Iascach Intíre Éireann
Inland Fisheries Ireland

Screening For Appropriate Assessment

Fish Stock Management Plan for Lough Carra, Co. Mayo, Ireland

January 2023

This document describes the management practices currently employed by Inland Fisheries Ireland for the removal of Pike from a Large lake in Co. Mayo, which is designated as protected site within the EU Natura 2000 network. It provides an assessment of the potential impacts on the protected habitats and species at the site and concludes whether a stage 2 Appropriate Assessment is required for this project.

Inland Fisheries Ireland: Management of Pike (*Esox lucius* L.) on Lough Carra

Screening for Appropriate Assessment

1. Introduction

Inland Fisheries Ireland has prepared this assessment in relation to the removal of Pike (*Esox lucius* L.) by electrofishing and gill netting, from Lough Carra, Co, Mayo, one of the "great Western lakes" and is world renowned as one of our premier wild Brown Trout (*Salmo trutta* L.) recreational fisheries.

Since their presumed introduction to these waters, the control and removal of pike has been practiced for over 100 years. This has been perceived as an important tool in the management of these inland waterways as quality brown trout fisheries. In the West of Ireland generally, brown trout are thought to have established populations soon after the retreat of ice sheets during the last glacial period, approximately 14,000 years ago (Maitland 2004). The founding event for the establishment of pike populations in Lough Carra is not known but for the purposes of EU Directives (e.g. 2000/60/EC) and Ireland's Red Data book, pike have been regarded as an invasive non-native species. In this context, they have been managed and removed, formerly by individuals with an interest in developing trout fishing and in more recent times by the Inland Fisheries Trust, The Western Regional Fisheries Board and by Inland Fisheries Ireland, for whom it is now regarded as an important conservation measure.

Lough Carra was designated as a protected site under the birds directive (Directive 2009/147/EC on the conservation of wild birds) in March 2004. With just one bird species (the common gull – *Larus canus*) referred to in Article 4 and listed in Annex II of Directive 92/43/EEC, named as qualifying interest. In addition to this designation, Lough Carra (in conjunction with L. Mask) was also designated as a Special Area of Conservation (SAC) in December 1995 citing 8 protected habitats, 2 mammal and one plant species as qualifying interests.

Pike have been managed at this site prior and subsequent to their designation under EU directives. In 2014, IFI published a policy document for the management of this invasive fish species in designated wild brown trout fisheries (see appendix1). IFI staff currently carry out these operations in accordance with this policy and the Standard Operating Procedures (SOP) for management of pike stocks in designated wild brown trout fisheries (see appendix 3). The principal methods used for pike management and removal are gill nets and electrofishing. Both methods are internationally recognized survey and management

methodologies for fisheries and their potential to impact on the protected habitats or species are evaluated in this assessment

Lough Carra is located approximately 5km north of Ballinrobe, Co. Mayo. It is the largest marl lake in Ireland, with a surface area of approximately 1600ha (NPWS, 2004; Irvine *et al.,* 2003). It is a hard water lake which acquires most of its water via the feeder streams that flow in at various points around its perimeter (Huxley and Huxley, 2009). The majority of the lake is shallow with a mean depth of approximately 1.8m; however, there are sections of the lake where depths reach over 19m (Huxley and Huxley, 2009).

Lough Carra is well known for its green/blue colour which is due to the formation of calcareous encrustations (NPWS, 2004). The lake contains well developed stonewort communities with *Chara curta, C. desmacantha, C. rudis* and *C. contraria* also recorded (NPWS, 2004). There are approximately 73 islands scattered throughout the lake, varying in size from less than 50m² to just over 10,000m2 (Fig. 1.1). The lake is categorised as typology class 10 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and highly alkaline (>100mg/l CaCO3).

Results from an Inland Fisheries Ireland (IFI) survey in March 2009 on Lough Carra suggest that the lake then supported a healthy stock of brown trout, possibly one of the best in the country (IFI, 2009). However, more recent surveys on the lake (2012, 2015 & 2019) indicate that trout numbers have fallen slightly since the first WFD survey. The ecological status for the lake was “high” in 2009 but had declined to “Good” in 2019. Lough Carra is believed to be one of the few remaining wild brown trout calcareous lakes within the EU (Irvine *et al.* 2003). During the 1990s fishery rehabilitation and enhancement works were undertaken in Lough Carra’s spawning streams by IFI (previously the Western Regional Fisheries Board) and this has led to greatly increased recruitment of juvenile brown trout to the lake. These works have resulted in a doubling of the adult stock in the lake, compared to the stock levels of the 1970’s (O’ Grady, 2009). Other fish species present in Lough Carra include pike, perch and eel. This species composition has not changed since the early 1960’s (Kelly et al. 2015).

2.0 Assessment Methodology

In accordance with Schedule 6(3) of the Habitats Directive 92/43/EEC (Assessment of Plans and projects significantly affecting NATURA 2000 Sites), this report has been prepared in relation to the implementation of Inland Fisheries Ireland's stock management plan for 2023 (see appendix 1) on Lough Carra, Co. Mayo. An evaluation of potential direct, indirect and in combination effects on the conservation objectives of any Natura site wholly or partially within the zone of influence of the project is undertaken in compliance with the requirements of the AA process.

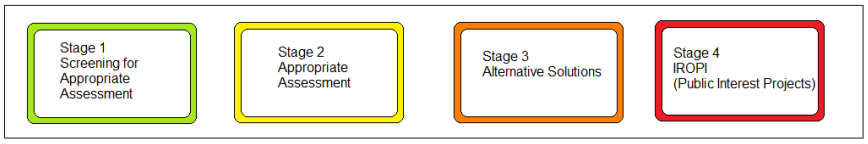
2.1 Legislative Context

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the NATURA 2000 network), "any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives". A competent authority can only agree to a plan or project after having determined that it will not adversely affect the integrity of the site concerned.

2.2 Stages of Appropriate Assessment

The Appropriate Assessment process is a four-stage process with issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The stages are set out below and, having regard to the scale, location and potential impacts of this project on the species and habitats in any relevant or connected site, this proposal has, so far, proceeded as far as Stage 1.

Figure 1: Four Stages of Appropriate Assessment



Stages 1 and 2 relate to Regulation 42 of the Birds and Natural Habitats Regulations; and Stage 2 relates to Article 6(3) of the Habitats Directive; and Stages 3 and 4 to Article 6(4) of the Habitats Directive.

Stage 1 - Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

(i) Whether a plan or project (in this instance the proposed works) is directly connected to or necessary for the management of the European Sites, and

(ii) Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on the European Sites in view of their conservation objectives.

2.3 Guidance on Appropriate Assessment

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2009). These guidance documents identify the staged approach to conducting an AA, as shown above. (from; Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities, DEHLG, 2009)

2.4 Purpose of Assessment

This Screening for Appropriate Assessment has been undertaken to determine the potential for significant impacts of the management of pike tocks on Loughs Conn & Cullin on a number of NATURA sites in the area. The various steps in this report aim to provide the following:

- A Description of the relevant processes involved in Appropriate Assessments which may be applicable to the proposed project
- A Description of the proposed project and its purpose, including an account of the characteristics and specific activities of the proposed works that could give rise to negative impacts on species and habitats at Natura sites in the area.
- Identification of the European Sites that are situated (in their entirety or partially) within the zone of influence or otherwise connected to the proposed project
- Identification of the Qualifying Interests (QIs) and Special Conservation Interests (SCIs) for each European Site occurring either wholly or partially within the zone of influence
- Identification of the Conservation Objectives for each relevant European Site occurring either wholly or partially within the zone of influence
- Identification of potential significant impacts and pathways of impact from the project activities to the species and habitats comprising the protected sites
- Identification of other plans or projects, for which In-combination impacts would likely have significant effects.
- Provision of a screening matrix and a determination as to whether the project may require further assessment to manage impacts. (i.e. screen in/out)

3.0 Description of the Project Site

The Project site comprises various locations on lough Carra (See figs 3.4 & 3.7). The project area lies entirely within the Lough Carra Mask Complex SAC and the Lough Carra SPA and detailed descriptions of the species and habitats of community interest and their conservation objectives are described in the following sub-sections.

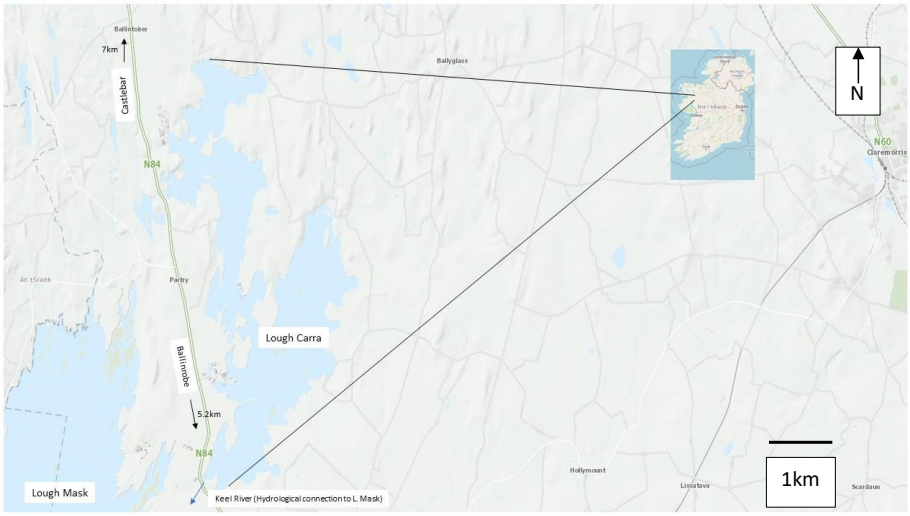


Fig 3.1. Lough Carra – In the context of the local landscape

3.3.1. Lough Carra

Lough Carra, lies to the north-east of Lough Mask, in the Corrib catchment in Co. Mayo. It is one of the best examples in Ireland of a hard water marl lake. It is a shallow (mean depth 1.5 m, maximum depth 18 m), predominantly spring-fed lake with only a few inflowing streams. It is connected to Lough Mask via the Keel River. The water has an alkaline pH and negligible amounts of iron and manganese. Sodium and chloride are present in relatively high concentrations. It is classified as a mesotrophic system. Lough Carra has well-developed stonewort communities in the submerged zones, and includes such species as Chara curta, C. desmacantha, C. rudis and C. contraria Roden et al. 2013). The lake has a highly indented shoreline (over 69 km in length) and includes many small islands. It is fringed by a diverse complex of limestone and wetland habitats. The wetland habitats include both Cladium fen and alkaline fen. In addition to the fen habitats, there are widespread reed swamps, Limestone pavement wet grassland and some freshwater marsh communities around the lakeshores. The site is a Special Protection Area (SPA) under the E.U. Birds Directive, designated for one special conservation interest, the Common Gull (*Larus canus*). This site is also a significant part of the Lough Carra/Mask Complex SAC which is designated for the following habitats and species

[3110] Oligotrophic Waters containing very few minerals
[3130] Oligotrophic to Mesotrophic Standing Waters
[3140] Hard Water Lakes
[4030] Dry Heath
[6210] Orchid-rich Calcareous Grassland*
[7210] Cladium Fens*

[7230] Alkaline Fens
[8240] Limestone Pavement*
[91E0] Alluvial Forests*
[1303] Lesser Horseshoe Bat (Rhinolophus hipposideros)
[1355] Otter (Lutra lutra)
[1393] Slender Green Feather-moss (Drepanocladus vernicosus)

The islands in Lough Carra have traditionally supported nesting gulls. A survey in 1993 recorded Common Gull (72 individuals) and Black-headed Gull (252 individuals). The site was surveyed in 1999 as part of the Seabird 2000 Survey and 65 pairs of Common Gull and 100 pairs of Black-headed Gull were recorded. The site synopsis for the L. Carra Mask complex SAC is attached to this document in appendix 3.

3.4. Fish Stocks on Lough Carra

The most recent survey data on fish stock for L. Carra were carried out by IFI in 2019 as part of the Water Framework Directive surveillance monitoring programme http://wfdfish.ie/wp-content/uploads/2020/05/Carra_2019 . Perch (*Perca fluviatilis*), a non-native fish, introduced several hundred years ago, was the dominant fish species (CPUE) both in terms of abundance and biomass. Native brown trout (*Salmo trutta*) were next most abundant followed by pike (*Esox lucius*)

WFD surveys are carried out at 3-4 year intervals on this lake and trends can be observed in fish stocks from 2009 – 2019 (Fig. 3.2). Perch and to a lesser extent, pike densities appear to be increasing while brown trout numbers are decreasing indicating a possible deterioration in habitat and water quality. Roach, (*Rutilus rutilus*) were introduced to the Corrib catchment in the 1960s and have caused widespread disruption of ecosystems in many areas. However, while they are recorded in L. Carra, they do not appear to have been successful in this environment and their stock densities remain low at this time.

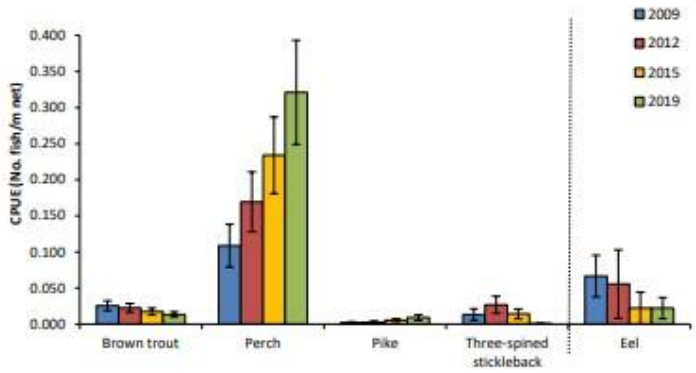


Fig 3.2. Fish stock trends on L. Carra 2009 – 2019 Source (http://wfdfish.ie/wp-content/uploads/2020/05/Carra_2019)

3.5. Water Quality & Typology

In order to comply with the reporting requirements of the Water Framework Directive, water quality assessments have been conducted for certain catchments and sub-catchments. These reports can be viewed on the EPA and Water Framework Directive web-sites. In the context of the reporting

requirements of the Water Framework Directive, the Lough Carra assessment indicates “Good Ecological Status” (2019). Lough Carra is categorised as typology class 10 (as designated by the EPA for the purposes of the Water Framework Directive (WFD)), i.e. shallow (<4m), greater than 50ha and highly alkaline (>100mg/l CaCO3).

4.0 Description of the Project

This section sets out the relevant information concerning the proposed plan, the project site and the specific activities which comprise the project. It details the characteristics and operations involved and describes the main components of the proposed stock management plan and what risks, if any, it may pose to the species and habitats or the attainment of the conservation objectives for the relevant Natura sites.

4.1. Stock Management Plan

A stock management plan for designated wild brown trout lakes in the year 2023 has been compiled by IFI, which outlines the periods, effort (person-days) and predicted numbers of pike to be removed, having regard to the requirements of IFI’s management policy for these lakes. This plan is presented in appendix 1

4.1.1. Characteristics of the Project

The characteristics of the project are described here in the context of the potential of their various elements to impact on the habitats and species which are features of the Natura sites within the zone of influence of the project. Table 3.1 below summarises the project characteristics and details of the activities.

Project Characteristics	Detail
Size, Scale, Land take	Main project activities are gill-netting, electrofishing at various locations on Lough Carra. No land take is required for the project.
Physical Changes that could take place at the site	No physical changes will take place - There will be no physical alteration to the Natura 2000 site or adjacent waterways or lands required for the project
Resource requirements for the operation of the project (Water resources, fuel/energy, construction material, human presence)	The plan will require 55 man days for gill netting operations, 45 man days for electrofishing. Approximately 60 l of petrol will be required for powering outboard motors and 180l of diesel for transport of vehicles and equipment Emissions from the combustion of this fuel are estimated to be 470kg CO2 There are no construction materials, or additional water resources required

Duration – and description of the timescale for the various project activities including start and finish dates	Gill netting will commence in mid - March and cease at the end of April. A second period of gill netting will also take place intermittently, between 10 October and 20 December. Electrofishing will take place on 25 days dispersed throughout the year and trapping trials will take place from April to July.
Description of any waste material arising from the project	Aside from the emissions associated with the combustion of fuels (described above) No other emissions are anticipated
Description of any additional equipment or services required to implement the plan	2 different types of boat are required for gill netting and electrofishing respectively. Specifications for these are described in Appendix 2. Outboard engines fuelled by gasoline and diesel powered vehicles will also be required to transport personnel and equipment to the project site.
Description of any facilities required	The IFI slipway located adjacent to the base at Brownstown will be used to transport personnel and equipment to the project site. Only established access points (i.e. Castleburke pier) will be used so that disturbance to habitats is avoided.

Table 4.1. Project characteristics

4.2. Purpose of the Project

The predation of salmonids by pike has been observed and described by many professionals working in the Inland fisheries sector both in Ireland and in other states and regions where pike are considered as non-native and invasive (Ireland; O'Grady & Delanty 2008), (Alaska; Sepulveda et.al :2013), (Sweden; Bystron et al :2007), (Norway; Hesthagen: 2014). This is particularly so in the spring months when juvenile trout migrate from feeder streams to larger freshwater bodies. Rosell & Macoscar (2002) describes the migration of pike on lower Lough Erne in response to seasonal abundances of salmonids as they move from inflowing streams to the lake on their seaward migration.

Inland Fisheries Ireland's Water Fremawork Directive monitoring programme classifies fish species to one of four categories (1. Domesticated, 2. Non-native benign, 3. Non-native non-benign and 4. Invasive requiring management). Subsequent to this description pike are classified as (3) non-native non-benign (Kelly et al., 2008; King et al., 2011). In some catchments, they have caused declines in brown trout and Atlantic salmon populations (IFI 2017). The removal of pike is therefore, regarded as an essential conservation measure in the management of wild brown trout fisheries.

4.3. Project Activities

The activities which form the basis of this project are based on methodologies to capture and remove pike from the waters of the project area, to reduce predation on salmonids. Some of the

activities are also carried out by way of planning and preparation for the project (i.e. transport of boats and equipment to the project site for gill-netting and electrofishing operations – Table 4.1.).

4.3.1. Specific Activities: Gill Netting

The gill nets used are made from terryline fabric and range in mesh size from 5 – 10 cm. They are usually set from a small boat (5.8m) in shallow water close to areas of emergent vegetation where pike are known to spawn in the early spring months (March – April). Nets are set during the day and serviced the following morning. Sets are usually deployed in groups in a single bay or along a shoreline, with panels of 6x 30m nets tied together. Typically the nets fish from the lake bed to approximately 2 m above and are set in groups of 6 – 10 "gangs" at a predetermined location. A known pike spawning area in the shallow area of the lake is usually targeted and re-fished for a period of 3 – 4 days. Nets are serviced at least once in every 24 hour period.

Commented [DC1]: The risk and avoidance of potential impacts on Charophytes is discussed in table 6.1.

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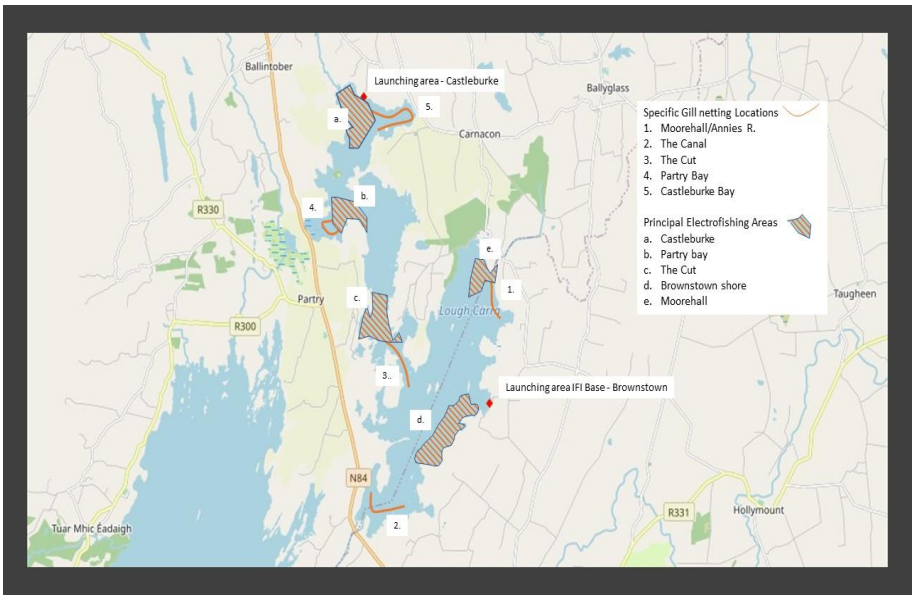

Fig. 4.1. Areas on L. Carra where gill-netting and electrofishing will take place

4.3.2 Specific Activities: Electrofishing

Electrofishing, to remove pike, is carried out at several locations on Lough Carra and on the lower parts of some the Annies river (see fig. 3.7 &3.8.). Although limited in it's efficacy in open or deep water, this method can be successful in the shallow pike nursery areas and in places where concentrations of brown trout occur as they migrate from their nursery streams to the main lake, usually at the mouths of inflowing and outflowing rivers.

Electrofishing is carried out from a 7m flat-bottomed boat mounted with a generator and transformer. This method is widely used in the fisheries management and research sector,

as it allows for the selective capture of target species without harming non-intended species (See stock management SOP – appendix 2). The equipment delivers a 12V DC current via an anode operated by hand at the front of the boat. A cathode is trailed through the water at the back of the boat. The apparatus delivers sufficient electrical current to the water to render fish in the immediate vicinity, temporarily motionless. The immobilized fish are removed from the water using hand nets. Non target fish are re-released directly to the water and pike are retained on-board. The principal areas where electrofishing will take place are highlighted in Fig. 4.1.

Fig.4.2. IFI Staff setting a gill net

Fig 4.3. A pike captured in a gillnet

Pike captured in the nets are removed and placed in a tank carried on-board the boat. Fish are euthanized immediately in an appropriate manner and, once brought ashore are subject to routine analysis and collection of data. When this part of the process is completed, carcasses are disposed of using a registered animal rendering service.

Fig. 4.4. Electrofishing for pike

Fig. 4..5 A pike, immobilised by electrofishing gear

5.0 Natura Sites

The protected site within which the proposed project will take place is the Lough Carra/Mask Complex SAC (001774) and the Lough Carra SPA (004051). The features and qualifying interests of these sites are discussed in section 6. There are also 9 additional sites that lie either wholly or partially within the potential zone of influence of the project. One of these (Lough Mask SAC/SPA) has a clear hydrological connection to the project site, while 6 more may have indirect subterranean hydrological connectivity. This section examines the potential source-pathway-receptor mechanisms which could result in impacts from the project to Natura sites, their habitats and species.

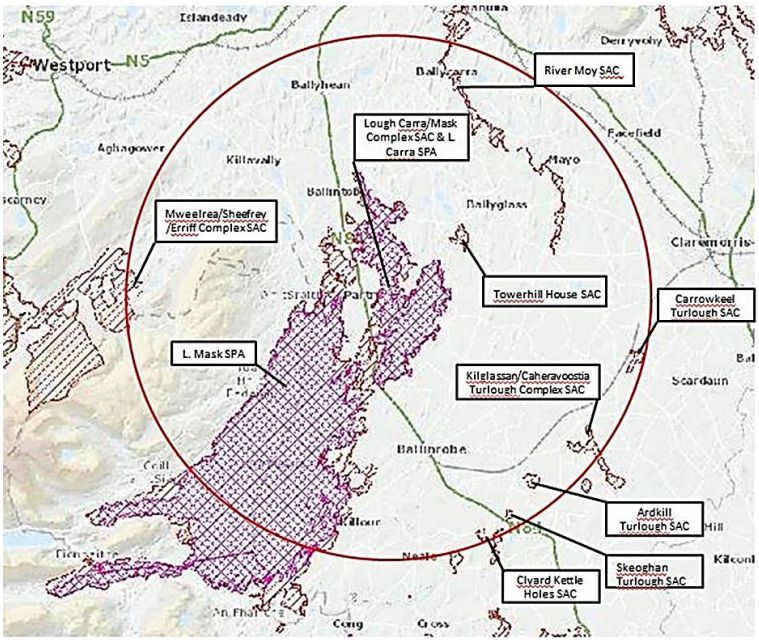

Fig: 5.1. European sites within potential zone of influence of the project area

5.1 The Potential Zone of Influence of the Project

The Zone of influence of any project is based on the precautionary principle and in accordance with NPWS guidance, is assumed to be within approximately 15km radius of the project activities or further if there is connectivity or biodiversity corridors between sites. In reality, the nature of the specific activities (table 4.1.)) along with ancillary activities (e.g. transport, re-fuelling etc) discussed in sections 6.3 & 6.4 imply a smaller zone of influence. However, in compliance with the requirements of Appropriate Assessment and the precautionary principle, features and sites within the maximum zone of influence and those hydrologically connected to the project area are evaluated in this section.

5.2. Other Natura Sites Connected to or within the zone of influence of the proposed project

There are a total of 9 additional protected sites within a the potential zone of influence of the proposed project area (see fig 2. & Table 1.). One is directly connected and a further 6 may be connected via subterranean aquifers, to the project area. Table 4.1 below, provides a list of these sites and their potential for impact by the project.

Table 5.1. Other Natura sites within the zone of influence (15km)

Designated Site and site code	Qualifying Interest	Proximity to Project area	Connectivity & Potential Impacts
River Moy SAC 002298	*Atlantic Salmon (Salmo salar)* *Otter (Lutra lutra)* *White-Clawed Crayfish (Austropotomobius pallipes)* *3 Lamprey spp.* *6 Habitat types*	12km	The northwestern shoreline of L. Carra is approximately 12 km from the upper reaches of the Manulla river, a tributary and part of the River Moy SAC The two watershed areas are not connected hydrologically and given the absence of emissions or resource requirements for the project, this SAC is unlikely to be impacted by the project activities
Towerhill House SAC 002179	Lesser Horseshoe Bat *(Rhinolophus hipposideros)*	1.4 km	This species roosts at known locations close to the lakeshore and forages at the waters edge at night. Most foraging activity occurs during summer months. There is no activity associated with the project which has the potential to disturb or impact on this species.
Carrowkeel Turlough SAC 000475	Turloughs	10.2 km	This project does not propose any discharges to surface or ground waters or have any activity likely to impact on water quality. Although a potential pathway exists (i.e hydrological connectivity)

			between the project area and Carrokeel turlough, there is no source of impact
Kilglassery/Caheravoostia Turlough Complex SAC 000504	Turloughs	10.1 km	The project does not propose any discharges to surface or ground waters or have any activity likely to impact on water quality. There may be a pathway (i.e hydrological connectivity) between the project area and Kilglassery turlough, but there is no source of impact
Ardkill Turlough SAC 000461	*Turloughs*	10.8 km	This project does not propose any discharges to surface or ground waters or have any activity likely to impact on water quality. There may be a pathway (i.e hydrological connectivity) between the project area and Ardkill turlough, but there is no source of impactivity between sites
Skeolaghan Turlough SAC 000541	*Turloughs*	7.7 km	This project does not propose any discharges to surface or ground waters or have any activity likely to impact on water quality. There may be a pathway (i.e hydrological connectivity) between the project area and Skeolaghan turlough, but there is no source of impact
Clyard Kettle Holes SAC 000480	*Turloughs, Calcareous Fens with Cladium meriscus and species of the caricion davallinae [7210]*	5.6 km	Possible Connectivity between sites via subterranean aquafers. No activity likely to impact on water quality. It is therefore considered unlikely that impacts could occur in relation to the habitats at this site
L. Mask SPA 004062	*Lesser Black-backed gull. Tufted Duck Black headed gull Common gull Common tern Greenland white-fronted goose Wetland and waterbirds*	6km	These sites are approximately 6km apart and connected, hydrologically, via Keel canal. Movement of some bird species between lakes is likely. See detailed risk assessment for L. Mask SPA Section 5.4

Mweelrea/Sheefrey/ Erriff Complex SAC 001832	*Hyperciun candens, Lycopodiellainundata*	11.2 km	No Connectivity between sites.

6.0. Conservation Objectives

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. In order to maintain the habitats and species within Natura 2000 sites in a favourable conservation condition, specific conservation objectives are established for each habitat and species at the site. These objectives are critical to the management of the site and should not be impacted by any plan or project.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing,
- 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
- 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
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

6.1. Sites and Qualifying Interests

The Qualifying interests, within the context of the Appropriate Assessment process, are the Annex I habitats or Annex II species for which the site has been designated. These are presented in Tables 1 & 2 and discussed in the subsections below.

6.2. Qualifying Interests - Habitats

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 annexes of the Habitats and Birds Directives. Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them and a series of conservation objectives has been compiled.

Of the eight protected habitats noted in the site designations of the Lough Carra/Mask Complex SAC & L. Carra SPA (Oligotrophic to Mesotrophic standing water [6401, Cladium Fens [6410], Hard Water Lakes [3140], Alluvial Forests [91E0], Alkaline Fens [6410] Orchid Rich Calcareous Grasslands [6210], Dry Heath[6410] Limestone Pavement [8240]), none are

considered vulnerable to the specific activities outlined as part of the project. The key activities associated with the project (gill-netting and Electrofishing) are entirely confined to the aquatic zone. Risk to charophyte beds is considered low as once gill-nets are set, they occupy a single transect line of contact with the lake bed. They are anchored by a small weight (C. 2kg) at each end and remain stationary for a period of days until their removal from the area. Their potential to damage areas of charophyte is therefore very limited. Access to the project area is also confined to existing, discrete boat access points at Brownstown and Castleburke in the east and western basins of the lake respectively (see fig 4.2).

Table 6.1. Description of the Protected Habitats within the Project Area

Habitat Type	Description	Potential Risks to habitats
Oligotrophic waters containing very few minerals of sandy plains Littorelletalia uniflorae [3110]	This habitat type occurs in the western arm (Kilbride) of the L. Mask part of the SAC. It may also be found in smaller lakes and ponds on the siliceous geology to the north of Lough Mask.	The conservation objectives emphasise the protection of water quality which is critical to the survival of many aquatic species. The project area is hydrologically connected to this habitat, although somewhat distant. However, as there are no discharges or emissions to surface or ground waters, or disturbance to soils, there is no likely source of impact from the project on this habitat. This habitat is outside and relatively distant from the project area (Fig. 5.2.).
Hard Oligotrophic to Mesotrophic Waters with Benthic Vegetation of Chara spp. [3140]	This habitat is one of the principal types in the SAC add is present throughout the L. Carra basin (fig. 5.1.). The lake has a surface area of 1,600ha and a mean depth of 1.8m. There are extensive areas of charophytes and emergent and submerged vegetation associated with this habitat type which support unique assemblages of species.	This habitat type comprises almost the entire project area and is charactered by the clear, calcium rich waters with extensive areas of Krustenstein and benthic vegetation of charophytes. Other, largely emergent, vegetation (e.g. *Phragmytes* and *Scirpus sp*. also fringes much of the littoral areas. The principal issues of concern to the conservation status of this habitat are those that impact on water quality. Access to the lake will be restricted to established slipways and piers, minimising anydisturbance to littoral areas or vegetation. Once set, the nets occupy a single transect line of contact with the lake bed. They are anchored by small weights and not moved for a period of days until their removal from the area. Their potential to damage areas of charaphyte is therefore very limited. Furthermore, as the project does not entail discharges or emissions to surface or ground waters which could affect water quality, there is no likely source of impact on this habitat.

Commented [BD3]: Impacts of nets on charophytes

Commented [DC4R3]: Comments on potential risk to charophytes is now expanded here and in section 6.2. (above)

Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoëto-Nanojuncetea [3130]	This habitat occurs in clear-water lakes of intermediate alkalinity where *Isoetes lacustris* and *Potamogeton perfoliatus/praelongus* co-occur and is characterised by high species richness and a deep-water flora that can include *Najas flexilis*. It appears to comprise almost the entire body of L. Mask but this has not been officially confirmed or mapped. It may also occur in some smaller lakes within this SAC	The majority of lakes of this type in Ireland are in poor condition, due mainly on the impacts of water quality declines on the species richness of the plants associated with this habitat. The project area is hydrologically connected to this habitat which is thought to be present in the L. Mask portion of the SAC. However, there will be no disturbance to soils or discharges to surface or ground waters associated with the project and, therefore no likely sources of impact to this habitat.
Alkaline Fens [7320]	Extensive areas of this habitat have been documented but the extent and precise locations are not maped. They are known to be present around L. Carra, especially around the southern and southwestern shores.	Nutrient levels, particularly N, must remain within specific ranges to facilitate the characteristic flora of this habitat. It also requires high groundwater levels. Consequently, the issues of principal concern to the conservation of alkaline fens are drainage and nutrient loss to groundwaters from human activity. As there will be no drainage or disturbance to soils, or discharges of nutrients or polluting substances required as part of this project, no impacts are envisaged on this habitat feature from the project activities.
Semi-natural dry grasslands and scrubland facies on calcareous substrates. (Festuco-Brometalia) (* important orchid sites) [6210]	This habitat feature occurs in mosaic with limestone pavements, dry heaths and scrub along the shores of L. Carra and the eastern and southern shores of L. Mask	Conservation objectives focus on the preservation of associated flora such as quaking grass, spring gentian, wild carrot and various orchids. No activities associated with the project will disturb flora or soils and this habitat is therefore unlikely to impact on this habitat
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] *	Not yet mapped in detail for this SAC, this habitat is known to occur in conjunction with Alkaline fens and is assumed to have a similar distribution, particularly around the sheltered areas of L. Carra and the eastern shore of L. Mask	This is another priority habitat which relies on a specific range of nutrient availability for the characterising forbs and mosses. Maintenance of water levels appropriate to the formation of peat is also critical to the conservation objectives. The project area is hydrologically connected to this habitat. However, there will be no drainage or disturbance to soils or discharges to surface or ground waters associated with the project and, therefore no likely sources of impact to this habitat.

Alluvial Forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) [91E0] *	This priority habitat relies on seasonal inundation and is present at four sub-sites within the SAC. These are located on the western and southern shores of L. Mask	The sub-sites where this habitat type occurs are hydrologically connected, albeit somewhat distant from the project area (Fig. 5.2.) Maintenance of water levels appropriate to seasonal inundation of this habitat is critical to the conservation objectives. The project area is hydrologically connected to this habitat. However, there will be no drainage or disturbance to riparian soils associated with the project and, therefore no likely sources of impact to this habitat
European Dry Heath [4030]	This habitat is scattered around both L. Carra and L. Mask, occurring in association with limestone pavement. At least seven indicator species are present and these are monitored as part of the objectives for this habitat.	The principal issues of concern to the conservation of this habitat include overgrazing by livestock, scrub encroachment and physical disturbance to vegetative cover. The project activities will not come into contact with this habitat type and could not be predicted to cause impacts.
Limestone Pavement* [8240]	L. Carra represents the northern most limit of the Clare/Galway (Burren) limestones. They are present in both exposed and wooded form where bryophytes are significant indicator spp.	Specific floral assemblages are associated with both the exposed and wooded forms of this habitat. Impacts of concern to its conservation are generally related to the loss of these species by encroachment of non native and/or invasive plant spp. or by ovrgrazing of ungulates. The stock management plan will be carried out subject to IFi's protocols on biosecurity, minimising the risk of invasive species or pathogen transfer. No other elements of the project are likely to present a risk to the conservation of this habitat.

***Denotes priority habitats**

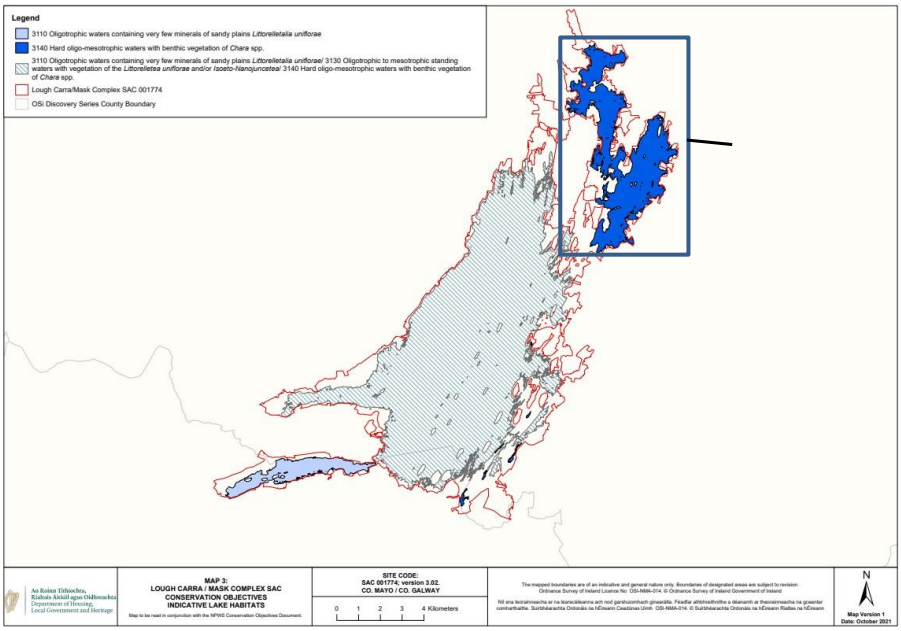

Fig. 6.1. Locations of Lake habitat types in the L.Carra/Mask Complex SAC. (Source: https://www.npws.ie/sites/default/files/protectedsites/conservation_objectives/CO001774.pdf)

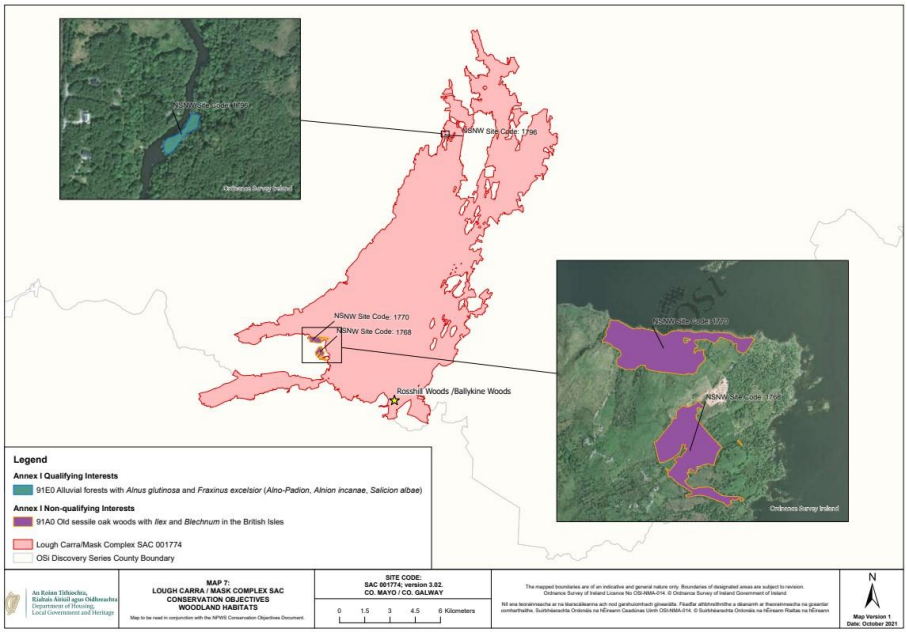

Fig. 6.2. Sub-sites within the SAC where Alluvial Forest has been recorded (Source: https://www.npws.ie/sites/default/files/protectedsites/conservation_objectives/CO001774.pdf)

6.3. Qualifying Interests - Species

A list of the protected species at the site is presented in table 5.1. In terms of the Lough Carra Mask complex SAC, three species are highlighted as being of particular conservation interest and are listed as qualifying interests for the site. These are Lesser Horseshoe Bat, (*Rhinolophus hipposideros*), Otter (*Lutra lutra*) and Slender Green Feathermoss (*Drepanocladus vernicosus)*. Atlantic salmon have not been recorded at the Lough Carra part of the SAC but are occasionly found on L. Mask and are common in the adjacent L. Corrib and its tributary rivers, which are hydrologically connected to the site.

6.3.1. Otter

Otter, are referred to as a priority species and have been recorded in the project area. The littoral areas and islands of L. Carra have important couching and breeding sites for the species. Disturbance or reduction of suitable habitats for these features are considered the principal threats. Declines of fish biomass, particularly salmonids, is also considered a threat to otter (Rochford 2007). This project aims to protect salmonids on L. Carra from predation by an invasive predator and may therefore contribute to the conservation of this species. The principal impacts of conservation concern regarding Otter is loss of appropriate riparian habitat for resting and reproduction, river drainage activities and infrastructural developments (e.g. roads) which present barriers to movement and may introduce collision hazard (NRA 2008)

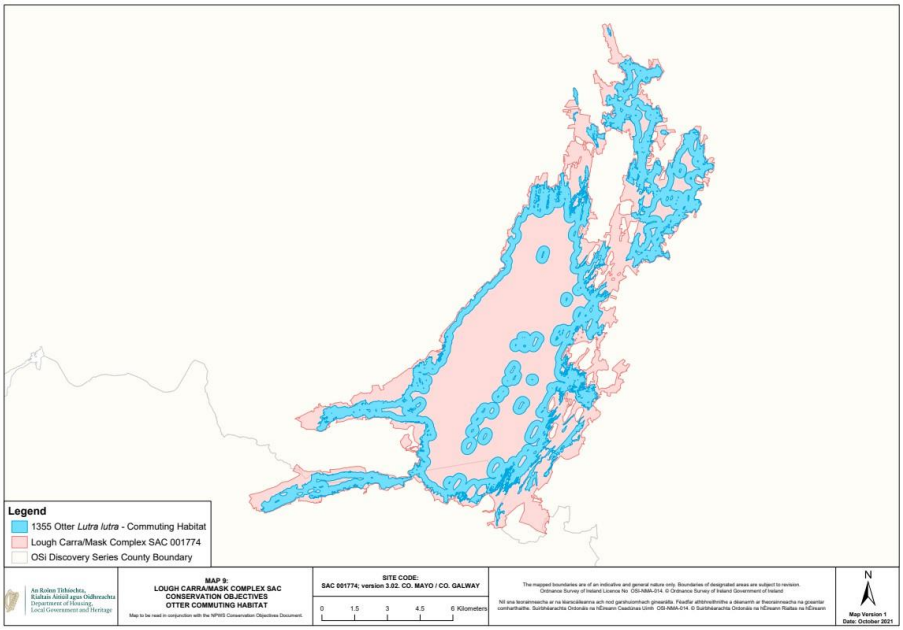

Fig. 5.2. Otter commuting habitat in the L.Carra/Mask Complex SAC (Source: https://www.npws.ie/sites/default/files/protectedsites/conservation_objectives/CO001774.pdf)

Although Otter have been observed in the vicinity of some gill netting locations and surveys suggest that commuting routes to islands may overlap with these areas (Fig. 5.3.), none have ever been discovered entangled in a gill-net used for stock management operations in the last 40 years. There has been no evidence of disturbance or interference to this species arising from stock management and fish survey operations over this protracted period and its conservation status remains at "good" at the site (96.3 % positive survey sites in Reid - 2013).

Commented [BD5]: I dont think that this can be stated.

Commented [DC6R5]: This has been re-phrased to reflect a more evidence based narrative

Iinteractions between Otter and fishermen using gillnets suggests that otter may raid from gill-nets but captures of the otter themselves are not known to occur (Barberi et al 2012). IFI Policy also requires that nets are checked and serviced at least once in every 24 hour period and all nets are marked with highly visible buoys. The nature of electrofishing makes it easily detected and avoided by otter.

6.3.2 Lesser Horseshoe Bat

The lesser horseshoe bat (*Rhinolophus hipposideros*) is mainly found in counties on Ireland's western seaboard Mayo, Galway, Clare, Limerick, Kerry and Cork. It is Ireland's only Annex II-listed bat species (as per EU Habitats Directive [92/43/EU]). This means that its population requires special protection measures and designation of Special Areas of Conservation within the Natura 2000 network. These designations are usually linked to roost or hibernation locations and focus on large roosting sites for the species, usually with >50 individuals in winter or >100 individuals in summer.

The lesser horseshoe bat (LHB) has important roosting, hibernation and foraging areas within the potential zone of influence of the project area. Consequently, the Lough Carra/Mask Complex SAC has been selected for lesser horseshoe bats because of the presence of three internationally important summer roosts. Damage or disturbance to the roosts or to the habitat immediately surrounding the roosts will lead to a decline in their condition.

Threats to LHB are mainly associated with the deterioration of roosting sites, although surveys carried out from 2010-2015 indicated that the nearby Towerhill house site had favourable conservation status with increasing populations. Other nearby populations in the Neal and Hollymount areas showed declines in the same period (Roche et al 2015). The characteristics of the project are set out in table 4.1. and discussed in section 4.3. None of these activities are likely to contribute to existing threats or have any reasonably foreseeable impacts on this species.

6.3.4 Slender Green Feather Moss (*Hematocaulis vemicosis*)[1303]

The Slender Green feather-moss (*Hamatocaulis vernicosus*) is a pleurocarpous moss of mesotrophic fens. It is a medium-sized perennial moss with distinctive hooked shoot tips and the etymology of the genus name reflects this, as hamatus means 'hook-like' and caulis means 'stem' (Hedenäs, 1989a).

Although rather rare and habitat-specific, the slender green feather moss is not as rare in Europe as was once thought. It is, for example, now regarded as Nationally Scarce in Britain (Church et al., 2001; Preston, 2006), rather than a Red Listed species. In Ireland, *H. vernicosus* is considered "Near Threatened" (Campbell et al 2013). In the most recent (2019) article 17 report to the European Commission, the distribution and populations of Slender Green feather moss were described as "stable".

The main threats to this species are considered to be related to habitat loss and land drainage (NPWS 2019). It has been recorded at 11 sites in Ireland with wetlands in Mayo and Galway representing its national stronghold. However, there is only one 10km2 grid cell within the L. Carra/Mask Complex SAC where this species has been recorded and this is on the South-Western shore of Lough Mask (Owenbrin). The specific activities associated with the project are presented in Section 3 and table 3.1. of this assessment and none of these could be considered likely to impact on the slender green feather moss, particularly as no land take or disturbance is envisaged and it is not recorded within the footprint of the project area.

6.3.5. Common Gull (Larus canus) [A182]

The Common gull is the smallest of the gulls endemic to Ireland and North-western Europe. It is a ground nesting bird, often found on sea cliffs, shingle banks and offshore Islands, particularly in Mayo, Galway and Donegal where it commonly nests on lake islands. Declines have been noted on such waterbodies in recent years. These have largely been attributed to predation by American Mink, reaching previously safe nesting areas (BWI 2020)

This is the only bird species for which the Lough Carra SPA is designated and the site is considered of national importance for this species (NPWS 2014). Although census data for this species is somewhat out-dated, the most recent report (2000) recorded 72 pairs nesting on Islands located within the SAC. It feeds largely on invertebrates, small fish and waste which it scavenges from shorelines and areas associated with human activity. This gull is a non-diving species, unlikely to come into contact

with any of the project activities either during feeding or breeding behaviours. It is considered unlikely to be impacted by the project.

Table 5.1. Summary of Species (Qualifying interests) and the likelihood of impacts at the Lough Carra/Mask Complex SAC

Qualifying Interest - Species	Occurrence at project site	Risk to species
Lesser Horseshoe Bat [1303] (*Rhinolophus hipposederios*)	Three known roosting sites are located within 5km of lough Carra. Bats are also expected to forage along treelines close to the shoreline of the lake.	Roost and hibernation sites are sufficiently distant from the project area to rule out any impacts. Foraging near the lakeshore occurs during darkness when no project activity will be taking place.
Otter (*Lutra lutra*)	The site is known as a foraging, couching and breeding area for otters.	Some operations may take place in otter commuting areas but precedent as well as previous studies have shown that they are unlikely to be impacted by gill-nets
Slender Green Feather moss (*Hematocaulis vemicosis)*	Recorded only at one grid square located on the south-western shore of L. Mask	The only known location of this terrestrial plant is sufficiently distant from the project area to rule out potential impacts

6.4 Lough Mask SPA

The Lough mask SPA is hydrologically connected to and immediately adjacent to the project site (6km). This sub-section assesses the possible risk to the various bird species of conservation interest at this site.

Species of Conservation Interest	Occurrence at project site	Risk to species
Common Gull	Present at the project site (L. Carra SPA) as well as the L. Mask SPA	Non diving feeder, unlikely to come into contact with project activities
Black-headed Gull	A species of conservation interest for the L. Mask SAC only but may visit the project site	Non diving feeder, unlikely to come into contact with project activities
Common Tern	A species of conservation interest for the L. Mask SAC only but may visit the project site	Non diving feeder, unlikely to come into contact with project activities
Tufted Duck	A species of conservation interest for the L. Mask SAC	Not a qualifying species at the project site but may visit from elsewhere. Tufted duck are a

	only but may visit the project site	species of special conservation interest at other Natura lakes and waterways some of which have been subject to stock management operations for some decades. Records show that this species has not been recorded in gill nets or their vicinity. It is, therefore, unlikely to be impacted by project activities
Greenland White Fronted Goose	Not usually seen at the site and therefore not named as special conservation interest for the L. Carra SPA. Occasionally present around L. Mask SPA	Non diving species which forages on land by day and roosts on water. Not often seen at the project site and therefore not mentioned as special conservation interest for the L. Carra SPA.

Commented [BD7]: Why?

Commented [DC8R7]: Agreed: This has been rephrased to include a more explanatory narrative

6.4.1. Risk to Bird Species

The particular bird species for which the L. Carra SPA and the Adjacent L. Mask SPA are designated are categorised in terms of their known behaviours and seasonal presence at or close to the project site. Some are immediately ruled out for potential impacts due to their typical locations, their non-diving behaviours, seasonal presence, breeding patterns and timing of the stock management plan, These are: Black Headed Gull, Common Gull, Common Tern, Greenland White Fronted Goose. The other species which does not conform to this type is the Tufted Duck.

Commented [BD9]: is this not a contradiction to what was said above?

Commented [DC10R9]: Agreed: some text removed and clearer explanation inserted to avoid contradiction

Birdwatch Ireland (2022) describe the status of Tufted duck in Ireland as "Resident and winter visitor" sometimes coming from SW England during cold weather. They feed on mussels, and to a lesser extent on crustaceans, insect larvae (particularly caddis-fly) and bryozoans. Tufted duck are a species of conservation interest on the L. Mask SPA but not on L. Carra. Their presence in the project area is probably transient and they are not known to breed there (NPWS 2022).

7.0. Potential Threats & Impacts to Natura Sites

This section considers the list of sites identified in section 5. Table 2 (above) together with the potential impacts identified in this section and determines whether this proposed stock management plan taking place within the L. Carra/mask Complex SAC - L. Carra SPA is likely to have significant effects on these or other Natura sites or prevent them from achieving favorable conservation status.

7.1. Conservation Status

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.

7.2. Connectivity and Zone of Influence

An initial assessment is made in section 4.0 to determine if all sites within or connected to the likely zone of influence can be considered to be within the functional area of a potential impact. This assessment is conducted in compliance with the DoEHLG (2009, as amended 2010) and considers the scope, scale, nature, size and location of the project and the sensitivities of the ecological receptors particularly the features of interest and the conservation objectives that pertain.

Once this determination is completed the significance of the potential impacts affecting the sites considered to be within a zone of potential impact influence are assessed in terms of magnitude/extent, probability and duration and an evaluation is made as to whether the Appropriate Assessment process can conclude at Stage 1, screening, or whether it needs to progress to stage 2, full Appropriate Assessment.

7.3 Direct Impact from Gill-Netting

Impacts on habitats for which the L.Carra/Mask Complex SAC has been designated, as well as other connected sites have been ruled out because of the lack of source / pathway / impact mechanisms being likely. Potential significant impacts on otters has also been ruled out on the basis of precedent for stock management operations and international research findings. The only diving bird (tufted duck) which could come into contact with gill nets is not a qualifying interest for the Lough Carra SPA but is present on the adjacent Lough Mask SPA. Like otters, this bird species has not been recorded in or close to the project's gill nets and it therefore, not considered to be at risk.

7.4. Direct impact from Electrofishing

Because of the localised effect of the electrofishing equipment on the water (C.5m) it is not envisaged that any of the species listed as qualifying interests at the site will be impacted by

the project activity. Only minor disturbance (engine noise etc.) could be regarded as an issue and this is temporary in nature, passing through any given area in less than 30min. Non-target fish species will not be removed from the water and there are no fish listed as qualifying intersts for the site. Boats and engines operated by recreational users are already a common feature at the site and this element of the project activity is regarded as no more disturbing than this.

7.5. Indirect Impacts

In considering the possible overall effects of this project on the species and habitats in the Lough Carra mask complex SAC and adjacent/connected sites, cognisance must also be taken on the less obvious or indirect potential impacts. These could include increased boat traffic at certain times, use of lighting if operating under low natural light conditions and potential loss of equipment during project operations. All of these potential indirect impacts have been ruled out on the basis that stock management will be carried out in strict accordance with the SOP set out by IFI. This SOP directs IFI staff to adhere to strict protocols in relation to timing of operations, and equipment care. The only remaining indirect impact apparent is the risk of spread of invasive species or pathogens during these operations and this is discussed in the following sub-section

7.5.1. Invasive Species and Biosecurity

To eliminate the potential for spread of invasive species and in accordance with IFI's biosecurity protocols, all equipment used in the project operations will be disinfected prior to, and following its use on the lakes. Japanese knotweed *(Fallopia japonica*) and Zebra mussel (*Dreissena polymorpha*) are known to be present in the general site area and strict adherence to these protocols will be necessary to avoid their spread. IFI provide a number of guidance documents on invasive species and their management which are available at: http://www.fisheriesireland.ie/Research/invasive-species.html All proposed works will be carried out consistent with IFI's Biosecurity Protocol for Field Work which is available at: https://www.fisheriesireland.ie/documents/73-biosecurity-protocol-for-field-survey-work-1/file.html

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Fig : 6 IFI staff member carrying out biosecurity protocol on an electrofishing boat

7.5.2. Impacts on Water Quality

Potential impairment of water quality as a result of the proposed project could include accidental fuel/oil spills from equipment/boat engines during refuelling activities near the watercourse. These impacts are considered highly unlikely due to the fact that all re-fuelling will be carried out off site. The re-fuelling methodology, detailed in IFI's SOP, will prevent significant impacts to water quality as a result of accidental fuel/oil spills. Therefore due to the fact that the likelihood of accidental spills happening is extremely low and the site specific methods that will be in place to prevent significant impacts to water quality, no significant water quality impacts will ensue within the L. Carra/Mask Complex SAC or the L. Carra SPA as a result of the proposed stock management programme

7.6. Cumulative/In-combination Impacts

The cumulative impacts from the carrying out of the L. Carra stock management programme are not seen as significant and are likely to reduce predation on wild Brown trout in the Lough Carra area. As wild brown trout stocks are known to be particularly significant on this lake, However, any other plans or projects known to be taking place within the zone of influence of Lough Carra must also be considered in case they could, in combination with this project, produce significant impacts.

7.6.1. Corrib Arterial Drainage Maintenance 2020 – 2025

This plan is likely to be ongoing during stock management operations on L. Carra. It aims to undertake drainage activities in sensitive habitats, and is, therefore, is likely to have impacts on Natura sites. The NIS prepared for this project proposes numerous mitigation measures to reduce or eliminate these impacts (OPW/Ryan-Hanley 2020). Inland Fisheries Ireland will be working with the OPW on some channels to reduce the impacts of drainage maintenance and, where possible, enhance previously damaged river habitats to make them more amenable for biodiversity.

The details in table 4.1. indicate that no disturbance of habitats or soils are involved in carrying out the stock management program for L. Carra and that there is no element of the project which could act in concert with the drainage maintenance programme to produce cumulative impacts.

7.6.2. Carra LIFE Project

Since 1970, the Lough Carra catchment has been subjected to significant pressures, particularly from agricultural intensification, with 25% of the catchment converted from natural or semi-natural vegetation to improved grassland. This has resulted in the loss of some semi-natural dry grasslands and scrubland as well as limestone pavement habitats. Over the same period, there were also significant increases in cattle and sheep stocking density as well as fertiliser and slurry application.

Commercial forestry has also increased and most houses in the catchment have septic tank systems for wastewater; some are old and likely losing nutrients to groundwater.

The aim of thus EU- LIFE project is to restore the marl habitat of Lough Carra to favourable condition, improving its national status and trends. The project will also improve the conservation status of several other habitats and species: orchid-rich grasslands, limestone pavements, caladium fens, common gulls, otters and lesser horseshoe bats. In addition, measures will be taken across the catchment to reduce losses of nutrients, by working with farmers and other stakeholders to change practices that are sources of pollution and biodiversity loss.

The specific objectives are to:

1. Establish and promote a model of farming to transform nutrient management on farms in 10% of the catchment area during the project, for rollout catchment-wide afterwards, to protect and conserve 4 habitats (certain types of semi-natural dry grassland and scrubland, limestone pavement, hard water with benthic vegetation, and calcareous fen habitats);
2. Define groundwater-surface water connectivity in the catchment through a groundwater study, to confirm the catchment boundary more exactly and help target nutrient-reduction actions;
3. Demonstrate and adopt an integrated approach to restoring the lake's habitats by collaboration of local authorities, other public bodies, farmers, anglers, other local stakeholders and the public – including long-term decision making, land management, community awareness and involvement. This includes management of forestry in the catchment for biodiversity by Coillte, and actions by Office of Public Works to sensitively manage public drainage channels;
4. Reduce nutrient pollution from septic tanks/domestic wastewater by education and public awareness; establish demonstration areas of constructed wetland and associated workshops and information, to complement increased inspections being undertaken outside of LIFE funding;
5. Implement a strategy to tackle invasive species, including preventing the introduction of zebra mussels and controlling numbers of mink and feral geese; and
6. Maximise the project's impact on enhancing the coherence of the Natura 2000 network, with actions complementary to conservation targets in other SACs. Lough Corrib SAC, which is downstream from Lough Carra, is designated for some of the same habitats (certain types of semi-natural dry grassland and scrubland, hard water with benthic vegetation, and limestone pavement habitats); nutrient-reduction measures in Lough Carra will reduce nutrient flow to the Corrib SAC. The Galway Bay Complex SAC is also hydrologically connected. The adjoining Moore Hall SAC and nearby Towerhill House SAC are designated for lesser horseshoe bats, so actions for this species are designed to promote the conservation interests of this species in the broader region.

Given the objectives, scope, scale and methodologies involved in this project, there is no clear mechanism by which the stock management program could act in concert or create any impediment to the success of Carra LIFE. In fact, by removing an invasive fish species which impacts on native fish

and possibly waterfowl, the two projects may have synergies which could lead to biodiversity improvements.

8.0. Screening Determination and Conclusion

The preceding sub sections have described in detail the habitats, species and their conservation objectives in the lough Carra/Mask Complex SAC and Lough Carra SPA, as well as those at other connected or nearby Natura sites. They have also described the project which is proposed by IFI at these sites and analysed the potential source/impact pathways and the likelihood of the project having any significant impacts. Where appropriate, supporting documentation has been referred to which verifies the conclusions of this assessment.

Based on the above, this Appropriate Assessment Screening Report is considered sufficient and the requirement to progress to Stage 2 (Natura Impact Statement) does not arise, as significant impacts to Natura 2000 sites are not likely.

Table 8.1. Screening matrix

Name of Project or Plan	**AA Screening for pike management on L. Carra (2023)**
Name and Location of European Sites	Lough Carra/Mask Complex SAC (Site Code:004050) Lough Carra SPA (Site Code:001673)
Description of the Project or Plan	The proposed works will comprise of the following; ▪ Setting of gill-nets to capture and remove pike from L. Carra ▪ Electrofishing on L. Carra to capture and remove pike ▪ Launching and setting boats, personnel and equipment to and from L. Carra
Are there other projects or plans that together with the project or plan being assessed could affect the site?	No.
Project Characteristics	
Scope	Management of pike stocks at specified sites on Lough Carra and some named tributaries
Scale	Areas within the confines of Lough Carra and named tributary rives
Duration	Gill-netting Feb/Mar and Oct – Dec, Electrofishing April, May, August Sept, Oct. Dates outlined in management plan (Appendix 1)

Timing	Timing of gill-netting is early spring and late autumn. Some potential impacts are avoided by this (e.g. disturbance to breeding & nesting gulls). No risk to habitats arises and potential risk to other species (otter, tufted duck) is without precedent and is not seen as impacting current conservation objectives. Electrofishing is selective, transient and low-risk to habitats & species.
Land-Take	Use of existing facilities - Project does not require land-take
Resource requirements	Fuel, personnel & equipment as indicated in plan & SOP (Appendices 1 & 2)
Emissions	Fuel/transport requirements result in approx. 224 kg Co_2. No other emissions arise
Potential Effects	
Describe how the project or plan (alone or in combination) is likely to affect the European Site.	The potential risk from this project to protected habitats and species is low (see sections 4.2 – 4.5)
Explain why these effects are not considered significant.	An evaluation of the location, seasonal distribution and behaviour of protected species against the specific timing and nature of project activities at the site indicates that no significant risk arises to a qualifying interest or to their conservation objectives. No habitat impacts are envisaged
Data For Assessment	
Data Collected to Carry Out the Assessment	Desktop Studies, Site Records, Consultations with relevant IFI operatives
Assessment carried out by	Inland Fisheries Ireland
Sources of data:	Inland Fisheries Ireland, National Parks & Wildlife Service Website, EPA Website & GIS Webtool. National Biodiversity Data Centre, BirdWatch Ireland
Level of assessment completed	Desktop and Site Investigations, IFI archives/records
Where can the full results of the assessment be accessed and viewed?	Inland Fisheries Ireland,
Overall Conclusion	Stage 1 Screening indicates that the proposed removal of pike from L. Carra will not have a significant negative impact on the European sites network. The species named as Qualifying Interests or Special Conservation Interests are unlikely to be impacted. Therefore, this project is deemed to "screen out" for potential impacts on a European site. A Stage 2 'Appropriate Assessment' under Article 6(3) of the Habitats Directive 92/43/EEC is not required.

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Appendix 1

Proposed stock management plan Corrib 2023

It is envisaged that large numbers of fish captured during the stock management programme during 2023 will be re-located. This will be dependent on having suitable locations for re-stocking the various species and logistics for transportation provided to WRBD managers. This will involve the survey of potential suitable waters 'Country wide' and approval by Research. Screening for all activities listed below needs to be provided by technical personnel.

Stock Management

Gill netting

Gill netting will commence on Monday 6th February on Lough Corrib/Mask and will commence on Lough Carra on the 27th of February. During the spring we estimate that 420 Man Days will be required for Gill netting on the Corrib Catchment. See table below. Location of the nets will be determined locally based on projected weather forecast for the coming weeks and staff numbers available.

Some gill netting operations may be stopped for a period to facilitate Electro Fishing when suitable conditions prevail if this is deemed more productive.

Lake	Period	Man days
Corrib	Feb – April, Oct - Nov	220
Mask	Feb – March, Oct - Nov	140
Carra	Feb – April, Oct - Nov	60

Electro Fishing

The plan for electro fishing is to operate when suitable conditions present over the whole year with a total of 180 man-days between the 3 lakes which include all tributaries.

Lake	Period	Man days
Corrib Catchment	Jan - Dec	180

Owenriff

The removal of pike from the Owenriff system will be on-going throughout the year with various methods being employed including electro fishing, gill nets, fyke nets and perch/pike traps. Below is an estimate of effort to be employed.

		Man Days	
		Gill Nets, Fyke Nets & Perch traps	Electro Fishing & Other Methods
Q1	Jan - March	20	
Q2	April - June	20	20
Q3	July - Sept	20	20
Q4	Oct - Dec		10
Total		**60**	**50**

Bream/Hybrids

The proliferation of coarse fish, in particular Bream and Bream/Roach hybrids is a problem in Lough Mask especially in the traditional areas for good olive angling. Some trials on the control of these species have taken place in Cushlough Bay in the last two years with a visible positive result.

The methods employed was Electro fishing in combination with the use of stop nets and gill nets. This will be continued in 2023 and further methods researched example, Seine netting in suitable locations.

Appendix 2

Inland Fisheries Ireland - Standard Operating Procedure (SOP) for Pike Management Operations

https://www.fisheriesireland.ie/sites/default/files/migrated/docman/2016/Wild%20Brown%20Trout%20Fishery%20Management%20Gill%20Netting%20SOP%2029-02-2016.pdf

Appendix 3

Site Description/Natura Sites

Natura sites where these works will be undertaken are Lough Carra/Mask Complex SAC and Lough Lough Carra SPA:

Site Name: Lough Carra/Mask Complex SAC
SITE CODE: 001774

This site is dominated by two large lakes, Lough Mask and Lough Carra, and includes the smaller Cloon Lough. Most of the site is in Co. Mayo, with a small portion in Co. Galway. On the western side, the site is overlooked by the Partry Mountains, while to the east the landscape is largely low-lying agricultural land. The nearest large town is Ballinrobe which is about 4 km east of Lough Mask. The general geological character of the area is Carboniferous limestones, with some shales and sandstones on the western side of Lough Mask. The underlying geology results in a great diversity of habitats, which support many scarce and rare plants and animals.
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):
[3110] Oligotrophic Waters containing very few minerals
[3130] Oligotrophic to Mesotrophic Standing Waters
[3140] Hard Water Lakes
[4030] Dry Heath
[6210] Orchid-rich Calcareous Grassland*

[7210] *Cladium* Fens*
[7230] Alkaline Fens
[8240] Limestone Pavement*
[91E0] Alluvial Forests*
[1303] Lesser Horseshoe Bat (*Rhinolophus hipposideros*)
[1355] Otter (*Lutra lutra*)
[1393] Slender Green Feather-moss (*Drepanocladus vernicosus*)

Lough Mask, at over 8,000 ha, is the sixth largest lake in the country and with a maximum depth of 58 m it is one of the deepest. It is an excellent example of an oligotrophic lake. Aquatic and wetland plant species present which are characteristic of this habitat include several pondweed species (*Potamogeton* spp.), Water Lobelia (*Lobelia dortmanna*) and Shoreweed (*Littorella uniflora*). The eastern part of the lake is shallow and is edged by a low lying shoreline which is subject to winter flooding. An intricate mixture of plant communities has developed on the limestone, with bare pavement, scrub-dominated pavement, dry grassland and heath. A variety of wetland habitats are also present, along with significant amounts of deciduous woodland along the eastern and southern shores. The western shoreline is less diverse and lacks the limestone communities. However, the fast flowing Owenbrin River has created at its mouth an interesting delta of coarse sandy sediment.
Lough Carra, which is hydrologically linked to Mask, is one of the best examples in Ireland of a hard water marl lake. It is a shallow (mostly less than 2 m), predominantly spring fed, lake with only a few streams flowing into it. Its well-known pellucid green colour is due to calcareous encrustations. It has well developed stonewort communities in the submerged zones, with *Chara curta, C. desmacantha, C. rudis* and *C. contraria* recorded. Lough Carra, like the eastern and southern shores of Mask, is fringed by a diverse complex of limestone and wetland habitats.
The limestone pavement within this site represents the northern limit of the limestones of Clare and Galway. The limestone is variable in character, from open bare pavement to areas covered with dense scrub. Associated with the pavement are areas of dry calcareous grassland and dry heath. Characteristic species of the rocky, limestone formations where soil may only occur in pockets include Bloody Crane's-bill (*Geranium sanguineum*), Yellow-wort (*Blackstonia perfoliata*), Blue Fleabane (*Erigeron acer*), Wild Madder (*Rubia peregrina*) and Rustyback (*Ceterach officinarum*). Areas of calcareous grassland, often orchid-rich, occur interspersed amongst the limestone. These grasslands support species such as Carline Thistle (*Carlina vulgaris*), Quaking-grass (*Briza media*), Blue Moor-grass (*Sesleria albicans*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Cowslip (*Primula veris*), Common Knapweed (*Centaurea nigra*), Fairy Flax (*Linum catharticum*), Lady's Bedstraw (*Galium verum*) and Wild Thyme (*Thymus praecox*). A good diversity of orchid species have been recorded from these grasslands, including Pyramidal Orchid (*Anacamptis pyramidalis*), Early-purple Orchid (*Orchis mascula*), Bee Orchid (*Ophrys apifera*), Fragrant Orchid (*Gymnodenia conopsea*) and Dense-flowered Orchid (*Neotinea maculata*). Several of these species, notably Dense-flowered Orchid and Spring Gentian (*Gentiana verna*), are typical Burren species and occur here towards the northern end of their distribution.
The scrub vegetation is variable in character, with extensive areas dominated by Hazel (*Corylus avellana*) and Hawthorn (*Crataegus monogyna*), with Buckthorn (*Rhamnus catharticus*), Alder Buckthorn (*Frangula alnus*), Spindle (*Euonymus europaeus*) and Ash (*Fraxinus excelsior*).

The dry heath is well developed in places and is characterised by Gorse (*Ulex europaeus*), Bell Heather (*Erica cinerea*), Heather (*Calluna vulgaris*) and St. Dabeoc's Heath (*Dabeocia cantabrica*). The diminutive orchid Lesser Twayblade (*Listera cordata*) occurs within the heath communities.
A wide range of wetland habitats occur around Lough Carra and along parts of the eastern and southern shores of Lough Mask, including *Cladium* fen and alkaline fen. Great Fen-sedge (*Cladium mariscus*) occurs as pure stands in places but also grades into areas of alkaline fen, where it is intermixed with Black Bog-rush (*Schoenus nigricans*), Common Club-rush (*Scirpus lacustris*), Common Reed (*Phragmites australis*) and a number of sedge species (*Carex* spp.). The areas of alkaline fen are more extensive than the *Cladium* fens, and here Black Bog-rush is generally the dominant species. A rich diversity of flowering plant occurs in the fen communities. In addition to the fen habitats, there are sparse but widespread reed swamps, wet grassland and some freshwater marsh communities around the lake shores.
Broadleaved deciduous woodland occurs fairly frequently around much of the shores of the lakes and on some of the islands. This is often scrub-type woodland, which may be either dry (dominated by Hazel, Hawthorn and Ash) or wet. In the case of the latter, dominant species include birches (*Betula* spp.), willows (*Salix* spp.) and Alder (*Alnus glutinosa*). The wet areas of woodland flood seasonally and represent alluvial woodland, a habitat that is listed with priority status on Annex I of the E.U. Habitats Directive. These are particularly well developed in the Ballykine and Clonbur areas of Lough Mask. In some places the woodlands contain Sessile Oak (*Quercus petraea*), Holly (*Ilex aquifolium*) and Rowan (*Sorbus aucuparia*).
A high concentration of rare plants is found at this site. Five species protected under the Flora (Protection) Order, 2015, occur: Irish St. John's-wort (*Hypericum canadense*), Chives (*Allium schoenoprasum*), Pillwort (*Pilularia globulifera*), Irish Lady's-tresses (*Spiranthes romanzoffiana*), and Small Cudweed (*Logfia minima*). Two other Red Data Book plants, Alder Buckthorn and Bird's-nest Orchid (*Neottia nidus-avis*), also occur, along with two Red Data Book stonewort species, *Chara curta* and *C. rudis*.
The Owenbrin area of the site supports a population of the rare bryophyte *Drepanocladus vernicosus*, a species listed on Annex II of the E.U. Habitats Directive. This is the only known lake shore site for the species, which is usually found in upland flushes in association with blanket bog.
A large loft in the stable block of Curramore House provides a summer breeding site of the Lesser Horseshoe Bat, a species listed on Annex II of the E.U. Habitats Directive. The bats gain access to the loft through windows that extend from the ground floor to the loft area. The building is surrounded by mixed woods and is close to the shores of Lough Mask; both of these habitats provide ideal foraging habitat for the bats. In 1993 more than 100 bats were counted at this site, which makes it of international importance. A second internationally important summer roost of Lesser Horseshoe Bats occurs within the site at Ballykyne, near Clonbur. Over 150 bats have been counted at this site in recent years.
The site provide excellent habitat for Otter, also an Annex II species, and the area has Pine Marten (*Martes martes*), a species listed in the Irish Red Data Book.
The site has important bird interests, both in winter and summer. It provides feeding areas for part of the Erriff/Derrycraff population of Greenland White-fronted Goose. This flock has declined somewhat in recent years but is still of national importance, with an average spring peak from 1989-94 of 124 birds. The following count figures are the averages from surveys in January 1995 and January 1996: Wigeon 167, Mallard 397, Shoveler 57, Pochard 91, Tufted Duck 757, Goldeneye 158, Lapwing 233and Curlew 118. Also, 68 Whooper Swan and 25 Gadwall were recorded in January

1996. The Shoveler, Tufted Duck and Goldeneye populations are of national importance. Both lakes are traditional sites for breeding gulls and terns. In 1995, 44 pairs of Common Tern nested at Lough Mask, while in 1992 a census of gulls at both lakes resulted in the following counts: Black-headed Gull 1,451 pairs, Common Gull 407 pairs and Lesser Black-backed Gull 361 pairs. The Common Gull colony represents 11.3% of the national total, and the Lesser Black-backed Gull colony is 6.9% of the total.
The deep waters of Lough Mask are home to a population of the glacial relict fish species Arctic Char (*Salvelinus alpinus*), and a rare shrimp (*Niphargus* spp.) is also found in these waters. Lough Mask is a very important Brown Trout fishery. White-clawed Crayfish (*Austropotamobius pallipes*), a species listed on Annex II of the E.U. Habitats Directive, has been recorded from Lough Carra.
This site is of considerable conservation importance as it has good examples of nine habitats listed on Annex I of the E.U. Habitats Directive, four of which are listed with priority status. Some of these habitats are amongst the best examples of their kind in the country. It is also selected for two Annex II mammal species and an Annex II moss. The site is of ornithological importance for both wintering and breeding birds. A relatively large number of rare or localised plant and animal species occur, including the glacial relict Arctic Char.

Site Name: Lough Carra SPA
Site Code: 004051

Lough Carra, which extends for over 9 km along its long axis, lies to the north-east of Lough Mask, in the Corrib catchment in Co. Mayo. It is one of the best examples in Ireland of a hard water marl lake. It is a shallow (mean depth 1.5 m, maximum depth 18 m), predominantly spring-fed lake with only a few inflowing streams. It is connected to Lough Mask via the Keel River. The water has an alkaline pH and negligible amounts of iron and manganese. Sodium and chloride are present in relatively high concentrations. Lough Carra is classified as a mesotrophic system.
Lough Carra has well-developed stonewort communities in the submerged zones, and includes such species as *Chara curta*, *C. desmacantha*, *C. rudis* and *C. contraria*. The lake has a highly indented shoreline (over 69 km in length) and includes many small islands. It is fringed by a diverse complex of limestone and wetland habitats. The wetland habitats include both Great Fen-sedge (*Cladium mariscus*) fen and alkaline fen. In addition to the fen habitats, there are widespread reed swamps, wet grassland and some freshwater marsh communities around the lakeshores.
The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Common Gull.
The islands in Lough Carra have traditionally supported nesting gulls. A survey in 1993 recorded Common Gull (72 individuals) and Black-headed Gull (252 individuals). The site was surveyed in 1999 as part of the Seabird 2000 Survey and 65 pairs of Common Gull and 100 pairs of Black-headed Gull were recorded.
The site also supports wintering populations of a number of species including Wigeon (67), Gadwall (26), Teal (63), Mallard (140), Shoveler (38), Pochard (33), Tufted Duck (133), Goldeneye (64), Little Grebe (14) Great Crested Grebe (12) and Lapwing (243) - all figures are mean peaks for 4 of the 5 winters in the period 1995/96-1999/2000. In the past, Lough Carra supported a population of Mallard of national importance.

Lough Carra SPA is of considerable ornithological importance for breeding gulls including a nationally important population of Common Gull. Part of Lough Carra SPA is a Wildfowl Sanctuary.