Appropriate Assessment Screening Report

Proposed Playground Development at Corrybrannan, Ballybay, Co. Monaghan

Report For:

Monaghan County Council

Prepared By:

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Date:

08th August 2023

Project No. 15304

Report No. 15304-01

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1.0 INTRODUCTION

1.1 Project Background

It is understood that Monaghan County Council intend to carry out upgrade works on a playground located at Corrybrennan, Ballybay, Co. Monaghan. Accordingly, Hydrec Environmental Consulting were engaged by Mr. Craig Connolly of Monaghan County Council to prepare an Appropriate Assessment Screening Report to determine the appropriateness of the proposed development in the context of the conservation objectives set out in any nearby Natura 2000 sites.

1.2 Statement of Competence

Patrick McCabe is a graduate of University College Dublin with a BSc in Applied Environmental Science. Additionally, Patrick has graduated from Dundalk Institute of Technology (Centre for Freshwater Studies) with a MSc focusing on freshwater ecology and catchment science / hydrology. He has over 10 years' experience in environmental consultancy, acting as project manager on a range of ecological and hydrological assessments within the agricultural, industrial, residential and waste sectors. Patrick has also spoke on such topics at a number of national conferences (e.g. International Association of Hydrogeologists (IAH), Irish Group, Annual Conference 2021) and given guest lectures on the subject to third level education institutions (e.g. NUI Galway - MSc Programme in "Marine and Freshwater Resources: Management, 2022 & 2023).

1.3 Legislative Context

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as the "Habitats Directive", provides legal protection for habitats and species of European importance.

Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC. It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. The Habitats Directive has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) and the Planning and Development (Amendment) Act, 2010 as amended.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites. Article 6(3) establishes the requirement for Appropriate Assessment (AA):

Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Article 6(4) states:

If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to: human health or public safety; beneficial consequences of primary importance for the environment; or, further to an opinion from the Commission, other imperative reasons of overriding public interest.

These articles mean that where the implementation of the proposed development has potential to have a significant effect on a Natura 2000 site, the relevant Competent Authority must ensure that an appropriate assessment is carried out in view of that site's conservation objectives

1.4 Stages of Appropriate Assessment

There are up to 4 stages in the Appropriate Assessment process as outlined in the European Commission Guidance document (EC, 2001). The following is a summary of these stages (each of which is dependent on the outcome of the previous):

- Stage 1 - Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 Site and considers whether it can be objectively concluded that these effects will not be significant.
- Stage 2 - Appropriate Assessment: In this stage, the impact of the project on the integrity of a Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function.
- Stage 3 - Assessment of Alternative Solutions: Should the Appropriate Assessment determine that adverse impacts are likely upon a Natura 2000 site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.
- Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura 2000 site will be necessary.

2.0 STAGE 1 – SCREENING

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA screening has had regard to the following guidance:

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government;
- Managing Natura 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, referred to as MN2000, European Commission 2000;
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, referred to as the "EC Article 6 Guidance Document (EC2000); and
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission.

In complying with the obligations under Article 6(3) and following the EC2000 and MN2000 Guidelines, this AA has been structured in a stage by stage approach as follows:

- Description of the project;
- Identification of Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result;
- Assessment of the significance of the impacts identified in relation to site integrity;
- Exclusion of sites where it can be objectively concluded that there will be no significant effects; and
- Screening conclusion.

2.1 Description of Project

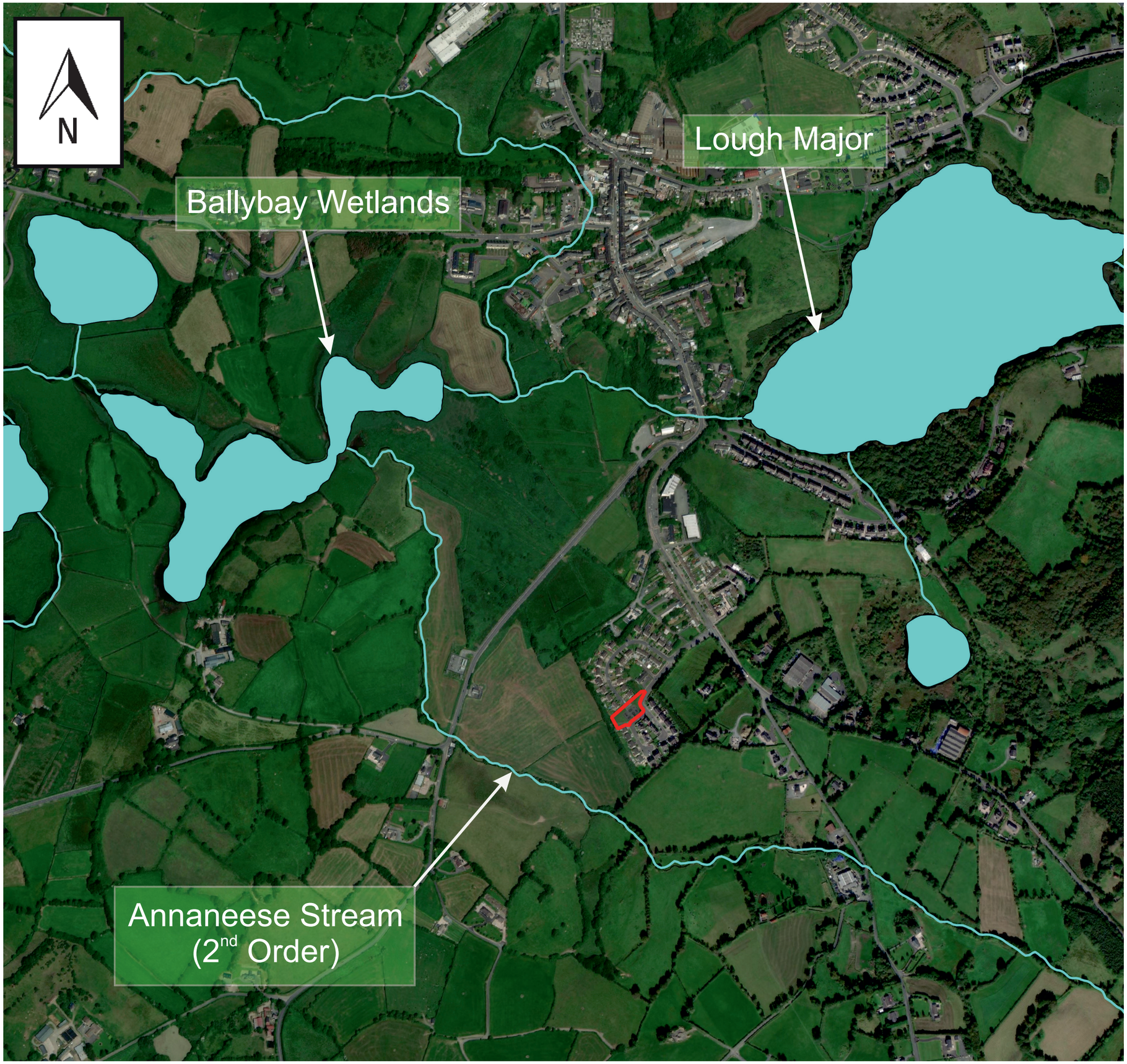
2.1.1 Site Location & Description of Proposed Works

As mentioned previously Monaghan County Council intend to carry out refurbishment works on a playground located at Corrybrennan, Ballybay, Co. Monaghan. The playground in question is situated in between the Corrybrennan Park and Culbrennan housing developments. The playpark is accessed via the L31002 – Local Road which in turn links to the R180 – Carrickmacross Regional Road c. 210m from the park.

2.1.2 Hydrology

With the publication of Ireland's second River Basin Management Plan (RBMP), the RBMP 2018 – 2021 defines the entirety of the island of Ireland as a single River Basin District (RBD). This single RBD has been broken down into 46 catchment management units. These units are mainly based on the hydrometric areas in use by the local authorities. Each of the 46 catchment management units have been further broken down into 583 sub-catchments. The proposed development site is located within the Erne Hydrometric Area WFD Catchment. Additionally, the site is located within the Dromore_SC_010 WFD Sub-catchment.

The Annaneese Stream (2nd Order) which is located c. 195m to the south-west, is the closest waterbody to the proposed development (see Figure 1). This stream flows in a general south-eastern to north-western orientation where it discharges into the Ballybay Wetlands. The outflow of the Ballybay Wetlands, the Dromore River (4th Order) flows into White Lough c. 2.3km downstream.



LEGEND

- Site Boundary
- Stream / River
- Lake

HYDREC
ENVIRONMENTAL CONSULTING

PROJECT:

AA Screening Report-
Monaghan County Council

TITLE:

Hydrological features in the vicinity of the site

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As part of the Catchment Flood Risk Assessment and Management (CFRAM) project, a number of watercourses associated with the Dromore River (including the Annaneese Stream), were modelled as part of the Ballybay CFRAM hydraulic model. As can be seen from Plate 1. flooding of the proposed development area and site entrance was not predicated to occur under either the 1 in 100-year or 1 in 1000-year flood events.

Plate 1. Extract from Cavan Model CFRAM Mapping

2.1.3 Soils & Geology

According to the Teagasc and EPA soils map, AminPD - Acid Deep Poorly Drained Mineral soils belonging to the Surface Water Gley / Groundwater Gley soil group are found within the entirety of the site. In reality soils are likely to consist of MADE GROUND.

In Ireland, the parent material underlying the majority of the country is comprised of quaternary sediments with the remainder composed of bedrock outcrop. These quaternary sediments have resulted from glacial movement, melting and deposition. The Teagasc and EPA subsoil maps identify that TLPSsS – Sandstone and shale till subsoil of predominately clayey texture are found to underly the poorly draining soils.

Based on the GSI's 1:100k bedrock formation mapping, the entirety of the site is underlain by the Lough Avaghon Formation which comprises principally of massive sandstone & microconglomerate. Bedrock outcrops are not found within the curtilage of the site. Similarly, and according to the National Karst Database, no karst features are present within the site's boundary or locality.

2.1.4 Hydrogeology

The Geological Survey of Ireland (GSI) have reviewed the 1,200 geological Formations and Members defined within the Republic of Ireland and reduced them into 27 'Rock Unit Groups' (RUGs) based on their hydrogeological properties and significance. Based on the GSI's generalised bedrock RUG mapping, the *Silurian Metasediments and Volcanics* RUG exists within the entirety of the site. A PI – Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones is associated with this RUG that underlies the site.

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydro-geological characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability maps are based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays), and the presence of certain karst features. Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes. The entirety of the development site is classified as *'E – Extreme'* vulnerability. The groundwater underneath the site is within the Cavan Groundwater Body (GWB) and is classified as being of 'Good' status.

2.1.5 Local Aquatic Ecology

Macroinvertebrate sampling has not historically been conducted on the Annaneese Stream. However, kick sampling has been completed on the downstream Dromore River at different monitoring locations since the 1970's. The closest active WFD operational monitoring station to the site (i.e. Balladian Bridge – RS36D020300), is located c. 2.2km downstream.

A Q-value rating of Q2-3 was recorded in 2019. This Q-value score represents a 'Poor' ecological status, which has been consistently recorded at this monitoring point since 1997. From 1980 – 1993 a 'Moderate' status was recorded, with the exception of 1989 when a Q3 value was once again recorded.

2.1.6 Local Flora & Fauna

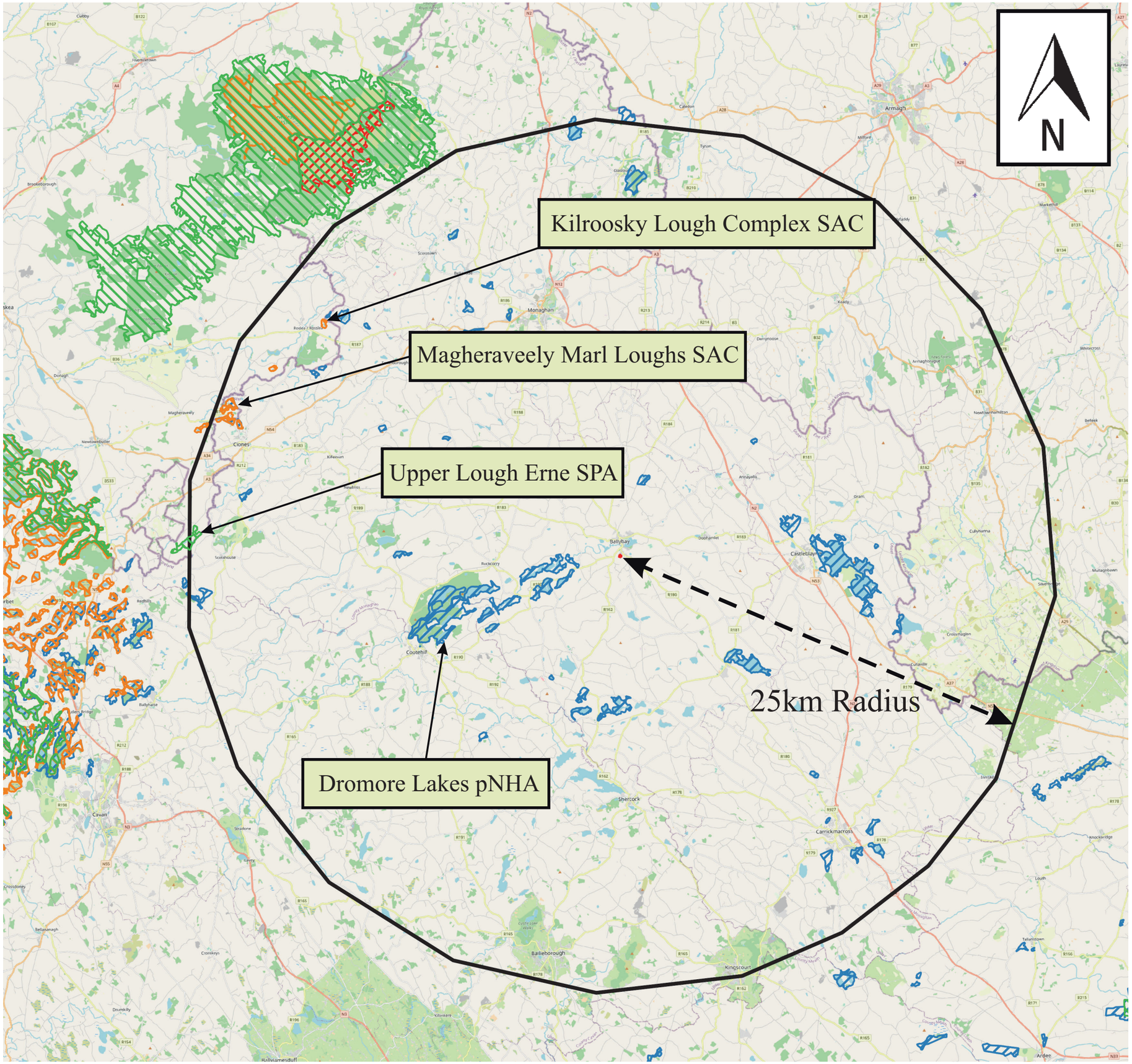
A search of the National Parks and Wildlife Services (NPWS) and National Biodiversity Data Centre's (NBDC) online data records was undertaken to determine if any protected species associated with the Natura 2000 sites assessed have been recorded within the site footprint. It was found that no such species were previously recorded at said location. This search was expanded to a 1km radius from the site. Based on these records, some sightings of Whooper Swan (Cygnus cygnus) were recorded. These records pertain to sightings of Whooper Swan at the inlet to Lough Major (i.e. 1km from the site) and 350m to the north within the Ballybay Wetlands. It is also noted that Whooper Swans have previously been found to be a winter visitor to White Lough which forms part of the Dromore Lakes pNHA.

Following, a site visit completed by Patrick McCabe of Hydrec Environmental Consulting in August 2023, two habitat types described in accordance with the Fossitt habitat classification system were observed. Such habitats included *BL3 Buildings and artificial surfaces* and *GA2 Amenity grassland (improved).* Thus, the habitats identified onsite were deemed to be wholly unsuitable for Whooper Swan foraging activities. Additionally, no High Impact invasive species were recorded onsite.

2.2 Identification of Natura 2000 Sites within Potential Zones of Influence

The EU Habitats Directive contains a list of habitats (Annex I) and species (Annex II) for which SACs must be established by Member States. Similarly, the EU Birds Directive contains lists of important bird species (Annex I) and other migratory bird species for which SPAs must be established. Those that are known to occur at a site are referred to as 'qualifying interests' and are listed in the Natura 2000 forms which are lodged with the EU Commission by each Member State. A 'qualifying interest' is one of the factors (such as the species or habitat that is present) for which the site merits designation. The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland.

Figure 2. illustrates all Natura 2000 sites situated within 25km of the proposed development. The use of a 25km radius was selected to ensure that the Upper Lough Erne SPA was included in the assessment, given the positioning of the proposed development location within the Erne Catchment. As can be seen from Figure 2. and Table 1, this expanded search results in three NATURA 2000 sites located within a 25km radius of the site.



LEGEND

- Special Area of Conservation
- Special Protection Area
- National Heritage Area
- proposed National Heritage Area

HYDREC ENVIRONMENTAL CONSULTING

PROJECT:

Appropriate Assessment Screening Report - Monaghan County Council

TITLE:

Identification of Natura 2000 Sites within a 25km Radius of the Proposed Development

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Table 1. Distance of Natura 2000 Sites from the Proposed Development

Natura 2000 Sites	Distance
Magheraveely Marl Loughs SAC	22.4km
Kilroosky Lough Complex SAC	22.8km
Upper Lough Erne SPA	24.0km

While Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA) do not form part of the Natura 2000 network, they can provide an important supporting function, particularly to fauna species that are not confined within the boundaries of an attributed SPA / SAC (e.g. certain bird species). Therefore, in order to protect the European network, it may also be a requirement to protect a designated NHA / p NHA. In addition, Article 10 of the Habitat's Directive places a high level of importance on such sites that connect the Natura 2000 network. Table 2 below identifies the closest NHA / pNHA's to the proposed development site.

Table 2. Distance of NHA & pNHA Sites from the Proposed Development

Natural Heritage Areas	Distance
Dromore Lakes (pNHA – 000001)	2.4km
Cordoo Lough (pNHA – 001268)	4.3km

2.3 Brief Description of Natura 2000 Sites

2.3.1 Magheraveely Marl Loughs SAC (Site Code: UK0016621)

Magheraveely Marl Loughs SAC is comprised of six low-lying lakes in the River Finn catchment (Co. Monaghan and Co. Fermanagh). This includes Annachullion Lough, Drumacritten Lough, Knockballymore Lough, Burdautien Lough, Kilroosky Lough and Summerhill Lough with the latter three also designated under the Kilroosky Lough Complex SAC. The habitats and/or species for which this area has been designated as a SAC are listed below:

- [3140] Hard Water Lakes
- [7210] Cladium Fens*
- [7230] Alkaline Fens
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)

In comparison with other lakes in the region, this site is important because the water has not been influenced by nutrient enrichment and remains clear, with a high lime content and low plant nutrient conditions. Stoneworts are the dominant submerged vegetation and include several rare and local species, including *Chara aspera*, *C. curta*, *C. hispida* and *C. pedunculata.*

The lakes are surrounded by an inundation zone containing significant stands of alkaline fen vegetation. This is generally composed of a sward that is very rich in sedges and herbs. Characteristic species include the sedges lesser tussock-sedge *Carex diandra*, long-stalked yellow sedge *C. viridula ssp. brachyrrhyncha* and glaucous sedge *C. flacca*. Other frequent rare species include marsh arrowgrass *Triglochin palustre*, quaking-grass *Briza media* and more notably, marsh helleborine *Epipactis palustris*, grass-of-Parnassus *Parnassia palustris*, knotted pearlwort *Sagina nodosa* and fen bedstraw *Galium uliginosum*. A copy of the Magheraveely Marl Loughs SAC Conservation Objectives are included in Appendix 1.

2.3.2 Kilroosky Lough Complex SAC (Site Code: 001786)

Kilroosky Lough Cluster straddles the border with Northern Ireland, and is located approximately 2 km north-west of Clones, Co. Monaghan. The site consists of three separate areas which contain several calcium-rich, clean water (oligo-mesotrophic) lakes and their marginal fen vegetation. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- [3140] Hard Water Lakes
- [7210] Cladium Fens*
- [7230] Alkaline Fens
- [1092] White-clawed Crayfish (*Austropotamobius pallipes*)

The lough cluster includes Kilroosky, Burdautien, Summerhill and Dummy's Loughs, which are of interest for their classic marl lake water chemistry and extensive calcicole plant communities. Marl lakes are relatively low in nutrients, high in calcium and have good water quality. These types of lakes are rare due to their sensitivity to pollution and have been recognised as being of international importance through their listing on Annex I of the E.U. Habitats Directive. Such hard water lakes are characteristically rich in stoneworts. Stonewort species recorded from Kilroosky include *Chara hispida*, *C. pedunculata*, *Nitella flexilis* and the regionally rare *Chara rudis*.

Kilroosky Lough is a marl lake surrounded by fen and species-rich, freshwater marsh. Of particular note is the occurrence of a fringe of Great Fen-Sedge (*Cladium mariscus*) – Cladium fen is a habitat type listed with priority status on Annex I of the E.U. Habitats Directive. Although with a more restricted distribution at the site, and perhaps existing in transition with other habitats in some areas, the presence of areas of alkaline fen are also notable. Plant species of regional or local importance recorded from fens within the site include Cowbane (*Cicuta virosa),* Fen Bedstraw (*Galium uliginosum*), Fen Pondweed (*Potamogeton coloratus),* Few-flowered Spike-rush (*Eleocharis quinqueflora*), Tufted-sedge (*Carex elata*) and Grass-of-parnassus (*Parnassia palustris*). Eight species of orchid, including the uncommon Marsh Helleborine (*Epipactis palustris*), have also been recorded.

Kilroosky Lough Cluster is of ecological interest for its diversity of habitats and species. It is of particular conservation significance for its hard water lakes, areas of alkaline fen and of *Cladium mariscus* fen, all habitats that are listed on Annex I of the E.U. Habitats Directive, the last-named with priority status. Furthermore, the site supports a population of White-clawed Crayfish, a species that is listed on Annex II of this Directive. A copy of the Kilroosky Lough Complex's SAC Conservation Objectives are included in Appendix 2.

2.3.3 Upper Lough Erne SPA (Site Code: UK9020071)

Upper Lough Erne Lough is situated in Co. Fermanagh in the west of Northern Ireland. It is a very large and complex freshwater system. A series of flooded drumlins in the course of the River Erne give rise to a complex of islands, bays and many lakes bordered by damp pastures, fens, reedswamp and alder/willow carr and oak woodland. The open waters of the main lough and smaller satellite loughs contain a variety of aquatic communities typical of natural

eutrophic lakes. In addition, the shallow sheltered shores support extensive swamp, fen and marsh communities. Behind the open grazed foreshore is species-rich grassland, which occasionally extends back into the old adjacent field systems. Alluvial woodland is found where the shoreline is ungrazed or only very lightly grazed, while occasionally the dryer soils of the drumlins behind support a natural Oak woodland; this is particularly well developed within the Crom Estate to the south and the small island to the north of the Lough. Wintering Whooper Swan generally utilise the improved or semi-improved grassland close to the water bodies for roosting. Foraging in flooded fields and within the emergent vegetation in shallower lakes is common. Consequently, the site qualifies under Article 4.1 of EC Directive 79/409 on the Conservation of Wild Birds by regularly supporting internationally important numbers of wintering Whooper Swan *Cygnus cygnus* (the five year peak mean for the period 1991/92 to 1995/96 was 352 which comprises 2 % of the international Icelandic population). Upper Lough Erne provides a core protected area for Whooper Swans in the region of Northern Ireland, there

being interchange between the swans using protected areas and those ranging more widely on surrounding farmland. A copy of the Upper Lough Erne SPA Conservation Objectives are included in Appendix 3.

2.4 Assessment of Direct, Indirect & Secondary Impacts

2.4.1 Direct Impacts

The proposed development works are not situated within any SAC or SPA, therefore no direct impacts will occur through land take / habitat loss or fragmentation of habitats (see Figures 1 & 2). Furthermore, no Alkaline or Cladium Fen habitats were recorded onsite.

2.4.2 Indirect & Secondary Impacts

Indirect impacts can occur where there is a viable pathway between the source (i.e. the proposed development site) and the receptor (i.e. the habitats and species for which a Natura 2000 site has been designated). Common pathways for impacts include surface water and groundwater contamination, air (e.g. airborne dust or noise) and land (e.g. overland flow or vibration).

Given the distance to the nearest NATURA 2000 site of ornithological importance (i.e. Upper Lough Erne SPA – 24km), it is not envisaged that any air, noise or vibration emissions resulting from the construction or operational phase of the project will impact on the species present (i.e. Whooper Swan). For instance, Whooper Swans associated with European Designated Sites have been found to forage up to 5km from NATURA 2000 site boundaries. Furthermore, given the type of development (i.e. playground refurbishment works), it is not anticipated that noise or dust emissions will cause a negative impact to the more local wintering populations of Whooper Swan found at Lough Major, Ballybay Wetlands or White Lough

Given the distance between the proposed development and nearest watercourse (i.e. Annaneese Stream – 195m to the south-west) and lack of proposed discharge from the site, no hydrological Source-Pathway-Receptor (S-P-R) linkages will exist. Consequently, the development will not directly / indirectly affect the water quality of the downstream Dromore Lakes pNHA or Upper Lough Erne SPA. As the development is situated within a different WFD sub-catchment to that of the Magheraveely Marl Loughs SAC and Kilroosky Lough Complex SAC (Finn_SC_020) the proposed works cannot impact on the water quality at these receptors. Whilst an extreme groundwater vulnerability has been assigned to the site, deep excavation works are not proposed thus the risk to groundwater was deemed to be low. A summary of any likely direct, indirect or secondary impacts of the proposed development is presented in Table 3.

Table 3. Potential Significant Impacts on Natura 2000 Sites from the Proposed Development

Assessment of Likely Impacts	
Size and Scale	The proposed development footprint is small in scale (<0.25ha) and sufficiently removed from any European Designated Site. Consequently, there will be no impact on any Natura 2000 sites as a result of the project's size or scale.
Land-take	Given that there are no works proposed within any Natura 2000 site, there will be no land-take as a result of the project. Thus, no loss of hard water lake, alkaline fen or cladium fen will occur.
Distance from Natura 200 Site	As can be seen from Table 1. the proposed development site is a considerable distance from the Upper Lough Erne SPA (i.e. 24.0km) and therefore deemed to be outside of the Zone of Influence for the species associated with this site. Similarly, the site is positioned within a different WFD sub-catchment to that of the other NATURA 2000 sites located within a 25km radius.
Resource Requirement	No materials for construction will be sourced from within any Natura 2000 site (e.g. no water abstraction).
Emissions	No water discharges are proposed from the site. Therefore, no deleterious material will be disposed of to the Annaneese Stream. Thus, the hydrological / hydrogeological Source – Pathway – Receptor continuum is broken.
Excavation Requirements	No excavations will take place within any Natura 2000 site.
Transportation Requirements	Site will be accessed via the L31004 - Local Road. Therefore, no access to or through any areas within an SAC or SPA will be required.
Duration of Construction	The duration of construction is not envisaged to have effect on any Natura 2000 site as noise is not anticipated to be a nuisance outside of the site's boundary.

2.5 Cumulative Effects

It is a requirement of the Appropriate Assessment process that the combined effects of the proposed development together with other plans or projects be assessed. Accordingly, a number of other projects have been considered in order to determine if 'In-Combination' impacts exist. A search of all planning applications submitted to Monaghan County Council within the last three years and within the townland of Corrybrannan was completed. It was determined that development density in the area was relatively low and that planning permission was granted to two other projects in this timeframe. These included planning applications:

- 22405 – permission for a development consisting of the construction of a two-storey extension to the side and rear of existing two storey end of terrace dwelling, alterations to existing elevations, internal alterations, removal of low rise wall to facilitate parking, new vehicular entrance to the rear and all associated site works; and
- 228002 – permission for a proposed development consisting of the construction of a 2-bay fire station (including a training tower) and ancillary accommodation and site works. The site works include a vehicular access from R162, pedestrian access from eastern laneway, large hardstanding area for training and turning circles, 10 number carparking spaces including disabled spaces(s), fuel tanks and gas tanks, all service connections and boundary treatments at the site.

Like the proposed development each of the aforementioned projects are located outside the boundaries of any NATURA 2000 site. Cumulative noise or dust emissions from the construction of the proposed development and those not yet constructed, (i.e. should they all proceed in tandem), will not have an impact on the flora or fauna associated with any of the aforementioned screened sites (i.e. deemed to be sufficiently removed). Given that no water discharges are proposed, no changes to the assimilative capacity of any receiving watercourse will occur.

It was therefore concluded that no cumulative impacts are predicated with any in-combination impacts associated with neighbouring developments deemed to be negligible and insignificant.

2.6 Likely Changes to Natura 2000 Sites & Significant Impacts

The likely changes that will arise from the proposed development have been examined in the context of a number of factors that could potentially affect the integrity of the identified Natura 2000 sites (see Table 4).

Table 4. Likely Effects on Natura 2000 sites

Assessment of Likely Impacts	
Reduction of Habitat Area	No works will take place within the boundary of any Natura 2000 site and therefore no loss of habitat will occur.
Disturbance of Key Species	All works associated with the proposed development will take place outside the boundaries of any Natura 2000 site. Given the low ecological condition of the existing site and absence of qualifying interests / supporting habitats of key species, no significant impacts are considered likely.
Habitat or Species Fragmentation	There will be no works within any SAC / SPA or land take as a result of the development. Consequently, habitat fragmentation will not occur.
Reduction in Species Density	No reduction in species density within any Natura 2000 site is considered likely as a result of the project.
Changes in Key Indicators of Conservation Value	Given the distance of the proposed development from the Upper Lough Erne SPA (i.e. 24.0km), it is not anticipated that there will be any adverse impact on the conservation objectives of either designated site.
Climate Change	No damage to any Natura 2000 site as a result of climate change is predicated to occur as a consequence of the development (i.e. no air emissions will occur post development).

3.0 CONCLUSION

The likely impacts that will arise from the proposed development located at Corrybrennan, Ballybay, Co. Monaghan have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. On the basis of the findings of this Appropriate Assessment screening exercise, it is concluded that the proposed development on its own or in combination with other developments will not have a significant effect on the Natura 2000 network and a Stage 2 Appropriate Assessment is not required.

Signed:

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APPENDIX 1

CONSERVATION OBJECTIVES FOR MAGHERAVEELY MARL LOUGHS SAC

MAGHERAVEELY MARL LOUGHS SAC
UK0016621

CONSERVATION OBJECTIVES

Document Details

Title	*Magheraveely Marl Loughs SAC Conservation Objectives*
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Approved By	*P. Corbett*
Date Effective From	*01/04/2015*
Version Number	*V2*
Next Review Date	Nov 2020
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Revision History:

Version	Date	Summary of Changes	Initials
V1	June 2013	Internal working document	PC
V2	January 2015	Complete review	RMK

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] to ensure that all habitats and species of Community Interest are maintained or restored to Favourable Conservation Status (FCS). Natura 2000 sites have a crucial role to play in achieving this overall objective since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.

To ensure that each Natura 2000 site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the Natura 2000 network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, Natura 2000 sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

[1] 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition

- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.

- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status is defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as "**the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site**".

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4. SITE INFORMATION

COUNTY: FERMANAGH

SUB-SITES	GRID REFERENCE
Kilroosky Lough	IH 495274
Burdautien Lough	IH 495282
Knockballymore Lough	IH 478269
Drumacrittin Lough	IH 549327
Annachullion Lough	IH 519302
Summerhill Lough	IH 491280

AREA: 58.8 ha

5. SUMMARY SITE DESCRIPTION

Magheraveely Marl Loughs SAC is comprised of six lakes low-lying in the catchment of the River Finn. They are individually designated as ASSIs and were selected from a cluster of lakes situated here because of the combination of hard water and low nutrient status, resulting in lakes that approach the classic marl lake condition. In addition, they are surrounded by wetlands whose interest is also promoted by high calcium concentration.

Further details of the site are contained in the ASSI Citation and Views About Management statement, which are available on the NIEA website (www.doeni.gov.uk/niea).

5.1 BOUNDARY RATIONALE

It was not attempted to include the surface water catchments for the basins. Boundaries were drawn to include the open water and swamp areas within

Northern Ireland, and any related adjacent semi-natural habitat, but habitats of lesser interest were not incorporated into a 'buffer zone'.

It is an objective that where a section of a lake and its adjacent wetland has been designated on one side of the border between Northern Ireland and the Republic of Ireland, there should be a corresponding designation on the other side. This has nearly been achieved, with the corresponding Kilroosky Lough cluster (SAC 001786) designated in the Republic of Ireland, although this includes Dummy's Lough which remains undesignated in Northern Ireland, and does not include any wetland around the Drumacrittin/Black Lough sub-site designated in Northern Ireland. Both areas are currently under consideration by the respective agencies.

6. SAC SELECTION FEATURES

Feature type	Feature	Global Status	Size/ extent/ pop~
Habitat	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations	B	6 sub-sites 10.5 ha*
Species	White-clawed Crayfish *Austropotamobius pallipes*	B	5 sub-sites
Habitat	Alkaline fens	B	6.8 ha
Habitat	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae	C	3 sub-sites 0.8 ha

Table 1. List of SAC selection features. Those with global status A-C will be referred to in ANNEX I.

Note that there is some overlap between the *Cladium* fens and the alkaline fens as, following JNCCs lead, the former are included here where zones of closed, species-poor *Cladium* have at their margins, transitions to species-rich short-sedge mire vegetation. As these are calcium-rich sites the small sedge component often comprises the calcicoles *Carex diandra* and *C. viridula* ssp. *brachyrrhyncha* in vegetation separately included as alkaline fen.

The global status is an expert judgement of the overall value of the site for the conservation of the relevant Annex I habitat. Sites have been graded A, B or C - in the UK these gradings have been interpreted as follows:

A - Sites holding outstanding examples of the habitat in a European context.

B - Sites holding excellent stands of the habitat, significantly above the threshold for SSSI/ASSI notification but of somewhat lower value than grade A sites.

C - Examples of the habitat which are of at least national interest (i.e. usually above the thresholdfor SSSI/ASSI notification on terrestrial sites) but not significantly above this. These habitats are not the primary reason for SACs being selected.

D - Habitat present but not of sufficient extent or quality to merit listing as SAC feature.

There is therefore a distinction between the principal features for which sites have been selected (those graded A or B) and those which are only of secondary interest (those graded C). This is a useful distinction but it is important to note that all three grades are qualifying SAC interest features.

Click here to go to the Natura 2000 Standard Data Form for Magheraveely Marl Loughs SAC.

6.1 ASSI SELECTION FEATURES

Magheraveely Marl Loughs ASSI

Feature Type	Feature	Size/Extent/Population
Habitat	Marl Lakes	10.5 ha
Habitat	Fens	7.6 ha
Species	White-clawed Crayfish	
Species	Invertebrate Assemblage	

Table 2. List of ASSI features.

7. CONSERVATION OBJECTIVES

The *Conservation Objective* for this site is:

To maintain (or restore where appropriate) the

- Hard oligo-mesotrophic waters with benthic vegetation of *Chara formations*
- White-clawed Crayfish *Austropotamobius pallipes*
- Alkaline fens
- Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae

to favourable condition.

For each SAC feature, there are a number of component objectives which are outlined in the table below. These include a series of attributes, measures and targets which form the basis of *Condition Assessment*. The results of this will determine whether the feature is in favourable condition or not. The feature attributes and measures are found in the attached annex.

8. SAC SELECTION FEATURE OBJECTIVE REQUIREMENTS

Feature	Global Status	Component Objective
Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations	B	No change in the lake hydrology outside normal seasonal fluctuations.
		Maintain the characteristic low nutrient status and high calcium concentration of the lake waters
		Maintenance of an assemblage of aquatic plants characteristic of Northern Ireland marl lakes.
		The extent of the fringing swamp zone to remain stable (not expanding into the lake, or contracting).
		There should be swamp gaps, or zones within the fringing swamps where the vegetation is sparse enough to allow charophyte growth.
		Minimal negative impact from artificial structures
		Minimal negative impact from recreation
White-clawed Crayfish *Austropotamobius pallipes*	B	Population size to be maintained or expanded at all sub-sites. No significant drop in trapped animals per unit standard trap effort.
		Recruitment of young animals into the population should be maintained.
		No stocking of the fish predators of Crayfish
Alkaline Fens	B	Maintain and expand the extent of existing alkaline fens.
		Maintain and enhance fen species and community diversity including the presence of notable species

		Maintain and enhance alkaline fen structure and hydrology
		Maintain the diversity and quality of habitats associated with the alkaline fens, e.g. reedbed and transitions to them
Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae	C	Maintain or expand the area/shoreline length of vegetation with >50% *Cladium mariscus* cover.
		Areas of alkaline fen adjacent to *Cladium mariscus* dominated zones should remain in favourable condition.
		Frequency of tree / scrub spp. incl. saplings no more than rare.

9. ASSI FEATURE OBJECTIVE REQUIREMENTS

Feature	Component Objective
Marl Lakes	See SAC Selection Feature Objective Requirements table.
Fens	See SAC Selection Feature Objective Requirements table.
White-clawed Crayfish	See SAC Selection Feature Objective Requirements table.
Invertebrate Assemblage	To be finalised.

10. MANAGEMENT CONSIDERATIONS

Ownership

All of the lakes are in individual private ownership, and with the exception of Knockballymore Lough, in multiple ownership.

Three of the lakes straddle the border with the Republic of Ireland, and a further lake abuts the border.

Summerhill Lough	Border runs through lake basin
Kilroosky Lough	Border runs through lake basin
Burdautien Lough	Border runs through lake basin
Drumacrittin Lough	Site boundary runs to border
Knockballymore Lough	Wholly within Northern Ireland
Annachullion Lough	Wholly within Northern Ireland

11. MAIN THREATS, PRESSURES AND ACTIVITIES WITH IMPACTS ON THE SITE

Both on-site and off-site activities can potentially affect SAC/ASSI features. The list below is not exhaustive, but deals with the most likely factors that are either affecting Magheraveely Marl Loughs, or could affect it in the future.

Although **Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations, White-clawed Crayfish *Austropotamobius pallipes*, Alkaline fens and Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae** are the qualifying SAC features, factors affecting ASSI features are also considered.

NOTE - Carrying out any of the Notifiable Operations listed in the ASSI schedule could affect the site.

Application of fertiliser

Application of fertiliser, either in inorganic form or as manure/slurry to the catchment could have great repercussions for the water quality. Marl lake water bodies are characterised by very clear water and low nutrient status. They are chemically buffered from phosphorus (P) enrichment to a degree, as P is immobilised by marl formation, but P is still stored and may be released if the buffering mechanism is disrupted and the lake 'switches' to a eutrophic state. This increases the vulnerability of these lakes as the early stages of P accumulation are disguised.

The effect upon adjacent wetlands is also noticeable as the vegetation type shifts to one adapted to more fertile wetlands and the influence of Calcium becomes a secondary variable. Changes in surrounding land use, for example Conifer plantation on a small scale, has been noted around Kilroosky Lough, and this may be accompanied by fertiliser application.

ACTION: Prevent nutrient enrichment from fertiliser drift and runoff by encouraging landowners to leave adequate buffer strips between fertiliser spray areas and sensitive interest features such as alkaline fens and nutrient poor loughs.

Drainage

On wetlands, a reduction in the frequency or duration of saturation or inundation has obvious direct effects on wetland organisms. For lakes, the effect can be profound even if the lake itself is not threatened, as the lake edge contracts the photic zone will move with it, and the lake bed substrate and depth profile will not necessarily be similar at the new location.

Major capital schemes for arterial drainage have in the past been very damaging to lakes and wetlands in Northern Ireland, but now seem to out of political favour. But piecemeal land drainage has also been a feature of agricultural

intensification in Ireland. Kilroosky Lough provides an example, where the outflow was deepened to lower the water level. A temporary sluice funded by Dúchas has recently been damaged by by-passing.

Underdrained grassland is more likely to lose nitrogen than undrained soil, as the sub-surface drains carry nutrient-rich water away from the area
ACTION: Installation of a staff gauge in these lakes with the owners permission. This is also important when depth measurements are implicated by monitoring.

Sedimentation
The natural process of siltation and terrestrialisation, sometimes hastened by management, may threaten the existence of an open water area in shallow lakes, in most cases this would be regarded as an unwelcome loss of site diversity.
ACTION: Reduce the rate of catchment sedimentation by encouraging landowners to leave adequate vegetation buffer strips between ploughed fields and adjacent drains and streams that may drain into the alkaline fens and nutrient poor loughs.

Invasion by exotics
In the UK, introduced crayfish species are aggressively out-competing the white-clawed crayfish and crayfish plague, introduced with them, is spreading through the country, wiping out the white-clawed crayfish populations. In Northern Ireland, no crayfish farms have been established and as of 2001, we do not have this problem, but the possibility of exotic crayfish species and of crayfish plague spreading here cannot be ruled out.
ACTION: Site integrity monitoring.

Grazing intensity
Marshes and swamps are affected by grazing and hence are vulnerable to poor grazing management - this could be the heavy grazing of all marsh and swamp areas, suppressing the development of tall vegetation and causing excessive poaching, or equally, could be the exclusion of grazers from all wetland areas, suppressing the development of open freshwater marsh swards in favour of species-poor swamp stands.
ACTION: Through liaison with landowners and monitoring, ensure sustainable grazing levels for the conservation interest features.

Nitrogen Deposition
Excess nitrogen deposition can favour the growth of competitive plants and lead to changes in ecosystem structure or function and to a reduction in biodiversity. National scale studies show the potential adverse effects of excess nitrogen on natural and semi-natural habitats to be widespread across the UK. Lower and upper critical loads have been calculated for Magheraveely Marl Loughs SAC.

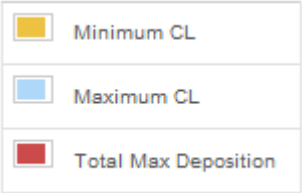
Feature: Hard oligo-mesotrophic waters with benthic vegetation of Chara spp

Critical Load Class: No comparable habitat with established critical load estimate available

Critical Loads (kg N/ha/yr): no critical loads available for this feature

Nitrogen Deposition (kg N/ha/yr):

Maximum: 7.6 Minimum: 6 Average: 6.7



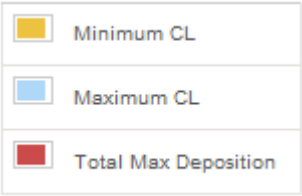
Feature: Austropotamobius pallipes - White-clawed (or Atlantic stream) crayfish

Critical Load Class: No comparable habitat with established critical load estimate available

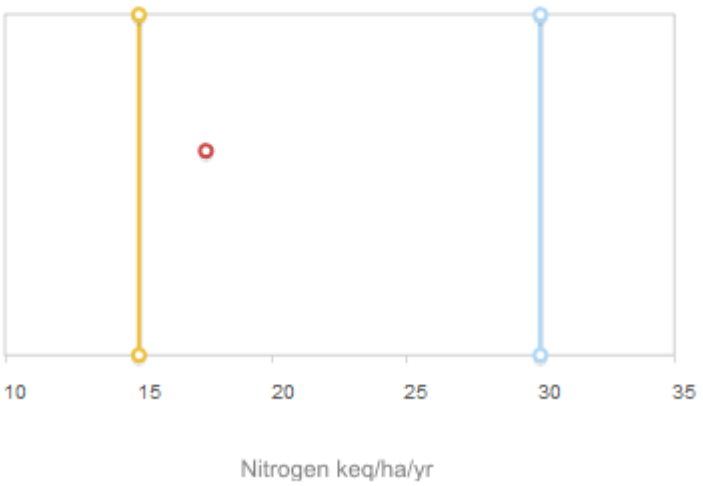
Critical Loads (kg N/ha/yr): no critical loads available for this feature

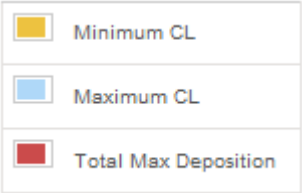
Nitrogen Deposition (kg N/ha/yr):

Maximum: 7.6 Minimum: 6 Average: 6.7

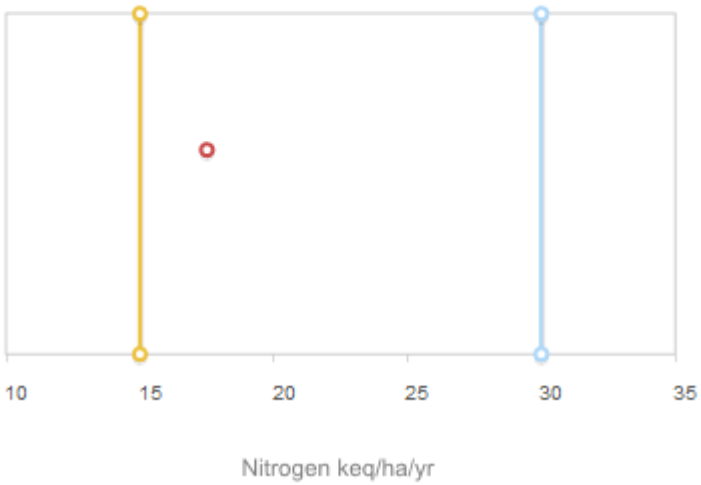


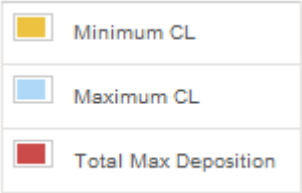
Feature: Alkaline fens
Critical Load Class: Rich fens
Critical Loads (kg N/ha/yr): 15-30
Nitrogen Deposition (kg N/ha/yr):
Maximum: 17.5 Minimum: 15.3 Average: 16.5





Feature: Calcareous fens with Cladium mariscus and species of the Caricion davallianae
Critical Load Class: Rich fens
Critical Loads (kg N/ha/yr): 15-30
Nitrogen Deposition (kg N/ha/yr):
Maximum: 17.5 Minimum: 15.3 Average: 16.5





(Source: Air Pollution Information System (APIS) website- www.apis.ac.uk)

ACTION: Seek to maintain or where necessary, restore concentrations and deposition of air pollutants to at or below the site-relevant critical load.

Changes to surrounding land use
Any changes in local land-use e.g. agricultural intensification, drainage works and development) may be detrimental to the SAC.
Action: Reduce the risk of surrounding agricultural intensification by encouraging the adjacent owner/occupiers to enter into agri-environment schemes. Use Habitats Regulations Assessments (HRAs), through the planning process, to minimise any development risks adjacent to the SAC.

Climate Change
Northern Ireland faces changes to its climate over the next century. Indications are that we will face hotter, drier summers, warmer winters and more frequent extreme weather events.
ACTION: When developing SAC management plans, the likely future impacts of climate change should be considered and appropriate changes made.

12. MONITORING

Monitoring of SACs takes place using two monitoring techniques.

Site Integrity Monitoring (SIM) is carried out to ensure compliance with the ASSI/ SAC Schedule. The most likely processes of change will either be picked up by SIM (e.g. dumping, burning, turf cutting, grazing etc.) or will be comparatively slow (e.g. gradual degradation of the habitat).

These longer-term changes will be picked up by monitoring of the feature via **Site Condition Assessment** - this is carried out on a rolling basis to pick up subtle changes in the condition of the feature.

The method for Site Condition Assessment was agreed by the relevant JNCC-led Lead Co-ordination Network although the methodology has been modified to reflect individual site attributes in Northern Ireland.

12.1 MONITORING SUMMARY

1. *Monitor the integrity of the site (SIM or Compliance Monitoring)*
Check for obvious signs of damage e.g. check on the lakes' water levels, signs of drainage in the designated area and signs of over-stocking causing damage to habitats adjacent to the lakes. This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment)
Monitor the key attributes for each of the SAC selection features. This will detect if the features are in favourable condition or not. See Annex I.

The favourable condition table provided in Annex 1 is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does <u>not by itself</u> provide a comprehensive basis on which to assess plans and projects, but it does provide a basis to inform the scope and nature of any Habitats Regulations Assessment (HRA) that may be needed. It should be noted that completion of a HRA is a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

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ANNEX I

Feature 1 (SAC) – Hard oligo-mesotrophic waters with benthic vegetation of *Chara* formations (Status B)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Measure	Targets	Comments
*Nutrient status	Summer total phosphorus $\mu g/l^{-1}$	No more than 25 $\mu g/l^{-1}$ in any lake, and no more than 25% higher than the N I Lakes Survey value.	Part of SIM. Collection methods still to be established
	Abundance weighted Trophic Ranking score	Within 0.2 of the NI Lakes Survey generated value	
	Abundance weighted Trophic Ranking Score	Less than 7.6 in all lakes	
*Water clarity	Subjective assessment	Clear	
	Secchi disc depth if lake is deep enough (cm)	Still visible at 300 cm	

*Charophyte extent	Plant Importance Value for total charophyte presence	No decline since the N I Lake Survey or PIV at least 3 (Frequent) in all lakes.	
	% of the phototrophic zone occupied.	> 50% occupied	Generic guidelines have varied in the target (lower LAC) cover of Chara in the photic – from 5% to 50%
*Filamentous algae (blanketweed)	Plant Importance Value	PIV <2 (occasional)	
Selected aquatic species	Plant Importance Values for any of: *Potamogeton coloratus* *Hippurus vulgaris* *Utricularia vulgaris* agg. *Chara hispida* var. *rudis (=C. rudis)*	No decline by a value more than 1 since the N I Lake Survey.	
*Sedimentation	Maximum depth c.f. staff gauge reference.	< 6cm reduction in a 6 year reporting cycle	

*Accretion	Width of swamp zone from a fixed point.	Less than 1m increase from the fixed point to the edge of the dense reeds. in any 6 year period.	

Feature 2 (SAC) – White-clawed Crayfish *Austropotamobius pallipes* (Status B)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Measure	Targets	Comments
* Population size	Catch per unit effort (CPU). Based on 40 liver-baited Trappy traps © with 10 mm mesh in clusters of 10 at four locations overnight	At least five lakes with populations. At least one lake with a CPU > 1	All lakes to be sampled
* Recruitment	Size distribution of crayfish within the sample	Smallest cohort for the trap mesh size > 5% of the sample.	
Population health	Crayfish plague symptoms	None	
	Thelohaniasis symptoms	< 10% of the sample where the sample numbers >20 individuals	

Feature 3 (SAC) – Alkaline fens (Status B)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Measure	Targets	Comments
* Extent	% of lakeshore backed by alkaline fen	No decline since the Northern Ireland Lakes Survey	= communities identifiable as Northern Ireland Lakes Survey Shore type 29 with > 50% small sedge cover Define fixed transects
	Width of alkaline fen zones (m)	No decrease in baseline reference value at any transect.	identifiable as type 29 with > 50% small sedge cover
*Community diversity	Number of recognisable alkaline fen sociations	No loss of recognisable sociations	Regardless of ease of NVC classification

*Sward composition in alkaline fen areas	Frequency of positive indicators (DAFOR scale) *Carex diandra* *Carex elata* *Carex paniculata* *Carex pseudocyperus* *Carex viridula ssp brachyrrhyncha* *Cladium mariscus* *Epipactis palustris* *Galium uliginosum* *Lysimachia vulgaris* *Parnassia palustris* *Rorippa palustris* *Sagina nodosa* *Scutellaria galericulata* *Veronica anagallis-aquatica* *Veronica scutellata*	No loss of more than one species since the baseline survey.	From anywhere in the fen/wetland. Note DAFOR status and position of the plants for use by future surveyors.
*Sward composition in alkaline fen areas	Frequency of negative indicators (DAFOR scale) as listed in 'monitoring species lists.doc'	Determine on a site by site basis	Use to identify a drift towards a grassy state – *Agrostis stolonifera*, *Holcus lanatus*, *Juncus effusus, Ranunculus repens… etc.* or to a more nutrient–rich state – *Epilobium hirsutum, Urtica dioica, Calystegia sepium*…. etc.

	Species-richness	No single species overwhelmingly dominant	although *Carex diandra* is often very abundant
* Sward structure in the fen areas	Cover of tall grasses	No more than 25%.	
	Cover of small sedges	No less than 50%	
	Frequency of tree/scrub spp.	Frequency of tree / scrub spp. incl. saplings no more than Rare (Occasional??) (DAFOR scale)	Alder (*Alnus glutinosa*) is the most likely coloniser – check carefully for establishment.
	Extent of bare mud or peat visible without disturbing the vegetation	No more than 10%	
	Average vegetative sward height	No less than 10 cm	
	Frequency of litter/thatch accumulation in the alkaline fen areas	No more than occasional	Hard to measure or estimate.

	Hoof prints	No more than occasional over the whole fen	
* Hydrology	Normal summer level of the ‘water table’ relative to the ground surface.	In the range 0 to – 12 cm	Dig a small hole, replace ‘divot’ afterwards
	Ellenberg mean F in the fen area	No more than 10% decline from baseline	Based on the fixed transects
	Drains	No new drains	

Feature 4 (SAC) – Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (Status C)

(* = primary attribute. One failure among primary attribute = unfavourable condition)

Attribute	Measure	Targets	Comments
*Extent	% of shoreline occupied by vegetation with *Cladium mariscus* cover > 50% Area of vegetation with *Cladium mariscus* cover > 50%	For both measures: Maintenance or expansion in Kilroosky Burdautien and Summerhill Loughs (Re)establishment in suitable areas in the other sub-sites	Expansion into, but not dominance in any adjacent small sedge zones is desirable.
*Adjacent small sedge mires	Extent of calcium enriched small sedge mire adjacent to the *Cladium mariscus* bed.	Maintenance of the baseline extent	

APPENDIX 2

CONSERVATION OBJECTIVES FOR KILROOSKY LOUGH CLUSTER SAC

ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Kilroosky Lough Cluster SAC 001786

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

National Parks and Wildlife Service,
Department of Housing, Local Government and Heritage,

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

Web: www.npws.ie
E-mail: natureconservation@housing.gov.ie

Citation:

NPWS (2021) Conservation Objectives: Kilroosky Lough Cluster SAC 001786. 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***

001786	Kilroosky Lough Cluster SAC
1092	White-clawed Crayfish *Austropotamobius pallipes*
3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae*
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 :	1983
Title :	Pre-drainage survey, Finn/Lacky River catchment, Cos Monaghan and Cavan
Author :	Douglas, C.; Lockhart, N.
Series :	Unpublished report
Year :	1984
Title :	Revisions to the lists of areas of scientific interest in County Monaghan
Author :	Ni Lamhna, E.
Series :	Unpublished Report
Year :	2007
Title :	Monaghan Fen Survey 2007 Volume I: Main Report
Author :	Foss, P.; Crushell, P.
Series :	Unpublished report to NPWS and Monaghan County Council
Year :	2009
Title :	Monitoring of white-clawed crayfish *Austropotamobius pallipes* in Irish lakes in 2007
Author :	O'Connor, W.; Hayes, G.; O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manuals, No. 37
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 :	2010
Title :	A technical manual for monitoring white-clawed crayfish (*Austropotamobius pallipes*) in Irish lakes
Author :	Reynolds, J.; O'Connor, W.; O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manuals, No.45
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 :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS

Year : 2016

Title : Ireland Red List No. 10: Vascular Plants

Author : Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.

Series : Ireland Red Lists series, NPWS

Year : 2019

Title : The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments

Author : NPWS

Series : Conservation assessments

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 : 2020

Title : Marl Lake (Habitat 3140) Survey and Assessment Methods Manual

Author : Roden, C.; Murphy, P.; Ryan, J.; Doddy, P.

Series : Irish Wildlife Manuals, No. 125

Year : 2020

Title : Benthic vegetation in Irish marl lakes: monitoring habitat 3140 condition 2011 to 2018

Author : Roden, C.; Murphy, P.; Ryan, J.

Series : Irish Wildlife Manuals, No. 124

Year : 2020

Title : Benthic vegetation in Irish marl lakes: monitoring habitat 3140 condition 2011 to 2018. Appendix III, Site Reports

Author : Roden, C.; Murphy, P.; Ryan, J.

Series : Irish Wildlife Manuals, No. 124

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 : 2021

Title : White-clawed Crayfish *Austropotamobius pallipes* survey in designated SACs in 2017

Author : Gammell, M.; McFarlane, A.; Brady, D.; O'Brien, J.; Mirimin, L.; Graham, C.; Lally, H.; Minto, C.; O'Connor, I.

Series : Irish Wildlife Manuals, No. 131

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 : 1982

Title : Eutrophication of waters. Monitoring assessment and control

Author : OECD

Series : OECD, Paris

Year :	1987
Title :	A method for evaluating wetlands - a case study on the Finn river catchment, County Monaghan, Ireland
Author :	Lockhart, N.D.
Series :	Irish Geography, 20: 75-81
Year :	1992
Title :	The Northern Ireland Lakes Survey
Author :	Wolfe-Murphy, S.A.; Lawrie, E.W.; Smith, S.J.; Gibson, C.E.
Series :	Report to Countryside and Wildlife Branch, Department of the Environment for Northern Ireland
Year :	2009
Title :	The marl lakes of the British Isles
Author :	Pentecost, A.
Series :	Freshwater Reviews, 2(1): 167-197
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 :	2014
Title :	Tellus Investigation of Wetland Ecology and Geochemistry (TIWEG) Final Report
Author :	Flynn, R.; McKernan, R.; O'Leary, Á.; Rolston, A.; McCarthy, V.
Series :	Tellus Border report
Year :	2014
Title :	Tellus Border Wetland Project: an ecohydrological investigation of wetlands in the border region of Ireland
Author :	McCarthy, V.; Rolston, A.
Series :	Tellus Border report
Year :	2015
Title :	Magheraveely Marl Loughs SAC Conservation Objectives. V2
Author :	McKeown, R.
Series :	Department of Agriculture, Environment and Rural Affairs, Northern Ireland
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 :	2018
Title :	Irish Vegetation Classification: Technical Progress Report No. 4
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre
Year :	2019
Title :	Crayfish (*Austropotamobius pallipes*) surveys in the Magheraveely/Kilroosky Lake Custer SAC 2019
Author :	CANN (Collaborative Action for the Natura Network)
Series :	Unpublished report for EU INTERREG project CANN

Year :	2020
Title :	Magheraveely Marl Lakes - Kilroosky Lough Cluster. Macrophytes and Water Chemistry Trends. Confidential draft
Author :	Stewart, N.F.; McElarney, Y.R
Series :	Internal CANN project report
Year :	2020
Title :	White-clawed crayfish (*Austropotamobius pallipes*) stock assessment on the 'Horseshoe lake' (Kilroosky Lough ASSI)
Author :	CANN (Collaborative Action for the Natura Network)
Series :	Unpublished report for EU INTERREG project CANN
Year :	2021
Title :	White-clawed crayfish (*Austropotamobius pallipes*) stock assessment on the 'Horseshoe lake' (Kilroosky Lough ASSI). June 2021
Author :	CANN (Collaborative Action for the Natura Network)
Series :	Unpublished report for EU INTERREG project CANN
Year :	2021
Title :	White-clawed crayfish (*Austropotamobius pallipes*) stock assessment on the 'Horseshoe Lake' (Kilroosky Lough ASSI). August 2021
Author :	CANN (Collaborative Action for the Natura Network)
Series :	Unpublished report for EU INTERREG project CANN
Year :	2021
Title :	White-clawed crayfish (*Austropotamobius pallipes*) stock assessment on the 'Dummy's Lough' (Kilroosky Lough Cluster SAC). August/September 2021
Author :	CANN (Collaborative Action for the Natura Network)
Series :	Unpublished report for EU INTERREG project CANN
Year :	2021
Title :	Kilroosky Lough Cluster SAC CANN Habitat Mapping Report
Author :	AFBI (Agri-Food and BioSciences Institute)
Series :	Unpublished report for EU INTERREG project CANN

Spatial data sources

Year :	2021
Title :	OSi Prime 2 water polygon file
GIS Operations :	WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For :	3140 (map 2)
Year :	2021
Title :	Kilroosky Lough Cluster SAC CANN Habitat Mapping Report
GIS Operations :	Dataset clipped to SAC boundary; QIs selected; Expert opinion used as necessary to resolve any issues arising
Used For :	7210, 7230 (map 3)
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 :	1092 (map 4)

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 Kilroosky Lough Cluster 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	Habitat 3140 occurs in a series of small marl lakes, Summerhill, Burdautien, Kilroosky and Dummy's Loughs. All are cross-border and most are protected in Northern Ireland in Magheraveely Marl Loughs SAC. The lakes in the SAC were assessed as in bad conservation condition and habitat 3140 was in bad, deteriorating conservation status across Ireland in the two reporting periods, 2007-2018 (NPWS, 2013, 2019). CANN project survey work showed charophyte abundance had significantly declined in the four lakes in 2018, with plants restricted to areas adjacent to calcareous fen or open patches in swamp (Stewart and McElarney, 2020). The lake surface area is the simplest measure of extent and should be stable or increasing. It may also be possible to estimate the area of the vegetation zones that typify the habitat. For further information on all attributes see Roden et al. (2020) and O Connor (2015). See Pentecost (2009) and Roden et al. (2020) for an overview of Irish and British marl lakes
Habitat distribution	Occurrence	No decline, subject to natural processes	In the SAC, habitat 3140 is found in Summerhill, Burdautien, Kilroosky and Dummy's Loughs, a series of small, cross-border, inter-drumlin, kettle-hole, marl lakes, on predominantly limestone substrate, fed by lime-rich water. See map 2. It may have formerly occurred in Ramages Lough, which was altered by drainage and some infilling. The lakes are protected in Kilroosky Lough Cluster SAC in Ireland and in Magheraveely Marl Loughs SAC (UK0016621) (and as ASSIs) in Northern Ireland; however, the boundaries of the SACs in the two jurisdictions do not match exactly. Habitat 3140 was surveyed in Summerhill in 2012 (Roden et al., 2020) and in all four lakes in 2018 for the CANN project. Other surveys have included (Wolfe-Murphy et al., 1992; McCarthy and Rolston, 2014; Lockhart, 1987; Ní Lamhna, 1984; Douglas and Lockhart, 1983). Further data may also be available from NIEA (condition monitoring) and, for Summerhill Lough, from the EPA (Water Framework Directive monitoring)
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution; restore condition and extent of typical charophyte species	While charophyte diversity had not decreased in 2018, charophytes were restricted in distribution and had low abundance, and higher plants dominated the flora (Stewart and McElarney, 2020). Roden et al. (2020) found no charophytes on the 2012 Summerhill transect. The following typical charophytes have been recorded: Summerhill: *Chara aculeolata, C. contraria* var. *contraria, C. globularis, C. hispida, C. rudis, C. vulgaris*; Burdautien: *C. aculeolata, C. curta, C. hispida, C. virgata, C. vulgaris*; Kilroosky: *C. aculeolata, C. contraria* var. *contraria, C. globularis, C. hispida, C. rudis, C. virgata, C. vulgaris, Nitella flexilis* agg.; Dummy's: *C. aculeolata, C. contraria* vars *contraria* and *hispidula, C. hispida*. Habitat 3140 typical species include cyanobacteria, algae, higher plants and water beetles (see NPWS, 2013, 2019 and O Connor, 2015). Roden et al. (2020) list species present in marl lakes in good condition

Vegetation composition: characteristic zonation	Occurrence	Restore characteristic charophyte and crust zones	Charophytes had declined significantly in all four lakes in 2018 and were confined to areas protected from the main water body, adjacent to calcareous fen, frequently in open patches within swamp (Stewart and McElarney, 2020). The 2012 Summerhill transect had no characteristic zones (Roden et al., 2020). Charophyte zones were extensive in Kilroosky until at least 2006, but declined significantly by 2014 and were restricted to the north-eastern shore in 2018. Higher plants dominated the lakes in 2018, particularly bands of floating-leaved species *Nuphar lutea, Nymphaea alba, Potamogeton natans*, and a variety of submerged species had expanded (e.g. *Utricularia vulgaris* agg. at Kilroosky). Marl lakes in good condition have four or more characteristic zones, see Roden et al. (2020). Small kettle-hole lakes may show some natural variation from this zonation, including more frequent, but not dominant, submerged vascular plants
Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation (euphotic depth), subject to natural processes	Maximum depth of vegetation was 1.5m in Summerhill in 2012; however, no charophytes occurred on the transect (Roden et al., 2020). Charophytes appeared to be restricted to shallow water in 2018 (Stewart and McElarney, 2020). The target for maximum depth of vegetation colonisation (euphotic depth) in marl lakes is >7m (Roden et al., 2020). Euphotic depth is considered to be a key measure of the structure and functions of marl lake vegetation and has been found to exceed 10m in some Irish marl lakes (Roden et al., 2020)
Hydrological regime: water level fluctuations	Metres	Restore appropriate hydrological regime necessary to support the habitat	The lakes in the SAC are largely fed by springs (McCarthy and Rolston, 2014). At Kilroosky, a sluice installed following unauthorised deepening of the outflow to lower the water level was subsequently by-passed (McKeown, 2015). Excavation of the outflow from Burdautien lowered the lake water level in 2018. Fluctuations in lake water level can be amplified by activities such as abstraction and drainage. In undisturbed marl lakes, fluctuations follow predictable seasonal trends and relationships exist with the vegetation zones (Roden et al., 2020). In summer, >90% of the crust zone should be covered and water level should never be lower than the top of the *Chara curta* zone; in winter, all zones should be submerged (Roden et al., 2020). Groundwater normally exerts a strong influence on the hydrology of marl lakes. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to nutrient release from sediment
Lake substratum quality	Various	Maintain/restore appropriate substratum type, extent and chemistry to support the vegetation	Highly variable surface sediment composition was recorded at Kilroosky (McCarthy and Rolston, 2014). Increased accumulation of nutrients and organic matter in the lake sediments in the SAC may contribute to eutrophication and the observed bad condition of the habitat. In general, marl lakes are dominated by limestone bedrock, calcareous silt and sand, and loose stones (Roden et al., 2020). Deposited peat may indicate excessive sediment inputs and sediment can accumulate phosphorus and release it into the water column (Roden et al., 2020). Further research into acceptable sediment phosphorus concentrations and other aspects of substratum quality in marl lakes would be beneficial

pH and Alkalinity	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Average alkalinity was 130mg/l at Kilroosky (McCarthy and Rolston, 2014). The Environmental Protection Agency (EPA) reported alkalinity of 201 and 196mg/l in Summerhill in 2010-12 and 2013-15, respectively. The lower alkalinity boundary for the habitat may lie between 80 and 100mg/l; however, alkalinity is far higher in most Irish marl lakes, exceeding 200mg/l in some cases (Roden et al., 2020). Acidification is not considered a threat to habitat 3140, but eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards (The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019). Further study of the sediment pH, alkalinity and cation concentration may assist in understanding of nutrient cycling
Nutrients	mg/l P; mg/l N	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	The EPA reported moderate total phosphorus (TP) status and average concentration of 0.030mg/l in Summerhill in 2010-12, but high TP status in 2013-15. Episodes of elevated TP concentrations have also been reported at Kilroosky since 2012 (Flynn et al., 2014; McCarthy and Rolston, 2014; NIEA/DAERA data). Maxima of 0.04mg/l and 0.08mg/l TP were recorded in Kilroosky and Burdautien respectively (Stewart and McElarney, 2020). Roden et al. (2020) found that most marl lakes in good condition have TP ≤0.01mg/l; this is the target for good condition although vegetation attributes determine the overall conservation condition (Roden et al., 2020). ≤0.01mg/l TP is equivalent to oligotrophic (OECD, 1982) and WFD High Status (The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019). WFD high status targets for total ammonia (annual average ≤0.04mg/l N and annual 95th percentile ≤0.09mg/l N) may also be appropriate. Summerhill had high ammonia status 2012-2015
Water colour	mg/l PtCo	Restore appropriate water colour to support the habitat	Water colour in Summerhill was 46mg/l PtCo in 2012 (Roden et al., 2020). Roden et al. (2020) found that water colour (dissolved light-absorbing compounds) is negatively correlated with euphotic depth, charophyte species richness and cover, and positively correlated with vascular plant cover in marl lakes. Roden et al. (2020) set good condition at <15mg/l PtCo; however, the highest conservation value marl lakes in Ireland have very clear waters with colour of <5mg/l PtCo. Roden et al. (2020) also set a TP×Colour Index with a target of <0.1 for good. Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. The primary source of increased colour in Ireland is peatland disturbance, e.g. through overgrazing, afforestation
Dissolved organic carbon (DOC)	mg/l	Maintain/restore appropriate organic carbon levels to support the habitat	Dissolved organic carbon (DOC) in the water column is linked to water colour. 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. The very high colour recorded in Summerhill Lough in 2012 may have indicated high DOC from catchment sources

Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain/restore appropriate turbidity to support the habitat	Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Transparency	Metres	Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	High colour was recorded in Summerhill in 2012 (Roden et al., 2020) and high chlorophyll concentration in Kilroosky in 2012-2013 (McCarthy and Rolston, 2014), both frequently associated with reduced transparency. Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. Roden et al. (2020) advised it is preferable to measure euphotic depth directly by observation, but noted that a decreasing trend in Secchi depth indicates declining water quality. Transparency can be affected by phytoplankton blooms, water colour and turbidity. Secchi depth in marl lakes in good condition is generally >6m. 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
Attached algal biomass	Algal cover	Maintain/restore trace/absent attached algal biomass (<5% cover)	Locally frequent filamentous algae were recorded at Dummy's Lough in 2018 (Stewart and McElarney, 2020). Filamentous algae have increased at Kilroosky. Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. Roden et al. (2020) noted that occasional blooms of filamentous algae occur in marl lakes in the absence of excess nutrients, especially species of the orders Zygnematales or Oedogoniales, but that drifting masses of *Cladophora* species may indicate a decline in water quality. In general, the cover abundance of attached algae in marl lakes (3140) should be trace/absent (<5% cover)
Fringing habitat: area and condition	Hectares	Restore the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	*Cladium* and alkaline fens fringe lakes in the SAC (see the conservation objectives for habitats 7210* and 7230 in this volume). Grazing to maintain open, species-rich fen and prevent further encroachment and dominance by dense swamp and woodland is essential for the survival of charophytes in the SAC. Wet woodland and scrub, swamp, species-rich marsh and wet grassland also occur around the lakes. The Near Threatened (Wyse Jackson et al., 2016) *Pyrola rotundifolia* subsp. *rotundifolia* occurs at Kilroosky, as does *Epipactis palustris*, and *Prunus padus* in woodland at Summerhill (Lockhart, 1987; NPWS internal files). Fringing habitats along lakes intergrade with and support the structure and functions of the lake habitat. Equally, fringing wetland habitats are dependent on the lake, particularly its water levels, and support invertebrate and plant communities and species of high diversity and conservation concern. See also Mainstone et al. (2016)

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

To restore the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* in Kilroosky Lough Cluster 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	As part of the CANN (Collaborative Action for the Natura Network) cross-border environment project, Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae* within Kilroosky Lough Cluster SAC was mapped with an area of 0.47ha (AFBI, 2021). See map 3. The habitat in the SAC had previously been surveyed by Foss and Crushell (2007) as part of the Monaghan Fen Survey 2007. See also the conservation objective for Alkaline fens (Annex I habitat code 7230) in this volume
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on mapping from the CANN project (AFBI, 2021). See map 3. *Cladium* fen occurs in an area on the south-east shore of Kilroosky Lough and on the north/north-east side of Summerhill Lough in the SAC
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 for fen habitats. Increased nutrients can lead to changes in plant and invertebrate species through competition and subsequent structural changes to micro-habitats. 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
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. Drying out of the habitat at Kilroosky Lough has been noted (AFBI, 2021)
Ecosystem function: water quality	Various	Maintain, or where necessary restore, 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. See Foss and Crushell (2007) for details of hydrochemical analysis undertaken in the SAC
Vegetation composition: cover of *Cladium mariscus*	Percentage cover at a representative number monitoring stops	Cover of *Cladium mariscus* at least 25%	Attribute and target based on O'Neill et al. (in prep.)
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, including high quality indicators, see O'Neill et al. (in prep.)

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, Ranunculus repens* and *Typha latifolia*. 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
Vegetation composition: trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on O'Neill et al. (in prep.). Scrub and trees will tend to invade if fen conditions become drier. Scattered alder (*Alnus glutinosa*) has been noted in the habitat around Summerhill Lough (AFBI, 2021)
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 10% of live shoots more than 1m high	Attribute and target based on O'Neill et al. (in prep.)
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.). Disturbed bare ground and the loss of characteristic species may result from excessive grazing. Disturbance can include hoof marks, wallows, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands. At Summerhill Lough, trampling causing worn paths through fen areas to fishing platforms, where further trampling occurs, has been reported (Foss and Crushell, 2007)
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.)
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)
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain/restore adequate transitional areas to support/protect the *Cladium* fen habitat and the services it provides	In many cases, fens transition to other wetland habitats. It is important that the transitional areas between *Cladium* fen and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen

7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Kilroosky Lough Cluster 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	As part of the CANN (Collaborative Action for the Natura Network) cross-border environment project, Alkaline fens within Kilroosky Lough Cluster SAC was mapped with an area of 0.22ha (AFBI, 2021). See map 3. The habitat in the SAC had previously been surveyed by Foss and Crushell (2007) as part of the Monaghan Fen Survey 2007. See also the conservation objective for *Cladium* fens (priority Annex I habitat code 7210) in this volume
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on mapping from the CANN project (AFBI, 2021). See map 3. Alkaline fen occurs on the eastern side of Kilroosky Lough and south-west of Dummy's Lough
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-habitats. 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
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, or where necessary restore, 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. See Foss and Crushell (2007) for details of hydrochemistry analysis undertaken in the SAC. Some enrichment has been noted in the habitat at Dummy's Lough (AFBI, 2021)
Vegetation composition: community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The entire diversity of alkaline fen vegetation communities present in the SAC is currently unknown. Information on the vegetation communities associated with alkaline fens is provided in O'Neill et al. (in prep.). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer/)

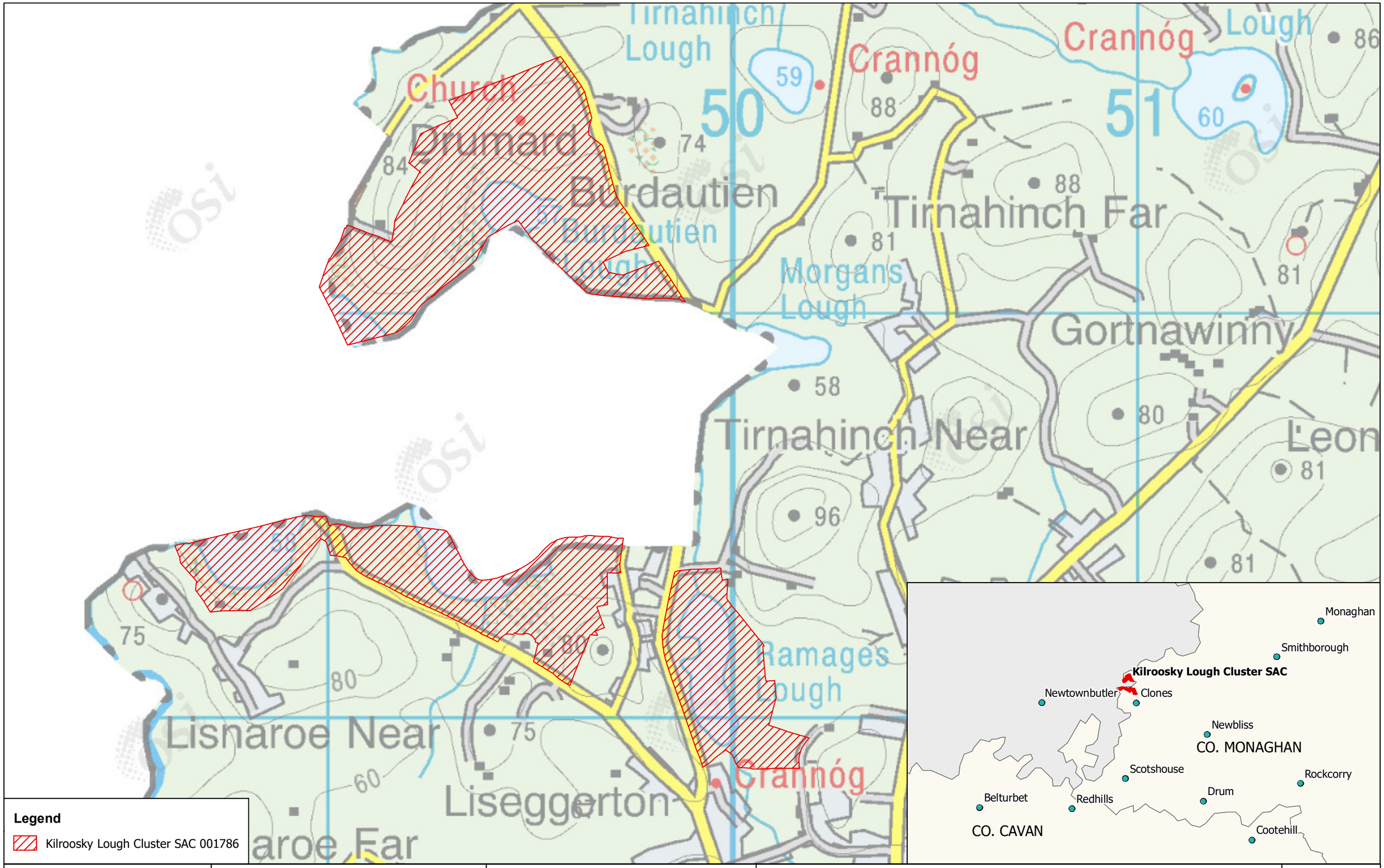
Vegetation composition: typical brown mosses	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical brown moss species	For lists of typical bryophyte species for alkaline fen, including high quality indicator species, see O'Neill et al. (in prep.)
Vegetation 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.)
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
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
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. In this SAC, heavy grazing by cattle has been reported in the habitat at Kilroosky Lough (AFBI, 2021)
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.)
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 Near Threatened round-leaved wintergreen (*Pyrola rotundifolia* subsp. *rotundifolia*) (Wyse Jackson et al., 2016) has been recorded from the wetland habitats around the shore of Kilroosky Lough in the SAC (NPWS internal files), but cannot be specifically assigned to this habitat in the SAC
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain/restore 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

1092 White-clawed Crayfish *Austropotamobius pallipes*

To maintain the favourable conservation condition of White-clawed Crayfish (*Austropotamobius pallipes*) in Kilroosky Lough Cluster SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Number of occupied 1km squares	No reduction from baseline. See map 4	White-clawed crayfish (*Austropotamobius pallipes*) has been reported from the four lakes in the SAC within the 1km grid squares H4827, H4927 and H4928. Most of the records come from Kilroosky Lough, but it is also been reported in each of the other three lakes in the SAC - Burdautien, Dummy's and Summerhill. The species is well-recorded from Kilroosky and it supports the largest population. Dummy's Lough also appears to have a resident population. In 2017, the species was found in Kilroosky Lough, but not Summerhill (Gammell et al., 2021); Dummy's and Burdautien were not surveyed. All four lakes were surveyed by the CANN (Collaborative Action for the Natura Network) project during 2019-2021 and many were found in both Kilroosky and Dummy's Lough, but only a single individual in Burdautien Lough and none in Summerhill Lough (CANN, 2019, 2020, 2021). The status of white-clawed crayfish in these two lakes remains unclear, but would appear not to be significant
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and females with eggs in at least 50% of positive samples taken at appropriate time and methodology	See Reynolds et al. (2010) for further details. Gammell et al. (2021) found high numbers of juveniles in Kilroosky Lough in 2017
Population size	Catch per unit effort (CPUE)	No reduction from baseline of 1.0 for Kilroosky Lough; no reduction in baseline of 0.5 for Dummy's Lough	Various catch per unit effort (CPUE) figures for Kilroosky Lough are given in O'Connor et al. (2009), Gammell et al. (2021) and CANN (2019, 2020, 2021). The figures vary according to the methodology used, but a CPUE figure of 1 is taken as an appropriate baseline for Kilroosky Lough. The CANN project (CANN 2019, 2021) sampled the white-clawed crayfish population in Dummy's Lough and calculated CPUE figures. Based on this, a CPUE of 0.5 is considered the baseline for Dummy's Lough. These figures may be refined with more detailed assessment of the stocks in both lakes. Each baseline CPUE figure applies to sampling using crayfish traps, sweep netting or night time searches. Hand searching at each site is considered ineffective due to the nature of the shoreline
Negative indicator species	Occurrence	No non-indigenous crayfish species	Non-indigenous crayfish species (NICS) are identified as a major direct threat to the white-clawed crayfish and as a disease vector, in particular crayfish plague (*Aphanomyces astaci*), which is fatal to white-clawed crayfish. The possession, import and intentional release of five species of invasive alien crayfish is banned by Statutory Instrument No. 354/2018
Disease	Occurrence	No instances of disease	Crayfish plague, caused by the water-borne mould *Aphanomyces astaci*, is identified as major threat to the species in Ireland. Instances of crayfish plague have occurred in Ireland since 2015 causing local extinctions. There have been no confirmed or suspected outbreaks in this SAC

Water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Water quality status of Summerhill Lough is monitored by the Environmental Protection Agency (EPA) and has been consistently assessed as moderate. There is no regular monitoring of Dummy's, Burdautien or Kilroosky Loughs. White-clawed crayfish is not considered very sensitive of water quality but the species is intolerant of low pH and poorest water quality, and lack of calcareous influence. There should be no decline in the water quality as defined by the targets for the Annex I lake habitat Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. (habitat code 3140), as these are more stringent than white-clawed crayfish requires. See the conservation objective for 3140 in this volume for further details
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline from the baseline	White-clawed crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions and habitat features must be available on the whole length of occupied habitat. Gammell et al. (2021) scored the habitat heterogeneity and, following this methodology, a baseline score of 0.5 is set



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Department of Housing, Local Government and Heritage

MAP 1:
KILROOSKY LOUGH CLUSTER SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 001786; version 3.02.
CO. MONAGHAN

0 0.1 0.2 0.4 Kilometres

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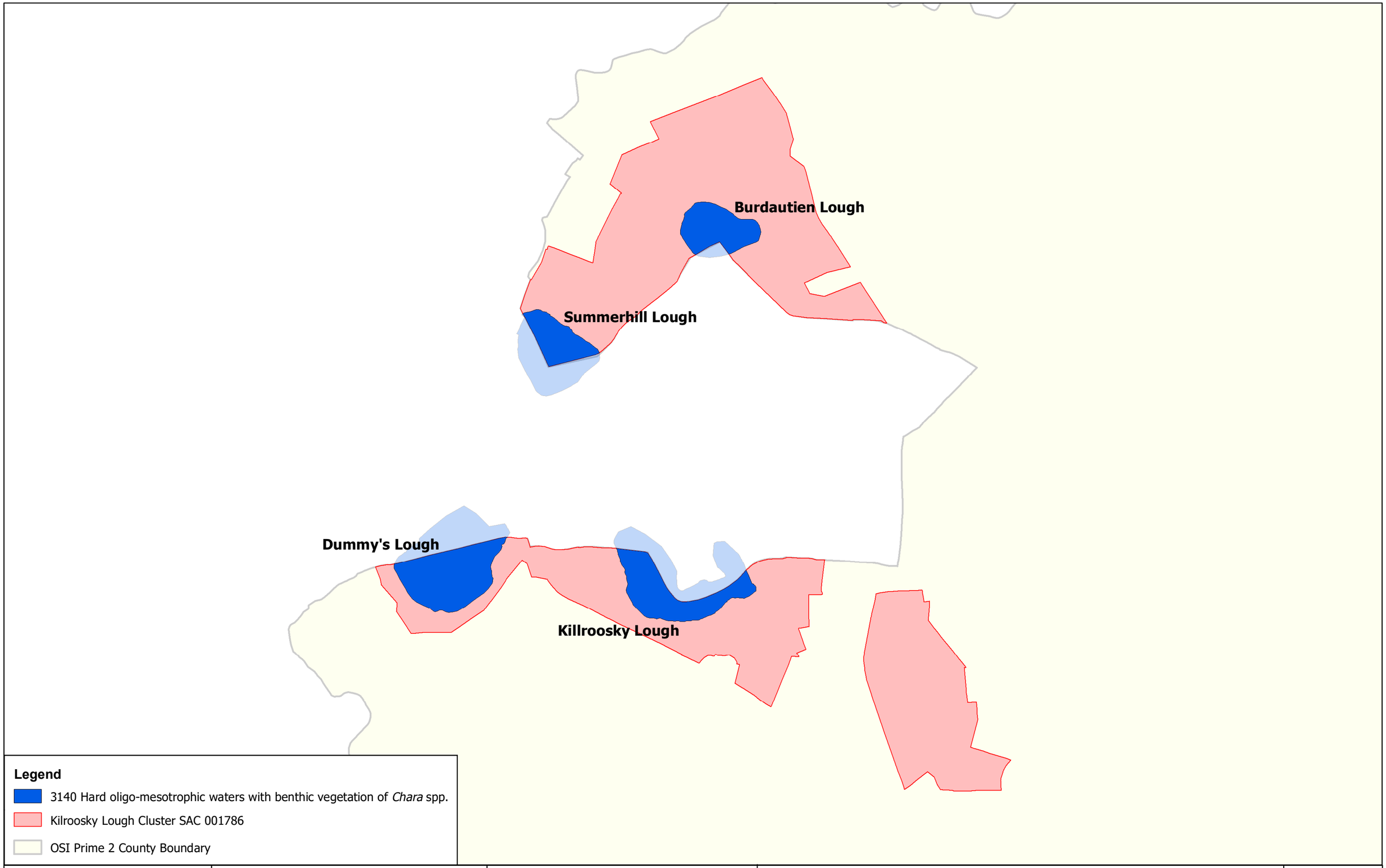
Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh OSI-NMA-014. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

N

Date: October 2021



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MAP 2:
KILROOSKY LOUGH CLUSTER SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS

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

SITE CODE:
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0 0.1 0.2 0.4 Kilometres

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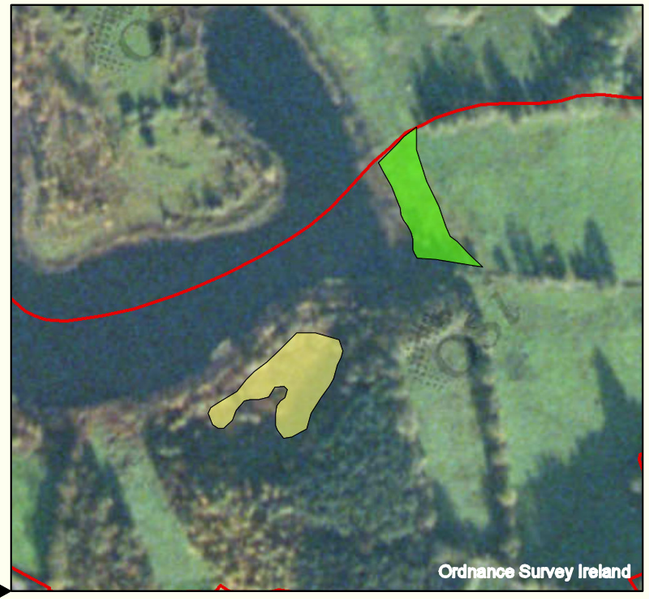
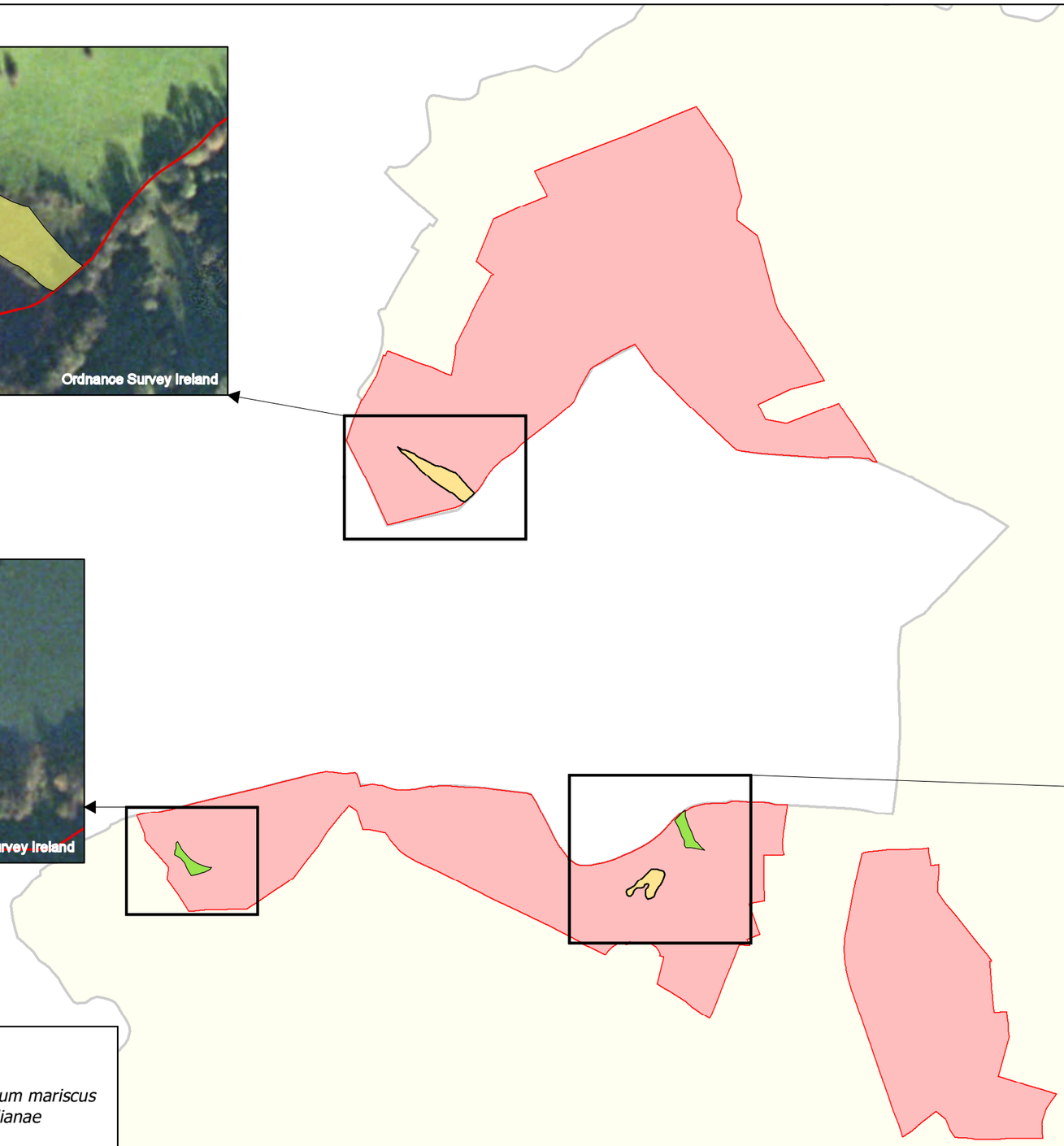
Date: October 2021





Legend

- 7210 *Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- 7230 Alkaline fens
- Kilroosky Lough Cluster SAC 001786
- OSI Prime 2 County Boundary

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MAP 3:
KILROOSKY LOUGH CLUSTER SAC
CONSERVATION OBJECTIVES
FEN HABITATS

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

SITE CODE:
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0 0.1 0.2 0.4 Kilometres

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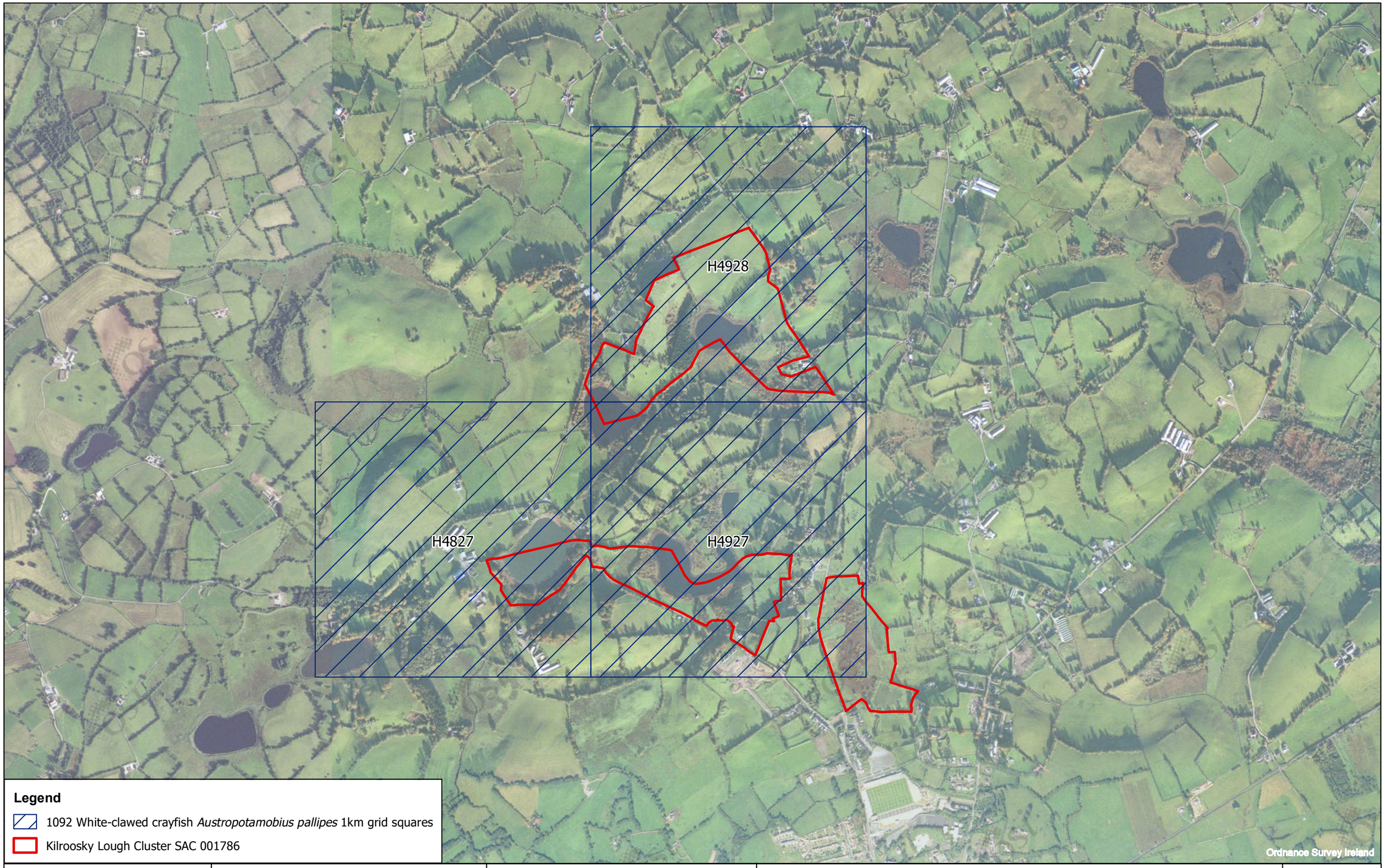
Date: October 2021



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MAP 4:
KILROOSKY LOUGH CLUSTER SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH

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

SITE CODE:
SAC 001786; version 3.02.
CO. MONAGHAN

0 0.125 0.25 0.5 Kilometres

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Date: October 2021

APPENDIX 3

CONSERVATION OBJECTIVES FOR UPPER LOUGH ERNE SPA

UPPER LOUGH ERNE-
SPECIAL PROTECTION AREA (SPA)

CONSERVATION OBJECTIVES

UK9020071

Document Details

Title	Upper Lough Erne SPA Conservation Objectives
Prepared By	*Ian Enlander*
Approved By	*Mark Wright*
Date Effective From	*01/04/2015*
Version Number	*V3*
Next Review Date	January 2020
Contact	cdp@doeni.gov.uk

Revision History:

Version	Date	Summary of Changes	Initials	Changes Marked
V1	04/03/1997	Internal working document	IE	
V1.1	August 2013	Review	IE	
V2.0	February 2015	Draft	IE	Complete review

Site relationship

To fully understand the site conservation requirements for this site it may be necessary to also refer to other site Conservation Objectives

This SPA overlaps with Upper Lough Erne SAC

The SPA also includes the Upper Lough Erne Ramsar site.

See also Boundary Rationale

The SPA is also close to, or adjoins, European designations in the Republic of Ireland. These are Lough Oughter and Associated Lake SAC and Lough Oughter SPA.

1. INTRODUCTION

EU Member States have a clear responsibility under the Habitats and Birds Directives[1] to ensure that all habitats and species of Community Interest are maintained or restored to Favourable Conservation Status (FCS). Natura 2000 sites have a crucial role to play in achieving this overall objective since they are the most important core sites for these species and habitats. Each site must therefore be managed in a way that ensures it contributes as effectively as possible to helping the species and habitats for which it has been designated reach a favourable conservation status within the EU.

To ensure that each Natura 2000 site contributes fully to reaching this overall target of FCS, it is important to set clear conservation objectives for each individual site. These should define the desired state, within that particular site, of each of the species and habitat types for which the site was designated.

Once a site has been included in the Natura 2000 network, Member States are required to implement, on each site, the necessary conservation measures which correspond to the ecological requirements of the protected habitat types and species of Community Interest present, according to Article 6.1 of the Habitats Directive. They must also prevent any damaging activities that could significantly disturb those species and habitats (Article 6.2) and to protect the site from new potentially damaging plans and projects likely to have a significant effect on a Natura 2000 site (Article 6.3, 6.4).

Conservation measures can include both site-specific measures (i.e. management actions and/or management restrictions) and horizontal measures that apply to many Natura 2000 sites over a larger area (e.g. measures to reduce nitrate pollution or to regulate hunting or resource use).

In Northern Ireland, terrestrial/inter-tidal Natura 2000 sites are usually underpinned by the designation of an Area of Special Scientific Interest (ASSI) under the Environment (NI) Order 2002 (as amended).

2. ROLE OF CONSERVATION OBJECTIVES

Conservation Objectives have a role in

- Conservation Planning and Management – guide management of sites, to maintain or restore the habitats and species in favourable condition

- Assessing Plans and Projects, as required under Article 6(3) of the Habitats Directive - Habitats Regulations Assessments (HRA) are required to assess proposed plans and projects in light of the site's conservation objectives.

- Monitoring and Reporting – Provide the basis for assessing the condition of a feature, the factors that affect it and the actions required.

[1] 92/43/EEC and 2009/147/EC (codified version of Directive 79/409/EEC as amended)

3. DEFINITION OF FAVOURABLE CONSERVATION STATUS

Favourable Conservation Status is defined in Articles 1(e) and 1(i) of the Habitats Directive:

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas 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 as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as 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 population on a long term basis.

3.1 DEFINITION OF FAVOURABLE CONDITION

Favourable Condition is defined as "**the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site"**.

The standards for favourable condition (Common Standards) have been developed by JNCC and are applied throughout the UK. Achieving Favourable Condition on individual sites will make an important contribution to achieving Favourable Conservation Status across the Natura 2000 network.

4 GENERAL INFORMATION

COUNTY: Fermanagh

G.R. H330 280 AREA: 5787 ha.

5 SUMMARY SITE DESCRIPTION

The open waters of the main lough and smaller satellite loughs contain a variety of aquatic communities typical of natural eutrophic lakes. In addition the shallow sheltered shores support extensive swamp, fen and marsh communities. Behind the open grazed foreshore is species-rich grassland, which occasionally extends back into the old adjacent field systems. Alluvial woodland is found where the shoreline is ungrazed or only very lightly grazed, while occasionally the dryer soils of the drumlins behind support a natural Oak woodland; this is particularly well developed within the

Crom Estate to the south and the small island to the north of the Lough. Wintering Whooper Swan generally utilise improved or semi-improved grassland close to water bodies used for roosting. Foraging in flooded fields and of emergent vegetation in shallower lakes is common.

5.1 BOUNDARY RATIONALE

The boundary has been drawn to include the open water of the lough, its islands and adjacent semi-natural habitats such as woodland, species-rich grassland and natural transition vegetation such as scrub or heath. The SPA boundary includes the composite boundaries of 9 ASSIs; Mill Lough, Corraslough Point, Belleisle, Inishroosk, Trannish, Dernish Island, Crom, Killymackan Lough and Galloon. The site boundary utilised permanent man-made boundary features when ever possible, however along some stretches of the foreshore such boundaries where absent and recognisable topographical or physical features such as break in slopes, scrub line, etc were used. In exceptional cases when there was no recognisable feature on the ground the Rivers Agency's ownership folio line was used. Agriculturally improved areas utilised by swans have not been included but their importance must not be underestimated.

6 SPA SELECTION FEATURES

Feature Type (i.e. habitat or species)	**Feature**	**Designation Population**	**Population at time of designation (ASSI)**	**Population at time of designation (SPA)**	**SPA Review population**
Species	Whooper Swan wintering population [a]	495 (five year running mean of maximum annual WeBS counts - 1991/92-95/96)[1]		352	352
Habitat[2]	Habitat extent				

Table 1. List of SPA selection features.

[1] The SPA Citation states the designation population to be 352. However there was an error in the calculation of this figure and therefore the revised figure of 495 should be used.

[2] Habitat is not a selection feature but is a factor and is more easily treated as if it were a feature.

Notes on SPA features – may not be applicable to all SPAs

The above table lists all relevant qualifying species for this site. As the identification of SPA features has and continues to evolve, species may have different status but all should be considered in the context of any HRA process. Ultimately all SPAs will be renotified to formalise species features.

[a] – species cited in current SPA citation and listed on current N2K dataform

[b] – species selected post SPA designation through UK SPA Review 2001

[c] – species highlighted as additional qualifying features through the UK SPA Review 2015 or the UK marine SPA programmes.

6.1 ADDITIONAL ASSI SELECTION FEATURES -

Feature Type (i.e. habitat, species or earth science)	**Feature**	**Size/ extent/ pop[.]**
See SAC conservation objectives for ASSI feature details		

Table 2. List of ASSI features, additional to those that form all or part of SPA selection features. These will be referred to in ANNEX II.

7. CONSERVATION OBJECTIVES

The Conservation Objectives for this site are:

To maintain each feature in favourable condition.

For each feature there are a number of component objectives, which are outlined in the tables below. Component objectives for Additional ASSI Selection Features are not yet complete. For each feature there are a series of attributes and measures, which form the basis of Condition Assessment. The results of this will determine whether a feature is in favourable condition, or not. The feature attributes and measures are found in the attached annexes.

8 UPPER LOUGH ERNE SPA CONDITION ASSESSMENT 2014

Species	2008	2009	2010	2011	2012	CSM	5 yr mean	% CSM	Status
Whooper Swan	483	504	415	560	484	432	489.20	**113.24**	Favourable

9 SPA SELECTION FEATURE OBJECTIVES

To maintain or enhance the population of the qualifying species
To maintain or enhance the range of habitats utilised by the qualifying species
To ensure that the integrity of the site is maintained;
To ensure there is no significant disturbance of the species and
To ensure that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species

Feature	Component Objective
Whooper Swan wintering population	No significant decrease in population against national trends
Habitat	Maintain the extent of main habitat components used by or potentially usable by the feature species subject to natural processes

Table 3. List of SPA Selection Feature Component Objectives

9.1 ADDITIONAL ASSI SELECTION FEATURE OBJECTIVES

Feature	Component Objective
See SAC conservation objectives for ASSI feature details	

Table 4. List of Additional ASSI Selection Feature Objectives

10. MANAGEMENT CONSIDERATIONS

See also Views About Management for relevant ASSIs

Owner/Occupier's – Land ownership within Upper Lough Erne SPA/cSAC is complex, and reflects the size and geography of the site. As of October 1995 there were over 340 landowners, the largest of which were The National Trust (which owns and manages the Crom Estate) and DANI (which owns the beds of the loughs). In addition, Reilly & Gole Woods NR is owned by DoE(NI) NIEA.

11. MAIN THREATS, PRESSURES, ACTIVITES WITH IMPACTS ON THE SITE OR SITE FEATURES

Notifiable Operations - Carrying out any of the Notifiable Operations listed in the schedule could affect the site. The list below is not exhaustive, but deals with the most likely factors that are either affecting Upper Lough Erne SPA, or could affect it in the future. Although, features 1, 2, 3, 4 etc, are the qualifying SPA features, factors affecting ASSI features are also considered.

Site/feature management issues

No	Issue	Threat/comments	Local considerations	Action
1	Adjoining habitat	Particularly important for swans. Significant changes in land management and disturbance are key considerations. Such areas lie without the site making effective management of developments other than those for which planning permission is required, difficult.	Considerable ad hoc local field drainage activities none presently identified on swan fields.	Assess planning applications. Identify key areas and promote site management schemes. Review use of Wildfowl Refuges. Consider the collective impact.
7	Boating activity – recreational	Disturbance and potential for impact especially from jet skis. Generally relevant to particularly sensitive areas within site.	Very limited activity in winter.	Liaise with appropriate authority with codes of good practice, zoning and use of by-laws as necessary. Consider the collective impact.
8	Shoreline protection schemes	Where there is no history of this, it impacts on natural beach systems with loss of habitat.	Not a notable problem with only limited impacts.	Liaise with Planning Service and other parties with an involvement in shoreline management.
11	Drainage	Potential impact on water flooding regime. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Nature of the lough makes capital scheme unlikely. Ongoing individual operations outside site.	Identify key areas and promote site management schemes to protect and enhance site features. Consider the collective impact.
14	Fishing – commercial or recreational	Minimal disturbance consideration.	Disturbance not thought to be significant.	Liaise with DARD and fishing authority as required. Liaise with angling clubs as required.
16	Habitat extent – open water	Loss likely to be limited but expansion of marina facilities can impact on key localities.	Not a significant issue	Assess planning applications. Consider the collective impact.
18	Habitat quality	Alteration of habitat quality through	The lough is	Assess planning

No	Issue	Threat/comments	Local considerations	Action
	– open water	diminution of water quality or invasive species.	naturally enriched. Establishment of Zebra Mussel is likely to alter the water environment significantly.	applications. Deal with invasive alien species by preventing their spread or reducing their impact. Liaise with Environmental Protection. Consider the collective impact.
21	Introduced species	Range of threats from loss of habitat, feeding competition, disease, hosting species presenting a threat outside of the site.	Zebra Mussel issue.	Liaise with appropriate authority. Consider feasibility of elimination. Participate in national/international initiatives.
22	Power cables	Specifically a problem in relation to swans. Threat is through impact. Need to consider flight lines, as well as feeding and loafing areas, which ideally should be avoided.	Impact not considered to be widespread.	Liaise with NIE. Minimum need is for line marking based on best current practice. Consider the collective impact.
24	Recreational activities.	Disturbance is the main consideration.	Most traditional swan areas are relatively remote. Land-based activities are minimal concern while winter boating is limited.	Liaise with local authorities and other managing parties.
25	Research activities.	Census and ringing activities especially have the potential to impact on bird populations, particularly at breeding sites.	Routine winter WeBS counts.	Census and ringing activities to be undertaken by competent individuals, appropriately trained. In case of ringers, appropriate license must be held.
28	System dynamics	Cuts across many other issues. Dynamic systems, especially coastal, can be affected by many factors especially engineered structures and significant changes in dominant wind direction or storm frequency. Many systems may indeed still be undergoing responses to historical developments e.g. partial reclamation, seawall construction. Changes may include alteration in sediment grade, shifts in patterns of erosion and deposition, etc. Consequences for habitat and species utilisation of the site can be profound.	Historical lowering of the lough level reduced considerably the area subject to flooding but also would have had implications for shore and nearshore morphology, particularly the dynamics of sand bar and river mouth shoal complexes and for habitat dynamics.	Human induced change should be minimised. Assess planning applications and liaise with other relevant authorities. Ad hoc dumping and removal of natural materials should be managed. Major natural shifts in system behaviour may be identified through analysis of aerial photographs and site monitoring. Major and consistent changes to patterns of habitat distribution and bird utilisation of the site should be noted.

No	Issue	Threat/comments	Local considerations	Action
30	Water level control	Impacts on natural fluctuation of water body. Potentially significant in relation to adjoining habitat if it leads to reduction in traditional areas of flooding.	Water level influenced by Ballyshannon hydro-electric scheme. Not thought to be a problem.	Liaise with relevant authorities.
31	Wildfowling	Has indirect effect through wider disturbance issue. Issue of regulated (through recognised shooting clubs) and ad hoc shooters. Lead shot on grazing lands.	Erne Wildfowlers liaise with NIEA.	Liaise with relevant shooting bodies to define areas for wildfowling, the development of Wildfowlers Codes of Good Practice and encourage bag returns. Support pressure to stop use of lead shot. Review use of Wildfowl Refuges. Consider the collective impact.

Table 3. List of site/feature management issues

12. MONITORING

Monitoring of our Special Protection Areas takes place at a number of levels, using a variety of methods. Methods for both Site Integrity Monitoring and Condition Assessment can be found in the Monitoring Handbook (To be written).

In addition, detailed quality monitoring or verification monitoring may be carried out from time to time to check whether condition assessment is adequate to detect long-term changes that could affect the site. This type of quality monitoring may involve assessment of aerial photographs to determine site morphological changes. Methodology for this is being developed.

12.1 MONITORING SUMMARY

1. Monitor the integrity of the site (Site Integrity Monitoring or SIM) – to ensure compliance with the SPA/ASSI schedule and identify likely processes of change (e.g. water level change, changes to trophic state). This SIM should be carried out once a year.

2. Monitor the condition of the site (Condition Assessment) - Monitor the key attributes for each selection feature (species, assemblage, habitat, etc). This will detect if the features are in favourable condition or not. See Annexes I and II for SPA and Additional ASSI Features respectively.

The favourable condition table provided in Annex 1 is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring condition of the site and its features. It does not by itself provide a comprehensive basis on which to assess plans

and projects, but it does provide a basis to inform the scope and nature of any appropriate assessment that may be needed. It should be noted that appropriate assessments are a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects.

12.2 ADDITIONAL MONITORING ACTIONS UNDERTAKEN FOR SITES IN UNFAVOURABLE CONDITION

Monitoring actions set out in section 6 and Annex 1 will use, amongst other attributes, bird population data to determine site condition. In the event of a significant population decline being detected, a series of subsequent actions will be initiated. The following list is not exhaustive, actions will be site dependant, but the order of these points IS hierarchical i.e. consider point 1, then 2, etc.

1. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, world. Refer to BTO ALERT limits etc. Liaise with other competent bodies to meaningfully assess wider pattern. No site action if site decline mirrors regional pattern the cause of which is not related to the site. Action may be required at regional or larger scale. If the cause of the regional population decline (e.g. eutrophication) is found at the site then action may be necessary, but this may need to form part of a network of strategic species action. Further research may be required.
2. Assess the site population in a wider geographical context – Northern Ireland, Ireland, UK, Europe, world. Determine if site losses are balanced by gains elsewhere e.g. breeding terns. Review site condition to determine if losses are due to site deterioration. Determine if possible whether population has relocated within SPA series (national, biogeographical, European). Note that the reasons for such locational changes may not be readily identifiable. Further research may be required.
3. For passage/wintering species assess breeding information. No site action if site decline is due to breeding ground failure, unless breeding ground failure is related to poor adult condition resulting from factors affecting wintering / passage birds.
4. Determine whether a major incident has affected the site e.g. toxic impact on prey items, predation event or geographical shift in available prey. Ability to respond to impacts may be limited.
5. Assess condition of principal site habitats e.g. vegetational composition and structure, change in habitat balance e.g. mudflats reduced by encroaching mussel beds.
6. Assess prey availability. Issues to consider are both within site e.g. water quality, broad site management, and without site e.g. climatically driven factors.
7. Assess whether there have been any changes in any other site features or management practices (see Table 3) that may have affected populations of site selection features.
8. Long-term site value must be considered even when it is found to be in unfavourable condition for a number of reporting cycles. This is particularly important for breeding seabird and wader sites where ongoing appropriate management may ultimately encourage re-establishment of a favourable population.

13. SELECTION FEATURE POPULATION TRENDS

A summary statement of site population trends, together with wider geographical trends. Date of completion is given as well as information sources used. Site trends are reported as % increase/decline from designation population (1995/96) using running 5 year means of annual maximum count (WEBS data). Other trends are generally limited to terms such as 'consistent increase/decline', 'variable with overall increase/decline', 'no discernable trend'.

SPECIES	SITE TREND	NI TREND	IRISH TREND	UK TREND	COMMENTS
Wintering Whooper Swan	+11% (1999-2000)	Variable with overall decline 1990/91-1999/2000 (WeBS)	I-WeBS data unavailable	Variable with overall increase 1990/91-1999/2000 (WeBS)	

ANNEX I

Feature (SPA) – Wintering waterfowl

* = primary attribute. One failure among primary attribute = unfavourable condition
# = optional factors – these can be in unfavourable condition without the site being in unfavourable condition

Attribute	Measure	Targets	Comments
*Whooper Swan wintering population	Bird numbers	No significant decrease in population against national trends	Five year running averages will be used to monitor population trends through WeBs data. A lower limit of 50% decline over a five year period may indicate unfavourable condition of the site.

Non-Avian Factors - habitat

Attribute	Measure	Targets	Comments
Habitat	Area of natural and semi-natural habitat	Maintain the extent of main habitat components subject to natural processes	

ANNEX II

Feature (ASSI)

Attribute	Measure	Targets	Comments
See SAC conservation objectives for ASSI feature details			