ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Dahybaun SAC 002177

An Roinn Tithíochta,
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Citation:

NPWS (2021) Conservation Objectives: Lough Dahybaun SAC 002177. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

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***

002177	Lough Dahybaun SAC

1833	Slender Naiad *Najas flexilis*

Supporting documents, relevant reports & publications

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

NPWS Documents

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 :	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 :	2013
Title :	Article 17 assessment form and audit trail for *Najas flexilis*, the slender naiad (species code 1833). Backing document. April 2013
Author :	O Connor, Á.
Series :	Unpublished report by NPWS
Year :	2017
Title :	Ballyhoorisky Point to Fanad Head SAC (site code: 1975) Conservation objectives supporting document- *Najas flexilis* 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
Year :	2017
Title :	Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (site code: 365) Conservation objectives supporting document- *Najas flexilis* V1
Author :	NPWS
Series :	Conservation objectives supporting document
Year :	2019
Title :	The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments
Author :	NPWS
Series :	Conservation assessments
Year :	in prep.
Title :	A study of lakes with Slender Naiad (*Najas flexilis*)
Author :	Roden, C.; Murphy, P.; Ryan, J.B.
Series :	Irish Wildlife Manual

Other References

Year :	2001
Title :	Aquatic plants in Britain and Ireland
Author :	Preston, C.D.; Croft, J.M.
Series :	Harley Books, Colchester
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 :	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 :	2020
Title :	Slender Naiad (*Najas flexilis*) habitat quality assessment
Author :	Gunn, I.D.M.; Carvalho, L.
Series :	CRW2018_27. Scotland's Centre of Expertise for Waters (CREW)N4908

1833 Slender Naiad *Najas flexilis*

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

Attribute	Measure	Target	Notes
Population extent	Hectares; distribution	Maintain the spatial extent of *Najas flexilis* (slender naiad) within the lake, subject to natural processes	*Najas flexilis* was first recorded in Lough Dahybaun by J.B. Ryan in 1977. It was found there again in 1978 and 1995. In August 2004, the south-eastern corner was surveyed and a large population was found. Dahybaun is a large lake on basal Carboniferous sandstone surrounded by extensive blanket bog, substantial areas of which are cutaway or afforested (Roden, 2004, 2007). Dahybaun was last surveyed in 2004 (Roden, 2004), and the current conservation condition of *Najas flexilis* is not known, however records of unconsolidated peat on the substratum are cause for concern. For information on the species in Ireland see NPWS (2019) and O Connor (2013). For further information on all attributes and targets, see Roden et al. (in prep.), O Connor (2013) and *Najas flexilis* conservation objective supporting documents for other SACs, for example SACs 001975 (NPWS, 2017), 001932 (NPWS, 2017) and 000365 (NPWS, 2017)
Population depth	Metres	Maintain the depth range of *Najas flexilis* within the lake, subject to natural processes	Roden (2004) recorded *Najas flexilis* at 1/1.5m and deeper in Dahybaun, and said the vegetation was very poorly developed possibly owing to the covering of loose peat, and recorded only five additional submerged species. *Najas flexilis* is part of the characteristic deep-water community of lake habitat 3130 (Roden et al., in prep.). *Najas flexilis* is frequently associated with the lower depths of macrophyte growth, where scattered plants gradually give way to bare mud or silt (Preston and Croft, 2001; Roden, 2002)
Population viability	Plant traits	No decline in plant fitness, subject to natural processes	Wingfield et al. (2004) used certain traits (leaf area/shoot length x reproductive number/shoot length) to assess *Najas flexilis* plant fitness and indicated a score of less than one would give rise to concern. Roden et al. (2020) suggested size measurements and photographs of the largest plants encountered may be non-destructive indicators of plant health
Population abundance	Square metres	Maintain the cover abundance of *Najas flexilis*, subject to natural processes	Roden (2004) recorded a 'a large population of *Najas* in the lake from 1m downwards' at Dahybaun, and a cover abundance of <25% in the relevé examined. Cover abundance is likely to vary within a lake, with depth, substratum and exposure. It may also vary inter-annually. However, there should be no sustained decline in the extent, overall size, cover abundance or density of the population in the lake
Species distribution	Occurrence	No decline, subject to natural processes	The full distribution of the species in Dahybaun is not known. Roden (2004) examined the south-eastern corner and found a large population. For further information on the species and its distribution in Ireland, see O Connor (2013), *Najas flexilis* conservation objective supporting documents for other SACs and NPWS (2019)
Habitat extent	Hectares	No decline, subject to natural processes	Habitat for the species relates to the area and quality of the available habitat for the species. Dahybaun was last surveyed in 2004 (Roden, 2004), and the current conservation condition of the species and its habitat are not known. See also Roden et al. (in prep.)

Vegetation distribution: maximum (euphotic) depth	Metres	Maintain/restore maximum depth of vegetation, subject to natural processes	There are no data available on the maximum depth of vegetation or euphotic depth in Dahybaun, but Roden (2004) said the submerged vegetation was very poorly-developed and *Najas flexilis* grew from 1m downwards as isolated plants on the loose peat surface with few associated species, suggesting a shallow euphotic zone. Euphotic depth ranged from 5.5 to <2m and the most extensive populations were found in lakes with euphotic depths >2.5m, however several lakes with *Najas flexilis* had lower euphotic depths (Roden et al., 2020). The target for maximum depth of vegetation colonisation (euphotic depth) was set as at least >3m (Roden et al., in prep.). Site-specific targets must be considered, however, as euphotic depths of >4m or >5m have been recorded in lakes with *Najas flexilis* in good condition. See also Roden et al. (in prep.)
Hydrological regime: water level fluctuations	Metres	Maintain appropriate natural hydrological regime necessary to support the habitat for the species	The hydrological regime of the lake must be maintained so that the area, distribution and depth of the *Najas flexilis* habitats are not reduced. Groundwater inputs are likely to be important for the characteristic deep-water zone and for *Najas flexilis* (Gunn and Carvalho, 2020). See also Roden et al. (in prep.)
Lake substratum quality	Various	Maintain/restore appropriate substratum type, extent and chemistry to support the population of the species	In 1995 it was noted that milled peat had been dumped on the north-eastern shore of the lake and peat dust had washed into the lake. Roden (2004) found *Najas flexilis* in Dahybaun grew on an unconsolidated peat substratum that probably originated from the industrially exploited peatland in its catchment. While the species was growing on allochthonous peat, these deposits are likely to limit the species' abundance. *Najas flexilis* is typically found on soft substrata of mud, silt or fine sand (Preston and Croft, 2001; Roden, 2002, 2004). The sediment chemistry of *Najas flexilis* lakes is described by Wingfield et al. (2004) and Gunn and Carvalho (2020). See also Roden et al. (in prep.)
Nutrients	mg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to support tthe population of the species	*Najas flexilis* is typically associated with high water quality. This is demonstrated by naturally low dissolved nutrients, clear water and low algal growth. The species' association with mixed geology, including some base-enrichment, is well-documented (Preston and Croft, 2001; Roden, 2004; Wingfield et al., 2004). While Roden et al. (in prep.) suggested a target of <0.015mg/l TP, a precautionary target for Good condition is set as ≤0.010mg/l or WFD High Status; however; population attributes determine the species' overall conservation condition. See also Roden et al. (in prep.)
Water colour	mg/l PtCo	Maintain/restore appropriate water colour to support the population of *Najas flexilis*	The large quantities of loose peat observed at Dahybaun and the industrial exploitation of the adjacent peatland may indicate high colour is a problem in the lake. The species is found in clear water (Roden et al., in prep.). Increased water colour (dissolved light-absorbing compounds) and turbidity decrease light penetration and can reduce the area of available *Najas flexilis* habitat, particularly at the lower euphotic depths. Water colour directly controls light penetration and, therefore, euphotic depth and vegetation extent. Roden et al. (in prep.) set Good condition at <40mg/l PtCo, however this was considered to be an impacted state some distance from reference condition. Further work is necessary to determine sustainable water colour levels for the species which may be <30 or even <20mg/l PtCo. The primary source of increased colour in Ireland is peatland disturbance, e.g. through turf-cutting, overgrazing, plantation forestry. See also Roden et al. (in prep.)

Dissolved organic carbon (DOC)	mg/l	Maintain/restore appropriate organic carbon levels to support the population of *Najas flexilis*	The large quantities of loose peaty observed at Dahybaun and the industrial exploitation of the adjacent peatland may indicate high DOC is a problem in the lake. Dissolved organic carbon (DOC) in the water column is linked to water colour and acidification (organic acids). It can provide a substrate (food source) for heterotrophic organisms, which can impact directly (e.g. shading) and indirectly (e.g. nutrient release) on the characteristic lake communities. Damage and degradation of peatland, e.g. through afforestation or turf-cutting, leading to decomposition of peat is likely to be the predominant source of dissolved and particulate organic carbon in Ireland
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	The species is associated with intermediate alkalinity, largely between 20-80mg/l but it also occurs in some lakes with lower values on Old Red Sandstone (Roden et al., in prep.). Acidification is considered a significant threat to *Najas flexilis* (Preston and Croft, 2001; Roden, 2004; Wingfield et al., 2004; Gunn and Carvalho, 2020). Wingfield et al. (2004) considered that *Najas flexilis* has rather specific environmental requirements and occupies a relatively narrow realised niche in Britain and Ireland. Groundwater may influence sediment and water chemistry and be important for contributing base-poor water to this obligate CO2 photosynthesiser in more calcareous lakes and more base-rich water to highly oligotrophic lakes. See also Roden et al. (in prep.)
Associated species	Species composition and abundance	Maintain/restore appropriate associated species and vegetation communities to support the population of *Najas flexilis*	The submerged vegetation was very poorly-developed at Dahybaun in 2004 and a total of six species were recorded (Roden, 2004). *Potamogeton berchtoldii* was the only other species growing with *Najas flexilis* in the relevé taken in 2004. *Najas flexilis* is part of the characteristic and highly sensitive deep water community of habitat 3130 that consists of some or all of *Callitriche hermaphroditica, Hydrilla verticillata, Najas flexilis, Potamogeton berchtoldii, P. perfoliatus, P. pusillus, Nitella confervacea, Nitella flexilis* and *Nitella translucens* (Roden et al., in prep.). See also Preston and Croft, 2001; Roden, 2004, 2007; Wingfield et al., 2004; O Connor, 2013; NPWS, 2019; Gunn and Carvalho, 2020
Fringing habitat: area and condition	Hectares	Maintain/restore the area and condition of fringing habitats necessary to support the population of *Najas flexilis*	Lough Dahybaun is surrounded by blanket bog, much of which has been cut or planted with coniferous trees. Some relatively intact bog survives at the south-eastern side of the lake. Fringing habitats are an integral part of the structure and functioning of lake systems. Heterogeneous lake fringes with a range of natural and semi-natural habitats are preferable. Restoration or maintenance of open, species-rich fen, marsh and grassland can be particularly important. See also Mainstone et al. (2016)

Lough Dahybaun

CO. SLIGO

Bangor

Bellacorick

Lough Dahybaun SAC

Crossmolina

Ballina

Ballycroy

CO. MAYO

Legend

Lough Dahybaun SAC 002177

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage

MAP 1:
LOUGH DAHYBAUN SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 002177; version 3. CO. MAYO

0 50 100 200 Metres

N

Date: January 2021