Iascach Intíre Éireann
Inland Fisheries Ireland

Screening for Appropriate Assessment

Lough Corrib Stock Management Plan 2023

Inland Fisheries Ireland

Western River Basin District

Table of contents

1. SUMMARY OF FINDINGS

1.1 SCREENING FOR APPROPRIATE ASSESSMENT

Project Title and Background	**A fish stock management programme is proposed for Lough Corrib** which borders two counties, Galway and Mayo. The programme will concentrate on the removal of pike *(Esox lucius)* from Lough Corrib which contains (amongst other species) stocks of wild brown trout *(Salmo trutta)* and Atlantic salmon *(Salmo salar).* The proposed methods are gill netting and electrofishing on Lough Corrib itself and electrofishing the lower sections of selected inflowing river systems. This programme has been carried out since the 1950s by Inland Fisheries Ireland (IFI) and the predecessors to IFI; the Western Regional Fisheries Board (WRFB) and the Inland Fisheries Trust (IFT).
Project Proponent	Inland Fisheries Ireland, Teach Breac, Earls Island, Galway
Project Location	Lough Corrib and lower sections of selected inflowing rivers into Lough Corrib across numerous townlands north of Galway City, in Counties Mayo and Galway.
Conclusion	The proposed project is necessary to the management of the Lough Corrib SAC. Atlantic salmon are classified an Annex II and Annex V species under the provisions of the EU Habitats Directive coupled with Atlantic salmon being a qualifying interest on the Lough Corrib SAC and the management of pike stocks is required to control an invasive predator of this Annex species. It has been concluded during the screening process that the Natura 2000 sites within the potential zone of influence of the project and those connected by a direct/indirect pathway or biodiversity corridor are not likely to be significantly impacted by the proposed stock management plan. These sites are: • Lough Corrib cSAC 000297 • Maamturk Mountains SAC 002008 • Lough Corrib SPA 004042 • Cregganna Marsh SPA 004142 • Inner Galway Bay SPA 004031 • Lough Carra SPA 004051 • Ross Lake and Woods SAC 001312 • Lough Carra/Mask Complex SAC 001774 • Lough Mask SPA 004062 • Connemara Bog Complex SPA 004181 • Connemara Bog Complex SAC 002034 • Cloughmoyne SAC 000479 • Shrule Turlough SAC 000525 • Mocorha Lough SAC 001536 • Clyard Kettle Holes SAC 000480 • Ballymaglancy Cave Cong SAC 000474 • Gortnandarragh Limestone pavement SAC 001271 • Galway Bay Complex SAC 000268 • Mweelrea/Sheeffry/Erriff Complex SAC 001932 • The Twelve Bens/Garran Complex SAC 002031 • Kildun Souterrain SAC 002320 • Kilkieran Bay And Islands SAC 002111 • Ardkill Turlough SAC 000461 • Greaghans Turlough SAC 000503 • Kilglassan/Caheravoostia Turlough Complex SAC 000504 • Skealoghan Turlough SAC 000541 An NIS is not required and significant effects to Natura 2000 sites are not likely.

2. INTRODUCTION

2.1 PURPOSE OF ASSESSMENT

This AA Screening stage examines the likely significant effects of a plan or project, either on its own, or in combination with other plans and projects, upon a Natura 2000 site and considers whether, on the basis of objective scientific evidence, it can be concluded, in view of best scientific knowledge and the conservation objectives of the relevant European sites, that there are not likely to be significant effects on any European site.

This Screening for Appropriate Assessment has been undertaken by Inland Fisheries Ireland, Galway.

2.2 LEGISLATIVE CONTEXT

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and of wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each member state to designate SPAs and cSACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. Further information is available at:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/

http://www.npws.ie/planning/appropriateassessment/

The current assessment was conducted within this legislative framework the DoEHLG (2009) guidelines and also IFI's own guidelines for AA Screenings in the vicinity of watercourses. In accordance with these guidance documents, it is the responsibility of the proponent of the project (in this case Inland Fisheries Ireland) to provide a comprehensive and objective Screening for Appropriate Assessment, which can then be used by the competent authority in order to conduct the Appropriate Assessment if deemed necessary (DoEHLG, 2009).

2.3 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 in Appendix 1. The assessment for this plan has proceeded as far as Stage 1.

3. ASSESSMENT METHODOLOGY

3.1 APPROPRIATE ASSESMENT GUIDANCE

As outlined in "Managing Natura 2000 sites" the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC" (European Commission, 21 November 2018) *"The purpose of the appropriate assessment is to assess the implications of the plan or project in respect of the site's conservation objectives, either individually or in combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus of the appropriate assessment is therefore specifically on the species and/or the habitats for which the Natura 2000 site is designated."*

3.2 DESK STUDY

In order to complete the Screening for Appropriate Assessment certain information on the existing environment is required. A desk study was carried out to collate available information on the site's natural environment. This comprised a review of the following publications, data and datasets:

- OSI Aerial photography and 1:50000 mapping www.osi.ie
- National Parks and Wildlife Service (NPWS) www.npws.ie
- Teagasc soil area maps http://maps.biodiversityireland.ie/
- Geological Survey Ireland (GSI) area maps www.gsi.ie
- Environmental Protection Agency (EPA) water quality data www.epa.ie
- Western River Basin District (WRBD) datasets (Water Framework Directive)
- Inland Fisheries Ireland (IFI) website www.fisheriesireland.ie
- Sampling fish for the Water Framework Directive www.wfdfish.ie
- National Biodiversity Data Centre https://biodiversityireland.ie/
- Other information sources and reports footnoted in the course of the report

3.3 SCREENING FOR APPROPRIATE ASSESSMENT

As set out in the 2009 NPWS guidance, the task of establishing whether a plan or project is likely to have an effect on a Natura 2000 site(s) is based on a preliminary impact assessment using available information and data, including that outlined above, and other available environmental information, supplemented as necessary by local site information and ecological surveys. This is followed by a determination of whether there is a risk that any potential effects identified could be significant. The precautionary principle approach is required. Once the potential impacts that may arise from the proposal are identified the significance of these is assessed through the use of key indicators:

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality and resource

3.4. APPROPRIATE ASSESSMENT SCREENING DETERMINATION PROCESS

Screening for Appropriate Assessment (Stage 1) determines the need for a full Appropriate Assessment (Stage 2) and consists of a number of steps, each of which is addressed in the following sections of this report:

- Establish whether the proposed project is necessary for the management of a Natura 2000 site
- Description of the proposed stock management plan
- Identification of Natura 2000 sites potentially affected
- Identification and description of individual and cumulative impacts of the proposed project
- Assessment of the significance of the impacts on the integrity of Natura 2000 sites
- Conclusion of the screening stage

4.0 DESCRIPTION OF PLAN/PROJECT

This section describes the nature, extent and purpose of the project as well as an evaluation of its context in the management of Natura sites.

4.1 Project Description

Details of the proposed start and finish dates are provided in Table 1 below. The operations will be carried out in accordance with IFI's Standard Operating Procedures (SOPs) – see appendix 7. All staff handling pike will do so in accordance with IFI's SOPs and all have received fish health, handling and welfare training. All pike carcasses will be appropriately disposed of by an approved rendering company.

Netting will be concentrated into specific areas of known pike spawning habitat in Lough Corrib during different periods of the pike management season, which extends from January to December. Gill netting operations will commence in February on Lough Corrib and run into April. Gill netting may also be considered for the period of October – November if specific vulnerability to Atlantic salmon, particularly in the Owenriff area, is demonstrated but the principal gill netting period is assumed to be at pike spawning time (February to April). Known spawning areas will be targeted during periods of maximum spawning activity while other operations will take advantage of congregations of adult pike which occur as a result of specific feeding behavior associated with migrating salmonids. Nets will be serviced daily and will not be set if there are concerns in relation to weather conditions the following day. Electrofishing operations on Lough Corrib will be carried out at any time during the year when weather conditions are suitable subject to the maximum number of days planned.

Table 3.1: Details of stock management operations planned for Lough Corrib in 2023

Planned operations for Lough Corrib 2023	Period	Person days
Gill Netting	Feb – April Oct - Nov	220
Electrofishing	Jan - Dec	180*

*This asterisk denotes person days allocated to electrofishing operations in the Corrib catchment, which includes Loughs Corrib, Mask and Carra.

4.2. Purpose of the Project

Stock Management is undertaken on certain lakes and rivers for the conservation of salmonids in waters which are managed by IFI as salmonid fisheries. Such waters are identified in IFIs pike and trout management policies (see appendix 3). These stock management operations are informed by scientific research and are based on best practice methodologies developed over many decades by IFI. Stock management in relation to pike on Lough Corrib has been carried out by IFI and its predecessors; the Western Regional Fisheries Board and the Inland Fisheries Trust since the 1950's.

The predation of salmonids by pike has been observed and described by many professionals working in the inland fisheries sector both in Ireland (O'Grady & Delanty, 2008) and in other states and regions where pike are considered as non-native and invasive e.g. Alaska (Sepulveda *et al.,* 2013) and Sweden (Byström *et al.,* 2007). This is particularly so in the spring months when juvenile salmon and trout migrate from feeder streams to larger freshwater bodies (Kennedy et al 2018).

4.3. The Project and Management of Natura Sites.

This proposal is connected with the conservation management of a Natura 2000 site, i.e. Lough Corrib SAC. In *"The Status of EU Protected Habitats and Species in Ireland, Backing Documents, Article 17 forms, Maps Volume 1"* (NPWS, 2007) predation by pike is considered a potential threat to the status of Atlantic salmon in some Irish waterbodies. This report specifically refers to Lough Corrib (which is designated Lough Corrib SAC) by stating *"Pike are known to prey on salmon smolts during the spring period. Salmon smolts passing through large lakes on their downward migration are frequently recorded in pike stomachs in Lough Corrib on the Corrib system and Lough Conn and Cullin on the Moy system. There have been rare incidences of large pike preying on adult salmon in both Lough Corrib and Lough Conn, and two grilse of 4lb and 5lb were recorded in one large pike on one occasion"* (NPWS, 2007). In the NPWS publication *"Ireland Red List No. 5, Amphibians, Reptiles and Freshwater Fish"* (2011) the status of Irish pike is considered "Non-native, non-benign". Certain fish including pike are classified as 'non-benign', signifying an adverse impact on the ecology of the water in which they occur (King *et al*, 2011).

When considering the above and bearing in mind that Atlantic salmon are classified as an Annex II and Annex V species under Council Directive 92/43/EEC of 21 May 1992 and are named as a qualifying interest of this Natura site, control of invasive pike stocks is regarded as being necessary to the proper management of the Lough Corrib SAC.

4.4. Project Activities

Stock management operations are carried out on six lake catchments in the Western River Basin District (WRBD); Loughs Corrib, Mask, Carra, Conn, Cullin & Arrow, all of which are designated as Natura sites and managed wild brown trout fisheries. Gill netting and electrofishing (EF) operations are the principal management methods which will be deployed to achieve the objectives of this plan.

4.4.1. Gill Netting Operations

Netting on Lough Corrib will be concentrated in February, March and April 2023. Further netting operations may also be carried out in the October – November period. This will involve a total of 220 person days. However, it should be noted that weather and other factors can impact on these operations. In general, gill nets will be set along the margins of the lakes to intercept pike moving in and out of known spawning areas. The Autumn element will target pike congregating around river mouths predating on migrating trout and salmon. Nets will be serviced daily. Regular recording and analysis of pike morphometrics and stomach contents will be undertaken for research purposes.

4.4.2. Electrofishing Operations

The main focus of Electrofishing (EF) operations will be to target pike in areas where salmonids tend to congregate on migratory routes and on juvenile pike in the nursery areas around the margins of the lake. Having regard to the fact that EF operations can be carried out year-round, it is envisaged that they will be carried out at any time during the year when weather conditions are suitable. Electrofishing operations are scheduled for 180 person days in the Corrib catchment (Loughs Corrib, Mask and Carra) during 2023. In addition to targeting the nursery margins, EF will also be used to control pike numbers in the lower reaches of a number of rivers. There is ample evidence of severe predation of salmon smolts and juvenile trout near and in the mouths of nursery rivers and streams, especially when salmonids are migrating in March, April and October.

4.5. Characteristics of the Project

Table 4.1. Project Characteristics.

Size, Scale, Area, Land Take	Electro-fishing and gill netting at numerous locations in Lough Corrib (See Section 4.2.3) No land take within any Natura 2000 site is required.
Details of physical changes that will take place during the various stages of implementing the proposal	The project does not require any physical changes.
Description of resource requirements for the operation and decommissioning of the proposal (water resources, construction material, human presence etc)	The proposed 2023 stock management programme will require 400 person days (220 person days (Gill Netting) and 180 person days* (Electrofishing). Two staff will be required for each crew deployed on netting operations. Three staff will be required for boat mounted electrofishing operations and additional staff will be essential where remote areas are being accessed. ***(*Corrib catchment)***
Description of 2023 timescale for the various activities that will take place as a result of implementation (including likely start and finish date)	The programme is scheduled to commence in January and will be completed by December 2023. Gill netting exercises will be confined to February, March, April, and possibly October and November.

Description of wastes arising and other residues (including quantities) and their disposal	No wastes apart from the pike carcasses will be generated. The carcasses will be disposed of through a licenced renderer. Any unanticipated wastes will be disposed of at an approved licensed landfill site
Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network	None anticipated.
Description of any additional services required to implement the project or plan, their location	Electro-fishing boats and associated equipment, appropriate boats and outboard engines. Four wheel drive vehicles. Quad bike. Refueling if required will take place a minimum of 50 m from any watercourse.

4.5.1. Identification of Other Projects, Plans or Activities

Other proposed projects in or adjacent to the Corrib catchment were considered as part of this report. The ongoing Lagarosiphon Research Lough Corrib (LARC) Project was identified as a project within the Corrib catchment along with the adjacent Owenriff Stock Management Programme. Annual drainage maintenance carried out by the OPW on selected channels in the Corrib catchment was also identified. No other projects or plans were identified as relevant to this stock management plan.

4.6. Methodologies (Elements of the project designed to protect habitats and species)

The following methodologies and standard operating practices (SOPs) will be in place throughout the proposed Corrib system stock management plan.

4.6.1 Refueling of outboard motors/generators/quad bikes etc.

All refueling will be carried out off site away from watercourses. In the unlikely event of refueling being required onsite, tanks and drums will be stored in secure, impermeable storage area, a minimum of 50m from drains and open water.

4.6.2 Standard Operating Procedures in relation to stock management plans

All operations will be undertaken in strict compliance with IFI's electrofishing and gill netting Standard Operating Procedures and in compliance with the provisions of IFI's most recent 2020 Safety Statement. All IFI staff involved in this project will have completed a comprehensive fish welfare course and will carry out their job consistent with best practice in mind.

Inland Fisheries Ireland's Standard Operating Procedure (SOP) For Pike management operations using gill nets is available at:
https://www.fisheriesireland.ie/sites/default/files/migrated/docman/2016/Wild%20Brown%20Trout%20Fishery%20Management%20Gill%20Netting%20SOP%2029-02-2016.pdf

The gill nets to be used range in mesh size from 2.5cm to 10cm, knot to knot, pulled. It is important to note that the majority of nets used will be 5cm to 10cm knot to knot pulled. They are usually set from an appropriate boat in shallow water close to areas of emergent vegetation where pike are known to spawn in the early spring months.

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. Nets can be set singularly (30m) or joined together to form a longer net which will measure a maximum of 180m for the Corrib plan. Typically, the nets fish to a depth of 1.5 m. A known pike spawning area in the littoral zones of the lake is usually targeted and re-fished for an appropriate period.

Fig. 4: IFI staff member servicing a gill net for stock management purposes from a lake boat

Electrofishing is carried out from flat-bottomed boats between 3m and 5m in length mounted with a generator and transformer. This equipment delivers an electrical current to the water which renders all fish in the immediate vicinity of the apparatus, temporarily motionless. The immobilized fish are removed from the water using hand nets. Non target fish are released directly to the water and pike are retained in an on board holding area.

Inland Fisheries Ireland's Standard Operating Procedure (SOP) For Pike management operations are shown in Appendix 7.

4.6.3 Management of Invasive species and Biosecurity

In accordance with IFI's biosecurity protocols, all equipment will be disinfected prior to, and following its use on the system to avoid introduction of invasive species such as Zebra Mussel or *Lagarosiphon major*. The highly aggressive submerged aquatic plant species *Lagarosiphon major* (Curly leaved

waterweed) was recorded from nine sites in Lough Corrib in 2005. One year later the plant had spread to 24 separate locations throughout the upper and middle lake and posed problems for amenity exploitation, principally wild brown trout fishing. Following a major survey in 2007, the plant had been positively identified from 64 locations. The largest plant stand occupied circa 19 hectares in Rinerroon Bay, north of Oughterard. It is noteworthy that no *Lagarosiphon* has yet been recorded from the lower lake (Central Fisheries Board, 2008).

Lagarosiphon Research Corrib (LARC) is a research project that is applying cutting-edge technologies, ecological sampling and statistical modelling to address this challenge. The project is trialing the use of aerial drones, subaquatic remotely operated vehicles, underwater cameras and hydroacoustic equipment. Sampling of 200 randomly selected sites commenced in October 2018 to assess the effect of environmental factors on the plant and to map its distribution in Lough Corrib. IFI continued to support extensive year-round control operations during 2018 and 2019, alongside partner agencies, to reduce the socioeconomic and ecological burden of the invasive plant, *L. major* in Lough Corrib. An average of 123 ha/annum have been treated over the last four years, restoring the amenity value of previously choked-up bays (Morrisey et al., 2021).
Ultimately, the LARC project will increase the efficiency of Lagarosiphon control by IFI (IFI, 2019). The next stage of this scientific work will involve:

1. Surveying additional sites and modelling the influence of habitat and environmental factors on L. major in Lough Corrib.
2. Continued distribution mapping of *L. major* to inform the control team of further occurrences.
3. A pilot study to investigate the use of multispectral satellite imagery to map the distribution of L. major in Lough Corrib.

If successful, this element of the project could significantly reduce the number of boat surveys required to map the distribution of *L. major* in the lake to inform management decisions as well as offer additional benefits, including reduced carbon footprint (Morrisey et al., 2021). More information is available about LARC at https://www.fisheriesireland.ie/sites/default/files/2021-06/lagarosiphon_report_2018_2019.pdf

The Zebra mussel *(Dreissena polymorpha),* another invasive species in Ireland was first recorded in Lough Corrib during 2007 and it is thought they were introduced to the lake in 2000/2001. Consideration will also have to be given to prevent the spread of other invasive species are present in the Corrib catchment such as Japanese knotweed which is known to be established in the system.

IFI provide a number of guidance documents on invasive species and their management which are available at: https://www.fisheriesireland.ie/search?keywords=invasive+species

All proposed works will be carried out strictly in accordance with IFI's Biosecurity Protocol for Field Work which is available at:
https://www.fisheriesireland.ie/sites/default/files/migrated/docman/biosecurityforfieldsurveys2010.pdf

Fig 6: IFI staff member carrying out the biosecurity protocol on a Rigiflex boat

Fig 5: IFI staff members carrying out electrofishing in accordance with IFI's electro-fishing SOP

4.7. Locations of Project Works

The proposed sites for this stock management programme occur at numerous waterbody locations throughout Lough Corrib including the lower sections of certain inflowing rivers to the lake. The principal areas where stock management (gill netting and electrofishing) will be carried out are shown in fig.2. Electrofishing operations may include the lower reaches of selected rivers namely; Bealnabreac, Cornamona, Cross, Black, Clare, Creggs and Owenriff rivers. These locations are shown in fig. 3.

The specific lake locations have been selected as they have been identified as established pike spawning areas that have historically produced substantial yield in terms of pike, whilst not disturbing salmonids. The river locations have been selected because they have been identified as areas where pike congregate especially during times when salmonids are migrating to and from spawning areas.

Annual stock management programmes on Lough Corrib for over 50 years have resulted in IFI staff building up significant tacit knowledge to inform and improve these programmes.

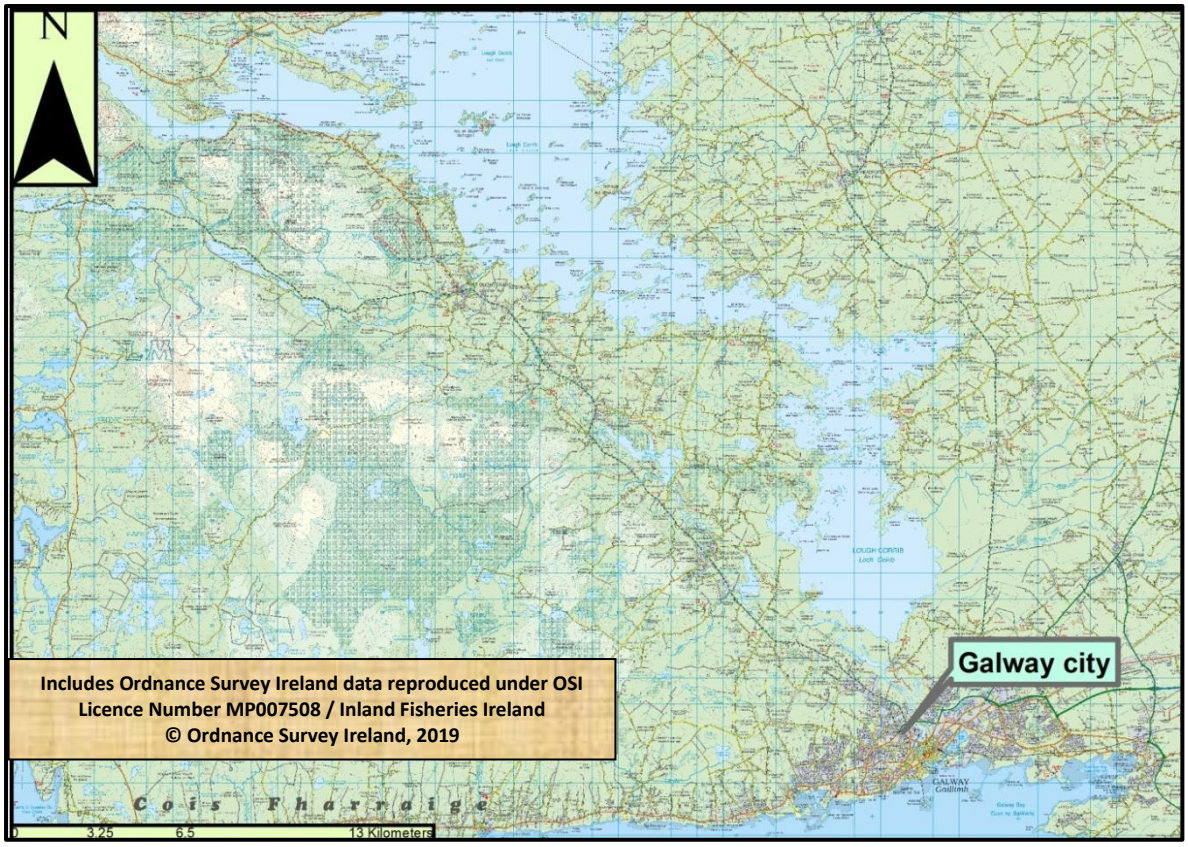

Fig.4.1: Location of Lough Corrib in relation to Galway City (OSI,2019)

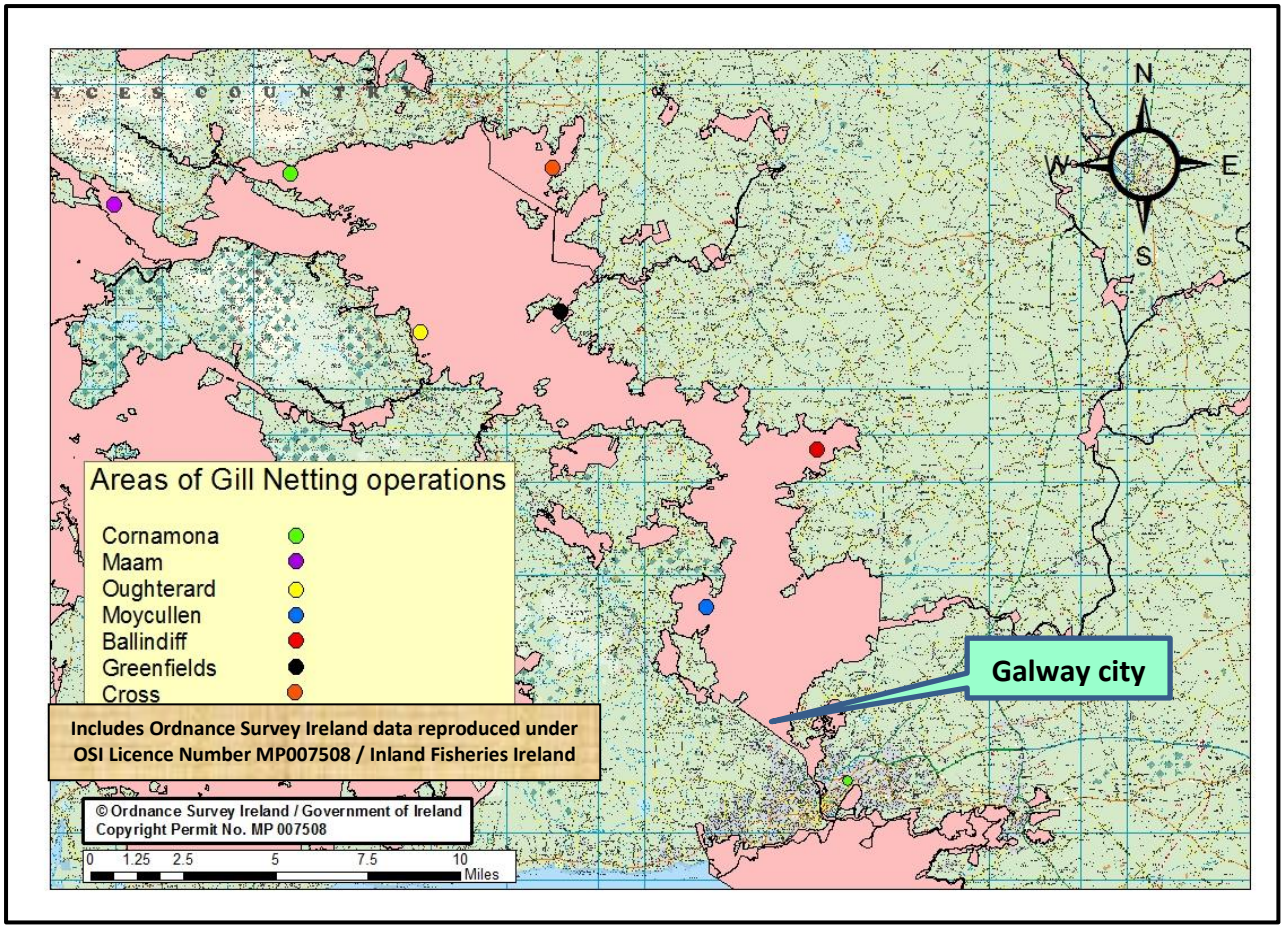

Fig 4.2: Locations of proposed gill netting sites within Lough Corrib SAC (OSI, 2019)

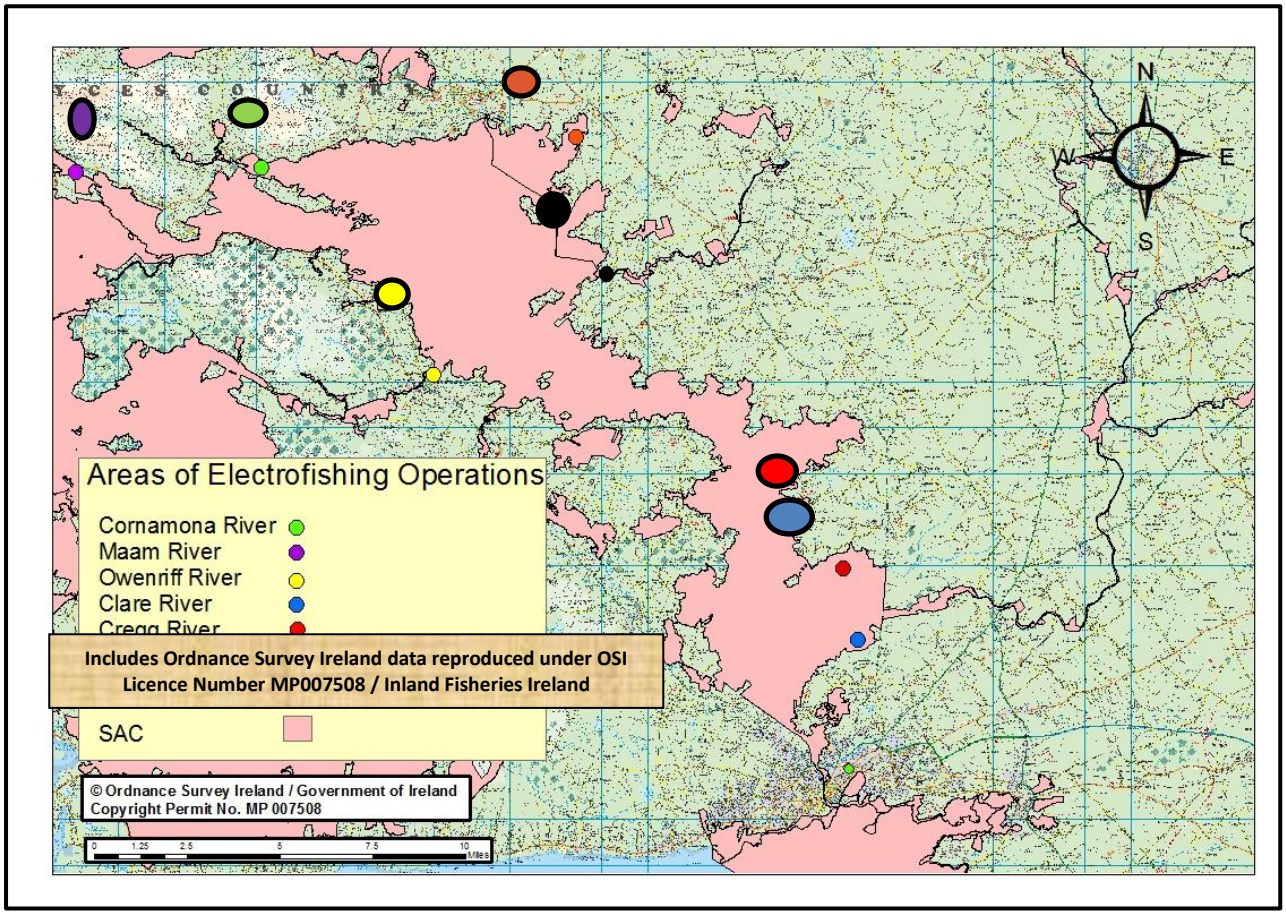

Fig 4.3: The outflow locations of selected rivers within Lough Corrib SAC where electrofishing operations are planned (OSI, 2019)

5.0 Description of the Site

Lough Corrib is situated to the north of Galway City and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha) and has a maximum depth of 42m. The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south (lower lake), and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north (upper lake). The lower lake is categorised as typology class 10 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth 100mg/l CaCO3) and the upper lake fits into typology class 12, i.e. deep (mean depth >4m), greater than 50ha and high alkalinity (>100mg/l CaCO3). The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north (NPWS, 2004). Lough Corrib has been designated as a Special Area of Conservation (SAC) and a Special Protection Area (SPA). A number of rivers are included within the SAC and they support important populations of Atlantic salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealnabreac, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the SAC. The first canal on the island of Ireland was cut in the 12th century. Known as the Friar's Cut, it allowed boats to pass from Lough Corrib to the sea at Galway. Lough Corrib covers 176 km² and lies mostly in County Galway with a small area of its northeast corner in County Mayo. Lough Corrib discharges to the Atlantic Ocean in

Galway city and lies within the Western River Basin District. The lake supports 14 protected habitats and six species, including salmon that are listed on Annex I and Annex II respectively of the EU Habitats Directive (NPWS, 2004). In early 2007, large numbers of the protozoan parasite Cryptosporidium sp. were detected in water from the lake, leading to contamination of the public water supply and an outbreak of cryptosporidiosis in Galway city.

5.1 Angling and fish stocks in Lough Corrib

Lough Corrib is a world-renowned salmonid fishery, and is economically important to the communities around the lake, providing employment in rural areas through tourism angling and ancillary businesses, as well as providing a valuable amenity for local anglers. It draws thousands of visitors annually to enjoy some of the best brown trout fishing in the world, and also provides quality salmon angling throughout the catchment as well (O' Reilly 2007).

Fish Species	WFD Status (Ireland) – IUCN Status
Atlantic Salmon (*Salmo salar*)	Native – Indicative of reference conditions. Annex ii & v EU -HD Status: Amber - Vulnerable
Brown Trout (*Salmo Trutta*)	Native – Indicative of reference conditions Status: Green - Least Concern
European Eel (*Anguilla Anguilla*)	Native – Indicative of reference conditions Status: Red – Critically Endangered
Sea Lamprey *(Petromyzon marinus*)	Native – Indicative of reference conditions Status: Amber - Near threatened
River Lamprey (*Lampetra fluviatilis*)	Native – Indicative of reference conditions Status: Amber - Near threatened
Brook Lamprey (*Lampetra planerii*)	Native – Indicative of reference conditions Status: Amber - Near threatened
3-Spined Stickleback (*Gasterosteus aculeatus*)	Native Status: Green – Least Concern
9-Spined Stickleback (Pungitus	Native Status: Green - Least Concern
Perch (*Perca fluviatilis*)	Non Native – Influencing Ecology
Pike (*Esox Lucius*)	Non Native – Influencing Ecology
Roach (*Rutilus rutilus*)	Non Native – Influencing Ecology
Rudd	Non Native – Benign

Bream (*Abramis brama*)	Non Native – Influencing Ecology
Roach Bream Hybrid	Non Native – Influencing Ecology
Tench (*Tinca tinca*)	Non Native – Benign
Minnow (*Phoxinus phoxinus*)	Non Native – Influencing Ecology

Angling is currently worth €836 million to Ireland's economy annually, supporting upwards of 11,000 jobs. Within this, brown trout angling contributes approximately €148,000 annually (IFI, 2016). A number of aquatic species are listed as qualifying features of Lough Corrib SAC, including Atlantic salmon, white clawed crayfish, sea lamprey, brook lamprey and freshwater pearl mussel. Roach, a non-native invasive fish species was first identified in Lower Lough Corrib in the early 1980s and subsequently spread to all corners of the lake. High numbers of roach were observed in routine netting operations on the lake from the late 1980s until 1992 when a decline in the stock was observed (O' Grady, 1996). Stocks of pike have been managed on Lough Corrib prior to and subsequent to the designation of the lake as an SAC and SPA. Lough Corrib is currently meeting its conservation limit for Atlantic salmon and has a total allowable catch of 3331 in 2023.

5.2 Fish Stock Survey of Lough Corrib - 2018

The latest data available in terms of fish stocks for Lough Corrib is based on a fish stock survey carried out by IFI in 2018 as part of the Water Framework Directive surveillance monitoring programme. Perch was the dominant fish species In Lower Lough Corrib in terms of abundance (CPUE) and roach x bream hybrids were the dominant fish species in terms of biomass (BPUE) captured during the 2018 survey. In Upper Lough Corrib perch was the dominant fish species in terms of abundance (CPUE) and perch were the dominant fish species in terms of biomass (BPUE) captured during the 2018 survey. A total of eight fish species and one type of hybrid were recorded on Lower Lough Corrib in June 2018, with 567 fish being captured (IFI, 2019).

The main notable change observed in species composition and abundance (CPUE)/biomass (BPUE) was the reduction in the roach and perch population between 2008 and 2011, however, perch abundance increased again in 2014 and 2018, with more of an increase observed in Lower Lough Corrib in 2018. Roach abundance in 2014 only increased in Lower Lough Corrib and decreased further in Upper Lough Corrib. Further decreases in roach abundances were observed in the 2018 survey. A decrease in brown trout abundance and biomass in the Upper Lake was also observed between 2008 and 2011 and increased again in 2014 and further increased in 2018. In addition, there was also a decrease in roach x bream hybrids in both the Upper and Lower Loughs in 2014 with an increase observed again in 2018. Reasons for these significant fluctuations in abundance for certain fish species are unknown but may be attributable to a number of factors, such as the harsh winters of the previous year's affecting recruitment and to the spread of zebra mussels throughout the lake since 2007. The zebra mussel which is an invasive species can disturb the food web in a lake by filtering microscopic

algae (phytoplankton) from the water column, divert nutrients from open water to lake bottom systems, thus favouring bottom-feeding fish such as bream and roach x bream hybrids (and their predators) over those fish species (and their predators) which feed in the open water (IFI, 2019).

Arctic char have historically existed in Lough Corrib; however none were recorded in the 2008, 2011, 2014 or 2018 surveys or in the previous 1996 survey. The last reports of Arctic char in the lake came from anglers in the 1980's (O' Grady, 1996). It is most likely that char became extinct between the late 1980's and early 1990's due to a moderate increase in trophic status observed in the lake (O' Grady, 1996) as it is known that Arctic char are sensitive to changes in water quality (Baroudy, 1995). Parts of the Corrib catchment area have recently had their ecological status downgraded to "Bad and/or Deteriorating" due to declines in native, ecologically sensitive species such as Atlantic salmon and brown trout (Corcoran et al. 2022). These declines have been linked to the introduction of pike to previously uncolonized areas (IFI 2018).

5.3. Freshwater pearl mussel in the Corrib catchment

The Owenriff River forms part of the Corrib catchment and supports a population of Freshwater Pearl Mussel. It is listed on the first schedule of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 - S.I. No. 296/2009. It is one of eitht river catchments in Ireland which has been selected for specific actions under the pearl mussel project (https://www.pearlmusselproject.ie/eligible-areas/index.html) due to the viability and importance of its populations of both pearl mussels and its principal vector Atlantic salmon. A separate Appropriate Assessment Screening Report is available for the 2023 Owenriff Stock Management Plan. The Owenriff pearl mussel populations are located approximately 4km upstream of the project site. Atlantic salmon play a vital part of the pearl mussel life-cycle, acting as vectors for the juvenile mussels (glaucidia). A percentage glochidia released to the river by mature mussels will be inhaled by passing salmonid fish (Bauer & Vogel, 1987), which act as the pearl mussels' temporary hosts. Given the recent declines of salmonids in this part of the L. Corrib catchment (IFI 2017), the removal of invasive predatory fish is seen as being important to the management of the site and the conservation of freshwater pearl mussel.

5.4. Water Quality

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 Lough Corrib is assessed as two water bodies; Upper Corrib and Lower Corrib.

Assessment of upper Lough Corrib (Lake Waterbody WFD Status 2013-2018) indicates "Good Ecological Status". Lower Corrib also indicates "Good Ecological Status", an improvement from "Moderate Ecological Status" for the period 2010-2015. The EPA also monitors general water quality in Lough Corrib. The latest data available classifies the lake as mesotrophic.

6.0. IDENTIFICATION OF NATURA 2000 SITES

The Lough Corrib SAC and SPA are situated in an area of particular wealth in terms of habitats and species and there are up to 24 additional Natura sites which need to be considered in terms of potential impacts from the project. This is because they are either within a relatively small distance (< 15km) from the site or are connected to it. These additional Natura sites and their proximity to the project are considered in this section.

Table 6.1. Designated conservation sites within The Potential Zone of Influence of project site

	Designated Site	Site Code	Proximity to designated site/pathway
1	Lough Corrib cSAC	000297	Sites are situated in this SAC
2	Maamturk Mountains SAC	002008	Sites are situated in this SAC
3	Lough Corrib SPA	004042	Sites are situated within this SAC
4	Cregganna Marsh SPA	004142	Approx. 11 km to the south east
5	Inner Galway Bay SPA	004031	Approx. 4.16 km to the south
6	Lough Carra SPA	004051	Approx. 13.46 km to the north
7	Ross Lake and Woods SAC	001312	Approx 2.97 km to the south
8	Lough Carra/Mask Complex SAC	001774	Approx. 2.12 km to the north
9	Lough Mask SPA	004062	Approx. 3.39 km to the north
10	Connemara Bog Complex SPA	004181	Approx. 7.77 km to the west
11	Connemara Bog Complex SAC	002034	Approx. 3.3 km to the west
12	Cloughmoyne SAC	000479	Approx. 1 km to the east
13	Shrule Turlough SAC	000525	Approx 4.93 km to the east
14	Mocorha Lough SAC	001536	Approx. 4 km to the north east
15	Clyard Kettle Holes SAC	000480	Approx. 4.75 km to the north east
16	Ballymaglancy Cave Cong SAC	000474	Approx. 1.3 km to the north
17	Gortnandarragh Limestone pavement SAC	001271	Approx. 0.17 km to the west
18	Galway Bay Complex SAC	000268	Approx. 4.1 km to the south
19	Mweelrea/Sheeffry/Erriff Complex SAC	001932	Approx. 14.27 km to the north west
20	The Twelve Bens/Garran Complex SAC	002031	Approx. 12.8 km to the west
21	Kildun Souterrain SAC	002320	Approx. 2.54 km to the north
22	Kilkieran Bay And Islands SAC	002111	Approx. 11.04 km to the south west
23	Ardkill Turlough SAC	000461	Approx. 12.48 km to the north east
24	Greaghans Turlough SAC	000503	Approx. 13.73 km to the north east
25	Kilglassan/Caheravoostia Turlough Complex SAC	000504	Approx. 13.68 km to the north east
26	Skealoghan Turlough SAC	000541	Approx. 10.77 km to the north east

6.1 Potential Zone of Influence

All Natura 2000 sites within the potential zone of impact or with direct or indirect pathways to the project area will be characterised in the context of the rationale for designation and qualifying features, in accordance with NPWS guidance. In line with the precautionary principle, this report considers any Natura 2000 sites that may be within approximately 15km or have a direct pathway of impact to the project site could be potentially impacted by, or as a result of the proposed works. Following this, the potential effects associated with the proposal will be identified before an assessment is made of the likely significance of these impacts. As described above, the test for the screening for Appropriate Assessment is to assess, in view of best scientific knowledge, if the development, individually or in combination with other plan/project is likely to have a significant effect on a Natura 2000 site.

6.2. Identification of Natura 2000 Sites

Adopting the precautionary principle in identifying potentially affected European sites, it has been decided to include all cSACs and SPAs within the potential zone of influence of the project site, a 15km radius of the proposal site. Consideration regarding potential biodiversity corridor links to sites >15km (i.e. in the same catchment) were also included as part of this assessment.

The proposed sites are situated within the Lough Corrib SAC and the Lough Corrib SPA. An extremely small section of the Corrib catchment also lies within the Maamturk Mountain SAC (the Maam River and where it enters Lough Corrib). Natura 2000 sites within 15 kilometres of the proposed sites were considered initially as per the NPWS guidance document.

Consideration was also given to designated sites beyond 15km which could possibly have an impact on a feature of interest of an SAC. No other designated sites beyond 15km were identified as having a biodiversity corridor/direct pathway associated with this programme which could impact on a feature of interest.

This initial screening revealed that the following sites lie within 15km radius of the stock management programme. Table 2 below, lists designated cSACs and SPA sites within 15km or the zone of influence of the proposal site including their proximity.

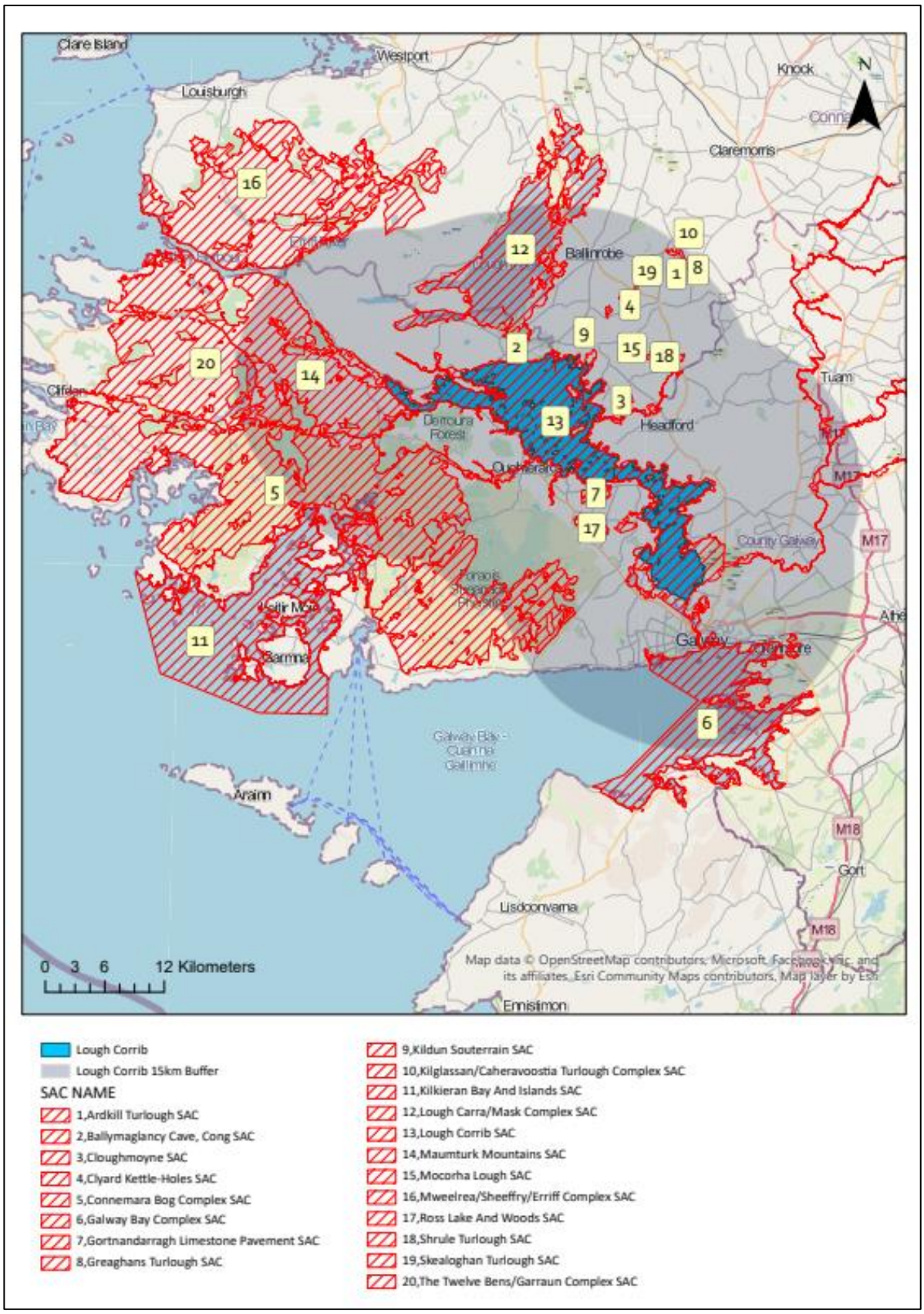

Fig 6.1: Special Areas of Conservation (SAC's) within 15 km of Lough Corrib

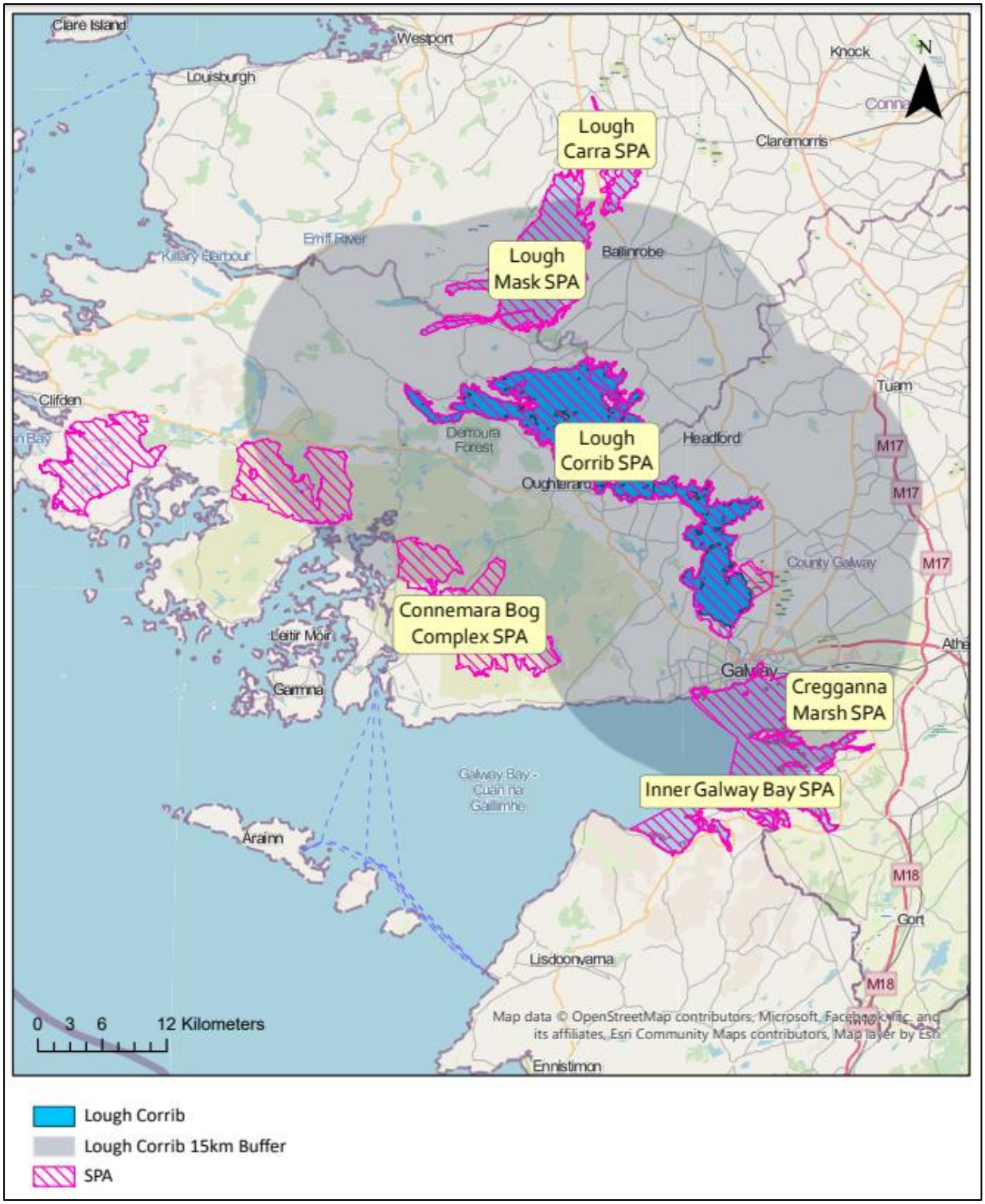

Fig.6.2. Special Protection Areas (SPA's) within the Potential Zone of Influence of The Project Site

6.3. Conservation Objectives

According to the Habitat's Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range 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 below.

According to the Habitat's Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range 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.

Site specific and more detailed conservation objectives were available for the following sites where a potential impact couldn't be ruled out at this stage, namely Lough Corrib SAC, Lough Corrib SPA and Maumturk Mountains SAC.

A detailed list of the conservation objectives for the Lough Corrib SAC is available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000297.pdf

A detailed list of the conservation objectives for Lough Corrib SPA is available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004042.pdf

A detailed list of the conservation objectives for Maumturk Mountains SAC is available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002008.pdf

The conservation objectives for Lough Corrib SAC, Lough Corrib SPA and Maumturk Mountains SAC above were consulted in the preparation of this report.

Table 6.2. Habitats Names as Qualifying interests for the Lough Corrib SAC including main threats and impacts

Habitat name (cSAC Qualifying Feature)	Habitat code	Main Threats and impacts Currently of concern to the qualifying feature
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	3140	Fertilisation, grazing, forestry, leisure fishing, hunting, human induced hydraulic changes, eutrophication and Invasive species.
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea	3130	Fertilisation, grazing, forestry, leisure fishing, hunting, human induced hydraulic changes, eutrophication and Invasive species.
Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)	3110	Fertilisation, grazing, forestry, burning, leisure fishing, hunting, peat extraction, dispersed habitation, discharges, sport and leisure structures, pollution, drainage, erosion, invasive species.
Molinia meadows on calcareous, peaty or clavey-silt-laden soils (Molinion caeruleae)	6410	Drainage and burning; afforestation; invasive species; grazing; dumping; fertilisation; restructuring agricultural land; communication routes; cultivation; mowing/cutting; modification of inland water structures; sand and gravel extraction.
Active raised bogs	7110	Peat Cutting, grazing, burning.
Old sessile oak woods with Ilex and Blechnum in British Isles	91A0	Internal effects include inappropriate grazing levels and invasive species, whereas external threats include clearance for agriculture or felling for timber.
Alkaline fens	7230	Fertilisation, grazing, forestry, burning, leisure fishing, hunting, peat extraction, dispersed habitation, discharges, sport and leisure structures, pollution, drainage, erosion, invasive species.
Calcareous fens with Cladium mariscus and species of the Caricion davallianae	7210	Overgrazing, Restructuring agricultural land holding, Peat Extraction, Mechanical removal of peat, Water pollution. Landfill, land reclamation and drying out, general. Infilling ditches, dykes, ponds, marshes and pits.
Limestone pavements	8240	Removal of limestone pavement, removal of scrub, dispersed habitation, stock feeding, agricultural improvement, quarry, disposal inert material, electricity lines, infilling wetlands, routes, abandonment of grazing, agricultural structure, burning, discharges, disposal household waste, dumping dredgings, forestry, grazing, improved

Habitat name (cSAC Qualifying Feature)	Habitat code	Main Threats and impacts Currently of concern to the qualifying feature
		access, landfill, nautical sports, paths and restructuring agricultural land holding.
Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia)(*important orchid sites)	6210	Invasion by a species, Undergrazing, Fertilisation, Agricultural improvement, Abandonment of pastoral systems, Sand & gravel extraction.
Bog woodland	91D0	Burning, Mechanical removal of peat, Drainage.
Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation	3260	Fertilisation, grazing, forestry, peat extraction, pollution, drainage, invasive species.
Petrifying springs with tufa formation (Cratoneurion)	7220	Peat cutting, arterial drainage, local drainage, water abstraction, agricultural reclamation.
Degraded raised bogs still capable of natural regeneration	7120	Peat cutting, arterial drainage, local drainage, water abstraction, agricultural reclamation.
Depressions on peat substrates of the Rhynchosporion	7150	Peat cutting; drainage and burning; afforestation; invasive species; grazing; dumping; fertilisation; restructuring agricultural land; communication routes; cultivation; mowing/cutting; modification of inland water structures; sand and gravel extraction.
Otter (*Lutra lutra*)	1355	Use of pesticides, fertilization, hunting, trapping, poisoning, water pollution, infilling of ditches, dykes, ponds, pools, marshes or pits, management of aquatic and bank vegetation for drainage purposes, removal of sediments, canalization of inland water course.
Slender Naiad (*Najas flexilis*)	1833	Water pollution, water abstraction, invasive species, forestry and farming.
Atlantic Salmon (*Salmo salar*)	1106	Water pollution, invasive species, forestry, farming and fishing.
Freshwater Pearl-mussel (*Margaritifera margaritifera*)	1029	Water pollution, water abstraction, invasive species, forestry and farming.
Sea Lamprey *(Petromyzon marinus)*	1095	Fish passages, water pollution (including discharges), commercial fishing, invasive species, forestry and farming.
Brook Lamprey *(Lampetra planeri)*	1096	Fish passages, water pollution (including discharges), commercial fishing, invasive species, forestry and farming.
Lesser Horseshoe Bat (*Rhinolophus hipposideros)*	1303	Loss of suitable summer and winter roosting sites due to the demolition or renovation of derelict buildings for human occupation, loss of commuting routes linking roosts to foraging sites, and loss of suitable foraging sites are the major threats to this species.

Habitat name (cSAC Qualifying Feature)	Habitat code	Main Threats and impacts Currently of concern to the qualifying feature
		The use of insecticides, habitat destruction such as felling of trees and scrub clearance and deterioration of old buildings.
White-clawed Crayfish (*Austropotamobius pallipes)*	1092	Water pollution, invasive species, forestry and farming.
Shining Sickle-moss (*Drepanocladus vernicosus*)	1393	Fertilisation, Abandonment of pastoral systems, Undergrazing, Forestry planting, Water pollution, Drainage

Table 6.3. Qualifying Interests of Maumturk Mountains SAC including main threats and impacts

Habitat name (SAC Qualifying Feature)	Habitat code	Main Threats and impacts currently of concern to the qualifying feature
Northern Atlantic wet heaths with Erica tetralix	[4010]	Fertilisation, grazing, forestry, burning, hunting, dispersed habitation, discharges, sport and leisure structures, pollution, drainage, erosion, invasive species.
Alpine and Boreal heaths	[4060]	Fertilisation, grazing, forestry, burning, hunting, dispersed habitation, discharges, sport and leisure structures, pollution, drainage, erosion, invasive species.
Blanket bogs (* if active bog)	[7130]	Peat Cutting, grazing, burning.
Depressions on peat substrates of the Rhynchosporion	[7150]	Peat cutting; drainage and burning; afforestation; invasive species; grazing; dumping; fertilisation; restructuring agricultural land; communication routes; cultivation; mowing/cutting; modification of inland water structures; sand and gravel extraction.
Siliceous rocky slopes with chasmophytic vegetation	[8220]	removal of scrub, agricultural improvement, infilling wetlands, routes, agricultural structure, burning, discharges, disposal, forestry, grazing, nautical sports, paths
Salmo salar (Salmon)	[1106]	Water pollution, invasive species, forestry, farming and fishing.
Najas flexilis (Slender Naiad)	[1833]	Water pollution, water abstraction, invasive species, forestry and farming.

Table 6.4. Special Conservation Interests in Lough Corrib SPA

Species name (SPA Qualifying Feature)	Species code
Shoveler *(Anas clypeata)*	**A056**
Pochard *(Aythya ferina)*	**A059**
Tufted Duck *(Aythya fuligula)*	**A061**
Common Scoter *(Melanitta nigra)*	**A065**
Hen Harrier *(Circus cyaneus)*	**A082**
Coot *(Fulica atra)*	**A125**
Golden Plover *(Pluvialis apricaria)*	**A140**
Black-headed Gull *(Chroicocephalus ridibundus)*	**A179**
Common Gull *(Larus canus)*	**A182**
Common Tern *(Sterna hirundo)*	**A193**
Arctic Tern *(Sterna paradisaea)*	**A194**
Greenland White-fronted Goose *(Anser albifrons flavirostris)*	**A395**
Wetland and Waterbirds	**A999**

Table 6.5. Designated sites within 15km/within zone of significant impact influence of the proposed stock management programme, With evaluation of potential for impacts

Designated Site	Site Code	Potential Impact	Potential Risk of Impacts from Project to Site
Galway Bay Complex SAC	000268	No significant effects are likely	Lough Corrib SAC drains into Galway Bay Complex SAC but, as no emissions are anticipated from the Lough Corrib stock management plan and no impacts on water quality are reasonably foreseeable, the project will have no impact on Galway Bay Complex SAC due to the nature of the stock management programme and the features of interest in the Galway Bay Complex SAC. There is very little risk of impact to this SAC
Connemara Bog Complex SAC	002034	No significant effects are likely	Located approximately 3.3km to the south west. There is no impact pathway for the proposed stock management plan to this Natura site therefore no significant impacts are reasonably foreseeable.
Shrule Turlough SAC	000525	No significant effects are likely	Located approximately 4.93km to the east. There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts
Ballymaglancy Cave Cong SAC	00474	No significant effects are likely	Located approximately 1.27km to the north. There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts
Clyard Kettle Holes SAC	000480	No significant effects are likely	Located approximately 4.74km to the north east. There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts

Ross Lake and Woods SAC	001312	No significant effects are likely	Located approximately 2.97km to the south. Waters from this sub-catchment of L. Corrib flow into the SAC. Given the lack of significant disturbance, land take and emissions from the project, there is no possibility for interaction with the two qualifying interests in this SAC *(Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. and Lesser Horseshoe Bat)* therefore no significant impacts
Lough Carra/Mask Complex SAC	001774	No significant effects are likely	Located upstream of Lough Corrib SAC approximately 2.13 km to the north. The pathway is restricted by a grating on the Cong River/Canal which is designed to prohibit upstream movement of fish therefore no significant impacts
Lough Mask SPA	004062	No significant effects are likely	Located upstream approximately 3.39 km to the north. Given the size and scale of the plan and its distance (upstream in the catchment) from this SPA, there should be no significant effects to protected bird species and habitats.
Connemara Bog Complex SPA	004181	No significant effects are likely	Located approximately 7.77 km to the south west. Given the size and scale of the plan and its distance from this SPA, there will be no significant effects to protected bird species and habitats.
Cloughmoyne SAC	000479	No significant effects are likely	Located on the eastern side of Lough Corrib and designated for limestone pavements. There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts
Gortnandarragh Limestone pavement SAC	001271	No significant effects are likely	Located on eastern side of Lough Corrib and designated for Limestone pavements. There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts
Mocorha Lough SAC	001536	No significant effects are likely	Located on the eastern side of Lough Corrib and designated for *Calcareous fens with Cladium mariscus and species of the Caricion davallianae.* There is no pathway for the proposed stock management plan to impact on this Natura site therefore no significant impacts
Creganna Marsh SPA	004142	No significant effects are likely	Located about 3 km south of Oranmore and is of special conservation interest for Greenland White-fronted Goose. Any potential threat to this species is dealt with in “protected bird species” chapter. No significant effects are likely.
Inner Galway Bay SPA	004031	No significant effects are likely	Located 4.16 km to the south in inner Galway Bay and is of special conservation interest for: Black-throated Diver, Great Northern Diver, Cormorant, Grey Heron, Light-bellied Brent Goose, Wigeon, Teal, Redbreasted Merganser, Ringed Plover, Golden Plover, Lapwing, Dunlin, Bar-tailed Godwit, Curlew, Redshank, Turnstone, Black-headed Gull, Common Gull, Sandwich Tern and Common Tern.

Lough Carra SPA	004051	No significant effects are likely	Located 13.46 km to the north and designated for Common gull. This site is subject to a similar stock management plan and has had an AA screening carried out resulting in no significant effects are likely.
Mweelrea/Sheeffry/Erriff Complex SAC	001932	No significant effects are likely	Located 14.27km to the north west
The Twelve Bens/Garran Complex SAC	002031	No significant effects are likely	Located 12.8km to the west
Kildun Souterrain SAC	002320	No significant effects are likely	Located approximately 2.54km to the north and designated for lesser horseshoe bat only so no pathway therefore no significant effects are likely
Kilkieran Bay And Islands SAC			Located approximately 11.04km to the south west. Due to the significant distance involved, the nature of the qualifying interests in this SAC and the absence of a pathway no significant effects are likely
Ardkill Turlough SAC	000461	No significant effects are likely	Located approximately 12.48km to the north east and designated for turloughs. No pathway so so significant effects are likely.
Greaghans Turlough SAC	000503	No significant effects are likely	Located approximately 13.73km to the north east and designated for turloughs only. No pathway therefore no significant effects are likely
Kilglassan/Caheravoostia Turlough Complex SAC	000504	No significant effects are likely	Located approximately 13.68km to the north east and designated for turloughs only. No pathway therefore no significant effects are likely
Skealoghan Turlough SAC	000541	No significant effects are likely	Located approximately 10.77km to the north east and designated for turloughs only. No pathway, therefore no significant effects are likely

7.0. IDENTIFICATION OF POTENTIAL IMPACTS

Table 7.1. The Screening for potential ecological impacts arising from the project.

Description of elements of the project likely to give rise to potential ecological impacts sites.	• The proposed stock management programme is to be carried out on waters which form part of the Lough Corrib SAC & SPA and the Maumturk Mountains SAC. • Population of *Margaritifera margaritifera* present in the Owenriff River however a separate Appropriate Assessment Screening Report is provided for the Owenriff stock management plan concluding that as the management of pike stocks is necessary to the management of the Lough Corrib SAC, an NIS is not required and that significant impacts to Natura 2000 sites are not likely. No known populations are in the vicinity or immediately downstream of this plan. This stock management plan is situated downstream of the Owenriff populations, so no downstream or upstream impact is possible. • Information from previous by-catch records indicate that the project activities are unlikely to pose a significant threat to the protected species or habitats at the site. • Use of equipment/vehicles/boats near watercourses (fuel/oil spills). • Increased noise levels (generators/outboard engines/equipment/human activity)
Describe any likely direct, indirect or secondary ecological impacts of the project (either alone or in combination with other plans or projects) by virtue of: ***Size and scale;*** ***Land-take;*** ***Distance from Natura 2000 Site or key features of the Site;*** ***Resource requirements;*** ***Emissions;*** ***Excavation requirements;*** ***Transportation requirements;*** ***Duration of construction, operation etc.; and*** ***Other.***	• No direct habitat loss to Natura 2000 sites. • Use of vehicles and equipment working close to the river/lake increases risk of fuel and oils pollution. Refueling will be carried out off site • This stock management plan is situated in the Lough Corrib SPA. Records show that the level of risk posed is considered low enough to be disregarded as a potential threat to the status or conservation objectives of any protected species in the SPA. • Lough Corrib is an important migratory route for salmon and trout. This programme should have a positive impact to two qualifying interests on Lough Corrib SAC; Atlantic and *Margaritifera Margaritifera.* Pearl mussel life history is complicated, and the larval stage (glochidia) released to the river are inhaled by passing salmonid fish which act as the pearl mussels' temporary hosts. The interaction/interdependence between *Margaritifera margaritifera* and salmonids therefore is important in terms of pearl mussel life cycle and increased numbers of salmonids provide the likelihood of increased recruitment of pearl mussel.

7.1. Assessment of Significance of potential Impacts

This section considers the potential ecological impacts and how these could affect the sites, their species and habitats. It should be noted that Atlantic salmon are classified an Annex II and Annex V species in the EU Habitats Directive and due to Atlantic salmon being a feature of interest of Lough Corrib SAC, management of pike stocks is necessary to the management of Lough Corrib SAC. For this reason, it is concluded that it is not necessary to proceed to Stage 2 - full Appropriate Assessment.

In Ireland, historic reports of negative impacts on trout populations have been described in a number of previously isolated lakes and rivers (Went, 1957). For example, Ross Lake within the Corrib catchment provides connectivity to a population of resident pike in Lough Corrib. This was created following the construction of a canal in the mid-1800s and resulted in a reported decline in brown trout stocks at that time (Went, 1957). This lake now supports a coarse fishery and stocks are dominated by cyprinids (Kelly *et al.*, 2017). Stock Management is required on systems such as Lough Corrib for the conservation of salmonids as these lakes are managed by IFI as salmonid fisheries.
These stock management operations are informed by scientific research, are based on best practice and carried out in accordance with IFIs pike and trout management policies under strict standard operating procedures. Stock management in relation to pike on Lough Corrib has been carried out by IFI and its predecessors; the Western Regional Fisheries Board and the Inland Fisheries Trust since the 1950's.

An initial assessment is made in section 4.5.1, below, to determine if all sites within that likely zone of impact can be considered to be within the functional zone of a potential impact influence of the impacts identified in section 4.4 above. 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 significant impacts affecting the sites considered to be within a zone of potential impact influence are assessed in terms of magnitude/extent, probability and duration.

7.2. Impact Indicators

The typical impacts which can arise from plans or projects and their potential effects on Natura sites, their habitat and species are examined in this section. The likelihood of significant effects to a Natura 2000 site from the project was determined based on a number of these indicators including:

- Habitat loss
- Habitat alteration
- Water quality and resource
- Habitat or species fragmentation
- Disturbance and/or displacement of species

The project activities are further evaluated in terms of these impact indicatior when the specific qualifying habitats and species for each site are considered.

7.2.1. Habitat Loss and Alteration

The proposed stock management programme on Lough Corrib is situated within the designated sites of Lough Corrib SAC, Lough Corrib SPA and the Maumturk Mountains SAC. The proposal described in this report will not result in direct habitat loss within this site as habitat loss or alteration (either directly or indirectly) is not a feature of the stock management plan. No negative impact is anticipated to the protected habitats within the zone of influence of this project. Access to the project areas is also confined to existing established boat access points around the lakes. No connectivity between

the protected habitats and the project activity has been identified. This includes *Najas flexilis* which occurs in Lough Lehanagh and Derryneen Lough in the Maumturk Mountains SAC, not Lough Corrib itself (NPWS, 2017b). There is, therefore, no potential for significant impacts on protected habitats arising from this stock management project.

The proposed stock management plan will involve the setting of gill nets at a number of locations on Lough Corrib along with scheduled electrofishing in established pike areas. Pike will be removed offsite and disposed of through a licenced renderer. Some pike may be transferred to other fisheries. All movement of vehicles into and out of the launch sites will happen so as to ensure no damage to any terrestrial habitat. Recognised public launching areas will be prioritized for this process. It is not likely that landowner permission will be required as the launching areas are mainly all public. No significant habitat loss or alteration is reasonably foreseeable within Lough Corrib SAC, Lough Corrib SPA or the Maumturk Mountains SAC as a result of the proposed stock management programme on Lough Corrib.

7.2.2. Water Quality

Water quality is of enormous importance within Lough Corrib SAC. Conservation Objective 3260 states *"to maintain the favourable conservation condition of Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation in Lough Corrib SAC"*. This is further defined by following a target – *"to maintain appropriate water quality to support the natural structure and functioning of the habitat"*. Lough Corrib discharges to the Atlantic Ocean through Galway Bay and the catchment supports (amongst other species) a stock of migratory Atlantic salmon, brown trout and freshwater pearl mussel. Impacts to water quality as a result of the proposed programme are considered important. Lough Corrib has a good stock of Atlantic salmon, is meeting its conservation limit for same with a total allowable catch of3331 salmon for 2023. The Water Framework Directive Ecological Status is considered "Good Status" in both the Upper Corrib and Lower Corrib.

Potential impairment of water quality as a result of the proposed project includes accidental fuel/oil spills from equipment/boat engines during refueling activities near/within the watercourses. These impacts are considered highly unlikely due to the fact that all refueling will be carried out off site. The refueling methodology, detailed in section 4.2.6.1 above, 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 methods that will be in place to prevent significant impacts to water quality, no significant water quality impacts are reasonably foreseeable within Lough Corrib SAC, Lough Corrib SPA and Maumturk Mountains SAC as a result of the proposed stock management programme on Lough Corrib.

7.2.3. Habitat or Species Fragmentation

The preceding sub sections have concluded that there will be no significant direct or indirect habitat loss to any designated site nor will there be any direct or indirect disturbance or displacement of any species, along with the fact that there will be no significant impacts to water quality within nearby designated sites. Indeed, the carrying out of the Lough Corrib stock management plan should have a positive impact on two qualifying interests of the Lough Corrib SAC; namely Atlantic salmon and freshwater pearl mussel. The stock management plan may also have a positive impact on Common Scoter in Lough Corrib SPA when considering that according to Hunt *et al* (2013) "large pike are known

to predate on waterfowl ducklings and may cause scoter duckling mortality" (eg. Stronach, c.1977). Therefore, considering the conclusions in the preceding subsections and bearing in mind the location, scope, scale, duration and timing of the proposed stock management plan, it is concluded that no significant habitat or species fragmentation impacts are reasonably foreseeable as a result of the proposed stock management programme on Lough Corrib.

7.2.4. Disturbance and/or Displacement of Species

An analysis is conducted here of species which may use the areas immediately adjacent to the proposed stock management programme, to investigate if they could experience significant levels of disturbance during the project. Particular attention is given to the use of nets and electrofishing gear and the possibility of increases in noise due to presence of humans, vehicles, boats, outboard engines, and generators. However, Stock management activities are transient in nature and take place at one or two specific locations each day. The size and scale of operations compared to the expanse of L. Corrib means that any impacts are expected to be relatively brief, slight and only in the immediate location of the project activity on any given day. More detailed analysis is also provided here, of the species which may be sensitive to some of the project activities.

7.2.4.1. Atlantic salmon

The timing and location of gill netting operations are set out to avoid any potential impact on Atlantic salmon *(Salmo salar).* Gill nets are set strategically in locations to target pike only. These locations, which will concentrate on pike spawning areas have been identified over 50 years of implementing stock management programmes and the tacit knowledge held by IFI staff is considerable. As the established migratory routes and behaviours of salmon are already known and daily servicing of nets will take place, the potential risk to this species is considered to be low

Because of the localised effect of the electrofishing equipment on the water it is not envisaged that any of the species listed as qualifying interests of the site will be impacted by the project activity. Fish captured by electrofishing are almost always completely unharmed so in the unlikely case that Atlantic salmon are captured by electrofishing, they will be immediately released unharmed to the water. It should be noted that as Atlantic salmon are classified an Annex II and Annex V species under the provisions of the EU Habitats Directive coupled with Atlantic salmon being a feature of interest of Lough Corrib SAC, management of pike stocks is necessary to the management of the Lough Corrib SAC.

7.2.4.2. Brook Lamprey

The brook lamprey *(Lampetra planeri)* is the smallest of the three lampreys recorded in Ireland typically reaching no more than 15-18cm in length. Unlike the sea lamprey *(Petromyzon marinus)* and the river lamprey (Lampetra fluviatilis), the brook lamprey is non-parasitic and non-migratory as an adult, living its entire life in freshwater. Adults spawn in spring, excavating shallow nests in relatively small sized gravels in areas of reduced flow. After hatching, the larvae called ammocoetes drift or swim downstream to areas of river bed with a fine silt composition. They burrow into this bed material and live as filter feeders over a period of years before transforming into young adult fish. The Overall Status is assessed as "Favourable". Brook lamprey are a qualifying feature in Lough Corrib SAC. In a study undertaken by Ecofact Environmental Consultants Ltd. on behalf of NPWS in 2006 concentrating

on lamprey on the Corrib catchment, juvenile lampreys were considered to have a patchy distribution in the Corrib catchment and were present at 38 out of the 77 locations investigated (O'Connor, 2007). Catchment wide surveying for juvenile lamprey was undertaken by Inland Fisheries Ireland during October and early November 2013 in the Corrib catchment. Suitable habitat for juvenile lamprey was encountered at 56 of the 100 sites visited. Lack of habitat was particularly pronounced in the western third of the catchment due to the prevailing topography, with only 11 (29%) of the 38 sites visited having suitable nursery habitat. Ammocoetes were encountered at the majority (8/11) of these locations. Conditions in the central section of the catchment were slightly more favorable, with suitable habitat recorded at 9 of the 22 sites (41%) visited. Ammocoetes were less-frequently encountered, however, with presence noted at 33% of suitable locations (3/9). The eastern section, in contrast, had a widespread distribution of suitable habitat at 36 (90%) of the 40 sites visited. Juvenile lamprey were present at 31 (86%) of the 36 suitable habitat sites. Densities were typically low to moderate across most of the catchment (IFI, 2014).

Brook lamprey can be found in both large and small river channels, although they are more typically found in smaller rivers (IFI, 2022) so stock management activities in Lough Corrib will not impact on them as they are unlikely to be present. Due to the physiological nature of brook lamprey it is unlikely that they could be captured in gill nets. The gill nets to be used range in mesh size from one inch to four inches, knot to knot when pulled. It is important to note that the majority of nets used will range from two-inch to four-inch knot to knot when pulled, allowing lamprey to pass through the meshes due to its elongated body and physical dimensions.

The type of gill net being used for this stock management programme does not target lamprey and they have not been caught in previous stock management programmes on Lough Corrib (M Butler IFI 2022, personal communication, 14 January). There is a possibility of encountering brook lamprey during stock management electrofishing as their almost entirely fluvial based life cycle would indicate that their presence in juvenile form in river areas where electrofishing may be taking place is possible. Electrofishing is the standard methodology used for assessing lamprey (O'Connor 2007) and it is considered to have a low impact. It is envisaged that due to this, the nature and site locations of the stock management plan and the unlikelihood of interaction with lamprey, there will be no negative impact to brook lamprey as a result of this proposed stock management plan on Lough Corrib.

7.2.4.3. Sea Lamprey

Sea lamprey is a qualifying interest of Lough Corrib SAC. The life cycle of the sea lamprey *(Petromyzon marinus)* contains both a marine phase and a freshwater phase. Adult sea lamprey ranging in length from 60 to 100 cm, live at sea as external parasites on host fish. Adult lamprey migrate in spring into freshwater to excavate redds or spawning nests in gravelled areas of large rivers. Records of non-migratory or 'land-locked' sea lamprey have been reported in Lough Corrib. Barriers to upstream migration (e.g. weirs which limit access to spawning beds and juvenile habitat) are considered the major impediment to good conservation status for sea lamprey. The Overall Status of this species is assessed as Bad. In a study undertaken by Ecofact Environmental Consultants Ltd. on behalf of NPWS in 2006 concentrating on lamprey in the Corrib catchment, no sea lampreys were found. Sea lampreys are present in the Corrib catchment but seem to be confined to below the Galway Regulating Weir (O'Connor, 2007). As part of Sampling Fish for the Water Framework Directive in Lough Corrib in 2011, one sea lamprey was recorded caught (Kelly et al. 2012). As part of a catchment wide survey for

juvenile lamprey carried out by IFI in 2013 for reporting requirements regarding the Habitats Directive and Red Data Book Species, no sea lamprey larvae were encountered from any of the sites surveyed around Lough Corrib, despite previous reports of adult spawning activity at Cong (IFI, 2014).

Due to the physiological nature of sea lamprey, it is highly unlikely that they will be captured in stock management gill nets. The type of gill net being used for this stock management programme does not target lamprey and they have not been caught in previous stock management programmes on Lough Corrib (M Butler IFI 2022, personal communication, 14 January). It is envisaged that due to this, the nature and site locations of the stock management plan and the unlikelihood of interaction with sea lamprey, there will be no negative impact to sea lamprey as a result of this proposed stock management plan on Lough Corrib.

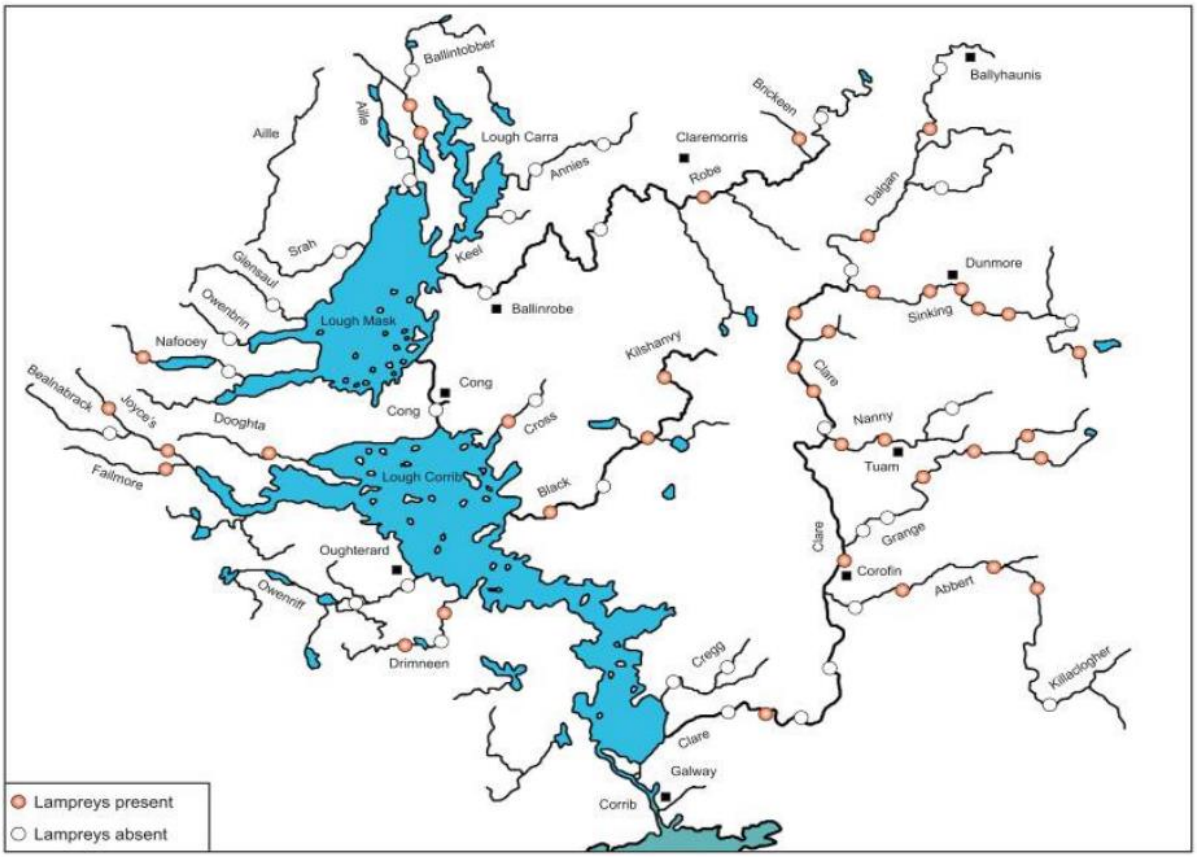

Fig. 9: Map of the Corrib catchment showing the 77 sites surveyed for Lamprey in 2006 (O'Connor, 2007)

7.2.4.4. White-clawed crayfish

The white-clawed crayfish *(Austropotamobius pallipes)* is the largest non-marine invertebrate found in Ireland. Adults can grow to approximately 11cm in length. In Ireland it occurs in small and medium-sized lakes as well as rivers and streams and this is considered to be due to the lack of competition from other crayfish species. The absence of nonnative species from North America also means the Irish population is at less risk from the crayfish plague, although plague events have occurred in Ireland. This disease kills white-clawed crayfish and is the principal cause of decline in Britain and parts of Europe. There is no shortage of potential habitat for the species. However, the threat from disease introduction is severe and not likely to disappear and as a result future prospects are considered Inadequate. The key objective is to maintain Ireland's status as free of both non-native species and

the crayfish plague disease. Unfortunately, an outbreak of Crayfish Plague was confirmed in the Clare River (Corrib catchment) during mid-2019. The Overall Status is assessed as Inadequate.

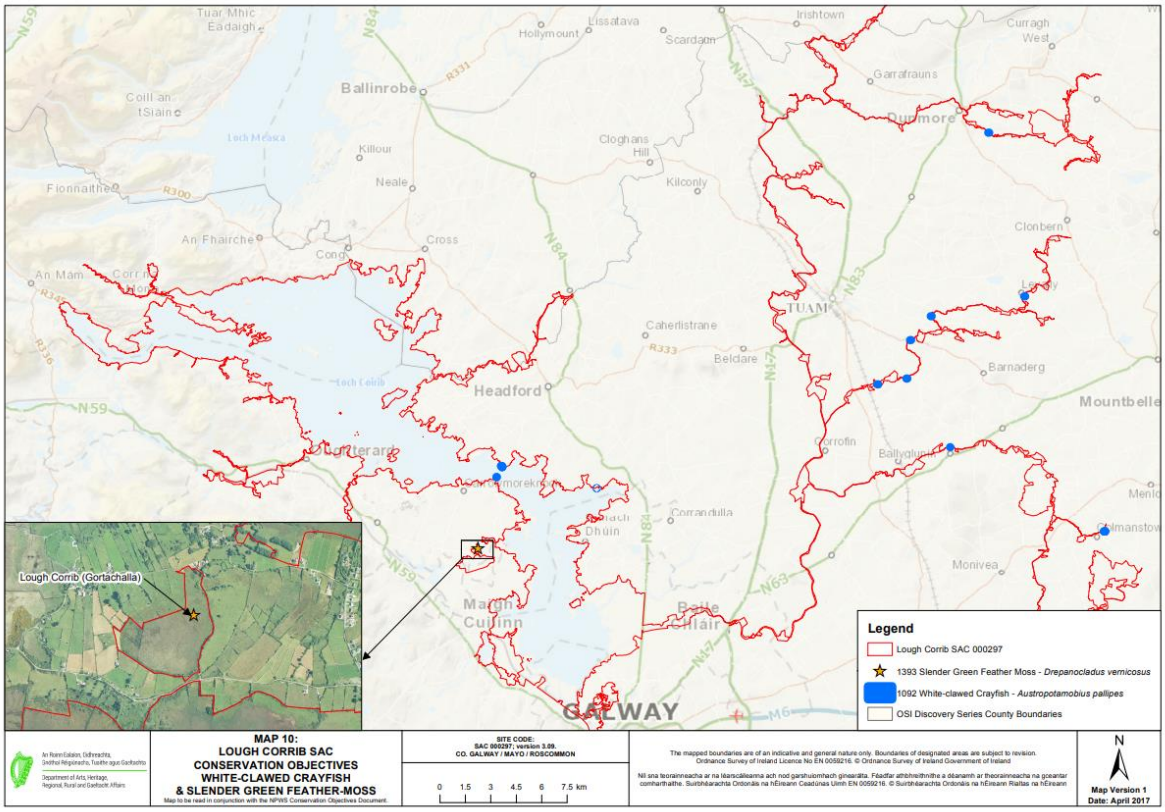

Fig.10: Lough Corrib SAC Conservation Objectives, White Clawed Crayfish & Slender Green Feather Moss (NPWS, 2017)

White-clawed crayfish is a qualifying interest in Lough Corrib SAC. In a study undertaken by Ecofact Environmental Consultants Ltd. in 2007 concentrating on white clawed crayfish in the Corrib catchment, no crayfish were caught at the sites assessed within the Corrib catchment (Loughs Aclaureen, Carra, Corrib and Mask), although crayfish were recorded in Loughs Corrib and Mask in 2004 and 2006 respectively, and may well still be present, but not detected on the 2007 survey (O'Connor, 2009). The type of gill net being used for this stock management programme does not target crayfish and they have not been caught in previous stock management programmes on Lough Corrib (M Butler IFI 2022, personal communication, 14 January).

Electrofishing is frequently used as a method for crayfish population survey and it is internationally recognized as being relatively harmless to this species. Alonso (2001) evaluated 56 successive depletion electrofishing surveys on White-clawed crayfish and recorded no appreciable decrease in either relative density or standing biomass. Furthermore, no mortality, due to electric shock, was recorded during sampling. As a result, it is envisaged that there will be no negative impact to White-clawed crayfish as a result of the proposed Lough Corrib stock management plan.

7.2.4.5. Freshwater pearl mussel

Freshwater pearl mussel is a feature of interest in Lough Corrib SAC. The Owenriff River forms part of the Lough Corrib catchment and is considered a "Margaritifera sensitive area" and is listed on the first schedule of the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 - S.I. No. 296/2009 which aims to support the achievement of favourable conservation status for this species. The freshwater pearl mussel is a bivalve, which is a type of mollusc or snail with a body that is almost completely enclosed between a pair of shells. Freshwater pearl mussel is associated with salmonid waters due to the relationship between juveniles (glochidia) and salmonids transporting them up and down the river in their gills. Freshwater pearl mussel requires higher water quality than salmonids. The freshwater pearl mussel is protected under Annex II and V of the EU Habitats Directive and is legally protected in Ireland under Schedule 1 of the Wildlife Act.

The freshwater pearl mussel is also on the following red data lists:

- IUCN Red Data List as Endangered
- Red Data (Ireland) as Critically Endangered

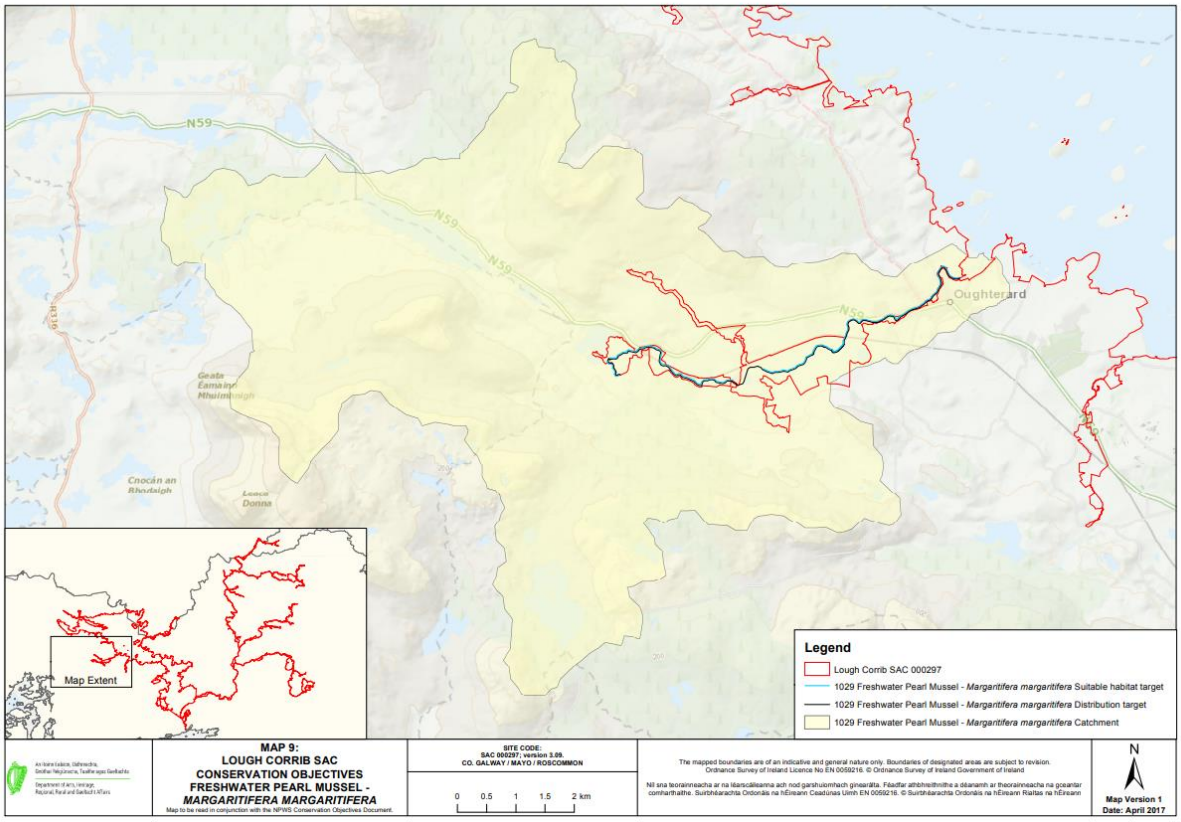

Fig.11: Lough Corrib SAC Conservation Objectives, Freshwater Pearl Mussel (NPWS, 2017)

Stock management plans for the Owenriff system are dealt with separately from stock management plans for Lough Corrib. A separate Owenriff system stock management plan and Appropriate Assessment Screening Report has been prepared for this sub catchment.

7.2.4.6. Otter

Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. The main disturbance will be as a result of the increase in noise due to presence of vehicles, boats, outboard engines, generators and humans plus the unlikely potential for drowning in gill nets. Disturbance can restrict access of wildlife to habitats and can alter habitats. However, any impacts are expected to be slight and in the immediate location of the proposed stock management plan. Lough Corrib is renowned in terms of angling/leisure/boating and a significant amount of existing boating activity takes place.

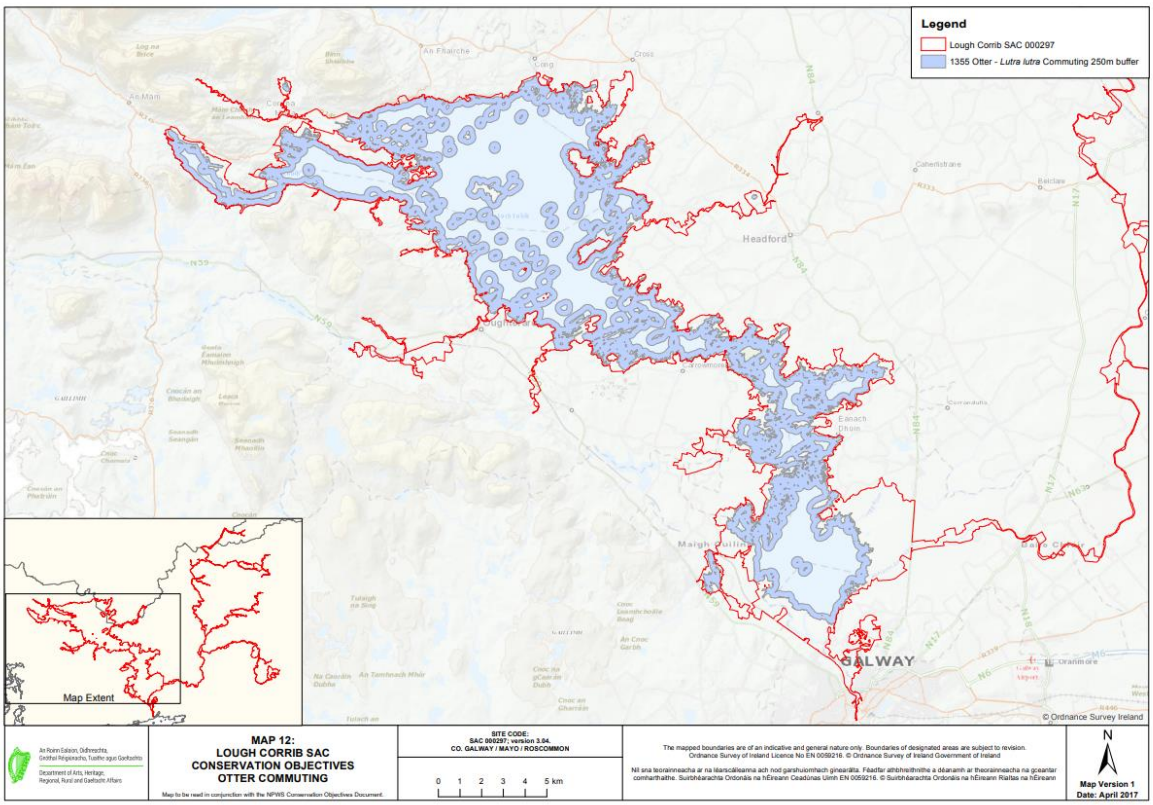

Fig.12: Lough Corrib SAC Conservation Objectives, Otter Commuting (NPWS, 2017)

Otters mark their territories with their droppings known as "spraints". Any obvious areas where spraints or otter footprints are visible will be noted and gill nets will not be set in areas where otter activity is acknowledged / recorded and nets will be serviced daily. There will be no impact/damage/obstruction to the breeding and resting places of otters. The nature of electrofishing makes it easily detected and avoided by Otter.

In approximately thirty years of carrying out stock management programmes on the Great Western Lakes, the local Fisheries Inspector communicated that an Otter has never been reported as being caught in a gill net on Lough Corrib and no otter mortalities due to electrofishing operations have occurred (M Butler IFI 2022, personal communication, 14 January). No significant disturbance or displacement of species is reasonably foreseeable within Lough Corrib SAC, Lough Corrib SPA or Maumturk Mountains SAC as a result of the proposed stock management programme on Lough Corrib.

7.2.5. Protected Bird Species – Lough Corrib SPA

Since 2013, IFI operatives have been required to record any interactions of protected species with stock management activities. Prior to this, written records were not kept in any formalized way but consultations with IFI staff who had been engaged in these operations for up to 40 years were conducted to establish if any real risk could arise with regard to impacts from stock management projects. These records and interviews clearly demonstrate that birds tend to avoid gill-nets that are regularly attended and serviced. The risk to special conservation interests associated with the L. Corrib SPA is, therefore regarded as low. Furthermore, the conservation objectives for the Lough Corrib SPA were taken into account in the preparation of this report and gill netting/electrofishing are not listed as potential impacts/threats in the conservation objectives for the Lough Corrib SPA.

However, when evaluating the potential risk of impacts to bird species, considerations such as the number and nature of particular species, their typical locations, their feeding/diving behaviours, breeding patterns and timing of the stock management plan, a number of the listed birds in Lough Corrib SPA can be ruled out in terms of potential impacts. These are: Hen Harrier, Golden Plover, Black Headed Gull, Common Gull, Common Tern, Arctic Tern and Greenland White Fronted Goose because they are unlikely to be in the vicinity of the project operations.

Other species such as Gadwall, Shoveler, Tufted duck, Common Scoter, Coot and Pochard are considered more carefully as the specific behaviours associated with these species mean that they could be present during the timeframe of the project.

7.2.5.1. Gadwall

The gadwall (*Mareca strepera*) is a species of duck which is amber listed in the UK and Ireland but of least concern throughout the remainder of their European and Global distribution. Lough Neagh in Northern Ireland and the Wexford slobs are considered as their Irish stronghold where it has recently established small breeding colonies (BLI 2016). Currently, only small numbers appear on Lough Corrib during the winter months as Western Ireland is at the periphery of their natural range and is not considered an important refuge for this species. The Gadwall is a herbivorous surface-feeding duck that favours the more productive margins and shallower water of lakes and other waterbodies (BTO.Org). As such, it is unlikely to come into contact with any project activity which could have any negative impacts on this species.

7.2.5.2. Shoveler

The Shoveler (*Anas clypeata*) is a resident and winter migrant in Ireland, occurring in small numbers on L. Corrib between March & October. Its resident populations are centered around Lough Neagh and the mid-Shannon bason (https://birdwatchireland.ie/birds/shoveler/). It is a rather specialized feeder, as its broad bill might suggest, feeding on zooplankton. One consequence of this is that Shoveler tend to favour more ephemeral waterbodies where potential competitors (e.g. fish) cannot survive (BTO.Org). These behaviours and seasonal distribution mean that shovelers are unlikely to be at risk from any of the project activities.

7.2.5.3. Common Scoter

A survey of Common scoter in Ireland (Hunt et al 2013) recorded 32 pairs of this species on lough Corrib in 2012, making it one of the most important locations for scoter in Ireland. Birdwatch Ireland (2022) describe the status of Common Scoter in Ireland as "Resident and winter visitor from the Continent to all Irish coasts between October and April and are almost entirely marine during the winter and tend to congregate in large flocks on shallow seas with sandy bottoms supporting their preferred prey". This demonstrates a significantly reduced incidence for interaction with gill netting activities. Hunt et al., (2013) in "The breeding status of Common Scoter Melanitta nigra in Ireland, 2012" state that "large pike are known to predate on waterfowl ducklings and may cause scoter duckling mortality" (eg. Stronach, c.1977).

Predation on scoter ducklings is also stated by Robson (2017) as an issue on larger Scottish loughs and quotes Dessborn et al., (2010) who examined the effect of pike predation on breeding ducks by monitoring wildfowl lake use before and after adult pike introduction. "Whilst the number of adult pairs using the lake did not decrease following pike introduction, the abundance of ducklings on the lakes with pike did show a statistically significant decrease". In this regard, this stock management programme may have the potential to assist in the conservation of Common Scoter populations on Lough Corrib.

7.2.5.4. Coot and Tufted Duck

It is understood that populations of Coot and Tufted Duck are more widespread around the lake. The Coot population is the largest in the country and populations of Tufted Duck are second only to Lough Neagh (NPWS, 2015). Numbers of migratory Coot on Lough Corrib reduce from mid-February significantly reducing the risk of interaction with this stock management programme.

Several IFI staff members engaged in stock management operations have been doing so for up to 30 years on Lough Corrib. A consultation with the local Fisheries Inspector who has been involved in designing, implementing, and reporting on stock management programmes for approximately 30 years established that over this period no Coot, Tufted Duck, Pochard or Common Scoter has been reported as being caught in the gill nets. All evidence relating to these stock management programmes, and fisheries research netting activities indicate that the inadvertent capture of protected bird species is extremely rare or unknown and instances of these captures are confined to a small number of individuals.

7.2.5.5. Other Bird Species

Other bird species which are not which are not listed as special conservation interests for the L. Corrib SPA but which are named in the conservation objectives of the adjacent Inner Galway Bay SPA are also considered in this analysis of risk to species from the project activities.

Based on numbers present, their locations and behaviours and their likelihood to interact with this stock management plan it is considered unlikely that any of these listed protected birds will be significantly impacted upon as a result of this stock management plan. The level of risk posed to diving birds is considered low and not significant. Experience from many years of previous gill netting operations for stock management operations, the likelihood of disturbance to protected species was broadly assessed. Following these considerations, it was concluded that any impacts from the project

activities (specifically gill netting) will not pose a significant threat to the protected species or habitats at the site.

7.8. In-combination effects

The in-combination effects from the carrying out of the Lough Corrib stock management programme can be considered positive. This stock management programme is necessary for the management of Lough Corrib SAC. As Atlantic salmon are cited in Annex II and Annex V of the EU Habitats Directive and salmon are a feature of interest in Lough Corrib SAC, the implementation of this stock management plan will assist in the maintaining of favourable status of Atlantic salmon in the Corrib system. Similarly, as Atlantic salmon provides a necessary host for juvenile *Margaritifera margaritifera*, increasing numbers of Atlantic salmon will provide an enhanced opportunity for this fundamental part of the life cycle of the freshwater pearl mussel *Margaritifera margaritifera*.

7.8.1. Owenriff Stock Management Plan

This Lough Corrib Stock Management Plan in combination with the adjacent Owenriff Stock Management Plan is likely to have a positive effect in terms of assist in the maintaining of favourable status of Atlantic salmon in the Corrib system and Lough Corrib SAC.

7.8.2. Lagarosiphon Research and Management on Lough Corrib (LARC)

Ongoing research and management of the aquatic invasive species *Lagarosiphon major* occurs on Lough Corrib. The CAISIE Project developed the weed control measures currently used on the lake, including mechanical harvesting and hand removal by scuba divers. The Lagarosiphon Research Lough Corrib (LARC) project aims to build on the success of the earlier CAISIE Project by testing new technologies to find and map *Lagarosiphon major.* Control operations are broken into four categories (i.e. mechanical (harvesting), physical, chemical and biological). Although few new mechanical control methods have been developed in recent times there has been some innovation related to fragment containment methods during and after harvesting/cutting, e.g. bubble curtains and debris collectors (sea bins and skimmer boats). Light exclusion (e.g. jute matting) still remains one of the most efficient physical methods for controlling invasive aquatic plants. Progress has also been made in the area of biological control (Morrisey et al., 2020). The only in-combination effects of the LARC project in conjunction with the Lough Corrib stock management plan are considered positive, in that whilst carrying out stock management activities, IFI staff can identify new areas of *Lagarosiphon major* spread and track the progress and success of current management activities.

Best practice water quality control methods including biosecurity protocols have been incorporated into the standard operating procedures (SOP's) of the stock management programme. Strictly complying with IFI's electrofishing and gill netting Standard Operating Procedures, the Lough Corrib proposed stock management plan, in combination with other activities in the general area, will not cause significant negative adverse impacts to Lough Corrib SAC, Lough Corrib SPA, Maumturk Mountains SAC and other nearby designated sites.

8.0. CONCLUSION OF SCREENING STAGE

In conclusion, this stock management plan is necessary for the management of Lough Corrib SAC. To determine the potential effects, if any, of the proposed stock management plan on Natura 2000 sites, a screening process for Appropriate Assessment was undertaken. No potential biodiversity corridor links to sites >15km have been identified. The proposed development is within 15km of 15 Natura 2000 sites. No significant effects are likely on features of interest of the SACs or SPAs.

It has been concluded during the screening process that all the sites within 15km of the plan are not likely to be significantly impacted by the proposed Lough Corrib stock management plan and these include:

- Lough Corrib cSAC 000297
- Maamturk Mountains SAC 002008
- Lough Corrib SPA 004042
- Cregganna Marsh SPA 004142
- Inner Galway Bay SPA 004031
- Lough Carra SPA 004051
- Ross Lake and Woods SAC 001312
- Lough Carra/Mask Complex SAC 001774
- Lough Mask SPA 004062
- Connemara Bog Complex SPA 004181
- Connemara Bog Complex SAC 002034
- Cloughmoyne SAC 000479
- Shrule Turlough SAC 000525
- Mocorha Lough SAC 001536
- Clyard Kettle Holes SAC 000480
- Ballymaglancy Cave Cong SAC 000474
- Gortnandarragh Limestone pavement SAC 001271
- Galway Bay Complex SAC 000268
- Mweelrea/Sheeffry/Erriff Complex SAC 001932
- The Twelve Bens/Garran Complex SAC 002031
- Kildun Souterrain SAC 002320
- Kilkieran Bay And Islands SAC 002111
- Ardkill Turlough SAC 000461
- Greaghans Turlough SAC 000503
- Kilglassan/Caheravoostia Turlough Complex SAC 000504
- Skealoghan Turlough SAC 000541

Based on the above, this Appropriate Assessment Screening Report is considered sufficient and the requirement to progress to Stage 2 and submit a Natura Impact Statement (NIS) is not required. Significant impacts to Natura 2000 sites are not likely.

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10.0 APPENDICES

APPENDIX 1

Stages of Appropriate Assessment

Stage 1 - Screening
This is the first stage of the Appropriate Assessment process and that undertaken to determine the likelihood of significant impacts as a result of a proposed project or plan. It determines need for a full Appropriate Assessment.
If it can be concluded that no significant impacts to Natura 2000 sites are likely then the assessment can stop here. If not, it must proceed to Stage 2 for further more detailed assessment.

Stage 2 - Natura Impact Statement (NIS)
The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site with respect to the conservation objectives of the site and its ecological structure and function. This is a much more detailed assessment that Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.
If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions
A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.
Where no alternatives exist the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 site where no less damaging solution exists.

APPENDIX 2

IFI Pike Policy

Inland Fisheries Ireland Pike Policy

Prepared by the Pike Policy Review Group August 2014

1. Executive summary.

Pike are widely distributed in Ireland and are an important component of the national angling resource. Pike thrive in the majority of Irish waters and rapidly establish themselves as the top fish predator. In productive watercourses, pike can grow to 40 lb, although fish of this size are not common. Many waters support good numbers of 10, 20 and even 30 lb pike and these are the principal quarry of the specialist pike angler. Many of these waters are also productive wild brown trout fisheries; trout is a species that can be heavily preyed upon by pike. IFI formed a group comprising internal and external experts to support the development of a policy on pike. This group would review existing pike policy and make recommendations in respect of new measures that would ensure the conservation of the species, while also protecting the broader aquatic resource. The policy group consulted broadly with pike, trout and coarse angling clubs and federations, and with a diversity of interested stakeholder groups. Based on discussions with the above groups, the best available scientific advice and following the best precautionary principles, the expert policy group put forward recommendations to ensure the best management of pike in Irish waters into the future.

2. Scope and objectives.

The Pike Policy Review Group was charged with developing policy that would ensure the conservation and protection of pike and their aquatic habitat, while also facilitating long-term sustainable social and economic value for all stakeholders. The policy aimed to follow the best precautionary principles while being cognisant of enhancing and conserving the environment for all species. The group would consider the development of policies for the management and development of pike angling, in addition to the conservation and protection of pike. Towards this end, the expert group considered all substantive issues relating to pike, associated species (primarily brown trout) and the aquatic habitat. The group confined its deliberations to the development of policy and not to matters relating to its implementation.

3. Policy development process.

The procedure on policy development is laid down by IFI. It is a very broad consultative process involving a wide diversity of stakeholders – IFI senior management, the Board of IFI, management personnel in DCENR, the National Inland Fisheries Forum and statutory consultees. It is intended that any document produced would be subject to review after three years. The policy group consisted of seven members Dr Joe Caffrey (IFI Swords) who acted as chairperson, John Chambers and John Crudden (both IFPAC), Michael Callaghan (NARA), Josie Mahon (IFI Blackrock), Liam Gavin (IFI Galway) and Mark Corps (IFI Swords). Sandra Doyle provided the secretariat services to the committee. The group met on four occasions between October 2011 and February 2012.

4. Group terms of reference.

A broad range of issues that might affect or influence policy development for pike were discussed by the group. These included the following:

• Best practice internationally.

• Irish and European legislation relating to this area.

• Existing legislation in this area.

• Corporate and other governance issues of relevance.

• The role of the private sector in the development of this resource.

While the meetings were confidential, it was deemed prudent, in certain circumstances and in respect of certain issues, to seek the input of external committee executives or other interested parties. Only when the review group agreed that this was worthwhile or, indeed, necessary, was permission to consult with these groups granted.

5. Policy recommendations.

The policy recommendations that follow were considered by the review group to be central policy issues that should be formalised by IFI. They aim to provide a framework on which to base sound and informed management of pike in Ireland into the future.

5.1 General.

1. IFI should recognise pike as an integral part of Ireland's freshwater biodiversity resource.

2. IFI should recognise pike as a valuable component of the national angling asset and as an important socio-economic driver in the country.

5.2 Pike distribution.

1. IFI should compile a comprehensive database that will inform about the detailed distribution of pike in waters throughout Ireland. It is important that details on waters that currently support pike populations and those that do not currently harbour any pike is available. The database should be updated on an ongoing basis.

5.3 Marketing of pike angling.

This group acknowledges the value the socio economic study of recreational angling has placed on angling in Ireland. As a follow on from such an exercise, the group feel that, in relation pike angling the study will inform future decisions on the protection, conservation, management and promotion of this and other species in this country. Specifically, it is recommended that:

1. Fisheries in Ireland should be marketed according to their angling potential, without compromising their primary management practices.

2. A greater marketing effort should be focused on pike angling in order to fully exploit the socio-economic potential of this species in Ireland. This should specifically include the promotion of junior and female pike angling while also recognising the importance of newer angling methods, such as fly fishing for pike. The latter represents an ever-increasing market in Europe and the USA.

3. Any Irish watercourse that regularly produces pike in excess of 1 metre in length should be actively promoted by IFI and Failte Ireland as a specimen pike fishing venue.

5.4 Management of pike in designated managed wild brown trout fisheries.

Pike management is currently operated by IFI in a small number of designated, managed wild brown trout fisheries in Ireland. These include Loughs Corrib, Mask, Carra, Conn, Cullin, Arrow and Sheelin, and a limited number of river catchments. Research conducted by IFI scientists in the past indicated that pike removal from waters such as Loughs Ennell, Owel and Derravarragh was deemed unnecessary at this time and, as a consequence, these operations were terminated. Pike management in these waters currently involves the removal of pike by netting and/or electric fishing. In addition, under Section 59 of the Fisheries Act, IFI is permitted to authorise designated angling clubs to fish for and kill pike that are caught during permitted angling competition on specified watercourses. In respect of pike management in designated managed wild brown trout fisheries, the review group recommends the following:

1. The selection of waters on which annual pike management operations will be conducted in the future will be informed by best available scientific advice. Any proposed changes from the current list of waters scheduled for pike control will be discussed with relevant stakeholders.

2. As part of ongoing IFI pike management programmes, all pike greater than or equal to 85 cm in fork length that are captured will be returned alive to the water from which they were taken.

3. The 85 cm size limit will be reviewed by IFI scientists, in consultation with the relevant stakeholders, after three years of operation. If it is considered at that time that the change in size limit has adversely affected resident wild brown trout stocks, an adjustment to the 85 cm size limit will be recommended.

4. Healthy pike of less than 85 cm that are captured during pike management programmes in these designated brown trout fisheries will be transferred to suitable recipient waters. Where possible, these waters should be within the same geographical area in order to reduce the stress imposed on the pike by the transportation process and in order to reduce costs associated with the operations.

Only pike that are deemed to be in good physical condition will be transferred. Those pike that are not sufficiently healthy to survive the transfer operation will be euthanized.

5. Where trout angling clubs are permitted by IFI to assist in pike management programmes (i.e. to catch pike on rod and line) in specified waters, IFI will provide, or support the provision of, facilities to ensure that rod-caught pike of less than or equal to 85 cm will be transferred to suitable recipient waters.

5.5 Recommended legislative change.

Conservation of Pike Bye-Law No. 805 (2006) prohibits the killing of any pike greater than 50 cm in length.

1. It is recommended that, in designated managed wild brown trout fisheries, the current bye-law be amended to prohibit the killing of any pike greater than or equal to 85 cm in length. All larger rod-caught pike will be returned to the water alive. In all other waters of the State an angler will be permitted to take and kill one pike of less than or equal to 50 cm in length (as per the existing bye-law).

2. It is recommended that a media campaign to announce the changes to the existing bye-law should be mounted and appropriate signage erected at key pike angling venues.

3. It is recommended that any S59 authorisations to kill pike during angling competitions on specified wild brown trout fisheries will be considered on a case by case basis and any pike caught over 85cm will be released back into the waters.

5.6 Research programmes.

1. A list of watercourses that are suitable to receive pike from IFI pike management operations should be formulated by IFI. This list will be informed by IFI fish stock survey data.

2. It is recommended that targeted research on the efficacy of pike transfer programmes be conducted and that studies commence as soon as practicable. Research that has been conducted by IFI to quantitatively evaluate the efficacy of pike transfer operations (in respect of overall survival, growth, sustainability and catchability of transferred pike) has been inconclusive to date. Studies should be conducted in Cloondroon Lake, which has received significant numbers of netted and tagged pike from Lough Carra over the last number of years, and in Loughs Sheever and Slevens, where tagged pike from Lough Sheelin were introduced in 2011. Further such programmes should be conducted in 2013, as resources permit.

5.7 Biosecurity.

All anglers should strictly adhere to biosecurity protocols, both pre- and post- all angling sessions, in order to ensure that no invasive species and harmful fish pathogens are introduced or spread within the country.

1. Best biosecurity practice guidelines for anglers, and other key stakeholder groups, have been produced by IFI (see www.fisheriesireland.ie) and these should be circulated widely among key stakeholder groups.

2. Because of the seriousness of the risk associated with invasive species and fish pathogens, it is recommended that strict adherence to these guidelines should be made a condition of membership of all angling clubs and Federations.

3. It is further recommended that information boards and facilities to disinfect angling tackle and protective clothing should be provided at all major air and sea ports in Ireland. It should also be mandatory for anglers travelling from abroad to show proof that their tackle (including nets, pike sacks, stink bags and protective footwear) has been disinfected prior to entering the country. Failing this, the tackle must be disinfected at the point of entry into the country.

4. International collaboration in respect of biosecurity matters must be encouraged.

5. In order to ensure that no invasive species or fish pathogens are transferred with the pike or the transfer water during IFI pike transfer operations, a best practice guide for moving fish from one watercourse to another has been produced by IFI and it is recommended that this be adhered to during all such operations.

5.8 Handling and conservation of pike.

The review group endorsed the 'Pike (Esox lucius) Handling and Conservation' leaflet that was produced by IFI and agreed that it provided comprehensive information on both angling and handling methods for pike anglers. The review group recommends that:

1. This leaflet should be advertised by IFI and copies should be circulated widely among the domestic and visiting pike angling community.

2. Angling clubs and Federations should urge their members to carefully read the leaflet and to strictly adhere to the advice given.

3. This same practice should also be adopted by pike angling competition organisers to minimise pike mortality or damage caused to hooked pike during these events.

5.9 Angler contribution.

1. It is the view of the review group that anglers should contribute towards the protection, management, development and promotion of angling and the aquatic environment in Ireland. It is recommended, however, that the mechanism(s) whereby this contribution will be gathered should be explored by a group or forum separate from the current Policy Review Groups.

2. The idea of creating a National Angler Registration Scheme is one that was well received within the Pike Policy Review Group.

5.10 Authorised persons.

The review group recognises that there is an issue with increased levels of illegal activity specifically relating to the killing of pike, in breach of the Conservation of Pike Bye-law No. 805 (2006). This is a countrywide problem, although certain geographical areas are targeted more than others. The committee recommends that:

IFI senior management investigate methods of dealing with the illegal killing of pike (and other fish species) and develop and implement an appropriate plan to address the problem, with relevant stakeholders.

5.11 Littering.

The review group recognises that the riparian habitat associated with our lakes, rivers and canals is an integral part of the fishery ecosystem and its status can significantly influence not only the productivity of the watercourse but also the experience felt by the angler. The review group recognises that there is a significant problem with littering and that this can act as a deterrent to angling. The review group recommends that:

1. IFI, in cooperation with other relevant State agencies, assist in the maintenance of these riparian habitats in order to ensure that biodiversity is enhanced, invasive species are discouraged and/or eliminated and ready and safe access for anglers is maintained.

APPENDIX 3

IFI Brown Trout Policy

Inland Fisheries Ireland Brown Trout Policy
Prepared by the Brown Trout Policy Review Group August 2014

Brown Trout Policy Review Group Management Recommendations

1. Executive summary.

Brown trout are one of the very few indigenous fish species in Ireland. Geographically, they are widespread, being found in every catchment in the country. In socio-economic terms, this fish species is very important, being highly regarded as an angling species by both Irish and tourist anglers alike. Because of its temperate climate and the shallow productive nature of its lakes, Ireland is the only country in Western Europe where lakes can support large trout stocks, which provides unique angling opportunities for fly fishermen. The relatively poor fish fauna in Ireland compared to other European countries means that Irish waters generally have a high capacity to support brown trout populations in the absence of many competitor and predatory fish species found in other European waters. Against this background Inland Fisheries Ireland (IFI) set up an expert group to review and draft a new policy in relation to the management of Irish brown trout stocks both from conservation and a broader fishery management perspective. Members of the group included experienced IFI personnel from a broad range of disciplines – biological, fisheries management and marketing. Irish angling interests were also well represented on this group (three members). This expert group had lengthy discussions on a broad range of pertinent issues and consulted widely with all interested parties within this sphere. Following all consultations and taking cognisance of the best available scientific advice, the expert group put forward recommendations that they felt were in the best interests of managing the brown trout resource in Ireland in the form of a policy.

2. Scope and objectives.

The Brown Trout Policy Review Group were charged with the generation of recommendations that would ensure the long-term sustainable management of this resource from both a conservation perspective while still retaining the socio-economic value of this resource to the community. The group did so in the knowledge that the trout's greatest piscivorous predator, the pike, also had a socio-economic value in some of the larger lake trout fisheries. The group confined its deliberations to policy issues, purposely omitting comment in relation to implementation issues. The group decided that a number of broader issues, while relating in part to brown trout policy, deserved consideration in their own right and, as such, lay beyond the objectives of this group. These are listed in Appendix 1.

3. Policy development process for the Brown Trout Policy Group.

The procedure on policy development is laid down by IFI. It is a very broad consultative process involving a wide diversity of stakeholders – IFI senior management, the Board of IFI, management personnel in DCENR, the National Inland Fisheries Forum and statutory consultees. It is intended that any document produced would be subject to review after three years. The policy group consisted of seven members – Dr. Martin O'Grady (IFI Swords) who acted as chairperson, Martin Butler (IFI, Galway), Marcus Muller (IFI, Ballina) and William Walsh (IFI, Blackrock). John Chambers (IFPAC), Eamon Moore (TAFI) and Eamon Ross (NARA). Ms.Sandra Doyle (IFI, Swords) acted as secretary to the group. The group met on four occasions between October 2011 and February 2012.

4. Terms of reference.

The group were careful to take cognisance of the following before generating policy recommendations: • Best practice internationally. • Irish and European legislation relating to this area. • Existing legislation in this area. • Corporate and other governance issues of relevance. • The role of the private sector in the development of this resource.

5. Policy recommendations.

The following areas were considered to be central policy issues in relation to the management of brown trout stocks that should be incorporated into any documentation on this subject. A summary of the recommendations is provided here in relation to each of these areas.

5.1 Recommendations in the legislative area.

1. Consider the introduction of a national minimum size limit (20cm).
2. Seek to have a national "bag limit"- perhaps in line with the new national sea trout bag limit.
3. Seek the inclusion by the EU of Irish brown trout stocks in the Annex I or II species list of the Habitats Directive. On-going genetic studies of this species are illustrating the rich diverse nature of these stocks in Ireland and showing that the trout populations in our larger rivers are complex stocks entirely reliant on recruitment from their tributary sub-catchments. Failing the introduction of such a measure, consider the designation of the more important trout waters as National Heritage Areas

(NHAs). The group feel strongly that wild Irish trout stocks be recognised and respected formally in law under the Fisheries Acts.
4. Consider the designation of specific rivers and lakes as managed wild brown trout fisheries. The inference here is that these waters would be managed to optimise brown trout stocks. In some instances (not all) this would recognise the validity of pike management programmes, the necessity for different regulations in relation to pike angling (see Section 5.4) and the particular sensitivity of such waters to organic pollution problems. The available IFI survey data base would place the following specific waters in this category: Lakes – Loughs Leane, Inchiquin, Corrib, Mask, Carra, Cullen, Conn, Melvin, Sheelin, Ennel, Derravaragh, Arrow, Inchiquin and Loughrea Lake. Rivers – Certain sections of many catchments which are known by IFI personnel to support quality brown trout stocks. For example, the Clare, Black and Robe Rivers in the Corrib, the Suir in Munster, the Liffey in Leinster and many more.
5. A ban on the sale of rod caught wild brown trout from any source.
6. IFI should be accommodated in law with the power to temporarily close fisheries and/or adjust regulations for brown trout fisheries in the interests of conservation in a speedier fashion than is currently available with the "bye-law system".

5.2 Recommendations in relation to hatcheries and stocking programmes.

Consideration should be given to incorporating the following into any new policy document:
1. Stocking of inbred diploid hatchery brown trout fish should be confined to ponds and lakes where an inadequate trout native trout stock is present because of a lack of spawning opportunities.
2. Supplementation of existing large natural brown trout stocks should be confined to the introduction of triploid fish.
3. The current practice of stripping wild trout, rearing them in hatchery conditions and then releasing them in either their natal stream or another watercourse should be licensed only on the basis of scientific evidence that shows that such an exercise is not likely to impinge on the natural production of the channel where the fish are being stripped or interfere with the genetic makeup of stocks in the recipient waters.
4. IFI should make every effort to redirect the anglers' focus from hatcheries to habitat enhancement projects by running educational programmes and involving anglers in pilot projects in this field.

5.3 Water quality issues.

The review group has expressed the view that the attainment and maintenance of high water quality in any brown trout fishery should be an absolute priority in any policy document relating to the management of this species. Research in recent years has illustrated clearly that trout cannot tolerate polluted conditions and require water quality values ≥ Q 3 on the EPA scale to survive. In relation to "designated brown trout waters" (see 5.1 point 4 on previous page) a special effort should be made to ensure compliance with the terms of the Water Framework Directive

5.4 Management of pike populations in designated managed wild brown trout fisheries.

The review group feel that some changes are desirable in relation to current policy on this issue. The following proposals are made:

1. The group accept the science in relation to the necessity for controlling pike stocks in "designated managed wild brown trout fisheries" – a list of these waters has been provided above in Section 5.1.4. Scientific evaluation has shown that, currently, pike management is not necessary in a few of the aforementioned waters – Loughs Derravaragh and Ennel. This is an irrelevant issue currently in relation to Loughs Leane and Melvin where no pike are present. In accepting the science there is a recognition that IFI have to undertake pike removal exercises in the aforementioned waters.
2. It is the group's view that IFI should, in relation to designated managed brown trout fisheries:
• Transfer all live pike captured, where possible, to designated coarse fisheries.
• Release all live pike captured that are ≥ 85cm in length.
• It is suggested that pike angling should be permitted on these trout fisheries with the angler being entitled to retain one fish per day that is < 85 cm in length. All pike captured by anglers' ≥ 85 cm in length should be returned alive. There is no inference here that the same regulations should apply to other pike fisheries in Ireland. Recommendations in relation to angling rules on other pike fisheries are entirely a matter for the Pike Policy Review Group.
• In the event of a trout angling group holding a pike angling competition on a designated wild brown trout fishery the same rules should apply. In these circumstances surplus pike (more than one fish per angler, per day, for fish < 85 cm) should be retained alive, if possible, and transferred to a suitable coarse fishery, assistance from IFI personnel will be crucial to the success of this operation. In certain restricted circumstances IFI may also authorise designated angling clubs to fish for and kill pike that are caught during permitted angling competitions on designated watercourses. However all pike ≥ 85 cm caught in such competitions should be released alive.

5.5 Policy issues in relation to the licensing of State owned brown trout fisheries.

1. Consider a ten-year license strategy with performance reviews at two-year intervals.
2. A strategic plan should be made by the licence holder for the proper development of the fishery to comply with a development framework of the State body made in consultation with the angling community. The plan should be for a three to five year period and be comprehensive in terms of defining its objectives.
3. Clear regulations for all aspects of managing the fishery should be specified and enforced.
4. Regular angling returns should be made to the State.
5. Clear IFI signage should be in position at fishery boundaries, particularly in riverine situations. Signs should display the Inland Fisheries Ireland name and logo, and designation or number of the fishery. Signs should also display the opening and closing dates of the fishery. The licence holders name, logo and entitlement could appear on a secondary sign affixed below the permanent sign.

5.6 Habitat enhancement issues.

After water quality issues, the question of habitat maintenance/enhancement is regarded as the single most important issue in relation to ensuring the long-term viability of quality brown trout stocks. Any policy document in relation to this species should:
1. Recognise this fact and ensure that available resources are directed towards addressing shortfalls in this area.
2. Understand that many such programmes (shrub pruning or placement of spawning gravels in drained rivers for example) are not capital works programmes but cyclical and, of necessity, repetitive

in nature.
3. Acknowledge that regular ecological/genetic surveys are essential in helping to pinpoint problem areas and measure change, thereby ensuring maximum returns on investment in this area. This is particularly important given the acceleration in recent years in relation to the introduction of exotic species – zebra mussels in most trout lakes, the spread of dace through the Rivers Barrow and Suir Catchments and the likely spread of asian clams through many catchments currently of importance as brown trout fisheries.
4. Continued liaison with a range of other State Agencies is crucial in ensuring that proposed changes in Government policy are not likely to impinge negatively on the brown trout resource.

5.7 Future research programmes.

It is crucial that wild brown trout research should continue, in tandem with developmental and marketing programmes in this field. Key features should include;-
1. On-going survey programmes to monitor change in the more important brown trout fisheries are essential - as a means of both assessing the effectiveness of various developmental exercises and evaluating the impact of new invasive species on the ecology of the resource.
2. Complete a micro-satellite DNA analysis of trout stocks in all designated managed trout fisheries in the country. The completion of such studies to date on Loughs Corrib, Mask, Ennel, the Rivers Boyne and Suir systems, in combination with available ecological data, has moved IFI's capacity to manage these fisheries to a much higher level. Ensure that a DNA analysis programme becomes an integral part of all future large scale monitoring programmes in important brown trout catchments.
3. Strive to achieve a close working liaison between IFI research, operational and marketing staffs to ensure that all relevant personnel are kept abreast of the status of trout stocks.
4. Ensure that the current EREP (Environmental River Enhancement Programme) programme) with OPW continues. An on-going programme over the next 20 years is required to restore all drained brown trout rivers. A completion of this exercise could greatly increase the availability of quality riverine brown trout angling water and further enhance the recruitment of trout to the quality lake trout fisheries.

5.8 Marketing of brown trout angling in Ireland.

This group acknowledges the value the socio economic study of recreational angling has placed on angling in Ireland. As a follow on from such an exercise, the group feel that, in relation to brown trout in particular, investigation in relation to the following areas would be important:
• Diversity of brown trout angling product in Ireland
• Quality and quantity of prime brown trout waters
• Key brown trout angling products & defined market segments
• Key target markets
• Standards for "promotable" brown trout angling tourism
• Competitiveness
• Availability and accessibility of brown trout waters for tourist anglers
• Quality and quantity of angling infrastructure (angler-friendly accommodation, guiding services, boat hire etc.)
• Up-skilling and training for the supply side of the industry

• SWOT Analysis

5.9 Biosecurity.

All anglers should strictly adhere to biosecurity protocols, both pre- and post- all angling sessions, in order to ensure that no invasive species and harmful fish pathogens are introduced or spread within the country.

1. Best biosecurity practice guidelines for anglers, and other key stakeholder groups, have been produced by IFI (see www.fisheriesireland.ie) and these should be circulated widely among key stakeholder groups.

2. Because of the seriousness of the risk associated with invasive species and fish pathogens, it is recommended that strict adherence to these guidelines should be made a condition of membership of all angling clubs and federations.

3. It is further recommended that information boards and facilities to disinfect angling tackle and protective clothing should be provided at all major air and sea ports in Ireland. It should also be mandatory for anglers travelling from abroad to show proof that their angling equipment has been disinfected prior to entering the country. Failing this, the tackle must be disinfected at the point of entry into the country.

4. International collaboration in respect of biosecurity matters must be encouraged. Appendix 1 The brown trout policy group felt that the following list of items, while of concern to brown trout policy were broader issues that need to be addressed in other fora.

5. Angler contributions towards the management costs of inland fisheries.

6. A policy directed at the control of invasive species.

7. The necessity to develop on the findings of the socio-economic study on recreational angling.

8. A redefined role for water keepers in Ireland.

9. Tackling the question of litter control in and around fishery locations.

10. The question of regularising insurance issues for all national and tourist anglers and minimising costs in this area.

APPENDIX 4

Site Synopsis for Lough Corrib SAC

SITE SYNOPSIS
Version date: 01.12.2015 1 of 5
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Site Name: Lough Corrib SAC
Site Code: 000297

Lough Corrib is situated to the north of Galway city and is the second largest lake in Ireland, with an area of approximately 18,240 ha (the entire site is 20,556 ha). The lake can be divided into two parts: a relatively shallow basin, underlain by Carboniferous limestone, in the south, and a larger, deeper basin, underlain by more acidic granite, schists, shales and sandstones to the north. The surrounding lands to the south and east are mostly pastoral farmland, while bog and heath predominate to the west and north. A number of rivers are included within the cSAC as they are important for Atlantic Salmon. These rivers include the Clare, Grange, Abbert, Sinking, Dalgan and Black to the east, as well as the Cong, Bealanabrack, Failmore, Cornamona, Drimneen and Owenriff to the west. In addition to the rivers and lake basin, adjoining areas of conservation interest, including raised bog, woodland, grassland and limestone pavement, have been incorporated into the site.

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 [3260] Floating River Vegetation [6210] Orchid-rich Calcareous Grassland* [6410] Molinia Meadows [7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation [7210] Cladium Fens* [7220] Petrifying Springs* [7230] Alkaline Fens [8240] Limestone Pavement* [91A0] Old Oak Woodlands [91D0] Bog Woodland* [1029] Freshwater Pearl Mussel (Margaritifera margaritifera) [1092] White-clawed Crayfish (Austropotamobius pallipes) [1095] Sea Lamprey (Petromyzon marinus) Version date: 01.12.2015 2 of 5 000297_Rev15.Docx

[1096] Brook Lamprey (Lampetra planeri) [1106] Atlantic Salmon (Salmo salar) [1303] Lesser Horseshoe Bat (Rhinolophus hipposideros) [1355] Otter (Lutra lutra) [1393] Slender Green Feather-moss (Drepanocladus vernicosus) [1833] Slender Naiad (Najas flexilis)

The shallow, lime-rich waters of the southern basin of Lough Corrib support one of the most extensive beds of stoneworts (Charophytes) in Ireland, with species such as Chara aspera, C. hispida, C. delicatula, C. contraria and C. desmacantha mixed with submerged pondweeds (Potamogeton perfoliatus, P. gramineus and P. lucens), Shoreweed (Littorella uniflora) and Water Lobelia (Lobelia dortmanna). These Chara beds are an important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters, without Chara species, but with Shoreweed, Water Lobelia, Pipewort (Eriocaulon aquaticum), Quillwort (Isoetes lacustris), Alternate Water-milfoil (Myriophyllum alternifolium) and Slender Naiad (Najas flexilis). The last-named is listed under the Flora (Protection) Order, 2015, and is an Annex II species under the E.U. Habitats Directive. Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (Phragmites australis) and Common Club-rush (Scirpus lacustris), occur around the margins of the lake. Reedswamp usually grades into species-rich marsh vegetation characterised by Slender Sedge (Carex lasiocarpa), Water Mint (Mentha aquatica), Water Horsetail (Equisetum fluviatile) and Bogbean (Menyanthes trifoliata). Of particular note are the extensive beds of Great Fen-sedge (Cladium mariscus) that have developed over the marly peat deposits in sheltered bays, particularly in the southeast corner of the lake. Alkaline fen vegetation is more widespread around the lake margins and includes, amongst the typically diverse range of plants, the Slender Cottongrass (Eriophorum gracile), a species protected under the Flora (Protection) Order, 2015.

Wet meadows dominated by Purple Moor-grass (Molinia caerulea) occur in seasonally flooded areas close to the lake shore. These support species such as Sharp-flowered Rush (Juncus acutiflorus), Jointed Rush (J. articulatus), Carnation Sedge (Carex panicea), Devil's-bit Scabious (Succisa pratensis), Creeping Bent (Agrostis stolonifera) and Tormentil (Potentilla erecta), amongst others. This large site contains four discrete raised bog areas and is selected for active raised bog, degraded raised bog, Rhynchosporion and bog woodland. Active raised bog comprises areas of high bog that are wet and actively peat-forming, where the percentage cover of bog mosses (Sphagnum spp.) is high, and where some or all of the following features occur: hummocks, pools, wet flats, Sphagnum lawns, flushes and soaks. Degraded raised bog corresponds to those areas of high bog whose hydrology has been adversely affected by peat cutting, drainage and other land use activities, but which are capable of regeneration. The Rhynchosporion habitat occurs in wet depressions, pool edges and erosion channels where the vegetation includes White Beak-sedge (Rhynchospora alba) and/or Brown Beak-sedge (R. fusca), and at least some of the following associated species, Bog Asphodel (Narthecium ossifragum), sundews (Drosera spp.), Deergrass (Scirpus cespitosus) and Carnation Sedge. At Addergoole, on the eastern shores of Lough Corrib, there is an important area of western raised bog. This bog area is one of the most westerly, relatively intact raised bogs in the country. There are also other substantial areas of raised bog along various tributaries of the Corrib in east Co. Galway, namely Slieve Bog, Lough Tee Bog and Killaclogher bog. The active parts of these bogs mostly correspond to the wettest areas, where there are well-developed surface features with hummocks, lawns and pools. It is in such areas that Rhynchosporion vegetation is best represented. The dominant species is the aquatic bog moss Sphagnum cuspidatum, which is usually accompanied by Bogbean, White Beak-sedge, Bog Asphodel, Common Cottongrass (Eriophorum angustifolium), Bog Sedge (Carex limosa) and Great Sundew

(Drosera anglica). Brown Beak-sedge, a locally rare plant of wet bog pools, has been recorded from a number of the bog areas within the site. At Addergoole a substantial bog lake or soak occurs and this is infilling with large rafts of Rhynchosporion vegetation at present. This area is associated with an important area of wet bog woodland dominated by Downy Birch (Betula pubescens). The largest part of the uncut high bog comprises degraded raised bog. Degraded bog is dominated by a raised bog flora which tends to be rather species-poor because of disturbance and/or drying-out.

The most conspicuous vascular plant species are usually Carnation Sedge, Heather (Calluna vulgaris), Cottongrasses, Cross-leaved Heath (Erica tetralix), Bog Asphodel and Deergrass. Bog-rosemary (Andromeda polifolia) and Cranberry (Vaccinium oxycoccos), two species indicative of raised bog habitat, are frequent on both degraded and active areas of raised bog. Sphagnum cover is generally low within degraded areas due to a combination of drying-out and frequent burning. Limestone pavement occurs along much of the shoreline in the lower Corrib basin, and supports a rich and diverse flora, including Herb-Robert (Geranium robertianum), Bloody Crane's-bill (G. sanguineum), Carline Thistle (Carlina vulgaris), Spring Gentian (Gentiana verna), Wild Thyme (Thymus praecox), Rustyback (Ceterach officinarum), Wood Sage (Teucrium scorodonia), Slender St. John's-wort (Hypericum pulchrum), Quaking-grass (Briza media) and Blue Moor-grass (Sesleria albicans). Areas of Hazel (Corylus avellana) scrub occur in association with exposed limestone pavement and these include species such as Hawthorn (Crataegus monogyna), Buckthorn (Rhamnus catharticus), Spindle (Euonymus europaeus), with occasional Juniper (Juniperus communis). Three Red Data Book species are also found in association with limestone scrub - Alder Buckthorn (Frangula alnus), Shrubby Cinquefoil (Potentilla fruticosa) and Wood Bitter-vetch (Vicia orobus), the latter is also protected under the Flora (Protection) Order, 2015.

Open areas of orchid-rich calcareous grassland are also found in association with the limestone exposures. These can support a typically rich vegetation, including many orchids such as Pyramidal Orchid (Anacamptis pyramidalis), Common Spotted-orchid (Dactylorhiza fuchsii), Early-purple Orchid (Orchis mascula), Frog Orchid (Coeloglossum viride), Fragrant Orchid (Gymnadenia conopsea), Marsh Helleborine (Epipactis palustris), Greater Butterfly-orchid (Platanthera chlorantha) and Irish Lady's-tresses (Spiranthes romanzoffiana). The latter is protected under the Flora (Protection) Order, 2015.

The Hill of Doon, located in the north-western corner of the lake, is a fine example of a Sessile Oak (Quercus petraea) woodland. The understorey is dominated by Sessile Oak, Holly (Ilex aquifolium) and occasional Juniper. There are occasional Yew (Taxus baccata) and Ash (Fraxinus excelsior), and a well-developed ground layer dominated by Bilberry (Vaccinium myrtillus), Hard Fern (Blechnum spicant) and Wood Rush (Luzula sylvatica). Woodland also occurs on some of the islands in the lake. A number of the rivers in the site support submerged and floating vegetation of the Ranunculion fluitantis and Callitricho-Batrachion, including mosses. For example, in the River Corrib species such as Shining Pondweed (Potamogeton lucens), Perfoliate Pondweed (Potamogeton perfoliatus), Small Pondweed (P. berchtoldii), Yellow Waterlily (Nuphar lutea), White Water-lily (Nymphaea alba) and stoneworts (Chara spp.) occur. The rare and Annex II-listed Slender Green Feather-moss (Drepanocladus [Hamatocaulis] vernicosus) is found at the fen at Gortachalla, north-east of Moycullen. Here it is widespread around the margins, and this constitutes a large and significant population in the national context. A very large population of another rare moss, Pseudocalliergon trifarium, is also found in this area.

The lake is rated as an internationally important site for waterfowl. Counts from 1984 to 1987 revealed a mean annual peak total of 19,994 birds. In the past a maximum peak of 38,281 birds was recorded. The lake supports internationally important numbers of Pochard (average peak 8,600) and nationally important numbers of the following species: Coot (average peak 6,756), Mute Swan (average peak 176), Tufted Duck (average peak 1,317), Cormorant (average peak 110) and Greenland Whitefronted Goose (average peak 83). The latter species is listed on Annex I of the E.U. Birds Directive. The Coot population is the largest in the country and populations of Tufted Duck and Pochard are second only to Lough Neagh. Breeding pairs of Common Scoter on the lake number 30-41 (1995 data), as well as breeding populations of Arctic Tern and Common Tern. Other bird species of note recorded from or close to the lake recently include Hen Harrier, Whooper Swan, Golden Plover and Kingfisher. All of these species are listed on Annex I of the E.U. Birds Directive. Otter and Irish Hare have been recorded regularly within this site. Both of these species are listed in the Red Data Book and are legally protected by the Wildlife Act, 1976.

Otter is also listed on Annex II of the E.U. Habitats Directive. Lough Corrib is considered one of the best sites in the country for Otter, due to the sheer size of the lake and associated rivers and streams, and also the generally high quality of the habitats. Atlantic Salmon (Salmo salar) use the lake and rivers as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the E.U. Habitats Directive. Lough Corrib is also a well-known fishing lake with a very good Trout (Salmo trutta) fishery. The lake has a population of Sea Lamprey (Petromyzon marinus), a scarce, though probably under-recorded species listed on Annex II of the E.U. Habitats Directive. Brook Lamprey (Lampetra planeri), also listed on Annex II, are also known from a number of areas within the site. A population of Freshwater Pearl Mussel (Margaritifera margaritifera), a species listed on Annex II of the E.U. Habitats Directive, occurs within the site. White-clawed Crayfish (Austropotamobius pallipes), also listed on Annex II, is well distributed throughout Lough Corrib and its in-flowing rivers over limestone.

A summer roost of Lesser Horseshoe Bat, another Annex II species, occurs within the site - approximately 100 animals were recorded here in 1999. The main threats to the quality of this site are from water polluting activities resulting from intensification of agricultural activities on the eastern side of the lake, uncontrolled discharge of sewage which is causing localised eutrophication of the lake, and housing and boating development, which is causing the loss of native lakeshore vegetation. The raised bog habitats are susceptible to further degradation and drying out due to drainage and peat cutting and, on occasions, burning. Peat cutting threatens Addergoole Bog and already a substantial area of it has been cut away. Fishing and shooting occur in and around the lake. Introduction of exotic crayfish species or the crayfish fungal plague (Aphanomyces astaci) could have a serious impact on the native crayfish population. The bat roost is susceptible to disturbance or development. Despite these ongoing issues, however, Lough Corrib is one the best examples of a large lacustrine catchment system in Ireland, with a range of habitats and species still well represented. These include 15 habitats which are listed on Annex I of the E.U. Habitats Directive, six of which are priority habitats, and nine species which are listed on Annex II. The lake is also internationally important for birds and is designated as a Special Protection Area.

APPENDIX 5
Site Synopsis – Lough Corrib SPA

SITE SYNOPSIS
SITE NAME: LOUGH CORRIB SPA
SITE CODE: 004042

Lough Corrib is the largest lake in the country and is located, for the most part, in County Galway, with a small section in the north extending into County Mayo. The lake can be divided into two parts: a relatively shallow basin in the south, which is underlain by Carboniferous limestone, and a larger, deeper basin to the north, which is underlain by more acidic granite, schists, shales and sandstones. The main inflowing rivers are the Black, Clare, Dooghta, Cregg, Owenriff and the channel from Lough Mask. The main outflowing river is the Corrib, which reaches the sea at Galway City. The shallow, lime-rich waters of the southern basin of the lake support one of the most extensive beds of Stoneworts (Charophytes) in Ireland. These Chara beds are a very important source of food for waterfowl. In contrast, the northern basin contains more oligotrophic and acidic waters. Large areas of reedswamp vegetation, dominated by varying mixtures of Common Reed (Phragmites australis) and Common Club-rush (Scirpus lacustris) occur around the margins of the lake. The lake has numerous islands, which range from relatively bare rocky islets to larger islands with grassland or woodland.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greenland White-fronted Goose, Gadwall, Shoveler, Pochard, Tufted Duck, Common Scoter, Hen Harrier, Coot, Golden Plover, Black-Headed Gull, Common Gull, Common Tern and Arctic Tern. The site is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetlands & Waterbirds. Lough Corrib is an internationally important site that regularly supports in excess of 20,000 wintering waterbirds including an internationally important population of wintering Pochard (10,107) – except where indicated all figures are five year mean peaks for the period 1995/96 to 1999/2000.

The site also supports nationally important populations of wintering Greenland White-fronted Goose (160 - five year mean peak for the period 1994/95 to 1998/99), Gadwall (48), Shoveler (90), Tufted Duck (5,486), Coot (14,426) and Golden Plover (1,727). Other species which occur include Mute Swan (182), Whooper Swan (35), Wigeon (528), Teal (74), Mallard (155), Goldeneye (74), Lapwing (2,424) and Curlew (114). In winter nationally important numbers of Hen Harrier (8 - four year mean peak count between 2006 and 2009) also utilise the site as a communal roost. Lough Corrib is also a traditional breeding site for gulls and terns, with various islands being used for nesting each year. There are important colonies of Common Tern (37 pairs in 1995) and Arctic Tern (60 pairs in 1995). The site supports substantial colonies of Black-headed Gull (431 pairs in 2000) and Common Gull (186 pairs in 2000), these representing 3% and 11% of the respective all-Ireland totals. Small numbers of Lesser Black-backed Gull, Great Black-backed Gull and Herring Gull have also been recorded breeding within the site. The site supports approximately half of the national population of nesting Common Scoter (30 pairs in 1995); Lough Corrib was colonised by this rare, Red Data Book species only as recently as the late1970s/early1980s.

Lough Corrib SPA is an internationally important site which supports in excess of 20,000 wintering waterbirds, including a population of Pochard that is, itself, of international importance. A further six species of wintering waterfowl have populations of national importance. The site also contains a nationally important communal roost site for Hen Harrier. Lough Corrib is the most important site in the country for breeding Common Scoter. Its populations of breeding gulls and terns are also notable, with nationally important numbers of Black-headed Gull, Common Gull, Common Tern and Arctic Tern occurring. It is of note that several species which regularly occur are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Greenland White-fronted Goose, Hen Harrier, Golden Plover, Common Tern and Arctic Tern. Lough Corrib is a Ramsar Convention site

APPENDIX 6
Site Synopsis – Maumturk Mountains SAC

SITE SYNOPSIS
Site Name: Maumturk Mountains SAC
Site Code: 002008

The Maumturk Mountains are situated east of the Twelve Bens and west of the Maumtrasnas, between the Inagh Valley and the Leenaun/Maam road in Co. Galway. The site is bounded to the north by Killary Harbour and to the south by the Galway/ Clifden road. Most of the mountains exceed 600 m in height and about half of the land within the site lies above an altitude of 250 m. In addition many rivers criss-cross the site. The main bedrock is quartzite in the south, which forms impressive cliffs but little mineral soil, and shales and slates in the northern area, which weather more easily. Bands of metamorphosed limestone (Lakes Marble Formation) occur at Lissoughter, Maumeen Gap at Knocknagur and Maamturkmore.

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
[4010] Wet Heath
[4060] Alpine and Subalpine Heaths
[7130] Blanket Bogs (Active)*
[7150] Rhynchosporion Vegetation
[8220] Siliceous Rocky Slopes
[1106] Atlantic Salmon (Salmo salar)
[1833] Slender Naiad (Najas flexilis)

Wet heath is widespread within this site on the margins of areas of blanket bog and on the lower slopes of mountains where peat depth is less than 1m. The vegetation is typically dominated by Purple Moor-grass (Molinia caerulea), with Cross-leaved Heath (Erica tetralix) and Heather (Calluna vulgaris)

locally sub-dominant. Other frequent species include Tormentil (Potentilla erecta), Heath Milkwort (Polygala serpyllifolia), Many-stalked Spike-rush (Eleocharis multicaulis), Bog Asphodel (Narthecium ossifragum) and the sedges Carex echinata and C. panicea. On drier, more steep slopes, dry heath is present with Bell Heather (Erica cinerea) a typical frequent species. Over-grazing by sheep has greatly modified the structure and composition of the heath communities, with a reduction in Heather cover and in places the initiation of soil erosion. Blanket bog also occurs within this site, some of which is intact and of good quality, with a particularly good example at Caher. Typical bog species are found, including Heather, Purple Moor-grass, Black Bog-rush (Schoenus nigricans), Bog Asphodel, Cross-leaved Heath, Common Cottongrass (Eriophorum angustifolium), Carnation Sedge (Carex panicea), the moss Racomitrium lanuginosum and locally frequent hummocks of the bog mosses Sphagnum fuscum and S. imbricatum. In addition, the lichen flora is locally luxuriant and includes the rare Cladonia rangiferina. Flushes occur in some areas of the bog, such as on the south slope of Knocknagur. Here, species such as Bog Pondweed (Potamogeton polygonifolius), Bulbous Rush (Juncus bulbosus), Jointed Rush (Juncus articulatus),Many-stalked Spike-rush (Eleocharis multicaulis) and various sedges (Carex panicea, C. demissa and C. hostiana) are found. At this location, the scarce Brown Beak-sedge (Rhynchospora fusca) is common in the surrounding bog. Rhynchosporion vegetation is associated with the blanket bog in a few areas of the site. It is characterised by well developed inter-connecting pool systems with quaking carpets of Sphagnum. The pool areas are typically dominated by Sphagnum cuspidatum and S. auriculatum, with Common Cottongrass, Bogbean (Menyanthes trifoliata), and sundews (Drosera anglica and D. intermedia). The quaking flat areas are dominated by White-beaked Sedge (Rhynchospora alba), Bog Asphodel and Common Cottongrass.

Oligotrophic lakes are well represented in this site, occurring mainly in the southeast near Maam Cross. The principal lakes are Lough Shindilla, Loughanillaun, Lough Nambrackboy, Lough Shannagrena, Maumwee Lough and Lehanagh Lough. Most of these are small to medium sized systems and are of good quality. Typical oligotrophic aquatic species occur, including Quillwort (Isoetes lacustris), Pipewort (Eriocaulon aquaticum), Water Lobelia (Lobelia dortmanna), Shoreweed (Littorella uniflora) and Alternate Water-milfoil (Myriophyllum alterniflorum). Spawning salmon and trout occur in Maumwee Lough, and perhaps others. Other habitats present include lowland blanket bog, siliceous quartzite scree, exposed rock, upland grassland on peaty and mineral substrates, river valleys and streams, lakes, and woodland on lake islands. In areas where base-rich rocks occur at altitude, e.g. Maumeen Gap and Lissoughter, scarce plant species such as Mountain Avens (Dryas octopetala), Alpine Meadow-rue (Thalictrum alpinum) and the Red Data Book species, Purple Saxifrage (Saxifraga oppositifolia), are found.

The site supports a range of other scarce arcticalpine/mountain plants, including Green Spleenwort (Asplenium viride), Brittle Bladder-fern (Cystopteris fragilis), Holly Fern (Polystichum lonchitis), Beech Fern (Phegopteris connectilis), Starry Saxifrage (Saxifraga stellaris), Roseroot (Rhodiola rosea), Cowberry (Vaccinium vitis-idaea), Mountain Sorrel (Oxyria digyna), Dwarf Willow (Salix herbacea), Lesser Twayblade (Listera cordata), Stiff Sedge (Carex bigelowii) and Juniper (Juniperus communis). Several other Red Data Book plant species are also found on the site, including Slender Cottongrass (Eriophorum gracile) and Slender Naiad (Najas flexilis), both occurring in just single locations. There is an old record from near Maam Cross for Wood Bitter-vetch (Vicia orobus), but this has not been seen on the site in recent years. The threatened species Marsh Clubmoss (Lycopodiella inundata) also

occurs within the site. All of these species are legally protected under the Flora (Protection) Order, 1999, and Slender Naiad is also listed on Annex II of the E.U. Habitats Directive.

The site is very important for salmon, a species listed on Annex II of the E.U. Habitats Directive. The rivers and lakes, and especially the Bealnabrack system, provide high quality spawning and nursery rivers. Arctic Char has been recorded in Derryneen Lough and Lough Shindilla. However, only in Lough Shindilla are there recent records for this species. This fish species is listed in the Irish Red Data Book as being threatened in Ireland. The Irish Hare has been recorded from the site and is probably widespread; this endemic subspecies is also listed in the Red Data Book as being threatened. Common Frog, also a Red Data Book species, breeds on the site. Bird species recorded from the site include Dipper, Heron, Kestrel, Meadow Pipit, Raven, Snipe, Stonechat, Wheatear and Woodcock. Peregrine, a species listed on Annex I of the E.U. Birds Directive, occurs within the site. The main damaging activities and threats to the Maumturk Mountains are overgrazing, peat cutting and afforestation. Grazing, in particular by sheep, is widespread and quite severe within the site. This has resulted in the erosion of both lowland and mountain blanket bog, and in the modification and destruction of heath communities, particularly in the southern half of the site. Peat cutting, both by hand and by machine, has become more of a problem in recent years but is largely confined to areas of deep, lowland blanket bog. The above activities are the most extensive, but other threats and potentially damaging activities include land drainage and reclamation, fertilization, quarrying and dumping. This site is of conservation interest as it is a good example of an extensive mountain landscape, containing blanket bog, large areas of heath, siliceous rocky vegetation, oligotrophic lakes and upland grassland. The areas of blanket bog at Teernakill and Caher are largely unaffected by over-grazing and are in very good condition. The presence of rare and protected plant species and of the scarce Arctic Char adds to the interest of the site.

Appendix 7: Standard Operating Procedures for Management of Pike on Wild Brown Trout Fisheries

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