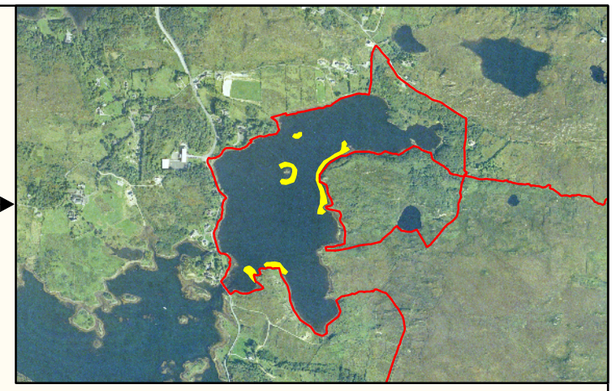
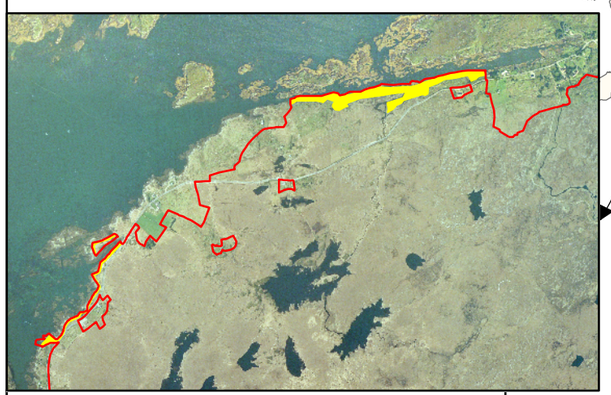
Date: June 2015





Legend

- Connemara Bog Complex SAC 002034
- 1170 Reefs
- OSi Discovery Series County Boundary

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MAP 4:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
REEFS

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

SITE CODE:
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0 2.5 5 7.5 10 km

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Date: June 2015

Legend

- Connemara Bog Complex SAC 002034
- OSi Discovery Series County Boundary

Marine Community Types

- Anoxic mud community
- Intertidal reef community complex
- *Ruppia maritima*-dominated community
- *Serpula vermicularis*-dominated subtidal reef community complex

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Department of Arts, Heritage and the Gaeltacht

MAP 5:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

SITE CODE:
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0 2.5 5 7.5 10 km

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Map Version 1
Date: June 2015

Legend

- Connemara Bog Complex SAC 002034
- OSi Discovery Series County Boundary

Lake Habitats

- 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- 3110 / Potential 3130, Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea
- 3160 Natural dystrophic lakes and ponds
- Potential 3110 Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)
- Potential 3110 / Potential 3130, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorarae and/or Isoeto-Nanojuncetea
- Potential 3110 / Potential 3160, Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae) / Potential Natural dystrophic lakes and ponds
- Potential 3160 Natural dystrophic lakes and ponds
- Potential 3160 / Potential 3110, Potential Natural dystrophic lakes and ponds / Potential Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorarae)

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Department of Arts, Heritage and the Gaeltacht

MAP 6:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
LAKE HABITATS

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

SITE CODE:
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0 2.5 5 7.5 10 km

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Ballynahinch/Recess Catchments

Owenriff Catchment (Priority SAC Catchment)

Knock Catchment

Legend

- Connemara Bog Complex SAC 002034
- OSi Discovery Series County Boundary
- OSi Discovery Series Rivers & Streams

Margaritifera Sensitive Areas

- Catchments of SAC populations listed in S.I. 296 of 2009
- Catchments of other extant populations

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Department of Arts, Heritage and the Gaeltacht

MAP 7:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
FLOATING RIVER VEGETATION

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

SITE CODE:
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0 2 4 6 8 10 km

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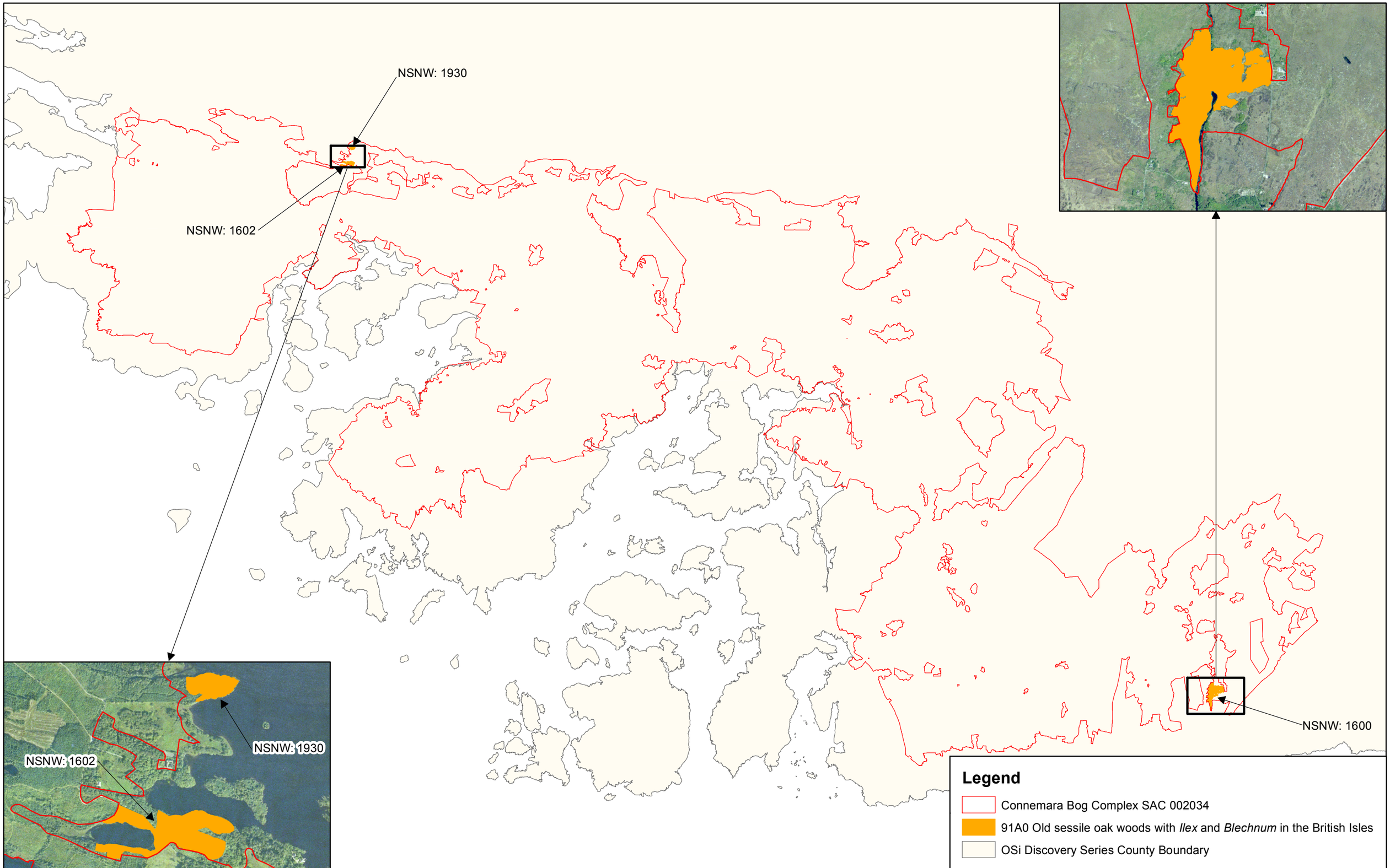
Date: June 2015



Legend

- Connemara Bog Complex SAC 002034
- 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- OSi Discovery Series County Boundary

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Department of
Arts, Heritage and the Gaeltacht

MAP 8:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
WOODLAND HABITATS

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

SITE CODE:
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0 2.5 5 7.5 10 km

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Derrywaking Lough Large

Lough Nacoogarrow

Shannaghcloontippen Lough

Loch Bó Finne

Lough Nafeakle

Lough Sruffauncam

Lough Anillaunlughy

Maumeen Lough

Lough Nalawney

Lough Truska

Legend

- Connemara Bog Complex SAC 002034
- 1833 Slender Naiad - *Najas flexilis*
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 9:
CONNEMARA BOG COMPLEX SAC
CONSERVATION OBJECTIVES
SLENDER NAIAD

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

SITE CODE:
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0 2.5 5 7.5 10 km

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Map Version 1
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ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Ballinafad SAC 002081

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,

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E-mail: nature.conservation@chg.gov.ie

Citation:

NPWS (2018) Conservation Objectives: Ballinafad SAC 002081. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002081	Ballinafad SAC

1303	Lesser Horseshoe Bat *Rhinolophus hipposideros*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust

Spatial data sources

Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roost identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 2)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 2)

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To maintain the favourable conservation condition of Lesser Horseshoe Bat in Ballinafad SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 62 bats for the summer roost (roost id. 683 in NPWS database). See map 2	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (*Rhinolophus hipposideros*). Where possible, NPWS conduct annual counts at each qualifying roost. For most summer roosts, qualified means from the 2012-2016 data have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean is usually set as the target figure for the roost. However, very limited counts have been taken at the summer roost (roost id. 683) in Ballinafad SAC. Also, this roost is situated at the northern extreme of the species' distribution in Ireland, and indeed Europe; thus, in this case, a figure below the MQS is justified and the most recent available count from 2014 is set as the target, i.e. 62 bats. See NPWS (2018) for further information on all attributes and targets
Summer roosts	Condition	No decline	Ballinafad SAC has been selected for lesser horseshoe bat because of the presence of one internationally important summer roost (roost id. 683 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Kelleher and Marnell, 2006). See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roost	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 2 which shows a 2.5km zone around the above roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roost. See map 2	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 2	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)

College

College

Castlebar

CO. MAYO

Ballycarra

SAC 002081

Legend

Ballinafad SAC 002081

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Department of Culture, Heritage and the Gaeltacht

MAP 1:
BALLINAFAD SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002081; version 3.0. CO. MAYO

0 10 20 30 40 Meters

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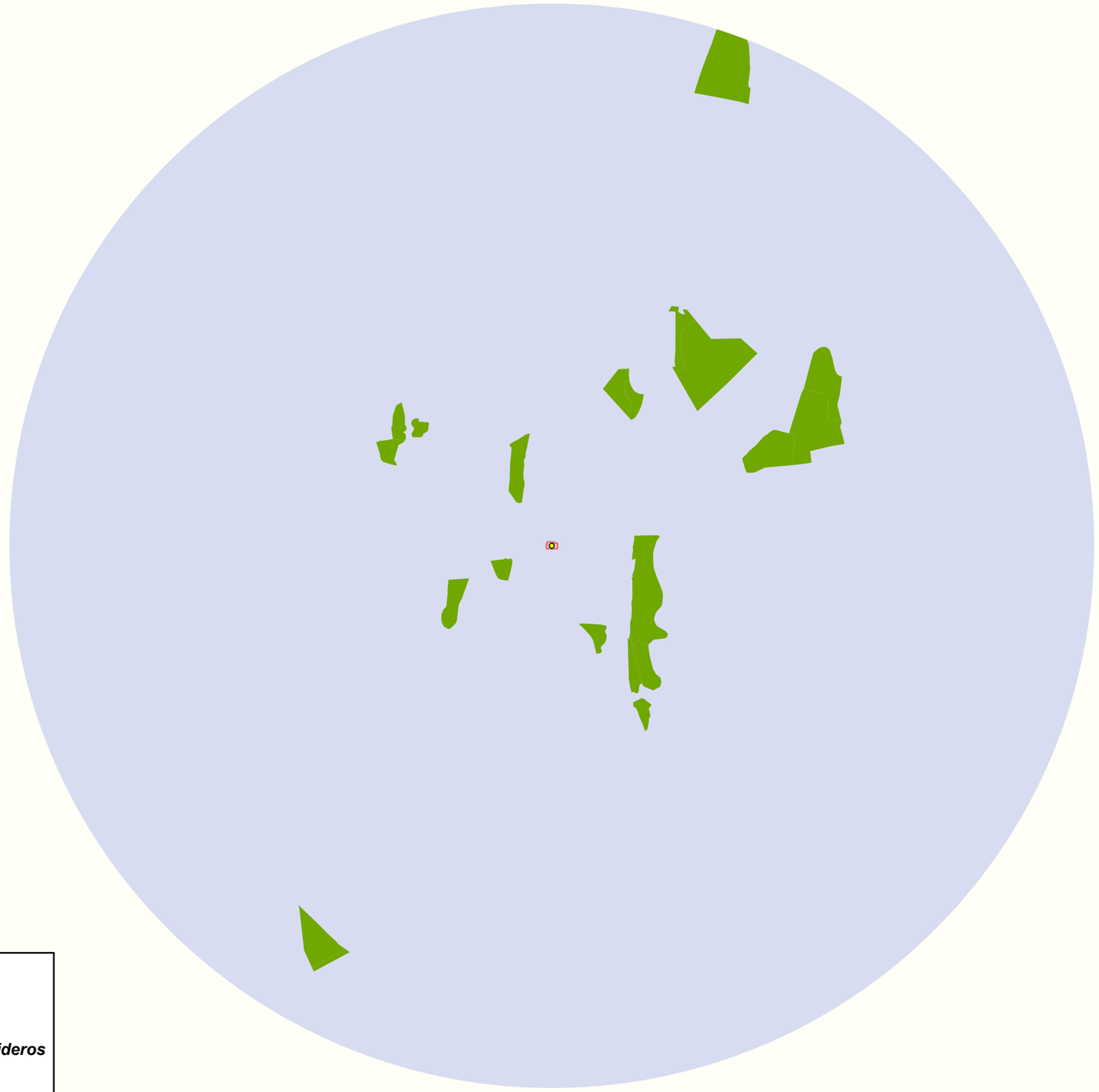

Legend

- OSi Discovery Series County Boundary
- Ballinafad SAC 002081

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

- Roost Location
- Roost ID 683 Foraging Range
- Potential Foraging Grounds

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MAP 2:
BALLINAFAD SAC
CONSERVATION OBJECTIVES
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 002081; version 3.0. CO. MAYO

0 0.25 0.5 0.75 1 Kilometers

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Conservation Objectives Series

Corliskea/Trien/Cloonfelliv Bog SAC 002110

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht

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Citation:

NPWS (201c) Conservation Objectives: Corliskea/Trien/Cloonfelliv Bog SAC 002110. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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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***

002110	Corliskea/Trien/Cloonfelliv Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
91D0	Bog woodland

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Cloonfelliv Bog (SAC 002110), Co. Galway/Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	Corliskea Bog (SAC 002110), Co. Galway/Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	Trien Bog (SAC 002110), Co. Roscommon, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	Corliskea/Trien/Cloonfelliv Bog SAC (site code: 2110) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Corliskea/Trien/Cloonfelliv Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 107.5ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 69.2ha by Fernandez et al. (2014). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 54.8ha. See map 2. However, it is estimated that only 31.8ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 101.0ha. Eco-hydrological assessments of the cutover estimates that an additional 6.5ha of bog forming habitats could be restored. The long term target for ARB is therefore 107.5ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 2013	ARB occurs at numerous locations on the high bog throughout Corliskea/Trien/Cloonfelliv Bog SAC. DRB occurs on the high bog surrounding ARB areas, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Corliskea/Trien/Cloonfelliv Bog SAC in 2012 (latest figure available) was 452.4ha (DAHG, 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around the margins of Corliskea/Trien/Cloonfelliv Bog SAC. Natural marginal habitats no longer exist around these bogs. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 53.8ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 107.5ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed on Corliskea/Trien/Cloonfelliv Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Corliskea/Trien/Cloonfelliv Bog SAC is noted for extensive ARB areas with central, sub-central ecotopes, active flush and bog woodland, together with a lake and swallow hole system
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Corliskea/Trien/Cloonfelliv Bog SAC suggest that the current level is approximately 10.6kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Corliskea/Trien/Cloonfelliv Bog SAC

Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

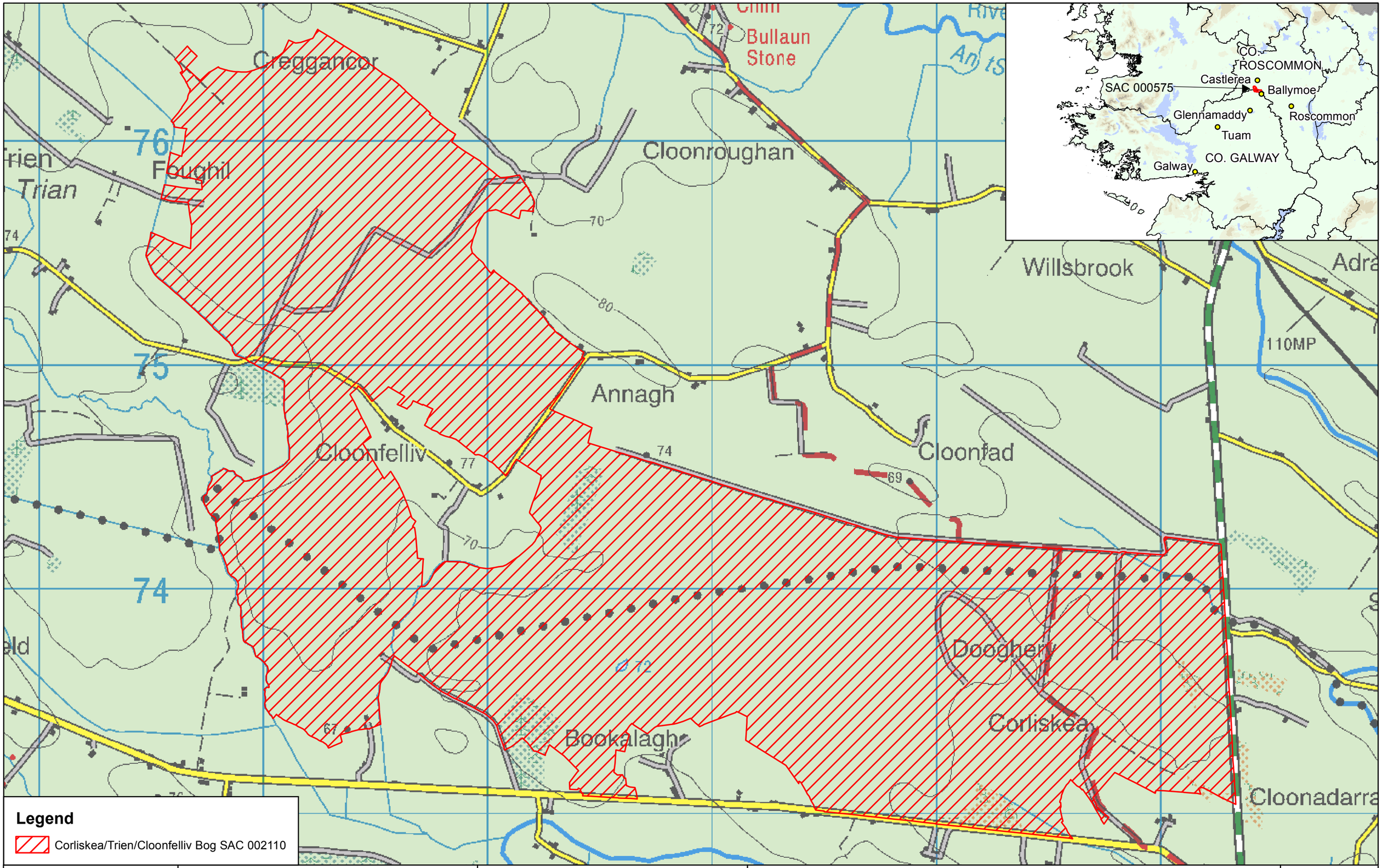
Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Corliskea/Trien/Cloonfelliv Bog SAC

Attribute	Measure	Target	Notes

91D0 Bog woodland

To maintain the favourable conservation condition of Bog woodland in Corliskea/Trien/Cloonfelliv Bog 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. At least 0.29ha. See map 4	Bog woodland occurs on Corliskea Bog (0.25ha) and Trien Bog (0.04ha) and is regarded as a component of the Active Raised Bog (ARB) habitat (7110). Thus, the conservation objective and supporting document for ARB (7110) are also relevant to this habitat and common attributes have not been repeated here. The latest survey for bog woodland in Corliskea/Trien/Cloonfelliv Bog SAC is reported in Fernandez et al. (2014)
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 4	Bog woodland occurs in active flushes on both Corliskea and Trien Bogs
Vegetation composition: positive indicator species	Number in a representative number of monitoring stops	Birch (*Betula pubescens*), bog moss (*Sphagnum* species) and at least five other species present	Bog woodland is typically species-poor but with a characteristic and distinctive flora. Positive indicator species are listed in bog woodland monitoring survey (Cross and Lynn, 2013)
Vegetation composition: negative indicator species	Percentage cover at a representative number of monitoring stops	Both native and non-native invasive species absent or under control. Total cover should be less than 10%	Negative indicator species include bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*), which can become invasive if the site begins drying out
Woodland structure: cover and height of birch	Percentage cover and metres at a representative number of monitoring stops	A minimum 30% cover of birch (*Betula pubescens*) with a median canopy height of 4m	Attribute and target based on Cross and Lynn (2013)
Woodland structure: dwarf shrub cover	Percentage cover at a representative number of monitoring stops	Dwarf shrub cover not more than 50%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: ling cover	Percentage cover at a representative number of monitoring stops	Ling (*Calluna vulgaris*) cover not more than 40%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: bryophyte cover	Percentage cover at a representative number of monitoring stops	Bryophyte cover at least 50%, with bog moss (*Sphagnum* spp.) cover at least 25%	Attribute and target based on Cross and Lynn (2013)
Woodland structure: tree size classes	Occurrence	Each size class present	Size classes are defined in Cross and Lynn (2013). The presence of all size classes suggests that a woodland has good structural variety with trees of varying ages
Woodland structure: senescent and dead wood	Occurrence	Senescent or dead wood present	Mature and veteran trees and dead wood are important for bryophytes, lichens, saproxylic organisms and some bird species. Their retention within a woodland is important to ensure continuity of habitats/niches and propagule sources over time. However, as birch (*Betula pubescens*) trees seldom exceed 30cm in diameter in this habitat and dead wood rots quickly and is engulfed by bog mosses (*Sphagnum* spp.), volume of dead wood may not be as high in bog woodland as in other woodland types



Legend

Corliskea/Trien/Cloonfelliv Bog SAC 002110

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

MAP 1: CORLISKEA/TRIEN/CLOONFELLIV BOG SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 002110; version 3.02. Co. Galway / Roscommon

0 200 400 600 800 1,000 m

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Map Version 1
Date: Feb 2016

Legend

- Corliskea/Trien/Cloonfelliv Bog SAC 002110
- High Bog Boundary
- Potential 7110 *Active Raised Bogs
- OSi Discovery Series County Boundary

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MAP 2:
CORLISKEA/TRIEN/CLOONFELLIV BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL ACTIVE RAISED BOGS

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

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Map Version 1
Date: Feb 2016

Legend

- Corliskea/Trien/Cloonfelliv Bog SAC 002110
- OSi Discovery Series County Boundary
- High Bog Boundary

Active Raised Bogs Ecotopes

- Bog Woodland
- Central ecotope
- Soaks / active flush
- Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 3:
CORLISKEA/TRIEN/CLOONFELLIV BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

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0 200 400 600 800 1,000 m

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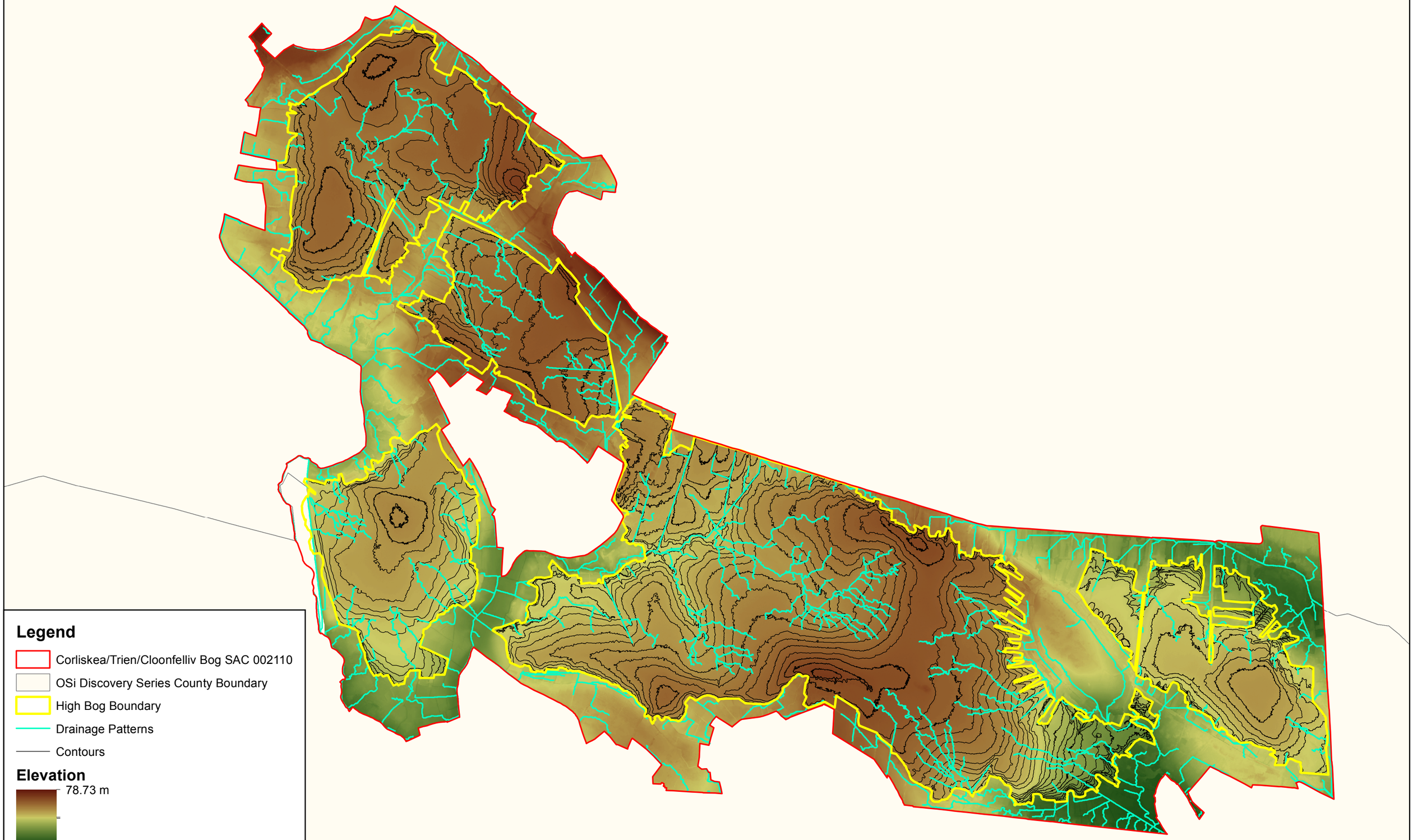
Map Version 1
Date: Feb 2016



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MAP 4:
CORLISKEA/TRIEN/CLOONFELLIV BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

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SAC 002110; version 3.02. Co. Galway / Roscommon

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Map Version 1
Date: Feb 2016

Conservation objectives for Tully Lough SAC [002130]

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.

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Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

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

* denotes a priority habitat

Code	Common Name	Scientific Name
1833	Slender Naiad	*Najas flexilis*

Citation: *NPWS (2020) Conservation objectives for Tully Lough SAC [002130]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Newport River SAC [002144]

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Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

ADD HABITATS

Code	**Common Name**	**Scientific Name**
1029	Freshwater Pearl Mussel	*Margaritifera margaritifera*
1106	Salmon	*Salmo salar*

Citation: *NPWS (2018) Conservation objectives for Newport River SAC [002144]. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Dahybaun SAC [002177]

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Objective: To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

ADD HABITATS

Code	Common Name	Scientific Name
1833	Slender Naiad	*Najas flexilis*

Citation: *NPWS (2020) Conservation objectives for Lough Dahybaun SAC [002177]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Towerhill House SAC 002179

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

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Citation:

NPWS (2018) Conservation Objectives: Towerhill House SAC 002179. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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- 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***

002179 Towerhill House SAC

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2007
Title :	Protecting and managing underground sites for bats
Author :	Mitchell-Jones, A.J.; Bihari, Z.; Masing, M.; Rodrigues, L.
Series :	EUROBATS Publication Series No. 2
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2009
Title :	Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*
Author :	Knight, T.; Jones, G.
Series :	Endangered Species Research, 8: 79-86

Spatial data sources

Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roosts identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 2)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost locations
Used For :	1303 (map 2)

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To maintain the favourable conservation condition of Lesser Horseshoe Bat in Towerhill House SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 373 bats for the summer roost (roost id. 668 in NPWS database); minimum number of 50 bats for the winter roost (roost id. 682). See map 2	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (*Rhinolophus hipposideros*). NPWS conduct annual counts at each qualifying roost. The qualified mean from the 2012-2016 summer data has been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean is set as the target figure for the summer roost (roost id. 668 in NPWS database) in Towerhill House SAC. There is no recent data available for the winter roost in the SAC (roost id. 682); therefore, the MQS is set as the target figure for the winter roost in the SAC. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Winter roosts	Condition	No decline	Towerhill House SAC has been selected for lesser horseshoe bat because of the presence of one internationally important winter roost (roost id. 682 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Mitchell-Jones et al., 2007)
Summer roosts	Condition	No decline	Towerhill House SAC has been selected for lesser horseshoe bat because of the presence of one internationally important summer roost (roost id. 668 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Kelleher and Marnell, 2006)
Auxiliary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity and winter hibernation roosts. Such additional roosts within the SAC may be important as night roosts, satellite roosts, etc. Night roosts are also considered an integral part of core foraging areas and require protection (Knight and Jones, 2009). In addition, in response to weather conditions for example, bats may use different seasonal roosts from year to year; this is particularly noticeable in winter. A database of all known lesser horseshoe bat roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roosts	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 2 which shows a 2.5km zone around the above roosts and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roosts. See map 2	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)

Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts. See map 2	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)

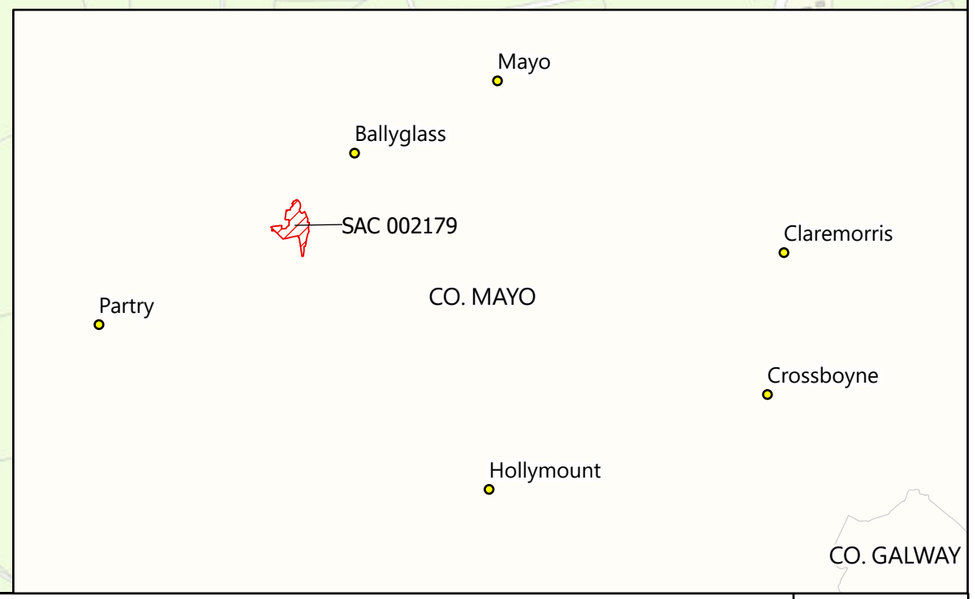
TOWERHILL DEMESNE

CARROWNAGREGGAUN

STUCKEEN

CLOONEENKILLEW

CLOONEENCARRA



Legend

Towerhill House SAC 002179

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

MAP 1:
TOWERHILL HOUSE SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002179; version 3.0. CO. MAYO

0 80 160 240 320 Meters

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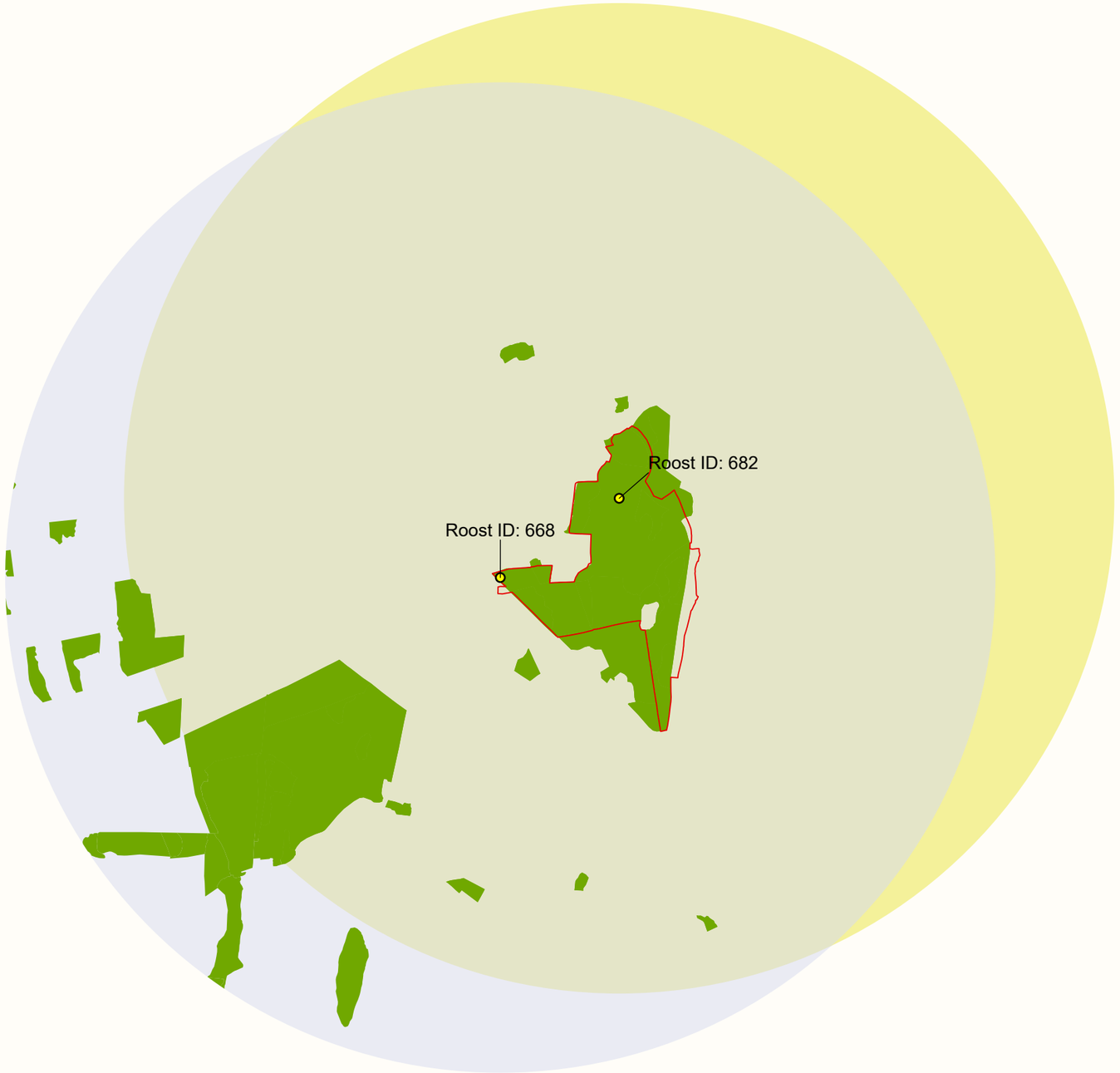
Map Version 1
Date: June 2018



Legend

- Towerhill House SAC 002179
- OSi Discovery Series County Boundary

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

- Roost Location
- Roost ID 682 Foraging Range
- Roost ID 688 Foraging Range
- Potential Foraging Grounds

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Department of Culture, Heritage and the Gaeltacht

MAP 2:
TOWERHILL HOUSE SAC
CONSERVATION OBJECTIVES ADJACENT
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 002179; version 3.0. CO. MAYO

0 0.35 0.7 1.05 1.4 Kilometers

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N

Map Version 1
Date: June 2018

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Clare Island Cliffs SAC 002243

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

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

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2016) Conservation Objectives: Clare Island Cliffs SAC 002243. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002243	Clare Island Cliffs SAC
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts
8210	Calcareous rocky slopes with chasmophytic vegetation
8220	Siliceous rocky slopes with chasmophytic vegetation

Please note that this SAC overlaps with Clare Island SPA (004136) and 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 overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
Author :	Barron, S.J.; Delaney, A.; Perrin, P.M.; Martin, J.; O'Neill, F.
Series :	Irish Wildlife Manual No. 53
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Clare Island Cliffs SAC (site code: 2243) Conservation objectives supporting document-coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS

Other References

Year :	1986
Title :	A resurvey of Clare Island flora
Author :	Doyle, G.J.; Foss, P.J.
Series :	Irish Naturalists' Journal, 22: 85-89
Year :	2005
Title :	National inventory of sea cliffs and coastal heaths
Author :	Browne, A.
Series :	Unpublished Report to NPWS

Spatial data sources

Year :	2011
Title :	National survey and assessment of the conservation status of Irish sea cliffs
GIS Operations :	Clipped to SAC boundary
Used For :	1230 (map 3)

1230 Vegetated sea cliffs of the Atlantic and Baltic coasts

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

Attribute	Measure	Target	Notes
Habitat length	Kilometres	Area stable, subject to natural processes, including erosion. For the sub-site mapped (Capnagower), total length of cliff sections: 14.69km. See map 3	Based on data from the Irish Sea Cliff Survey (ISCS) (Barron et al., 2011). Cliffs are linear features and are therefore measured in kilometres. The sub-site Capnagower (ISCS site ID: 08017) was identified using a combination of aerial photos and the DCENR helicopter viewer. The length of cliff was measured (in sections) to give a total estimated area of 14.69km within the SAC. The length of cliff is likely to be underestimated. See the Clare Island Cliffs SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 3	Sea cliffs are known to occur along the coastline from Kinnacorra in the east, along the north coast and around the south-western corner of the island as far east as Tonabrickill. Both hard and soft cliffs have been noted in this SAC, with hard cliffs being by far the most dominant type (Browne, 2005; Barron et al., 2011). See the coastal habitats supporting document for further details
Physical structure: functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes, including groundwater quality, due to artificial structures	Based on data from Barron et al. (2011). Maintaining natural geomorphological processes, including natural erosion, is important for the health of vegetated sea cliffs. Hydrological processes maintain flushes, and in some cases tufa formations, that can be associated with sea cliffs. Hydrological features such as gullies, streams and cascades were identified by the ISCS as occurring within Clare Island Cliffs SAC. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession	Based on data from Barron et al. (2011). The cliffs in the south-west and eastern sectors are low-lying with a sward of maritime grassland vegetation. On the upper cliffs, there is a concentration of alpine vegetation, which is species-rich and includes a number of rarities, in association with a species-rich bryophyte flora. See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Barron et al. (2011). The cliffs in the south-west and east of the SAC have low-growing vegetation along the cliff top. See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011)	The cliffs are well-vegetated, with a maritime sward of grasses and herbs. A plantain (*Plantago* spp.) dominated sward of low-growing vegetation occurs along the tops of some of the cliffs. On the upper cliffs, there is a concentration of species-rich alpine vegetation, which occurs in association with a species-rich bryophyte flora. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%	Based on data from Barron et al. (2011). See the coastal habitats supporting document for further details

8210 Calcareous rocky slopes with chasmophytic vegetation

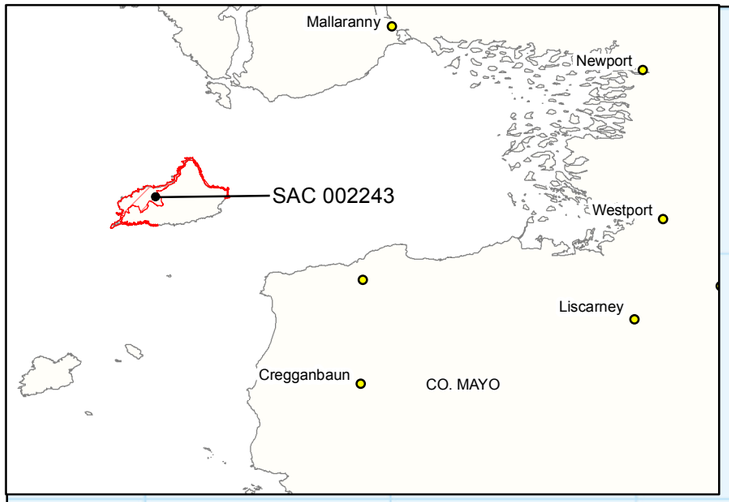
To maintain the favourable conservation condition of Calcareous rocky slopes with chasmophytic vegetation in Clare Island Cliffs SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Calcareous rocky slopes with chasmophytic vegetation has not been mapped in detail for Clare Island Cliffs SAC and thus the total area of the qualifying habitat is unknown. It occurs as a mosaic with siliceous rocky slopes with chasmophytic vegetation (8220) and is generally found on the sheer cliffs on the seaward face of Croaghmore and to the north and north-west of the island on some of the higher sea cliffs, above c.250m (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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)
Vegetation composition: positive indicator fern and *Saxifraga* species	Number of species in local vicinity of a representative number of monitoring stops	Number of ferns and *Saxifraga* 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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014). High cover of bracken, native trees and shrubs would indicate that the rocky slopes are becoming more vegetated which would impact on the niches of the chasmophytic vegetation
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., 2016; Wyse Jackson et al., 2016). The red-listed (Wyse Jackson et al., 2016) species holly-fern (*Polystichum lonchitis*) and alpine saw-wort (*Saussurea alpina*) have been recorded from the rocky cliffs (NPWS internal files; Doyle and Foss, 1986)

8220 Siliceous rocky slopes with chasmophytic vegetation

To maintain the favourable conservation condition of Siliceous rocky slopes with chasmophytic vegetation in Clare Island Cliffs 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	Siliceous rocky slopes with chasmophytic vegetation has not been mapped in detail for Clare Island Cliffs SAC and thus the total area of the qualifying habitat is unknown. It occurs as a mosaic with calcareous rocky slopes with chasmophytic vegetation (8210) and is generally found on the sheer cliffs on the seaward face of Croaghmore and to the north and north-west of the island on some of the higher sea cliffs, above c.250m (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
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)
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), 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). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: bracken, native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of bracken (*Pteridium aquilinum*), native trees and shrubs less than 25%	Attribute and target based on Perrin et al. (2014). High cover of bracken, native trees and shrubs would indicate that the rocky slopes are becoming more vegetated which would impact on the niches of the chasmophytic vegetation
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., 2016; Wyse Jackson et al., 2016). The red-listed (Wyse Jackson et al., 2016) species holly-fern (*Polystichum lonchitis*) and alpine saw-wort (*Saussurea alpina*) have been recorded from the rocky cliffs (NPWS internal files; Doyle and Foss, 1986)



Legend

Clare Island Cliffs SAC 002243

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

MAP 1:
CLARE ISLAND SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE: SAC 002243; version 3.02
CO. MAYO

0 0.3 0.6 0.9 1.2 1.5 km

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N

Map Version 1
Date: Oct 2016

CO. MAYO

CO. MAYO

CO. GALWAY

Legend

- Clare Island Cliffs SAC 002243
- West Connacht Coast SAC 002998
- Clare Island SPA 004136
- OSi Discovery Series County Boundary

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

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

MAP 2:
CLARE ISLAND SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE: SAC 002243; version 3.02,
SAC 002998; version 3.03,
SPA 004136; version 3.01. CO. MAYO

0 5 10 15 20 25 km

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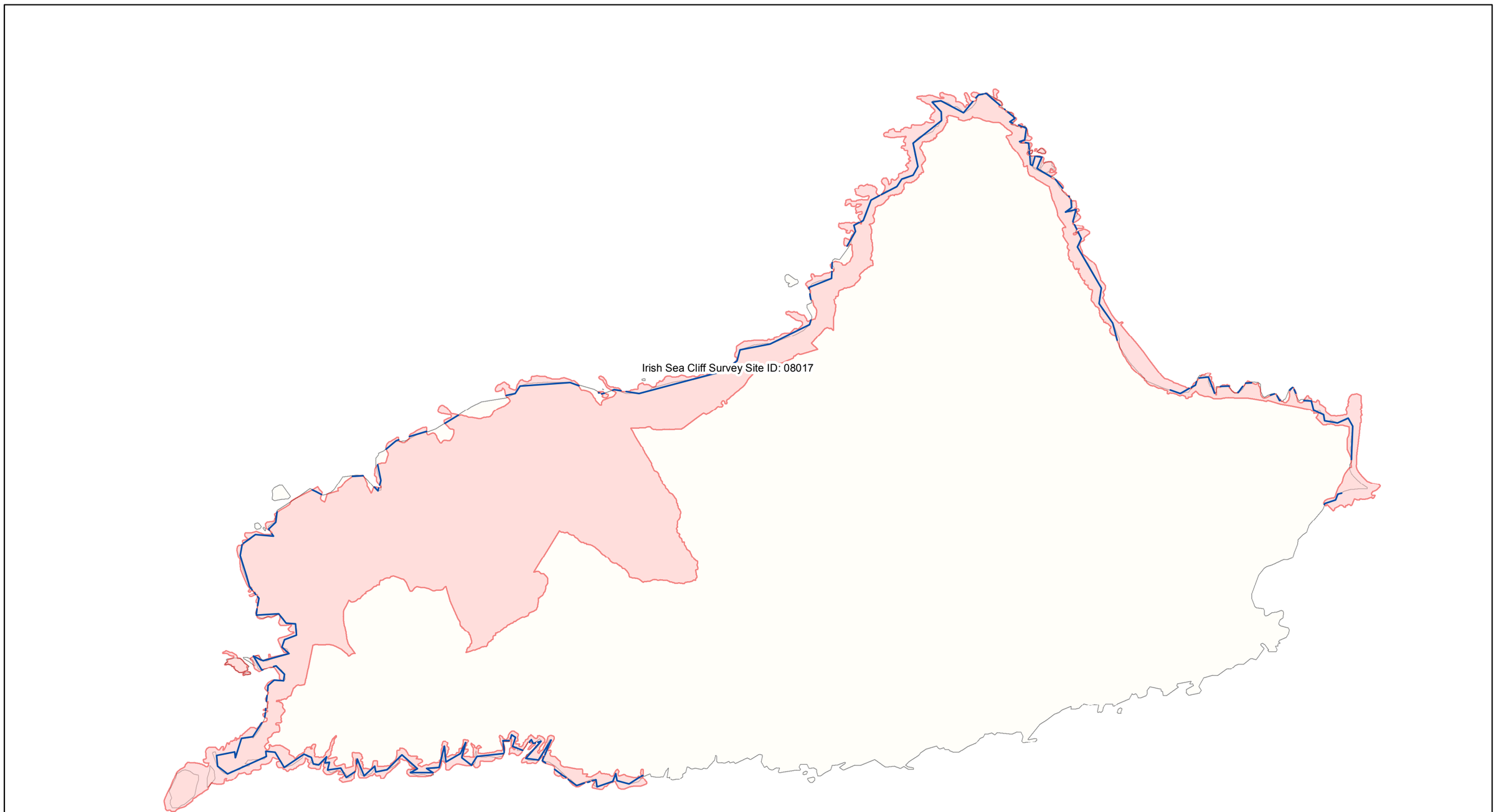
Map Version 1
Date: Oct 2016



Legend

- 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
- Clare Island Cliffs SAC 002243
- OSi Discovery Series County Boundary

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

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

MAP 3:
CLARE ISLAND SAC
CONSERVATION OBJECTIVES
VEGETATED SEA CLIFFS

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

SITE CODE:
SAC 002243; version 3.02,
CO. MAYO

0 0.3 0.6 0.9 1.2 1.5 km

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

N

Map Version 1
Date: Oct 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Achill Head SAC 002268

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

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Citation:

NPWS (2013) Conservation Objectives: Achill Head SAC 002268. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002268	Achill Head SAC
1140	Mudflats and sandflats not covered by seawater at low tide
1160	Large shallow inlets and bays
1170	Reefs

Please note that this SAC adjoins Keel Machair/Menaun Cliffs SAC (001513) and Croaghaun/Slievemore SAC (001955). See map 2. The conservation objectives for this site should be used in conjunction with those for adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2013
Title :	Achill Head SAC (site code 2268) Conservation objectives supporting document- marine habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1997
Title :	The BioMar biotope viewer: a guide to marine habitats, fauna and flora in Britain and Ireland
Author :	Picton, B.E.; Costello, M.J.
Series :	Environmental Science Unit, Trinity College Dublin
Year :	2012
Title :	Intertidal benthic survey of Achill Head SAC
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS
Year :	2012
Title :	Subtidal sediment and subtidal and intertidal reef survey of Achill Head SAC
Author :	MERC
Series :	Unpublished report to the Marine Institute and NPWS

Spatial data sources

Year :	Interpolated 2013
Title :	1995 BioMar Survey; 2011 intertidal and subtidal surveys
GIS Operations :	Polygon feature classes from marine community types base data sub-divided based on interpolation of marine survey data. Expert opinion used as necessary to resolve any issues arising
Used For :	1140, 1170, Marine community types (maps 3, 5 and 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High Water Mark (HWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. EPA WFD transitional waterbody data erased from extent. Expert opinion used as necessary to resolve any issues arising
Used For :	1160 (map 4)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	High water mark (HWM) and low water mark (LWM) polyline feature classes converted into polygon feature classes and combined; EU Annex I Saltmarsh and Coastal data erased out if present
Used For :	Marine community types base data (map 6)

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Achill Head SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 3	Habitat area was estimated using OSi data as 16ha
Community distribution	Hectares	Conserve the following community type in a natural condition: Intertidal fine sand community. See map 6	Based on an intertidal survey undertaken in 2011 (MERC, 2012). See marine supporting document for further information

1160 Large shallow inlets and bays

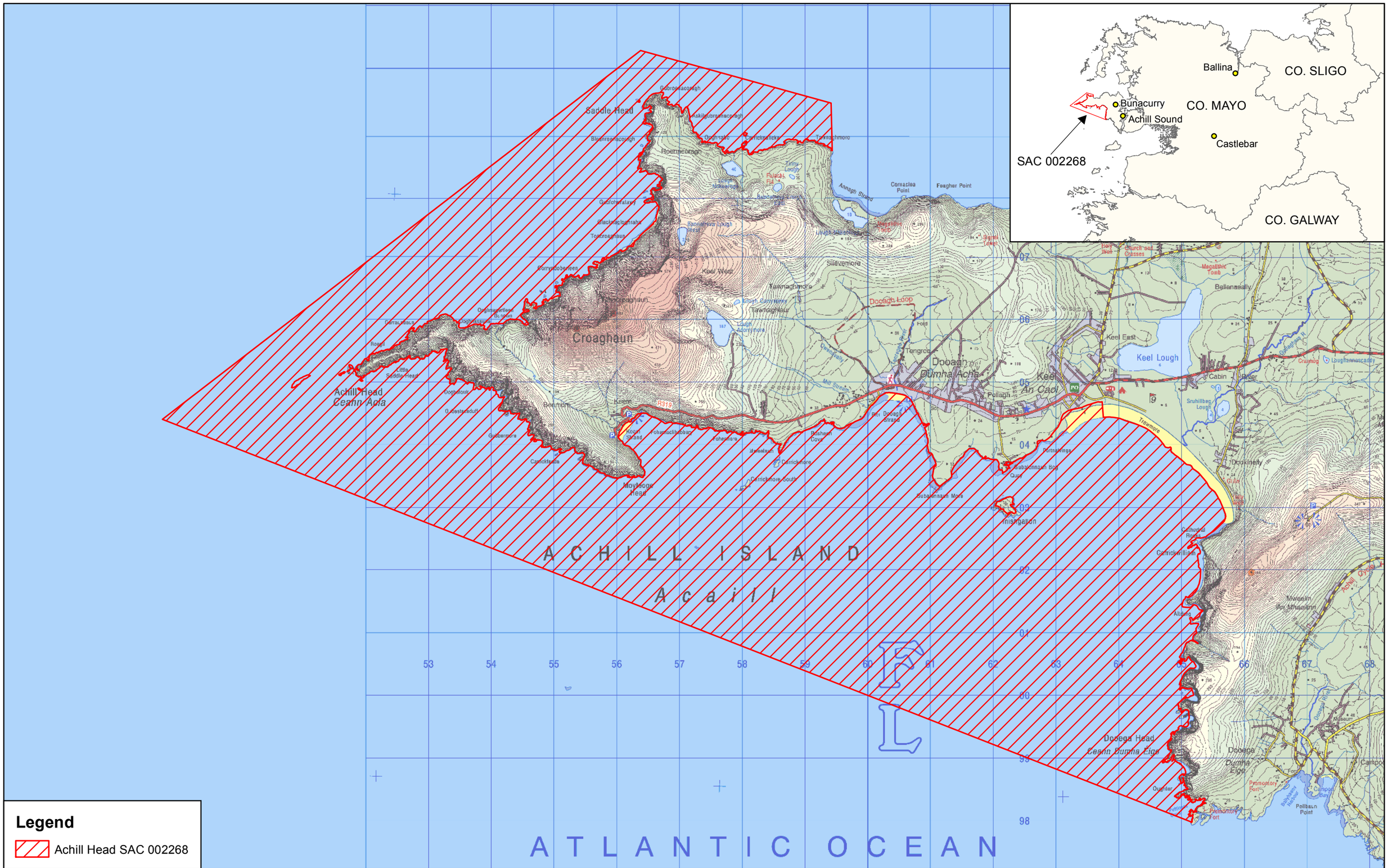
To maintain the favourable conservation condition of Large shallow inlets and bays in Achill Head SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 4	Habitat area was estimated as 6888ha using OSi data and the Transitional Water Body area as defined under the Water Framework Directive
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal fine sand community; Mobile subtidal sand with *Gastrosaccus spinifer* community; Subtidal sand with *Bathyporeia elegans* and polychaetes community complex; Intertidal reef community complex; *Laminaria*-dominated community complex; Subtidal reef community. See map 5	Based on the BioMar survey in 1995 (Picton and Costello, 1997) and intertidal and subtidal surveys undertaken in 2011 (MERC, 2012). See marine supporting document for further information

1170 Reefs

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

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes. See map 5	Habitat area estimated as 1919ha from the 1995 BioMar Survey (Picton and Costello, 1997) and a reef survey in 2011 (MERC, 2012)
Distribution	Occurrence	The distribution of reefs remains stable, subject to natural processes. See map 5 for mapped distribution	Based on information from the 1995 BioMar Survey (Picton and Costello, 1997) and a reef survey in 2011 (MERC, 2012). See marine supporting document for further details
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; *Laminaria*-dominated community complex; Subtidal reef community. See map 6	Reef mapping based on information from the 1995 BioMar Survey (Picton and Costello, 1997) and a reef survey in 2011 (MERC, 2012). See marine supporting document for further details



Legend

Achill Head SAC 002268

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

MAP 1: ACHILL HEAD SAC CONSERVATION OBJECTIVES SAC DESIGNATION

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

SITE CODE:
SAC 002268; version 3. CO. MAYO

0 1 2 3 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).

Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)

N

Map Version 1
Date: Oct 2013

Legend

- Keel Machair/Menaun Cliffs SAC 001513
- Croaghaun/Slievemore SAC 001955
- Achill Head SAC 002268
- OSi Discovery Series County Boundaries

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

MAP 2:
ACHILL HEAD SAC
CONSERVATION OBJECTIVES
ADJOINING / OVERLAPPING DESIGNATIONS

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

SITE CODE:
SAC 001513; version 3, SAC 001955; version 3, SAC 002268; version 3. CO. MAYO

0 1 2 3 km

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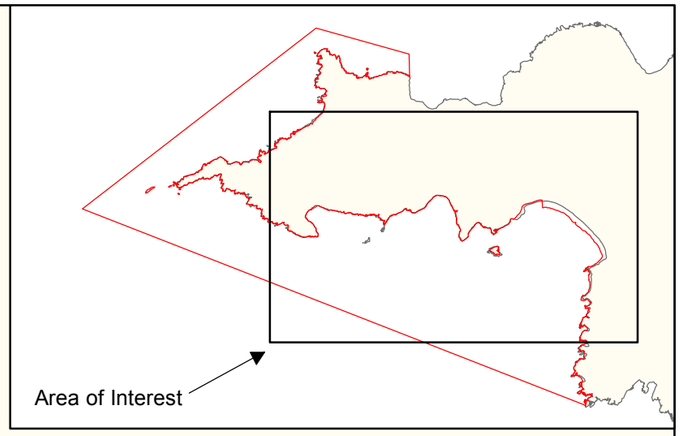
N

Map Version 1
Date: Oct 2013



Legend

- Achill Head SAC 002268
- 1140 Mudflats and sandflats not covered by sea water at low tide
- OSi Discovery Series County Boundaries

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

MAP 3:
ACHILL HEAD SAC
CONSERVATION OBJECTIVES
TIDAL MUDFLATS AND SANDFLATS

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

SITE CODE:
SAC 002268; version 3. CO. MAYO

0 0.5 1 1.5 2 km

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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)

N

Map Version 1
Date: Oct 2013

Legend

- Achill Head SAC 002268
- 1160 Large shallow inlets and bays
- OSi Discovery Series County Boundaries

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Department of
Arts, Heritage and the Gaeltacht

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

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

SITE CODE:
SAC 002268; version 3. CO. MAYO

0 1 2 3 km

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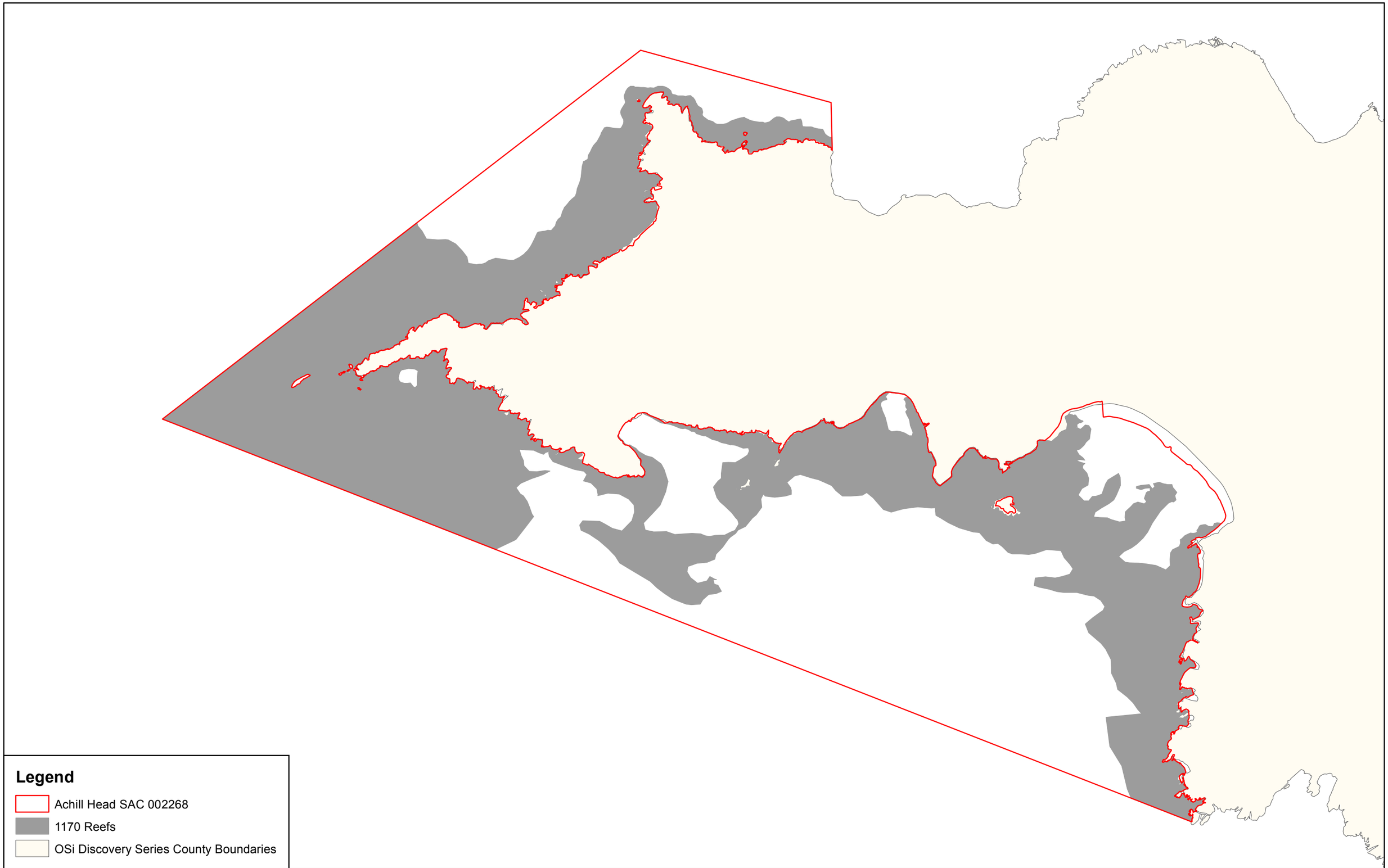
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)

N

Map Version 1
Date: Oct 2013



Legend

- Achill Head SAC 002268
- 1170 Reefs
- OSi Discovery Series County Boundaries

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

MAP 5:
ACHILL HEAD SAC
CONSERVATION OBJECTIVES
REEFS

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

SITE CODE:
SAC 002268; version 3. CO. MAYO

0 1 2 3 km

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N

Map Version 1
Date: Oct 2013

Legend

- Achill Head SAC 002268
- OSi Discovery Series County Boundaries

Marine Community Types

- Intertidal fine sand community
- Intertidal reef community complex
- *Laminaria*-dominated community complex
- Mobile subtidal sand with *Gastrosaccus spinifer* community
- Subtidal reef community
- Subtidal sand with *Bathyporeia elegans* and polychaetes community complex

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

MAP 6:
ACHILL HEAD SAC
CONSERVATION OBJECTIVES
MARINE COMMUNITY TYPES

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

SITE CODE:
SAC 002268; version 3. CO. MAYO

0 1 2 3 km

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Map Version 1
Date: Oct 2013

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Williamstown Turloughs SAC 002296

An Roinn
Cultúir, Oidhreachta agus Gaeltachta

Department of
Culture, Heritage and the Gaeltacht

National Parks and Wildlife Service,
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E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2018) Conservation Objectives: Williamstown Turloughs SAC 002296. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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- 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:

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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***

002296	Williamstown Turloughs SAC

3180	Turloughs*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1992
Title :	Turloughs over 10ha - Vegetation survey and evaluation
Author :	Goodwillie, R.N.
Series :	Unpublished report to NPWS
Year :	2017
Title :	Conservation objectives supporting document: Turloughs* and Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation
Author :	O Connor, Á.
Series :	Conservation objectives supporting document

Other References

Year :	1997
Title :	Williamstown Environmental Study
Author :	ECS (Environmental Consultancy Services)
Series :	Unpublished report to the Office of Public Works

Spatial data sources

Year :	2017
Title :	Internal NPWS data
GIS Operations :	Paper map scanned and georectified. Turlough as outlined on map digitised and clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	3180 (map 2)

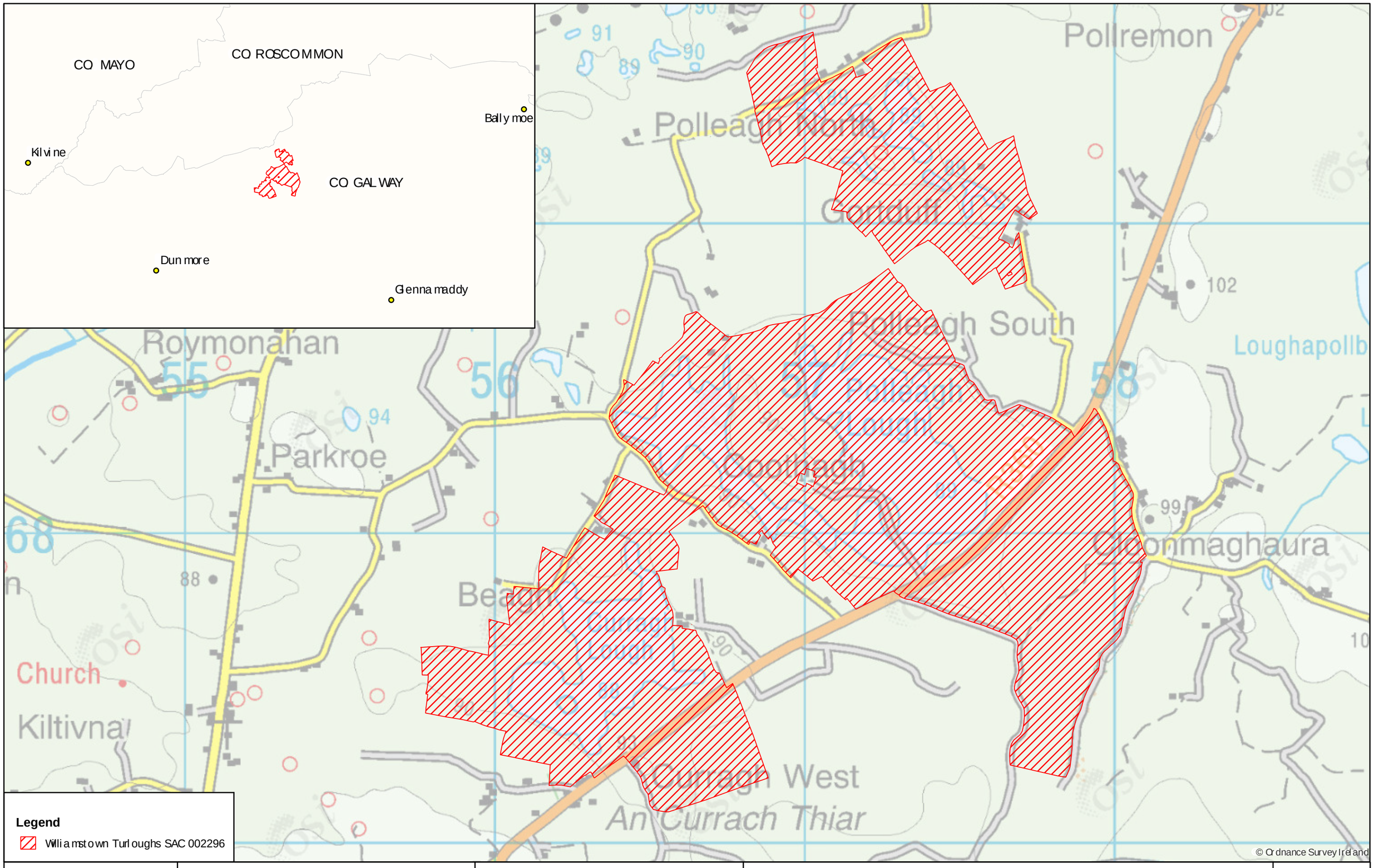
3180 Turloughs

To restore the favourable conservation condition of Turloughs* in Williamstown Turloughs SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable at c.110ha or increasing, subject to natural processes. See map 2	Williamstown Turloughs SAC is a complex of three turlough basins: Curragh, Polleagh (including Polleagh West) and Gortduff (see map 2). The total area of turlough habitat in the SAC is estimated to be 109.5ha (based on NPWS internal files). In the 1990s, drainage damaged the SAC and the medium- to long-term impacts on turlough area have not been assessed. Restoration of turlough area may therefore be required. See O Connor (2017) for information on all attributes and targets
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, Williamstown Turloughs SAC contains three turloughs: Curragh, Polleagh and Gortduff. See map 2
Hydrological regime: groundwater contribution; flood duration, frequency, area and depth; permanently flooded/wet areas	Various	Restore appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	See O Connor (2017) for details on the sub-divided attributes and targets of hydrological regime. The hydrology of the Williamstown turloughs was investigated by ECS (1997). The turloughs are in hydraulic continuity, their zone of contribution is small and groundwater flow is to the west. Drainage works in 1995 and 1996 impacted the natural hydrological regime, including by reducing the flood extent, the contributing catchment by c.20% and, at Polleagh, water level fluctuations by c.37%. A pond was also infilled. Further drainage was observed in 2005 (NPWS internal files). All three turloughs have permanent water: an estimated 13ha at Polleagh Lough and 5.25ha at Curragh (ECS, 1997). Permanent water at Polleagh and Gortduff is likely dependent on a perched water table in summer. Polleagh Lough merges with Polleagh West at times of high flood, completely surrounding a hill of glacial drift. Sinkholes have been observed at Curragh and Gortduff
Soil type	Hectares	Maintain variety, area and extent of soil types necessary to support turlough vegetation and other biota	ECS (1997) noted sub-soils of peat and glacial deposits and soils of peat, degraded grey brown podzolics, brown earths, gleys and podzols in the Williamstown study area. The Williamstown turloughs are dominated by wet soils, including peat and marl. ECS (1997) recorded peat, marl, mud and a stony shoreline at Polleagh turlough, and peat, soft mud and well-drained mineral soils at Curragh turlough
Soil nutrient status: nitrogen and phosphorus	N and P concentration in soil	Maintain/restore nutrient status appropriate to soil types and vegetation communities	Direct fertilisation and run-off of organic and chemical fertilisers may have artificially enriched soils in the Williamstown turloughs
Physical structure: bare ground	Presence	Maintain/restore sufficient wet bare ground, as appropriate	Bare soil was noted on the edge of Polleagh Lough during surveys in 1996 (ECS, 1997). A wet annual community, likely to be Annex I habitat 3270 (Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation), was recorded to the north-west of Polleagh Lough (ECS, 1997). This community was associated with permanently damp, soft, fine mud
Chemical processes: calcium carbonate deposition and concentration	Calcium carbonate deposition rate/soil concentration	Maintain appropriate calcium carbonate deposition rate and concentration in soil	As noted above, the Williamstown turloughs are dominated by wet soils, including peat and marl. Marl deposition was recorded at Polleagh and there was some associated with stony bays at the lake margins at Curragh (ECS, 1997)

Water quality	Various	Maintain/restore appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes (nutrients, colour, phytoplankton and epiphyton biomass) and targets in O Connor (2017). The abundance of peaty substratum, marl, common sedge (*Carex nigra*) communities and species such as bulbous rush (*Juncus bulbosus*) and shoreweed (*Littorella uniflora*) at Polleagh and Curragh indicate highly calcareous, oligotrophic conditions and a requirement for high status/oligotrophic water. Limited water sampling in 1995/6 indicated generally oligotrophic conditions at Curragh and Polleagh; however, elevated chlorophyll *a* concentrations were measured in both (Curragh range <1-13.25µg/l; Polleagh <1-12.1µg/l), indicating enrichment. Organic and chemical agricultural fertilisation, animal housing, farmyards and domestic dwellings are potential nutrient sources
Active peat formation	Flood duration	Maintain active peat formation	As noted above, the Williamstown turloughs are dominated by wet soils, including peat and marl. Extensive peat development was noted to the south of Polleagh and at the south-eastern side of the basin at Curragh (ECS, 1997)
Vegetation composition: area of vegetation communities	Hectares	Maintain/restore area of sensitive and high conservation value vegetation communities/units	As noted, the impacts of drainage on the vegetation communities of the turloughs have not been monitored. The vegetation of Polleagh and Curragh was surveyed in detail (ECS, 1997) and classified in accordance with Goodwillie (1992). 13 Goodwillie (1992) turlough communities were recorded at Polleagh (P) and 8 at Curragh (C), a total of 15: Wet *Carex nigra* (P,C), Dry *C. nigra* (P,C), Peaty *C. nigra* (P), Reedbed (P), Marl pond (P), Peaty pond (C), Wet annuals (P), Open water (P), *Polygonum amphibium* (P,C), *P. amphibium* (grassy) (P,C), Tall herb (P), Peat grassland (P), *Potentilla reptans* (species-rich) (P), Poor grassland (C) and *Lolium* grassland (P,C) (ECS, 1997). A *Juncus* grassland community was also found at both turloughs (ECS, 1997). *Polygonum amphibium, P. amphibium* (grassy), Wet *Carex nigra*, Dry *C. nigra* and *Lolium* grassland were noted at Gortduff (ECS, 1997)
Vegetation composition: vegetation zonation	Distribution	Maintain/restore vegetation zonation/mosaic characteristic of the site	As detailed above, the vegetation of the turloughs in the SAC was surveyed and classified in accordance with Goodwillie (1992) (ECS, 1997). Good vegetation zonation was associated with the steep-sided Gortduff. Drainage works are likely to have impacted vegetation zonation through both direct vegetation removal/reclamation and in-filling, and hydrological change
Vegetation structure: sward height	Centimetres	Maintain/restore sward heights appropriate to the vegetation unit, and a variety of sward heights across the turloughs	It was noted that Curragh was more intensively grazed than Polleagh in 1996 (ECS, 1997)
Typical species	Presence	Maintain/restore typical species within and across the turloughs	Typical species is sub-divided into more detailed attributes (terrestrial, wetland and aquatic plants, invertebrates and birds) and targets in O Connor (2017). As noted above, the impacts of drainage on the species of the Williamstown turloughs have not been monitored. 112 vascular plant species have been recorded in the Williamstown turloughs, including northern yellow-cross (*Rorippa islandica*) and red goosefoot (*Chenopodium rubrum*) at Polleagh (ECS, 1997). The wet annuals community recorded at Polleagh requires further study to determine if it is Annex I habitat 3270 (Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation). Wintering waterfowl at Polleagh and Curragh include wigeon, mallard, teal, tufted duck, shoveler, whooper swan, lapwing, golden plover, curlew and dunlin (ECS, 1997). Breeding waterfowl included snipe, lapwing, redshank and ringed plover. Curragh has fish, including pike

Fringing habitats: area	Hectares	Maintain/restore marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	NPWS site files show much of the land surrounding the Williamstown turloughs was 'improved' grassland in 2001 (NPWS internal files). Some lowland dry grassland occurred at all three turloughs, and also lowland wet grassland around Polleagh and Curragh. Cutover bog is widespread in the catchment
Vegetation structure: turlough woodland	Species diversity and woodland structure	Maintain appropriate turlough woodland diversity and structure	No turlough woodland or scrub has been recorded in Williamstown Turloughs SAC



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

MAP 1:
WILLIAMSTOWN TURLOUGHS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002296; version 3.02. CO. GALWAY

0 140 280 420 560 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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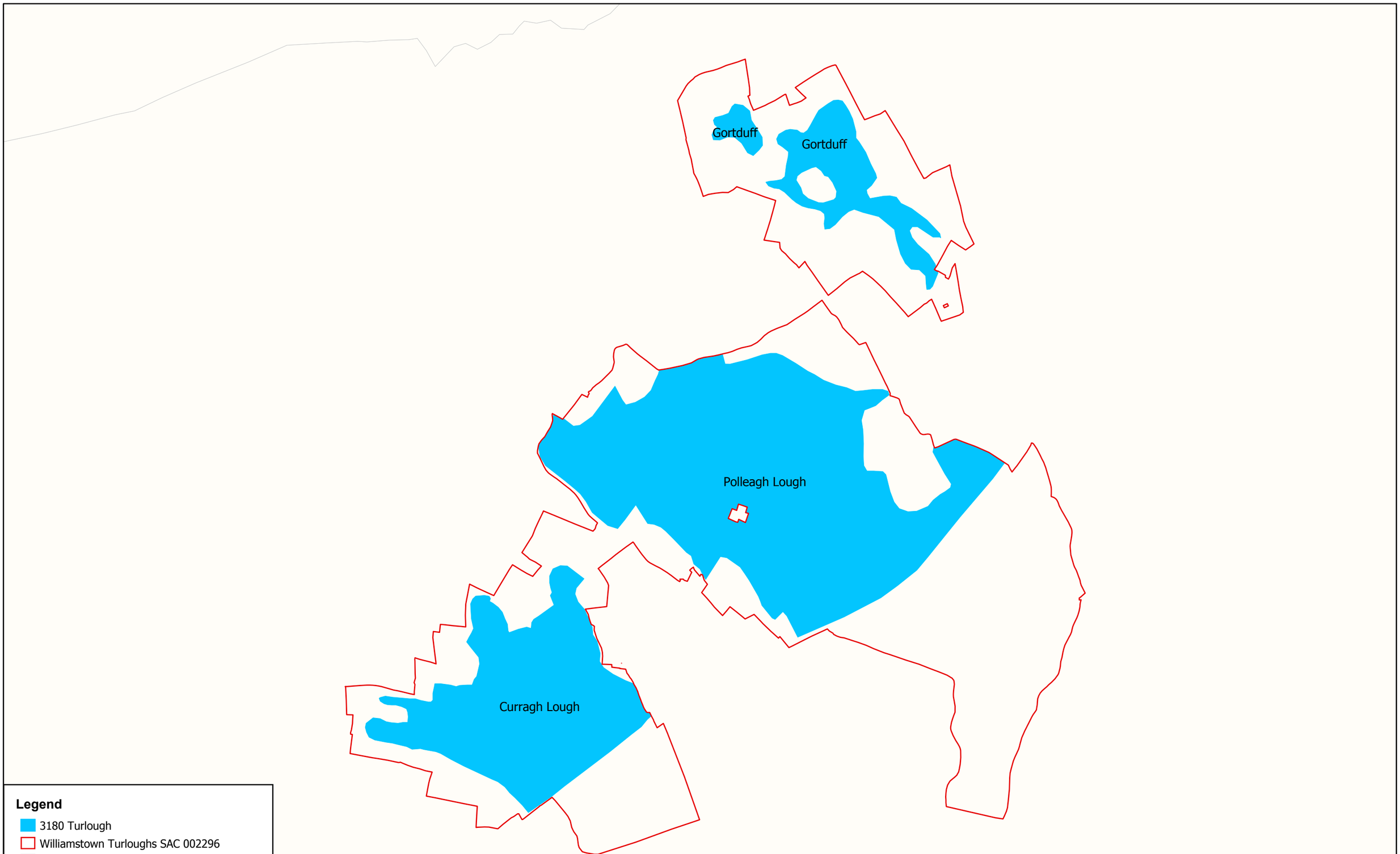
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

Map Version 1
Date: Dec 2017



Legend

- 3180 Turlough
- Williamstown Turloughs SAC 002296
- OSi Discovery Series County Boundary

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

MAP 2:
WILLIAMSTOWN TURLOUGHS SAC
CONSERVATION OBJECTIVES
TURLOUGHS

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

SITE CODE:
SAC 002296; version 3.02. CO. GALWAY

0 140 280 420 560 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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Map Version 1
Date: Dec 2017

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

River Moy SAC 002298

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

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

National Parks and Wildlife Service,
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Citation:

NPWS (2016) Conservation Objectives: River Moy SAC 002298. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002298	River Moy SAC
1092	White-clawed Crayfish *Austropotamobius pallipes*
1095	Sea Lamprey *Petromyzon marinus*
1096	Brook Lamprey *Lampetra planeri*
1106	Salmon *Salmo salar*
1355	Otter *Lutra lutra*
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion
7230	Alkaline fens
91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*

Please note that this SAC overlaps with Killala Bay/Moy Estuary SPA (004036) and Lough Conn and Lough Cullin SPA (004228). It is adjacent to Killala Bay/Moy Estuary SAC (000458), Lough Hoe Bog SAC (000633), Bellacorick Bog Complex SAC (001922) and Ox Mountains Bogs SAC (002006). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1998
Title :	Conservation management of the white-clawed crayfish, (*Austropotamobius pallipes*)
Author :	Reynolds, J.D.
Series :	Irish Wildlife Manual No. 1
Year :	2004
Title :	The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs
Author :	King, J.J.; Linnane, S.M.
Series :	Irish Wildlife Manuals No. 14
Year :	2004
Title :	A survey of juvenile lamprey populations in the Moy catchment
Author :	O'Connor, W.
Series :	Irish Wildlife Manuals No. 15
Year :	2006
Title :	Otter survey of Ireland 2004/2005
Author :	Bailey, M.; Rochford, J.
Series :	Irish Wildlife Manual No. 23
Year :	2006
Title :	Assessment of impacts of turf cutting on designated raised bogs
Author :	Fernandez Valverde, F.; MacGowan, F.; Farrell, M.; Crowley, W.; Croal, Y.; Fanning, M.; McKee, A-M.
Series :	Unpublished report to NPWS
Year :	2007
Title :	Supporting documentation for the Habitats Directive Conservation Status Assessment - backing documents. Article 17 forms and supporting maps
Author :	NPWS
Series :	Unpublished report to NPWS
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished Report to NPWS
Year :	2010
Title :	A provisional inventory of ancient and long-established woodland in Ireland
Author :	Perrin, P.M.; Daly, O.H.
Series :	Irish Wildlife Manual No. 46
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (*Austropotamobius pallipes*) in Irish lakes
Author :	Reynolds, J., O'Connor, W., O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manual No.45
Year :	2012
Title :	Killala Bay/Moy Estuary SAC (00458) Coastal Supporting doc V1
Author :	NPWS
Series :	Conservation objectives supporting document

Year :	2012
Title :	Killala Bay/Moy Estuary SAC (000458) Marine supporting doc v.1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2013
Title :	National otter survey of Ireland 2010/12
Author :	Reid, N.; Hayden, B.; Lundy, M.G.; Pietravalle, S.; McDonald, R.A.; Montgomery, W.I.
Series :	Irish Wildlife Manual No. 76
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2014
Title :	Raised Bog Monitoring and Assessment Survey 2013
Author :	Fernandez, F.; Connolly K.; Crowley W.; Denyer J.; Duff K.; Smith G.
Series :	Irish Wildlife Manual No. 81
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2014
Title :	Derrynabrock Bog (SAC 002298), Co.Roscommon/Mayo, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2014
Title :	Tawnaghbeg Bog (SAC 002298), Co. Mayo, Site Report
Author :	Fernandez, F.; Connolly, K.; Crowley, W.; Denyer J.; Duff K.; Smith G.
Series :	Raised bog monitoring and assessment survey 2013
Year :	2016
Title :	River Moy SAC (site code: 2298) Conservation objectives supporting document- raised bog habitats 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 :	2002
Title :	Reversing the habitat fragmentation of British woodlands
Author :	Peterken, G.
Series :	WWF-UK, London

Year :	2003
Title :	Monitoring the river, sea and brook lamprey, *Lampetra fluviatilis*, *L. planeri* and *Petromyzon marinus*
Author :	Harvey, J.; Cowx, I.
Series :	Conserving Natura 2000 Rivers Monitoring Series No. 5. English Nature, Peterborough
Year :	2003
Title :	Identifying lamprey. A field key for sea, river and brook lamprey
Author :	Gardiner, R.
Series :	Conserving Natura 2000 rivers, Conservation techniques No. 4. English Nature, Peterborough
Year :	2007
Title :	Evolutionary history of lamprey paired species *Lampetra fluviatilis* L. and *Lampetra planeri* Bloch as inferred from mitochondrial DNA variation
Author :	Espanhol, R.; Almeida, P.R.; Alves, M.J.
Series :	Molecular Ecology 16, 1909-1924
Year :	2010
Title :	Otter tracking study of Roaringwater Bay
Author :	De Jongh, A.; O'Neill, L.
Series :	Unpublished draft report to NPWS
Year :	2015
Title :	Behaviour of sea lamprey (*Petromyzon marinus* L.) at man-made obstacles during upriver spawning migration: use of telemetry to access efficacy of weir modifications for improved passage
Author :	Rooney, S.M.; Wightman, G.D.; O Conchuir, R.; King, J.J.
Series :	Biology and Environment: Proc. R. Ir. Acad. 115 B, 1-12
Year :	2015
Title :	River engineering works and lamprey ammocoetes; impacts, recovery, mitigation
Author :	King, J.J.; Wightman, G.D.; Hanna, G.; Gilligan, N.
Series :	Water and Environment Journal, 29, 482-488
Year :	2016
Title :	The status of Irish salmon stocks in 2015 with precautionary catch advice for 2016
Author :	Standing Scientific Committee on Salmon
Series :	Independent scientific report to Inland Fisheries Ireland

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	Potential 7110; digital elevation model; drainage patterns (maps 3 and 5)
Year :	2013
Title :	Raised Bog Monitoring and Assessment Survey 2013
GIS Operations :	RBMA13_ecotope_map dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 4)
Year :	Digitised 2003
Title :	Raised Bog Restoration Project 1999
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 4)
Year :	Revision 2010
Title :	National Survey of Native Woodlands 2003-2008. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	91A0, 91E0 (map 6)
Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Creation of a 10m buffer on the terrestrial side of river banks data; creation of 20m buffer applied to canal centreline data. Creation of a 20m buffer applied to river and stream centreline data; These datasets combined with the derived OSI 1:5000 vector lake buffer data. Overlapping regions investigated and resolved; resulting dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1355 (no map)
Year :	2010
Title :	OSi 1:5000 IG vector dataset
GIS Operations :	Creation of 80m buffer on the aquatic side of lake data; creation of 10m buffer on the terrestrial side of lake data. These datasets combined with the derived OSi Discovery Series river and canal datasets. 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
Used For :	1355 (map 8)
Year :	2016
Title :	NPWS rare and threatened species database
GIS Operations :	Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For :	1092 (map 7)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 132.4ha, subject to natural processes	There are five raised bogs listed for River Moy SAC. The total area of Active Raised Bog (ARB) habitat for these five bogs was mapped at 45.3ha. Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 152.4ha. See map 3. However, it is estimated that only 82.1ha is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 127.4ha. Eco-hydrological assessments of the cutover estimates that an additional 5.0ha of bog forming habitats could be restored. The long term target for ARB is therefore 132.4ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 4 for most recently mapped distribution	ARB occurs on most of the bogs in the River Moy SAC. DRB occurs on all five bogs in the River Moy SAC. There is also potential for ARB restoration on cutover areas surrounding the bogs (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 3	The area of high bog within the five raised bogs listed for River Moy SAC in 2012 (latest figure available) was 498.4ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 5 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around the margins of the bogs within the River Moy SAC. Natural marginal habitats no longer exist. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 66.2ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 132.4ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in less disturbed parts of the bogs in River Moy SAC
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	An important feature of interest in relation to the raised bogs in the River Moy SAC is the fact that they occur at the north-western edge of the geographic range of the habitat in Ireland
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around the bogs in River Moy SAC suggests that the current level is approximately 8.5kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in River Moy SAC

Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in River Moy SAC

Attribute	Measure	Target	Notes

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The full extent of of this habitat within the SAC is unknown. An extensive area is known to occur as part of a wetland complex on the Glore River, north-west of Ballyhaunis but there are likely to be other areas present in the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes	Full distribution of the habitat in this SAC is currently unknown- see note above
Hydrological regime	Metres	Appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat
Peat formation	Flood duration	Active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Water quality: nutrients	Water chemistry measures	Appropriate water quality to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus with the latter tending to be tbe limiting nutrient
Vegetation structure: typical species	Percentage	Maintain vegetation cover of typical species including brown mosses and vascular plants	Mosses listed for fen in this SAC include *Campylium stellatum*, *Aneura pinguis* and *Scorpidium scorpioides* while vascular plants include long-stalked yellow sedge (*Carex lepidocarpa*), black bog rush (*Schoenus nigricans*), blunt-flowered rush (*Juncus subnodulosus*), purple moor-grass (*Molinia caerulea*), grass of Parnassus (*Parnassia palustris*), butterwort (*Pinguicula vulgaris*), marsh helleborine (*Epipactis palustris*) and meadow thistle (*Cirsium dissectum*) (internal NPWS files)
Vegetation composition: trees and shrubs	Percentage	Cover of scattered native trees and shrubs less than 10%	Scrub and trees will tend to invade if fen conditions become drier. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., 2014)
Physical structure: disturbed bare ground	Percentage	Cover of disturbed bare ground less than 10%. Where tufa is present, disturbed bare ground less than 1%	While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., 2014)
Physical structure: drainage	Percentage	Areas showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based on upland habitat conservation assessment criteria (Perrin et al., 2014)

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

To maintain the favourable conservation condition of Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles in River Moy 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	Old sessile oakwoods are likely to occur as mosaics with other woodland types and the total extent within the SAC is unknown. Two sites (1763, 1800) in the SAC were surveyed as part of the the National Survey of Native Woodlands (NSNW) (Perrin et al., 2008). Site 1763 (Pontoon) is an extensive area of woodland and 106.3ha was mapped as this Annex I habitat type (or mosaics containing it). See map 6. NB further areas are likely to be present within the SAC
Habitat distribution	Occurrence	No decline. Woodlands surveyed as part of the NSNW are shown on map 6	The main location of this woodland type in the SAC is Pontoon Woods. See note on area above
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large"; woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring "deep" woodland conditions (Peterken, 2002). Topographical and land ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al (2008)
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008)
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Oak (*Quercus* spp.) regenerates poorly. In suitable sites ash (*Fraxinus excelsior*) can regenerate in large numbers although few seedlings reach pole size
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least 30m^3/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species. Perrin and Daly (2010) list Pontoon Wood as possible ancient woodland
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)

Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*)	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: beech (*Fagus sylvatica*), sycamore (*Acer psudoplatanus*), rhododendron (*Rhododendron ponticum*) and cherry laurel (*Prunus laurocerasus*)

91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

To maintain the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Total extent of this habitat within the SAC is unknown and it may occur in mosaics with other woodland types. Two sites (1763, 1800) within the SAC were surveyed as part of the the National Survey of Native Woodlands (NSNW) (Perrin et al., 2008). Map 6 shows surveyed woodlands including areas classified as 91E0 (2.76ha). NB areas mapped as other wet woodland types may also correspond with this Annex I woodland type. There are also likely to be additional areas of this Annex I woodland type within the SAC
Habitat distribution	Occurrence	No decline. Woodlands surveyed as part of the NSNW are shown on map 6	The area of this habitat identified by the NSNW occurs at Prospect (site 1800) on the western shore of Lough Conn. See note on area above
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The sizes of at least some of the existing woodlands need to be increased in order to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). Topographical and land-ownership constraints may restrict expansion
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; and well-developed herb layer	Described in Perrin et al. (2008)
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	Described in Perrin et al. (2008)
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy	Alder (*Alnus glutinosa*) and oak (*Quercus* spp.) regenerate poorly. Ash (*Fraxinus excelsior*) often regenerates in large numbers although few seedlings reach pole size
Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river floodplains and lakeshores
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local disctinctiveness	Occurrence	No decline	Includes ancient or long-established woodlands, archaeological and geological features as well as red-data and other rare or localised species

Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%	Species reported in Perrin et al. (2008)
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including including alder (*Alnus glutinosa*), willows (*Salix* spp.), oak (*Quercus robur*) and ash (*Fraxinus excelsior*)	Species reported in Perrin et al. (2008)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control	The following are the most common invasive species in this woodland type: sycamore (*Acer pseudoplatanus*) and Himalayan balsam (*Impatiens glandulifera*). The NSNW notes rhododendron (*Rhododendron ponticum*) clearance in site 1800

1092 White-clawed Crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed Crayfish in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Occurrence	No reduction from baseline. See map 7	The general distribution of white-clawed crayfish in the SAC is that it is widespread in the upper tributaries of the River Moy and the rivers which feed Loughs Conn and Cullin. It is absent from the main River Moy. The named tributaries that it is recorded from are the following: Upstream of Lough Conn: River Deel and its tributaries of the Toreen River, Rathnamagh River and Rappa Stream; Fiddaunglass; Addergoole River. Upstream of Lough Cullin: Tobergal River; Clydagh; tributaries of the Toormore and Manulla Rivers. Moy tributaries: Gweestion River; tributaries of the Pollagh, Glore, Yellow and Geestaun Rivers; Killeen River; Spaddagh River; Sonnagh River; Owenaher River; Owengarve River
Population structure: recruitment	Occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in all occupied tributaries	See Reynolds et al. (2010) for further details
Negative indicator species	Occurrence	No alien crayfish species	Alien crayfish species are identified as a major direct threat to this species and as a disease vector. See Reynolds (1998) for further details. Ireland is currently free of non-native invasive crayfish species
Disease	Occurrence	No instances of disease	Crayfish plague is identified as major threat and has occurred in Ireland even in the absence of alien vectors. See Reynolds (1998) for further details. Disease can in some circumstances be introduced through contaminated equipment and water in the absence of vector species
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA	Target taken from Demers and Reynolds (2002). Q values based on triennial water quality surveys carried out by the EPA
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality	Crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree-roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions must be available on the whole length of occupied habitat

1095 Sea Lamprey *Petromyzon marinus*

To maintain the favourable conservation condition of Sea Lamprey in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	This SAC only covers the freshwater portion of the River Moy. The adjacent Killala Bay/Moy Estuary SAC (site code: 000485) encompasses the estuarine elements of sea lamprey habitat. Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas (Rooney et al. 2015), however, there are no artificial barriers in the Moy catchment limiting lamprey access
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density at least 1/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date. (King and Linnane, 2004; King et al., unpublished data)

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Access to all watercourses down to first order streams	Artificial barriers can block lampreys' migration both up- and downstream, thereby possibly limiting species to specific stretches, restricting access to spawning areas and creating genetically isolated populations (Espanhol et al., 2007). However, there are no artificial barriers in the Moy catchment limiting lamprey access
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m²	Mean catchment juvenile density of brook/river lamprey at least 2/m²	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m² in optimal conditions and more than 2/m² on a catchment basis
Extent and distribution of spawning habitat	m² and occurrence	No decline in extent and distribution of spawning beds	Attribute and target based on spawning bed mapping by Inland Fisheries Ireland (IFI). Lampreys spawn in clean gravels
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Silting habitat is essential for larval lamprey and they can be severely impacted by sediment removal. Recovery can be rapid and newly-created habitat can be rapidly colonised (King et al., 2015). However, it is vital that such sedimenting habitats are retained. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date. (King and Linnane, 2004; King et al., unpublished data)

1106 Salmon *Salmo salar*

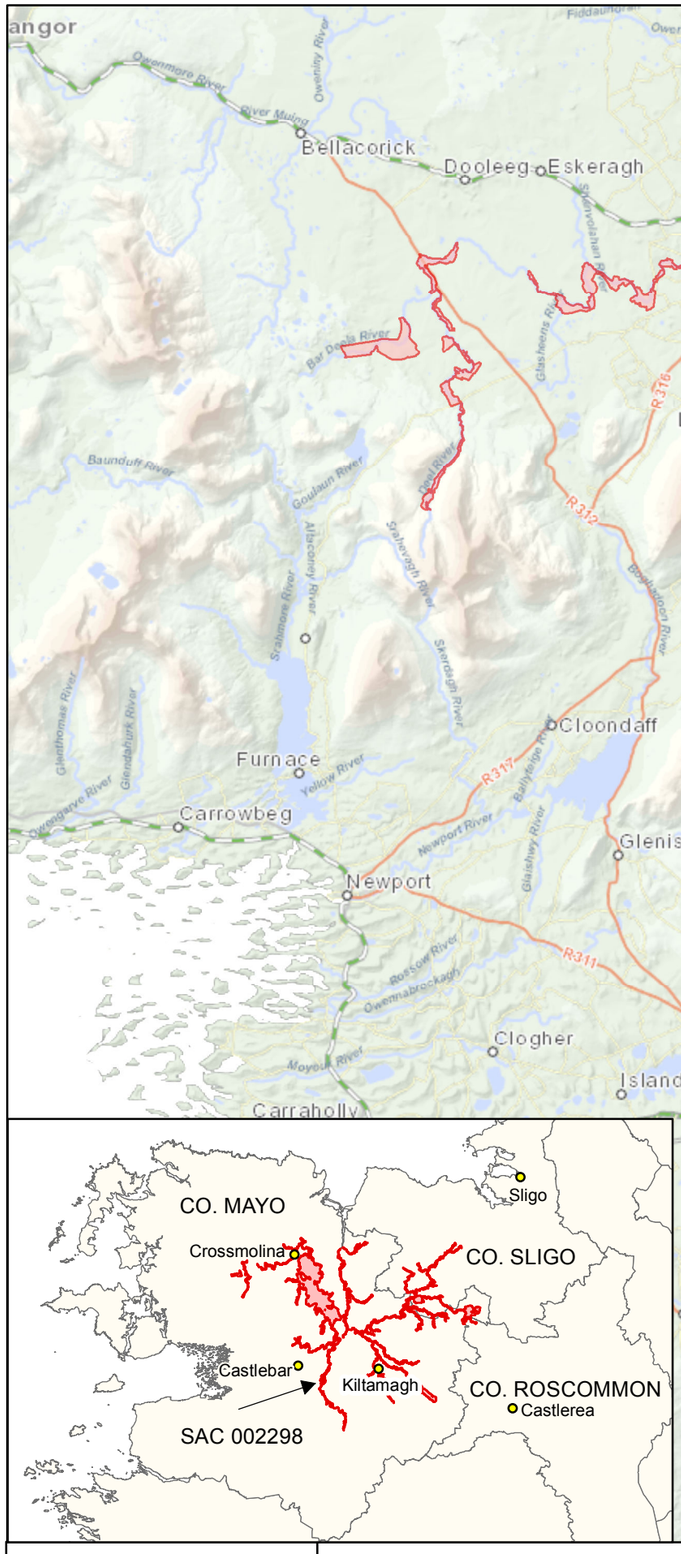
To maintain the favourable conservation condition of Salmon in River Moy SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. There are no artificial barriers on the Moy catchment limiting salmon access
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit 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 of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2016). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. For the 2016 SSC advice, the Moy is currently exceeding its CL by 19,012 salmon
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	Target is 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 (*Lepeophtheirus salmonis*)
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. There are no artificial barriers preventing salmon from accessing suitable spawning habitat in this SAC
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)

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter in River Moy 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. 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 1068.8ha	No field survey. Areas mapped to include 10m terrestrial buffer along lake shorelines and along river banks identified as critical for otters (NPWS, 2007)
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 479.4km	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 1248.2ha	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, 2006; Kruuk and Moorhouse, 1991)
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; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase. For guidance, see map 8	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



Legend

River Moy SAC 002298

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

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

MAP 1:
RIVER MOY SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
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0 2 4 6 8 10 km

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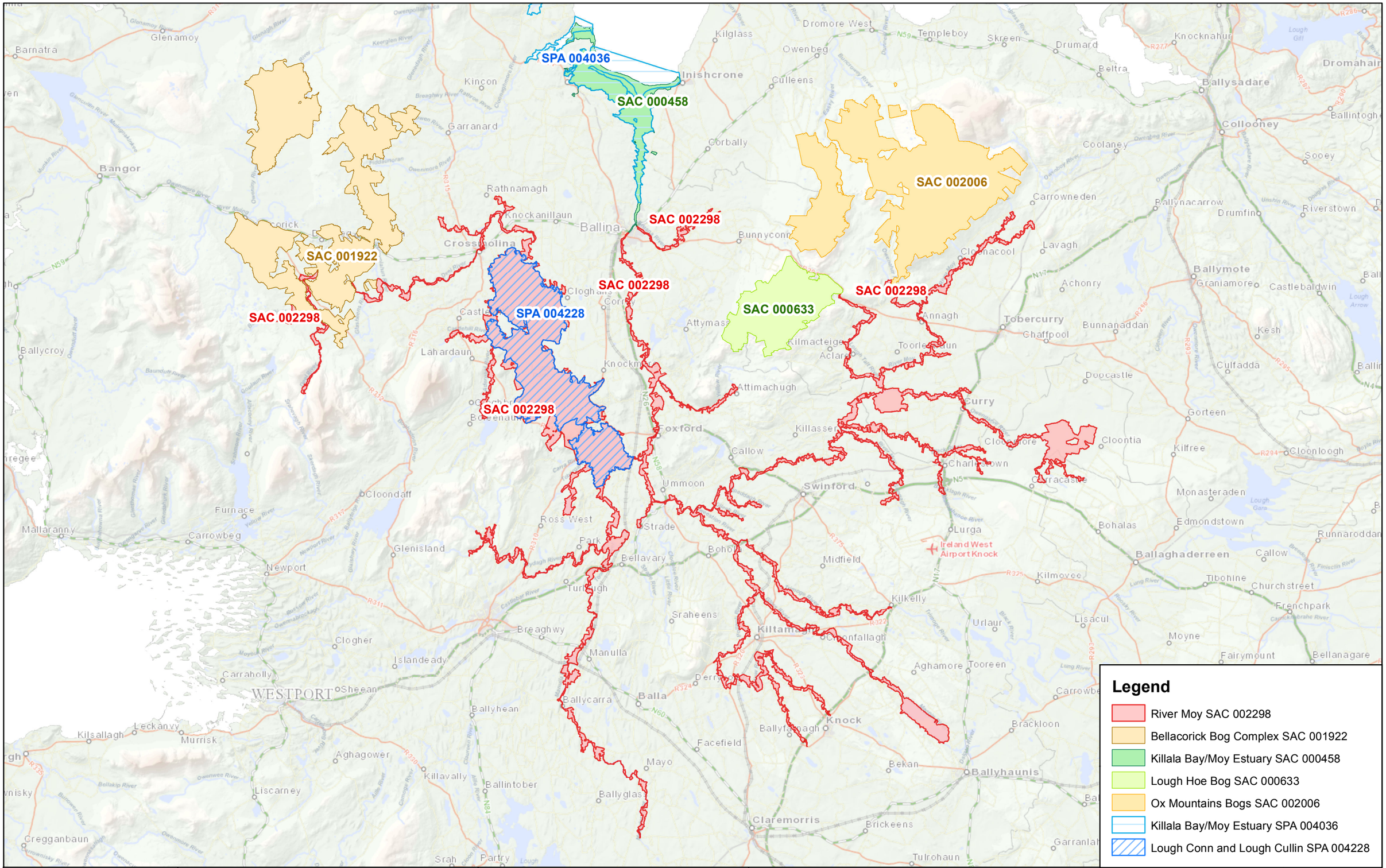
Map Version 1
Date: July 2016



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MAP 2:
RIVER MOY SAC
CONSERVATION OBJECTIVES
ADJACENT / ADJOINING & OVERLAPPING DESIGNATIONS

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

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0 2.5 5 7.5 10 12.5 km

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Map Version 1
Date: July 2016

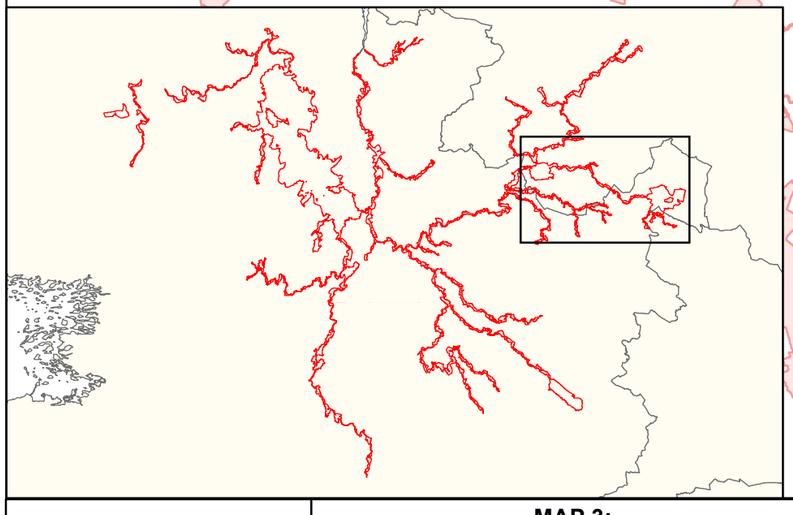
Cloongoonagh Bog

Gowlaun Bog

Tawnaghbeg Bog

Derrynabrock Bog

Kilgarriff Bog



Legend

- River Moy SAC 002298
- High Bog Boundary
- Potential 7110 Active Raised Bogs

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MAP 3:
RIVER MOY SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
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0 0.45 0.9 1.35 1.8 2.25 km

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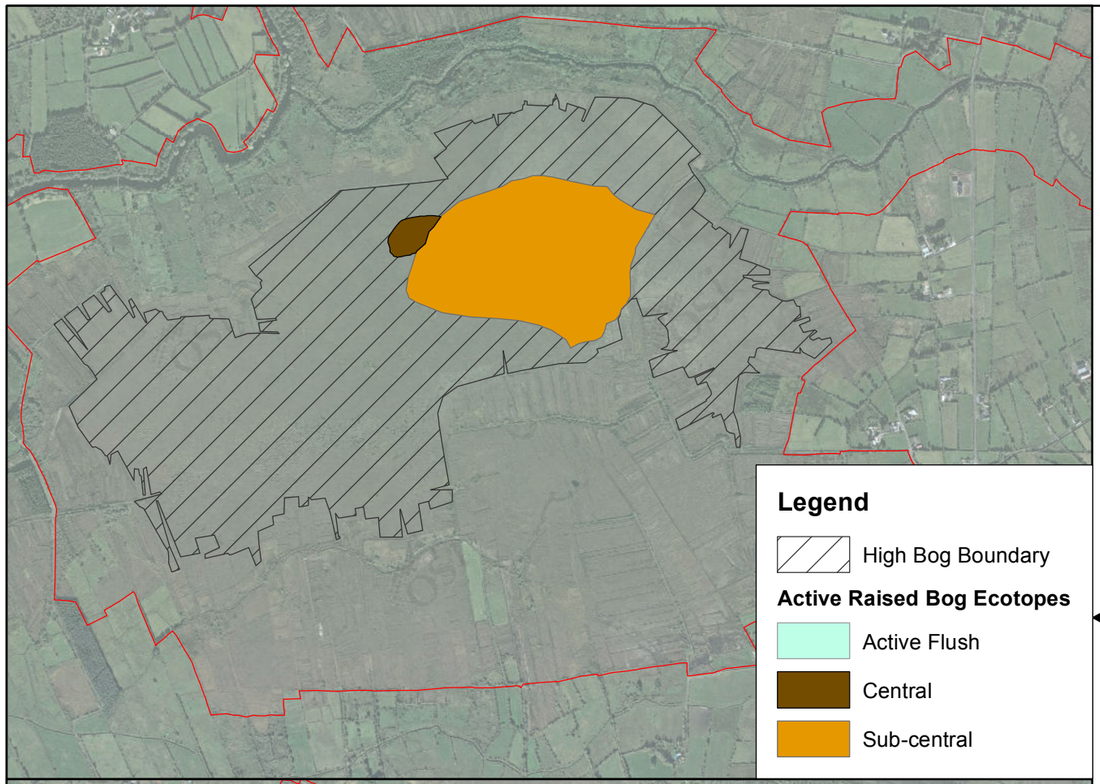
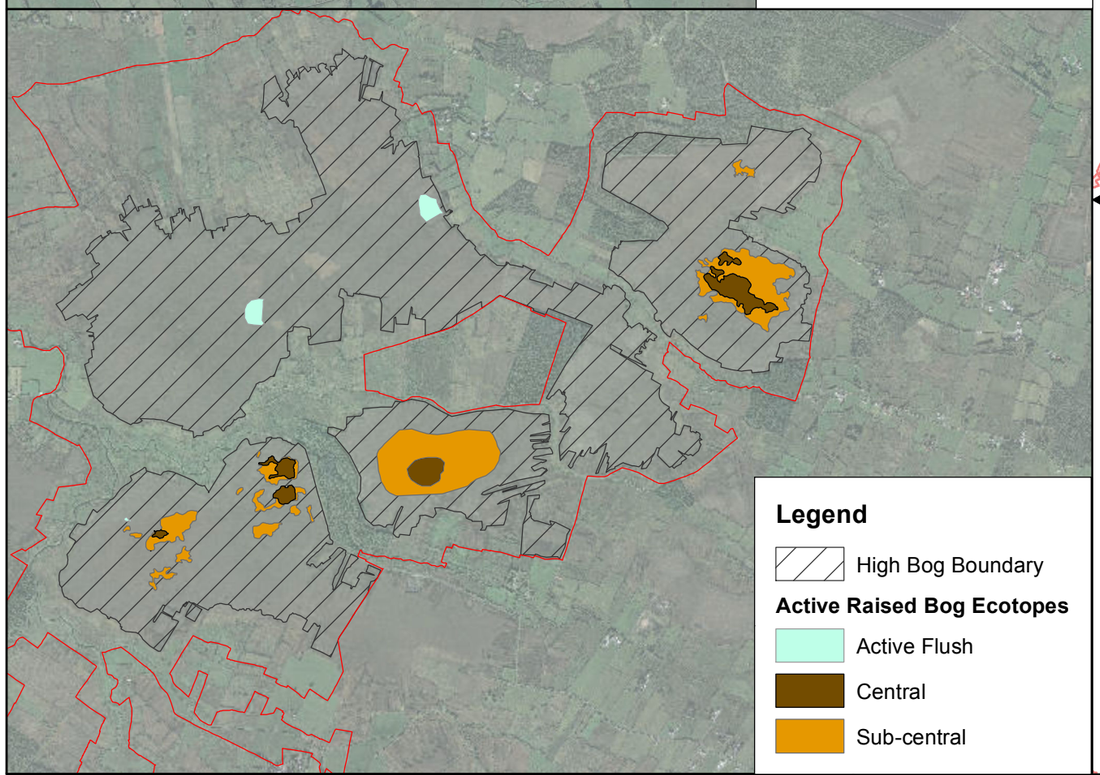
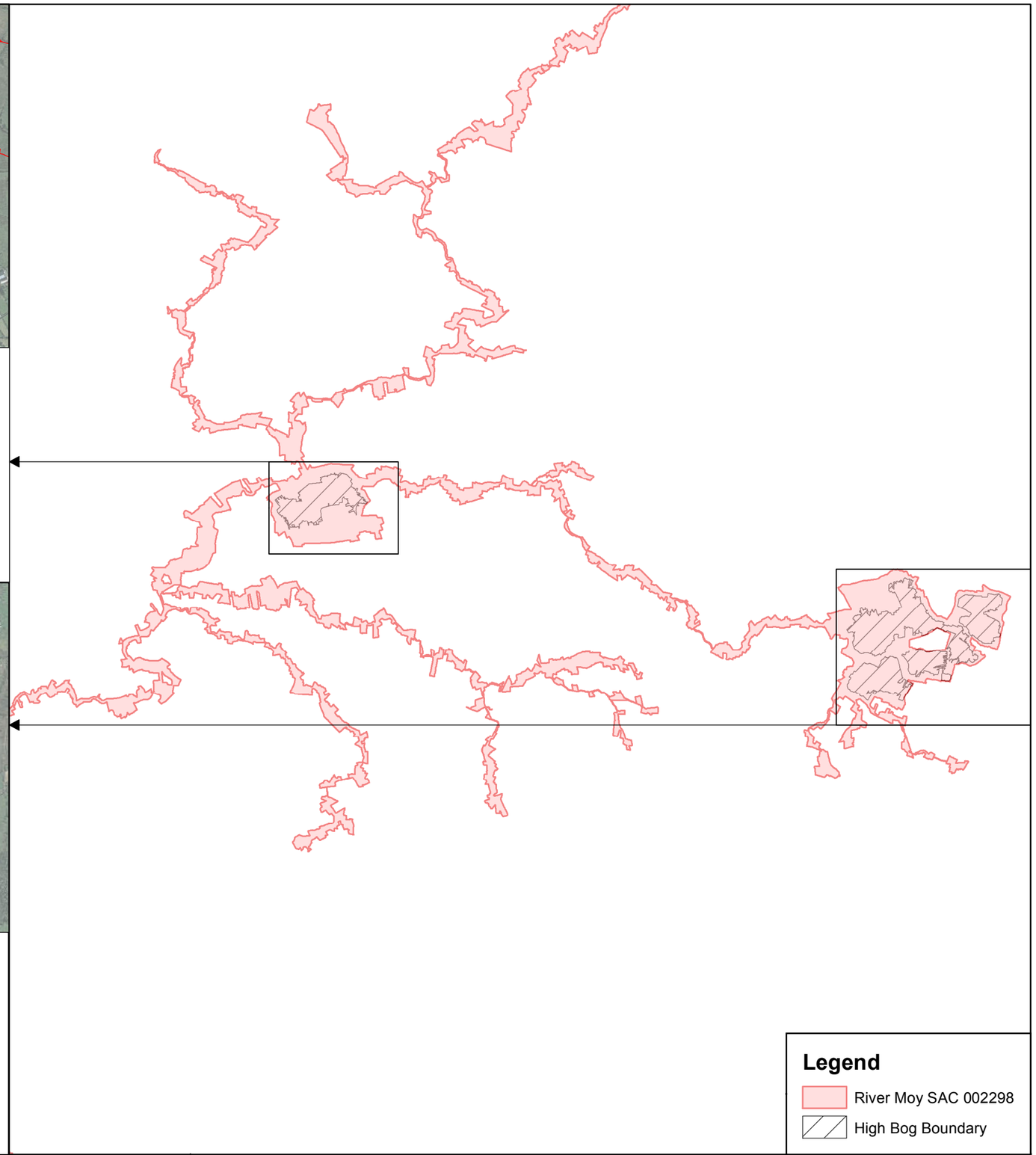
Map Version 1
Date: July 2016







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MAP 4:
RIVER MOY SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOG ECOTOPES

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

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0 1 2 3 4 5 km

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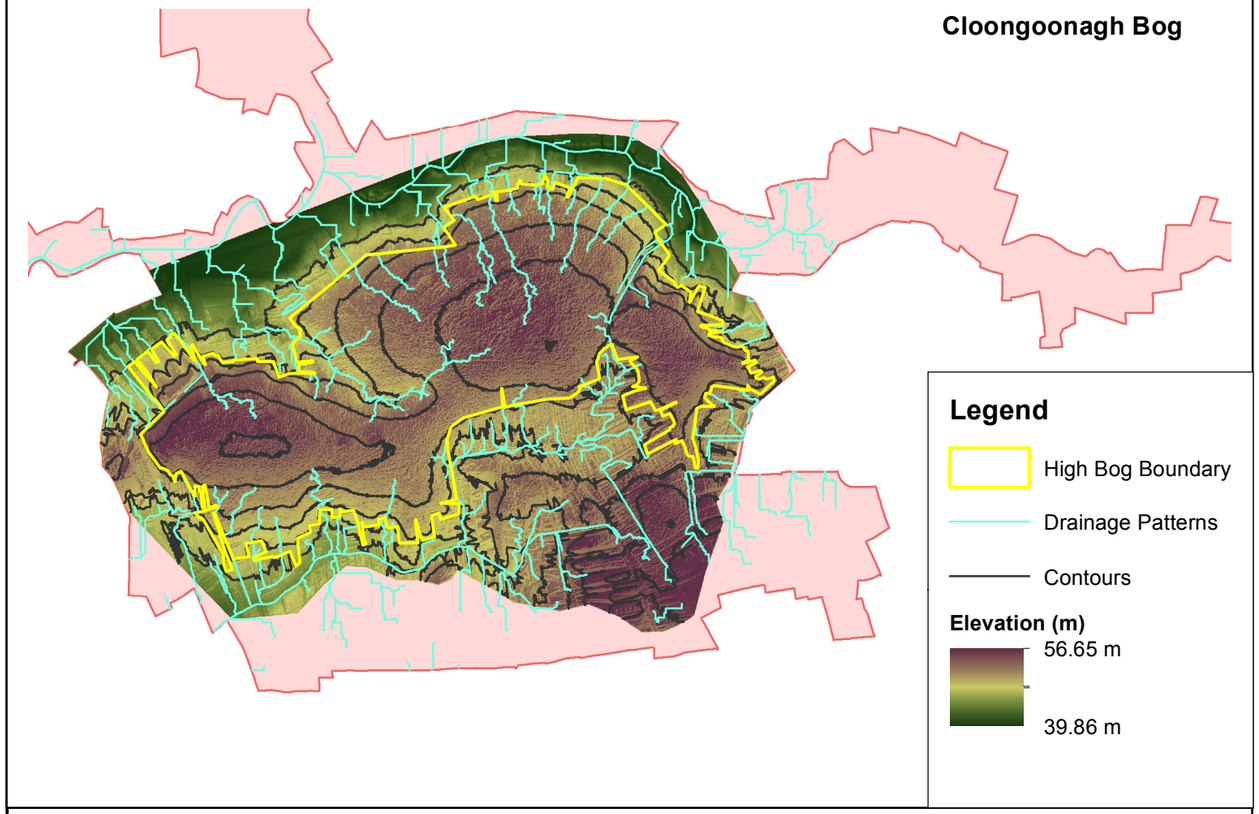
N

Map Version 1
Date: July 2016

Cloongoonagh Bog



Legend

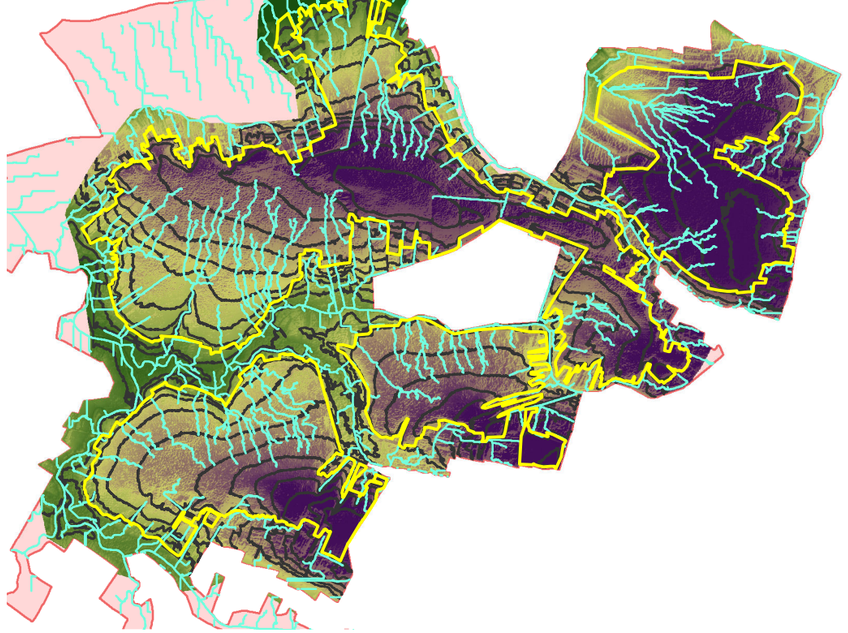
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation (m)

56.65 m

39.86 m

Derrynabrock / Kilgarriff / Tawnabeg / Gowlaun Bogs



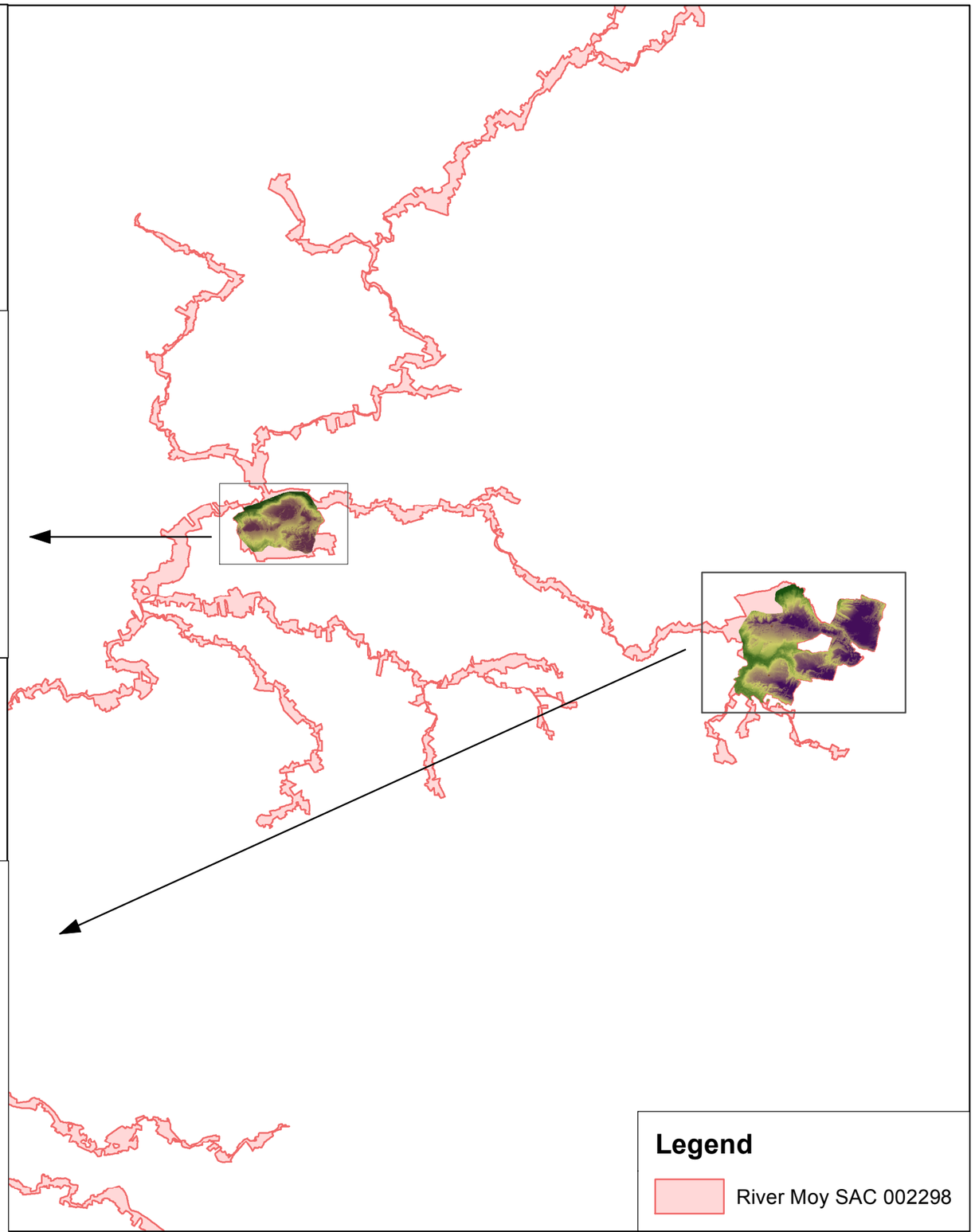
Legend

- High Bog Boundary
- Drainage Patterns
- Contours

Elevation (m)

91.94 m

71.07 m



Legend

- River Moy SAC 002298

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

MAP 5:
RIVER MOY SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERN

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

SITE CODE:
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0 1.5 3 4.5 6 7.5 km

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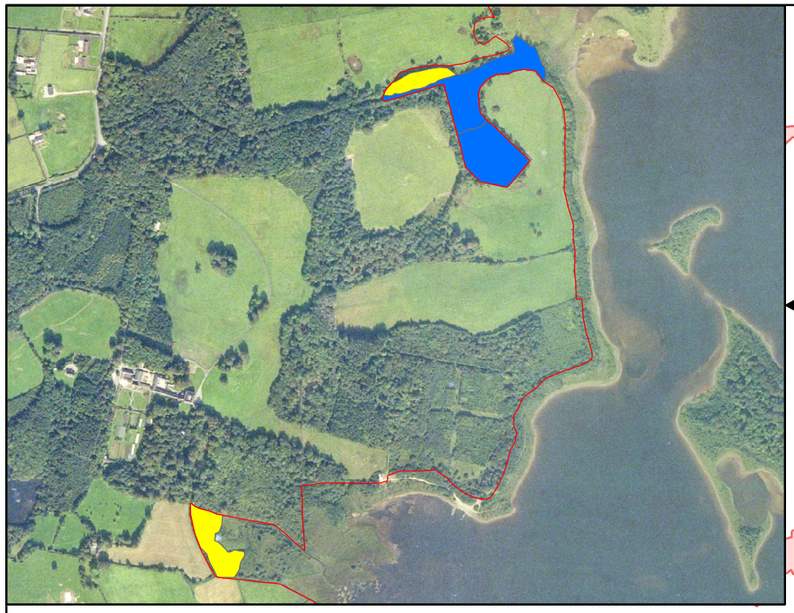
Date: July 2016



NSNW Site Code: 1800

Legend

River Moy SAC 002298

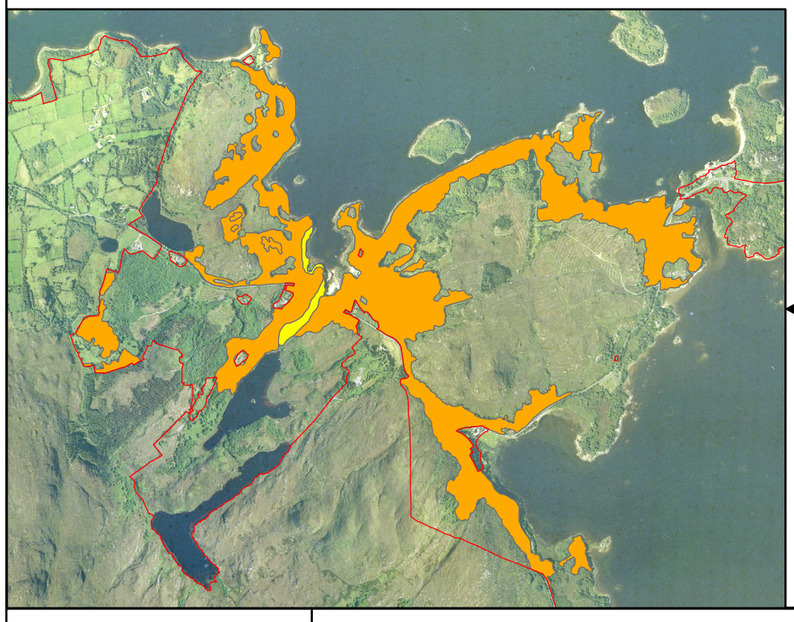
Qualifying Interests

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles

91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Pandion, Alnion incanae, Salicion albae)

Non Qualifying Interests

WN6, Wet willow-alder-ash woodland



NSNW Site Code: 1763

Map Extent

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

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

MAP 6:
RIVER MOY SAC
CONSERVATION OBJECTIVES
WOODLAND HABITATS

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

SITE CODE:
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0 1 2 3 4 km

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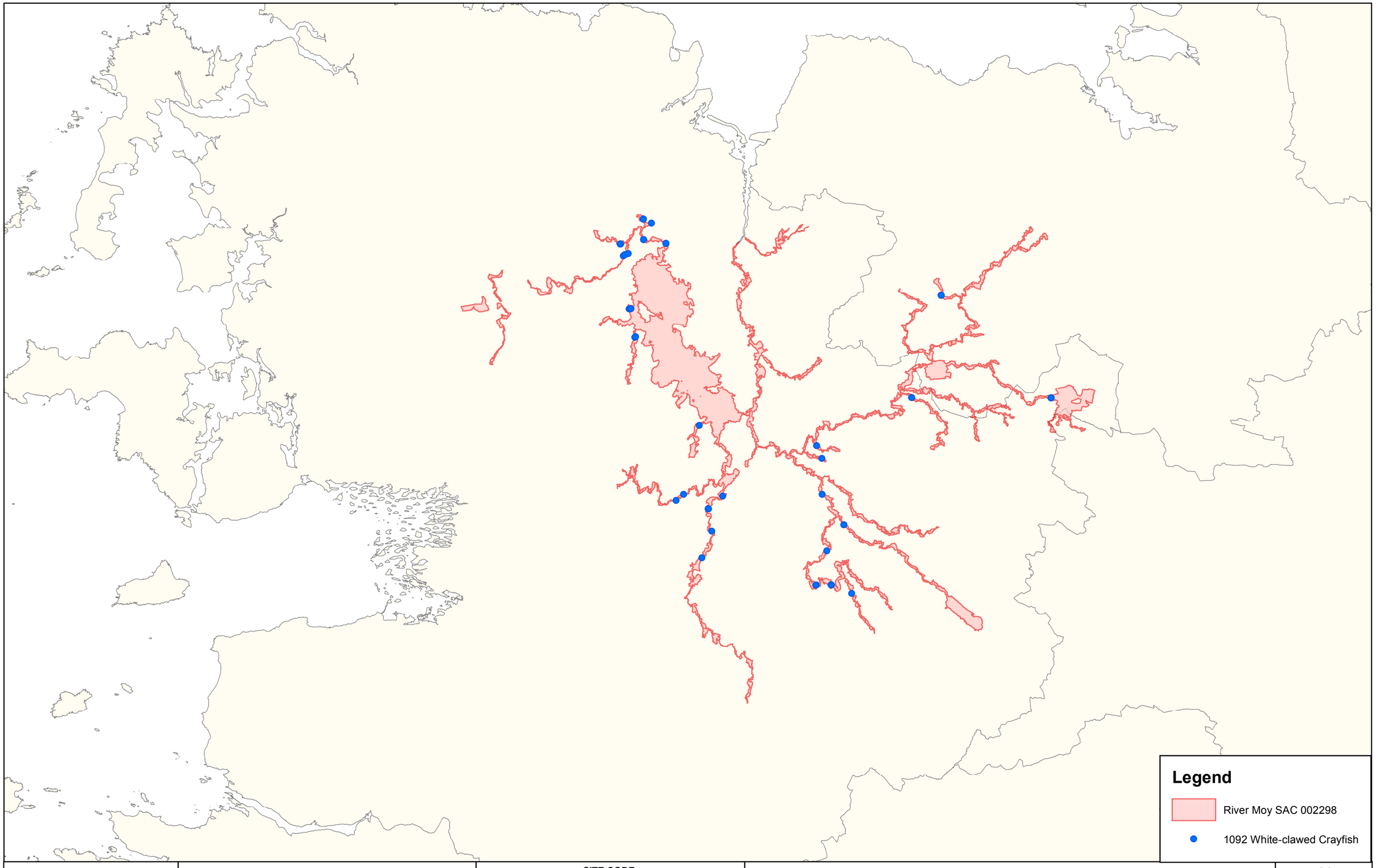

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MAP 7:
RIVER MOY SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH

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

SITE CODE:
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0 5.5 11 16.5 22 km

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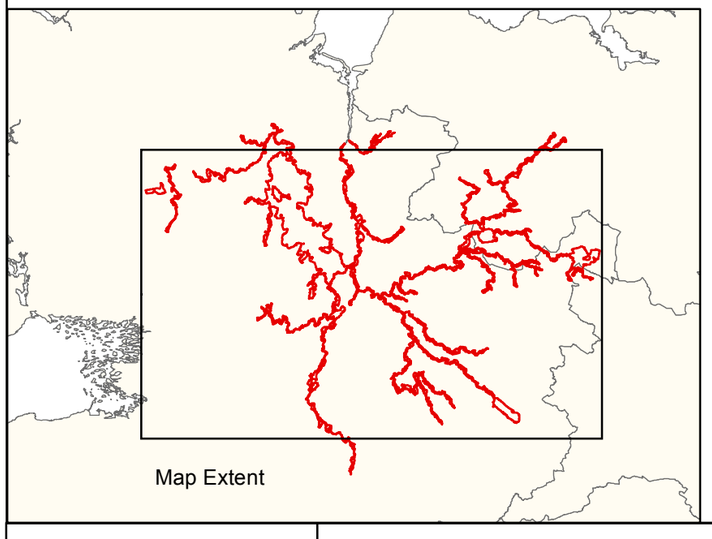
Map Version 1
Date: July 2016

Legend

- River Moy SAC 002298
- 1355 Otter - *Lutra lutra* commuting 250m buffer



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

MAP 8:
RIVER MOY SAC
CONSERVATION OBJECTIVES
OTTER COMMUTING

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

SITE CODE:
SAC 002298; version 3.01. CO. MAYO, CO. SLIGO & CO. ROSCOMMON

0 1.5 3 4.5 6 7.5 km

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Map Version 1
Date: July 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Kildun Souterrain SAC 002320

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,

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Citation:

NPWS (2018) Conservation Objectives: Kildun Souterrain SAC 002320. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

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

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

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

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

Favourable conservation status of a habitat is achieved when:

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

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002320	Kildun Souterrain SAC

1303	Lesser Horseshoe Bat *Rhinolophus hipposideros*

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2007
Title :	Protecting and managing underground sites for bats
Author :	Mitchell-Jones, A.J.; Bihari, Z.; Masing, M.; Rodrigues, L.
Series :	EUROBATS Publication Series No. 2
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2009
Title :	Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*
Author :	Knight, T.; Jones, G.
Series :	Endangered Species Research, 8: 79-86

Spatial data sources

Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roost identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 2)
Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 2)

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To restore the favourable conservation condition of Lesser Horseshoe Bat in Kildun Souterrain SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 50 bats for the winter roost (roost id. 676 in NPWS database). See map 2	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (*Rhinolophus hipposideros*). NPWS conduct annual counts at each qualifying roost. Qualified means from the 2013-2017 winter data have been calculated whereby the year with the highest maximum count and the year with the lowest maximum count were removed and the mean of the remaining years was calculated. This mean is usually set as the target figure for the roost. However, in the case of the winter roost (roost id. 676 in NPWS database) in Kildun Souterrain SAC, where a mean of 15 bats was recorded (2013-2017), the target is instead set at the MQS of 50 bats. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Winter roosts	Condition	No decline	Kildun Souterrain SAC has been selected for lesser horseshoe bat because of the presence of one internationally important winter roost (roost id. 676 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Mitchell-Jones et al., 2007)
Auxiliary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity and winter hibernation roosts. Such additional roosts within the SAC may be important as night roosts, satellite roosts, etc. Night roosts are also considered an integral part of core foraging areas and require protection (Knight and Jones, 2009). In addition, in response to weather conditions for example, bats may use different seasonal roosts from year to year; this is particularly noticeable in winter. A database of all known lesser horseshoe bat roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roost	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 2 which shows a 2.5km zone around the above roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roost. See map 2	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 2	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)

Kildun

SAC 002320

CO. MAYO

Cong

CO. GALWAY

Legend

Kildun Souterrain SAC 002320

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

MAP 1:
KILDUN SOUTERRAIN SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002320; version 3. CO. MAYO

0 20 40 60 80 Meters

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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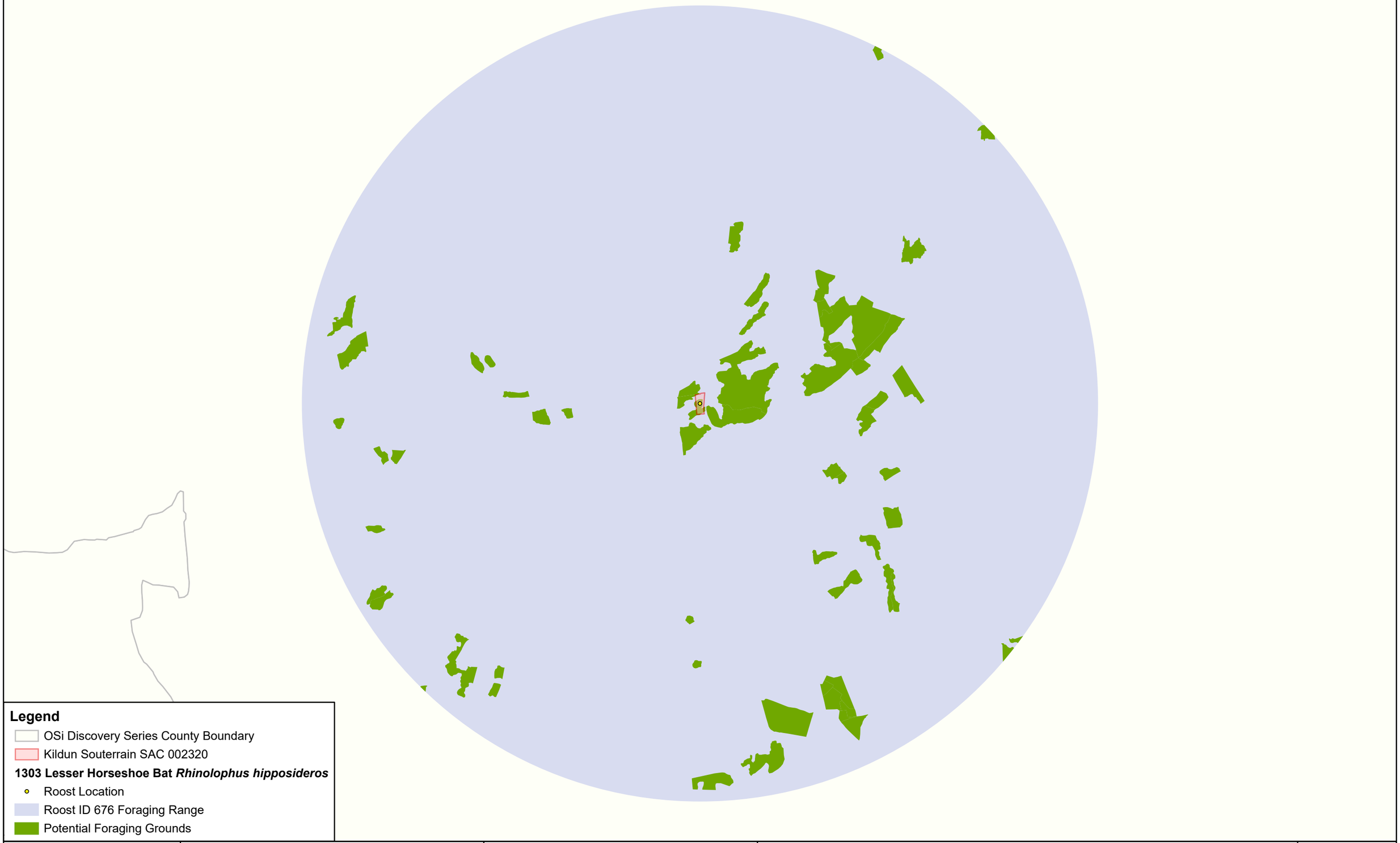
Map Version 1
Date: June 2018



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MAP 2:
KILDUN SOUTERRAIN SAC
CONSERVATION OBJECTIVES
LESSER HORSESHOE BAT

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

SITE CODE:
SAC 002320; version 3.0. CO. MAYO

0 0.25 0.5 0.75 1 Kilometers

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Map Version 1
Date: Apr 2018

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Drumalough Bog SAC 002338

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

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

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Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002338	Drumalough Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2016
Title :	Drumalough Bog SAC (site code: 2338) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	Potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
Year :	Digitised 2003
Title :	Raised Bog Restoration Project 1999
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Drumalough Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 45.2ha, subject to natural processes	Active Raised Bog (ARB) habitat on Drumalough Bog West has been estimated as 5.1ha. The area of ARB on Drumalough Bog East is unknown. Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 46.6ha. See map 2. However, it is estimated that only 39.0ha of this area is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 44.1ha. Eco-hydrological assessments of the cutover estimates that an additional 1.1ha of bog forming habitats could be restored. The long term target for ARB is therefore 45.2ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution mapped in 2003	ARB has been mapped on Drumalough Bog West. DRB occurs on both Drumalough Bog East and Drumalough Bog West, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Drumalough Bog SAC in 2012 (latest figure available) was 159.0ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	ARB is threatened due to effects of past drainage and peat-cutting around the margins of Drumalough Bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 22.6ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the SAC has been set at 45.2ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	High quality microtopography (hummocks, hollows and pools) is well developed in the western part of Drumalough Bog
Vegetation quality: bog moss (Sphagnum) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	These include features of geological, topographical, archaeological and hydrological interest as well as noteworthy species of flora and fauna
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Disturbance indicators include species indicative of conditions drying out such as abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (Sphagnum magellanicum) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)); and indicators of frequent burning events such as abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*) and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Drumalough Bog suggests that the current level is approximately 9.9kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater and run-off from surrounding mineral lands)

7120	Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Drumalough Bog SAC

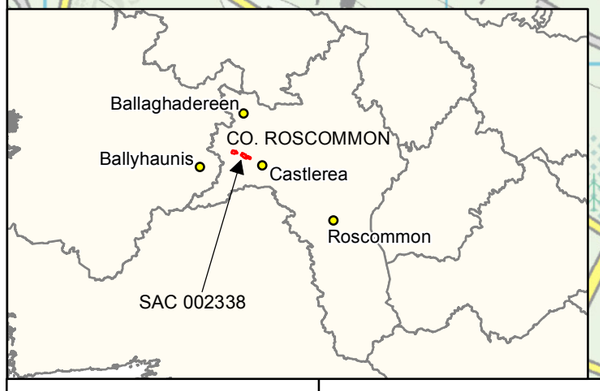
Attribute	Measure	Target	Notes

7150	Depressions on peat substrates of the Rhynchosporion

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Drumalough Bog SAC

Attribute	Measure	Target	Notes

asaun
Cloonmaul
Breanamore
107
Clooncraffield
Aghalo
90
84
95
Breanabeg
90
80
Cloonelt
98
Derreen
Drumalough
Drumalough
87
Cloonbonniff
Sch
Suck



Legend

Drumalough Bog SAC 002338

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 1:
DRUMALOUGH BOG SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002338; version 3. Co. Roscommon

0 250 500 750 1,000 m

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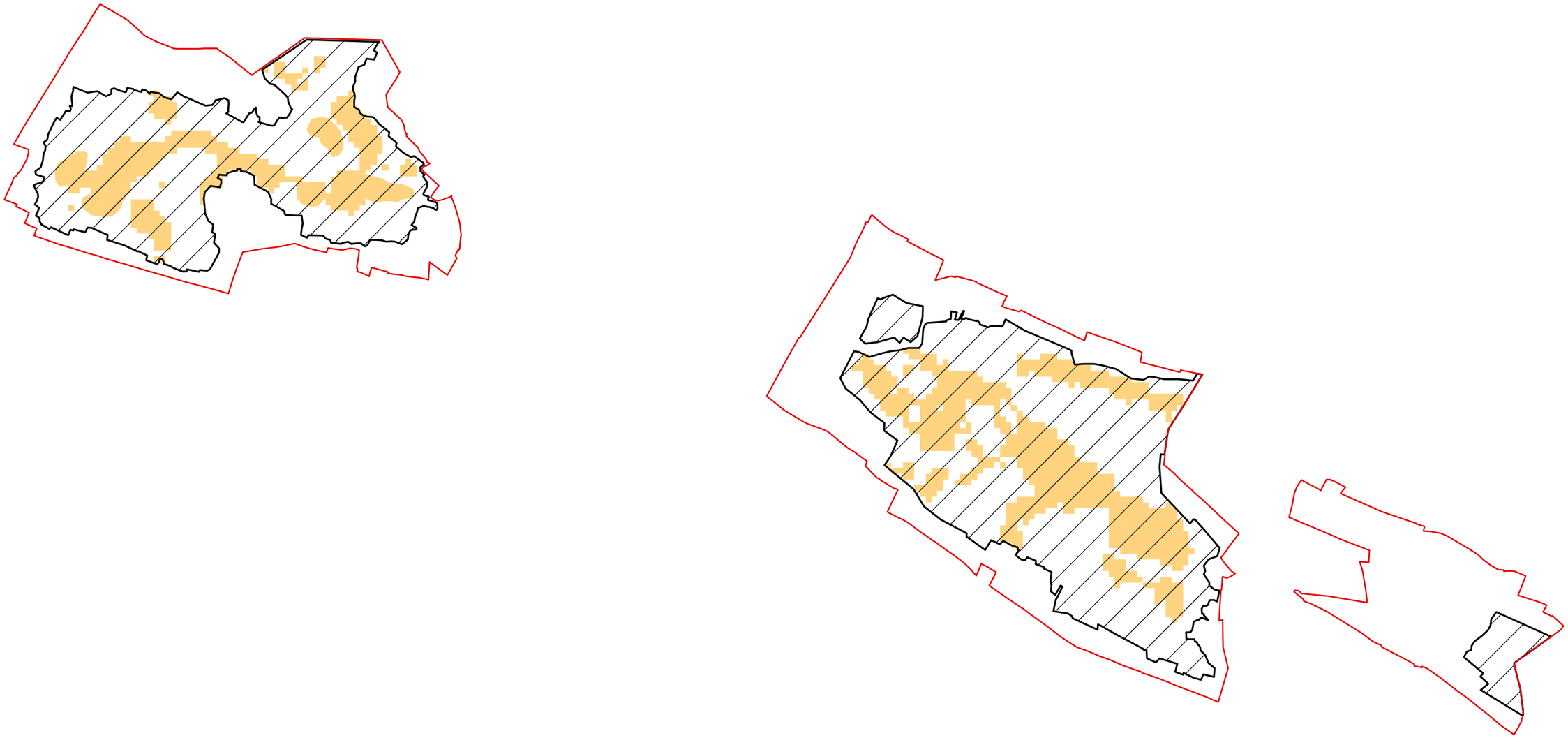
Map Version 1
Date: July 2016



Legend

- Drumalough Bog SAC 002338
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
DRUMALOUGH BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

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

SITE CODE:
SAC 002338; version 3.0. CO. ROSCOMMON

0 0.2 0.4 0.6 0.8 1 km

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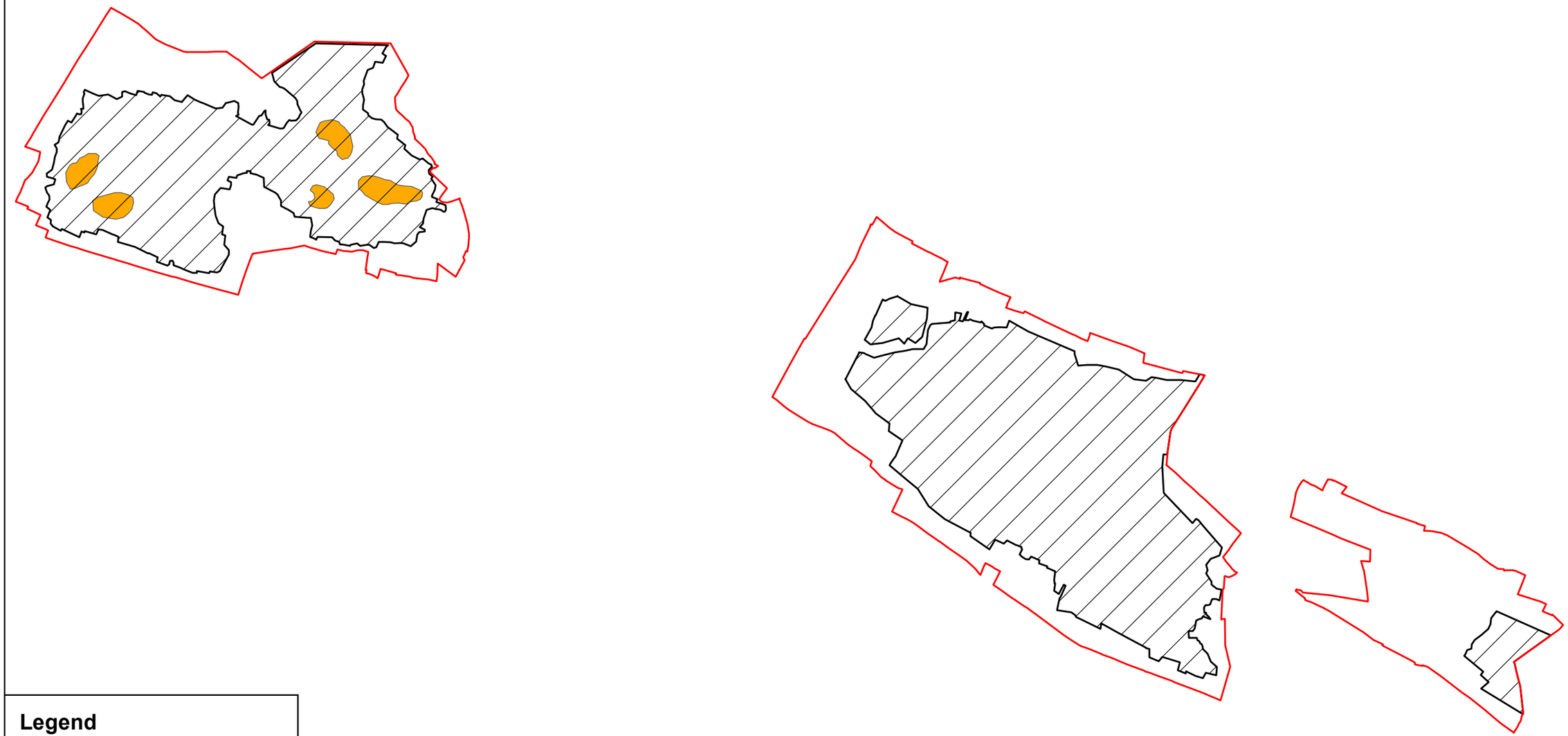
Map Version 1
Date: July 2016



Legend

- Drumalough Bog SAC 002338
- High Bog Boundary

Active Raised Bog Ecotopes

- Sub-central Ecotope

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

MAP 3:
DRUMALOUGH BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

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

SITE CODE:
SAC 002338; version 3.0. CO. ROSCOMMON

0 0.2 0.4 0.6 0.8 1 km

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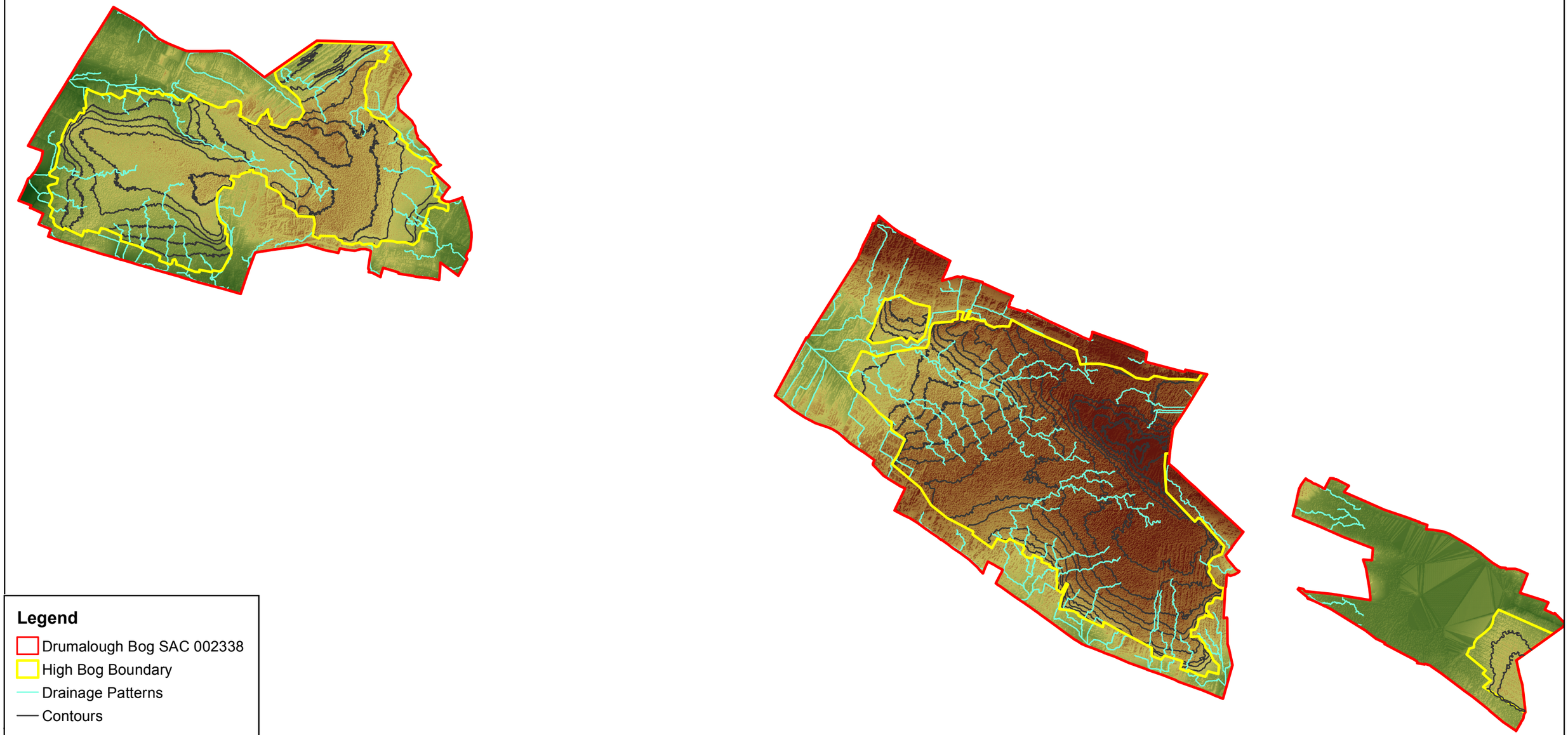
Map Version 1
Date: July 2016



Legend

- Drumalough Bog SAC 002338
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

97.80 m

83.49 m

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

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

MAP 4:
DRUMALOUGH BOG SAC
CONSERVATION OBJECTIVES
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

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

SITE CODE:
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0 200 400 600 800 Meters

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Map Version 1
Date: July 2016

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Tullaghanrock Bog SAC 002354

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Citation:

NPWS (201p) Conservation Objectives: Tullaghanrock Bog SAC 002354. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002354	Tullaghanrock Bog SAC
7110	Active raised bogs*
7120	Degraded raised bogs still capable of natural regeneration
7150	Depressions on peat substrates of the Rhynchosporion

Please note that this SAC adjoins Callow Bog SAC (000595). 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

NPWS Documents

Year :	2000
Title :	Raised bog restoration project. A continuation of the investigation into the conservation and restoration of selected raised bog sites in Ireland
Author :	Derwin, J.; Mac Gowan, F.
Series :	Unpublished report to Duchas, the Heritage Service
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2015
Title :	Tullaghanrock SAC (site code: 2354) Conservation objectives supporting document- raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	potential 7110; digital elevation model; drainage patterns (maps 3 and 5)
Year :	Digitised 2006
Title :	Raised Bog Restoration Project 1999
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 4)

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Tullaghanrock Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 15.2ha, subject to natural processes	Active Raised Bog (ARB) habitat was mapped at 11.0ha (Derwin and MacGowan 2000). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 3.9ha. See map 3. It is considered that all of this area is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 14.9ha. Eco-hydrological assessments of the cutover estimates that an additional 0.3ha of bog forming habitats could be restored. The long term target for ARB is therefore 15.2ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 4 for distribution in 1999	ARB habitat at Tullaghanrock Bog is central and sub-central ecotopes only. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 3	The area of high bog within Tullaghanrock Bog SAC in 2012 (latest figure available) was 62.8ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 5 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support / protect active raised bog and the services it provides	To the south and east there is a semi-natural margin between the high bog and the River Lung. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 7.6ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 15.2ha (see area target above)
Vegetation quality: microtopograph-ical features	Hectares	Restore adequate cover of high quality microtopographical features	Hummock and hollow microtopography with frequent pools is well developed on Tullaghanrock Bog
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site
Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range

Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	These include features of geological, topographical, archaeological and hydrological interest as well as noteworthy species of flora and fauna
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds /ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Native negative indicator species that suggest drying out include abundant bog asphodel (*Narthecium ossifragum*), deergrass (*Trichophorum germanicum*) and harestail cotton-grass (*Eriophorum vaginatum*) forming tussocks; abundant magellanic bog-moss (*Sphagnum magellanicum*) in pools previously dominated by *Sphagnum* species typical of very wet conditions (e.g. feathery bog-moss (*S. cuspidatum*)). Indicators of frequent burning events include abundant *Cladonia floerkeana* and high cover of carnation sedge (*Carex panicea*) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species on raised bogs include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Tullaghanrock Bog suggests that the current level is approximately 8.9kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measure	Water quality on the high bog and transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas and lagg zone surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and runoff from surrounding mineral lands)

Conservation Objectives for : Tullaghanrock Bog SAC [002354]

7120 **Degraded raised bogs still capable of natural regeneration**

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Tullaghanrock Bog SAC

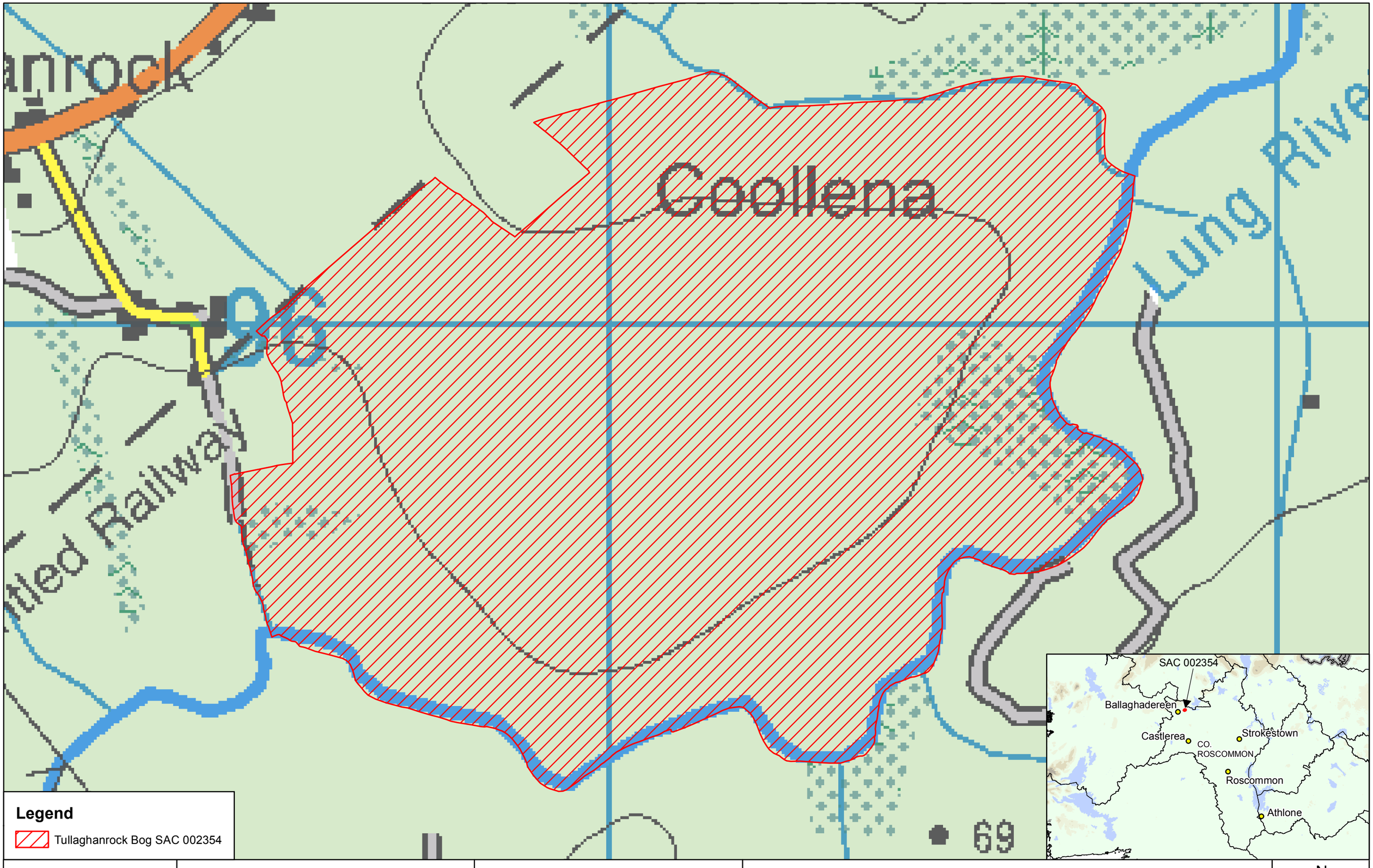
Attribute	Measure	Target	Notes

Conservation Objectives for : Tullaghanrock Bog SAC [002354]

7150	**Depressions on peat substrates of the Rhynchosporion**

Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Tullaghanrock Bog SAC

Attribute	Measure	Target	Notes



Legend

Tullaghanrock Bog SAC 002354

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Department of Arts, Heritage and the Gaeltacht

MAP 1: TULLAGHANROCK BOG SAC CONSERVATION OBJECTIVES SAC DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002354; version 3. Co. Roscommon

0 50 100 150 200 250 m

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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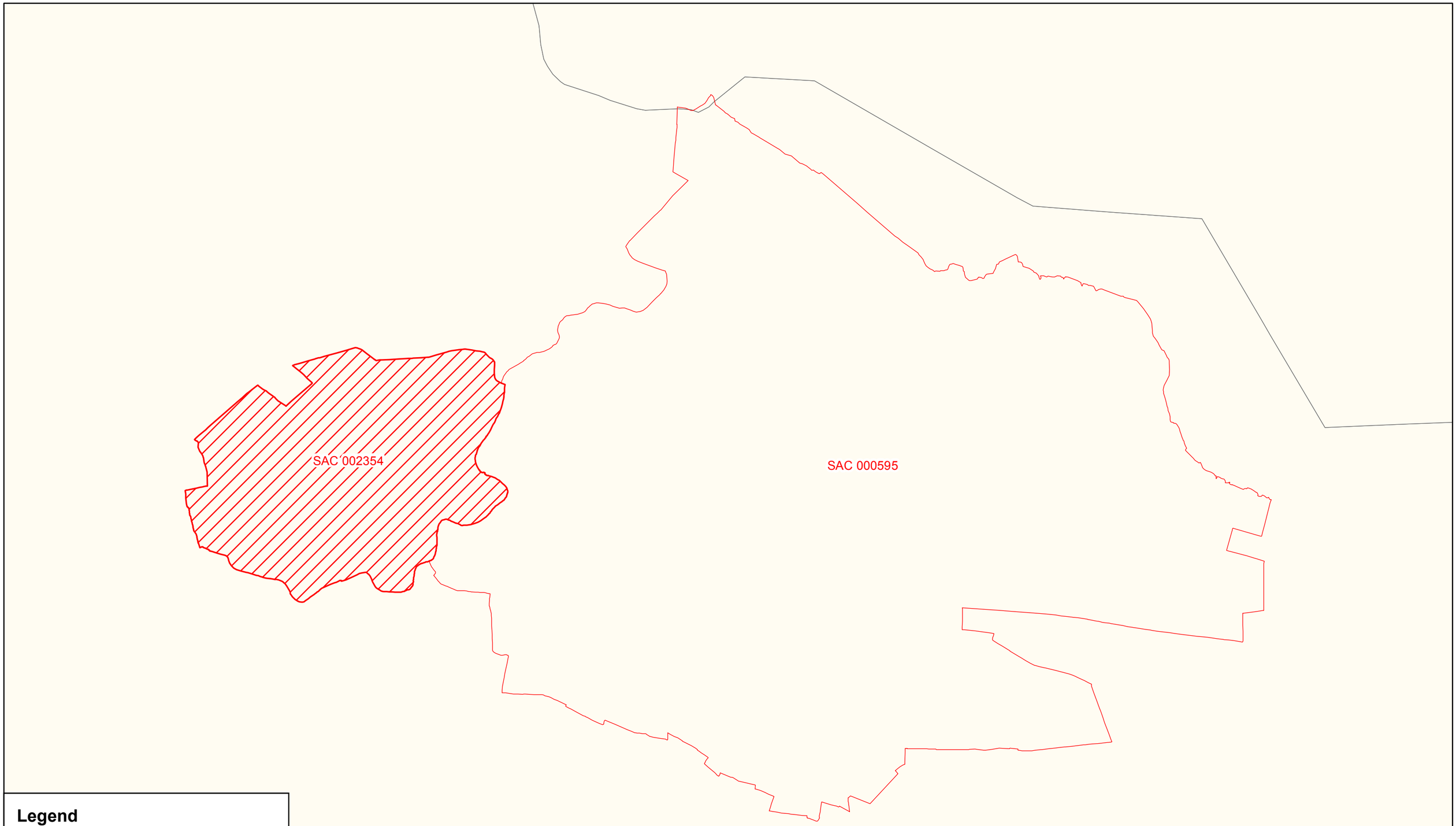
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

N

Map Version 1
Date: Dec 2015



Legend

- Tullaghanrock Bog SAC 002354
- Callow Bog SAC 000595
- OSi Discovery Series County Boundary

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MAP 2: TULLAGHANROCK BOG SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002354; version 3,
SAC 000595; version 3. Co. Roscommon

0 250 500 750 1,000 m

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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N

Map Version 1
Date: Dec 2015

Legend

- Tullaghanrock Bog SAC 002354
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

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Arts, Heritage and the Gaeltacht

MAP 3:
TULLAGHANROCK BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002354; version 3. Co. Roscommon

0 50 100 150 200 250 m

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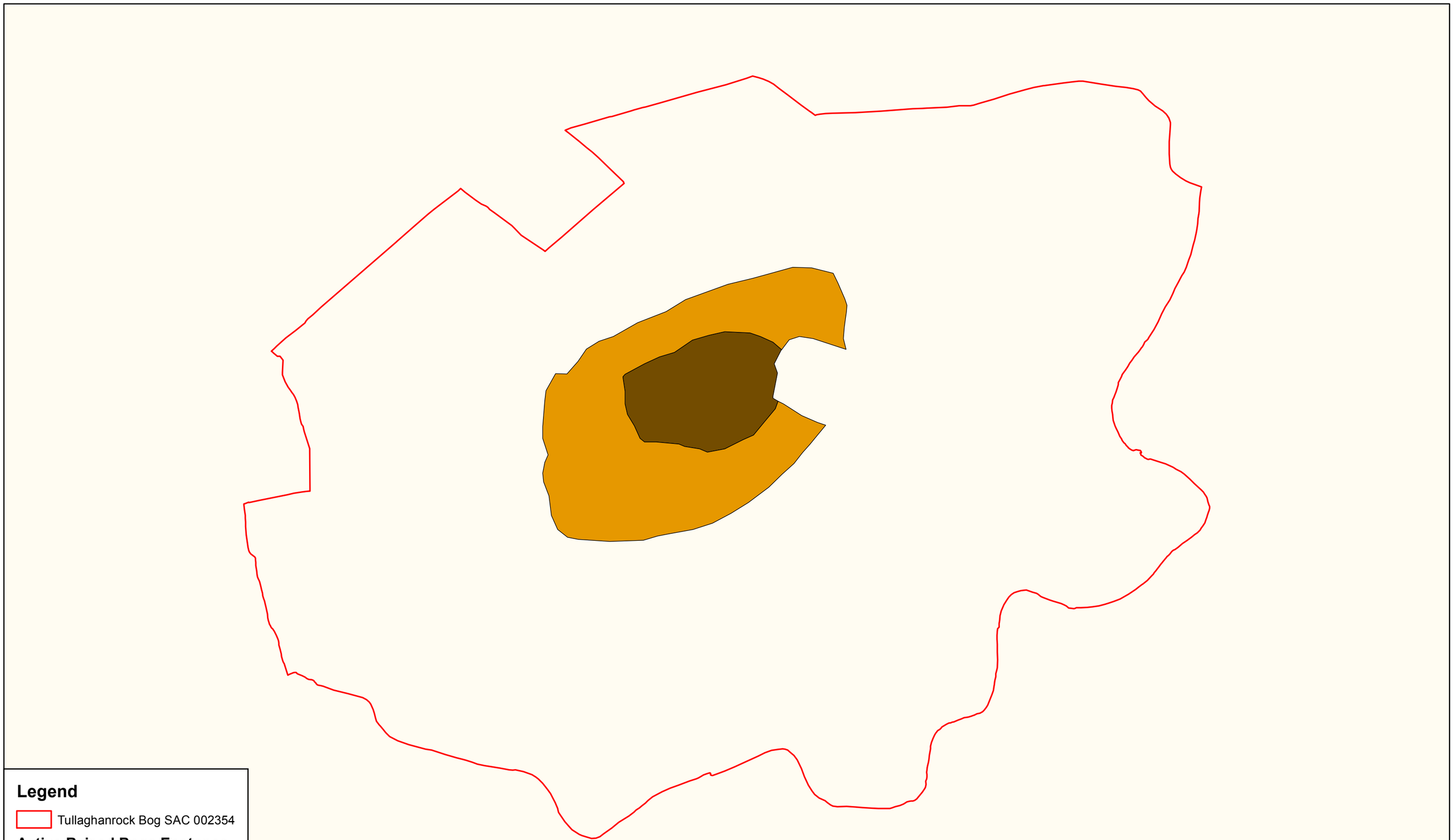
Map Version 1
Date: Dec 2015



Legend

Tullaghanrock Bog SAC 002354

Active Raised Bogs Ecotopes

Central ecotope

Sub-central ecotope

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Department of Arts, Heritage and the Gaeltacht

MAP 4:
TULLAGHANROCK BOG SAC
CONSERVATION OBJECTIVES
ACTIVE RAISED BOGS
ECOTOPES

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002354; version 3. Co. Roscommon

0 50 100 150 200 250 m

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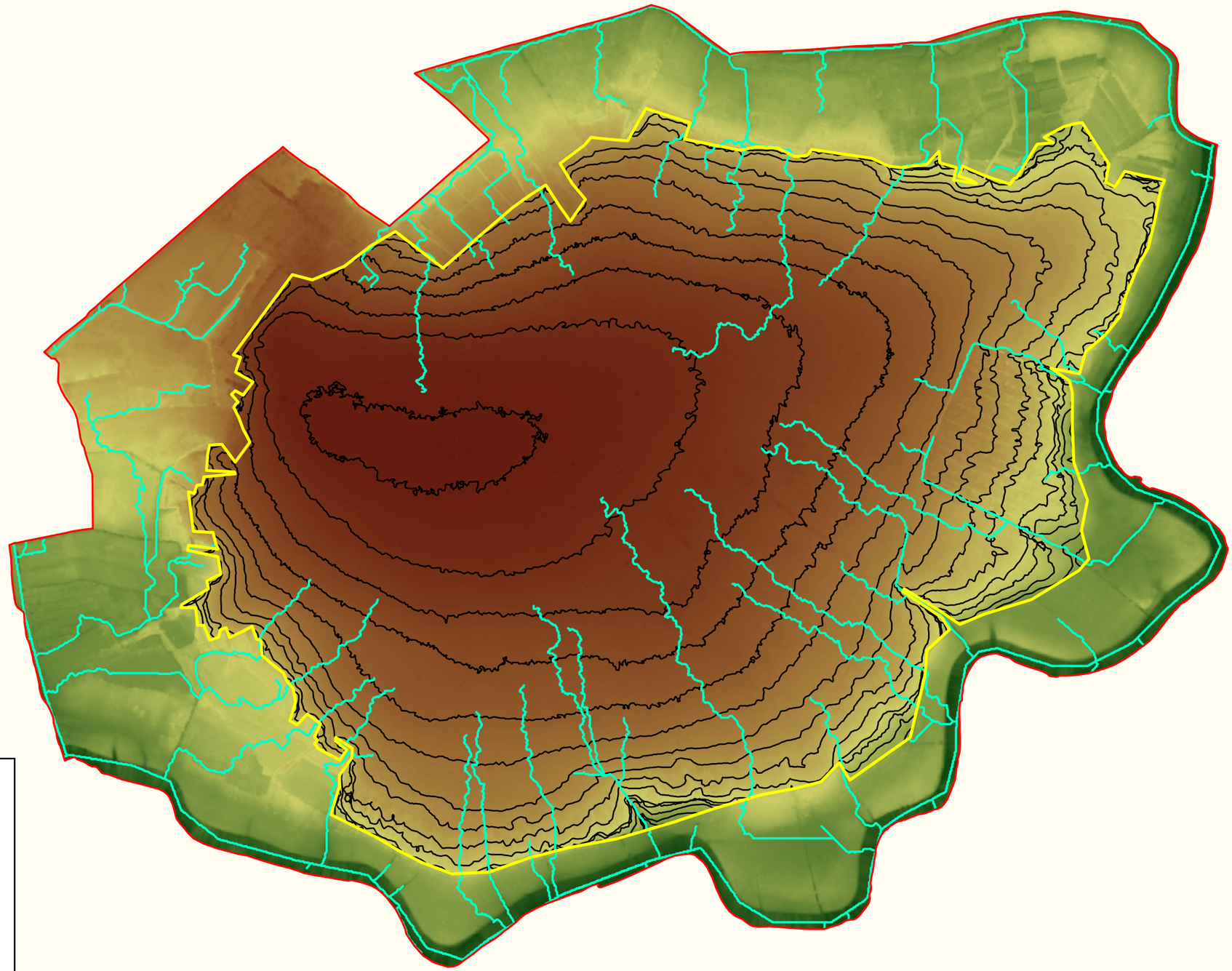

Legend

- Tullaghanrock Bog SAC 002354
- High Bog Boundary
- Drainage Patterns
- Contours

Elevation

73.80 m

62.82 m

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Department of Arts, Heritage and the Gaeltacht

MAP 5:
TULLAGHANROCK BOG SAC
CONSERVATION OBJECTIVES
RAISED BOG
DIGITAL ELEVATION MODEL
& DRAINAGE PATTERNS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

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Map Version 1
Date: Dec 2015

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

West Connacht Coast SAC 002998

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Citation:

NPWS (201p) Conservation Objectives: West Connacht Coast SAC 002998. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

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- 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***

002998	West Connacht Coast SAC
1349	Common Bottlenose Dolphin *Tursiops truncatus*

Please note that this SAC overlaps with the following SPAs: 004004, 004084, 004111, 004136, 004144, 004170 and adjoins the following SACs: 000278, 000328, 000330, 000470, 000472, 000484, 000495, 000507, 001228, 001309, 001311, 001501, 001529, 001932, 002031, 002074, 002243, 002265. See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2015
Title :	West Connacht Coast SAC (site code: 2998) Conservation objectives supporting document-marine species V1
Author :	NPWS
Series :	Conservation objectives supporting document

Spatial data sources

Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Low Water Mark (LWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1349 (map 3)

Conservation Objectives for : West Connacht Coast SAC [002998]

1349 Common Bottlenose Dolphin *Tursiops truncatus*

To maintain the favourable conservation condition of Common Bottlenose Dolphin in West Connacht Coast SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 3	See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	See marine supporting document for further details

SAC 002998
Belmullet
Ballina
Castlebar
Louisburgh
CO. MAYO
Clifden
Galway
CO. GALWAY
Erris Head
Eagle Island
Termoncarragh Lake
Belmullet
Inishglora
Inishkeeragh
An Geata Mór
Cross Lough
Trawmore Bay
Inishkea North
Tiraun Point
Elly Bay
Feorinyeeo Bay
Clogher
Inishkea South
Blacksod
Duvillaun More
Duvillaun Beg
Doohooma
Dumha Thuama
Gweesalia
Gaoth Saile
Tullaghan Bay
N59
Bellacorick
Blacksod Bay
Ridge Point
Saddle Head
Doona
Ballycroy
Baile Chruaich
Glassillan
Scardaun Lough
Bunaveela Lough
Owenduff R.
Deel R.
MAYO
Achill Head
Keem
Dooagh
Keel
An Caol
Keel L.
R319
Bunacurry
Annagh Island
Moyteoge Head
Achill Island
Acaill
Dooega
Dumha Éige
Knockmore
Achill Sound
Tonregee
Achill
Anaffrin L.
Lough Feeagh
Furnace Lough
Mallaranny
An Mhala Raithní
Dooega Head
Portnahally or Ashleam Bay
Cloghmore
An Chloich Mhóir
Corraun
Achillbeg Island
Bills Rocks
Newport
Newport Bay
CLEW BAY
Clare Island
Fawnglass
Old Head
Roonah Point
Kilsallagh
Murrisk
Westport Bay
Emlagh Point
Louisburgh
Cluain Cearbán
Aghagower
Liscarney
Lough Nacorra
Killeen
Killadoon
Bunowen River
Drummin
Carrowkennedy
Inishturk
Inis Toirc
Caher Island
Barnaboun Point
Inishbofin
Inis Bó Finne
Tonakeera Point
Rinvyle Point
Cramp Island
Inishshark
Inishbroon
Doo Lough
Tawnyard Lough
Fin Lough
Delphi
Erriff River
Killary Harbour
Lough Glenawough
Gowlaun
Tully Cross
Lough Fee
Leenaun
Killateeaun
Coill an tSiáin
Lough Nafooey
Cleggan
An Cloigeann
High Island
Aughrus Point
Claddaghduff
An Cladach Dubh
Moyard
Letterfrack
Leitir Fraic
Kylemore Lough
Joyces Country
Lough Inagh
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Clifden
An Clochán
Kill
An Chill
Lough Auna
Ballynahinch Lake
Derryclare Lough
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Oracle Island
Inishturk
Cruagh Island
Dinish Island
Duck Island
Ferry Pt.
Achill Sound
Annagh Island
Anaffrin L.
Owenduff R.
Deel R.
Lough Feeagh
Furnace Lough
Lough Nafooey
Joyces Country
Lough Inagh
Bealanabrack
Killary Harbour
Erriff River
Lough Glenawough
Bunowen River
Drumlough Pass
Lough Nacorra
Lough Auna
Lough Fee
Ballynahinch Lake
Derryclare Lough
Kylemore Lough
Tawnyard Lough
Fin Lough
Doo Lough
Scardaun Lough
Bunaveela Lough
Owenduff R.
Deel R.
Erriff River
Killary Harbour
Lough Glenawough
Lough Nafooey
Joyces Country
Lough Inagh
Bealanabrack
Lough Auna
Lough Fee
Ballynahinch Lake
Derryclare Lough
Kylemore Lough
Tawnyard Lough
Fin Lough
Doo Lough
Bunowen River
Drumlough Pass
Lough Nacorra
Furnace Lough
Lough Feeagh
Anaffrin L.
Achill Sound
Annagh Island
Keel L.
Ferry Pt.
Duck Island
Dinish Island
Cruagh Island
Oracle Island
Inishturk
Caher Island
Cramp Island
Inishbroon
Inishshark
Tullaghan Bay
Gaoth Saile
Cluain Cearbán
Aghagower
Liscarney
Carrowkennedy
Drummin
Killateeaun
Coill an tSiáin
Leenaun
Delphi
Gowlaun
Tully Cross
Letterfrack
Leitir Fraic
Moyard
Claddaghduff
An Cladach Dubh
Cleggan
An Cloigeann
Kill
An Chill
Clifden
An Clochán
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Killary Harbour
Newport
Baile Uí F
Westport
Cathair
Cloon
Finn
Fionn
Cloghbra
Dahybau
Doolec
Achill Island
Acaill
Achill Head
Saddle Head
Dooega Head
Portnahally or Ashleam Bay
Bills Rocks
Inishbofin
Inis Bó Finne
Clare Island
Inishturk
Inis Toirc
Caher Island
Cramp Island
Inishbroon
Inishshark
Tullaghan Bay
Gaoth Saile
Cluain Cearbán
Aghagower
Liscarney
Carrowkennedy
Drummin
Killateeaun
Coill an tSiáin
Leenaun
Delphi
Gowlaun
Tully Cross
Letterfrack
Leitir Fraic
Moyard
Claddaghduff
An Cladach Dubh
Cleggan
An Cloigeann
Kill
An Chill
Clifden
An Clochán
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Killary Harbour
Newport
Baile Uí F
Westport
Cathair
Cloon
Finn
Fionn
Cloghbra
Dahybau
Doolec
Legend
West Connacht Coast SAC 002998
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
MAP 1:
WEST CONNACHT COAST SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION
Map to be read in conjunction with the NPWS Conservation Objectives Document.
SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo
0 2.5 5 7.5 10 km
The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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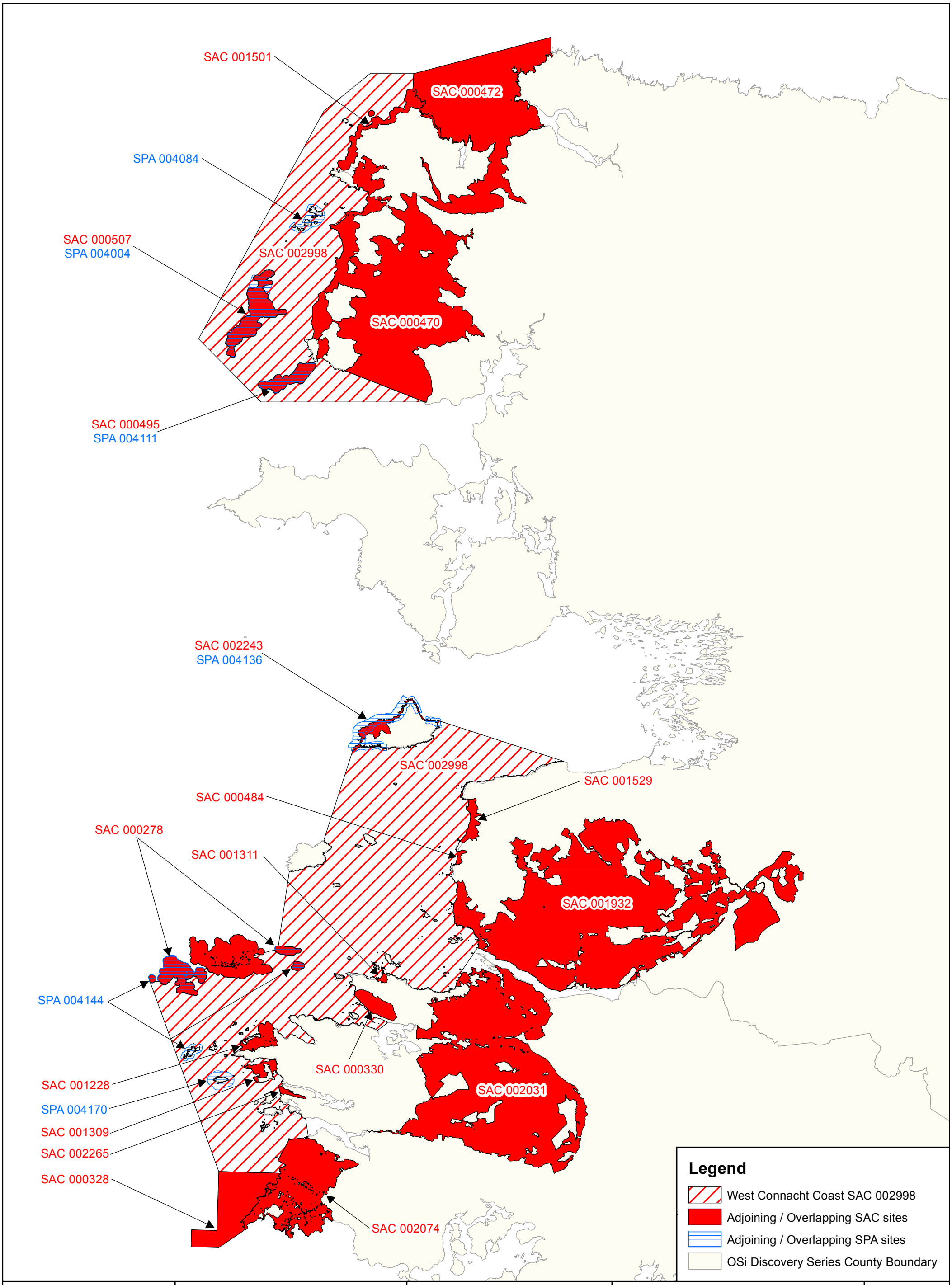
Map Version 1
Date: Oct 2015



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 2: WEST CONNACHT COAST SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo

0 2.5 5 7.5 10 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.
Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214.
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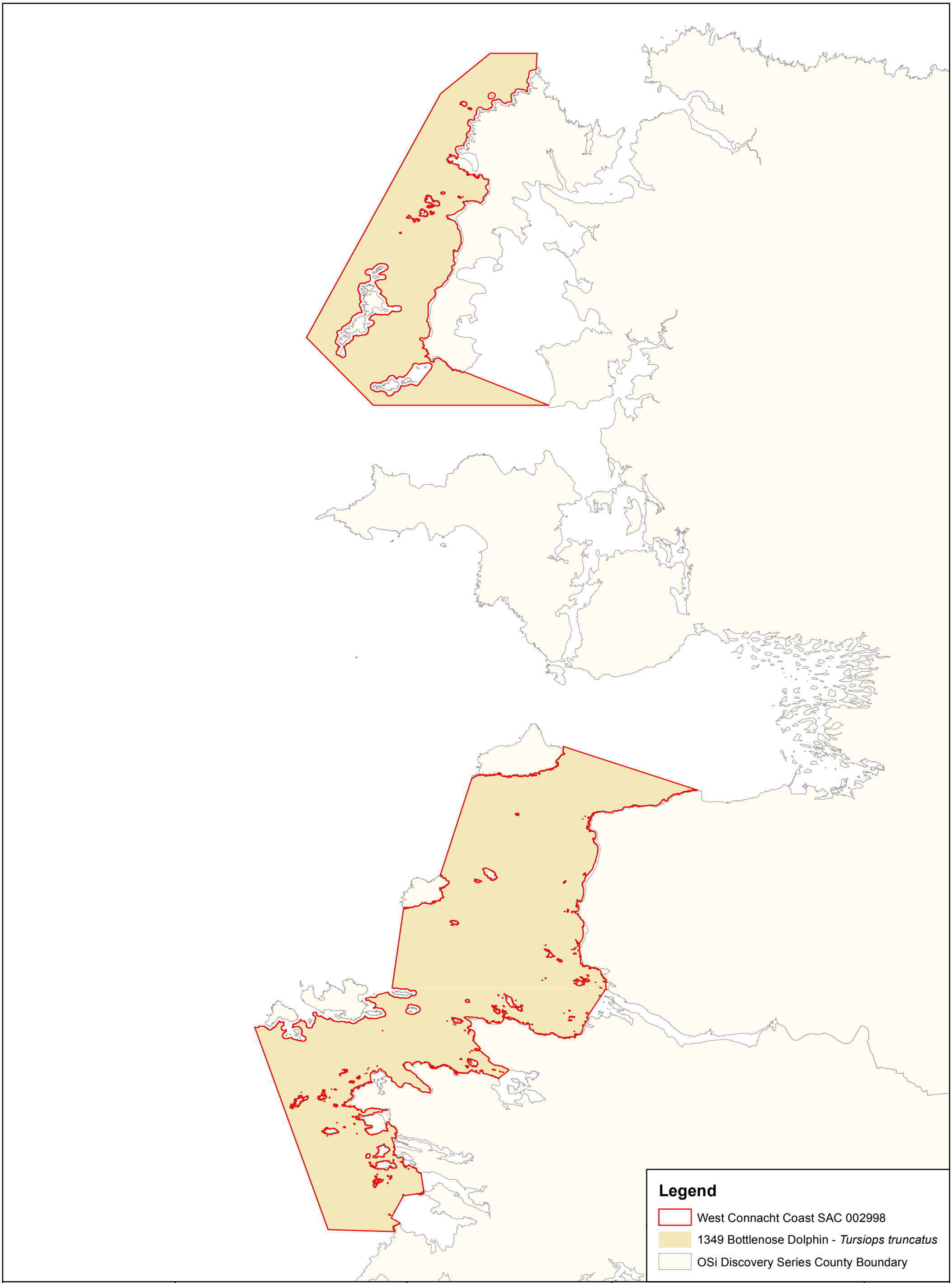
N

Map Version 1
Date: Oct 2015



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 3: WEST CONNACHT COAST SAC CONSERVATION OBJECTIVES BOTTLENOSE DOLPHIN

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.
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Map Version 1
Date: Oct 2015

Conservation objectives for Inishkea Islands SPA [004004]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A018	Shag	*Phalacrocorax aristotelis*
A045	Barnacle Goose	*Branta leucopsis*
A137	Ringed Plover	*Charadrius hiaticula*
A144	Sanderling	*Calidris alba*
A148	Purple Sandpiper	*Calidris maritima*
A169	Turnstone	*Arenaria interpres*
A182	Common Gull	*Larus canus*
A184	Herring Gull	*Larus argentatus*

A194	Arctic Tern	*Sterna paradisaea*
A195	Little Tern	*Sterna albifrons*
A466	Dunlin	*Calidris alpina schinzii*

Citation: *NPWS (2020) Conservation objectives for Inishkea Islands SPA [004004]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Killala Bay/Moy Estuary SPA 004036

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2013) Conservation Objectives: Killala Bay/Moy Estuary SPA 004036. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

004036	Killala Bay/Moy Estuary SPA
A137	Ringed Plover *Charadrius hiaticula*
A140	Golden Plover *Pluvialis apricaria*
A141	Grey Plover *Pluvialis squatarola*
A144	Sanderling *Calidris alba*
A149	Dunlin *Calidris alpina alpina*
A157	Bar-tailed Godwit *Limosa lapponica*
A160	Curlew *Numenius arquata*
A162	Redshank *Tringa totanus*
A999	Wetlands

Please note that this SPA overlaps with Killala Bay/Moy Estuary SAC (000458) and Lackan Saltmarsh and Kilcummin Head SAC (000516). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2013
Title :	Killala Bay/Moy Estuary SPA (site code 4036) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of conservation objectives supporting document

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A162 Redshank *Tringa totanus*

To maintain the favourable conservation condition of Redshank in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of area	No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Killala Bay/Moy Estuary SPA [004036]

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Killala Bay/Moy Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 3204 hectares, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 3204ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

Legend

SPA 004036

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 1: KILLALA BAY / MOY ESTUARY SPA CONSERVATION OBJECTIVES SPA DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SPA 004036
CO. MAYO; version 1.02
CO. SLIGO; version 1.02

0 0.5 1 1.5 2 km

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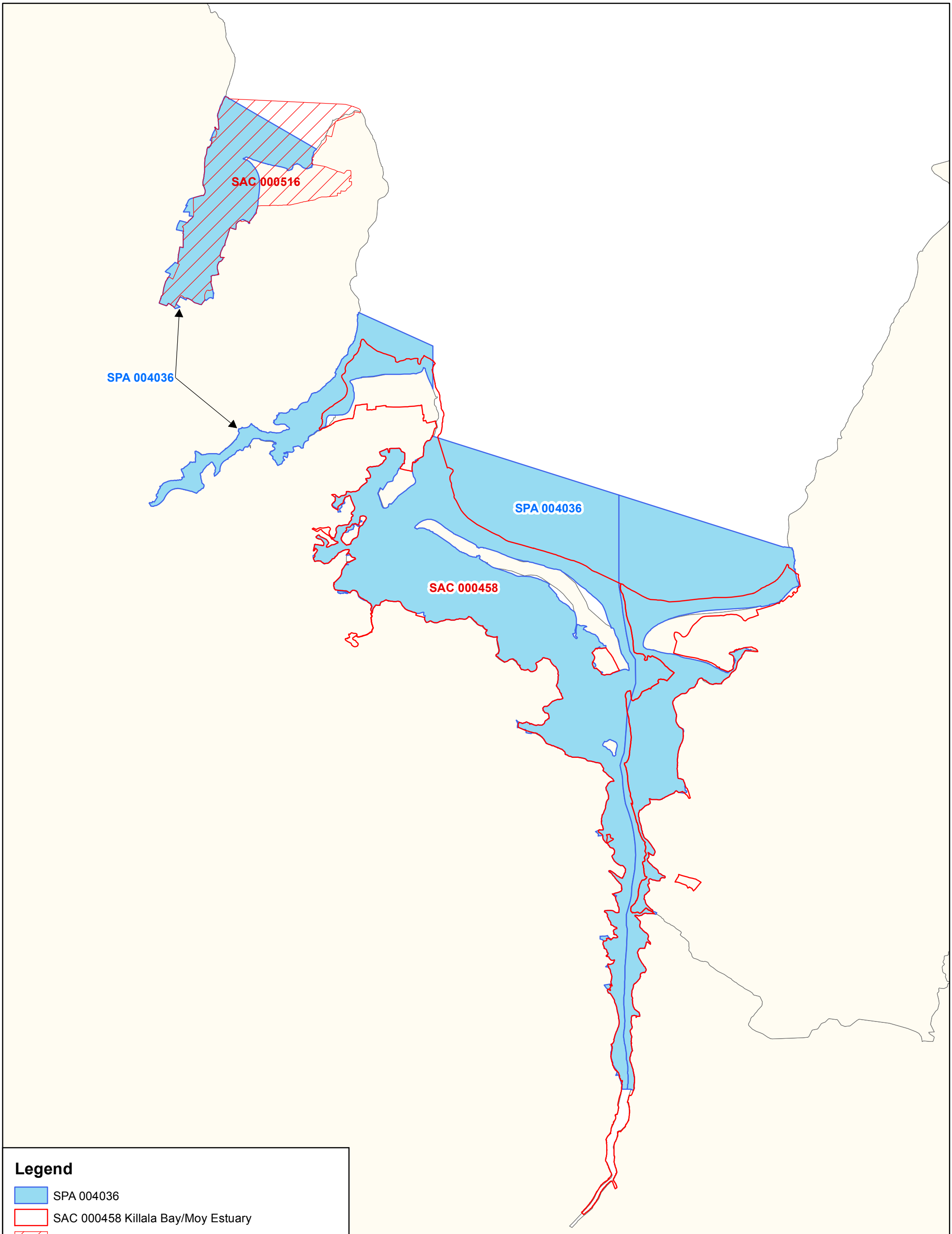
Map Version 1
Date: Feb 2013



Legend

- SPA 004036
- SAC 000458 Killala Bay/Moy Estuary
- SAC 000516 Lackan Saltmarsh And Kilcummin Head
- OSi Discovery Series County Boundaries

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
KILLALA BAY / MOY ESTUARY SPA CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004036 CO. MAYO; version 1.02, CO. SLIGO; version 1.02
SAC 000458 CO. MAYO; version 1.01, CO. SLIGO; version 1.01
SAC 000516 CO. MAYO; version 1.01

0 1 2 3 km

The mapped boundaries are of an indicative and general nature only.
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Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)

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Map Version 1
Date: Feb 2013

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Blacksod Bay/Broad Haven SPA 004037

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

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Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201п) Conservation Objectives: Blacksod Bay/Broad Haven SPA 004037. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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- 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:

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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.
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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***

004037	Blacksod Bay/Broad Haven SPA
A003	Great Northern Diver *Gavia immer*
A046	Brent Goose *Branta bernicla hrota*
A065	Common Scoter *Melanitta nigra*
A069	Red-breasted Merganser *Mergus serrator*
A137	Ringed Plover *Charadrius hiaticula*
A144	Sanderling *Calidris alba*
A149	Dunlin *Calidris alpina alpina*
A157	Bar-tailed Godwit *Limosa lapponica*
A160	Curlew *Numenius arquata*
A191	Sandwich Tern *Sterna sandvicensis*
A466	Dunlin *Calidris alpina schinzii*
A999	Wetlands

Please note that this SPA overlaps with Mullet/Blacksod Bay Complex SAC (000470), Broadhaven Bay SAC (000472) and Glenamoy Bog Complex SAC (000500). It adjoins Mullet Peninsula SPA (004227). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2010
Title :	Resurvey of breeding wader populations of machair and associated wet grasslands in north-west Ireland
Author :	Suddaby, D.; Nelson, T.; Veldman, J.
Series :	Irish Wildlife Manual No. 44
Year :	2014
Title :	Blacksod Bay/Broad Haven SPA (site code: 4037) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1984
Title :	The 1984 all Ireland tern survey
Author :	Whilde, A.
Series :	Irish Birds 3: 1-32
Year :	1985
Title :	The birds of the Western Palaearctic- Volume IV
Author :	Cramp, S.
Series :	Oxford University Press, Oxford
Year :	1985
Title :	Breeding waders of sand dune machair in north-west Ireland
Author :	Nairn, R.G.W.; Sheppard, J.R.
Series :	Irish Birds 3: 53-70
Year :	1995
Title :	Seabird monitoring handbook for Britain and Ireland: a compilation of methods for survey and monitoring of breeding seabirds
Author :	Walsh, P.; Halley, D.J.; Harris, M.P.; del Nevo, A.; Sim, I.M.W.; Tasker, M.L.
Series :	JNCC, Peterborough
Year :	1997
Title :	The status and distribution of breeding sandwich, roseate, common, arctic and little terns in Ireland in 1995
Author :	Hannon, C.; Berrow, S.D.; Newton, S.F.
Series :	Irish Birds, 6: 1-22
Year :	1998
Title :	Breeding waders of machair systems in Ireland in 1996
Author :	Madden, B.; Cooney, T.; O'Donoghue, A.; Norriss, D.W.; Merne, O.J.
Series :	Irish Birds 6: 177-191
Year :	2004
Title :	Seabird Populations of Britain and Ireland
Author :	Mitchell, P.I.; Newton, S.F.; Ratcliffe, N.; Dunn, T.E.
Series :	Poyser, London

Year :	2006
Title :	Breeding parameters of selected wader species at machair sites and adjacent areas associated with the Mullet/Blacksod Bay and offshore islands complex, NW Mayo, 2006
Author :	Thompson, L.J.; Suddaby, D.; Newton, S.
Series :	BirdWatch Ireland Conservation Report No. 06/6
Year :	2014
Title :	Seabird Monitoring Programme (SMP) Database
Author :	JNCC
Series :	http://jncc.defra.gov.uk/smp/Default.aspx
Year :	2014
Title :	BirdLife International Seabird Ecology and Foraging Range Database
Author :	BirdLife International
Series :	http://seabird.wikispaces.com

Spatial data sources

Year :	2014
Title :	NPWS SPA boundary data
GIS Operations :	SPA boundary polygons divided into two classifications (wetlands, coastal grasslands) based on line identified by expert judgement. Expert opinion used as necessary to resolve any issues arising
Used For :	Wetlands (map 3)

A003 Great Northern Diver *Gavia immer*

To maintain the favourable conservation condition of Great Northern Diver in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A065 Common Scoter *Melanitta nigra*

To maintain the favourable conservation condition of Common Scoter in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by common scoter, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting ocument

A069 Red-breasted Merganser *Mergus serrator*

To maintain the favourable conservation condition of Red-breasted Merganser in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A191 Sandwich Tern *Sterna sandvicensis*

To maintain the favourable conservation condition of Sandwich Tern in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) recorded 81 breeding pairs on Inishderry as part of the 1995 All-Ireland Tern Survey. Recent data is lacking for this colony
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2014) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985). Wide fluctuations between years in both breeding numbers and colony locations are known to occur for this species (Mitchell et al., 2004). However, a sandwich tern colony has been recorded on Inishderry in the 1990s and on several occasions in the 1980s (see Hannon et al., 1997 and Whilde, 1985)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Mostly energy-rich fish, some crustaceans and occasionally insects and rag worms. Key habitats: sandwich tern forage in/over shallow marine waters such as bays, inlets and outflows, gullies, shoals, inshore waters, reefs, and sandbanks; also more open waters nearshore and offshore, including open sea. Foraging range: max. 70km, mean max. 42.3km, mean 14.7km (BirdLife International Seabird Database (Birdlife International, 2014))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Foraging range: Max 70km, mean max 42.3km, mean 14.7km (Birdlife International Seabird Database (Birdlife International, 2014))
Disturbance at the breeding stage	Level of impact	Human activities should occur at levels that do not adversely affect the breeding sandwich tern population	Colonies are typically situated on low-lying offshore islands or islets, in bays or brackish lagoons, on spits or remote mainland dunes (Cramp, 1985). The sandwich tern colony on Inishderry has been recorded in the 1990s and on several occasions in the 1980s (see Hannon et al., 1997 and Whilde, 1984)

A466 Dunlin *Calidris alpina schinzii*

To maintain the favourable conservation condition of Dunlin in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets

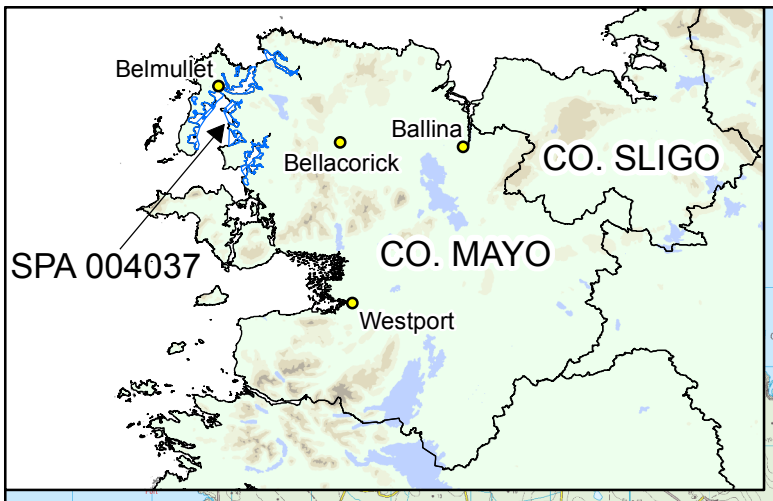
Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied territories (AOTs)	Number	Stable or increasing, subject to natural variation	Measure based on standard survey methods (see Suddaby et al. (2010))
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard survey methods (see Thompson et al. (2007))
Distribution	Number; location	Stable or increasing, subject to natural variation	The distribution of breeding dunlin has contracted since initial surveys were undertaken (Nairn and Shephard, 1985; Madden et al., 1998; Suddaby et al., 2010)
Availability of suitable habitat: area and distribution	Hectares; location	Stable or increasing, subject to natural processes	Ideally, suitable habitat should be at, or close to, existing breeding pairs. Factors that are negatively affecting potentially suitable habitat include fencing, drainage, inappropriate grazing regimes, fertilisation and overgrazing by rabbits (*Oryctolagus cuniculus*)
Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding dunlin population	Unsuitable livestock grazing regimes can result in nest trampling and destruction of suitable nesting sites. Agri-environment schemes in Ireland specify less than 1.0 livestock units per hectare during the breeding wader nesting period

Conservation Objectives for : Blacksod Bay/Broad Haven SPA [004037]

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in Blacksod Bay/Broad Haven SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 8,539 hectares, other than that occurring from natural patterns of variation. See map 3	The wetland habitat area was estimated as 8,539ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document



BROAD HAVEN
Cuan an Inbhir

Blacksod Bay
Cuan an Fhoid Duibh

Carrowmore Lake
Loch na Ceathrú Móire

Tullaghan Bay

Elly Bay

Termoncarragh Lake

Ross Port
Tód Duimhach

Belmullet
Béal an Mhuirthead

Bangor
Baingear

Kanfinalta

Kinrovar

Ridge Point

Slievemore
An Sliabh Mór

Doogort
Dumha Goirt

Derrinumera

Derreens Is.

Muingerroon Is.

Gortmore Is.

Inishderry

Inishcoe

Inishgort

Inishkeeragh

Inishkeeragh Lighthouse

Inishkeeragh Rocks

Inishkeeragh Reef

Inishkeeragh Pier

Inishkeeragh Slip

Inishkeeragh Boathouse

Inishkeeragh Cottage

Inishkeeragh Cottage Ruins

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SAC 000472

SAC 000500

SPA 004227

SPA 004037

SAC 000470

Legend

- Blacksod Bay / Broad Haven SPA 004037
- Mullet Peninsula SPA 004227
- Mullet/Blacksod Bay Complex SAC 000470
- Broadhaven Bay SAC 000472
- Glenamoy Bog Complex SAC 000500
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
BLACKSOD BAY / BROAD HAVEN SPA CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004037; version 2.02. SPA 004227; version 1.02
SAC 000470; version 3.01, SAC 000472; version 3.01,
SAC 000500; version 3.01, CO. MAYO

0 2.5 5 7.5 10 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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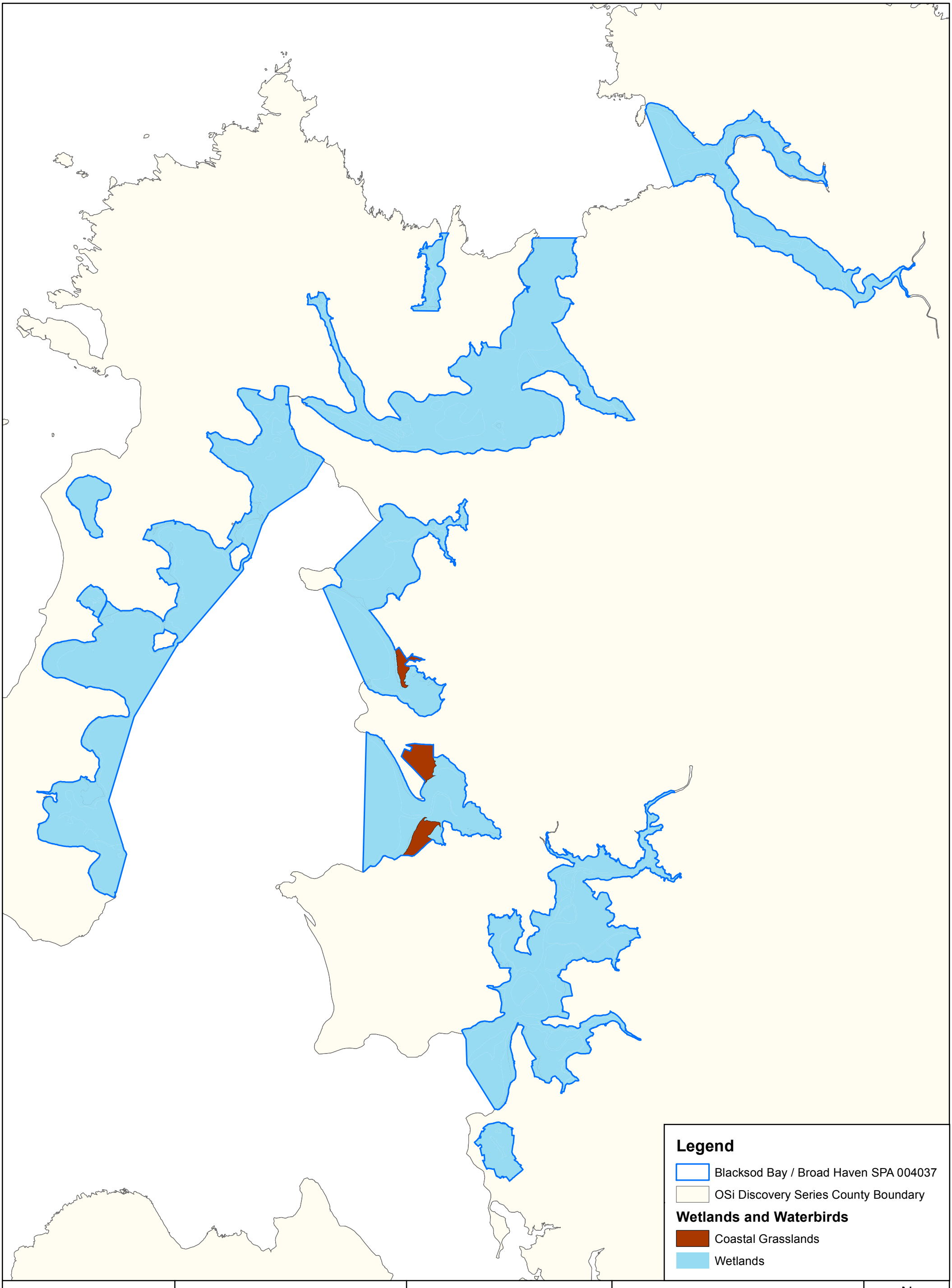
Map Version 1
Date: Dec 2014



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Department of Arts, Heritage and the Gaeltacht

MAP 3:
BLACKSOD BAY / BROAD HAVEN SPA
CONSERVATION OBJECTIVES
WETLANDS AND WATERBIRDS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004037; version 2.02. CO. MAYO

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar
comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214.
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Map Version 1
Date: Dec 2014

Conservation objectives for Lough Corrib SPA [004042]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A051	Gadwall	*Anas strepera*
A056	Shoveler	*Anas clypeata*
A059	Pochard	*Aythya ferina*
A061	Tufted Duck	*Aythya fuligula*
A065	Common Scoter	*Melanitta nigra*
A082	Hen Harrier	*Circus cyaneus*
A125	Coot	*Fulica atra*
A140	Golden Plover	*Pluvialis apricaria*

A179	Black-headed Gull	*Chroicocephalus ridibundus*
A182	Common Gull	*Larus canus*
A193	Common Tern	*Sterna hirundo*
A194	Arctic Tern	*Sterna paradisaea*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Lough Corrib SPA [004042]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Gara SPA [004048]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	*Cygnus cygnus*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

Citation: *NPWS (2020) Conservation objectives for Lough Gara SPA [004048]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Carra SPA [004051]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	**Common Name**	**Scientific Name**
A182	Common Gull	*Larus canus*

Citation: *NPWS (2020) Conservation objectives for Lough Carra SPA [004051]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Carrowmore Lake SPA [004052]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A191	Sandwich Tern	*Sterna sandvicensis*

Citation: *NPWS (2020) Conservation objectives for Carrowmore Lake SPA [004052]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Mask SPA [004062]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A061	Tufted Duck	*Aythya fuligula*
A179	Black-headed Gull	*Chroicocephalus ridibundus*
A182	Common Gull	*Larus canus*
A183	Lesser Black-backed Gull	*Larus fuscus*
A193	Common Tern	*Sterna hirundo*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Mask SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Lough Mask SPA [004062]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Stags of Broad Haven SPA [004072]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A015	Leach's Storm-petrel	*Oceanodroma leucorhoa*

Citation: *NPWS (2020) Conservation objectives for Stags of Broad Haven SPA [004072]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Illanmaster SPA [004074]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*

Citation: *NPWS (2020) Conservation objectives for Illanmaster SPA [004074]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Inishglora and Inishkeeragh SPA [004084]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A017	Cormorant	*Phalacrocorax carbo*
A018	Shag	*Phalacrocorax aristotelis*
A045	Barnacle Goose	*Branta leucopsis*
A183	Lesser Black-backed Gull	*Larus fuscus*
A184	Herring Gull	*Larus argentatus*
A194	Arctic Tern	*Sterna paradisaea*

Citation: *NPWS (2020) Conservation objectives for Inishglora and Inishkeeragh SPA [004084]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Termoncarragh Lake and Annagh Machair SPA [004093]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	*Cygnus cygnus*
A045	Barnacle Goose	*Branta leucopsis*
A122	Corncrake	*Crex crex*
A142	Lapwing	*Vanellus vanellus*
A346	Chough	*Pyrrhocorax pyrrhocorax*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*
A466	Dunlin	*Calidris alpina schinzii*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Termoncarragh Lake and Annagh Machair SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Termoncarragh Lake and Annagh Machair SPA [004093]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Owenduff/Nephin Complex SPA [004098]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A098	Merlin	*Falco columbarius*
A140	Golden Plover	*Pluvialis apricaria*

Citation: *NPWS (2020) Conservation objectives for Owenduff/Nephin Complex SPA [004098]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Bellanagare Bog SPA [004105]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

Citation: *NPWS (2020) Conservation objectives for Bellanagare Bog SPA [004105]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Duvillaun Islands SPA [004111]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A014	Storm Petrel	*Hydrobates pelagicus*
A045	Barnacle Goose	*Branta leucopsis*

Citation: *NPWS (2020) Conservation objectives for Duvillaun Islands SPA [004111]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Clare Island SPA [004136]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A018	Shag	*Phalacrocorax aristotelis*
A182	Common Gull	*Larus canus*
A188	Kittiwake	*Rissa tridactyla*
A199	Guillemot	*Uria aalge*
A200	Razorbill	*Alca torda*
A346	Chough	*Pyrrhocorax pyrrhocorax*

Citation: *NPWS (2020) Conservation objectives for Clare Island SPA [004136]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A045	Barnacle Goose	*Branta leucopsis*
A194	Arctic Tern	*Sterna paradisaea*

Citation: *NPWS (2020) Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Bills Rocks SPA [004177]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A204	Puffin	*Fratercula arctica*

Citation: *NPWS (2020) Conservation objectives for Bills Rocks SPA [004177]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Connemara Bog Complex SPA [004181]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A017	Cormorant	*Phalacrocorax carbo*
A098	Merlin	*Falco columbarius*
A140	Golden Plover	*Pluvialis apricaria*
A182	Common Gull	*Larus canus*

Citation: *NPWS (2020) Conservation objectives for Connemara Bog Complex SPA [004181]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

West Connacht Coast SAC 002998

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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Citation:

NPWS (201p) Conservation Objectives: West Connacht Coast SAC 002998. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

002998	West Connacht Coast SAC
1349	Common Bottlenose Dolphin *Tursiops truncatus*

Please note that this SAC overlaps with the following SPAs: 004004, 004084, 004111, 004136, 004144, 004170 and adjoins the following SACs: 000278, 000328, 000330, 000470, 000472, 000484, 000495, 000507, 001228, 001309, 001311, 001501, 001529, 001932, 002031, 002074, 002243, 002265. See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2015
Title :	West Connacht Coast SAC (site code: 2998) Conservation objectives supporting document-marine species V1
Author :	NPWS
Series :	Conservation objectives supporting document

Spatial data sources

Year :	2005
Title :	OSi Discovery series vector data
GIS Operations :	Low Water Mark (LWM) polyline feature class converted into polygon feature class; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1349 (map 3)

Conservation Objectives for : West Connacht Coast SAC [002998]

1349 Common Bottlenose Dolphin *Tursiops truncatus*

To maintain the favourable conservation condition of Common Bottlenose Dolphin in West Connacht Coast SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use. See map 3	See marine supporting document for further details
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the bottlenose dolphin population at the site	See marine supporting document for further details

SAC 002998
Belmullet
Ballina
Castlebar
Louisburgh
CO. MAYO
Clifden
Galway
CO. GALWAY
Erris Head
Eagle Island
Termoncarragh Lake
Belmullet
Inishglora
Inishkeeragh
An Geata Mór
Cross Lough
Trawmore Bay
Inishkea North
Tiraun Point
Elly Bay
Feorinyeeo Bay
Clogher
Inishkea South
Blacksod
Duvillaun More
Duvillaun Beg
Doohooma
Dumha Thuama
Gweesalia
Gaoth Saile
Tullaghan Bay
N59
Bellacorick
Blacksod Bay
Ridge Point
Saddle Head
Doona
Ballycroy
Baile Chruaich
Glassillan
Scardaun Lough
Bunaveela Lough
Owenduff R.
Deel R.
MAYO
Achill Head
Keem
Dooagh
Keel
An Caol
Keel L.
R319
Bunacurry
Annagh Island
Moyteoge Head
Achill Island
Acaill
Dooega
Dumha Éige
Knockmore
Achill Sound
Tonregee
Achill
Anaffrin L.
Lough Feeagh
Furnace Lough
Mallaranny
An Mhala Raithní
Dooega Head
Portnahally or Ashleam Bay
Cloghmore
An Chloich Mhóir
Corraun
Achillbeg Island
Bills Rocks
Newport
Newport Bay
CLEW BAY
Clare Island
Fawnglass
Old Head
Roonah Point
Kilsallagh
Murrisk
Westport Bay
Emlagh Point
Louisburgh
Cluain Cearbán
Aghagower
Liscarney
Lough Nacorra
Killeen
Killadoon
Bunowen River
Drummin
Carrowkennedy
Inishturk
Inis Toirc
Caher Island
Barnaboun Point
Inishbofin
Inis Bó Finne
Tonakeera Point
Rinvyle Point
Cramp Island
Inishshark
Inishbroon
Doo Lough
Tawnyard Lough
Fin Lough
Delphi
Erriff River
Killary Harbour
Lough Glenawough
Gowlaun
Tully Cross
Lough Fee
Leenaun
Killateeaun
Coill an tSiáin
Lough Nafooey
Cleggan
An Cloigeann
High Island
Aughrus Point
Claddaghduff
An Cladach Dubh
Moyard
Letterfrack
Leitir Fraic
Kylemore Lough
Joyces Country
Lough Inagh
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Clifden
An Clochán
Kill
An Chill
Lough Auna
Ballynahinch Lake
Derryclare Lough
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Oracle Island
Inishturk
Cruagh Island
Dinish Island
Duck Island
Ferry Pt.
Achill Sound
Annagh Island
Anaffrin L.
Owenduff R.
Deel R.
Lough Feeagh
Furnace Lough
Lough Nafooey
Joyces Country
Lough Inagh
Bealanabrack
Killary Harbour
Erriff River
Lough Glenawough
Bunowen River
Drumlough Pass
Lough Nacorra
Lough Auna
Lough Fee
Ballynahinch Lake
Derryclare Lough
Kylemore Lough
Tawnyard Lough
Fin Lough
Doo Lough
Scardaun Lough
Bunaveela Lough
Owenduff R.
Deel R.
Erriff River
Killary Harbour
Lough Glenawough
Lough Nafooey
Joyces Country
Lough Inagh
Bealanabrack
Lough Auna
Lough Fee
Ballynahinch Lake
Derryclare Lough
Kylemore Lough
Tawnyard Lough
Fin Lough
Doo Lough
Bunowen River
Drumlough Pass
Lough Nacorra
Furnace Lough
Lough Feeagh
Anaffrin L.
Achill Sound
Annagh Island
Keel L.
Ferry Pt.
Duck Island
Dinish Island
Cruagh Island
Oracle Island
Inishturk
Caher Island
Cramp Island
Inishbroon
Inishshark
Tullaghan Bay
Gaoth Saile
Cluain Cearbán
Aghagower
Liscarney
Carrowkennedy
Drummin
Killateeaun
Coill an tSiáin
Leenaun
Delphi
Gowlaun
Tully Cross
Letterfrack
Leitir Fraic
Moyard
Claddaghduff
An Cladach Dubh
Cleggan
An Cloigeann
Kill
An Chill
Clifden
An Clochán
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Killary Harbour
Newport
Baile Uí F
Westport
Cathair
Cloon
Finn
Fionn
Cloghbra
Dahybau
Doolec
Achill Island
Acaill
Achill Head
Saddle Head
Dooega Head
Portnahally or Ashleam Bay
Bills Rocks
Inishbofin
Inis Bó Finne
Clare Island
Inishturk
Inis Toirc
Caher Island
Cramp Island
Inishbroon
Inishshark
Tullaghan Bay
Gaoth Saile
Cluain Cearbán
Aghagower
Liscarney
Carrowkennedy
Drummin
Killateeaun
Coill an tSiáin
Leenaun
Delphi
Gowlaun
Tully Cross
Letterfrack
Leitir Fraic
Moyard
Claddaghduff
An Cladach Dubh
Cleggan
An Cloigeann
Kill
An Chill
Clifden
An Clochán
Maum
An Mám
Derryvoreada
Doire Bhó Riada
Recess
Ballyconneely
Baile Conaola
Mannin Bay
Clifden Bay
Cleggan Bay
Ballynakill Harbour
Killary Harbour
Newport
Baile Uí F
Westport
Cathair
Cloon
Finn
Fionn
Cloghbra
Dahybau
Doolec
Legend
West Connacht Coast SAC 002998
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
MAP 1:
WEST CONNACHT COAST SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION
Map to be read in conjunction with the NPWS Conservation Objectives Document.
SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo
0 2.5 5 7.5 10 km
The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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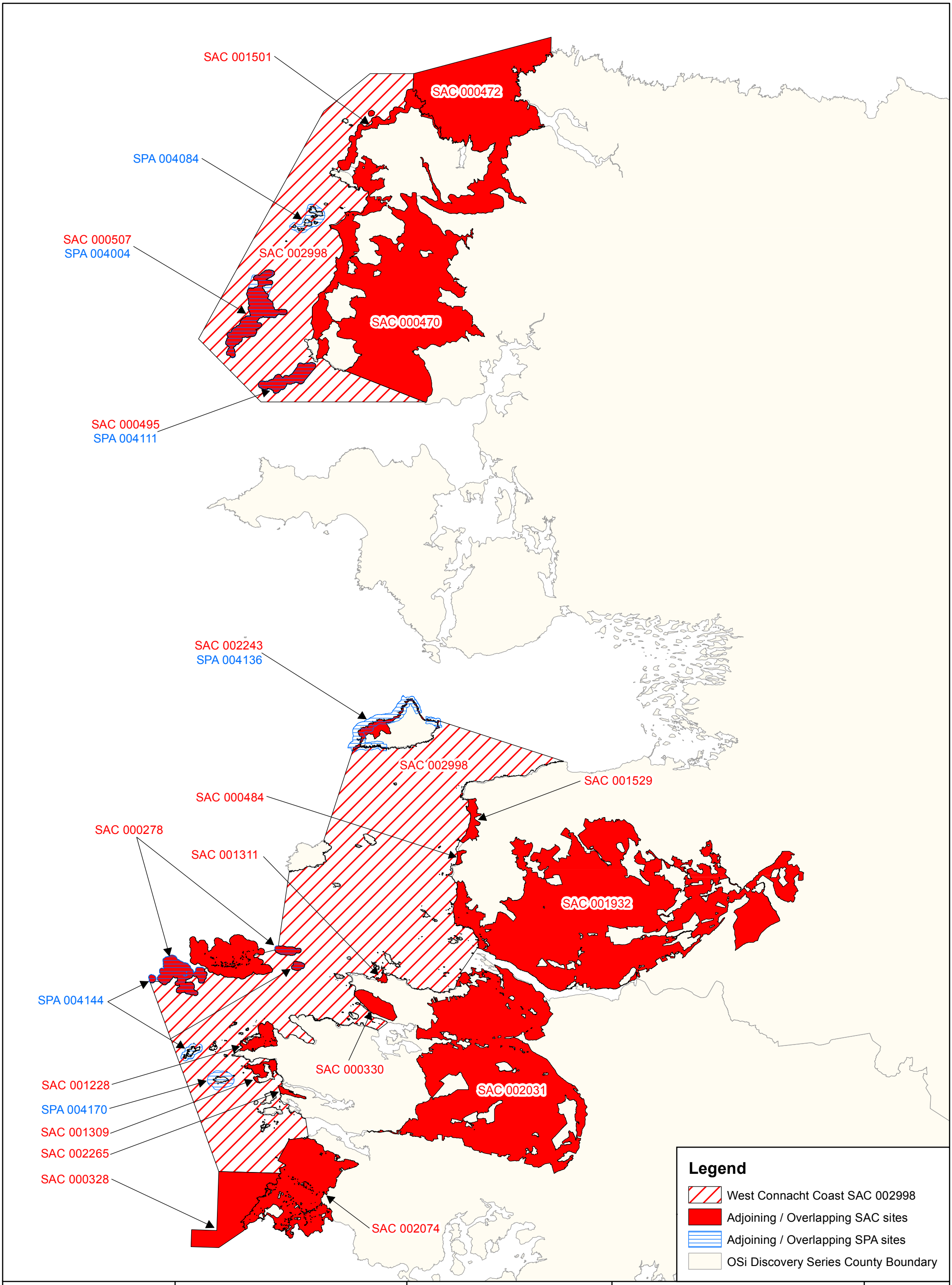
N
Map Version 1
Date: Oct 2015



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 2: WEST CONNACHT COAST SAC CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo

0 2.5 5 7.5 10 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.
Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214.
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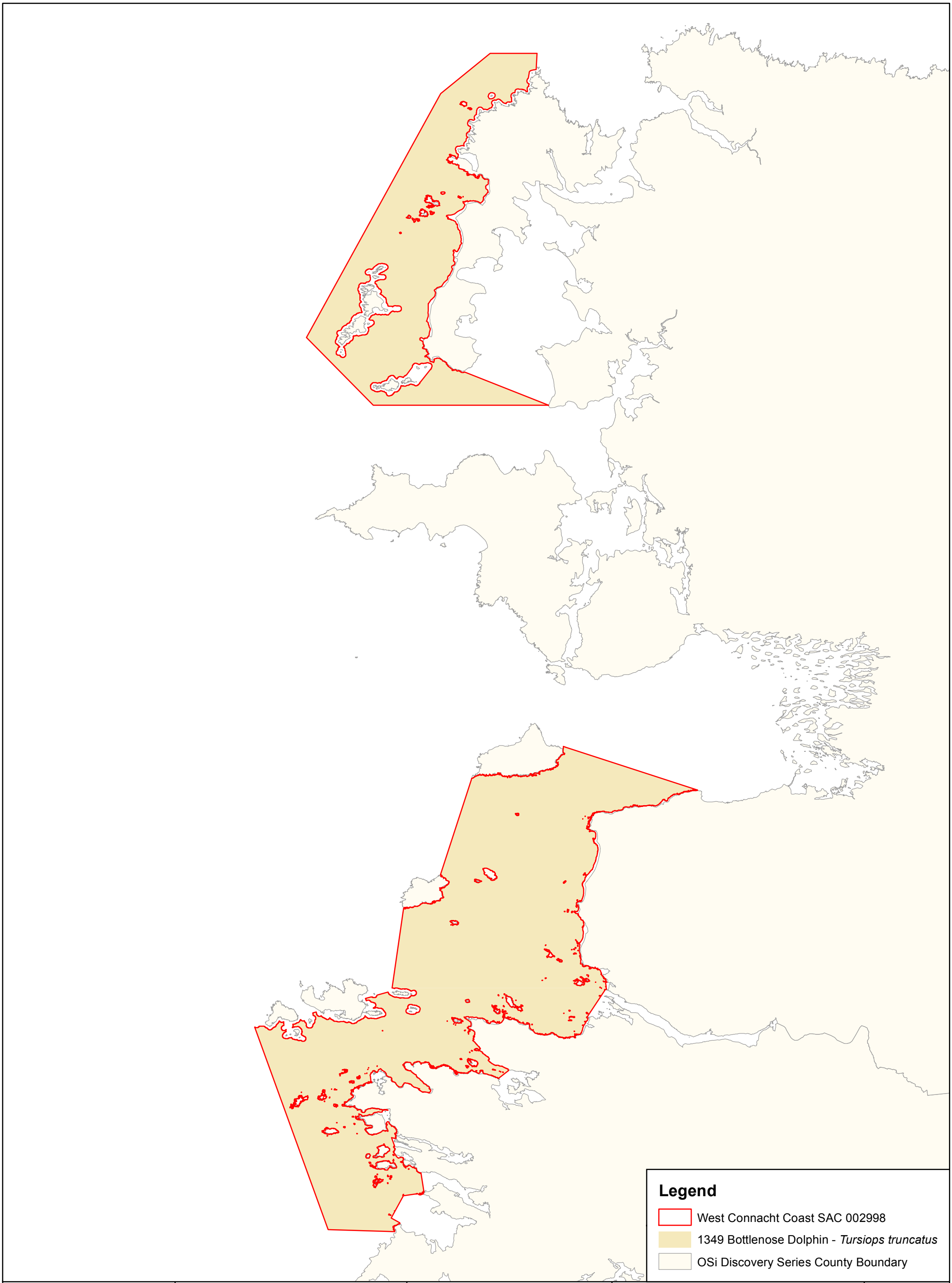
N

Map Version 1
Date: Oct 2015



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 3: WEST CONNACHT COAST SAC CONSERVATION OBJECTIVES BOTTLENOSE DOLPHIN

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 002998; version 3.03. Co. Galway / Mayo

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.
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Map Version 1
Date: Oct 2015

Conservation objectives for Inishkea Islands SPA [004004]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A018	Shag	*Phalacrocorax aristotelis*
A045	Barnacle Goose	*Branta leucopsis*
A137	Ringed Plover	*Charadrius hiaticula*
A144	Sanderling	*Calidris alba*
A148	Purple Sandpiper	*Calidris maritima*
A169	Turnstone	*Arenaria interpres*
A182	Common Gull	*Larus canus*
A184	Herring Gull	*Larus argentatus*

A194	Arctic Tern	*Sterna paradisaea*
A195	Little Tern	*Sterna albifrons*
A466	Dunlin	*Calidris alpina schinzii*

Citation: *NPWS (2020) Conservation objectives for Inishkea Islands SPA [004004]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Killala Bay/Moy Estuary SPA 004036

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (2013) Conservation Objectives: Killala Bay/Moy Estuary SPA 004036. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

004036	Killala Bay/Moy Estuary SPA
A137	Ringed Plover *Charadrius hiaticula*
A140	Golden Plover *Pluvialis apricaria*
A141	Grey Plover *Pluvialis squatarola*
A144	Sanderling *Calidris alba*
A149	Dunlin *Calidris alpina alpina*
A157	Bar-tailed Godwit *Limosa lapponica*
A160	Curlew *Numenius arquata*
A162	Redshank *Tringa totanus*
A999	Wetlands

Please note that this SPA overlaps with Killala Bay/Moy Estuary SAC (000458) and Lackan Saltmarsh and Kilcummin Head SAC (000516). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2013
Title :	Killala Bay/Moy Estuary SPA (site code 4036) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number and range of areas used by waterbirds	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of conservation objectives supporting document

A140 Golden Plover *Pluvialis apricaria*

To maintain the favourable conservation condition of Golden Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by golden plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A141 Grey Plover *Pluvialis squatarola*

To maintain the favourable conservation condition of Grey Plover in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by grey plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A162 Redshank *Tringa totanus*

To maintain the favourable conservation condition of Redshank in Killala Bay/Moy Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Number, range, timing and intensity of use of area	No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation	Waterbird distribution from the 2010/2011 waterbird survey programme is discussed in part five of the conservation objectives supporting document

Conservation Objectives for : Killala Bay/Moy Estuary SPA [004036]

A999 Wetlands

To maintain the favourable conservation condition of wetland habitat in Killala Bay/Moy Estuary SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 3204 hectares, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 3204ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

Legend

SPA 004036

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 1: KILLALA BAY / MOY ESTUARY SPA CONSERVATION OBJECTIVES SPA DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE: SPA 004036
CO. MAYO; version 1.02
CO. SLIGO; version 1.02

0 0.5 1 1.5 2 km

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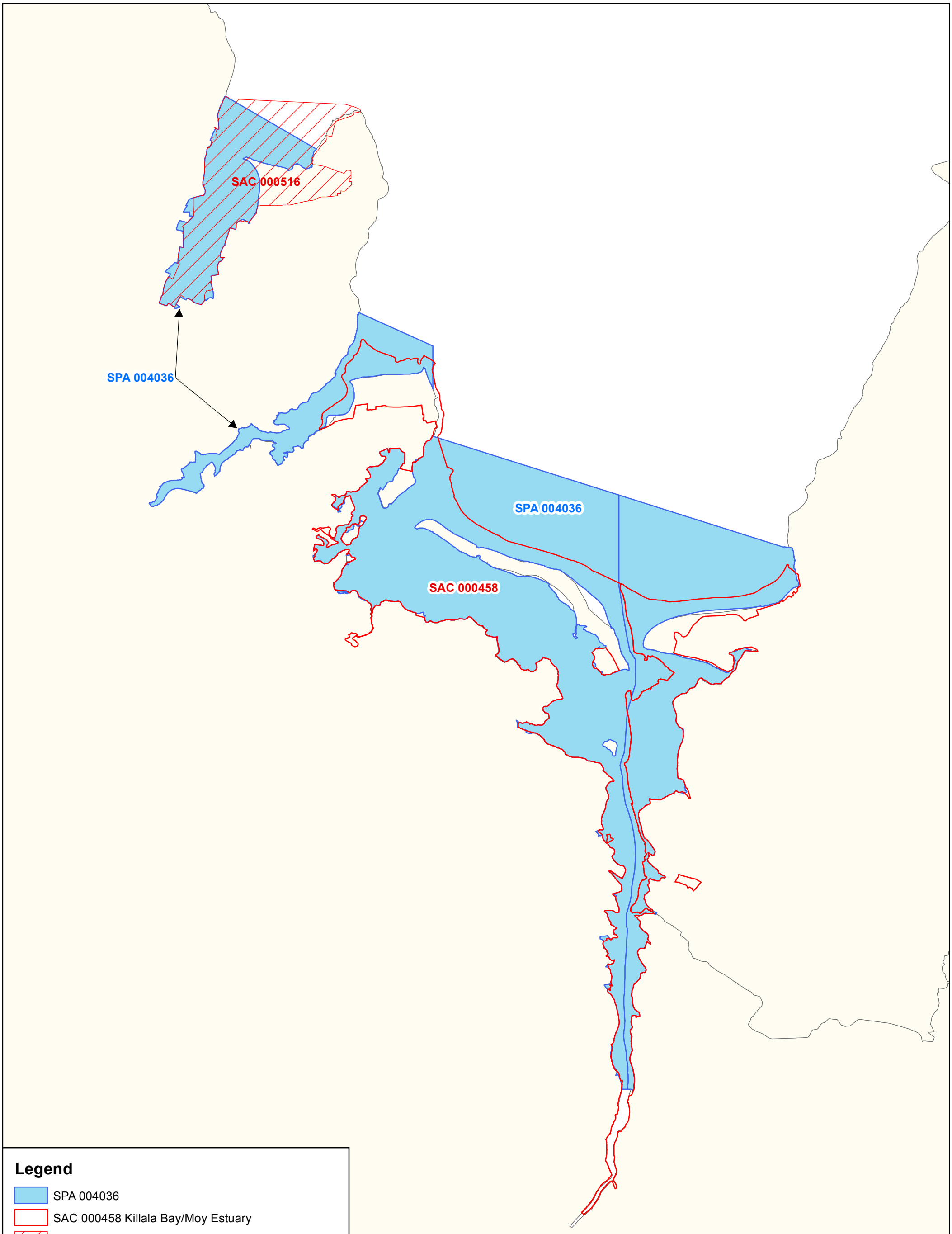
Map Version 1
Date: Feb 2013



Legend

- SPA 004036
- SAC 000458 Killala Bay/Moy Estuary
- SAC 000516 Lackan Saltmarsh And Kilcummin Head
- OSi Discovery Series County Boundaries

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

MAP 2:
KILLALA BAY / MOY ESTUARY SPA CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004036 CO. MAYO; version 1.02, CO. SLIGO; version 1.02
SAC 000458 CO. MAYO; version 1.01, CO. SLIGO; version 1.01
SAC 000516 CO. MAYO; version 1.01

0 1 2 3 km

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Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)

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Map Version 1
Date: Feb 2013

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Blacksod Bay/Broad Haven SPA 004037

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

Citation:

NPWS (201п) Conservation Objectives: Blacksod Bay/Broad Haven SPA 004037. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Series Editor: Rebecca Jeffrey
ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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- 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***

004037	Blacksod Bay/Broad Haven SPA
A003	Great Northern Diver *Gavia immer*
A046	Brent Goose *Branta bernicla hrota*
A065	Common Scoter *Melanitta nigra*
A069	Red-breasted Merganser *Mergus serrator*
A137	Ringed Plover *Charadrius hiaticula*
A144	Sanderling *Calidris alba*
A149	Dunlin *Calidris alpina alpina*
A157	Bar-tailed Godwit *Limosa lapponica*
A160	Curlew *Numenius arquata*
A191	Sandwich Tern *Sterna sandvicensis*
A466	Dunlin *Calidris alpina schinzii*
A999	Wetlands

Please note that this SPA overlaps with Mullet/Blacksod Bay Complex SAC (000470), Broadhaven Bay SAC (000472) and Glenamoy Bog Complex SAC (000500). It adjoins Mullet Peninsula SPA (004227). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	2010
Title :	Resurvey of breeding wader populations of machair and associated wet grasslands in north-west Ireland
Author :	Suddaby, D.; Nelson, T.; Veldman, J.
Series :	Irish Wildlife Manual No. 44
Year :	2014
Title :	Blacksod Bay/Broad Haven SPA (site code: 4037) Conservation objectives supporting document V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1984
Title :	The 1984 all Ireland tern survey
Author :	Whilde, A.
Series :	Irish Birds 3: 1-32
Year :	1985
Title :	The birds of the Western Palaearctic- Volume IV
Author :	Cramp, S.
Series :	Oxford University Press, Oxford
Year :	1985
Title :	Breeding waders of sand dune machair in north-west Ireland
Author :	Nairn, R.G.W.; Sheppard, J.R.
Series :	Irish Birds 3: 53-70
Year :	1995
Title :	Seabird monitoring handbook for Britain and Ireland: a compilation of methods for survey and monitoring of breeding seabirds
Author :	Walsh, P.; Halley, D.J.; Harris, M.P.; del Nevo, A.; Sim, I.M.W.; Tasker, M.L.
Series :	JNCC, Peterborough
Year :	1997
Title :	The status and distribution of breeding sandwich, roseate, common, arctic and little terns in Ireland in 1995
Author :	Hannon, C.; Berrow, S.D.; Newton, S.F.
Series :	Irish Birds, 6: 1-22
Year :	1998
Title :	Breeding waders of machair systems in Ireland in 1996
Author :	Madden, B.; Cooney, T.; O'Donoghue, A.; Norriss, D.W.; Merne, O.J.
Series :	Irish Birds 6: 177-191
Year :	2004
Title :	Seabird Populations of Britain and Ireland
Author :	Mitchell, P.I.; Newton, S.F.; Ratcliffe, N.; Dunn, T.E.
Series :	Poyser, London

Year :	2006
Title :	Breeding parameters of selected wader species at machair sites and adjacent areas associated with the Mullet/Blacksod Bay and offshore islands complex, NW Mayo, 2006
Author :	Thompson, L.J.; Suddaby, D.; Newton, S.
Series :	BirdWatch Ireland Conservation Report No. 06/6
Year :	2014
Title :	Seabird Monitoring Programme (SMP) Database
Author :	JNCC
Series :	http://jncc.defra.gov.uk/smp/Default.aspx
Year :	2014
Title :	BirdLife International Seabird Ecology and Foraging Range Database
Author :	BirdLife International
Series :	http://seabird.wikispaces.com

Spatial data sources

Year :	2014
Title :	NPWS SPA boundary data
GIS Operations :	SPA boundary polygons divided into two classifications (wetlands, coastal grasslands) based on line identified by expert judgement. Expert opinion used as necessary to resolve any issues arising
Used For :	Wetlands (map 3)

A003 Great Northern Diver *Gavia immer*

To maintain the favourable conservation condition of Great Northern Diver in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by great northern diver, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A046 Brent Goose *Branta bernicla hrota*

To maintain the favourable conservation condition of Light-bellied Brent Goose in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by light-bellied brent goose, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A065 Common Scoter *Melanitta nigra*

To maintain the favourable conservation condition of Common Scoter in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by common scoter, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting ocument

A069 Red-breasted Merganser *Mergus serrator*

To maintain the favourable conservation condition of Red-breasted Merganser in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by red-breasted merganser, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A137 Ringed Plover *Charadrius hiaticula*

To maintain the favourable conservation condition of Ringed Plover in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by ringed plover, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of conservation objectives supporting document

A144 Sanderling *Calidris alba*

To maintain the favourable conservation condition of Sanderling in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Waterbird population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by sanderling, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A149 Dunlin *Calidris alpina alpina*

To maintain the favourable conservation condition of Dunlin in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by dunlin, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A157 Bar-tailed Godwit *Limosa lapponica*

To maintain the favourable conservation condition of Bar-tailed Godwit in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by bar-tailed godwit, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A160 Curlew *Numenius arquata*

To maintain the favourable conservation condition of Curlew in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long term population trend stable or increasing	Population trends are presented in part four of the conservation objectives supporting document
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by curlew, other than that occurring from natural patterns of variation	Waterbird distribution from the 2009/2010 waterbird survey programme is discussed in part five of the conservation objectives supporting document

A191 Sandwich Tern *Sterna sandvicensis*

To maintain the favourable conservation condition of Sandwich Tern in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). Hannon et al. (1997) recorded 81 breeding pairs on Inishderry as part of the 1995 All-Ireland Tern Survey. Recent data is lacking for this colony
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard tern survey methods (see Walsh et al., 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2014) provides population data for this species
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline	Typical sandwich tern breeding sites are located on low-lying offshore islands or islets in bays or brackish lagoons on spits or remote mainland dunes (Cramp, 1985). Wide fluctuations between years in both breeding numbers and colony locations are known to occur for this species (Mitchell et al., 2004). However, a sandwich tern colony has been recorded on Inishderry in the 1990s and on several occasions in the 1980s (see Hannon et al., 1997 and Whilde, 1985)
Prey biomass available	Kilogrammes	No significant decline	Key prey items: Mostly energy-rich fish, some crustaceans and occasionally insects and rag worms. Key habitats: sandwich tern forage in/over shallow marine waters such as bays, inlets and outflows, gullies, shoals, inshore waters, reefs, and sandbanks; also more open waters nearshore and offshore, including open sea. Foraging range: max. 70km, mean max. 42.3km, mean 14.7km (BirdLife International Seabird Database (Birdlife International, 2014))
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase	Foraging range: Max 70km, mean max 42.3km, mean 14.7km (Birdlife International Seabird Database (Birdlife International, 2014))
Disturbance at the breeding stage	Level of impact	Human activities should occur at levels that do not adversely affect the breeding sandwich tern population	Colonies are typically situated on low-lying offshore islands or islets, in bays or brackish lagoons, on spits or remote mainland dunes (Cramp, 1985). The sandwich tern colony on Inishderry has been recorded in the 1990s and on several occasions in the 1980s (see Hannon et al., 1997 and Whilde, 1984)

A466 Dunlin *Calidris alpina schinzii*

To maintain the favourable conservation condition of Dunlin in Blacksod Bay/Broad Haven SPA, which is defined by the following list of attributes and targets

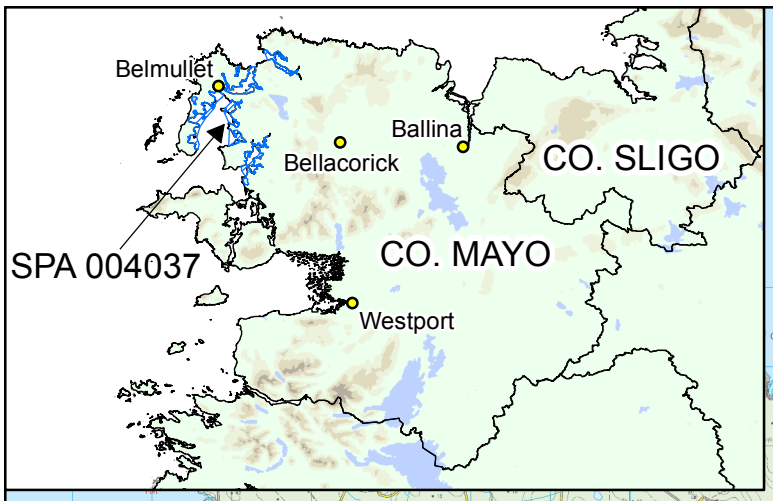
Attribute	Measure	Target	Notes
Breeding population abundance: apparently occupied territories (AOTs)	Number	Stable or increasing, subject to natural variation	Measure based on standard survey methods (see Suddaby et al. (2010))
Productivity rate: fledged young per breeding pair	Mean number	No significant decline	Measure based on standard survey methods (see Thompson et al. (2007))
Distribution	Number; location	Stable or increasing, subject to natural variation	The distribution of breeding dunlin has contracted since initial surveys were undertaken (Nairn and Shephard, 1985; Madden et al., 1998; Suddaby et al., 2010)
Availability of suitable habitat: area and distribution	Hectares; location	Stable or increasing, subject to natural processes	Ideally, suitable habitat should be at, or close to, existing breeding pairs. Factors that are negatively affecting potentially suitable habitat include fencing, drainage, inappropriate grazing regimes, fertilisation and overgrazing by rabbits (*Oryctolagus cuniculus*)
Disturbance at the breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding dunlin population	Unsuitable livestock grazing regimes can result in nest trampling and destruction of suitable nesting sites. Agri-environment schemes in Ireland specify less than 1.0 livestock units per hectare during the breeding wader nesting period

Conservation Objectives for : Blacksod Bay/Broad Haven SPA [004037]

A999 Wetlands

To maintain the favourable conservation condition of the wetland habitat in Blacksod Bay/Broad Haven SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 8,539 hectares, other than that occurring from natural patterns of variation. See map 3	The wetland habitat area was estimated as 8,539ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document



BROAD HAVEN
Cuan an Inbhir

Blacksod Bay
Cuan an Fhoid Duibh

Carrowmore Lake
Loch na Ceathrú Móire

Tullaghan Bay

Elly Bay

Termoncarragh Lake

Ross Port
Tód Duimhach

Belmullet
Béal an Mhuirthead

Bangor
Baingear

Kanfinalta

Kinrovar

Ridge Point

Slievemore
An Sliabh Mór

Doogort
Dumha Goirt

Derrinumera

Derreens Is.

Muingerroon Is.

Gortmore Is.

Inishderry

Inishcoe

Inishgort

Inishkeeragh

Inishkeeragh Lighthouse

Inishkeeragh Rocks

Inishkeeragh Reef

Inishkeeragh Pier

Inishkeeragh Slip

Inishkeeragh Boathouse

Inishkeeragh Cottage

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SAC 000472

SAC 000500

SPA 004227

SPA 004037

SAC 000470

Legend

- Blacksod Bay / Broad Haven SPA 004037
- Mullet Peninsula SPA 004227
- Mullet/Blacksod Bay Complex SAC 000470
- Broadhaven Bay SAC 000472
- Glenamoy Bog Complex SAC 000500
- OSi Discovery Series County Boundary

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Department of Arts, Heritage and the Gaeltacht

MAP 2:
BLACKSOD BAY / BROAD HAVEN SPA CONSERVATION OBJECTIVES ADJOINING / OVERLAPPING DESIGNATIONS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004037; version 2.02. SPA 004227; version 1.02
SAC 000470; version 3.01, SAC 000472; version 3.01,
SAC 000500; version 3.01, CO. MAYO

0 2.5 5 7.5 10 km

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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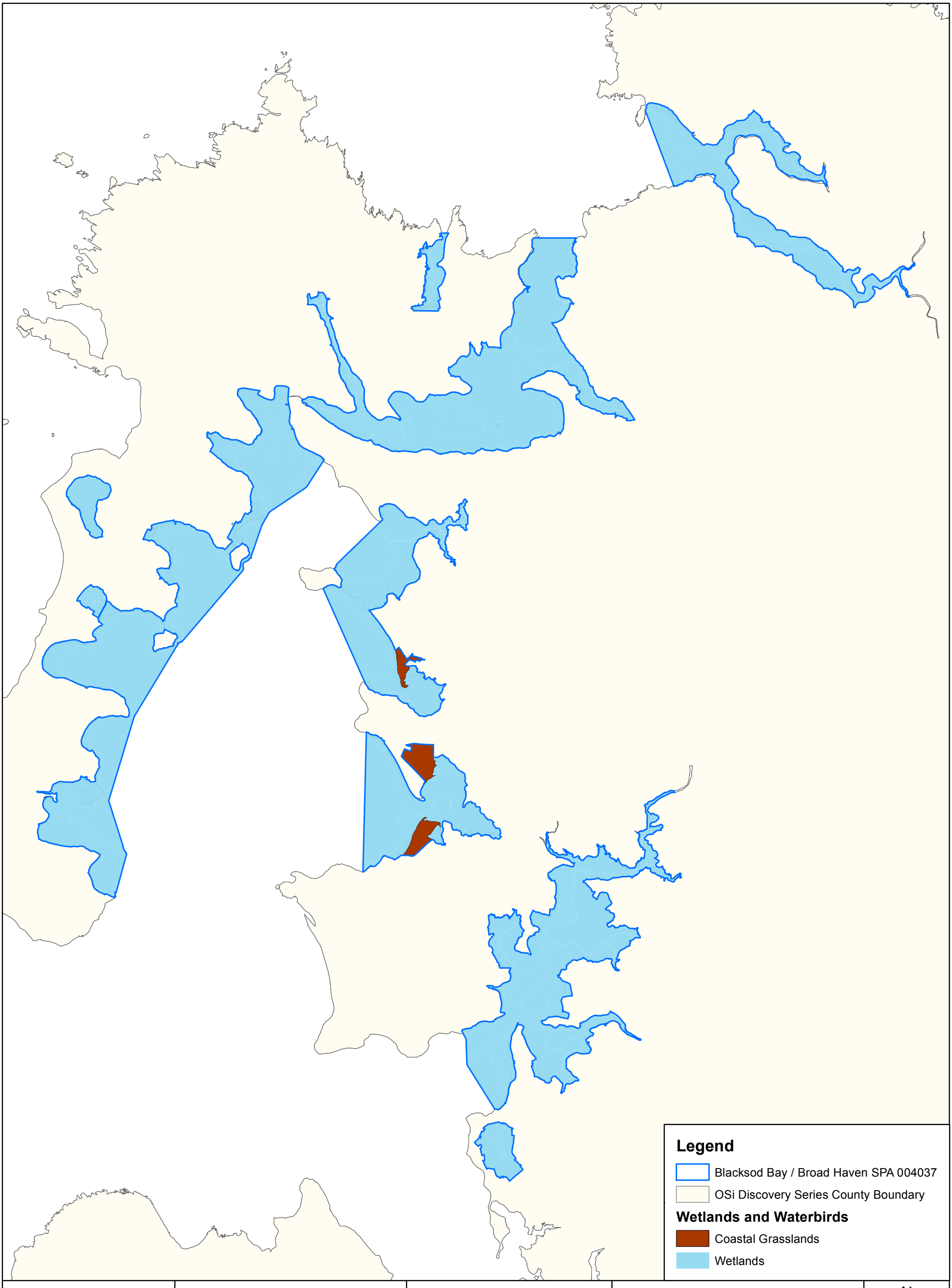
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

N

Map Version 1
Date: Dec 2014



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Department of Arts, Heritage and the Gaeltacht

MAP 3:
BLACKSOD BAY / BROAD HAVEN SPA
CONSERVATION OBJECTIVES
WETLANDS AND WATERBIRDS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SPA 004037; version 2.02. CO. MAYO

0 1 2 3 4 5 km

The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta.
Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar
comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214.
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Map Version 1
Date: Dec 2014

Conservation objectives for Lough Corrib SPA [004042]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A051	Gadwall	*Anas strepera*
A056	Shoveler	*Anas clypeata*
A059	Pochard	*Aythya ferina*
A061	Tufted Duck	*Aythya fuligula*
A065	Common Scoter	*Melanitta nigra*
A082	Hen Harrier	*Circus cyaneus*
A125	Coot	*Fulica atra*
A140	Golden Plover	*Pluvialis apricaria*

A179	Black-headed Gull	*Chroicocephalus ridibundus*
A182	Common Gull	*Larus canus*
A193	Common Tern	*Sterna hirundo*
A194	Arctic Tern	*Sterna paradisaea*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Corrib SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Lough Corrib SPA [004042]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Gara SPA [004048]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	*Cygnus cygnus*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

Citation: *NPWS (2020) Conservation objectives for Lough Gara SPA [004048]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Carra SPA [004051]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	**Common Name**	**Scientific Name**
A182	Common Gull	*Larus canus*

Citation: *NPWS (2020) Conservation objectives for Lough Carra SPA [004051]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Carrowmore Lake SPA [004052]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A191	Sandwich Tern	*Sterna sandvicensis*

Citation: *NPWS (2020) Conservation objectives for Carrowmore Lake SPA [004052]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Lough Mask SPA [004062]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A061	Tufted Duck	*Aythya fuligula*
A179	Black-headed Gull	*Chroicocephalus ridibundus*
A182	Common Gull	*Larus canus*
A183	Lesser Black-backed Gull	*Larus fuscus*
A193	Common Tern	*Sterna hirundo*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Lough Mask SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Lough Mask SPA [004062]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Stags of Broad Haven SPA [004072]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A015	Leach's Storm-petrel	*Oceanodroma leucorhoa*

Citation: *NPWS (2020) Conservation objectives for Stags of Broad Haven SPA [004072]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Illanmaster SPA [004074]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*

Citation: *NPWS (2020) Conservation objectives for Illanmaster SPA [004074]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Inishglora and Inishkeeragh SPA [004084]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A017	Cormorant	*Phalacrocorax carbo*
A018	Shag	*Phalacrocorax aristotelis*
A045	Barnacle Goose	*Branta leucopsis*
A183	Lesser Black-backed Gull	*Larus fuscus*
A184	Herring Gull	*Larus argentatus*
A194	Arctic Tern	*Sterna paradisaea*

Citation: *NPWS (2020) Conservation objectives for Inishglora and Inishkeeragh SPA [004084]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Termoncarragh Lake and Annagh Machair SPA [004093]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A038	Whooper Swan	*Cygnus cygnus*
A045	Barnacle Goose	*Branta leucopsis*
A122	Corncrake	*Crex crex*
A142	Lapwing	*Vanellus vanellus*
A346	Chough	*Pyrrhocorax pyrrhocorax*
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*
A466	Dunlin	*Calidris alpina schinzii*

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a Special Conservation Interest for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the species of Special Conservation Interest. Thus, a second objective is included as follows:

Objective: To maintain or restore the favourable conservation condition of the wetland habitat at Termoncarragh Lake and Annagh Machair SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

Citation: *NPWS (2020) Conservation objectives for Termoncarragh Lake and Annagh Machair SPA [004093]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Owenduff/Nephin Complex SPA [004098]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A098	Merlin	*Falco columbarius*
A140	Golden Plover	*Pluvialis apricaria*

Citation: *NPWS (2020) Conservation objectives for Owenduff/Nephin Complex SPA [004098]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Bellanagare Bog SPA [004105]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A395	Greenland White-fronted Goose	*Anser albifrons flavirostris*

Citation: *NPWS (2020) Conservation objectives for Bellanagare Bog SPA [004105]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Duvillaun Islands SPA [004111]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A014	Storm Petrel	*Hydrobates pelagicus*
A045	Barnacle Goose	*Branta leucopsis*

Citation: *NPWS (2020) Conservation objectives for Duvillaun Islands SPA [004111]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Clare Island SPA [004136]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A018	Shag	*Phalacrocorax aristotelis*
A182	Common Gull	*Larus canus*
A188	Kittiwake	*Rissa tridactyla*
A199	Guillemot	*Uria aalge*
A200	Razorbill	*Alca torda*
A346	Chough	*Pyrrhocorax pyrrhocorax*

Citation: *NPWS (2020) Conservation objectives for Clare Island SPA [004136]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A009	Fulmar	*Fulmarus glacialis*
A045	Barnacle Goose	*Branta leucopsis*
A194	Arctic Tern	*Sterna paradisaea*

Citation: *NPWS (2020) Conservation objectives for High Island, Inishshark and Davillaun SPA [004144]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Bills Rocks SPA [004177]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A014	Storm Petrel	*Hydrobates pelagicus*
A204	Puffin	*Fratercula arctica*

Citation: *NPWS (2020) Conservation objectives for Bills Rocks SPA [004177]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*

Conservation objectives for Connemara Bog Complex SPA [004181]

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.

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.

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
A017	Cormorant	*Phalacrocorax carbo*
A098	Merlin	*Falco columbarius*
A140	Golden Plover	*Pluvialis apricaria*
A182	Common Gull	*Larus canus*

Citation: *NPWS (2020) Conservation objectives for Connemara Bog Complex SPA [004181]. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.*