National Parks and Wildlife Service

Conservation Objectives Series

Lough Yganavan and Lough Nambrackdarrig SAC 000370



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Citation:

NPWS (2021) Conservation Objectives: Lough Yganavan and Lough Nambrackdarrig SAC 000370. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

Series Editors: Rebecca Jeffrey and Christina Campbell 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			
000370	Lough Yganavan and Lough Nambrackdarrig SAC		
1024	Kerry Slug Geomalacus maculosus		
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)*		
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)		

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1976
Title :	Abbreviated report of a botanical and malacological study performed in the southwestern part of Ireland
Author :	Visser, G.; Zoer, J.A.
Series :	Unpublished report to NPWS
Year :	1984
Title :	The vegetation of Irish lakes
Author :	Heuff, H.
Series :	Unpublished report to NPWS
Year :	2011
Title :	Distribution and population dynamics of the Kerry Slug, Geomalacus maculosus (Arionidae)
Author :	Mc Donnell, R.J.; Gormally, M.J.
Series :	Irish Wildlife Manuals, No. 54
Year :	2013
Title :	Natterjack toad monitoring project, 2011 - 2012
Author :	Sweeney, P.; Sweeney, N.; Hurley C.
Series :	Irish Wildlife Manuals, No. 67
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 :	2019
Title :	The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments
Author :	NPWS
Series :	Conservation assessments

Other References

Year :	1972
Title :	Verslag van een botanisch/malacologische studiereis naar Z.W. lerland
Author :	Visser, G.; Zoer, J.A.
Series :	Unpublished Report; Rijksinstituut voor Natuurbeheer, Leersum, Netherlands
Year :	1982
Year : Title :	1982 Eutrophication of waters. Monitoring assessment and control
Year : Title : Author :	1982 Eutrophication of waters. Monitoring assessment and control OECD

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 :	Environmental Protection Agency, Wexford
Series : Year :	2009
Series : Year : Title :	2009 The identification, characterization and conservation value of isoetid lakes in Ireland
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Series : Year : Title : Author : Series : Year :	2009 The identification, characterization and conservation value of isoetid lakes in Ireland Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W. Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264-273 2013
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Series : Year : Title : Author : Series : Year : Title : Author : Series : Year :	 Environmental Protection Agency, Wexford 2009 The identification, characterization and conservation value of isoetid lakes in Ireland Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W. Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264-273 2013 Revised distribution and habitat associations for the protected slug, <i>Geomalacus maculosus</i> (Stylommatophora: Arionidae) in Ireland Mc Donnell, R.J.; O'Meara, K.; Nelson, B.; Marnell, F.; Gormally, M.J. Basteria, 77: 33-37 2016
Series : Year : Title : Author : Series : Year : Title : Author : Series : Year : Year : Title :	 Environmental Protection Agency, Wextord 2009 The identification, characterization and conservation value of isoetid lakes in Ireland Free, G.; Bowman, J.; McGarrigle, M.; Little, R.; Coroni, R.; Donnelly, K.; Tierney, D.; Trodd, W. Aquatic Conservation: Marine and Freshwater Ecosystems, 19(3): 264-273 2013 Revised distribution and habitat associations for the protected slug, <i>Geomalacus maculosus</i> (Stylommatophora: Arionidae) in Ireland Mc Donnell, R.J.; O'Meara, K.; Nelson, B.; Marnell, F.; Gormally, M.J. Basteria, 77: 33-37 2016 A narrative for conserving freshwater and wetland habitats in England
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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 2)
Year :	2021
Year : Title :	2021 NPWS rare and threatened species database
Year : Title : GIS Operations :	2021 NPWS rare and threatened species database Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising

Conservation Objectives for : Lough Yganavan and Lough Nambrackdarrig SAC [000370]

2150 Atlantic decalcified fixed dunes (Calluno-Ulicetea)*

To restore the favourable conservation condition of Atlantic decalcified fixed dunes (Calluno-Ulicetea)* at Lough Yganavan and Lough Nambrackdarrig 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	Decalcified fixed dunes* has not been mapped in detail for Lough Yganavan and Lough Nambrackdarrig SAC and thus the exact total area of the priority qualifying habitat in the SAC is unknown. The habitat is known to occur to the east of Lough Yganavan and is characterised by dry and wet heath communities on undulating topography. Although there is an organic layer surface layer in parts, sand is generally present close to the surface (NPWS internal files)
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes	See the notes for habitat area above
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	There are no indications that human impacts have altered the sediment supply since designation, but this is an unusual site in Ireland, as it is now isolated from the coast (NPWS internal files)
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	There are no indications that human impacts have altered the habitat zonation since designation, but this is an unusual site in Ireland, as it is now isolated from the coast (NPWS internal files)
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of the dune habitat, subject to natural processes	Bare sand should be present, but not more than 10%
Vegetation structure: sward height	Centimetres	Restore structural variation within sward	The habitat in Lough Yganavan and Lough Nambrackdarrig SAC has been noted as being undergrazed, with the vegetation becoming tall (NPWS internal files)
Vegetation composition: typical species and sub- communities	Occurrence	Maintain range of sub- communities with typical species	For the list of typical species, see the 2019 Article 17 conservation assessment for habitat 2150* (NPWS, 2019). The habitat in Lough Yganavan and Lough Nambrackdarrig SAC is characterised by dry and wet heath communities on undulating topography. Typical heath species recorded in the habitat in this SAC include <i>Calluna vulgaris, Erica tetralix</i> and <i>Carex</i> spp. (NPWS internal files)
Vegetation composition: native negative indicator species	Percentage cover	Native 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	Negative indicators include species indicative of changes in nutrient status and species not considered characteristic of the habitat
Vegetation composition: non- native species	Percentage cover	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%	Sea buckthorn (<i>Hippophae rhamnoides</i>) should be absent or effectively controlled. No non-native species have been recorded from the habitat in this SAC (NPWS internal files)

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Vegetation Percentage cover composition: scrub/trees

No more than 5% cover or under control Scrub encroachment can lead to a reduction in dune biodiversity

Conservation Objectives for : Lough Yganavan and Lough Nambrackdarrig SAC [000370]

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 Yganavan and Lough Nambrackdarrig 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 Yganavan, Nambrackdarrig and the adjacent unnamed lake in the SAC (see map 2). The bedrock geology is Carboniferous limestone and the lakes are surrounded by cutover peat and sand (residual dunes). 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 occur in the three lakes in the SAC. See map 2 $\ensuremath{2}$
Vegetation composition: 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 assessments for 3110 (NPWS, 2013, 2019) and the lake habitats supporting document (O Connor, 2015). As part of their botanical and malacological study, Visser and Zoer (1972, 1976) recorded <i>Elatine hexandra, Fontinalis antipyretica,</i> <i>Littorella uniflora, Lobelia dortmanna, Nymphaea</i> <i>alba, Phragmites australis, Potamogeton natans,</i> <i>Sparganium angustifolium</i> and <i>Typha</i> sp. in Lough Yganavan. Heuff (1984) also surveyed Yganavan and found similar species. Lough Yganavan is also one of the most important breeding sites for Natterjack toad (Sweeney et al., 2013). Toads also formerly bred in Lough Nambrackdarrig
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). Information on vegetation zonation may be available from Environmental Protection Agency (EPA) surveys and 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 3110. Lough Yganavan is shallow (maximum depth 0.8m), with highly coloured (brown) water and Secchi depth of 0.5m (Heuff, 1984)
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

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. Heuff (1984) stated that Lough Yganavan has sandy substratum with stony shoreline
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 \geq 6m annual mean Secchi disk depth, and \geq 3m annual minimum Secchi disk depth (OECD, 1982). Free et al. (2009) found high isoetid abundance in lakes with Secchi depths of more than 3m. Lough Yganavan has very low transparency (0.5m) (Heuff, 1984)
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 to lakes with 3110. 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. High status/oligotrophic has annual average total phosphorus (TP) concentration $\leq 10\mu$ g/I TP, average annual total ammonia concentration ≤ 0.040 mg/I N and annual 95th percentile for total ammonia ≤ 0.090 mg/I N. See also O Connor (2015), OECD (1982) and the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019
Phytoplankton biomass	μg/l chlorophyll <i>a</i>	Maintain appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status	Oligotrophic and WFD 'high' status targets apply to lake habitat 3110. The average growing season (March-October) chlorophyll <i>a</i> concentration must be $<5.0\mu$ g/l. The annual average chlorophyll <i>a</i> concentration should be $<2.5\mu$ g/l and the annual peak chlorophyll <i>a</i> concentration should be $\le 8.0\mu$ g/l. Where a lake has a chlorophyll <i>a</i> concentration that is lower than this target, there should be no decline within class, i.e. no upward trend in phytoplankton biomass. See also OECD (1982) and the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019
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
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 habitat 3110 should, therefore, be trace/absent (<5% cover)
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 \geq 0.90, as defined in the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

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Acidification status	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Acidification can impact on species abundance and composition in soft water lake habitats. In Europe, acidification of isoetid lakes can lead to loss of isoetids and dominance by submerged <i>Sphagnum</i> mosses and <i>Juncus bulbosus</i> (Arts, 2002). The specific requirements of lake habitat 3110, in terms of water and sediment pH, alkalinity and cation concentration, have not been determined. For lakes with 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 also the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019
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 lakes with habitat 3110, where the peatland in the lake's catchment is intact. Lough Yganavan is very highly coloured. It is unclear to what extent this is natural, but it is likely that drainage and cutting of the surrounding peatland has increased water colour
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. The strong brown colour suggests high DOC in Lough Yganavan. DOC levels are likely to have increased owing to disturbance to the surrounding peatland
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

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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. The shoreline of Lough Yganavan includes heath and scrub/woodland 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. See also Mainstone et al. (2016)

Conservation Objectives for : Lough Yganavan and Lough Nambrackdarrig SAC [000370]

1024 Kerry Slug *Geomalacus maculosus*

To maintain the favourable conservation condition of Kerry Slug (*Geomalacus maculosus*) in Lough Yganavan and Lough Nambrackdarrig SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: occupied 1km grid squares	Number	Number of occupied 1km grid squares at least stable, subject to natural processes. See map 3	The distribution of Kerry slug (<i>Geomalacus maculosus</i>) is not known in detail within this SAC; though it is stated to be common, this has not been confirmed by recent survey. There are confirmed records from the 1km grid square V7095 and there is reference to it being present on rocks and boulders around Lough Yganavan (NPWS species database; Mc Donnell and Gormally, 2011). See also Mc Donnell et al. (2013). The species may also be found in the small patches of woodland in the SAC
Habitat extent: area of heath, blanket bog and lakeshore with sandstone outcrops	Hectares	Stable or increasing, subject to natural processes	Kerry slug (<i>Geomalacus maculosus</i>) feeds on lichens and mosses which grow on exposed boulders, especially Old Red Sandstone, and where these are available the species is likely to be present. The species will retreat during dry periods to refuges around the interface between the rock and the soil. The quality of the habitat surrounding the rock outcrops is not considered important for the species as there is no evidence the slug feeds off the rock surface. Movement presumably does occur between rocks but the conditions needed to facilitate this are not known. The extent of exposed rock surface and occupied woodland in this SAC is not currently known so a target figure cannot be set at this stage
Habitat extent: woodland area and suitable tree cover	Hectares	Stable or increasing, subject to natural processes	Kerry slug (<i>Geomalacus maculosus</i>) feeds on lichens and mosses which grow on the trunks of trees. The type of woodland is no longer considered important for the species so long as the trees have growths of the preferred foodplants and provide refuges for the species in dry conditions. There are small patches of tree cover in this SAC and the species is likely to be present but this needs to be confirmed







Date: November 2021

