

National Parks and Wildlife Service

Conservation Objectives Series

Ross Lake and Woods SAC 001312



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

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Citation:

**NPWS (2018) Conservation Objectives: Ross Lake and Woods SAC 001312.
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*

001312 Ross Lake and Woods SAC

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

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 :	2006
Title :	Bat mitigation guidelines for Ireland
Author :	Kelleher, C.; Marnell, F.
Series :	Irish Wildlife Manual No. 25
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
Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1909
Title :	A Tourist's Flora of the West of Ireland
Author :	Praeger, R.L.
Series :	Hodges, Figgis and Co., Dublin
Year :	1934
Title :	The Botanist in Ireland
Author :	Praeger, R.L.
Series :	Hodges, Figgis and Co., Dublin
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 :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
Year :	2003
Title :	Pondweeds of Great Britain and Ireland
Author :	Preston, C.D.
Series :	BSBI Handbook, No. 8, London
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 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 <i>Rhinolophus hipposideros</i>
Author :	Knight, T.; Jones, G.
Series :	Endangered Species Research, 8: 79-86
Year :	2010
Title :	Water Quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	Environmental Protection Agency, 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 :	Environmental Protection Agency, Wexford
Year :	2017
Title :	Water Quality in Ireland 2010-2015
Author :	Fanning, A.; Craig, M.; Webster, P.; Bradley, C.; Tierney, D.; Wilkes, R.; Mannix, A.; Treacy, P.; Kelly, F.; Geoghegan, R.; Kent, T.; Mageean, M.
Series :	Environmental Protection Agency, 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 SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For : 3140 (map 2)

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 3)

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 3)

Conservation Objectives for : Ross Lake and Woods SAC [001312]

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 Ross Lake and Woods 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 3140 is considered to occur in Ross Lake in Ross Lake and Woods SAC. It may also occur in the smaller lakes/ponds: Loughs Parkyflaherty and Dolloug. The selection of the SAC for the lake habitat was based on NPWS survey data recording the presence of extensive beds of charophytes (<i>Chara</i> spp.) and a shoreline of limestone boulders with calcareous encrustations and silty marl (NPWS internal files). Ross Lake 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	Lake habitat 3140 occurs in Ross Lake, and may also occur in Lough Parkyflaherty and Lough Dolloug in the SAC. See map 2
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). The charophytes <i>Chara aculeolata</i> , <i>C. curta</i> and <i>C. virgata</i> have been recorded in Ross Lake, as well as great fen-sedge (<i>Cladium mariscus</i>), yellow water-lily (<i>Nuphar lutea</i>), common reed (<i>Phragmites australis</i>) and common club-rush (<i>Schoenoplectus lacustris</i>) (NPWS internal files). Praeger (1909) noted the pondweed <i>Potamogeton x nitens</i> in Ross Lake (see also Praeger, 1934; Preston and Croft, 2001; Preston, 2003). Species recorded by EPA biologists include pondweeds (<i>Potamogeton</i> spp.), aquatic moss species (<i>Fontinalis</i> sp.), shoreweed (<i>Littorella uniflora</i>), alternate water-milfoil (<i>Myriophyllum alterniflorum</i>) and bladderwort species (<i>Utricularia</i> sp.)
Vegetation composition: characteristic zonation	Occurrence	All characteristic zones should be present, correctly distributed and in good condition	The characteristic zonation of lake habitat 3140 was described in Roden and Murphy (2013). The benthic vegetation of Ross Lake has not yet been surveyed in detail; however, the charophytes <i>Chara aculeolata</i> , <i>C. curta</i> and <i>C. virgata</i> were recorded, as well as encrustations on limestone boulders that may be krustenstein
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.). Conifer forestry and peatland drainage/damage in the catchment of Ross Lake may 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. As noted above, the shoreline of Ross Lake is dominated by limestone boulders with calcareous encrustations, and has some areas of silty marl (NPWS internal files)
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.)
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	Lake habitat 3140 is typically associated with high water quality, as demonstrated by naturally low dissolved nutrients. The target for lakes and ponds in the SAC 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. Ross Lake failed the TP target in 2007 (good status) (McGarrigle et al., 2010), but passed in 2010 (Bradley et al., 2015) and in 2013 (Fanning et al., 2017)
Water quality: phytoplankton biomass	µg/l chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Lake habitat 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 <i>a</i> concentration must be <5.8µg/l. Annual average chlorophyll <i>a</i> concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll <i>a</i> 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. Ross Lake passed the target (high status) in 2007 (McGarrigle et al., 2010), 2010 (Bradley et al., 2015) and 2013 (Fanning et al., 2017)

Water quality: phytoplankton composition	EPA phytoplankton composition metric	Maintain appropriate water quality to support the habitat, including high phytoplankton composition status	The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, the default target for lake habitat 3140 is WFD high status. Ross Lake passed the target (high status) in 2007 (McGarrigle et al., 2010), 2010 (Bradley et al., 2015) and 2013 (Fanning et al., 2017)
Water quality: attached algal biomass	Algal cover	Maintain trace/absent attached algal biomass (<5% cover)	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)
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. Ross Lake failed the target, having moderate macrophyte status in 2007 (McGarrigle et al., 2010) and 2010 (Bradley et al., 2015), and good status in 2013 (Fanning et al., 2017)
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 (>9.5 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
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, conifer forestry and peatland drainage/damage in the catchment of Ross Lake may artificially increase the lake's water colour

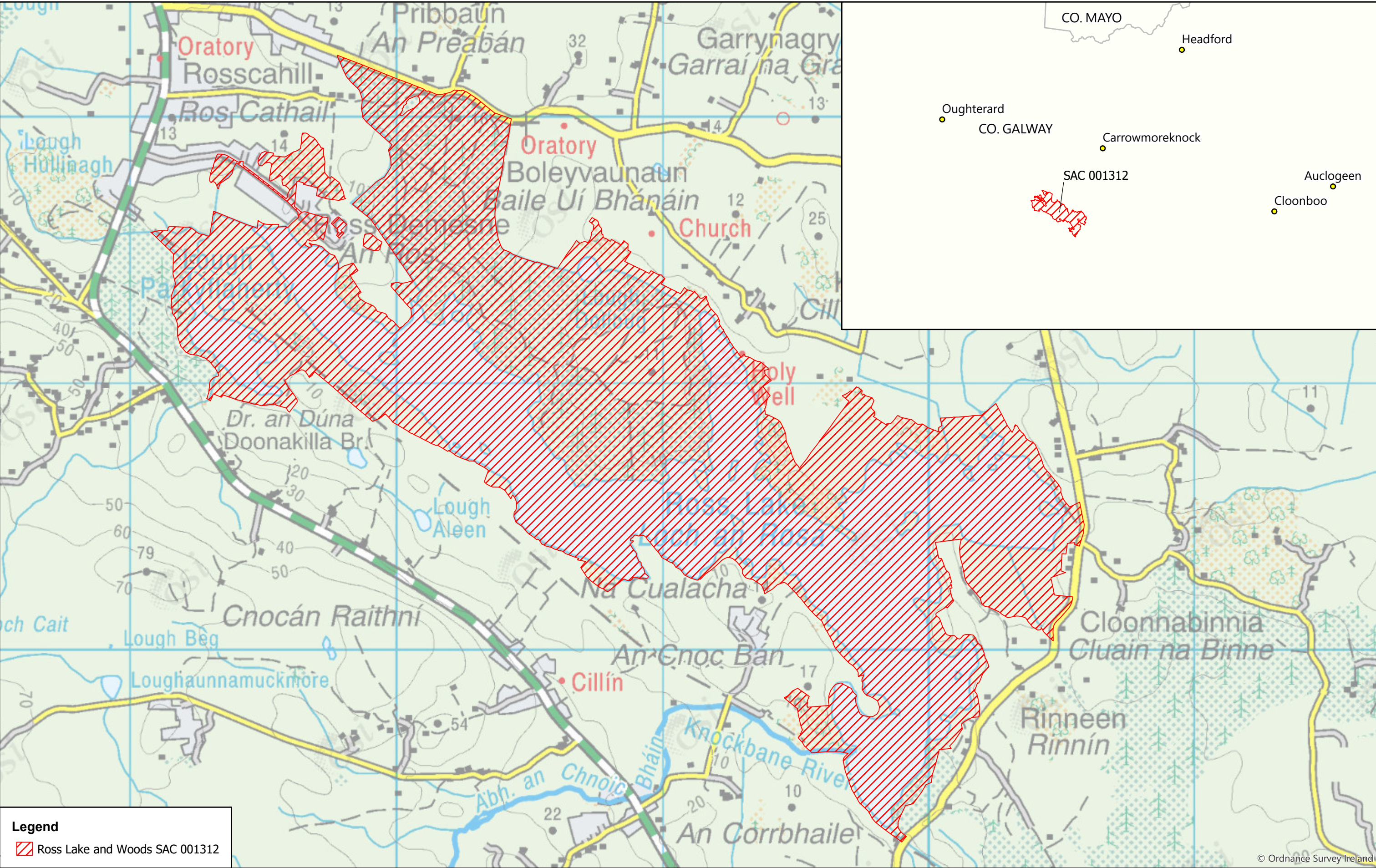
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher 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 lake habitat 3140	Most lake shores have fringing habitats of reedswamp/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 and <i>Cladium</i> fens and petrifying springs (habitat codes 7230, 7210 and 7220). Reedbeds (<i>Schoenoplectus lacustris</i> , <i>Phragmites australis</i>), swamp (<i>Cladium mariscus</i>), freshwater marsh, fen (with <i>Schoenus nigricans</i>), wet woodland and wet grassland have been recorded on the shores of Ross Lake, and also areas of broadleaved and mixed woodland and scrub, although most were replaced by conifer plantation

Conservation Objectives for : Ross Lake and Woods SAC [001312]


1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To restore the favourable conservation condition of Lesser Horseshoe Bat in Ross Lake and Woods 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 the summer roost (roost id. 212 in NPWS database). See map 3	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 (<i>Rhinolophus hipposideros</i>). NPWS conduct annual counts at each qualifying roost. Qualified means from the most recent available five years of summer data (collected between 2011-2016) 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 summer roost (roost id. 212 in NPWS database) in Ross Lake and Woods SAC, where a mean of 31 bats was recorded (2011-2016), the target is instead set at the MQS of 100 bats. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Summer roosts	Condition	No decline	Ross Lake and Woods SAC has been selected for lesser horseshoe bat because of the presence of one internationally important summer roost (roost id. 212 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 roost	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 3 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 3	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 3	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)



Legend

 Ross Lake and Woods SAC 001312



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MAP 1:
ROSS LAKE AND WOODS SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001312; version 3.0. CO. GALWAY

0170340510680

Meters

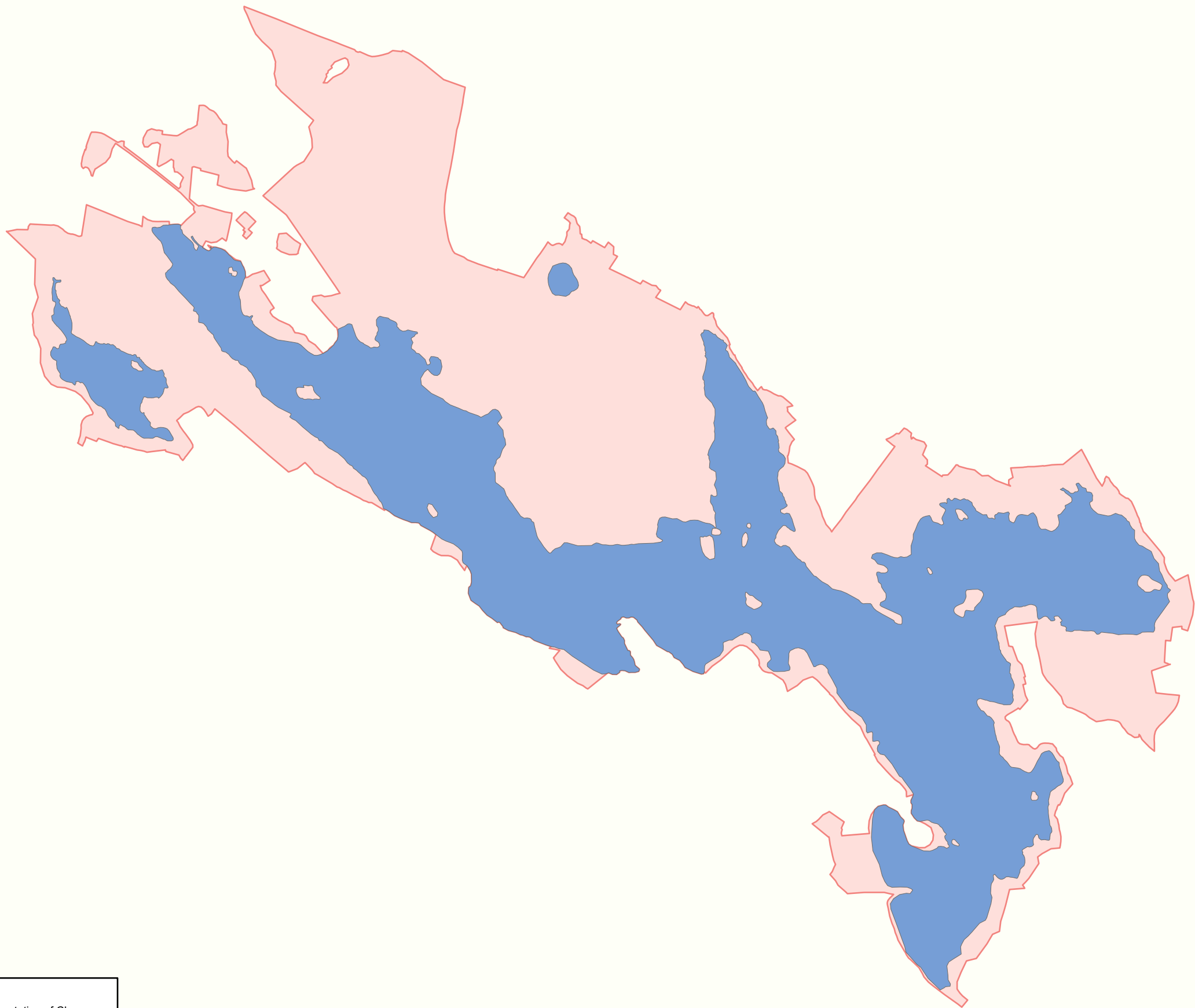
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha 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 2018



Legend

- 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
- Ross Lake and Woods SAC 001312
- OSi Discovery Series County Boundary



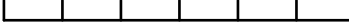
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MAP 2:
ROSS LAKE AND WOODS SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
SAC 001312; version 3.0. CO. GALWAY

0 0.1 0.2 0.3 0.4 0.5 0.6 Kilometers



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: Aug 2018



Legend

- OSi Discovery Series County Boundary
- Ross Lake and Woods SAC 001312
- 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros***
 - Roost Location
 - Roost ID 212 Foraging Range
 - Potential Foraging Grounds