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Conservation Objectives Series

Ballynafagh Lake SAC 001387

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

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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.

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***

001387	Ballynafagh Lake SAC
1016	Desmoulin's Whorl Snail *Vertigo moulinsiana*
1065	Marsh Fritillary *Euphydryas aurinia*
7230	Alkaline fens

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1972
Title :	A Preliminary Report on Areas of Scientific Interest in County Kildare
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 :	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 Manuals, 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 :	2013
Title :	Survey of Marsh Fritillary Colonies – South and East Ireland 2012
Author :	Wilson, F.; Bond, K.; Crushell, P.; Foss, P.J.; Osthoff, C.
Series :	Unpublished report to 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 :	2019
Title :	Monitoring of sites and habitat for three Annex II species of whorl snail (*Vertigo*)
Author :	Long, M.P.; Brophy, J.T.
Series :	Irish Wildlife Manuals, No. 104
Year :	2019
Title :	Monitoring of sites and habitat for three Annex II species of whorl snail (*Vertigo*). Appendix VI *Vertigo moulinsiana* site reports
Author :	Brophy, J.T.; Long, M.P.
Series :	Irish Wildlife Manuals, No. 104

Year :	2019
Title :	Checklists Protected and Threatened Species in Ireland 2019
Author :	Nelson, B.; Cummins, S.; Fay, L.; Jeffrey, R.; Kelly, S.; Kingston, N.; Lockhart, N.; Marnell, F.; Tierney, D.; Wyse Jackson, M.
Series :	Irish Wildlife Manuals, No. 116
Year :	2021
Title :	Checklists Protected and Threatened Species in Ireland. Version 2.1. 3 December 2021
Author :	Nelson, B.; Cummins, S.; Fay, L.; Jeffrey, R.; Kelly, S.; Kingston, N.; Lockhart, N.; Marnell, F.; Tierney, D.; Wyse Jackson, M.
Series :	Irish Wildlife Manuals, No. 116
Year :	in prep.
Title :	Scoping study and pilot survey of fens
Author :	O'Neill, F.H.; Perrin, P.M.; Denyer, J.; Martin, J.R.; Daly, O.H.; Brophy, J.T.
Series :	Irish Wildlife Manuals

Other References

Year :	1997
Title :	An ecological study of the Blackwood Feeder Canal, Co. Kildare
Author :	Dromey, M.
Series :	Unpublished report to the Inland Waterways Association, Kildare Branch
Year :	2005
Title :	Blackwood Feeder Baseline Study
Author :	White Young Green Ltd.
Series :	Report submitted to Kildare European Leader II Company Ltd.
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 :	2011
Title :	The Fen Management Handbook
Author :	McBride, A.; Diack, I.; Droy, N.; Hamill, B.; Jones, P.; Schutten, J.; Skinner, A.; Street, M. (eds.)
Series :	Scottish Natural Heritage, Perth
Year :	2012
Title :	County Kildare Wetland Survey II. Part 1: Main Report
Author :	Crushell, P.; Foss, P.J.; O'Loughlin, B.; Wilson, F.
Series :	Report prepared for Kildare County Council and The Heritage Council
Year :	2012
Title :	County Kildare Wetland Survey II. Part 2: Site Reports
Author :	Crushell, P.; Foss, P.J.; O'Loughlin, B.; Wilson, F.
Series :	Report prepared for Kildare County Council and The Heritage Council
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 :	2018
Title :	Irish Vegetation Classification: Technical Progress Report No. 4
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre

Spatial data sources

Year :	2012
Title :	Crushell et al. (2012) County Kildare Wetland Survey II dataset
GIS Operations :	QI selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	7230 (map 2)
Year :	2021
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 :	1016, 1065 (map 3, 4)

Conservation Objectives for : Ballynafagh Lake SAC [001387]

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Ballynafagh Lake 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	Ballynafagh Lake SAC contains one of the best examples of alkaline fen in eastern Ireland. Ballynafagh Lake, a former reservoir, is a shallow alkaline lake with a diverse wetland vegetation. Alkaline fen occurs around the lake and is the main habitat in the SAC. Part of Ballynafagh Lake SAC was surveyed as part of the Kildare Wetland Survey (KWS) by Crushell et al. (2012; site code KE8) who mapped c.11.9ha of alkaline fen habitat, including in mosaic with other habitats. It is important to note that further unsurveyed areas are present within the SAC as the Blackwood Feeder was not included in the KWS KE8 sub-site
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on Crushell et al. (2012)
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). Increased nutrients can lead to changes in plant and invertebrate species through competition and subsequent structural changes to micro-habitat. These nutrients favour growth of grasses rather than forbs and mosses and leads to a higher and denser sward
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; water supply	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. In Ballynafagh Lake SAC, water levels in the lake appear to be declining (White Young Green, 2005; NPWS internal files). See White Young Green (2005) for further details on hydrology in the SAC
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 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	Various	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. Ballynafagh Lake is partly groundwater-fed and a calcium-rich water supply flows up from the underlying limestone (White Young Green, 2005). See White Young Green (2005) for futher details

Vegetationcomposition: community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	White Young Green (2005) describe the alkaline fen communities in Ballynafagh Lake SAC. Information on the vegetation communities associated with alkaline fens is provided by O'Neill et al. (in prep.). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Vegetation composition: typical brown mosses	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical brown moss species	For lists of typical bryophyte species, including high quality indicator species, see O'Neill et al. (in prep.). Typical brown moss species recorded in the habitat in the SAC include *Bryum pseudotriquetrum, Campylium stellatum, Ctenidium molluscum, Fissidens adianthoides, Scorpidium revolvens* and *S. scorpioides* (Dromey, 1997; White Young Green, 2005; NPWS internal files)
Vegetation composition: typical vascular plants	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical vascular plant species	For lists of typical vascular plant species for the different vegetation communities, including high quality indicators, see O'Neill et al. (in prep.). Typical species recorded in the habitat in the SAC include *Schoenus nigricans*, *Carex rostrata*, *C. lepidocarpa*, *Juncus subnodulosus* and *Pinguicula vulgaris* (Goodwillie, 1972; Dromey, 1997; White Young Green, 2005; NPWS internal files)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of 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. Native negative indicators may include *Anthoxanthum odoratum, Epilobium hirsutum, Holcus lanatus, Juncus effusus, Phragmites australis* and *Ranunculus repens*. See O'Neill et al. (in prep.)
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	Attribute and target based on O'Neill et al. (in prep.). 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. White Young Green (2005) recorded one specimen of the invasive non-native pitcher plant (*Sarracenia purpurea*) in an area of fen/heath at the north-eastern side of the lake in the SAC
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 O'Neill et al. (in prep.). Scrub and trees will tend to invade if fen conditions become drier. Scrub encroachment, particularly by willow (*Salix* sp.) and birch (*Betula* sp.), has been reported in the habitat in the SAC (Dromey, 1997; Crushell et al., 2012)
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	Attribute and target based on O'Neill et al. (in prep.). Algal cover is indicative of nutrient enrichment from multiple sources (McBride et al., 2011)
Vegetation structure: vegetation height	Percentage cover at a representative number of monitoring stops	At least 50% of the live leaves/flowering shoots are more than either 5cm or 15cm above ground surface depending on community type	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive grazing can reduce the ability of plant species to regenerate reproductively and maintain species diversity, especially if flowering shoots are cropped during the growing season
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground not more than 10%	Attribute and target based on O'Neill et al. (in prep.). 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
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on O'Neill et al. (in prep.). Calcareous springs, some tufa-forming, are found in association with the habitat, mainly in the north-eastern area of the SAC (White Young Green, 2005; see site PS016 in Lyons, 2015)

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.; see Nelson et al., 2019, 2021). The alkaline fen and associated habitats in the SAC are important for a variety of invertebrates, including the Annex II listed species Desmoulin's whorl snail (*Vertigo moulinsiana*), which is classified as Endangered in Ireland (Byrne et al., 2009), and marsh fritillary (*Euphydryas aurinia*), which is classified as Endangered (Regan et al., 2010). See the conservation objective for Desmoulin's whorl snail (Annex II species code 1016) and marsh fritillary (1065) in this volume
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain adequate transitional areas to support/protect the alkaline fen habitat and the services it provides	In many cases, fens transition to other wetland habitats. It is important that the transitional areas between fens and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen. In Ballynafagh Lake SAC, alkaline fen occurs in association with common reed (*Phragmites australis*) beds, petrifying springs, fen meadows, great fen-sedge (*Cladium mariscus*) swamp and transitional bog communities, as well as wet woodland (NPWS internal files)

1016 Desmoulin's Whorl Snail *Vertigo moulinsiana*

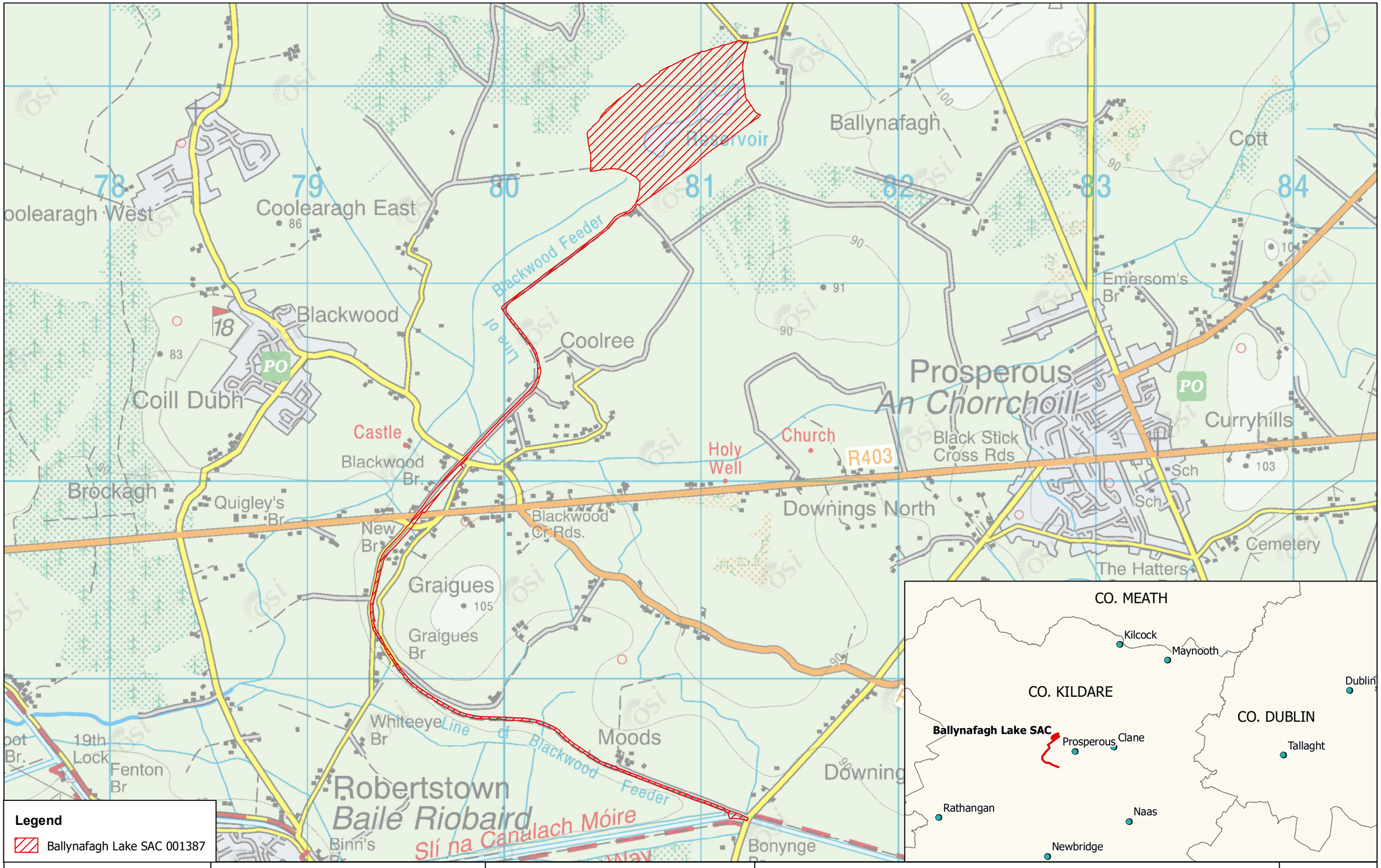
To maintain the favourable conservation condition of Desmoulin's Whorl Snail (*Vertigo moulinsiana*) in Ballynafagh Lake SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number of occupied 1km squares	No decline, subject to natural processes. There is one known site for this species in the SAC within the 1km grid squares N8125, N8025, N7927, N8027, N8028, N8128 and N8129. See map 3	There are records of Desmoulin's whorl snail (*Vertigo moulinsiana*) from seven 1km grid squares that overlap Ballynafagh Lake SAC: N8125, N8025, N7927, N8027, N8028, N8128 and N8129. The species is present at the edge of the lake and along the whole length of the Blackwood feeder. See details for the site Ballynafagh (VmCAM10) in Moorkens and Killeen (2011), Long and Brophy (2019) and Brophy and Long (2019)
Occurrence in suitable habitat	Percentage positive records in a representative number of samples	No decline, subject to natural processes. A baseline figure of 50% positive samples is set	Desmoulin's whorl snail (*Vertigo moulinsiana*)should be present in at least 50% of sample points that have suitable habitat. This attribute should be assessed following the methodology in Long and Brophy (2019) taking a representative number of samples in suitable habitat across the site. Optimal and sub-optimal habitat is defined in Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019)
Habitat area	Hectares	Area of suitable habitat stable or increasing, subject to natural processes; no less than 10ha of at least sub-optimal habitat	The baseline figure for the amount of habitat in at least sub-optimal condition for this site is 10ha. This attribute should be assessed according to the definitions and methodology in Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019), where optimal and sub-optimal habitat is defined
Habitat quality: occupied patches in at least sub-optimal condition	Percentage	No decline, subject to natural processes. A baseline of 50% is set	Suitable habitat that is at least sub-optimal is patchy on the site. The baseline target is that at least 50% of the occupied habitat patches should be in at least sub-optimal condition. This attribute should be assessed according to the definitions and methodology in Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019), where optimal and sub-optimal habitat is defined
Habitat quality: soil wetness	Soil wetness criteria	No decline, subject to natural processes	The baseline is that 50% of sample points should be classified as in soil wetness Class 1 or 2 with appropriate scale of sampling across the site and within habitat patches. This attribute should be assessed according to the definitions and methodology in Moorkens and Killeen (2011), Brophy and Long (2019) and Long and Brophy (2019), where soil wetness classes are defined

1065 Marsh Fritillary *Euphydryas aurinia*

To maintain the favourable conservation condition of Marsh Fritillary (*Euphydryas aurinia*) in Ballynafagh Lake SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: occupied 1km grid squares	Number	No decline, subject to natural processes	There are few records of marsh fritillary (*Euphydryas aurinia*) from Ballynafagh Lake SAC that give more accurate than 1km resolution to the record, in N8129. See map 4. The distribution of suitable habitat in the SAC is taken as a surrogate for the potential distribution of the marsh fritillary butterfly. According to Wilson et al. (2013), habitat is present in four 1km squares that overlap the SAC: N8028, N8029, N8128 and N8129
Proof of breeding: larval webs	Number at a representative number of sub-sites	Proof of breeding, confirmed by detection of webs	The presence of the larval webs of marsh fritillary (*Euphydryas aurinia*) provides best proof that the habitat is suitable for the species. Proof of breeding should be established at least one year in six
Potential habitat: area	Hectares	Area of potential habitat, stable or increasing, subject to natural processes	Suitable potential habitat for marsh fritillary (*Euphydryas aurinia*) 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 high. In 2012, just under 2.5ha of habitat was assessed as suitable for the species and was classified as in good condition (Wilson et al., 2013), and this is taken as the baseline figure



Legend

Ballynafagh Lake SAC 001387

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Department of Housing, Local Government and Heritage

MAP 1:
BALLYNAFAGH LAKE SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001387; version 3.01
CO. KILDARE

0 125 250 500 Metres

N

Date: December 2021

Legend

- 7230 Alkaline fens
- Ballynafagh Lake SAC 001387

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Department of Housing, Local Government and Heritage

MAP 2:
BALLYNAFAGH LAKE SAC
CONSERVATION OBJECTIVES
ALKALINE FENS

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

SITE CODE:
SAC 001387; version 3.01
CO. KILDARE

0 125 250 500 Metres

N

Date: December 2021

N8129

N8028

N8128

N7927

N8027

N8025

N8125

Legend

1016 Desmoulin's whorl snail *Vertigo moulinsiana* 1km grid squares

Ballynafagh Lake SAC 001387

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Department of Housing, Local Government and Heritage

MAP 3:
BALLYNAFAGH LAKE SAC
CONSERVATION OBJECTIVES
DESMOULIN'S WHORL SNAIL

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

SITE CODE:
SAC 001387; version 3.01
CO. KILDARE

0 170 340 680 Metres

N

Date: December 2021

Legend

1065 Marsh fritillary *Euphydryas aurinia* 1km grid square

Ballynafagh Lake SAC 001387

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Department of Housing, Local Government and Heritage

MAP 4:
BALLYNAFAGH LAKE SAC
CONSERVATION OBJECTIVES
MARSH FRITILLARY

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

SITE CODE:
SAC 001387; version 3.01
CO. KILDARE

0 170 340 680 Metres

N

Date: December 2021