ACTIVITY REPORT

OF THE

TECHNICAL EXPERT GROUP ON EEL

2022

REPORT OF THE TECHNICAL EXPERT GROUP ON EEL TO THE NORTH-SOUTH STANDING SCIENTIFIC COMMITTEE ON INLAND FISHERIES (NSSSCIF)

Nov 2023

Disclaimer:	**This report includes data and analyses that are supplied by various agencies for the purposes of supporting the implementation of the Eel Management Plans in Ireland. The data will be subject to scientific review for the National Report to the EU in 2024.** **The data and analyses are part of an on-going scientific assessment and are, therefore, preliminary and may be subject to change, updating or reanalysis. Some data may also be submitted for peer-review publication. The contents of this report should not be reproduced without the prior permission of the Technical Expert Group on Eel.**

Glossary of terms

Glass eel	Young, unpigmented eel, recruiting from the sea into continental waters. WGEEL consider the glass eel term to include all recruits of the 0+ cohort age. In some cases, however, also includes the early pigmented stages.
Elver	Young eel, in its first year following recruitment from the ocean. The elver stage is sometimes considered to exclude the glass eel stage, but not by everyone. To avoid confusion, pigmented 0+cohort age eel are included in the glass eel term.
Bootlace, fingerling	Intermediate sized eels, approx. 10–25 cm in length. These terms are most often used in relation to stocking. The exact size of the eels may vary considerably. Thus, it is a confusing term.
Yellow eel (Brown eel)	Life-stage resident in continental waters. Often defined as a sedentary phase, but migration within and between rivers, and to and from coastal waters occurs. This phase encompasses the elver and bootlace stages.
Silver eel	Migratory phase following the yellow eel phase. Eel characterized by darkened back, silvery belly with a clearly contrasting black lateral line, enlarged eyes. Downstream migration towards the sea, and subsequently westwards. This phase mainly occurs in the second half of calendar years, though some are observed throughout winter and following spring.
Assisted Upstream Migration	the practice of trapping and transporting juvenile eel within the same river catchment to assist their upstream migration at difficult or impassable barriers, without significantly altering the production potential (Bbest) of the catchment
Eel River Basin or Eel Management Unit	"Member States shall identify and define the individual river basins lying within their national territory that constitute natural habitats for the European eel (eel river basins) which may include maritime waters. If appropriate justification is provided, a Member State may designate the whole of its national territory or an existing regional administrative unit as one eel river basin. In defining eel river basins, Member States shall have the maximum possible regard for the administrative arrangements referred to in Article 3 of Directive 2000/60/EC [i.e. River Basin Districts of the Water Framework Directive]." EC No. 1100/2007.
River Basin District	The area of land and sea, made up of one or more neighbouring river basins together with their associated surface and groundwaters, transitional and coastal waters, which is identified under Article 3(1) of the Water Framework Directive as the main unit for management of river basins. The term is used in relation to the EU W F D.
Stocking	Stocking (not restocking) is the practice of adding fish [eels] to a waterbody from another source, to supplement existing populations or to create a population where none exists.
Trap & transport	Traditionally, the term trap and transport referred to trapping recruits at impassable obstacles and transporting them upstream and releasing them. Under the EMPs, trap and transport (or catch and carry) now also refers to fishing for downstream migrating silver eel for transportation around hydropower turbines.
European Maritime Fisheries and Aquaculture Fund (EMFAF)	EMFAF is an EU fund running from 2021 to 2027 to support EU common fisheries policy (CFP), the EU maritime policy and the EU agenda for international ocean governance. It also helps achieve the UN's sustainable Development Goal 14 and European Green Deal.
EEL REFERENCE POINTS/POPULATION DYNAMIC	
B_0	The amount of silver eel biomass that would have existed if no anthropogenic influences had impacted the stock.
$B_{current}$	The amount of silver eel biomass that currently escapes to the sea to spawn.
B_{best}	The amount of silver eel biomass that would have existed if no anthropogenic influences had impacted the current stock.
ΣF	The fishing mortality rate, summed over the age-groups in the stock, and the reduction effected.
ΣH	The anthropogenic mortality rate outside the fishery, summed over the age-groups in the stock, and the reduction effected.
R	The amount of glass eel used for restocking within the country.
ΣA	The sum of anthropogenic mortalities, i.e. $\Sigma A = \Sigma F + \Sigma H$

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Executive Summary

International Advice; ICES - 2021

The format of the ICES advice has changed for 2023, ICES now provides advice on fishing opportunities and on conservation aspects. The advice for eels for 2023 is

ICES Advice on fishing opportunities

ICES advises that when the precautionary approach is applied, there should be zero catches in all habitats in 2023. This applies to both recreational and commercial catches and includes catches of glass eels for restocking and aquaculture.

ICES advice on conservation aspects

ICES advises based on ecosystem based management consideration that:

- *All non-fisheries related anthropogenic mortalities should be zero.*
- *The quantity and quality of eel habitats should be restored; this includes connectivity and the physical, chemical and biological properties of the habitats.*

Stock development over time

"The status of European eel remains critical."

"In the "Elsewhere Europe" index series it was 9.7% in 2022 (provisional) and 5.5% in 2021 (final). The yellow eel recruitment index for 2021 was 19% (final) of the 1960–1979 geometric mean. Time-series from 1980 to 2022 show that glass eel recruitment remains at a very low level."

National Advice

There were no requests for advice in 2023.

Irish EMP Management Actions 2021 -2024

Under the EU Regulation (EC No. 1100/2007) four main management actions were included in the Irish Eel Management Plans aimed at reducing eel mortality and increasing silver eel escapement in Irish waters. These were a cessation of the commercial eel fishery and closure of the market, mitigation of the impact of hydropower, including a comprehensive silver eel trap and transport plan, ensure upstream migration of juvenile eel at barriers and improve water quality including fish health and biosecurity issues.

1. Reduction in Fishing

All regions reported on the continued closure of the fishery with no licences issued and the eel fishery, with the exception of L. Neagh, also remained closed in N. Ireland. Some illegal fishing was reported which led to seizures of gear in the Shannon IRBD, Eastern RBD and the NorthWestIBD. Reliable trade (import/export) data remains unavailable to the TEGE.

2. **Hydropower Impact**

Mitigation of hydropower involved a comprehensive trap and transport system for migrating silver eels on the Shannon, Erne and Lee, the targets for 2009-2011 were set out in the Eel Management Plans and these were subsequently modified on the Erne for the 2015-2017 period

to allow for the transport of 50% of the annual silver eel production and a rolling target based on a 3-year basis allowing shortfalls in one year to be made up the following year. A long-term shortfall should not be carried forward indefinitely.

The total quantity of silver eel released from the three catchments was 61,547 kg.

In the **River Shannon** the trap and transport total of 19,929 kg represented 54% of silver eel production (using the escapement estimate adjusted to account for nights not fished) and, therefore, exceeded the 30% target, the EMP requirement was met on the basis of the agreed (3 year rolling mean value) protocol.

In the **River Erne**, the trap and transport annual target (50% of silver eel production) for the River Erne was exceeded in the 2022 season. The quantity (40 531 kg) transported for safe release at Ballyshannon represented 65% of the estimated silver eel production (61,941 kg) for the river system for the season.

In the 2022/2023 season, fishing took place on the **River Lee** at several different locations between 15th September and 27th October 2022. The total catch was 1,087 kg, which exceeds the annual target for the river of 500 kg.

For the ***Shannon***, an estimated 21.15% mortality was applied to the 2022 data. The estimated silver eel mortality at Ardnacrusha hydropower station was 3,3141 kg.

For the ***Erne***, the estimated mortality at the dams was 9,326 kg in the 2022/2023 migration period. Total mortality was estimated to be 5,431 kg at Cliff and 3,913 kg at Cathaleen's Fall. The estimated mortality is 25.3% at Cliff and 24.5% at Cathaleen's Fall.

3. **Obstacles to migration**

Work continues on managing existing barriers (management action 3) using the IFI developed I-BAST application to date 24,523 structures have been assessed, 22,785 were classified as being 'not a barrier' with 7,429 classified as a 'potential barrier' requiring further work.

4. Improve Water Quality, fish health and biosecurity

In October of 2022, the EPA reported on water quality for the period of 2016-2021. This report showed that over half (54%) of our surface waters are in good or better ecological status which means that nearly half (46%) are in unsatisfactory condition.

There were 21 reported fish kills in 2022.

Irish EMP Monitoring Actions

A close link between the management actions and eel-stock targets will be established by implementing a comprehensive monitoring and stock assessment programme. This will allow for a direct feedback to management based on response of the stock to management actions.

Silver Eel Assessment

Silver eels are being assessed by annual fishing stations on the Shannon, Erne, Burrishoole, Fane and Barrow catchments in 2022.

Shannon

In 2021/22, conservation eel fishing was conducted at three sites, two at Athlone, and one at Killaloe.

A total of 12,912 kg of eels were caught at Athlone (11,878 kg at the Jolly Mariner site and 1,034 kg at the Yacht Club site), and a further 7,017 kg were caught at Killaloe, giving an overall Trap and Transport catch of 19,929 kg.

Silver eel production was estimated to have been 36,943 kg.

Burrishoole

Silver eel trapping was continued in Burrishoole in 2022/23 and the total run amounted to 3,780 eels (up to April) the highest count recorded since 2003. As in other years, the highest proportion of the total catch (75%) was made in the Salmon Leap trap. The mean weight of eels has dropped to an average of about 166 g in the last three years and the sex ratio in 2021 of 50.4% males was the highest recorded since 1990.

Erne

The total catch contributed to the Trap and Transport programme was 40,531 kg. The silver eel production was estimated to be 61,941 kg with escapement estimated at 52,615 kg, 84.9% of the production.

Fane

In 2022, silver eel catches at the Fane Fishery were higher than previous 2 years with a total catch of 912 kg (1,953 eels) and 37 nights fished. Due to low water levels in September, fishing began in late October and continued until December.

R. Barrow

In 2022, after 21 nights of fishing, a total of 199.7 kg of silver eels were captured. This equated to 1,055 eels, with the majority of these being caught in October.

Recruitment

For 2022 a value of 570 kg of elvers were caught at Ardnacrusha; this has been the highest value recorded since 1997 (2016 had a high of 317 kg). 2022 was a good year for recruitment for the Erne with 502 kg collected in the traps at the station. This was an increase from the 382 kg counted in 2021 and the very low 0.112 kg recorded in 2020.

ICES (2022) noted an increase in recruitment for the Europe Elsewhere series; the estimated figure was 9.7% (provisional) an increase from 5.5% (final) for 2021. The increase is based on increased recruitment in the Irish recruitment series that was not visible in the Bay of Biscay index sites.

1 Introduction

1.1 EU Regulation

The EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock required Ireland to establish eel management plans for implementation in 2009. Under the EC Regulation, Ireland should monitor the eel stock, evaluate current silver eel escapement and post-evaluate implemented management actions aimed at reducing eel mortality and increasing silver eel escapement.

The Irish Eel Management Plan submitted to the EU on the 9th January 2009 and accepted by the EU in June 2009 outlined the main management actions aimed at reducing eel mortality and increasing silver eel escapement to the sea. The four main management actions were as follows;

- a cessation of the commercial eel fishery and closure of the market
- mitigation of the impact of hydropower, including a comprehensive trap and transport plan to be funded by the ESB
- to ensure upstream migration of juvenile eel at barriers
- to improve water quality

Under the EC Regulation (EC No. 1100/2007), each Member State shall report to the Commission initially every third year until 2018 and subsequently every six years. At a meeting of the EU Fisheries Council in January 2018 it was agreed to continue to report every 3 years until there is scientific evidence of recovery signs for the eel population across Europe. The most recent report, was submitted on the 30th August 2021 using the ICES datacall, addressing the following;

- monitoring time series of recruits, yellow eel abundance and silver eel abundance
- Commercial, recreational and other fishery landings
- Releases of eels to other waters
- Aquaculture production
- Overview of Eel management plan
- the effectiveness and outcome of the Eel Management Plans
- biomass indicators
- anthropogenic mortality rates
- use of eel caught of less than 12 cm in length

The European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE) has commissioned an external Study on the evaluation of the Eel Regulation. The purpose of the evaluation is to assess the measures to protect European eel under the Eel Regulation, and in particular the contribution of the national Eel Management Plans established and implemented under this Regulation to the recovery of the stock of European eel. The report on the evaluation is available on line. The overall conclusion is presented here:

> *The adoption of the Eel Regulation has been an important milestone in the long process towards the recovery of the European eel. It remains as relevant now as it was in 2009. Nevertheless, despite notable progress in reducing fishing effort and a concerted attempt to develop a pan-EU management framework, the status of eel remains critical. The Regulation's success in ensuring the recovery of the European eel is still far from certain, as it is widely recognised that the recovery of the European eel will take many decades. In this respect, further ambition is needed to implement the Regulation with a greater focus on non-fisheries related measures.*

European Commission, Directorate-General for Maritime Affairs and Fisheries, MacNab, S., Luchetta, G., Nimmo, F., et al., *Evaluation of the Eel Regulation : final report*, Publications Office, 2020, **https://data.europa.eu/doi/10.2771/679816**

1.2 Technical Expert Group on Eel (TEGE)

An expert group on eel has been in existence since 2010 formerly known as the Standing Scientific Committee on Eel and since 2017 as the Technical Expert Group on Eels.

1.2.1 Background

The North-South Standing Scientific Committee for Inland Fisheries (NSSSCIF) was formed in 2017 to support the provision of scientific advice relating to the conservation and sustainable exploitation of the inland fisheries resource with advice provided in response to requests from Department of Communications, Climate Action and Environment (DCCAE) and its agency Inland Fisheries Ireland (IFI) from Ireland (IRL), the Department of Agriculture, Environment and Rural Affairs (DAERA) from Northern Ireland (NI) and the Loughs Agency (LA) a North-South Implementation Body. This group was also tasked to give consideration to the coordination and effective use of scientific resources for data collection and research projects linked to the above. The NSSSCIF Term of Reference (TOR) facilitates the formation of Expert Groups drawn from within the membership of the Committee, or additional invitees as required, to advise and contribute on any particular species, aquatic habitat or biosecurity issues. To this end the NSSSCIF has established an eel expert group to provide scientific advice to guide the NSSSCIF and IFI management in the decisions and policy development aimed at ensuring the recovery of Ireland's eel stocks as outlined in Ireland's National Eel Management plan.

1.2.1.1 Purpose

The NSSSCIF requests the Expert Group on Eel to provide a report, details outlined in Appendix A, on the status of eel stocks for the purpose of reporting to the EU in line with the Eel Regulation (EC1100/2007). The NSSSCIF may also request the Expert Group on Eel to provide scientific advice on the implications of proposed management decisions or policies on eel or seek advice on scientific matters in relation to eel. All scientific advice provided by the Expert Group on Eel will be considered by the NSSSCIF and presented as independent advice.

1.2.2 Term of Reference

1. The technical group shall carry out an appropriate assessment of eel stocks (juvenile, yellow and silver eel) in accordance with the EU Regulation for each Eel Management Unit and transboundary plan.

a. Update the national stock assessment framework in line with EU reporting requirements and assess the level of contemporary silver eel escapement with respect to the EU 40% target.

b. The appropriate assessments for all fishery districts, River Basin Districts and transboundary plans shall take account of the different habitat types, lakes, rivers and transitional waters.

2. The technical group shall complete a scientific assessment of the implementation of the relevant monitoring and management objectives identified in the National EMP, in line with the reporting requirements for the regulation (see Appendix I for National Management plan objectives)

3. Compile a stock assessment report and scientific advice as required in support of the report to the EU in line with the timeframes outlined in the eel regulation.

4. Oversee the updating of the national eel database and quality control of the data.

    a. This should include the long term data series

        i. National recruitment time series

        ii. Silver eel index sites

5. Address any requests for scientific advice received from NSSSCIF.

1.3 Meeting Activities

The TEGE met three times times during the 2021/2022 to monitor and report on the 2021 survey year in addition to email correspondence.

17th November 2022	Video Conference
02nd February 2023	Ballyshannon & VC
25th April 2023	Galway & VC

2 International Advice from ICES

2.1 Introduction to ICES Advice

The International Council for Exploration of the Seas (ICES) is the prime source of scientific advice on the marine ecosystem to governments and international regulatory bodies that manage the North Atlantic Ocean and adjacent seas. The ICES Council has delegated its advisory authority to the Advisory Committee or ACOM. ACOM has established the mechanisms necessary to prepare and disseminate advice subject to a protocol satisfying the following criteria:

Objectivity and integrity;
Openness and transparency;
Quality assurance and peer review;
Integrated advice – based on an ecosystem approach;
Efficiency and flexibility;
National consensus;

Therefore, ACOM is the sole competent body in ICES for scientific advice in support of the management of coastal and ocean resources and ecosystems. It designs strategies and processes for preparation of advice, manages advisory processes, and creates and delivers advice, subject to direction from the Council. The content of scientific advice is solely ACOM's responsibility not subject to modification by any other ICES entity. ACOM has one member from each member country under the direction of an independent chair appointed by the Council. ACOM works on the basis of scientific analysis prepared in the ICES expert groups and the advisory process include peer review of the analysis before it can be used as basis for the advice. In the case of eel, the relevant expert group is the Joint EIFAAC/ICES/GFCM Working Group on Eel (WGEEL).

2.2 ICES Advice on Eel for 2023

European Eel throughout its natural range (reproduced from the *ICES Advice 2022,*

ICES Advice 2022 – ele.2737.nea – https://doi.org/10.17895/ ices.advice.19772374

The format of the ICES advice has changed for 2023. ICES now provides advice on fishing opportunities and on conservation aspects.

ICES Advice on fishing opportunities

ICES advises that when the precautionary approach is applied, there should be zero catches in all habitats in 2023. This applies to both recreational and commercial catches and includes catches of glass eels for restocking and aquaculture.

ICES advice on conservation aspects

ICES advises based on ecosystem based management consideration that:

- All non-fisheries related anthropogenic mortalities should be zero.
- The quantity and quality of eel habitats should be restored; this includes connectivity and the physical, chemical and biological properties of the habitats.

Stock development over time

The status of European eel remains critical. Indices of both glass and yellow eel recruitment strongly declined from 1980 to 2011. Index values correspond to the recruitment as a percentage of the 1960–1979 geometric mean. Glass eel recruitment in the "North Sea" index area was 0.5% in 2022 (provisional) and 0.6% in 2021 (final). In the "Elsewhere Europe" index series it was 9.7% in 2022 (provisional) and 5.5% in 2021 (final). The yellow eel recruitment index for 2021 was 19% (final) of the 1960–1979 geometric mean. Time-series from 1980 to 2022 show that glass eel recruitment remains at a very low level. Figure 2-1 shows the recruitment trend for glass eels and yellow eels in Europe and Baltic/North Sea.

ICES cannot assess the exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined. The recruitment geometric mean between 1960–1979 is considered as a likely limit reference point (Rlim). Given that the current recruitment estimate has been below Rlim for many years, it is assumed that current biomass is below a likely Blim. Therefore, while stock-size reference points are also undefined, it is considered likely that the stock size is well below potential biological limit reference points.

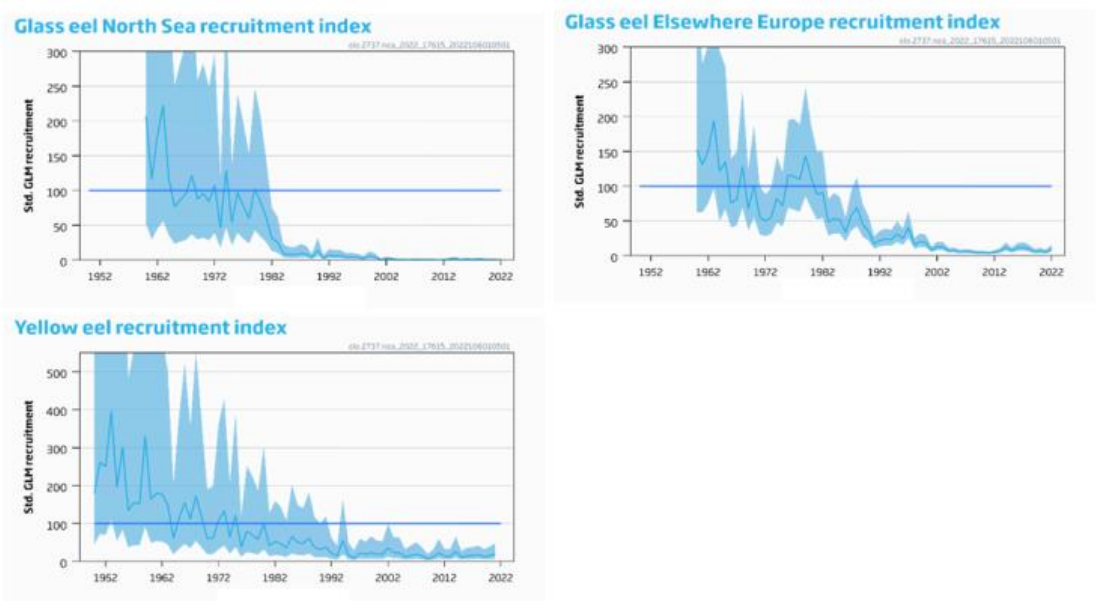

Figure 2-1 (ICES Advice): European eel. Indices, geometric mean of estimated glass eel recruitment for the continental "North Sea" (top-left panel) and "Elsewhere Europe" (top-right panel) series. A statistical model was fitted to 57 time-series comprising either pure glass eel or a mixture of glass and yellow eels (26 "North Sea" and 31 "Elsewhere Europe"). The results were scaled in percentage to the 1960–1979 geometric mean. The "North Sea" series are from Norway, Sweden, Germany, Denmark, the Netherlands, UK, and Belgium; the "Elsewhere" series are from UK, Ireland, France, Spain, Portugal, and Italy. In the Baltic area, recruitment occurs at the yellow eel stage only, and series are thus not included in the glass eel recruitment index. Bottom panel: estimated yellow eel recruitment trends for Europe. A statistical model was fitted to 22 yellow eel time-series and scaled in percentage to the 1960–1979 geometric mean. The series are from Denmark, Germany, Ireland, Sweden, France, and UK. The horizontal line on each panel represents the likely Rlim (calculated from the 1960–1979 geometric mean).

Link to Eel Advice 2022

ICES. 2022. European eel (Anguilla anguilla) throughout its natural range. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, ele.2737.nea, https://doi.org/10.17895/ices.advice.19772374

3 National Advice

There were no requests for ad hoc advice in 2022.

In 2021 the TEGE group recommended that a workshop be held between relevant stakeholders to include DECC, IFI and ESB, etc to review the existing National Management Plan. During the EU review of the regulation held in 2019 it was noted that very few Member States had reviewed the plans in the intervening years. This recomendation is becoming more pressing in light of the new EMFAF Data Collection Programme and international data call requirements.

Trade and movement of fish

It has come to our notice that as a result of Brexit the glass eels for Lough Neagh continue to access markets in France (totalling 319kg) whilst sources from the Severn (which were re-opened in June 2021 under CITES guidance to UK Government), provided 3 shipments totalling 1123kg delivered by inspected refrigerated road transit. As in 2020 we have brought this to the attention of IFI, DECC and the Marine Institute Health Unit and CITES representatives at NPWS. We believe this to be a potential risk of introducing invasive species to the island of Ireland. We note the measures implemented by the Lough Neagh co-operative and fisheries authorities in N Ireland to reduce this risk but the risk remains.

4 Management Actions – a scientific assessment

4.1 Introduction

There are four main management actions included in the Irish Eel Management Plans aimed at reducing eel mortality and increasing silver eel escapement in Irish waters. These are a cessation of the commercial eel fishery and closure of the market, mitigation of the impact of hydropower, including a comprehensive silver eel trap and transport plan, ensure upstream migration of juvenile eel at barriers and improve water quality including fish health and biosecurity issues.

Every three years, each Member State must submit details of;

- monitoring,
- effectiveness and outcome of Eel Management Plans
- contemporary silver eel escapement
- non-fishery mortality
- Policy regarding enhancement/stocking

4.2 Management Action No. 1 Reduction of fishery to achieve EU target

4.2.1 Introduction

The target set for the Irish Eel Management Plan was to have zero fishing mortality and reduce illegal capture and trade to as near zero as possible.
In May of 2009 Eamon Ryan, Minister for Communications, Energy and Natural Resources passed two Bye laws closing the commercial and recreational eel fishery in Ireland. The byelaw which prohibited the issuing of licenses was continued. However, on expiry of Bye law C.S. 312 of 2012, a new byelaw was required to prohibit the fishing for eel or possessing or selling eel caught in a Fishery District in the State for a further period until June 2018.

- Bye-Law No 858, 2009 prohibits the issue of eel fishing licences by the regional fisheries boards in any Fishery District.
- Bye-law No C.S. 303, 2009 prohibits fishing for eel, or possessing or selling eel caught in a Fishery District in the State until June 2012. (revoked).
- Bye-law No C.S. 312, 2012 prohibits fishing for eel, or possessing or selling eel caught in a Fishery District in the State until June 2015. (revoked).
- Bye-law No C.S. 312, 2015 prohibits fishing for eel, or possessing or selling eel caught in a Fishery District in the State until June 2018.

It should be noted that since EU Commission ratification of the Ireland/UK NWIRBD transboundary plan in March 2010, the fishery in the NI portion of the Erne was closed from April 2010.

In late 2018 the Department of Communications, Climate Change and Energy announced the creation of a Support Scheme for Former Eel Fisherpersons to address the hardship experienced by commercial eel fisherpersons.

Conservation of Eel byelaw No. C.S. 319, 2015 ceased to have effect on 30 June 2018 and has not yet been renewed.

4.2.2 Action 1a: Report closure of fishery

All management regions confirmed a closure of the eel fishery for the 2022 season with no commercial or recreational licences issued (Appendix 3). The eel fishery, with the exception of the strictly managed L. Neagh, also remained closed in N. Ireland in 2022.

4.2.3 Reports of illegal fishing activity

Ireland:

For the complete modelling of silver eel escapement, information is required on the levels of illegal fishing and illegal catch. Therefore, this information is required on an annual basis. A questionnaire was circulated to the IFI Regions and the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland and the Loughs Agency (Appendix 3), summarised into Table 4.1. Some illegal fishing was reported which led to some seizures of gear in the Shannon IRBD, Eastern RBD and the NorthWestIBD (Table 4-1). No seizures of eel dealers transport trucks have been reported and no illegal activity was reported in relation to the silver eel trap and transport programmes. The poor quality of the export data currently available to the TEGE makes it difficult to determine the level of illegal catch. There were no instances of seizures of illegal or undocumented eel shipments.

Transboundary:

No update for 2022

4.2.4 Action 1b: Recreational Fishery

The Bye Law No CS 319 2015 prohibiting the possession of eel caught in Ireland expired in June 2018 and has not been renewed.

4.2.5 Action 1c: Diversification of the Fishery

No update for 2022

Table 4-1 Details of illegal activity within the regions and transboundary Northern Ireland, 2022.

	ERBD	LA	DAERA	NWRBD	SHRBD	SERBD	SWRBD	WRBD Galway	WRBD Ballina
Silver T&T programme	No	No	nr	Yes	Yes	No	Yes	No	No
Illegal trading related to T&T	No	No	nr	No	No	No	No	No	No
Estimated level of illegal fishing	Low	n.a.	nr	Low	Low	None	None	None	None
Number of gear seizures	2			2	5	0	0	0	0
Gear types seized	Fyke, crayfish trap	n.a.	nr	fyke	Fyke	n.a.	n.a.	n.a.	n.a.
Number of eel dealer interceptions	0	n.a.	nr	0	0	0	0	0	0
Estimated tonnage on board	n.a.	n.a.	nr	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Declared origin of cargos	n.a.	n.a.	nr	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a.= not applicable, nr = not reported

4.3 Management Action No. 2. Mitigation of hydropower

4.3.1 Action 2a: Trap and Transport

The targets were set for the trap and transport system in the Irish Eel Management Plan 2009-2011 and these were subsequently modified, following the experience of the three year programme, for the 2012-2014 and 2015-2017 and 2018 – 2021 periods as follows:

***Shannon*:** Trap and transport 30% of the annual production (unchanged)
***Erne*:** Trap and transport 50% of the annual silver eel production. A rolling target on a 3-year basis allowing shortfalls in one year to be made up the following year. A consistent long-term shortfall could not be carried forward indefinitely.

***Lee*:** Trap and transport 500 kg of the annual escapement (unchanged)

4.3.1.1 2022 Trap and Transport Results

The total amounts of silver eel trapped and transported in each of the three rivers in 2022 are presented in Table 4-2 to 4-4. The separate detail sheets of the amounts transported from each site on each date are presented as an Appendix to this report (Appendix 4).

In the **River Shannon** the trap and transport total of 19,929 kg represented 54% of silver eel production (using the escapement estimate adjusted to account for nights not fished) and, therefore, exceeded the 30% target, the EMP requirement was met on the basis of the agreed (3 year rolling mean value) protocol (Table 4-2).

In the **River Erne**, the trap and transport annual target (50% of silver eel production) for the River Erne was exceeded in the 2022 season. The quantity (40 531 kg) transported for safe release at Ballyshannon represented 65% of the estimated silver eel production (61,941 kg) for the river system for the season (Table 4-3).

In the 2022/2023 season, fishing took place on the River Lee at several different locations between 15th September and 27th October 2022. The total catch was 1,087 kg, which exceeds the annual target for the river of 500 kg. This is another good catch following a similar level in 2021/22 (1,033 kg; Table 4-4). Additional effort in fishing was implemented in these years following a particularly low catch of 35 kg in 2018/19 season.

Table 4-2: Total amounts (t) of silver eel trapped and transported in the Shannon, 2009-2022, and the success relative to the targets set in the EMPs.

Year	Bbest	Bcurrent	HPS Mort kg	T&T Target	Amount Transported (kg)	Relation to target	3 yr Running Average
2009	74,382	66,788	4,095	30% of run	23,730	31%	31%
2010	68,920	60,170	8,210	30% of run	27,768	40%	36%
2011	65,558	57,885	7,673	30% of run	25,680	39%	37%
2012	67,931	58,836	9,095	30% of run	24,228	36%	38%
2013	79,970	70,775	9,195	30% of run	22,561	28%	34%
2014	70,725	62,980	6,950	30% of run	26,438	37%	34%
2015	70725*	65798*	4,656	30% of run	19,957	28.2%*	31%
2016	38,608	32,920	3,062	30% of run	16,711	43%	36%
2017	34,139	31,191	2,948	30% of run	16,737	49%	40%
2018	32,580	29,613	2,967	30% of run	16,411	50%	47%
2019	38,028	33,011	5,017	30% of run	11,853	31%	44%
2020	41,548	37,810	3,738	30% of run	21,229	51%	44%
2021	23,903	22,902	1,001	30% of run	18,751	78%	53%
2022	36,943	33,629	3,314	30% of run	19,929	54%	61%

Table 4-3 Total amounts (t) of silver eel trapped and transported in the Erne 2009-2022, and the success relative to the targets set in the EMPs. Note change of target on the Erne in 2012.

Year	Bbest	Bcurrent	HPS Mort kg	T&T Target	Amount Transported (kg)	Relation to target	3 yr Running Average
2009			20,960	22t	9,383	42.6	
2010	41,232	37,942	3,047	34t	19,334	56.9	46.9
2011	42,855	40,011	2,394	39t	25,405	65.1	59.3
2012	67,666	57,366	10,215	50% of run	34,660	51%	51%
2013	73,330	64,285	8,809	50% of run	39,319	54%	52%
2014	72,493	66,525	5,859	50% of run	48,126	66%	57%
2015	78,034	71,650	6,333	50% of run	54,706	56%	59%
2016	62,871	51,377	11,494	50% of run	38,264	61%	61%
2017	68,810	58,539	10,271	50% of run	43,470	63%	60%
2018	83,033	68,244	14,896	50% of run	47,004	57%	60%
2019	66,175	54,209	11,966	50% of run	39,651	60%	60%
2020	65,263	56,885	8,378	50% of run	46,957	72%	63%
2021	78,876	62,286	15,590	50% of run	45,000	57%	63%
2022	61,941	52,615	9,326	50% of run	40,531	65%	65%

Table 4-4 Total amounts (t) of silver eel trapped and transported in the Lee 2009-2022, and the success relative to the targets set in the EMPs.

Year	Bbest	Bcurrent	HPS Mort kg	T&T Target	Amount Transported (kg)	Relation to target	3 yr Running Average
2009				0.5t	79	16%	16%
2010				0.5t	278	56%	36%
2011				0.5t	731	146%	73%
2012				0.5t	230	46%	83%
2013				0.5t	824	165%	119%
2014				0.5t	670	134%	115%
2015				0.5t	527	105%	135%
2016				0.5t	44	9%	83%
2017				0.5t	542	108%	74%
2018				0.5t	35	7%	41%
2019				0.5t	1,098	220%	112%
2020				0.5t	1,082	216%	148%
2021				0.5t	1,033	207%	214%
2022				0.5t	1,087	217%	213%

4.3.1.2 Improvements to T+T programme

The fishing season has been extended in the Shannon and Erne, starting earlier and finishing later.

4.3.2 Action 2b: Quantify Turbine Mortality

4.3.2.1 Shannon

No update for 2022

4.3.2.2 Erne

No update for 2022

4.3.3 Action 2c: Engineered Solution

No update for 2022, in the Erne system the ESB have plans for smolt gates and surface deflection gate installation. Following planning and design it is expected construction will take place in 2024. In the lower Shannon an investigation by CDM Smith on mitigating fish passage is complete, the report is with the Department of Housing, Local Government and Heritage.

4.3.4 Action 2c: Other solutions

No update for 2022

4.4 Management Actions No. 3. Ensure upstream migration at barriers

Under the National Eel Management Plan, objective 7 requires the evaluation of upstream colonisation: migration and water quality effects. Lasne and Laffaille (2008) found that while eels are capable of overcoming a wide array of obstacles the resulting delay in migration can have an impact on the eel distribution in the catchment. Knowledge of what constitutes a barrier for eels (at different life stages) will assist in the estimation of eel population densities and escapement for future management plan reviews. The EU Habitats Directive (Directive 92/43/EEC) and Water Framework Directive (2000/60/EC) both require the assessment of barriers to fish migration.

4.4.1 Action 3a: Existing barriers (inc. small weirs etc.)

To fulfil its remit to produce a georeferenced database of barriers to fish passage on the Irish river network, the National Barriers Programme (NBP) team has performed a desk-based survey to identify potential barriers at a national scale, collating significant volumes of geospatial data from state agencies, such as the OPW, OSi, TII, Waterways Ireland, and Irish Rail, as well as historic IFI barrier surveys. This has produced a geodatabase of 73,076 potential barriers, which are being assessed using field surveys and desk-based analysis photographs or video of barrier sites. Using the IFI developed I-BAST application to date 24,523 structures have been assessed, 22,785 were classified as being 'not a barrier' with 7,429 classified as a 'potential barrier' requiring further work. Detailed assessments using the SNIFFER survey have been carried out on 233 structures in advance of mitigation works (Figure 4-1).

In the ESB operated Clady River a fish lift is being replaced with a vertical slot fish pass, this work is scheleded for 2024.

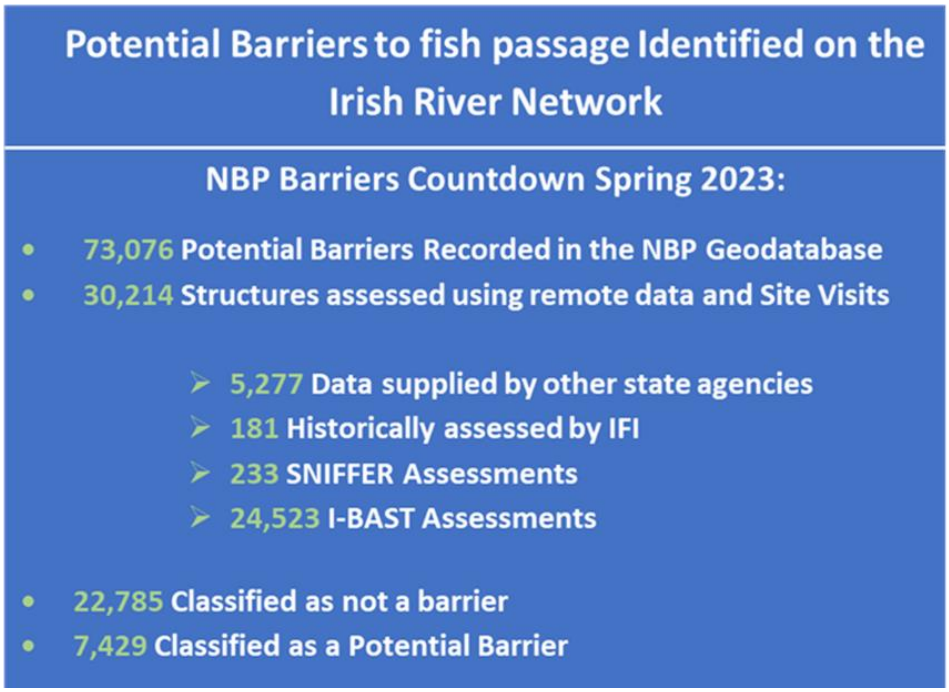

Figure 4-1 Summary description of barrier identification & mitigation.

Over the last number of years, the IFI Eel Monitoring Programme has assisted the NBP in assessing barriers in the eel index catchments, including the Fane, Kells Blackwater and Broadmeadow. In 2022, a further collaborative effort saw an assessment of the potential barriers on the River Bride and the River Araglin (Crinnaghtane) carried out by the EMP. A total of 238 sites were assessed. Of these, 33 were recorded as barriers and were marked for further assessment, the remaining 205 were either not barriers to fish migration or were marked for further assessment at a later date (n = 15), (Figure 4-2 and Figure 4-3).

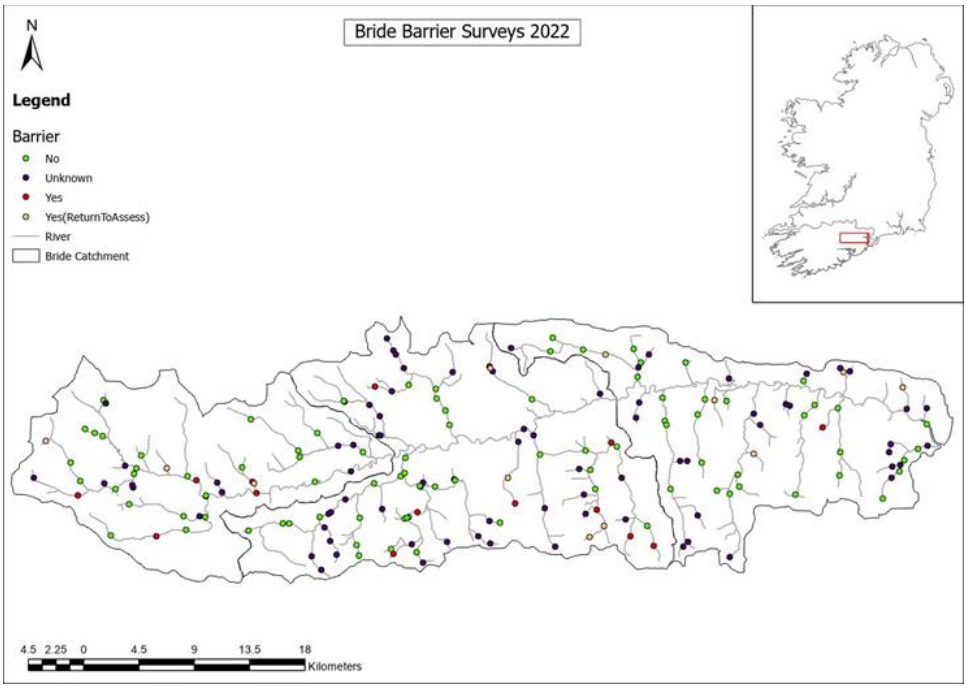

Figure 4-2 Barriers assessed on the River Bride catchment, 2022. Inset: Map of Ireland, with Southwestern River Basin District (SWRBD), (outlined) and Bride catchment (red box).

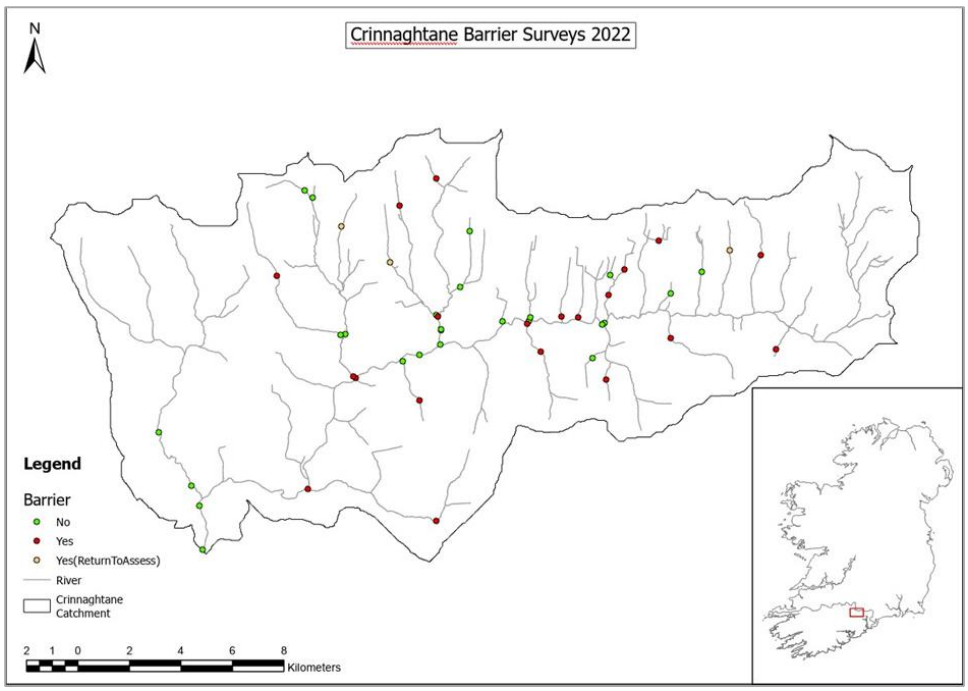

Figure 4-3 Barriers assessed on the River Araglin catchment, 2022. Inset: Map of Ireland, with Southwestern River Basin District (SWRBD), (outlined) and Araglin catchment (red box).

4.4.2 Action 3b: New potential barriers

IFI have created an internal group to review the 2012 'Guidelines for Small Scale Hydro Schemes'. The group had their first meetingon the 9th February 2023.

4.4.3 Action 3c: Assisted migration and stocking

Assisted upstream migration takes place at the ESB Hydropower Stations on the Shannon (Ardnacrusha, Parteen), Erne (Cathaleen's Fall), Liffey and Lee. This has been a long-term objective to mitigate against the blockage of the HPSs under ESB Legislation (Sec 8, 1935). On the Erne and Shannon, elvers and bootlace eel are transported upstream from the fixed elver traps. These programmes outlined in the EMP were continued in 2022. The catches shown in Tables 7.1 were transported upstream. On the Erne, the distribution of elvers throughout the catchment is by cross-border agreement between IFI and DAERA.

4.5 Management Action No. 4 Improve water quality

4.5.1 General water quality – Compliance with the Water Framework Directive

In October of 2022, the EPA reported on water quality for the period of 2016-2021. This report showed that over half (54%) of our surface waters are in good or better ecological status which means that nearly half (46%) are in unsatisfactory condition. Overall, water quality has generally declined. The number of water bodies in satisfactory condition in our estuaries and coastal waters has declined by almost 16% and 10% respectively since the last assessment (2013-2018). There has also been a relatively small decline in the water quality of our rivers and lakes (1% and 2.7% declines respectively). There has been a loss of quality status among formerly pristine, high status river sites. These declines are mostly attributed to agriculture, hydromorphology and forestry practices.

https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/WaterQuality_SummaryReport.pdf

4.5.2 WFD monitoring – fish

Inland Fisheries Ireland is responsible for delivering the fish monitoring element of the WFD in Ireland. Eel are included in the WFD (fish) monitoring of rivers, lakes and transitional waters. Summary reports are available for all sites surveyed (www.wfdfish.ie). All reports are uploaded to the website http://wfdfish.ie/.

Results from 2021 are reported in section 6.4 of this report.

4.5.3 Fish Kills

National fish kills are reported in the IFI annual reports and published online. A review of the data was carried out recently and the numbers in the table will have changed from previous TEGE reports.

http://www.fisheriesireland.ie/Corporate/corporate-publications.html

There were 21 reported fish kills in 2022 (Table 4-5 Fish kill data 2007 – 2022.Table 4-5).

Table 4-5 Fish kill data 2007 – 2022.

Year	No of Fish Kills
2007	18
2008	27
2009	13
2010	34
2011	26
2012	10
2013	36
2014	22
2015	23
2016	30
2017	14
2018	39
2019	20
2020	5
2021	41
2022	21

4.5.4 Prevalence of *Anguillicola crassus*

Considered ubiquitous across Europe and since last reported (Becerra-Jurado *et al.,* 2014) it continues to spread through Irish water courses. The agencies involve continue to monitor swimbladder health in monitoring sites from MI, IFI, LA and AFBI. There is a new PhD at Queens University assessing reproductive fitness and spawner quality of migrating silver eels from the heavily constrained waterbody community of Lough Erne; this work will look at A. crassus impacts along with other metrics for eel health.

(refers to Ch. 7.2.1 of the National EMP Report, 2008)

5.1 Introduction

The Council Regulation (EC) No 1100/2007 sets a target for silver eel escapement to be achieved in the long-term - 40% escapement of silver eels compared to the pristine level of escapement (pre 1980's). Ireland is therefore required to provide an estimate of contemporary silver eel escapement. The Regulation also requires post-evaluation of management actions by their impact directly on silver eel escapement. Quantitative estimates of silver eel escapement are required both to establish current escapement and to monitor changes in escapement relative to this benchmark. Furthermore, the sex, age, length and weight profile of migrating silver eels are important for relating recruitment or yellow eel stocks to silver eel escapement. Quantifying migrating silver eel between September and December, or even January/February the following year, annually is a difficult and expensive process but it is the only way of ultimately calibrating the outputs of the assessments.

Silver eels are being assessed by annual fishing of index stations on the Erne, Shannon, Burrishoole, Barrow and Fane catchments (Table 5-1). Figure 5-1 shows the sampling locations in 2021.

There are three monitoring objectives in relation to silver eels:

1. Synthesise available information into a model based management advice tool.
2. Estimate silver eel escapement (in collaboration with ESB, NUIG, Marine Institute)
3. Estimate silver eel escapement indirectly using yellow eels.

In Ireland escapement and mortality is calculated for two ESB catchments by the National University of Ireland Galway (Shannon, Erne), for the Burrishoole system by the Marine Institute and for the Fane and Barrow system by Inland Fisheries Ireland.

Table 5-1: The locations where silver eel escapement will be assessed.

Catchment	Priority	2021	2022	2023	Method
Erne	High	√	√	√	Coghill net / Mark-recapture
Shannon	High	√	√	√	Coghill net / Mark-recapture
Burrishoole	High	√	√	√	Trap
Fane	High	√	√	√	Coghill net / Mark-recapture
Barrow	High	√	√	√	Coghill net / Mark-recapture

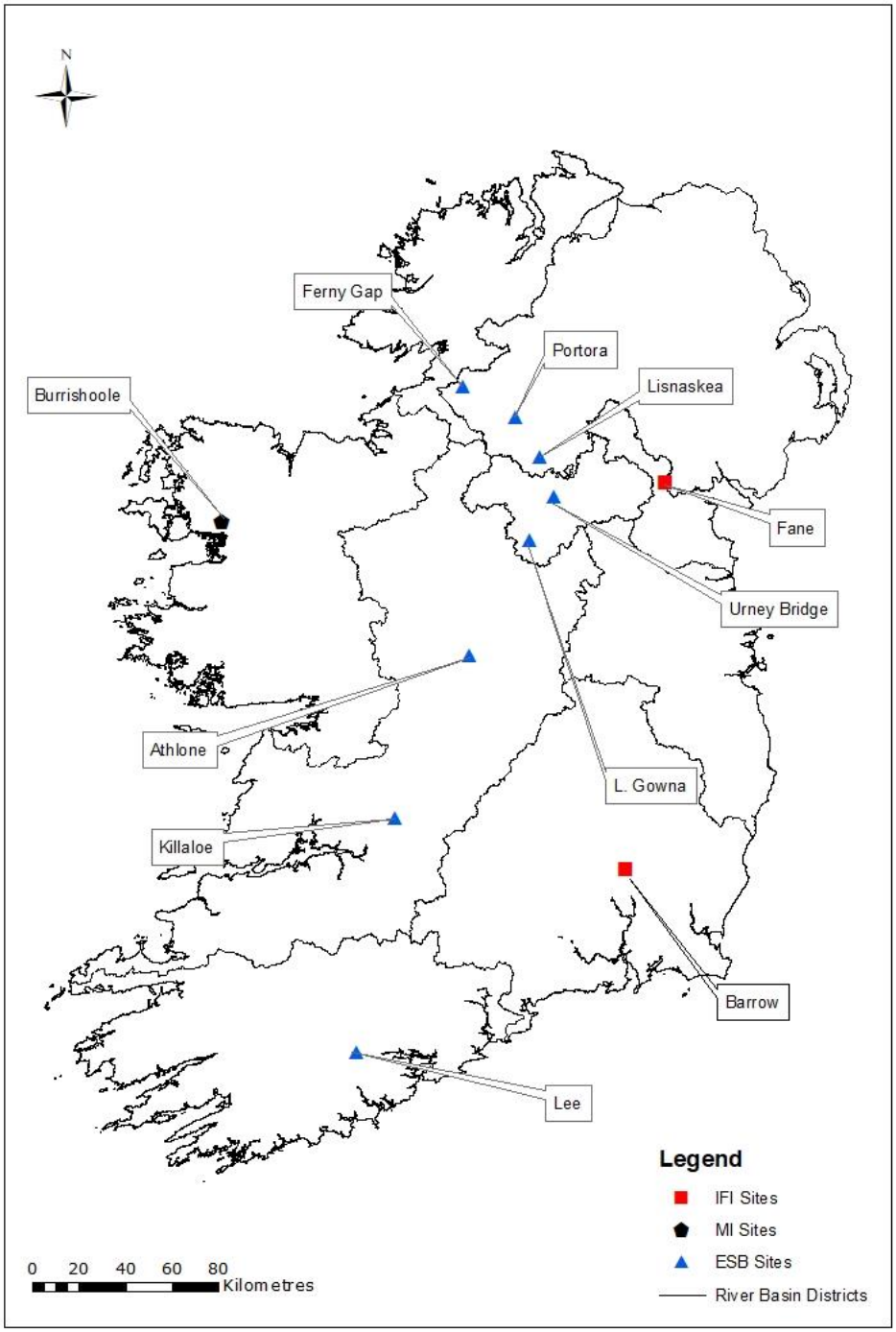

Figure 5-1 Silver eel monitoring locations, 2021.

Shannon

The River Shannon is Ireland's largest river, and its extensive lake ecosystems offer some of the country's best eel habitat. It has been the focus of much of the eel population studies in Ireland to date.

5.1.1 Catch

In 2022/23 season, conservation eel fishing was conducted at three sites: two at Athlone, and one at Killaloe (Figure 5-2). Fishing began on the last week of August 2022 at Athlone and the 19th October 2022 at Killaloe. Fishing ceased at Athlone on 28th December 2022, but continued at Killaloe until 24th January 2023. A total of 12,912 kg of eels were caught at Athlone (11,878 kg at the Jolly Mariner site and 1,034 kg at the Yacht Club site), and a further 7,017 kg were caught at Killaloe, giving an overall Trap and Transport catch of 19,929 kg (Figure 5-3). The overall Trap and Transport capture in 2022/23 is comparable with captures from the previous 2 years.

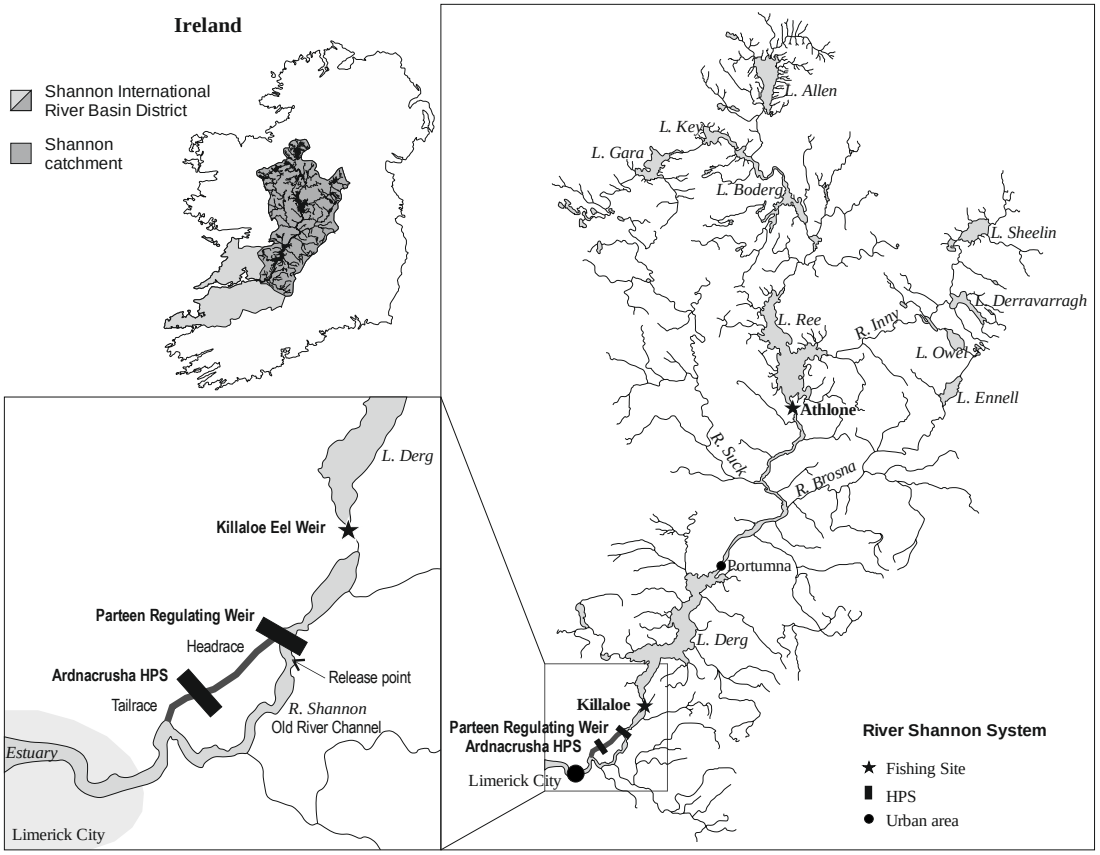

Figure 5-2 Map of River Shannon catchment with conservation fishing sites, release point and Ardnacrusha HPS indicated.

Daily catch rates at Killaloe are shown in Figure 5-4, along with variation in discharge and spillage. Discharge was variable during the season with little spillage. Highest catches were recorded during the last moon quarter in November 2022, and in January, which coincided with a period of relatively high discharge.

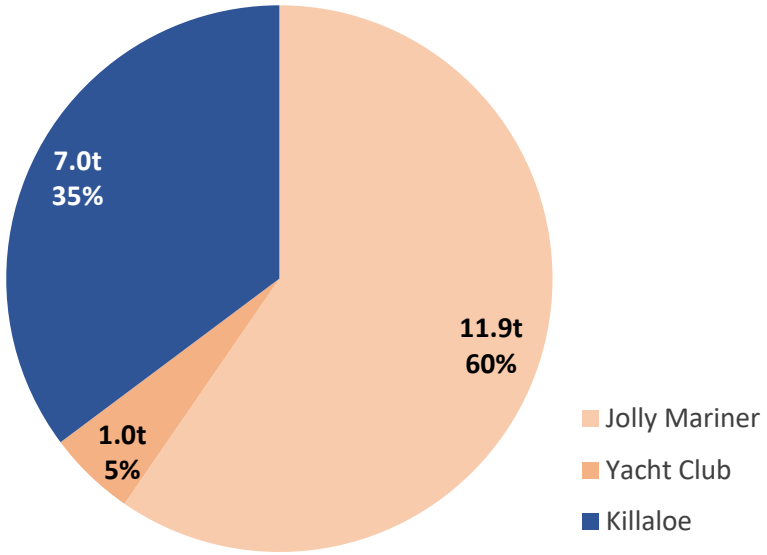

Figure 5-3 The relative quantities of silver eels contributed by fishing crews to the River Shannon T&T during the 2022/2023 season

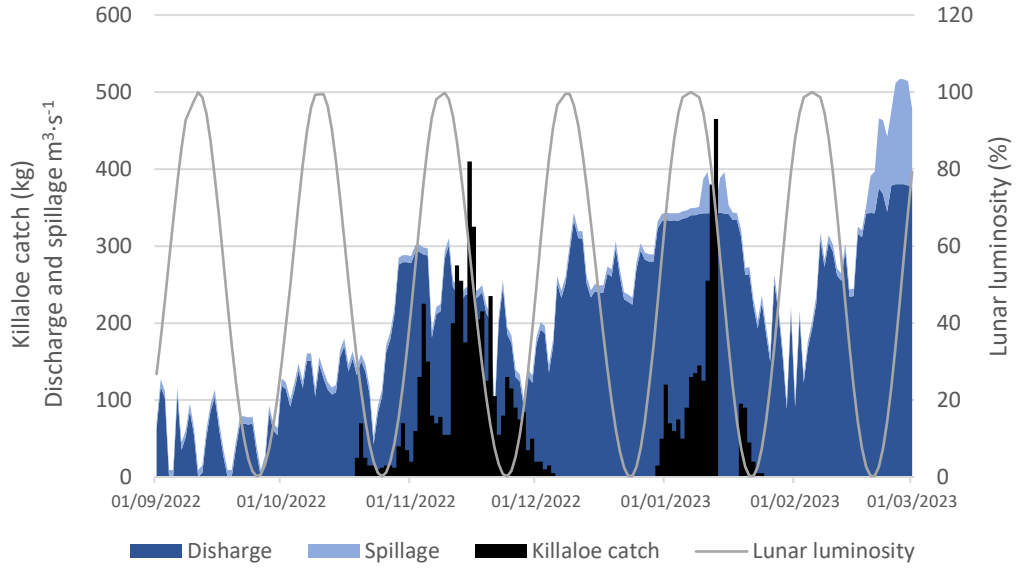

Figure 5-4 The seasonal variation in daily catches at the Killaloe eel weir during the 2022/23 fishing season together with variation in discharge via Ardnacrusha and as spillage to the Old River Shannon channel

5.1.2 Mark Recapture

No update for 2022

5.1.3 Production and Escapement

Production and escapement figures for the River Shannon are summarised in the flow diagram (Figure 5-5). Production of 36,943 kg is estimated by the trap and transport catch at Killaloe using the fishing efficiency rate of 29.2%, together with the catch from the two Athlone sites. This fishing efficiency rate at Killaloe is based on Mark-Recapture experiments (n = 14) conducted by the University of Galway from 2016/17 – 2019/20 (MacNamara *et al.,* 2014; Lenihan *et al.,* 2021). In total 19,929 kg (53.9% of production) was moved beyond the hydropower station through trap and transport. Of the 17,014 kg that moved beyond Killaloe weir, it is estimated that 1,344 kg (7.9 %) migrated via the Old River Channel. This is determined by the amount of spillage to the Old River Channel, using a regression model based on historical telemetry studies of route selection (MacNamara *et al.,* 2014). An estimated 21.15% mortality (3,314 kg) at Ardnacrusha hydropower station of the 15,670 kg that entered the headrace, leaves 12,356 kg progressing downstream. This gives an escapement of 33,629 kg, or 91.0 % of production.

The estimates of production and escapement, together with trap and transport quantities for the last five years are comparable except for the 2021/22 season, where production was 13 t lower. The value of escapement as a percentage of production remains high, ranging from 86.8% to 95.5%. An explanation of how calculations are carried out is available in Appendix 5 Figure A5-1.

Current and annual figures for production and escapement for the Shannon are shown in Table 5-2. An explanation of how calculations are carried out is available in Appendix 5 Figure A5-1.

Table 5-2 Production and escapement estimations on the River Shannon from 2016

Year	Production (kg)	Escapement (kg)	% of Production
2022/23	36,943	33,629	91%
2021/22	23,903	22,902	95.8
2020/21	41,548	37,810	91
2019/20	38,028	33,011	86.8
2018/19	32,850	29,613	90.9
2017/18	34,139	31,191	91.4
2016/17*	38,608	32,920	85.3

*Figure raised to account for gaps in fishing due to flood event

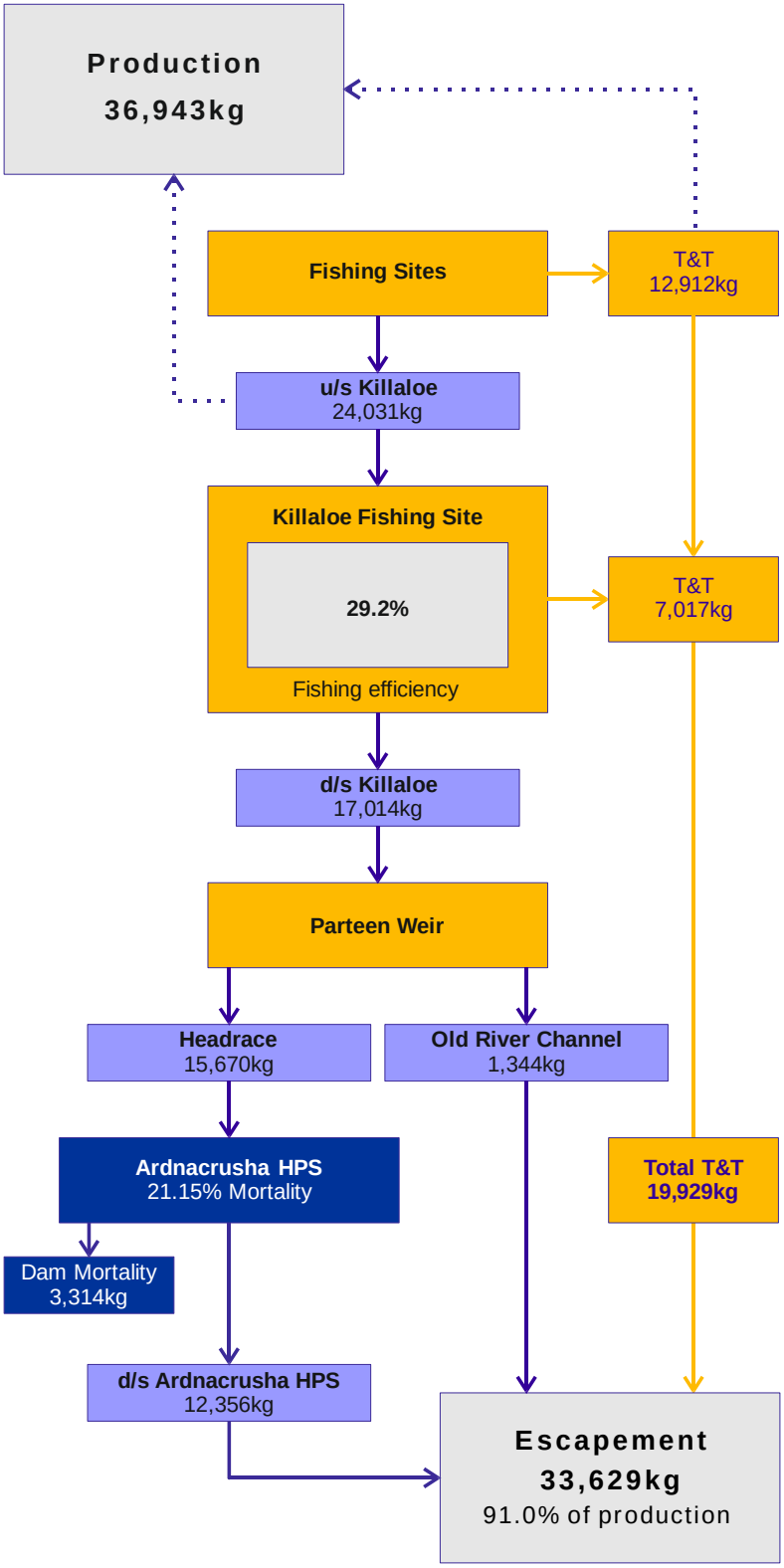

Figure 5-5 A summary of the analysis of silver eel production and escapement in the River Shannon during the 2022/23 eel migration season. See Appendix 5 for further explanation

5.1.4 Length

No length frequencies for 2022

5.2 Burrishoole

The only total silver eel production and escapement data available in Ireland is for the Burrishoole catchment in the Western RBD, a relatively small catchment (0.3% of the national wetted area), in the west of Ireland. The Burrishoole consists of rivers and lakes with relatively acid, oligotrophic, waters (Figure 5-6). The catchment has not been commercially fished for yellow eels, has not been stocked and there are no hydropower turbines.

The eels have been intensively studied since the mid-1950s; total silver eel escapement from freshwater was counted since 1970 (Poole *et al*., 1990; Sandlund *et al*., 2017; Poole, data unpublished); and an intensive baseline survey was undertaken in 1987-88 (Poole, 1994). The detailed nature of the Burrishoole data makes it suitable for model calibration and validation (e.g. Dekker *et al.,* 2006; Walker *et al*. 2011).

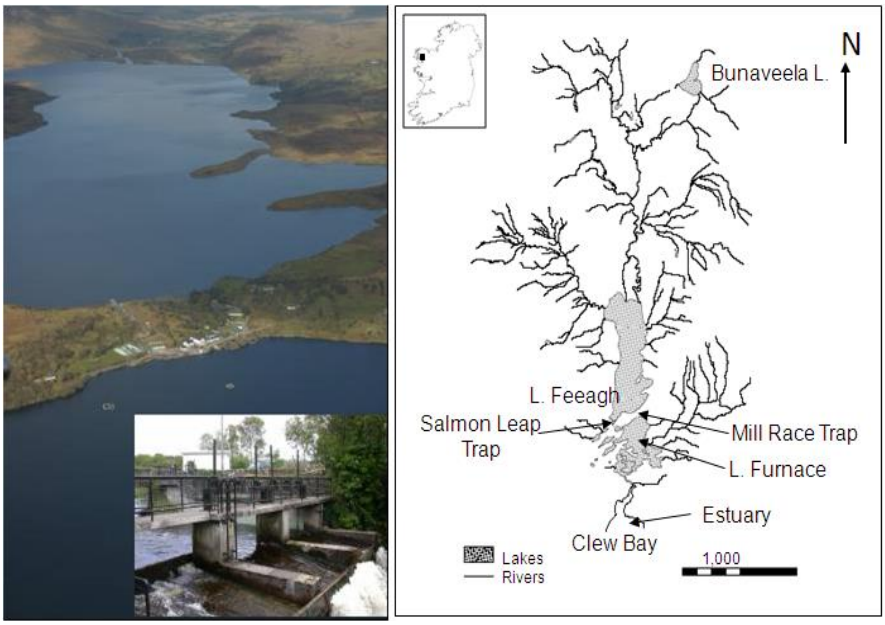

Figure 5-6 An aerial view of the Burrishoole catchment, looking north over the tidal Lough Furnace, in the foreground, and the freshwater Lough Feeagh: inset shows the silver eel downstream trap at the "Salmon Leap". A map of the Burrishoole catchment showing the locations of the traps

5.2.1 Catch

The total run amounted to 3,780 eels (up to April) the highest count recorded since 2003. As in other years, the highest proportion of the total catch (75%) was made in the Salmon Leap trap. The silver eel season in 2022 opened early with some silvers being recorded in June and July. A flood in early August gave a small pulse of eels but low water levels delayed any further activity until early October. A sequence of floods from early October facilitated the run in a series of three periods with most eels migrating in October. A final large flood in late December/early January yielded a few eels (Figure 5-7). Some individuals continued to be counted until mid-April 2023.

In 2022, the timing of the run was 3% migrating up to the end of August, 9% in September and 68% in October (Table 5-3). Figure 5-7 shows the daily counts of silver eels.

Table 5-3 Timing and numbers of the 2022/2023 silver eel run.

	Salmon Leap	Mill Race	Total	%
May	0	1	1	0.0
June	9	6	15	0.4
July	12	4	16	0.4
August	67	28	95	2.5
September	241	106	347	9.2
October	1871	710	2581	68.3
November	516	79	595	15.7
December	81	3	84	2.2
Jan. 2023	22	1	23	0.6
February	10	1	11	0.3
March	7	1	0	0.0
April	4	0	0	0.0
Total	2840	940	3780	

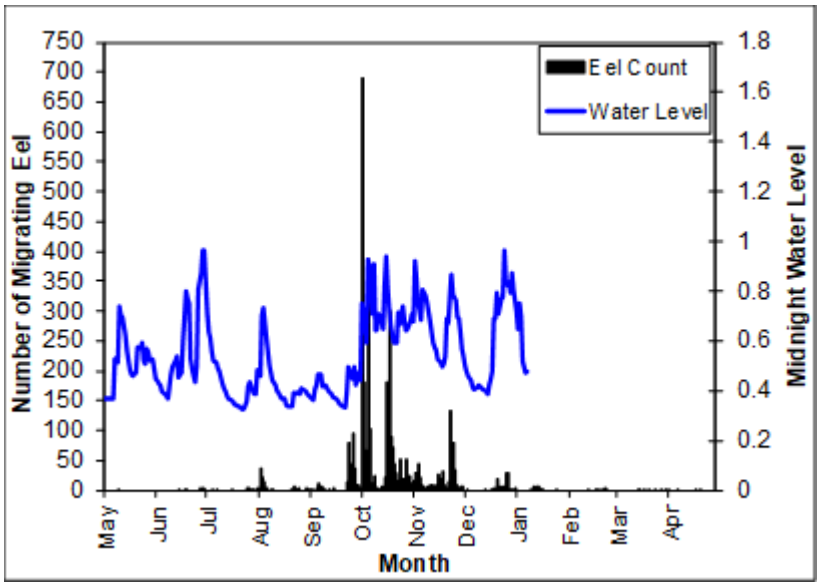

Figure 5-7 Daily counts of downstream migrating silver eel and mid-night water levels (m).

5.2.2 Length, weight & sex

Sampling of individual eels (n = 1,255) gave an average length of 41.4 cm (range: 25.8 – 96.3 cm), an average weight of 151 g and the proportion of male eels was 45.7%. The length frequency is presented in Figure 5-8 along with those 2020 and 2021 for comparison. The lack of eels above 46/47 cm was once again notable and a notable decline in size of males was also evident.

The long-term trend in numbers and average weight is presented in Figure 5-9. The mean weight has dropped to an average of about 166g in the last three years and the sex ratio in 2021 of 50.4% males was the highest recorded since 1990.

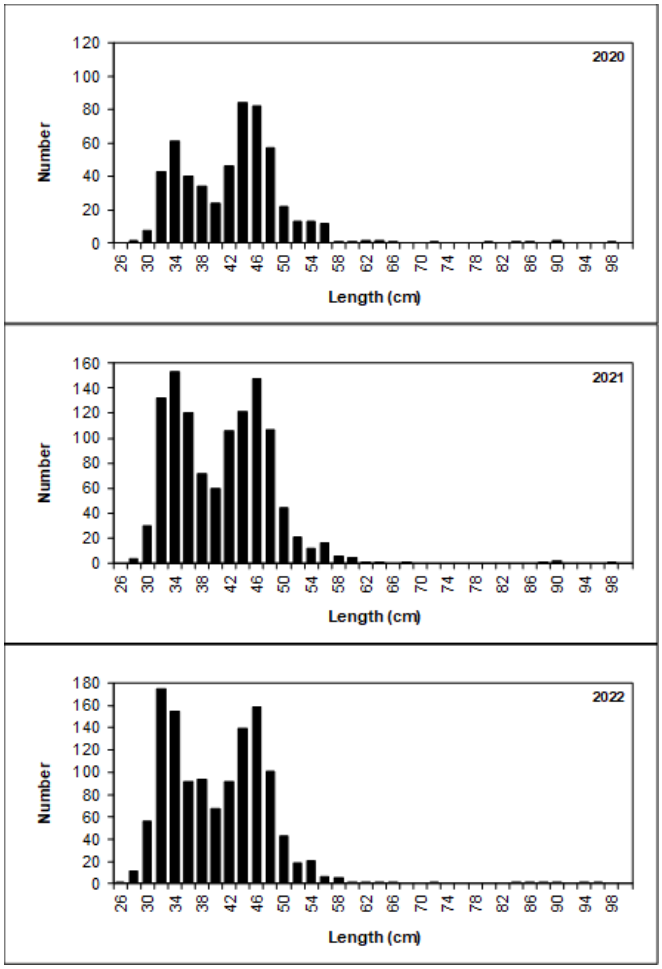

Figure 5-8 Length frequency of samples of silver eels trapped in the Burrishoole downstream traps, 2020 (555), 2021 (1,165) and 2022 (1,255). Note one eel at 25.8 cm was plotted as 26 cm

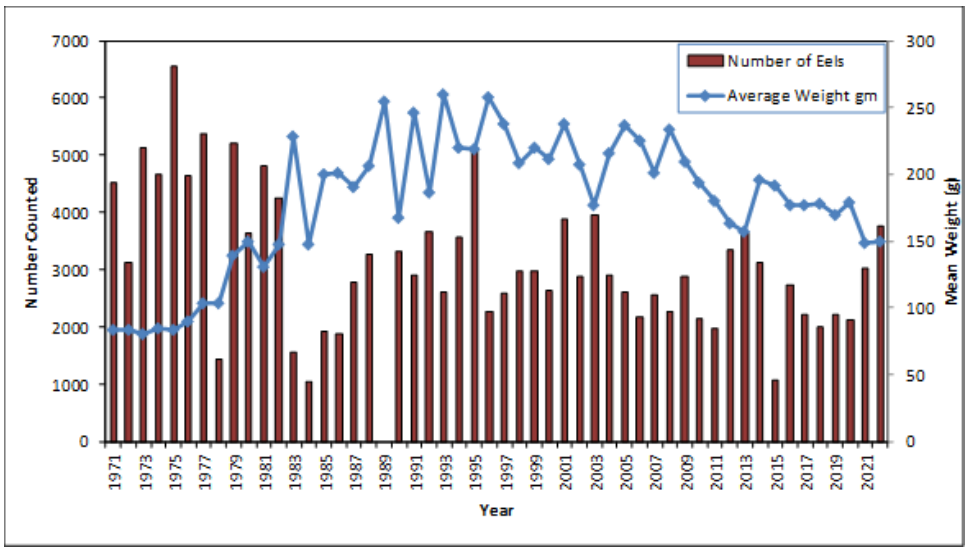

Figure 5-9 Annual number and mean weight of silver eels trapped in the Burrishoole downstream traps.

5.3 Erne Transboundary

The River Erne, a transboundary system, is the second largest river system in Ireland, with an extensive lake habitat. The River Erne conservation fishery and trap and transport (T&T) programme was monitored by researchers from the Agri Food and Biosciences Institute (AFBI) and the National University of Ireland (NUIG).

5.3.1 Catch

In 2022 the River Erne system was fished at 5 sites and the locations of these are indicated on the map (Figure 5-10). Roscor Bridge, the lowermost site, was not fished during 2022/2023 season. Fishing on other sites started in the last week of August 2022 and finished December 2022, except Ferny Gap, which fished until the first week of March 2023. The total catch contributed to the Trap and Transport programme weighed 40,531 kg. The proportions caught at each site are shown in Figure 5-11. The total T&T catch in 2022/23 season was comparable with quantities obtained in previous years.

The variation in the daily catches at the Ferny Gap fishing site are shown in Figure 5-12, with catch levels (and therefore fish migration) affected by discharge level and lunar cycle stage.

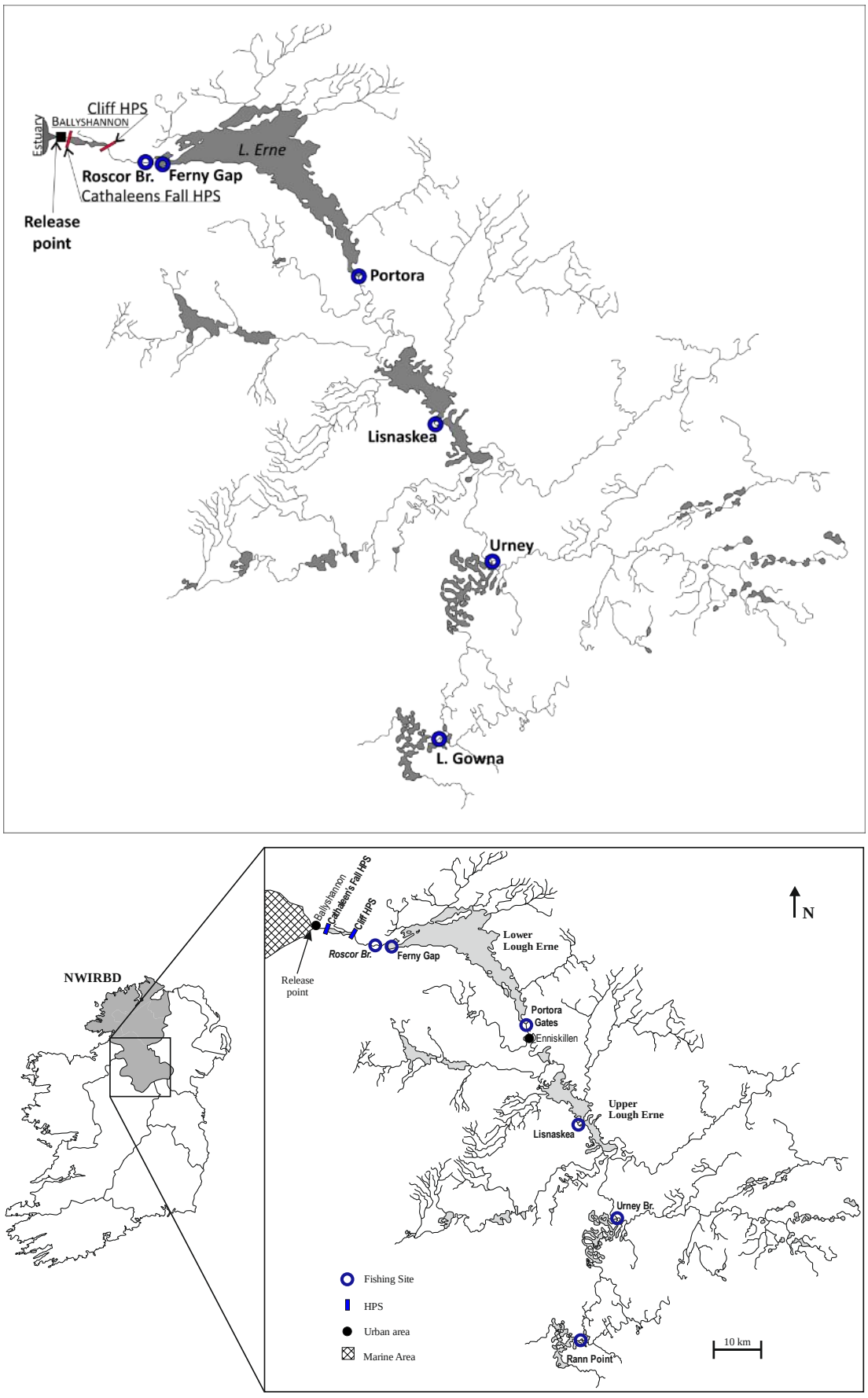

Figure 5-10 Map of River Erne catchment with conservation fishing sites, release point and hydropower dams indicated.

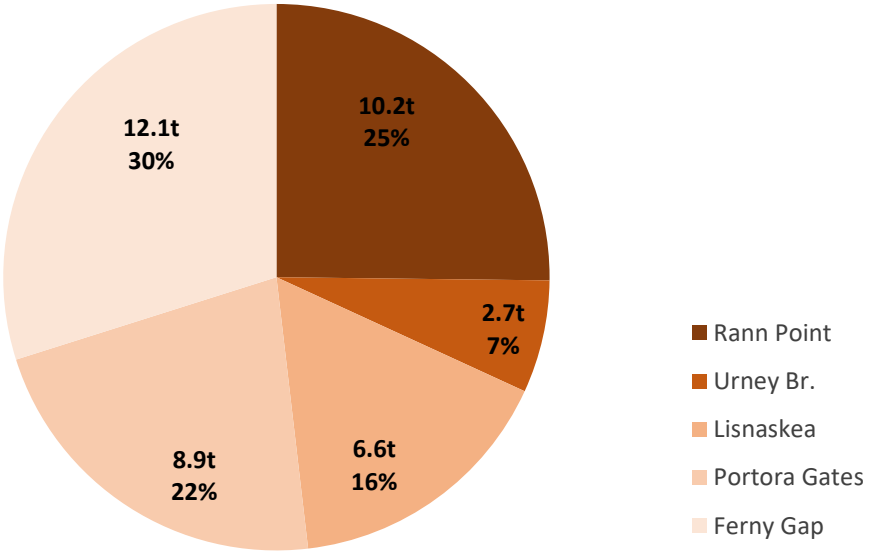

Figure 5-11 Proportions of the River Erne trap and transport catch obtained by each fishing crew in the 2022/2023 season.

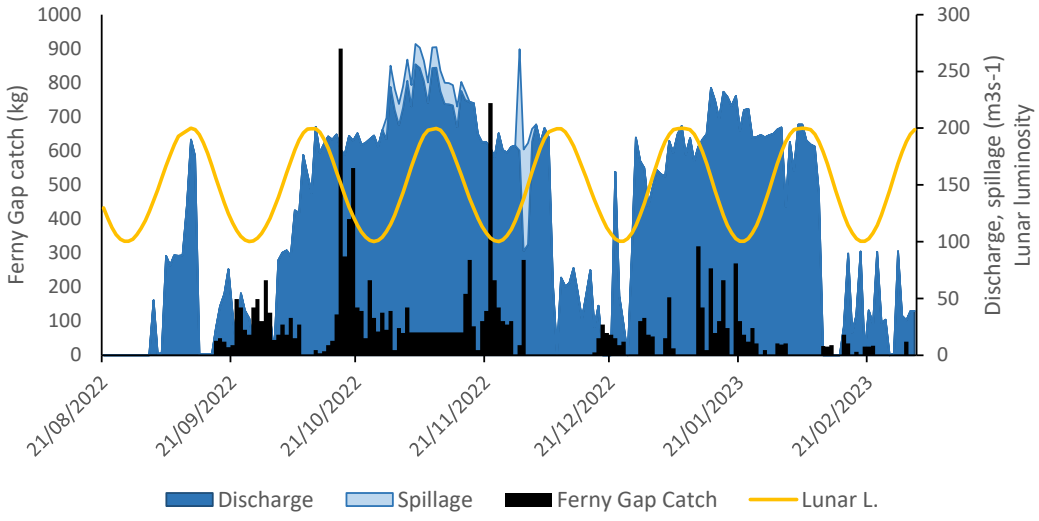

Figure 5-12 Variation in daily catches at Roscor Bridge fishing site, in relation to lunar cycle and discharge during the 2022/23 season

5.3.2 Production and Escapement

Although not fished during the 2021/22 and 2022/23 season, the Roscor Bridge site is vital to the analysis of silver eel migrations and to the calculation of eel production and escapement for the River Erne (Figure 5-13). The site, located 750 metres downstream of the outflow point of lower Lough Erne (Figure 5-10), provides a discrete river section from which it is possible to accurately assess the biomass of uncaptured eels. In previous years this biomass has been estimated based on daily catch records at Roscor Bridge combined with the results of extensive mark–recapture experiments (McCarthy *et al.,* 2019). However, it was noted in previous seasons that Roscor Bridge had limitations as a monitoring site with low discharge and catch

levels frequently leading to prolonged periods of fishing crew inactivity. When this occurred, catch records required for the calculation of production were unavailable. This prompted the development of alternative monitoring protocols capable of assisting with the quantification of eel migrations at this site in the absence of T&T catch records.

Based on over a decade of scientific observation, it is possible to predict catch levels on Roscor Bridge fishing site (McCarthy *et al.*, 2014,McNamara *et al.*, 2014; Lenihan *et al.*, 2021). In 2022/2023 silver eel migration season, it was estimated that the total catch would be 3,331 kg at Roscor Bridge fishing site. 40,531 kg of eels were moved by trap and transport from the five fishing sites upstream of Roscor Bridge. Fishing efficiency rates for calculating production and escapement were based on several mark/recapture experiments carried out by the University of Galway, at the experimental fishing site at Roscor Bridge from 2010/11 to 2015/16 at low discharge (< 130 m3·s-1= 9.78%) and high discharge (> 130 m3·s-1= 18.43%) (McCarthy *et al.*, 2016; McCarthy *et al.*, 2019). These were used with estimated Roscor Bridge catch (3,331 kg) to calculate the biomass of eels arriving there (21,410 kg), based on the flow conditions throughout the season.

The silver eel production was estimated to be 61,941 kg (Figure 5-13), and escapement was estimated to be 52,615 kg (84.9% of production). The trap and transport catch of 40,531 kg at the five fishing sites represented 65.4% of the production (exceeding the 50% target by 9,561 kg). 21,410 kg of eels are estimated to have passed the weir and moved through the hydropower stations at Cliff and Cathaleen's Fall. Mortality at each station is based on historic telemetry work conducted by the University of Galway (McCarthy *et al.*, 2014) at the two stations, depending on the operations of the dams throughout the season. Total mortality was estimated to be 5,413 kg at Cliff and 3,913 kg at Cathaleen's Fall (Table 5-4) Table 5-4 Mortality rates (based on unpublished NUIG telemetry results) at two hydropower stations, depending on station operation.

In total, 12,084 kg of eels are estimated to have navigated beyond the hydropower stations, and with the trap and transport quantity of 40,531 kg, a total escapement of 52,615 kg is estimated. The average value of escapement as a percentage of production was 83.3% in last five years, where in 2022/23 season it is 84.9%. The estimates of production and escapement, together with trap and transport quantities for last five subsequent years are similar, and do not present any significant trend.

Table 5-4 Mortality rates (based on unpublished NUIG telemetry results) at two hydropower stations, depending on station operation.

Operation	Cliff	Cathaleen's Fall
No flow	0%	0%
Generation & Spillage	7.9%	7.7% (half load) 15.4% (full load)
Generation only (no spillage)	26.7%	27.3%
Overall mortality 2018/19	19.6%	26.8%
Overall mortality 2019/20	23.9%	25.5%
Overall mortality 2020/21	25.4%	27.3%
Overall mortality 2021/22	26.7%	27.3%
Overall mortality 2022/23	25.3%	24.5%

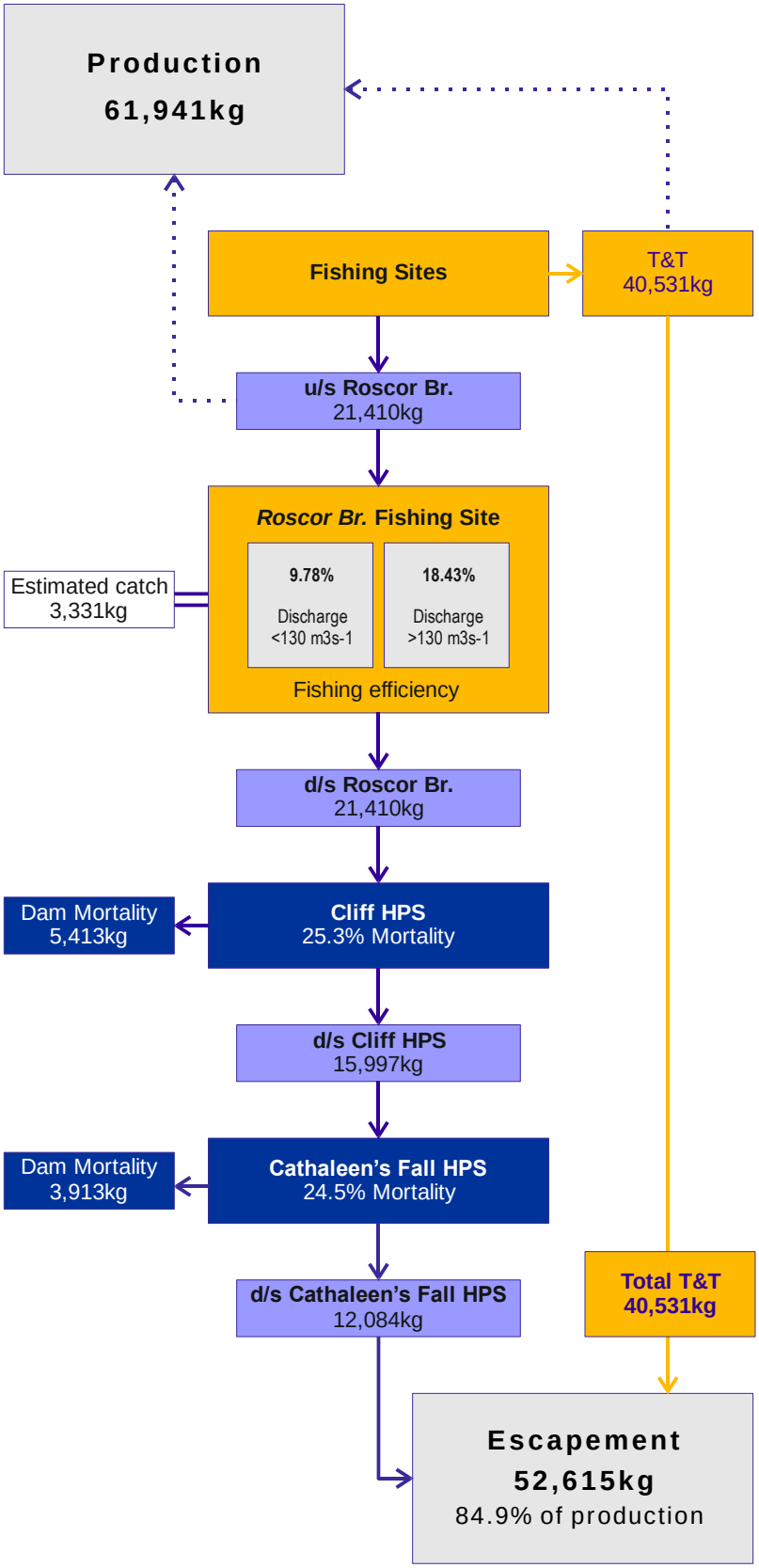

Figure 5-13 A summary of the analysis of silver eel production and escapement in the River Erne during the 2022/2023 eel migration season. See Appendix 5 for further explanation.

5.3.3 Length Frequency

No length frequencies for 2022; see next section for length frequencies by AFBI.

5.3.4 AFBI Length Frequency

By way of the request from EU COMM and TEGE for additional data to enhance the calculations of silver eel production from those EMU's impacted by hydro and operated under T&T fisheries This data has been a requirement under the EMP, but is now also required to fill out the eel data calls for eels being released – i.e. to convert from biomass to numbers and provide an indication of gender. AFBI undertook an extended season long effort to measure the length frequencies of the silver eel caught at the Erne T&T sites within NI jurisdiction, (and assisted with one visit to the site in Gowna in November only).

- Ferny Gap (September – February)
- Portora (August – December)
- Lady Craigavon Bridge (ULE). (September – December)

These analyses were focused on the key lunar darks throughout Autumn and Winter of 2022/23 up until the point that fishing ceased mid-February, the season having been extended through until April 2023. Every eel captured or held in tanks for that respective fishing period was measured.

A total of 3,615 eels were measured for length with summary stats presented in Table 5-5. Individual length frequencies for this data set have been provided to the TEGE for necessary production calculations and for storage on the new all Ireland database.

Table 5-5 Erne silver eel length measurements and summary stats for 2022 (NI sites only).

Location	Date	n	Mean Length (mm)	Min	Max
Ferny Gap	26th Aug	n/a	n/a	n/a	n/a
Ferny Gap	27th Sept	283	587	400	995
Ferny Gap	24th Oct	311	547	340	880
Ferny Gap	22nd Nov	361	577	360	850
Ferny Gap	01st Dec	130	576	440	910
Ferny Gap	13th Jan	253	605	340	1000
Ferny Gap	01st Feb	209	613	300	980
Ferny Gap	22nd Feb	150	656	380	920
Portora	26th Aug	182	651	430	930
Portora	26th Sept	233	683	450	998
Portora	25th Oct	324	656	340	940
Portora	21st Nov	305	647	340	960
Portora	18th Dec	86	692	390	880
ULE Lisnaskea	26th Aug	n/a	n/a	n/a	n/a
ULE Lisnaskea	25th Sept	146	697	520	890
ULE Lisnaskea	23rd Oct	142	688	360	930
ULE Lisnaskea	20th Nov	310	659	380	980
ULE Lisnaskea	01st Dec	190	673	350	1000

5.3.5 Lough Erne Silver eel health and spawner quality survey overview

5.3.5.1 Introduction

The 2022 Lough Erne silver eel survey was completed alongside the annual Trap and Transport length frequency analysis conducted by AFBI from November 2022 to February 2023. The results from this survey are being applied to a QUB PhD assessing reproductive fitness and spawner quality of migrating silver eels from the heavily constrained waterbody community of Lough Erne. Due to constraints at the outflow of this system, namely, two hydro-electric dams leading from Erne, migrants from this system encounter difficulties accessing the sea. The overarching aim of this PhD is to examine how constrained access of eels to the sea impacts individual migrating spawners, the ensuing reproducing eel communities in the Atlantic Ocean, and consequences impacting juvenile eel communities across the range of the European eel. The data produced from this PhD complements recommendations within WGEEL reports (ICES, 2021) to examine the effect of sublethal impacts, with a focus on contaminant exposure and parasites/diseases, on spawner quality subsequently the ability of silver eels to successfully migrate.

To quantify silver eel reproductive fitness and the quality of spawners leaving these systems, several health parameters will be assessed.

- examining female fecundity by egg count
- Macroscopic examinations will be employed to assess the prevalence and mean intensity of endohelminth parasites within the gut and swim bladders
- examining the viral load of haematological viral pathogens.
- Contaminant presence, type and concentrations within the body fat will be assessed using mass-spectrometry techniques with focus on heavy metal pollutants.
- On top of these assessments, percentage body fat will be assessed with non-invasive Distell fat meter techniques followed by comparative laboratory calorimetric lipid analysis.

These new assessments into the spawner quality of European eels on Lough Erne builds upon an existing knowledge base of biological quality parameters, addressing conservation efforts and potentially advising in the modification of existing eel management policies locally and across Europe. Within Lough Erne, a total sample size of 100 eels spread across males (n=50) and females (n=50) were collected from known trap and transport conservation fishing sites within Upper and Lower Lough Erne, shown in Figure 5-14, between November 2022 and January 2023. Length, weight, and body fat analysis using a handheld distell fat meter were recorded along with prevalence and intensity of the swim bladder parasite Anguillicola crassus as basic biometric data at the site prior to the removal of the digestive tract, gonads and liver for laboratory analysis and the removal of the head for cranial dissection and otolith age analysis. The remaining carcasses were frozen for examination contaminants within body fat along with lipid analysis. From these recommendations, the creation of a Silver eel quality database for lough erne will be produced over the 3 consecutive years. To ensure consistency of the data collection samples will be collected from the same fishing sites and using similar methodologies. An in-depth silver eel database will also be developed for Lough Neagh as part of the PhD. This will allow for not only the fulfilment of ICES recommendations but will also provide a novel comparison of two separate large lake systems to be completed. An extract of the preliminary findings from the first survey connected to the Lough Erne silver eel quality database is produced below with more detailed outputs to follow in a future thesis submission.

Figure 5-14 Map of Trap and transport sites used on (A) Lower Lough Erne and (B) Upper Lough Erne.

5.3.5.2 Results

5.3.5.2.1 Length / Weight Relationship

A summary of the samples collected within the 2022 L. Erne silver eel health and quality survey is produced in Table 5-6. A strong length/weight relationship [R2 0.92] was also recorded for eels captured and processed during this survey (Figure 5-15).

Table 5-6 Summary statistics of 2022 silver eel survey on L. Erne

	N	Mean Length	Max Length	Min Length	Mean Weight	Max Weight	Min Weight
All	100	544	990	310	402	2117	48
Male	50	383	455	310	92	145	48
Female	50	704	990	521	712	2117	270

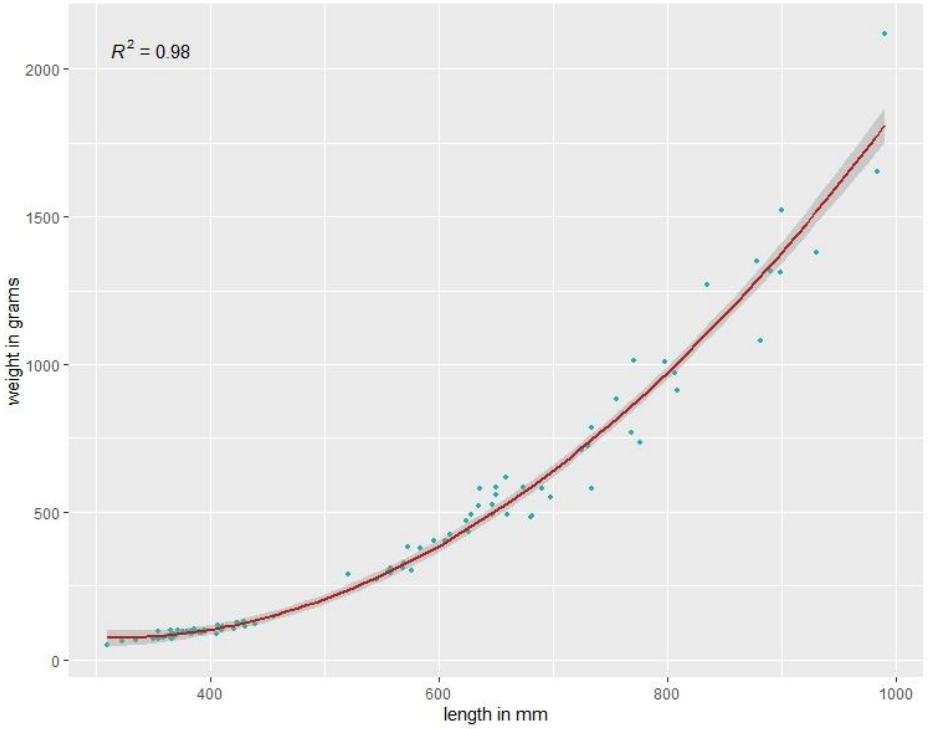

Figure 5-15 Length/weight relationship from 2022 silver eel survey on L. Erne (n=100)

5.3.5.2.2 Silver eel Fat content

Preliminary fat content measurements using a Distell handheld fat meter show a mean percentage body fat of 20.6% (n=100). Results as shown in

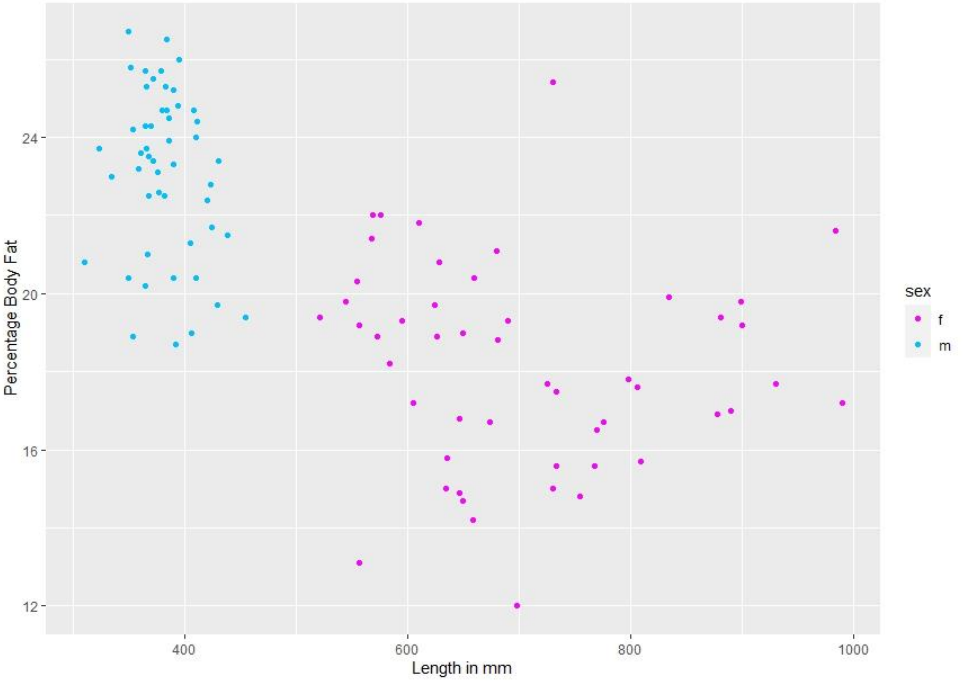

Figure 5-16 show a clear divide in percentage body fat between males (mean body fat = 20.1%, n=50) and females (mean body fat = 18.1%, n=50) with male individuals displaying generally high body fat percentages than female counterparts.

Previously, WKPGMEQ (ICES, 2015) reported the Distell Fat meter to be inaccurate for the measurement of individual eel samples, particularly on silver eel individuals. Inconsistencies in the outputs of this device have been suggested to be due to differences in the water content between eel life stages (Tesch, 2003). To account for any discrepancies within this dataset, a detailed laboratory calorific lipid analysis will be conducted as a standardised methodology with an attempt to produce a silver eel fat meter correction factor based on similar attempts by Pohlmann *et al.,* (2018).

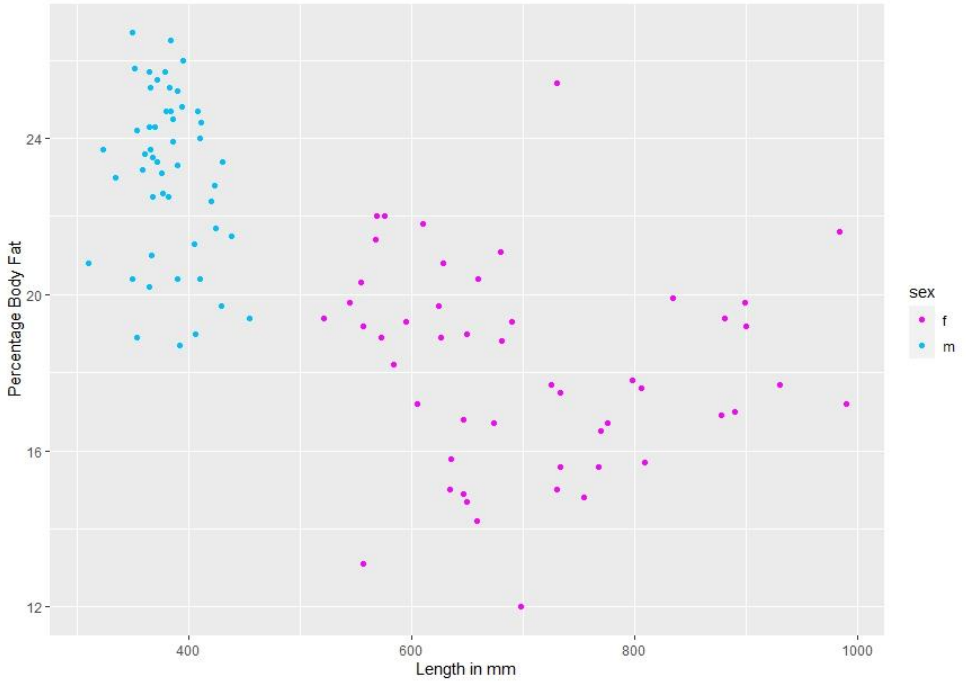

Figure 5-16 Fat content from 2022 L. Erne silver eel health and quality survey (n=100)

5.3.5.2.3 *Anguillicola crassus*

This project has provided the first update on *A.crassus* infection parameters in Erne silver eels since 2000. The prevalence and infection intensity of the invasive swim bladder nematode Angu*ilicola crassus* was examined as part of the spawner quality assessment within this survey. Table 5-7 shows the prevalence of this parasite within all samples (n=100) with comparisons made between males (n=50) and females (n=50). Figure 5-17 demonstrates the quantity of swim bladders assessed within this survey that are opaque versus translucent possibly suggesting that although the prevalence of *A. crassus* within the samples was 66%, a large number of individuals from the population had previous infections.

Table 5-7 parasite infection parameters of invasive swim bladder parasite A. crassus collected during L. Erne silver eel survey.

	Mean Intensity	Max Intensity	Min Intensity	% prevalence
All	4.42	39	0	66
Male	4.74	39	0	33

Female	4.42	39	0	33

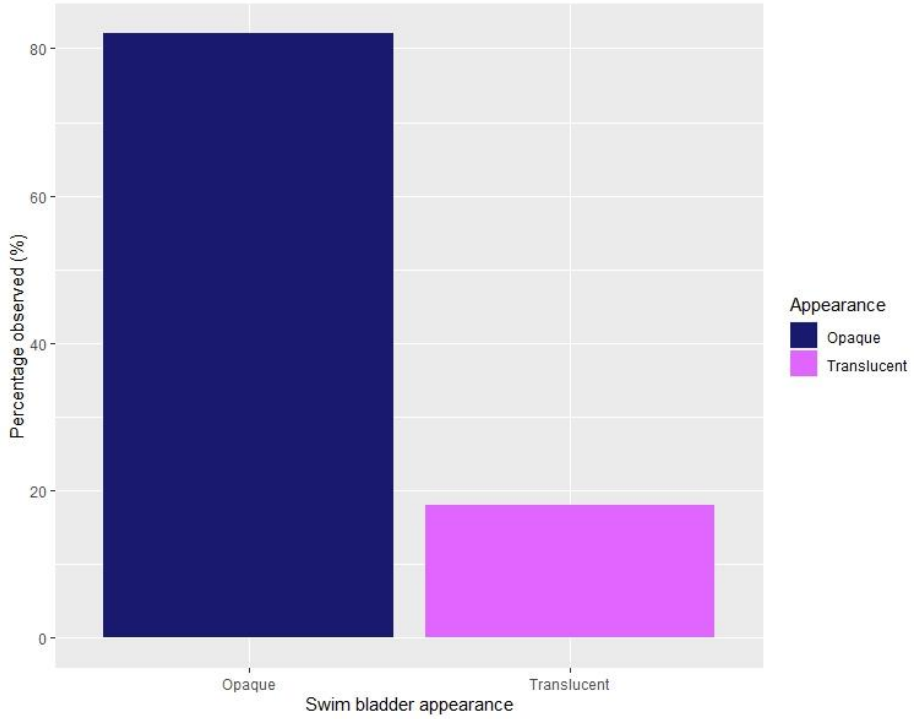

Figure 5-17 Percentage of swim bladders appearing opaque or translucent

5.3.5.2.4 Contaminant analyses.

The work into contaminant analysis is in hand using outsourced labs and it is aniticiapted that preliminary data from this will be provided to TEGE at meetings and in year report when they become available.

5.4 Fane

The Fane is a relatively small catchment within the Eastern River Basin District (ERBD) with the silver eel fishery located in the upper reaches of the system approximately 28 km from the coast. The catchment has a riverine wetted area of 84 ha (0.84 km^2) and a lacustrine wetted area of 553 ha (5.53 km^2). A research silver eel fishery was carried out on the Clarebane River on the outflow of Lough Muckno in the Fane catchment from 2011 to the present (Figure 5-18). The site was the location of a commercial fishery until 2008.

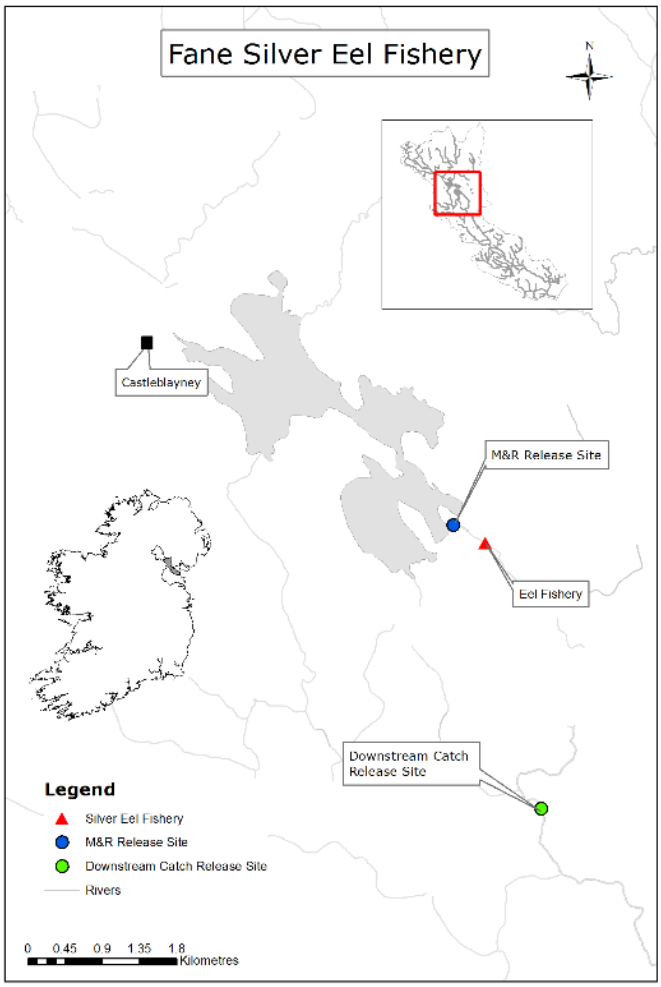

Figure 5-18 Map of silver eel fishing and release locations within the Fane catchment, 2021 (Insets: Map of Ireland with Fane catchment (shaded) and Neagh-Bann River Basin District (outlined) and detail of Fane catchment rivers with sampling location indicated (red box)).

5.4.1 Silver Eel Catch

In 2022, silver eel catches at the Fane Fishery were higher than the previous year's numbers with a total catch of 912 kg (1,953 eels including batch weighs), (Table 5-8). These catches were made over 37 nights fished. Due to low water levels in September, fishing began in late October and continued through part of December, (Figure 5-19). Once water temperature readings declined below 10˚C catches dwindled (Figure 5-20).

Table 5-8 Silver eel catch record for Barrow Fishery, 2011 – 2021.

Year	No. Days Fished	Catch (kg)	No of Eels
2011	13	268	1,433
2012	21	448	1,195
2013	19	1,151	3,097

2014	25	797	2,542
2015	23	730	1,810
2016	9	76	206
2017	20	770	2,376
2018	34	725	1,974
2019	26	500	1,323
2020	27	465	996
2021	22	550	1,203
2022	37	912	1,953

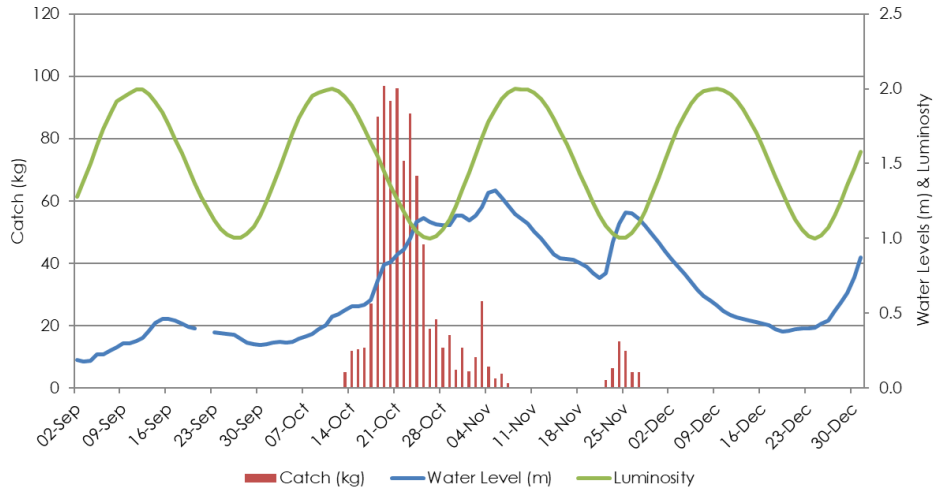

Figure 5-19 Catch (kg), water levels (m) and luminosity for the Fane Fishery, 2022.

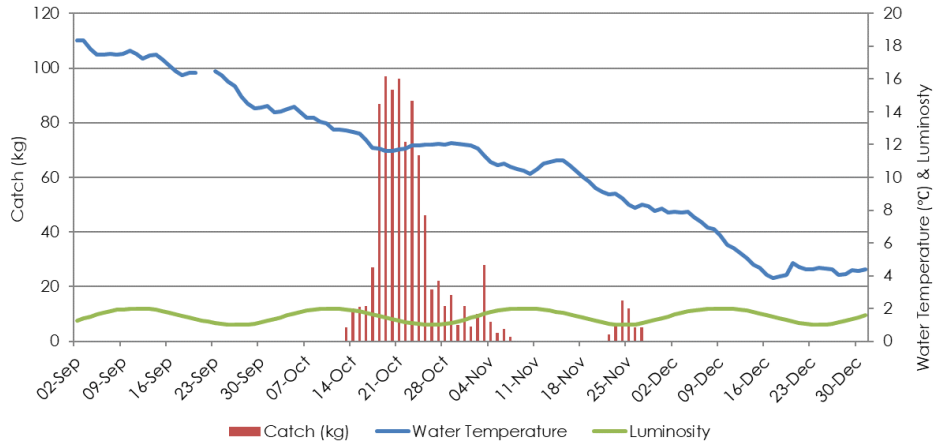

Figure 5-20 Catch (kg), water temperature (˚C) and luminosity for the Fane Fishery, 2022.

5.4.2 **Mark Recapture**

Out of the 150 eels PIT tagged during this season, there are 12 recaptures noted (8% recapture rate). Table 5-9 below depicts numbers of tagged eels with number and percentages of recaptures from each each year (2014-2022).

Table 5-9 Mark-recapture results for Fane Silver Eel Fishery 2014-2022.

Year	No. Tagged	No. Recaptured	% Recapture
2014	272	80	29
2015	296	100	34
2016	0	0	0
2017	126	26	20.6
2018	365	46	12.6
2019	188	28	14.9
2020 *	0	n.a.	n.a.
2021	54	0	0
2022	150	12	8

* No PIT tags were deployed in 2020 due to the COVID-19 Lockdown.

5.4.3 Eel Biology

The average length of eel was 56.2 cm (ranging from 29.6 cm to 94.2 cm), (Figure 5-21 and Figure 5-22, Table 5-10). The average weight was 0. 411 kg (ranging from 0.016 kg to 2.03 kg), (Table 5-10). The length frequency of the silvers catch shows similar numbers of males to females however the proportion of the catch that was measured was comparatively lower than in previous years (Figure 5-21 and Figure 5-22). Therefore, it may not be a true reflection of length frequency. The usual trend is a high sharp peak depicting male silvers in the 30 cm length classes, followed by a broader, shallower peak depicting females from approximately 45 cm in length onwards to the maximum length recorded for the season. Out of the 551 eels measured, 269 had head widths recorded. 30.86% of these were broadhead eels (n = 83), (Figure 5-23).

5.4.4 Environmental DNA

In 2022, a pilot study was launched to investigate a potential correlation between eDNA signatures for eels in water samples and the net catches at the Clarebane Weir Fishery. The water samples were taken from locations upstream of the fishing weir and around Lough Muckno. This could be developed into a new methodology for the assessment of the silver eel escapement. The results will be reported once all samples from 2020 and 2021 are processed and analysed.

Table 5-10 Length and weight data for processed silver eels from the Fane Fishery, 2011 – 2022.

Year	No. Eels	Mean Length (cm)	Min. Length (cm)	Max. Length (cm)	Mean Weight (kg)	Min. Weight (kg)	Max. Weight (kg)	Total Weight (kg)
2011	1433	43.8	30.4	91.7	0.187	0.044	1.709	268
2012	1541	47.1	31.4	96.0	0.251	0.050	2.090	387
2013	1165	49.2	30.8	96.6	0.289	0.030	1.952	337
2014	1334	50.4	30.4	95.0	0.292	0.045	1.721	389
2015	1622	54.0	31.2	96.6	0.370	0.030	2.045	599
2017	427	51.9	30.9	94.7	0.332	0.014	1.751	142
2018	634	54.1	27.5	95.5	0.367	0.042	2.200	232
2019	337	50.8	23.4	91.4	0.313	0.052	1.461	106.86
2020	87	50.2	22.0	86.5	0.29	0.057	1.200	25.25
2021	180	54.3	29.0	82.7	0.352	0.035	1.400	63.32
2022	551	56.2	29.6	94.2	0.411	0.016	2.033	226.64

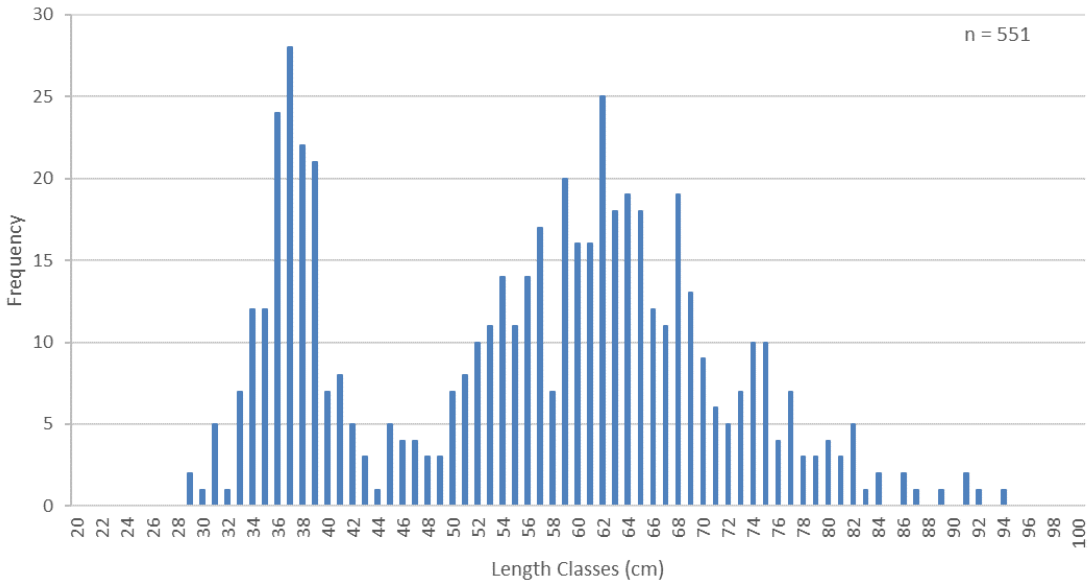

Figure 5-21 Length frequency for silver eels caught at the Fane Fishery, 2022.

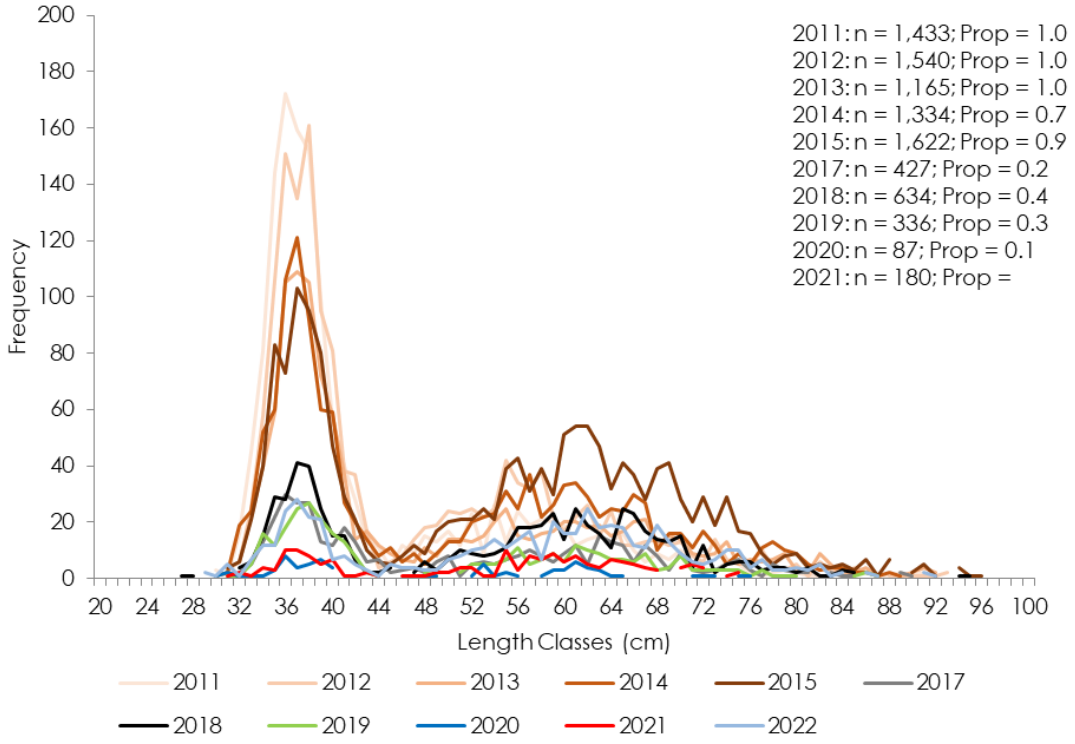

Figure 5-22 Length frequency for silver eels caught at the Fane Fishery, 2011 – 2022.

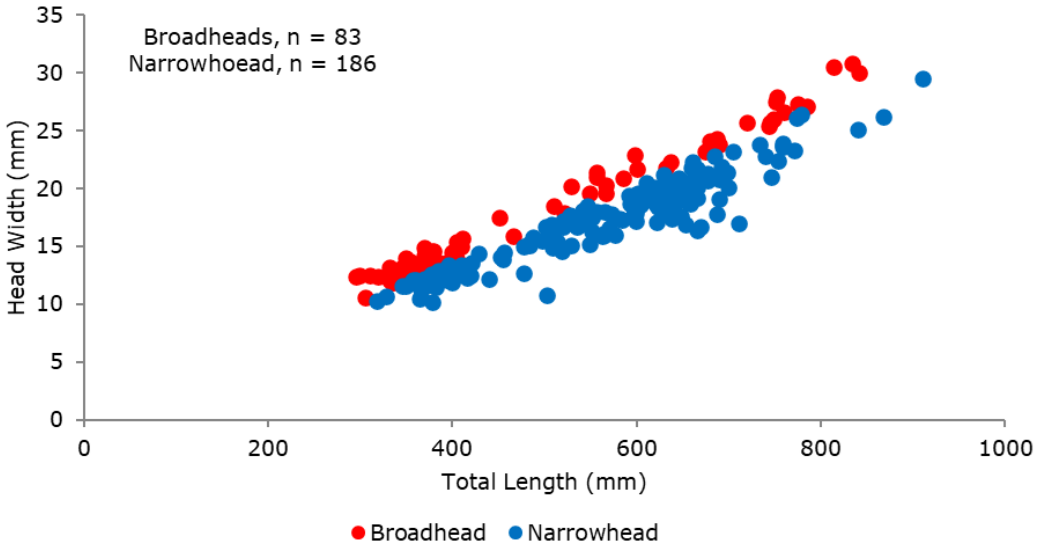

Figure 5-23 Broadhead and narrowhead records for the Fane Fishery, 2022.

5.5 River Barrow

The Barrow catchment is a large riverine catchment located on the east coast of Ireland in the South Eastern River Basin District (SERBD). The catchment has a riverine wetted area of 72,780 ha (727.8 km^2). The SERBD is 60% calcareous bedrock which makes it a very productive habitat for eels. There has historically been a commercial fishery on the River Barrow and the presence of historical catch will aid in the assessment of the current silver eel escapement levels from the river. There is also historical research data on the River Barrow from the Fisheries Research Centre which is available to Inland Fisheries Ireland. The assessment of the silver eel stocks from a river dominated catchment will help highlight any difference in production and escapement of eels compared with catchments with large lake/lacustrine wetted areas. The Barrow is the first riverine dominated silver eel index catchment assessed to date.

The fishing location is situated upstream of the town of Graiguenamanagh; approximately 5km upstream from the tidal limit (estuary) in the River Barrow (Figure 5-24). The location of the Ballyteiglea Lock fishing site means that over 99% of the River Barrow freshwater wetted area is above the fishing site. Four nets were fished from openings on the Ballyteiglea Lock gates of the canal section of the River Barrow during the silver eel season. Historically the commercial fishery in the River Barrow concentrated effort on the canal lock gates.

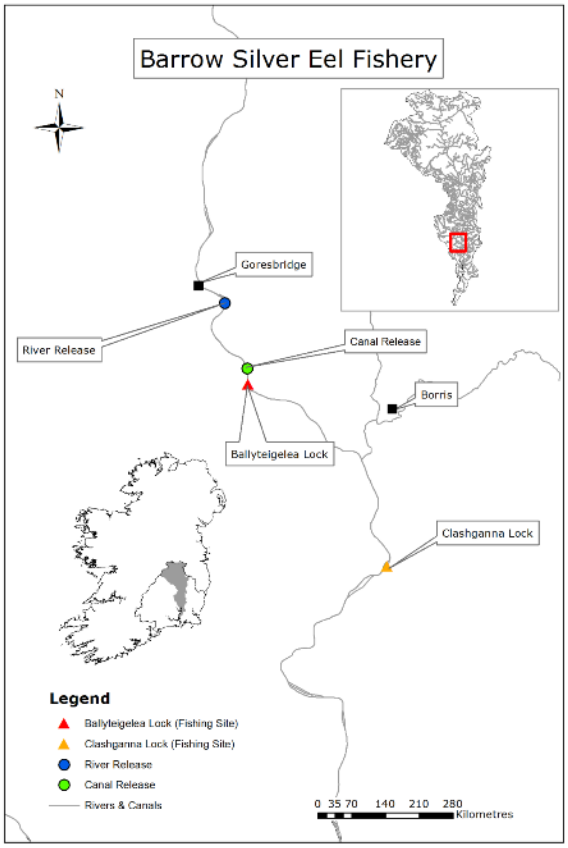

Figure 5-24 Map of silver eel fishing and release locations within the Barrow catchment, 2021 (Insets: Map of Ireland with Barrow catchment (shaded) and South Eastern River Basin District (SERBD) (outlined) and detail of Barrow catchment rivers with sampling location indicated (red box)).

5.5.1 Eel catch

In 2022, after 21 nights of fishing, a total of 199.7 kg of silver eels were captured at the Ballyteiglea Lock Barrow Silver Eel Fishery. This equated to 1,055 eels, with almost all of these being caught in October during moderate flood events. 228 eels (55.48kg) were measured while a further 767 eels (138.25kg) were batch weighed.

Despite later flooding events occurring in both October and November, the catch numbers tapered off considerably until several nights of zero catch were recorded in both November and December, signaling the end of the migration runs (Figure 5-25 and Figure 5-26). Declines in water temperature, (particularly those in late November) would have further reduced catches at this time (Figure 5-26). The catch details at this location since its inception in 2014 to the current sampling in 2022 are highlighted in Table 5-11.

Table 5-11 Silver eel catch record for Barrow Fishery, 2014 – 2022.

Year	No. Days Fished	Catch (kg)	No of Eels
2014	22	174	1,223
2015	20	128	687
2016	25	193	880
2017	24	273	1,388
2018	28	391	2,808
2019	24	183	1,329
2020	29	238	1,163
2021	20	196	1,200
2022	21	199	1,055

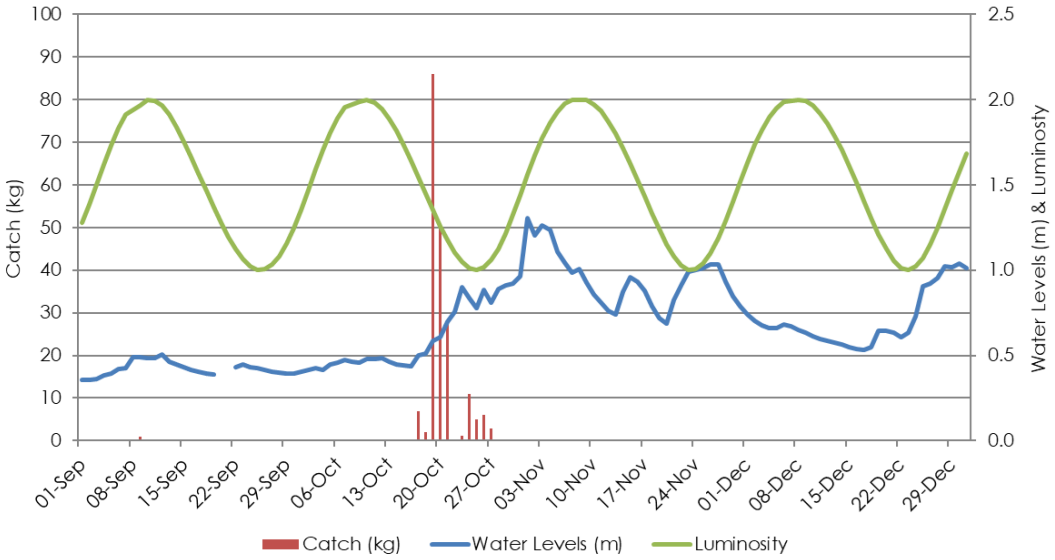

Figure 5-25 Catch (kg), water levels (m) and luminosity for the Barrow Fishery, 2022.

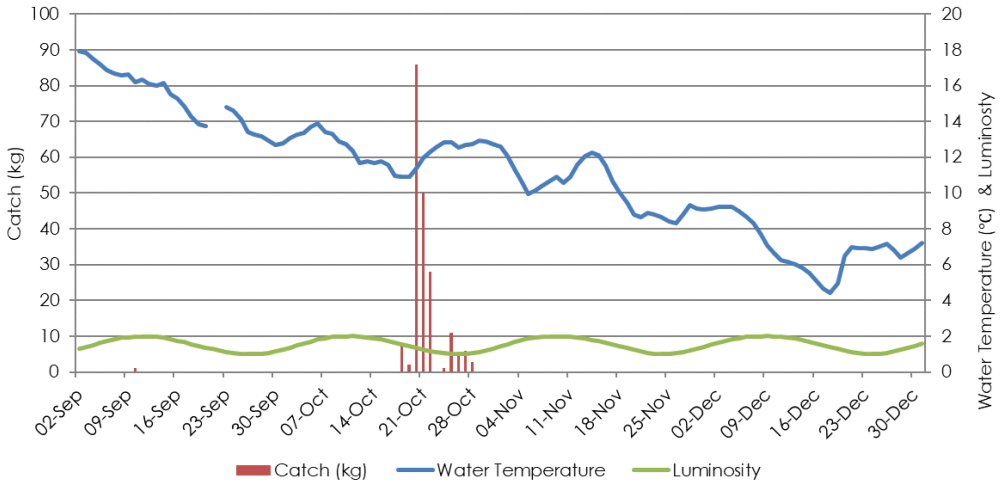

Figure 5-26 Catch (kg), water temperatures (°C) and luminosity for the Barrow Fishery, 2022.

5.5.2 Mark Recapture

Out of the 153 eels PIT tagged during this season, there were 5 recaptures giving a recapture rate of 3.3%. No recaptures from previous years were noted. The Table 5-12 below depicts numbers of tagged eels with number and percentages of recaptures from each each year (2015-2022).

Table 5-12 Mark-recapture results for Barrow Silver Eel Fishery 2015-2022.

Year	No. Tagged	No. Recaptured	% Recapture
2015	279	41	14.7
2016	48	21	43.7
2017	51	8	15.7
2018	432	61	14.1
2019	202	52	25.7
2020 *	0	n.a.	n.a.
2021	99	1	1.01
2022	153	5	3.3

* No PIT tags were deployed in 2020 due to the COVID-19 Lockdown.

5.5.3 Eel Biology

The average length of eel captured was 44.9 cm (ranging from 24.1 cm to 79.4 cm), (Figure 5-27 and Figure 5-28). The average weight of eels was 0.1926 kg (ranging from 0.0019 kg to 1.201 kg), (

Table 5-13). The length frequency for 2022 shows a moderate number of small/male eels in the catch which is an increase from some previous years (e.g. 2021, 2020, 2019 and 2017). The number of males in the current year was similar to that of 2016 with only 2014, 2015 and 2018 showing higher numbers of males (Figure 5-27 and Figure 5-28). Each progressive year shows a pattern of further declines of small/male eels in the catch. The fishing in 2018 appears to break this trend with higher numbers of small eels captured, however the trend of decline then returned in 2019 and 2020 until the rise in the current silver eel season in 2021. Out of the measured eels, 72 had head width measurements recorded. 18.06% of these were broadhead eels (n = 13), (Figure 5-29).

5.5.4 Environmental DNA

A pilot study was launched in 2020 in order to investigate a potential correlation between eDNA signatures for eels in water samples and the net catches from Ballyteiglea Lock. The water samples taken from locations upstream of the fishing lock. This could be developed into a new methodology for the assessment of the silver eel escapement. The results will be presented in a later report once all samples from 2020 and 2021 are processed and analysed.

Table 5-13 Length and weight data for processed silver eels from the Barrow Fishery, 2014 – 2022.

Year	No. of Eels	Mean Length (cm)	Min Length (cm)	Max Length (cm)	Mean Weight (kg)	Min Weight (kg)	Max Weight (kg)	Total Weight (kg)
2014	811	41.4	27.6	76.2	0.140	0.033	0.742	113.578
2015	730	41.8	31.5	77.4	0.149	0.050	0.873	108.730
2016	681	45.2	32.0	77.8	0.195	0.052	0.860	132.983
2017	351	45.5	26.2	81.8	0.203	0.025	1.078	71.337
2018	853	39.5	21.3	72.3	0.1212	0.0100	0.7390	103.379
2019	292	38.2	31.6	69.3	0.1084	0.0520	0.6830	31.538
2020	305	45.6	31.4	75.8	0.2070	0.051	0.849	63.233
2021	551	41.3	30.4	79.2	0.151	0.052	0.983	82.970
2022	288	44.9	24.1	79.4	0.192	0.002	1.201	55.481

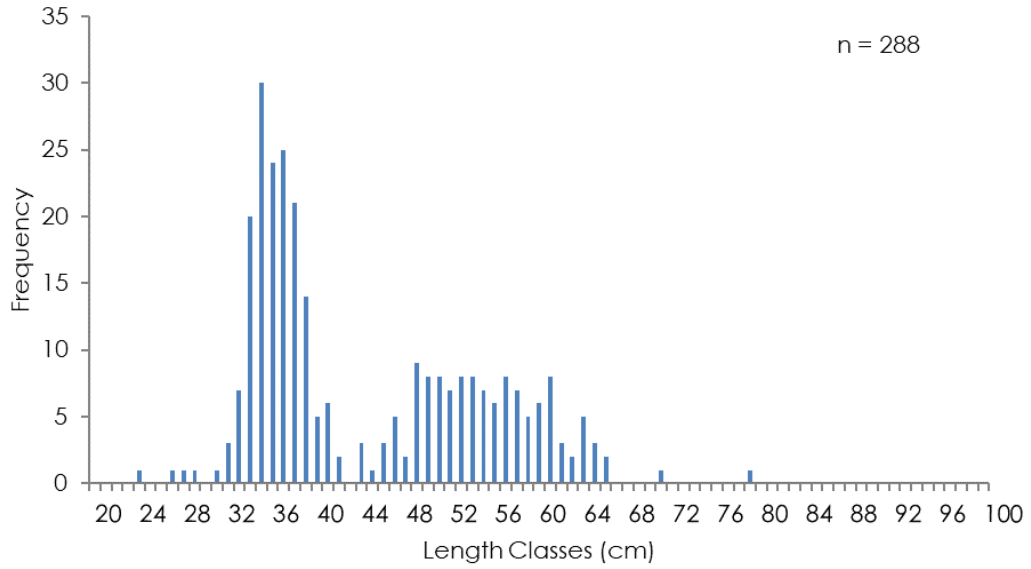

Figure 5-27 Length frequency for measured silver eels caught on Barrow Fishery, 2022.

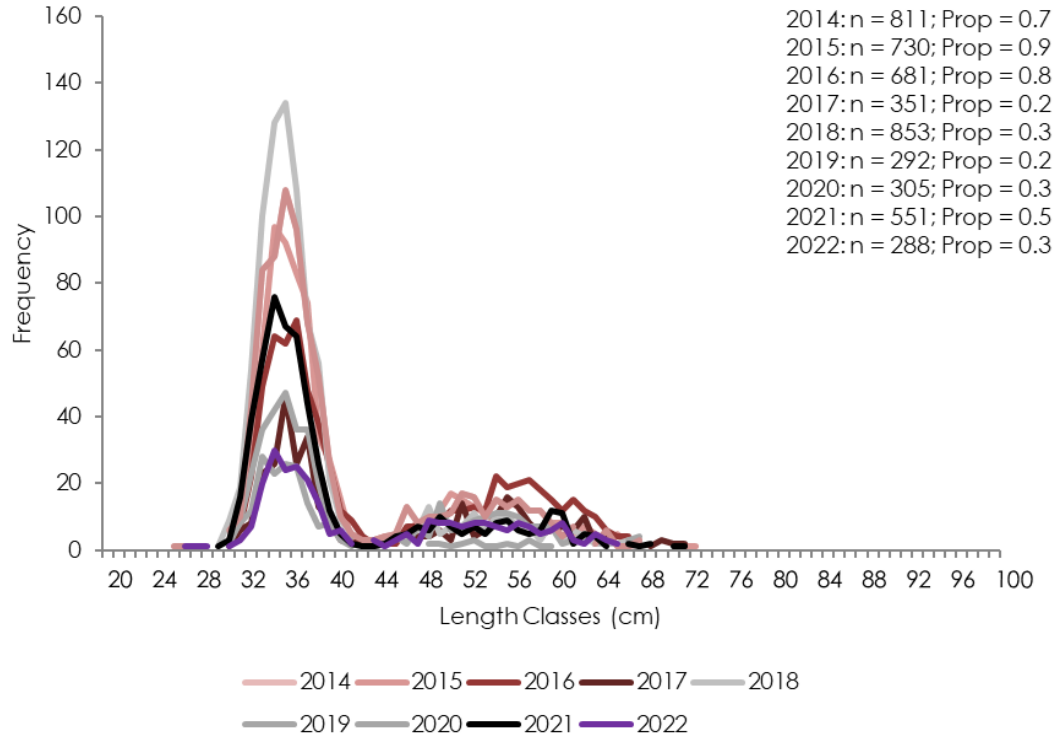

Figure 5-28 Length frequency for measured silver eels caught on Barrow Fishery, 2014 – 2022.

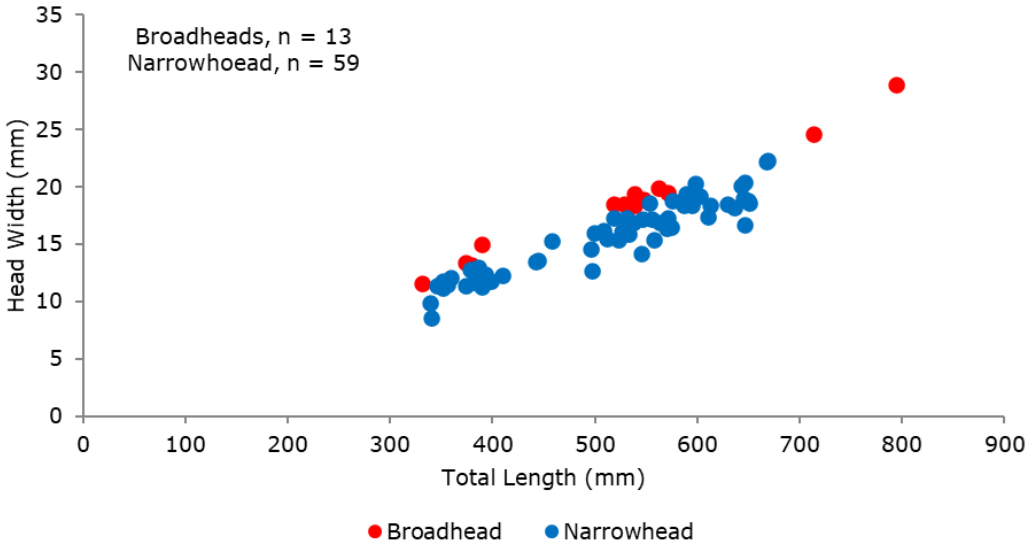

Figure 5-29 Broadhead and narrowhead eels from Barrow Fishery, 2022.

6 Yellow Eel Stock Assessment

This section refers to Ch. 7.2.2 of the National EMP Report, 2008

Yellow-eel stock monitoring is integral to gaining an understanding of the current status of local stocks and for informing models of escapement, particularly within transitional waters where silver eel escapement is extremely difficult to measure directly. Such monitoring also provides a means of evaluating post-management changes and forecasting the effects of these changes on silver eel escapement. The monitoring strategy aims to determine, at a local scale, an estimate of relative stock density, the stock's length, age and sex profiles, and the proportion of each length class that migrate as silvers each year. Furthermore, individuals from this sample will be used to determine levels of contaminants and parasites to assess spawner quality. Two classes of survey methodologies will be employed; eel specific surveys and multi-species surveys, mainly involving standardised fyke netting and electro-fishing. Table 6-1 gives the locations for eel specific lake and transitional waters to be surveyed in the 2018 - 2020 period.

Fyke net surveys carried out between 1960 and 2008 by State Fisheries Scientists will provide a useful benchmark against which to assess the changes in stock. The yellow eel monitoring strategy will rely largely on the use of standard fyke nets. Relative density will be established based on catch per unit (scientific survey) effort.

Water Framework Directive general fish surveys were undertaken on lakes (fyke nets, gill-nets and hydro acoustics), rivers (electro-fishing and fyke nets) and transitional waters (fyke nets, seine nets & beam trawls) in 2017 which adds significantly to the national eel specific programme. The WFD is being undertaken on a three-year rolling cycle by Inland Fisheries Ireland. The National programme of yellow eel monitoring in 2017, as laid out in the EMPs, was undertaken by Inland Fisheries Ireland with additional support from the Marine Institute (Table 6-1).

Under the Irish Eel Management Plan a number of key monitoring objectives were outlined. A monitoring programme for the years 2018 – 2020 will aim to meet these objectives:

2.1 Estimate silver eel escapement using indirect assessment from yellow eel stocks.

3. Monitor the impact of fishery closure on yellow eel stock structure.

4. Inter-calibration with water framework sampling.

5. Compare current and historic yellow eel stocks.

6. Establish baseline data to track changes in eel stock over time.

8. Determine parasite prevalence and eel quality.

6.1 Surveys 2022

Yellow eel surveys took place in 3 lake, 1 transitional water and 1 riverine catchment (Figure 6-1 and Table 6-1). The lakes surveyed were Lough Feeagh and Bunaveela Lough by MI, Lower Lough Erne by AFBI and Queens University. The transitional waters were Lough Furnace and Lower Lough Furnace in Burrishoole (by MI) and river electric-fishing was carried out in the Bride river catchment in 2022 by IFI along with a detailed River Hydromorphology Assessment Technique (RHAT) survey of the Bride, Fane sub-catchment in conjunction with the electrofishing.

The yellow eel surveys need to meet a number of objectives, to monitor the impact of fishery closure on yellow eel stock structure, compare with historic eel surveys, establish baseline data set, evaluate impedance of upstream migration and determine parasite prevalence within Ireland. Samples of eels are measured for length, weight, and INDICANG style morphological features associated with silvering (eye measurements, pectoral fin measurements, and pigmentation). At selected locations eels are retained for further analysis in the laboratory. These analyses include age, growth, sex determination, parasite prevalence and diet.

Table 6-1 Monitoring Programme 2021 - 2023

RBD	Location	Water body	Life stage	2021	2022	2023
SHIRBD	ESB Shannon	Catchment	Silver	√	√	√
NWIRBD	ESB Erne	Catchment	Silver	√	√	√
WRBD	Burrishoole	Catchment	Silver	√	√	√
SERBD	Barrow	River	Silver	√	√	√
ERBD/NBRBD	Fane	River	Silver	√	√	√
NWIRBD	Erne	Lake	Silver		√	√
SHIRBD	Ardnacrusha	River	Elver	√	√	√
SHIRBD	Maigue	River	Elver	√	√	√
SHIRBD	Feale	River	Elver	√	√	√
SHIRBD	Inagh	River	Elver	√	√	√
NWIRBD	Erne	River	Elver	√	√	√
ERBD	Liffey	River	Elver	√	√	√
WRBD	Ballysadare	River	Elver			√
WRBD	Corrib	River	Elver	√	√	√
WRBD	Burrishoole	River	Elver	√	√	√
SHIRBD	Parteen	River	Yellow	√	√	√
NWIRBD	Erne	Lake	Yellow	√	√	
ERBD	Boyne	River	Yellow	√		
SWRBD	M Blackwater	River	Yellow		√	
SERBD	Barrow	River		√	√	
ERBD	Muckno	Lake	all	√	√	
SHIRBD	Owel	Lake	all	√	√	
WRBD	Shramore/Burrishoole	River	Yellow	√	√	√
WRBD	Lough Feeagh	Lake	Yellow	√	√	√
WRBD	Lough Furnace	T. water	Yellow	√	√	√
Ireland	WFD Rivers	Rivers	Yellow	√	√	√
Ireland	WFD Lakes	Lakes	Yellow	√	√	√
Ireland	WFD Transitional	T. water	Yellow	√	√	√

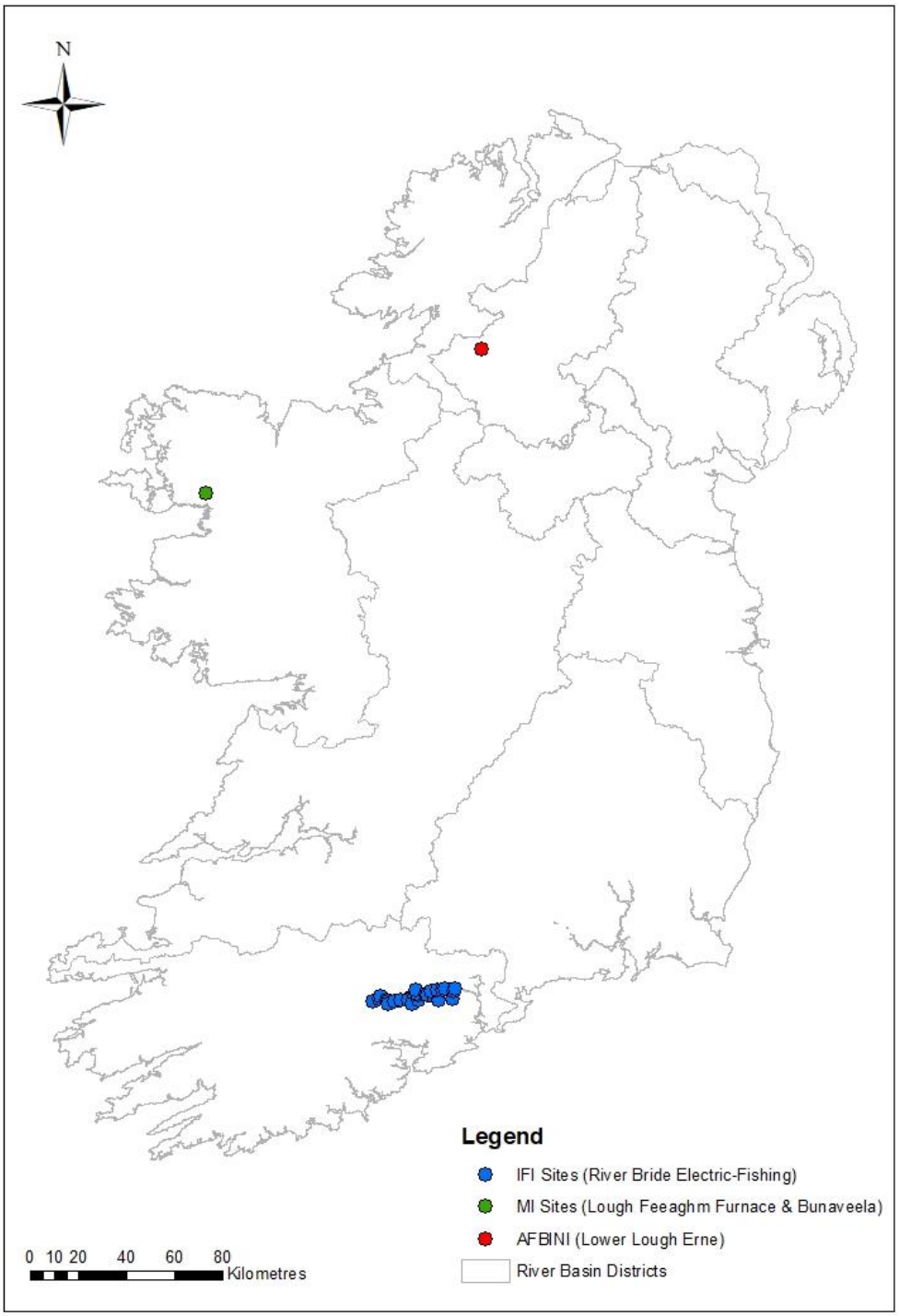

Figure 6-1 Locations of yellow eel surveys carried out in 2022.

6.1.1 **Burrishoole**

All four locations in Burrishoole were fished in 2022, Bunaveela, Feeagh, Furnace (Transitional) and lower Furnace, (Transitional) (Figure 6-2).

Bunaveela Lough is in the upper reaches of the catchment. It has a surface area of 42ha and a maximum depth of 23m. Bunaveela L. was fished in the traditional style (sets of 10 nets perpendicular to the shore) in 2022 (14th July 2022), with chains of 10 nets fished at three sites. In total 13 eels were caught with a catch per unit of effort of 0. 0.43 eels/net/night (Table 6-5). The average length was 47.3cm and ranged in length from 30.2cm to 72.2cm, and a total weight of 3.39 kg caught (Figure 6-3). No eels were PIT tagged and one recapture was made of an eel tagged in July 2017, and previously recaptured in June 2019.

Lough Feeagh has a surface area of 395ha and an average depth of 14.5m (with several areas >35m in depth). L. Feeagh was fished in the traditional style (sets of 10 nets perpendicular to the shore) in 2022 (19-20th July 2022), with chains of 10 nets fished at six sites for one night each. In total, 54 eels were caught with a catch per unit effort (CPUE) of 0.90 eels/net/night (Table 6-5). The average length of eels was 39.8cm and ranged in length from 27.3cm to 51.1cm, with a total weight of 6.04 kg caught in the two nights (Figure 6-3). No eels were PIT tagged and two previously tagged eels were recorded, both tagged in 2019. No eels were sacrificed in the survey.

An additional two nights were fished on Lough Feeagh with three chains of nets on the 26th and 27th Oct 2022 (two nights – one lift due to bad weather). Sites were in Glenamong and Lordeen's Bays and 136 eels were captured with a CPUE of 2.27 eels/net/night and a total weight of 26.5kg. The average size was 45.2cm with eels up to 93cm recorded (Figure 6-3). This was considerably larger eel size to the summer survey. Eleven eels were recaptured, including one that had been recaptured in July. Sixteen eels were sacrificed for SIA analysis in Germany (Ref: Lasse Marohn, van Thunen Institute) and sampled for *A. crassus* (Table 6-5).

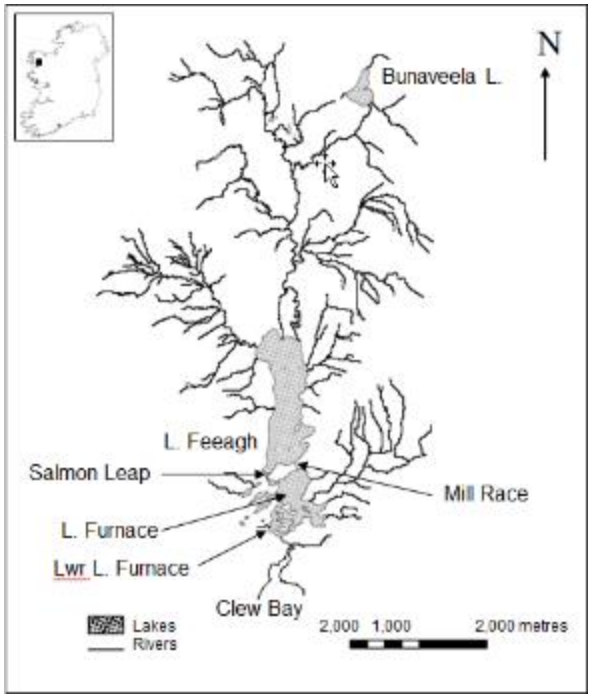

Figure 6-2 Map of Burrishoole showing the lakes surveyed.

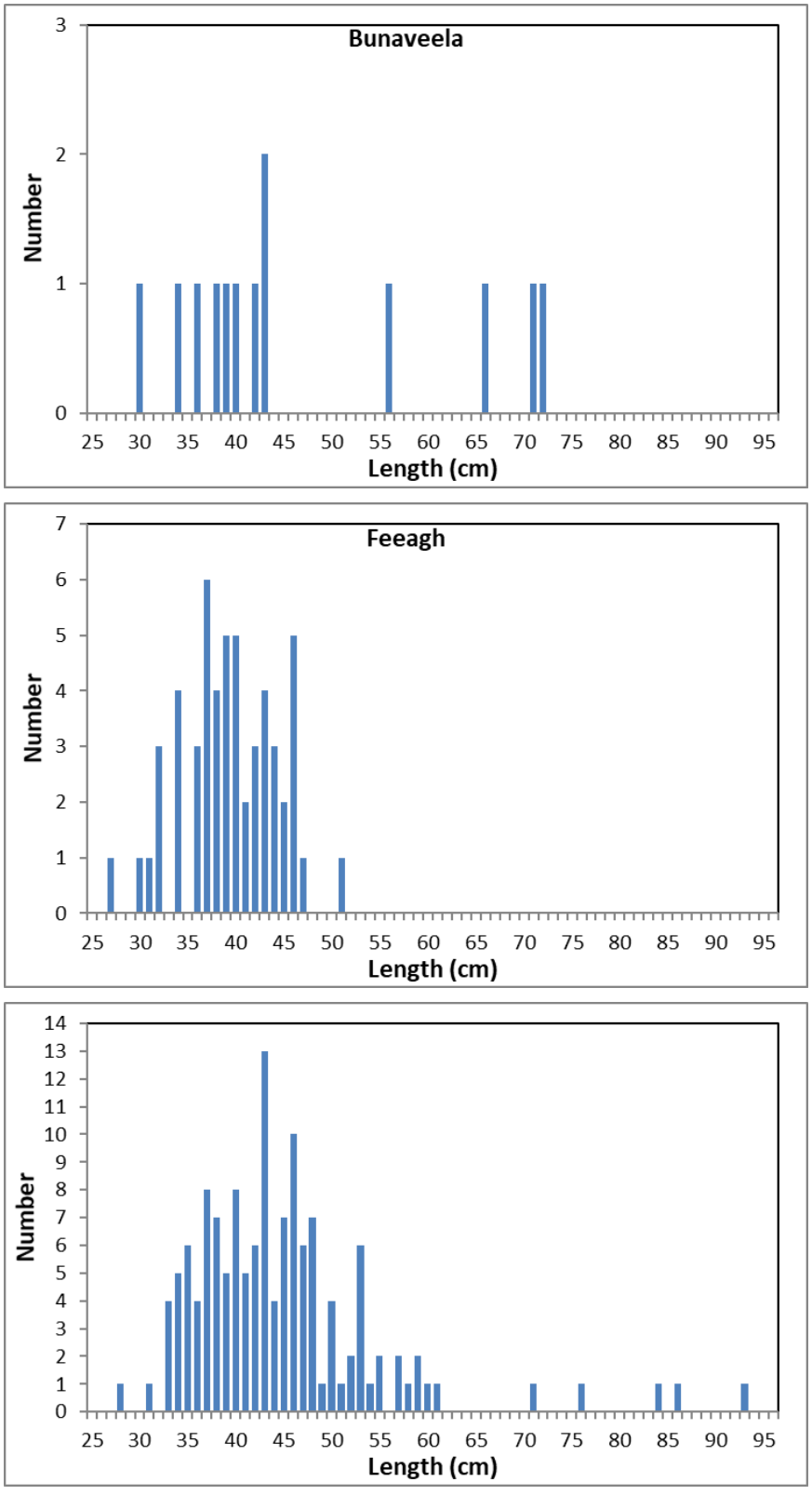

Figure 6-3 Length frequency of yellow eels captured at Bunaveela L. (n=13) (top), and L. Feeagh (n=54) (middle), and Feeagh October (n = 136) (bottom), in 2022.

6.1.2 IFI lake surveys 2022

There were no yellow eel lake surveys carried out by EMP in 2022. Data are presented below on two Artic Char lakes sampled by the Habitats Directive Programme for the year.

6.1.2.1 Habitats Directive Char Lakes, 2022

In 2022, the Habitats Directive Programme in IFI sampled two Char lakes in Donegal. These Loughs Gartan and Greenan.

Lough Gartan was sampled on the 19th and 20th of September, with 4 fyke net chains set on each night (set in chains of three). One of these chains captured 7 eels on the first night of fishing, and one net caught a single eel on the second night of fishing (n = 8 eels captured over two nights of fishing). This gives a CPUE of 0.66. The eels captured had an average length of 47.5 cm (range: 32.0 - 68.0 cm). The locations of the nets on Lough Gartan are shown in Figure 6-4 below with details in Table 6-5).

Lough Greenan in Donegal was sampled on the 26th September 2022, and two fyke net chains (again in chains of three) were set on a single night. Two eels were captured from this survey over one night. The CPUE recorded was 0.33. The average length of the eels captured was 33.5 cm (range: 32.0 - 35.0 cm). The locations of the nets on Lough Greenan are shown below in Figure 6-5 with details in Table 6-5.

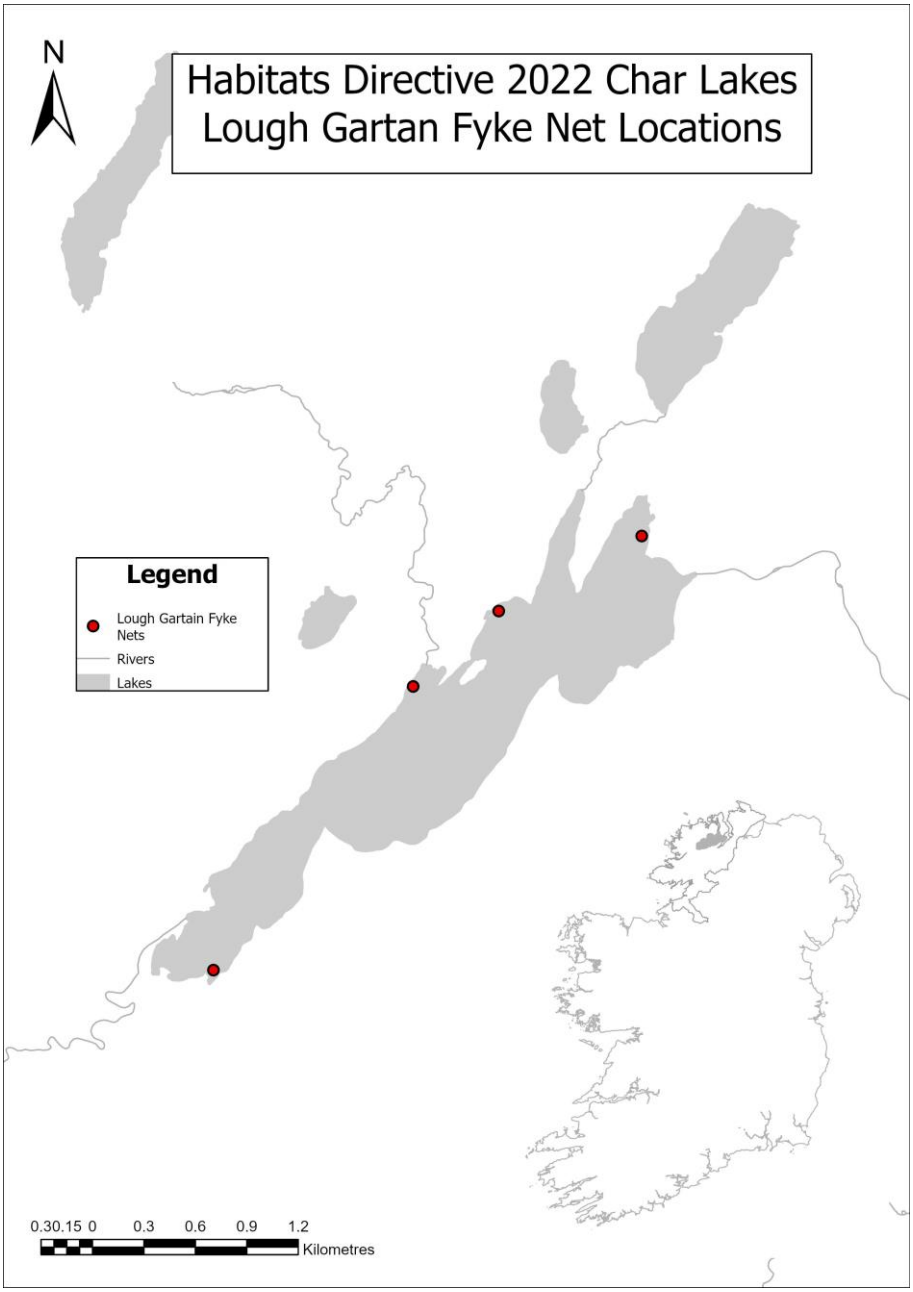

Figure 6-4 Locations of fyke nets on Lough Gartan (Char Lake) by Habitats Directive, 2022. Inset: Map of Ireland with North-western River Basin District (NWRBD) (outlined) and Leannan catchment (shaded).

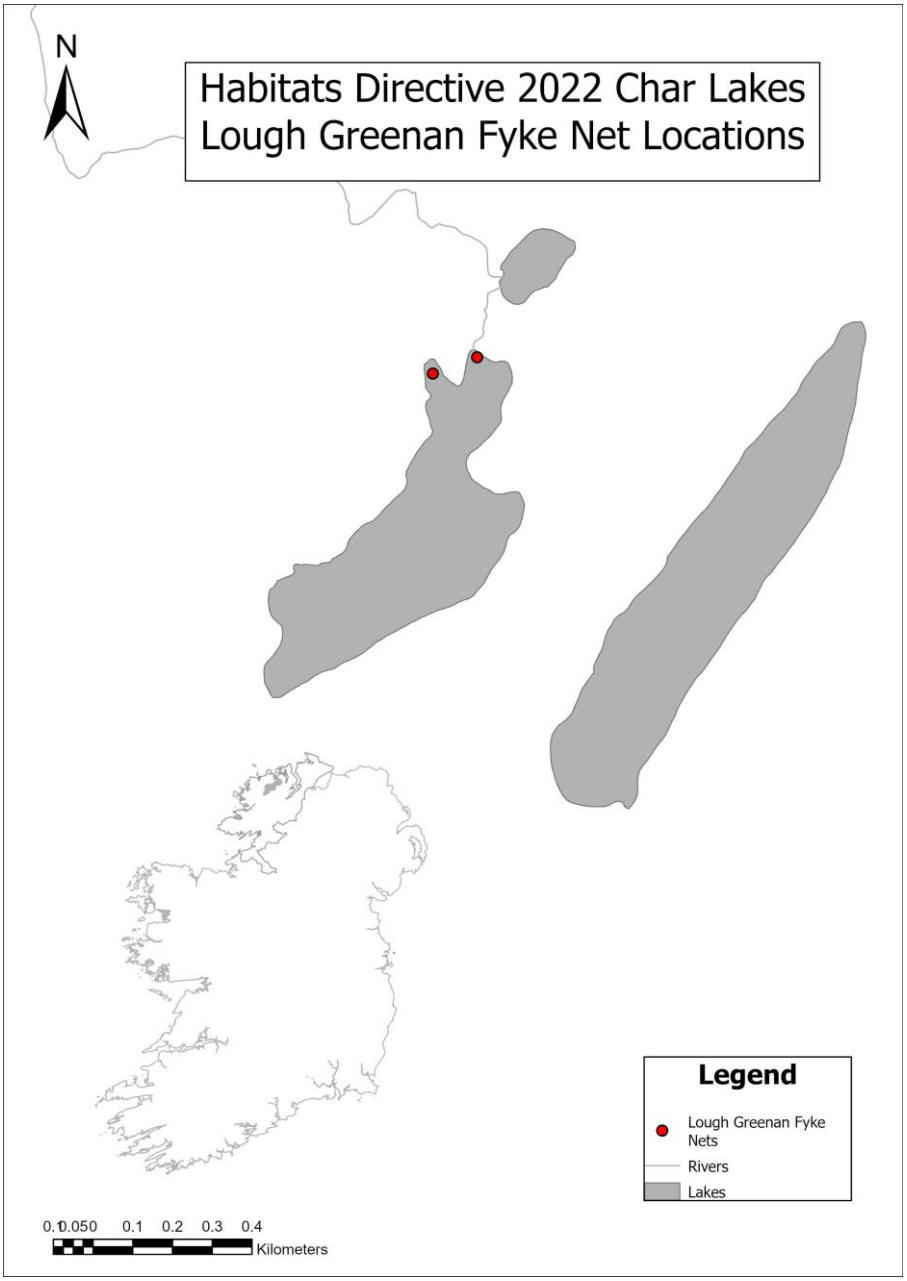

Figure 6-5 Locations of fyke nets on Lough Greenan (Char Lake) by Habitats Directive, 2022. Inset: Map of Ireland with North-western River Basin District (NWRBD) (outlined) and Lackagh catchment (shaded).

6.1.3 River Bride electric-fishing survey, 2022

A catchment-wide electric-fishing program was devised, utilising bankside electric-fishing (without the use of stop nets). The bankside approach was used as it is believed to be a useful method of catching and estimating minimum eel densities along stretches of river and is a semi-quantative approach. In each site, one bank is randomly selected and fished in a single timed pass and a second pass focuses on the opposite bank. On average, individual passes were between 4 and 13 minutes duration. A total of 34 sites were fished in 2022 using this methodology.

The Bride catchment was divided into upper, middle and lower zones and a comparable number of sites were fished in each zone. The survey electric-fishing was carried out using Hans- Grassl™ back-pack equipment. The packs were set to the recommended frequency for catching eels of 20 Hz (hertz). Voltage was site dependent and was set between 200-375 V (volts), (pulsed DC), in order to turn fish in differing conductivity conditions.

6.1.3.1 Results

During this survey, 130 eels were successfully captured over the 34 sites. This compares to the 128 eels that were captured in the original survey in 2015 (Figure 6-6 and Figure 6-7). Of these 59 were captured using the bankside (semi-quantitative) method, while 71 were caught using the 3-pass depletion (quantitative) method. The average length of the measured eels was 16.1 cm (min: 9.2 cm; max: 34.6 cm), while the average weight was 0.012 kg (min: 0.001 kg; max: 0.106 kg). All captured eels were released after biometrics were taken and no eels were returned to the laboratory for analyses from this survey (Table 6-6).

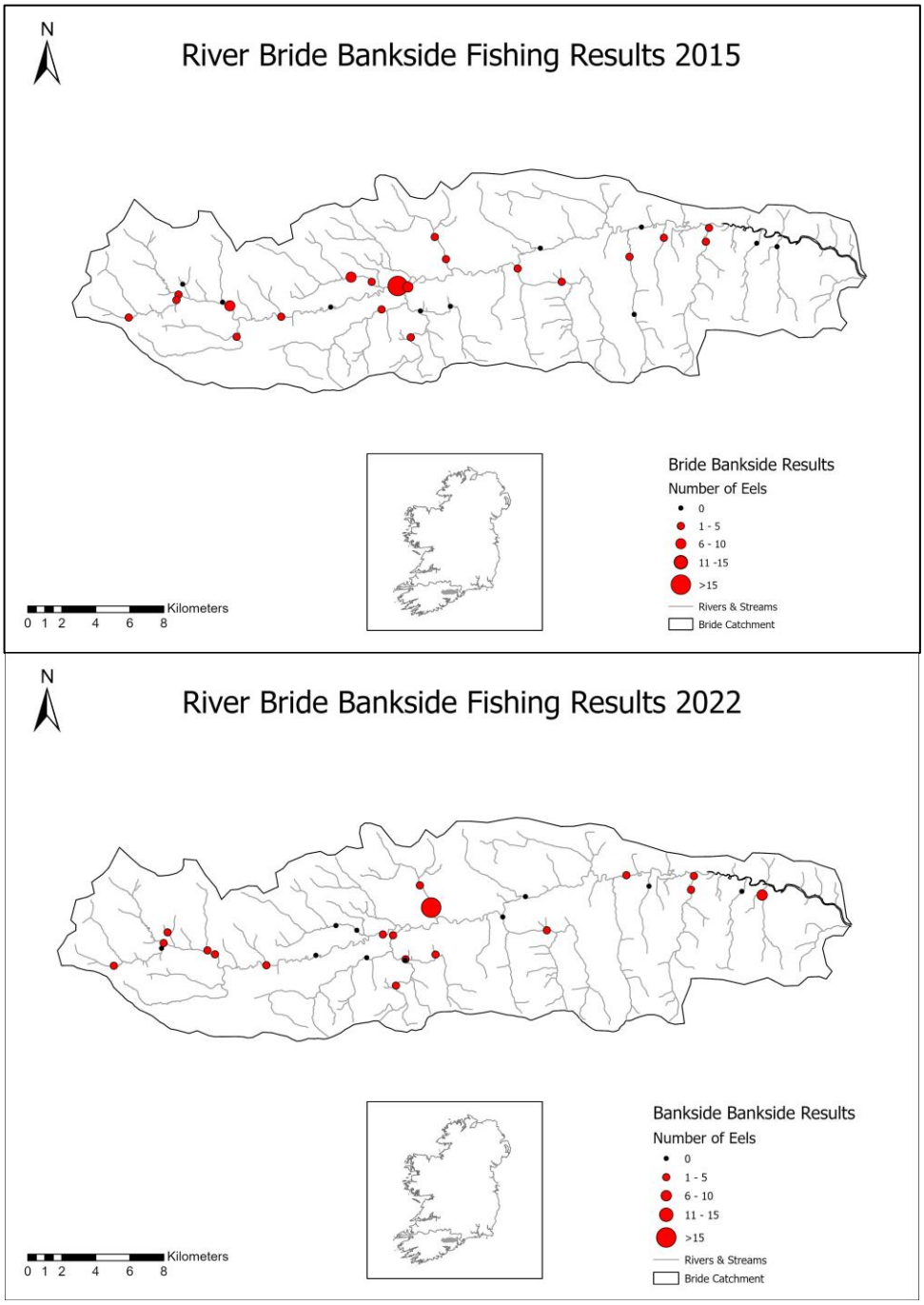

Figure 6-6 River Bride bankside electric-fishing catch results, top: 2015 and bottom: 2022. Insets: Map of Ireland with Southwestern River Basin District (SWRBD) (outlined) and River Bride catchment (shaded).

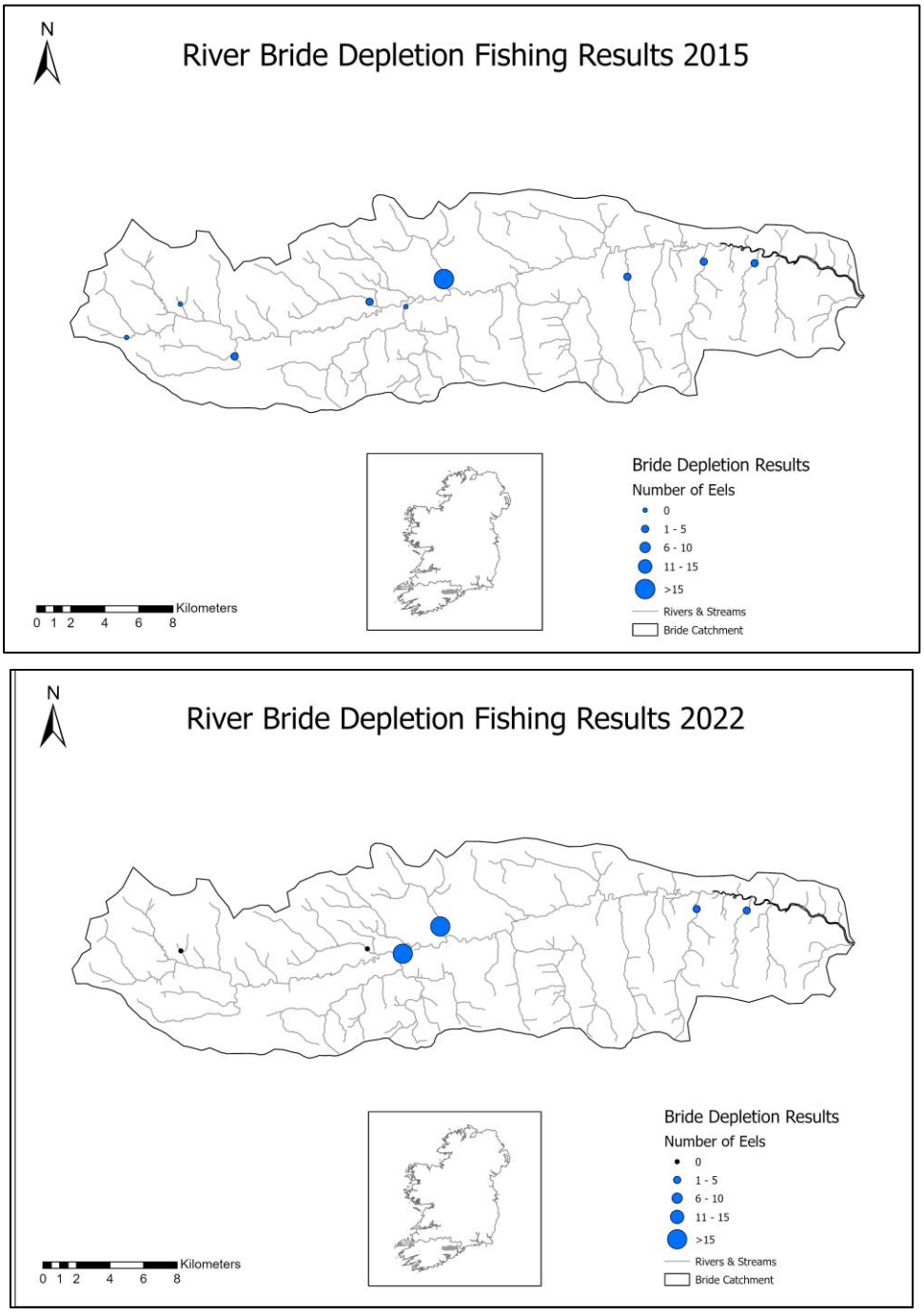

Figure 6-7 River Bride depletion electric-fishing catch results, top: 2015 and bottom: 2022. Insets: Map of Ireland with Southwestern River Basin District (SWRBD) (outlined) and River Bride catchment (shaded).

6.1.4 Bride catchment RHAT surveys, 2022

A total of 29 out of the 34 Bride electric-fishing sites were RHAT surveyed using the spot check methodology. The results of these surveys showed that the majority of the sites fell in to "Moderate" and "Good" status (31 and 69% of the total sites respectively), (Figure 6-8 and Figure 6-9). There were no "High,", "Poor" or "Bad" category sites noted in the results. These results suggest that the eel numbers of the Bride catchment are not influenced by impaired hydromorphological habitat status, as the majority of sites fell into the "Moderate" and "Good" categories of classification.

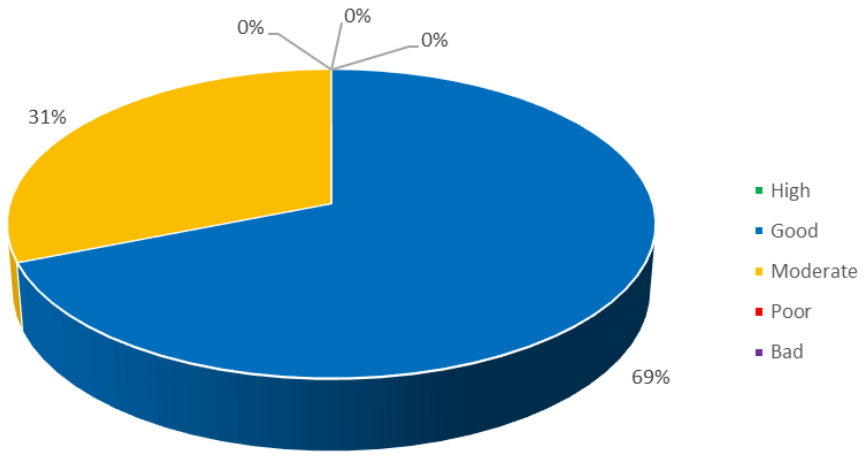

Figure 6-8 River Bride RHAT survey results, 2022.

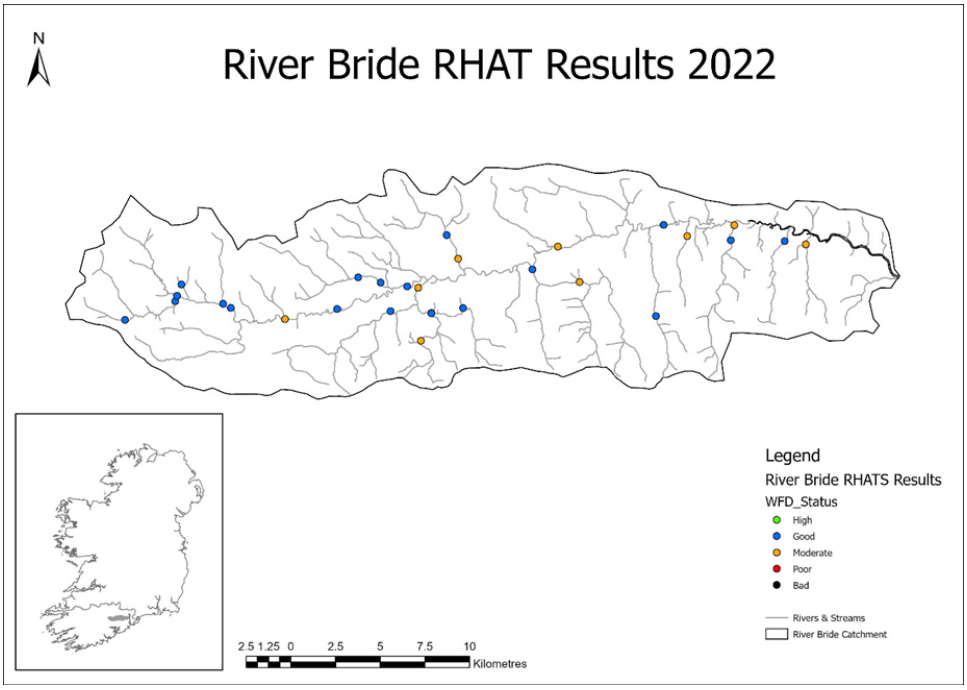

Figure 6-9 River Bride RHAT survey results, 2022. Inset: Map of Ireland with Southwestern River Basin District (SWRBD) (outlined) and Bride catchment (shaded).

6.1.5 Fane catchment RHAT surveys, 2022

The Fane catchment was electric-fished in 2013 and 2020 and a large decline in eel numbers was recorded between the two years of sampling with 97 individuals captured in 2013 and just 2 eels found in 2020. A similar result was found on the Kells Blackwater when sampled in 2014 and again in 2021. RHAT surveys were used to assess hydromorphological habitat status in order to discern if declines in habitat quality had contributed to the decline in eel numbers in these catchments between sampling occasions. However, as with the Bride RHAT results, all sites in the Fane 2022 RHAT survey fell into "Moderate" and "Good" status. A total of 25 sites were RHAT surveyed on the Fane using the spot check methodology. The results of these surveys showed that all the sites fell in to "Moderate" and "Good" status (64 and 36% of the total sites respectively), (Figure 6-10 and Figure 6-11). There were no "High,", "Poor" or "Bad" category sites noted in the results. These results suggest that the eel numbers of the Fane catchment, while declining sharply between the 2013 and 2020 surveys, were not influenced by impaired hydromorphological habitat status, as the majority of sites fell into the "Moderate" and "Good" categories of classification.

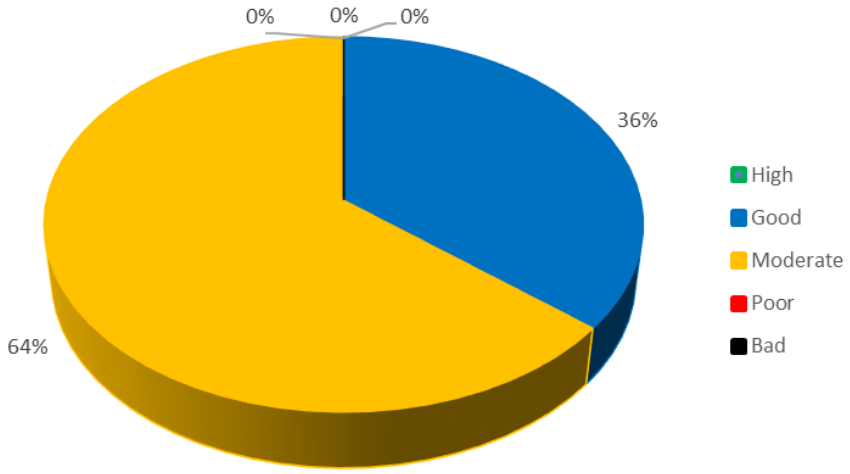

Figure 6-10 River Fane RHAT survey results, 2022.

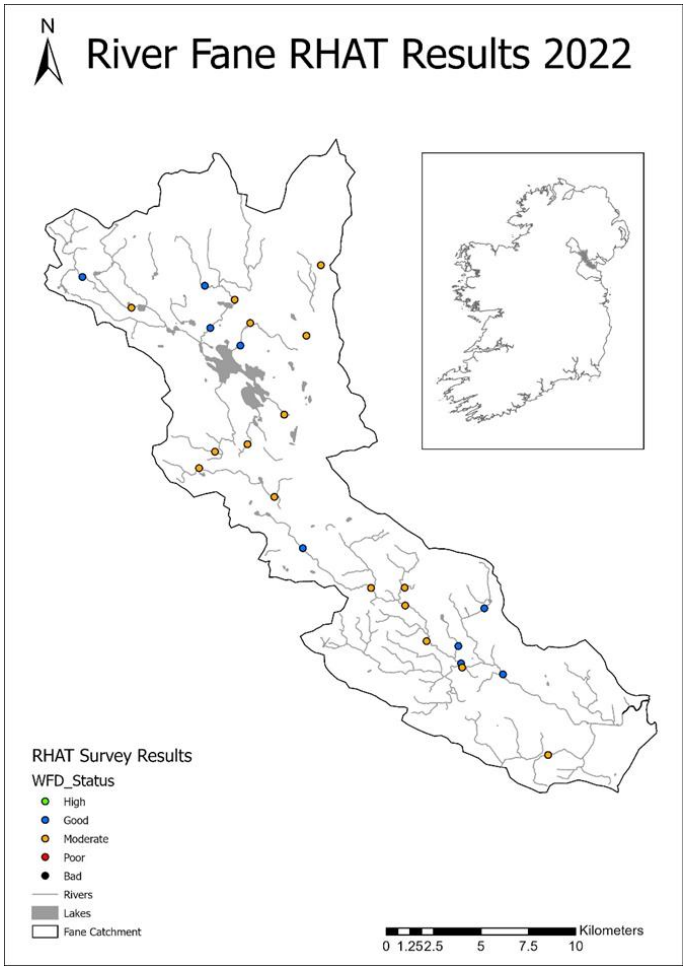

Figure 6-11 River Fane RHAT survey results, 2022. Inset: Map of Ireland with Eastern River Basin District (SWRBD) (outlined) and Bride catchment (shaded).

6.2 Transboundary Yellow Eel

The 2022 lower Lough Erne yellow eel survey was undertaken by AFBI from 4th to 8th July 2022 in conjunction with Queen's University Belfast. This survey was carried out as a part of the biennial AFBI Lower Lough Erne (LLE) yellow eel survey program. The results from this survey and the previous 2 years of LLE yellow eel surveys reported to TEGE now form the culmination of the QUB PhD to assess ecological changes in LLE and the yellow eel community over the last 20 years. Comparisons of ecological and yellow eel data from recent LLE yellow eel surveys will be drawn from the Erne Eel Enhancement program. As a result, below is a brief overview of the major findings with a more detailed output to be followed upon thesis submission.

To ensure data consistency and to enable trends to be compared across years the same commercial fishermen were employed using the same methodology as in previous LLE yellow eel surveys. The survey sites chosen in each of these surveys (Figure 6-12) are an attempt to revisit sites fished during the intensive sampling regime devised during the Erne Eel Enhancement Programme (from 1998-2000) and to maintain a harmonised series of sites for the biennial survey needs.

Each day 6 gangs of 5 Dutch fyke nets with a 12mm mesh size were set in a zone of the lake established during the previous LLE yellow eel surveys (Figure 6-12). The nets were retrieved the following morning with all eel catch being returned to shore for processing. Any bycatch was recorded and returned immediately. Lengths of every eel captured was recorded to the nearest cm with a sub sample of 25 being held each day (100 total) for more detailed analysis. This consisted of measuring length, weight, fat content, removal of digestive tract for stomach content analysis and parasite burden and removal of otoliths for age analysis. The total number of the invasive parasite *A. crassus* in each swim bladder was also recorded. A 10mm section of gonad was removed and stored in 70% ethanol from a total of 60 eels spread across both narrow head (n = 30) and broad head (n = 30) individuals. This section of gonad will be weighed to enable comparison of gonadal development between narrow and broad head eels.

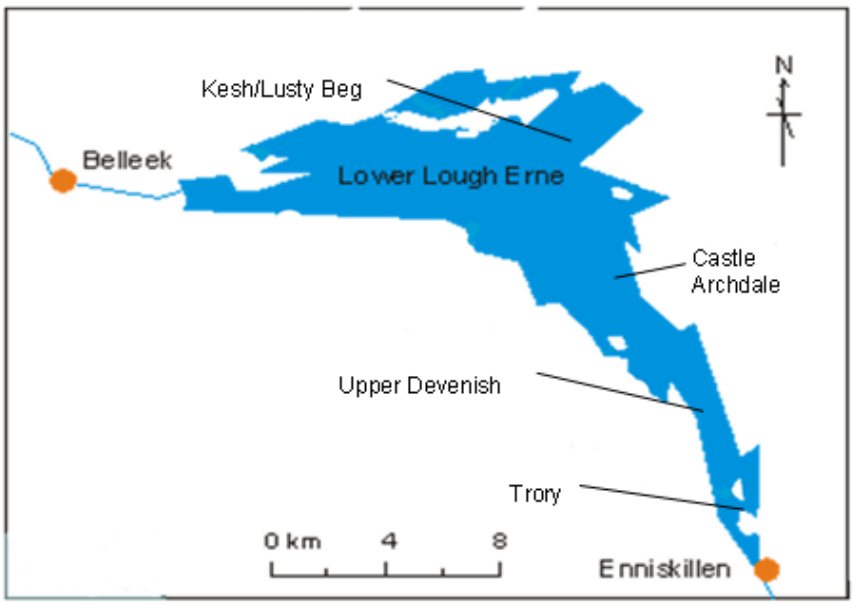

Figure 6-12 Four zones surveyed during the Lower Lough Erne yellow eel survey.

6.2.1 Results

6.2.1.1 Total Catch

An overview of the results of this survey are presented below. A more detailed analysis of the total catch from 2020-2022 will be provided at a later date. This will include a detailed breakdown of stomach contents and age profiles. This breakdown will compare the results of this recent lower Lough Erne yellow eel survey with results obtained during the Erne Eel Enhancement work of the late 1990's.

During the 5-day survey a total of 1,473 eels were caught and measured, a drop of 389 eels from 2021 yellow eel survey. Of the 1,473 eels caught and measured 170 (11.54%) were classified as broad head with 1,303 being narrow headed. The mean CPUE for 2022 was 12.3, the lowest recorded on the mean CPUE of 17.72 across the previous 5 surveys covering 8 years (Table 6-2).

Table 6-2 Catch per unit effort from lower Lough Erne yellow eel surveys.

Zones	2014	2016	2018	2020	2021	2022	Zonal average
Trory	3.23	8.73	10	12.5	7.7	8.6	8.46
Upper Devenish	18.23	13.76	14.1	18.3	12.23	12.3	14.82
Castle Archdale	28.3	30.77	25.6	27.5	13	13.3	23.08
Kesh/Lusty	25	12.76	30.7	12.7	29.07	14.9	20.86
Yearly average	18.7	16.5	20.1	17.8	15.5	12.3	

In the 2022 survey zonal CPUE trends followed a similar pattern to previous years with Trory being the lowest followed by Upper Devenish. However, Castle Archdale and Kesh zone had considerably lower CPUE than the zonal average.

6.2.1.2 Size Classes

Size classes of eels captures during the 2022 yellow eel survey followed a similar trend to previous years (Figure 6-13).

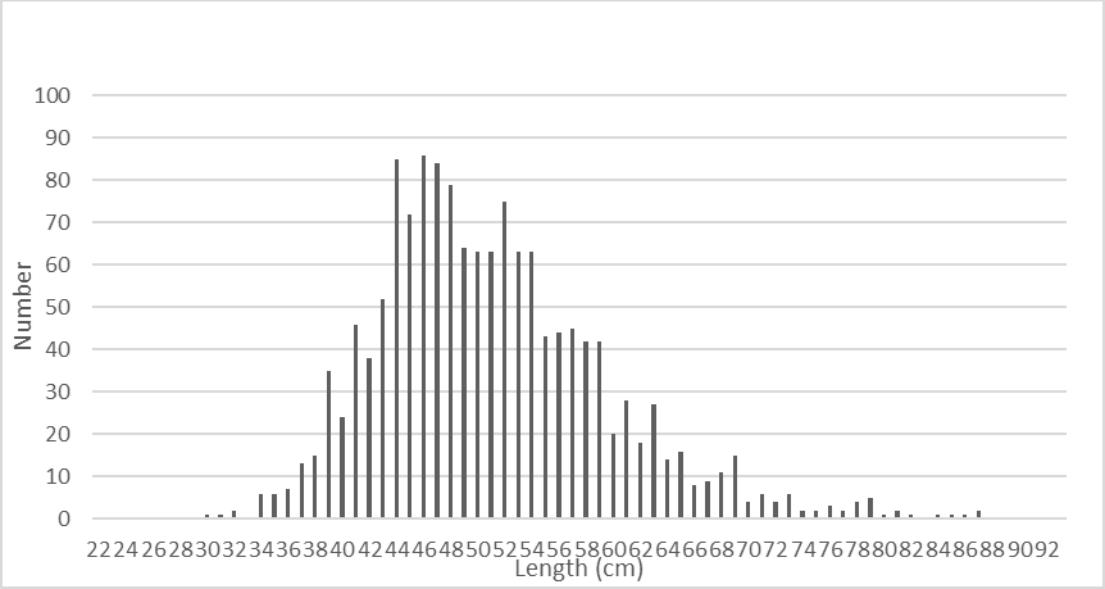

Figure 6-13 Size classes from the 2022 LLE yellow eel survey (n = 1473).

6.2.1.3 Undersize catch

The 2022 LLE yellow eel survey saw another significant drop in the mean percentage of catch that was under 40cm (Table 6-3). This has been falling since surveys began in 2011 despite the closure of the commercial fishery. The falling numbers of catches under 40cm is unsurprising given the poor levels of recruitment. This also coincides with the average decrease in CPUE seen over the last 11 years highlighting the poor recruitment seen in Lough Erne.

Table 6-3 Percentage of catch under 40cm from each year of the LLE yellow eel survey.

Zones	2011	2014	2016	2018	2020	2021	2022
Trory	35.1	21.7	10	9.3	9.1	10	8.5
Upper Devenish	31.8	22.5	13	11.3	9.8	9.3	5.1
Castle Archdale	34.3	23.7	16	10.3	12.1	9.2	4.8
Kesh/Lusty	23.4	33	12	22.8	6.8	7.2	6.1
Mean	**31.2**	**25.2**	**12.8**	**13.4**	**9.5**	**8.9**	**6.1**

6.2.1.4 By catch

Only four species were caught as by catch during the 2022 yellow eel survey with Perch making up over 78% of the catch (Figure 6-14). Roach, Roach/Bream hybrids and pike made up the rest of the by catch respectively.

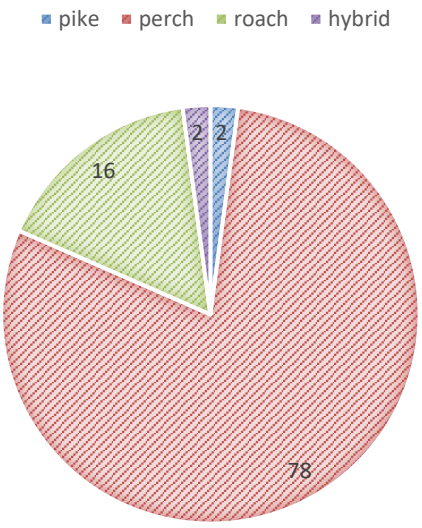

Figure 6-14 Total by catch caught during the 2022 lower Lough Erne yellow eel survey

6.2.1.5 Fat content

Fat content measurements from the 2022 survey show a similar pattern to previous survey results.

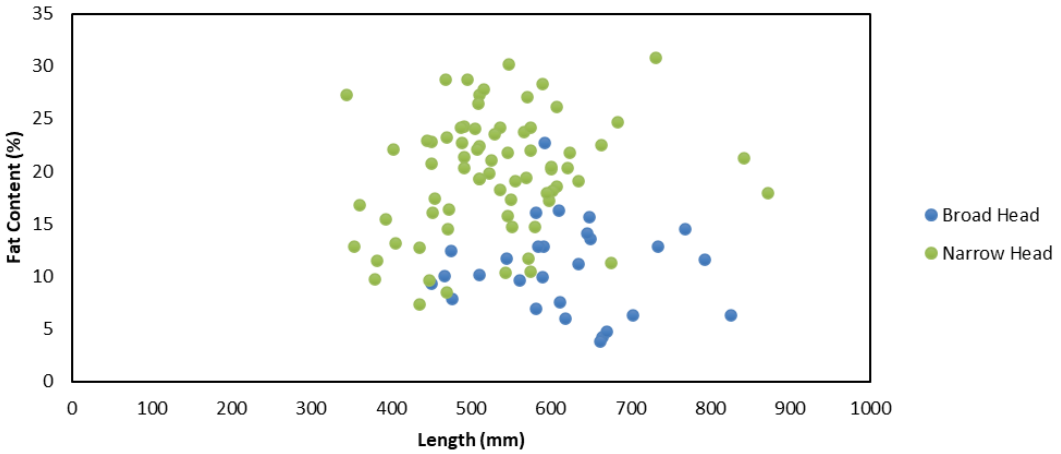

Figure 6-15 below shows a clear divide of fat content with head shape with broad head individuals consistently displaying lower fat contents, often in single figures.

Fulton's condition factor corresponds with fat readings with broad head individuals having a lower average condition factor of 0.17 compared to an average of 0.19 for narrow head individuals. It is expected after analysis of gonadal development it will show reduced gonadal development among broad head individuals also.

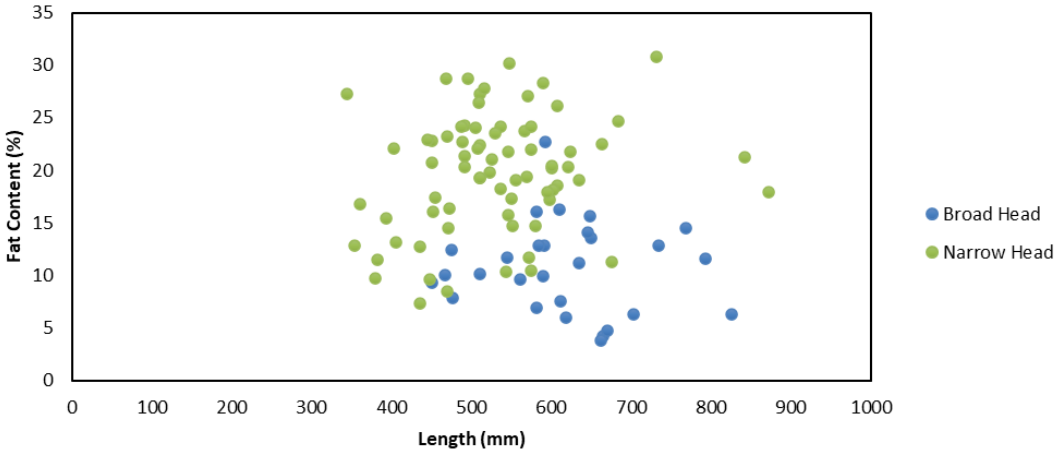

Figure 6-15 Fat content from 2022 LLE yellow eel survey catch (n=100).

6.2.1.6 Stomach Contents

Results of stomach content analysis from the 2022 lower Lough Erne yellow eel survey are shown below. Of the 100 digestive tracts that were examined 39% were empty. The percentage occurrence of different food items is shown below in Figure 6-16. Fish were found exclusively in broad head individuals and often in high numbers with up to 6 individual fish in one case. Broad head individuals also had a lower percentage of empty stomachs than narrow head individuals, possibly as a consequence of longer digestion times of fish prey. This also highlights the availability of fish as prey items for eels in Lough Erne and despite this broad head individuals consistently show poorer body condition.

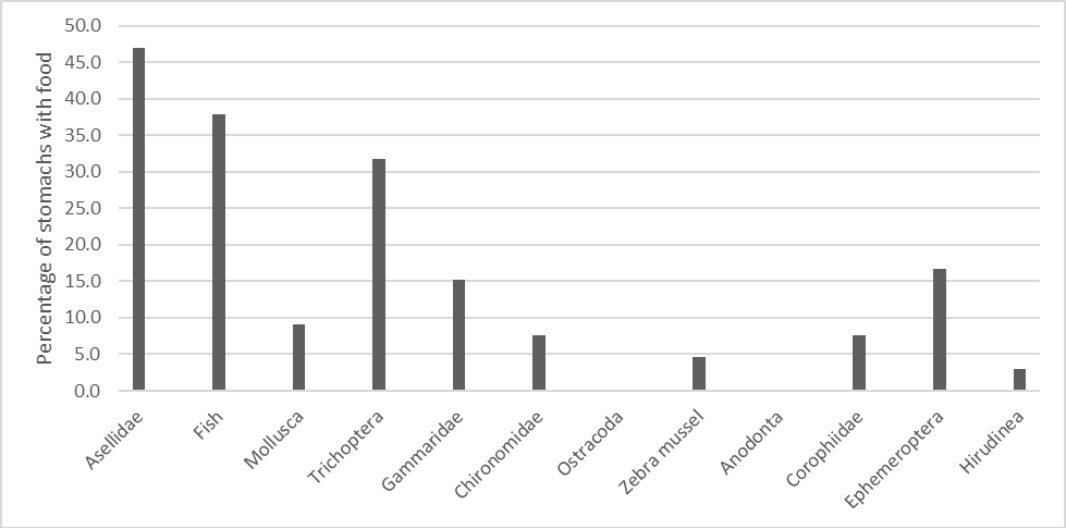

Figure 6-16 Percentage occurrence of food items in stomach contents from yellow eel survey 2022 (n = 61).

6.2.1.7 Anguillicola crassus

Prevalence and intensity of infections with the invasive swim bladder nematode *Anguillicola crassu*s was also examined during the 2022 yellow eel survey. Table 6-4 below shows mean prevalence of the parasite across each zone over the previous 8 years. Zonal prevalence for 2022 follows a similar pattern to previous years.

Table 6-4 Prevalence of the invasive swim bladder parasite A crassus from lower Lough Erne yellow eel surveys.

	Year					
Zone	**2014**	**2016**	**2018**	**2020**	**2021**	**2022**
Trory	80	68	80	64	64	64
Upper Devenish	80	51	60	68	56	64
Castle Archdale	60	40	56	56	48	48
Kesh/Lusty	73	15	56	52	56	68
Mean	73.3	43.5	63	60	56	61

6.3 Transitional Waters

6.3.1 Burrishoole Transitional Waters

Lough Furnace, the tidal lough, has a surface area of 125ha north of Nixon's Island and 16ha between Nixon's Island and the mouth of the estuarine river (Lower Lough Furnace) (Figure 6-17). Lough Furnace, the tidal lough, has a surface area of 125ha north of Nixon's Island and 16ha between Nixon's Island and the mouth of the estuarine river (Lower Lough Furnace). The main lough has a maximum depth of 21.5m. Furnace is heavily stratified with significant areas of deoxygenated water in the main basin. L. Furnace was fished in the traditional style (sets of 10 nets perpendicular to the shore) in 2022 (28-28 July & 19 Aug 2022), with chains of 10 nets fished at the 6 core sites in one night each. Two chains of nets were fished at the Back of the House (18 August 2022), which is a shallow tidal area between the lough and the estuarine river.

In L. Furnace, 74 eels were caught with a catch per unit effort (CPUE) of 0.93 eels/net/night (Table 6-7). The average length was 41.2 cm ranging from 27.3 cm to 71.2 cm (Figure 6-18). A total weight of 9.94 kg was caught. No eels were PIT tagged and two previously tagged eels were recorded, both tagged in 2018, although one had been previously recaptured in 2020. No eels were sacrificed in L. Furnace.

In Lower Lough Furnace (Back of the House), 16 eels were caught with a catch per unit effort (CPUE) of 0.8 eels/net/night (Table 6-7). The eels average length was 38.5 cm ranging in length from 29.6cm to 54.8 cm (Figure 6-18), with a total weight of 1.58 kg caught. No eels were PIT tagged and none were recaptured. No eels were sacrificed in this survey from Lower Lough Furnace.

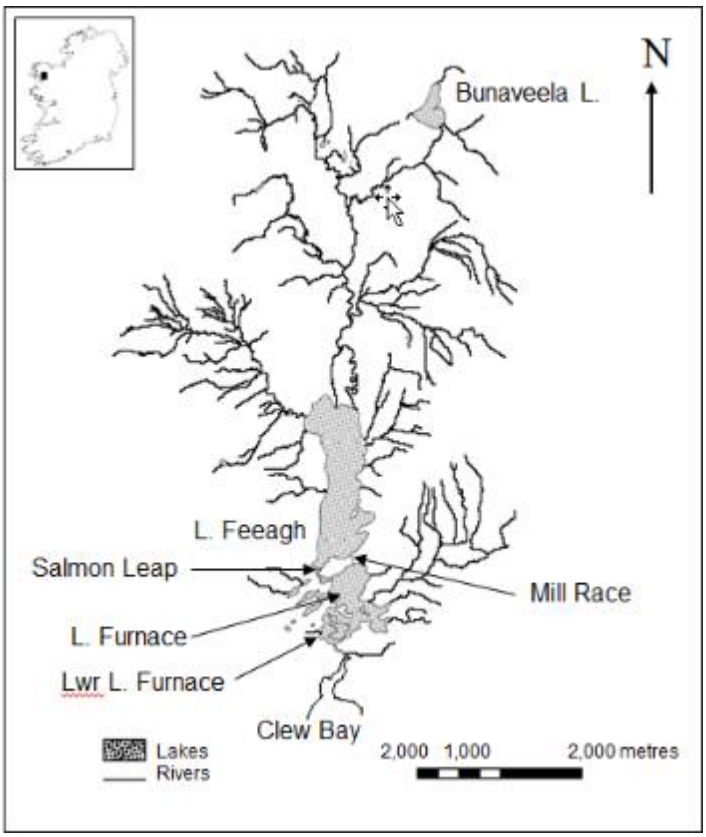

Figure 6-17 Location of Lough Furnace and Lwr Lough Furnace in the Burrishoole catchment.

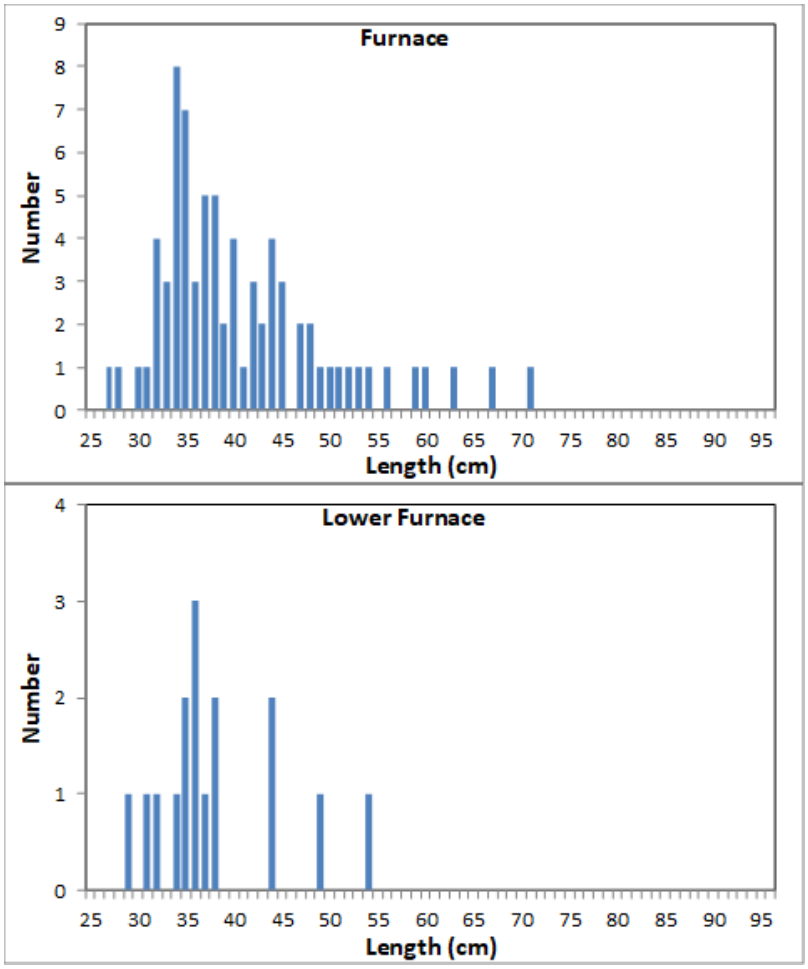

Figure 6-18: Length frequency of yellow eels captured at Lough Furnace (n = 74) (top) and lower Lough Furnace (n = 16) (bottom), in 2022.

Table 6-5 Catch detail from yellow eel lakes surveys 2022.

Lake	Dates	No. Eels	Net* Nights	CPUE	Total weight (kg)	Mean length (cm)	Mean weight (Kg)
Bunaveela	Jul-22	13	30	0.43	3.39	47.3 (30.2-72.2)	0.26
Feeagh	Jul-22	54	60	0.90	6.04	39.8 (27.3-51.1)	0.112
Feeagh	Oct-22	136	60	2.27	26.47	45.2 (28.4-93.4)	0.195
Gartan	Sept-22	8	12	0.66	n.a.	47.5 (32.0-68.0)	n.a.
Greenan	Sept-22	2	6	0.33	n.a.	33.5 (32.0-35.0)	n.a.
LL Erne	Jul - 22	1473	120	12.3		55.4 (34.4 – 87.2)	0.344

Table 6-6 Catch detail from River Bride electric fishing surveys 2022.

River	No. Eels	Average Length (cm)	Min Length (cm)	Max Length (cm)	Average Weight (kg)	Min Weight (kg)	Max Weight (kg)	Total Weight (kg)
R. Bride	130	16.1	9.2	34.6	0.012	0.001	0.106	1.587

Table 6-7 Transitional Waters yellow eel survey data 2022.

Lake	Dates	No. Eels	Net* Nights	CPUE	Total weight (kg)	Mean length (cm)	Mean weight (Kg)
Furnace	Jul/Aug-22	74	80	0.93	9.94	41.2 (27.3-71.2)	0.134
Lwr Furnace BOH	Aug-22	16	20	0.80	1.58	38.5 (29.6-54.8)	0.099

6.4 Water Framework Directive

6.4.1 Introduction

In December 2000, the European Union introduced the Water Framework Directive (WFD) (2000/60/EC) as part of a standard approach for all countries to manage their water resources and to protect aquatic ecosystems. The fundamental objectives of the WFD are to protect and maintain the status of waters that are already of good or high quality, to prevent any further deterioration and to restore all waters that are impaired so that they achieve at least good status by 2015. A key step in the WFD process is for EU Member States to assess the health of their surface waters through national monitoring programmes. Monitoring of all biological elements including fish is the main tool used to classify the status (high, good, moderate, poor and bad) of each water body. The responsibility for monitoring fish has been assigned to Inland Fisheries Ireland. A national fish stock surveillance monitoring programme has been initiated at specified locations in a 3-year rolling cycle.

Locations for WFD sampling sites for 2020 surveys are shown for lakes, rivers and transitional waters (Figure 6-19).

6.4.2 2021 Results

6.4.2.1 Lakes:

In 2021, 22 lakes were sampled with eels present in all 22 (100% of sites). A total of 231 eels were caught during lake surveys (fyke net catches). They ranged in length from 29 to 79 cm with an average length of 49.2 cm. A mean CPUE of 0.83 was found across all lake sites. While the highest CPUE value for eels was found in Lough Melvin (CPUE = 2.45, n = 81 eels) the lowest were noted in lakes Adrehid, Atedaun, Bunny, Dan, Loughaphreaghaun, Nasnahida and Shannaghree (all 7 lakes shared a CPUE = 0.33, n = 1 – 3 eels captured). (Appendix 6 WFD, Tables A6 1 and A6 2).

6.4.2.2 Rivers:

A total of 274 river sites (across 15 catchments) were covered in the 2021 surveys. The WFD river sites had a 25.5% eel presence rate (with eel captured at 70 out of 274 sites), 100% of sites with eels have <10 eels. The highest catch at any site was 9 eels on the River Dee (Bridge at Drumcar_A) in Louth. A total of 143 eels were caught, ranging from 8.5 to 60.0 cm (Mean: 23.7 cm), (Appendix 6 WFD, Tables A6 3, A6 4 and A6 5). Densities (where eels were present) ranged from 0.0006 eels per m^2 in the Litte Brosnsa River (Riverstown Br._A) to 0.2273 eels per m^2 in the Swilly (Knocknamora) River (Arena 7_A).

6.4.2.3 Transitional Waters:

A total of 4 estuaries (across 6 estuaries) were covered in the 2022 surveys. A total of 42 eels were captured ranging in length from 6 to 65 cm (mean: 37 cm). European eel were caught at all but one of these estuaries (Cromane Estuary had no eel catch). CPUE values for transitional water sites ranged from 0.038 (Lower Shannon Estuary) to 1.00 (Limerick Docks). (Appendix 6 WFD, Tables A6 6 and A6 7).

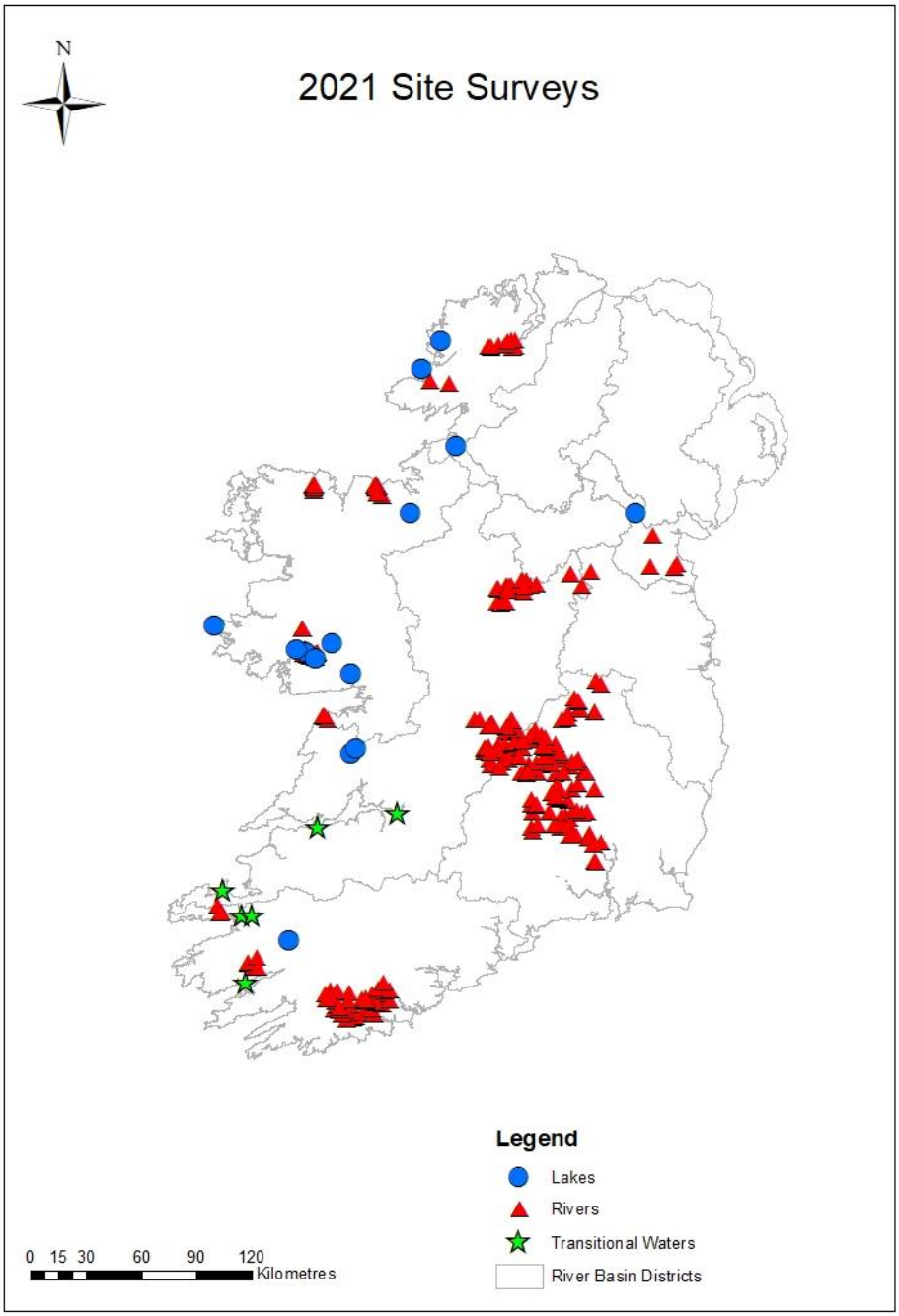

Figure 6-19 Location of WFD survey sites, 2021.

6.5 Summary

Bunaveela L. was fished in the traditional in 2022, with a total of 13 eels caught with a catch per unit of effort of 0. 0.43 eels/net/night. Lough Feeagh caught 54 eels with a catch per unit effort (CPUE) of 0.90 eels/net/night. An additional two nights were fished on Lough Feeagh in October (3 chains of nets), 136 eels were captured with a CPUE of 2.27 eels/net/night and a total weight of 26.5kg. Considerably higher than the summer catch.

The bankside semi-quantitative electrofishing method enabled the whole catchment to be assessed for the presence and absence of eels. In 2015, 128 eels were captured on the Bride, using the bankside electric-fishing survey in 2022, 130 eels were captured. The depletion fishing method did catch more eels than the bankside method, however, as in previous years, there was no statistical difference in the catch numbers at the sites were both methods were employed.

The 2022 results confirmed that of 2015 in terms of eel distribution around the catchment. There was an even coverage of eels throughout the area, with no one focus in density of population. As the Bride is exclusively a riverine catchment with no focal lake centre in terms of productivity, there was no one focal set of streams or tributaries having higher numbers of eels. Both the Fane and Kells Blackwater systems (lacustrine systems with Lough Muckno and Lough Ramor respectively), had uneven eel distributions noted with the highest catches found in inflows and outflows of the catchments lake.

The 2022 survey resulted in a very comparable number of eels to the previous Bride survey in 2015. This may have been an indication of stable population and recruitment being maintained in the years between the two surveys. A possible explanation for this may be the proximity of the Bride catchment to its estuary.

All RHAT surveys on the Bride and Fane sites resulted in hydromorphological status of “Moderate” and “Good”. The reductions in eel catch numbers on the Fane between the two electric-fishing surveys remain unexplained however, it would seem that impaired hydromorphological habitat status is not responsible for the decline in numbers.

Loughs Gartan and Greenan in Donegal, both known Artic Char lakes, were sampled by the Habitats Directive Programme during September 2022. Eight eels were captured on Lough Gartan and a further two eels were caught on Lough Greenan during these surveys. While fyke nets and various benthic and floating monofilament nets were used on these surveys, only the fyke data is presented here. These surveys highlight the presence of European eel in Artic Char lakes in Donegal.

Lower Lough Erne was surveyed in July 2022 during the 5-day survey a total of 1,473 eels were caught and measured.

Lough Furnace was the only transitional water surveyed specifically for eels with 74 eels were caught with a catch per unit effort (CPUE) of 0.93 eels/net/night.

7 Recruitment

(refers to Ch. 7.3 of the National EMP Report, 2008)

7.1 Introduction

Many studies have focused on sampling the active phase of elver migration into freshwater (Gollock *et al*., 2011; Jessop 2000; Knights and White 1998; Moriarty 1986, Naismith and Knights 1988; O'Connor 2003; Piper *et al.,* 2012; Reynolds *et al.,* 1994). Elvers exhibit counter current behaviour once they start actively migrating upstream. This means that instead of moving with the current as they do in the estuary, they now avoid the river current which will carry them downstream. To avoid the current, the elvers tend to migrate along the banks of the river and seek out slack water. At this time the elvers are congregated in schools near the bank of the river where they can be trapped.

The sites monitored are shown in Figure 7-1.

The elver traps used on the Erne and the Shannon by the ESB are permanent brush ladders, based on the fixed ramp style traps designed by O'Leary and reported in an EIFAC technical paper on 'Eel Fishing gear and techniques in 1971, leading to holding boxes fitted with freshwater supplies. They are sited at the main hydro installations at Ardnacrusha and Parteen on the Shannon, Cathaleen's Fall on the Erne and Inniscarra Dam on the Lee. They are described in more detail in the Irish SSCE reports.

The elver traps used by IFI are also based on the fixed ramp style traps. They have been cited in various studies with modifications being made to the traps (Gollock *et al.,* 2011; Jessop 1995; Jessop 2000, Moriarty 1986, Naismith and Knights 1988). Elvers and young yellow eels will encounter the ramp and ascend due to the flow of water attracting them upstream. The elver migration season extends from April to August, with migration influenced by water temperature and river discharge. White and Knights 1997 reported not catching juvenile eels in any numbers until temperatures rose above 15-16°C in mid-June /early July, peaking at >20°C. The pattern of distribution across a season has been described as waves of runs of short duration but repeated over the season (Jessop 2000). Where possible the traps are located downstream of a structure (e.g. weir or waterfalls) in order to get a flow of water to feed the traps. The structure also acts as a bottleneck restricting the ability of elvers utilising the whole river to ascend.

Elver traps currently run by the MI on the Burrishoole (IE_West) and the Liffey (IE_East) are O'Leary type bristle ramp traps with gravity fed water supplies.

The aim of the long-term monitoring programme is to set up a number of sites as an index of recruitment in order to get an understanding of changes to relative abundance of recruitment since the implementation of the Eel Regulation. It is not intended to make assumptions on the whole catch entering the river as the proportion of elvers avoiding the traps is not known and is difficult to quantify. The elver traps sample a proportion of the elver migration in a standardised way and when operating for a number of years a trend in recruitment is observed.

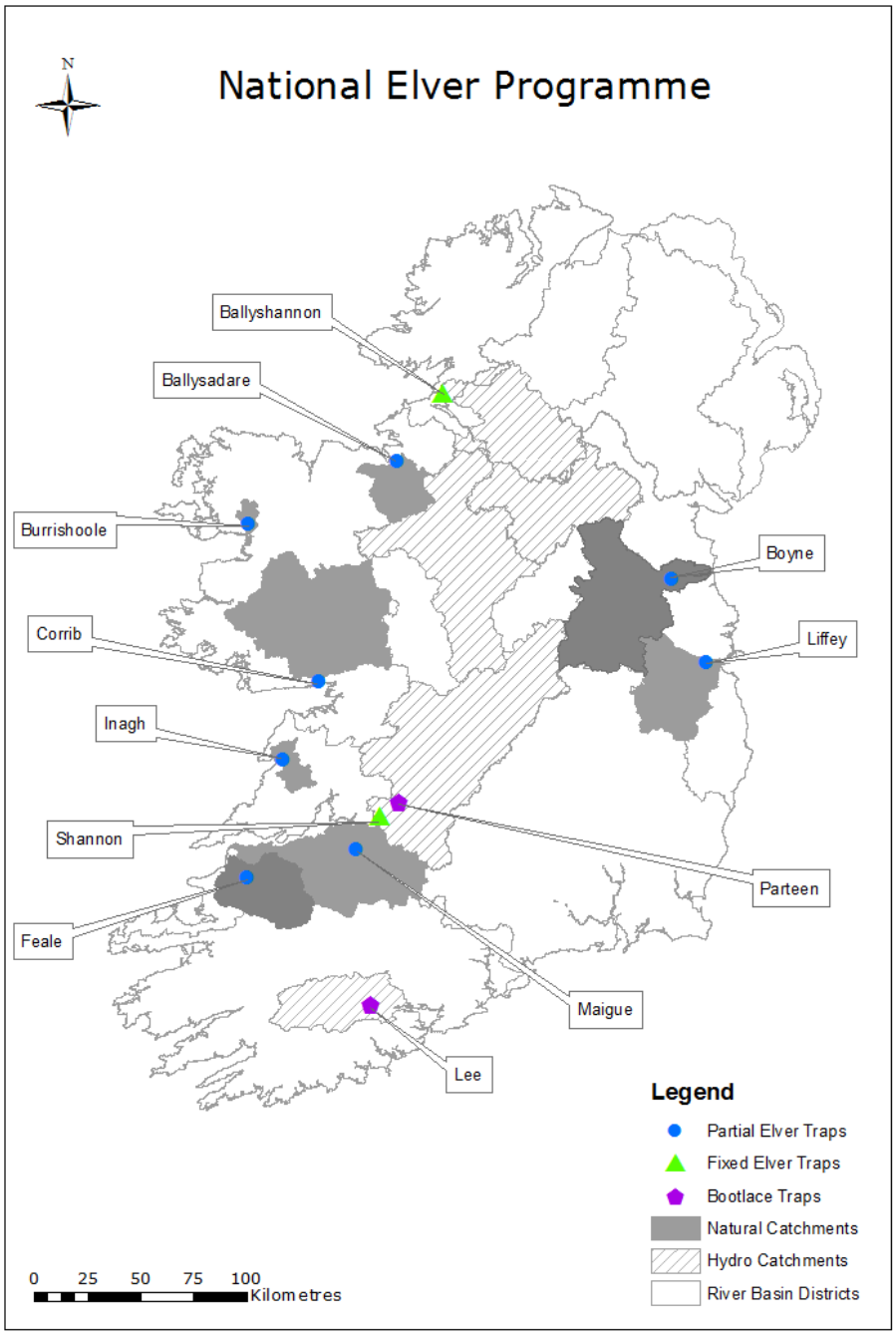

Figure 7-1 Location of recruitment monitoring stations in Ireland.

7.2 0+ Recruitment

There is no authorised commercial catch of juvenile eel in Ireland, but some fishing has been authorised in the past under Sec. 18 of the Fisheries Act for enhancement of the fisheries. Catches are made at impassable barriers and this is reported in the relevant Regional Eel Management Plans.

ICES (2022) noted an increase in recruitment for the Europe Elsewhere series; the estimated figure was 9.7% (provisional) an increase from 5.5% (final) for 2021. The increase is based on increased recruitment in the Irish recruitment series that was not visible in the Bay of Biscay index sites.

7.2.1 Shannon & Erne

Long-term monitoring of elver migrating at Ardnacrusha (Shannon) is undertaken by the ESB and at Cathaleen's Fall (Erne) by the ESB in conjunction with DAERA and AFBI (Figure 7-2).

In the Erne recruitment has shown an increase each year since 2011 with the highest catch in 2018 since 1995.

For 2022 a value of 570 kg of elvers were caught at Ardnacrusha; this has been the highest value recorded since 1997 (2016 had a high of 317 kg).

2022 was a good year for recruitment for the Erne with 502 kg collected in the traps at the station. This was an increase from the 382 kg counted in 2021 and the very low 0.112 kg recorded in 2020.

7.2.2 Other Locations

Long-term monitoring of migrating elvers also takes place at on the Feale, Inagh and Maigue Rivers and in Burrishoole (Table 7-1).

The Ballysadare elver trap was not operational for the 2022 season due to the impacts of Covid-19. The trap on the Corrib is located within the elver pass of the Galway weir. The trap caught 64.8 kgs of elvers in 2022 and operated from June until October. The Feale trap at Listowel ran from April to August. A total of 7.1 kg of elvers and 275 g of yellow eels were caught for the entire season with the highest catch in July. The elver trap on the River Inagh in Ennistymon ran from April to August. The total catch of elvers for the season was 4.3 kg, 395 g of yellow eels were also caught during the survey period. The Maigue trap in Adare ran from June to August. The total catch of elvers for the season was 10.174 kg, (there were 23 individual yellow eels captured across the season, but these were not weighed).

In Burrishoole, a small O'Leary style elver trap was installed in 2007 in the outflow of the large release pond in Furnace. This provides some indicative data of the relative annual abundance of young eel recruitment. By numbers, the catch is predominantly zero age class glass eel ("elvers") of various levels of pigmentation, but by weight the young yellow eels moving out of Lough Furnace make a more significant contribution. These young yellow eels are predominantly ages one to four. Figure 7-3 gives the annual weight of recruits trapped and compares with catches in a similar trap in the 1980s. These current levels are about 10 times lower than those of the 1980s in the same location. 2020 was the 3rd highest year over the last decade.

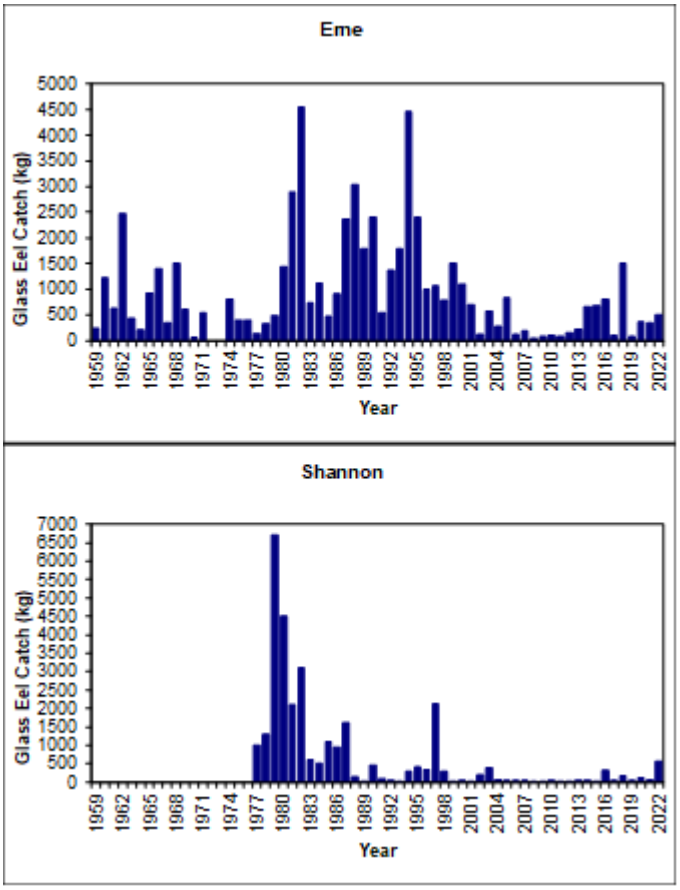

Figure 7-2 Annual elver catches (t) in the traps at Ardnacrusha (Shannon) and Cathaleen's Fall (Erne) – data from ESB. Full trapping of elvers took place on the Erne from 1980 onwards indicated by the arrow. Erne 2015 onwards does not include the additional new trap.

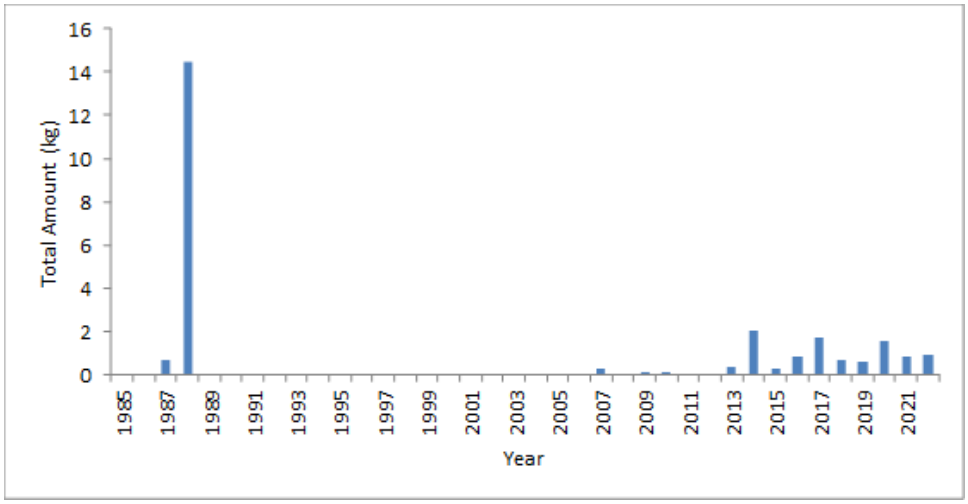

Figure 7-3 Total quantities (kg) of recruits in the Burrishoole index trap, including all ages.

Table 7-1: Glass eel catches (kg), 1985 to 2022 (blanks = not fished).

Year	Erne Index traps	Shannon Ardnacrusha	R Feale	R Maigue	R Inagh	Sh. Estuary Glass Eels	R. Liffey Fish Pass	Burrishoole
1985	463	1093	503					
1986	898	948						
1987	2367	1610						
1988	3033	145						
1989	1781	27						
1990	2409	467						
1991	546	90						
1992	1371	32						
1993	1785	24						
1994	4463	287	70	14				
1995	2400	398	0	194				
1996	1000	332	0	34	140			
1997	1065	2120	407	467	188	616		
1998	782	275	81	8	11	484		
1999	1500	18	135	0	0	416		
2000	1100	39	174	0	120	43		
2001	699	27	58	2	18	1		
2002	113	178	116	5		37		
2003	576	378	36	72	111	147		
2004	269	58.126	0	0	24	1		
2005	838	41.36	0	1	0	41		
2006	118	42	1	0	4	3		
2007	189	45	0	0	39	12		0.259
2008	38.7	7	0	0	83	2		0.028
2009	88.3	7.75	42					0.089
2010	96.6	49.7	20	3	1	3		0.094
2011	74.34	7.239	7	5	15			0.084
2012	145.71	22.525	47		*		0.5	0.053
2013	214.7	46.615	68	14	44		1.1	0.393
2014	659.37	45.085	5	29**	40		0.3	2.000
2015	686.17	11.42	3	15	25		0.2	0.300
2016	805.06	317.2	30.5	29	51		0.4	0.870
2017	94.95	29.7	15	9	20		0.5	1.691
2018	1508.4	165.2	3.2	n/a	5.4		6.3	0.697
2019	83.99	34.6	7.6	n/a	2.12		1.5	0.569
2020	358	112	0.915	0.254	5.26		1.8	1.591
2021	336	62.25	0.409	1.15	0.564		2.7	0.876
2022	509.2	570	7.11	10.17	4.31		5.7	0.943

7.3 Young Yellow Eel Recruitment

Monitoring of juvenile yellow eel migrating at Parteen Regulating Weir (Shannon) and Inniscarra on the R. Lee takes place using fixed brush traps.

The data for Parteen is presented in Figure 7-4. In 2009 and 2010, due to maintenance work by ESB at the Parteen regulating weir the discharge patterns were less favourable than in 2008. This may partly account for the poor catches recorded in 2009 & 2010. However, catches in the original Parteen hatchery trap continued to decline in 2011, 2012 and 2013. The catch in 2015 was 301.1 kg and in 2016 it was 890 kg.

A new trap was installed in 2012 on the Shannon at Parteen, on the opposite bank (Co. Clare). The catch was 6.6 kg and 6.8 kg in 2013 and 7.8 kg in 2014. The Co. Clare trap and a new one installed in 2015 near the hatchery (Tipperary) trapped 26.95 kg in 2015 and 23.1 kg in 2016.

In Parteen in 2020 the main catch was 1 051 kg and the new trap catch was 8.7 kg

In Parteen in 2021 the main catch was 33.46 kg and the new trap catch was 6.7 kg.

In Parteen in 2022 the main catch was 91.43 kg and the new trap catch was 5.27 kg.

In 2010, less than one kg was recorded in the Inniscarra trap on the River Lee and in 2011, 48 kg were recorded. The catch has declined since 2011 with only 0.6 kg recorded in 2014 and 0.94 kg in 2015. The catch remained low in 2016 (1.1 kg) and in 2017 it was 13.8 kg.

In 2018, the Inniscarra trap only trapped 0.8 kg, likely due to low water levels and closure of the fish pass.

In 2019, the Inniscarra trap only trapped 0.8 kg, likely due to low water levels and closure of the fish pass.

In 2020 the trap operated from the 16th March until the 27th September. Like previous years, the catches were largely recorded for the period early June to the end of August.

The trap operated from 15th March until 7th September 2021. The catches were released into the mid catchment of the River Bride which enters the River Lee below Iniscarra station. A total of 0.445 kg of elver were caught in 2021.

The trap operated from 15th March until 7th September 2022. The catches were released into the River Bride. A total of 1.04 kg of elver were caught in 2022.

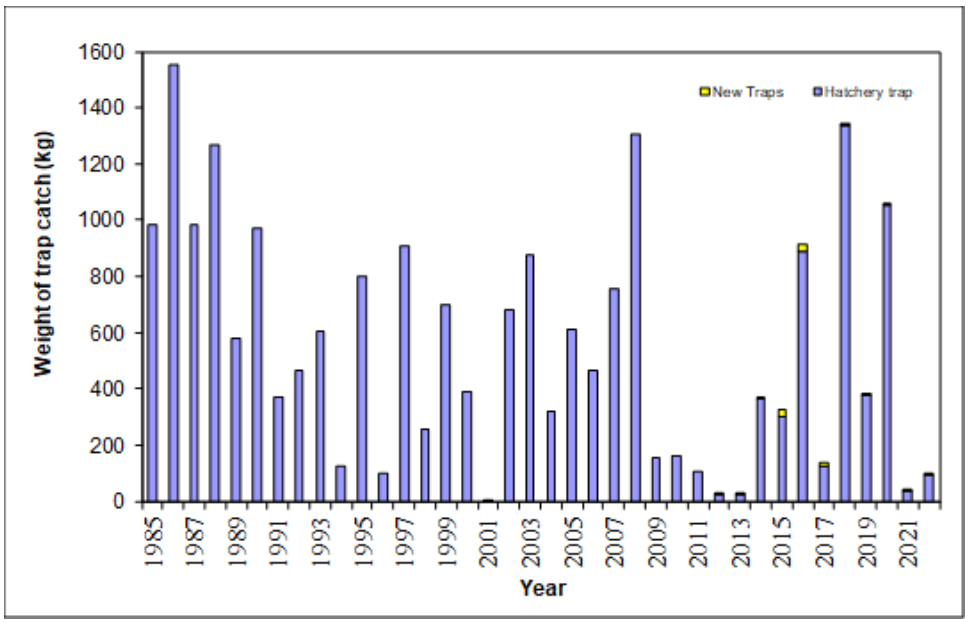

Figure 7-4 Juvenile yellow eel catches (kg) at Parteen Weir, 1985 to 2021. From 2012, a second trap was installed on the opposite bank (Clare) and in 2015 near the hatchery (Tipperary) and these data are included in the graph as separate bars.

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Appendix 1: Members of the Technical Expert Group on Eel 2021-2024

The TEGE is comprised of the following representatives:

Dr. Ciara O'Leary	Inland Fisheries Ireland
Dr. Colm Fitzgerald	Inland Fisheries Ireland
Dr. Russell Poole	Marine Institute
Dr. Denis Doherty	Electric Ireland
Dr. Paddy Gargan	Inland Fisheries Ireland
Dr. Derek Evans	Agri-Food & Bioscience Institute, N. Ireland
Dr. Sarah McLean	Loughs Agency

The following experts were invited to attend relevant meetings.

Jonathan McDowell	Queens University

Appendix 2: Conservation of Eel Fishing Bye-law No. C.S. 319, 2015

I, Joe McHugh, Minister of State at the Department of Communications, Energy and Natural Resources, in exercise of the powers conferred on me by section 57 of the Inland Fisheries Act 2010 (No. 10 of 2010) and the Energy and Natural Resources (Delegation of Ministerial Functions) Order 2014(S.I. No. 585 of 2014), at the request of Inland Fisheries Ireland, and for the purpose of giving full effect to the State's Eel Management Plan under Council Regulation (EC) No. 1100/2007 of the 18 September 2007[1], hereby make the following bye-law:

1. (1) This Bye-law may be cited as the Conservation of Eel Fishing Bye-law No. C.S. 319, 2015.

(2) This Bye-law comes into operation on the day after the day of its making and ceases to have effect on 30 June 2018.

2. (1) Notwithstanding anything contained in any bye-law fixing the annual close season, it is prohibited for a person -

(a) to take, or attempt to take, or to fish for or to attempt to fish for, or to aid or assist in the taking or fishing for, eel, or

[1] OJ No. L248, 22.09.2007, p.17.

(b) to be in possession of or sell or offer for sale or reward, or to purchase eel caught or taken by any means,

in any fishery district.

(2) In this Article "eel" means eel of the species *Anguilla anguilla*.

3. The Conservation of Eel Fishing Bye-Law No. C.S. 312, 2012 is revoked.

GIVEN under my hand,

23 November 2015.

JOE MCHUGH

Joe McHugh,

Minister of State at the Department of Communications,

Energy and Natural Resources.

EXPLANATORY NOTE

(This is not part of the Bye-law and does not purport to be a legal interpretation).

This Bye-law prohibits the taking, or attempting to take, fishing for or attempting to fish for, aiding or assisting the taking of or fishing for, eel in any fishery district in the State. It also prohibits being in possession of, selling or offering for sale or reward, or purchasing eel caught or taken by any means in any fishery district in the State.

FOOTNOTE

Section 57 (7) of the Inland Fisheries Act, 2010 provides that any person aggrieved by this Bye-law may within 28 days after its publication in the Iris Oifigiúil, appeal against same to the High Court.

Appendix 3: Reports on Fisheries closures, illegal fishing and other management actions from the IFI RBD's.

Eel Management Information 2022

River District Basin: Eastern / Neagh Bann River Basin District

Date: 1 Jan- 31 Dec 2022

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the EASTERN / NEAGH BANN RBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the EASTERN / NEAGH BANN RBD during 2021.

No commercial eel fishing licences were issued by the EASTERN / NEAGH BANN RBD during 2020. Scientific licences issued to trap eels relating to research activity in IFI Dublin (details TBC by Ciara O'Leary) (covering both Eastern / Neagh Bann (International) River Basin Districts). Ex-commercial eel fishermen were contracted by IFI Research Division to undertake surveys.

Estimated level of illegal fishing: Very low. The estimated level of illegal activity was very low for 2022 in the IFI Dublin area. Illegal activity targeting eels was not recorded. Patrols concentrated on lakes / rivers throughout the Eastern / Neagh Bann RBDs.

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred:

Number of gear seizures: 1 Fyke Net (1.5m long), 4 crayfish traps Gear types seized:

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions: NIL

Estimated tonnage on board: NIL Declared origin(s) of cargos: NIL

Describe Action taken: NIL

General impression of levels of illegal activity since the cessation of the commercial fishery: Low levels of illegal activity recorded, any eels recorded were a by-product when coarse fish were found / seized in nets (however very few eels found in any nets in 2022). 4 crayfish traps and one fyke net were seized in 2022 which would be capable of catching eels – it is believed that all were targeting other species (coarse fish).

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD? NIL

(If 'Yes', please insert quantity transported).

What was the total catch transported (kg)?: NIL

Was there any evidence of illegal trading of eel in conjunction with the T&T programme: NIL

General impression of the programme: NIL

Photograph. Fyke net retrieved from River Liffey in April 2022 and trap retrieved in the Broadmeadow River (July 2022).

Management Action 3. Ensure Upstream Migration at Barriers

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

IFI staff work proactively to remove blockages to the free migration of fish in surface water systems. Natural debris barriers to upstream migration arising from floods etc were removed in at least 10 locations during 2022.

Photographs 2 & 3. During a patrol of the Stonyford River (mid-May, 2022), staff noticed a huge blockage of woody debris, wire, sheep carcasses trapped under Southill Bridge, near Delvin in Co. Westmeath. This was a severe and total blockage that presented a major flood risk, as well as a certain impediment to migrating fish. The OPW was contacted, and by month's end they had assisted IFI in removing the blockage.

Photographs 4 & 5. Blockage at the bridge in Inniskeen, Fane River, before removal (L) & after removal (R) (December 2022).

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

IFI's environmental function focuses on water quality / habitat improvement and can broadly be broken into 3 main themes – a. regulatory & enforcement (planning / licensing / compliance / responsive enforcement action); b. collaboration / liaison / industry expert; c. stewardship and advocacy. IFI field staff respond to and investigate what can be termed 'water pollution' complaints received by IFI on a 24/7/365 basis. Investigations are often carried out in co-operation and close liaison with staff in Local Authorities, the E.P.A., Waterways Ireland or other bodies / agencies. Investigations can extend to pollution incidents on cross-border rivers, where close cooperation with staff from relevant agencies in Northern Ireland is required. Typical regulatory non-emergency complaints include poor quality discharges to watercourses, illegal dumping, and issues relating to developments beside or close to rivers. IFI's goal is to protect and conserve all fish populations and their habitats.

Local Authorities and other agencies are obliged under legislation to notify and engage Inland Fisheries Ireland on certain planning matters where an impact on the fisheries resource is possible. These agencies also require stakeholders (under their statutory powers) to consult with Inland Fisheries Ireland, and subsequently submit proof of compliance with Inland Fisheries Ireland's requirements as a component of the national formal planning system. Beyond local pre-planning and planning a constant demand exists for input to Local Authority Development Plans, Screening and Scoping on Strategic Environmental Assessments (SEA) relating to major plans and

national policies, Regional Planning Guidelines, Local Area Plans etc. SAC, SPA and NHA catchment plans and projects are subject to Appropriate Assessment (AA) where Inland Fisheries Ireland are also prescribed and notifiable.

Infrastructural elements impacting on surface waters (e.g. schemes such as wastewater/water treatment plants, water abstractions for potable supply, flood relief schemes, roads projects, housing, commercial waterside development) are evaluated and assessed from a fisheries legislative perspective. From design through to construction, Inland Fisheries Ireland environmental staff are involved in close liaison with the relevant parties (often public agencies and bodies), their design teams and the various contractors 'on the ground' to ensure habitat protection, control of pollution and conservation of the fisheries resource.

Please include any relevant photographs of elver and/or silver eel trap & truck activities or seized gear.

Eel Management Information 2022

River District Basin: **North West River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the NWRBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the NWRBD during 2022.

Estimated level of illegal fishing:

0

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred:

Number of gear seizures: 2

Gear types seized: two fyke nets

Insert quantity/length of gear seized

Two fyke nets were seized from Trinty lake (R. Erne), Co. Cavan on 13th June following a report from the public.

Following a call from a local angler IFI staff seized two fyke nets from Trinity Lake, Co. Cavan

Number of Eel Dealer Interceptions: 0

Estimated tonnage on board:

Declared origin(s) of cargos:

Describe Action taken:

General impression of levels of illegal activity since the cessation of the commercial fishery:

Low

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD?

Yes

(If 'Yes', please insert quantity transported).

12,879kg

What was the total catch transported;- 12,879kg

Was there any evidence of illegal trading of eel in conjunction with the T&T programme:

No

General impression of the programme:

Programme has continued to worked well with good cooperation between IFI, ESB, DAERA and the contracted silver eel fishermen.

ESB Silver Eel collection at Rann point, L. Oughter during November

Management Action 3. Ensure Upstream Migration at Barriers

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

Fish habitat restoration works and improved fish passage was created at Corvish Bridge on the Donagh River, Co. Donegal following unauthorised gravel extraction and lowering of the river bed by a private landowner (ostensibly for flood alleviation).

IFI stipulated that the riverbed and instream habitat be restored, and improved fish passage be created through the apron of the bridge. This request was achieved under the guidance and supervision of IFI staff by reintroducing river gravels and placement of random boulders to create a rock ramp fish passage. These reintroduced materials have created several small channels and pockets of slower flows throughout the river profile downstream of the bridge to aid salmonid and eel migration.

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

Fish there were a number of fish kills recorded in the upper Erne catchment over the course of the year with significant numbers of salmonids and coarse fish mortalities noted. Whilst eel mortalities were not observed, there was undoubtedly an impact to the aquatic habitat to all fish species present.

Protection staff also assisted the SFEO with sampling of Ballinagh STP and delivery of samples to CAL in Dublin following a report from the public of a fish kill in the Cavan town river in July 2022.

Fish kill on the Ballinagh River (approximately 150 salmonids an coarse fish killed)

A major fish kill was reported on Friday 26th August a in relation to the Glennagannon River in Carndonagh, Inishowen, Co. Donegal. When IFI staff arrived at the Glennagannon the extent of the kill became apparent. Over 2,250 juvenile salmonid mortalities were discovered along a 4km stretch of the river (although no eel mortalities were recorded).

Over 2,250 salmonid mortalities collected from the Glennagannon R., Co. Donegal

Eel Management Information 2022

River District Basin: **SW River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the SWRBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the SWRBD during 2022.

Estimated level of illegal fishing: Low to Nil

Insert No. of alleged or confirmed reports: Nil

Main catchments where illegal activity occurred: N/A

Number of gear seizures: Nil

Gear types seized:

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions: Nil

Estimated tonnage on board:

Declared origin(s) of cargos:

Describe Action taken:

General impression of levels of illegal activity since the cessation of the commercial fishery:

No reported or suspected illegal eel fishing activity.

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD? Yes 1,087kg recorded.

(If 'Yes', please insert quantity transported).

What was the total catch transported (kg)?: 1,087 kg

Was there any evidence of illegal trading of eel in conjunction with the T&T programme: No

---

General impression of the programme: Uneventful,

Management Action 3. Ensure Upstream Migration at Barriers

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

Any key photos ?

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

Please include any relevant photographs of elver and/or silver eel trap & truck activities or seized gear.

Eel Management Information 2022

River District Basin: **Western River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the WRBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the WRBD- Ballina during 2022.

Estimated level of illegal fishing:

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred: Nil

Number of gear seizures: Nil Gear types seized:

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions: Nil

Estimated tonnage on board:

Declared origin(s) of cargos:

Describe Action taken:

General impression of levels of illegal activity since the cessation of the commercial fishery:

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD? No

(If 'Yes', please insert quantity transported)

What was the total catch transported (kg)?:

Was there any evidence of illegal trading of eel in conjunction with the T&T programme:

General impression of the programme:

Management Action 3. Ensure Upstream Migration at Barriers

On 1st September 2022 Moy catchment staff improved upstream migration for elvers at the Ballina Salmon Weir elver pass on the River Moy, Ballina, County Mayo.

A significant amount of bottles, cans and other rubbish was removed from the elver pass which should improve upstream migration. A photo is provided below at Fig.1.

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

Fig.1: Ballina Salmon Weir Elver Pass on the River Moy – September 2022

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

Please include any relevant photographs of elver and/or silver eel trap & truck activities or seized gear.

Eel Management Information 2022

River District Basin: **South Eastern River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the South Eastern RBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the South Eastern RBD during 2022.

Estimated level of illegal fishing: **No illegal activity detected**

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred:

Number of gear seizures: NIL Gear types seized: NIL

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions: none

Estimated tonnage on board: NIL Declared origin(s) of cargos: NIL

Describe Action taken: n/a

General impression of levels of illegal activity since the cessation of the commercial fishery:

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD? No

(If 'Yes', please insert quantity transported).

What was the total catch transported (kg)?: NIL

Was there any evidence of illegal trading of eel in conjunction with the T&T programme: n/a

---

General impression of the programme:

Management Action 3. Ensure Upstream Migration at Barriers

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

Any key photos ?

A rock ramp was constructed at Ballinacarrig weir on the River Burren, u/s of the main channel River Barrow. This will improve eel passage at the site.

Pre works

Post works

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

Eel Management Information 2022

River District Basin: **Shannon River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the Shannon RBD remained closed throughout 2022.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the Shannon RBD during 2022.

Estimated level of illegal fishing:

No seizures on Lough Derg so illegal activity perceived to be same as 2021.

Some illegal fishing occurred on Lough Ree, with fyke net seizures occurring there during the year.

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred:

Lough Ree

Number of gear seizures: **5** **Gear types seized: fyke nets x 15**

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions:

Estimated tonnage on board: Declared origin(s) of cargos:

Describe Action taken:

General impression of levels of illegal activity since the cessation of the commercial fishery:

Illegal fishing is generally on a small scale with few operators, possibly two or three crews.

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD?

(If 'Yes', please insert quantity transported).

Yes, 19,849kgs

What was the total catch transported (kg)?: **19,849kgs**

Was there any evidence of illegal trading of eel in conjunction with the T&T programme:

No

General impression of the programme:

Management Action 3. Ensure Upstream Migration at Barriers

(List/ tabulate any sites etc where barriers were removed or elver access improved etc)

Any key photos ?

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

Please include any relevant photographs of elver and/or silver eel trap & truck activities or seized gear.

Eel Management Information 2021

River District Basin: **Galway Western River Basin District**

Date: **1 Jan- 31 Dec 2022**

Management Action 1. Reduction of Fishery to achieve EU target

Confirm fishery ceased under **Conservation of Eel Fishing Bye-law No. C.S. 319, 2015**:

The above Bye law expired on 30 June 2018 and has not been renewed

The eel fishery in the WRBD remained closed throughout 2021.

Confirm no licences issued in 2009 under Conservation of Eel Fishing (Prohibition on Issue of Licences) Bye-law No. 858, 2009:

No eel fishing licences were issued by the Galway WRBD during 2022.

Estimated level of illegal fishing: 0

Insert No. of alleged or confirmed reports

Main catchments where illegal activity occurred: 0

Number of gear seizures: Gear types seized: 0

Insert quantity/length of gear seized

Number of Eel Dealer Interceptions: 0

Estimated tonnage on board: Declared origin(s) of cargos:

Describe Action taken:

General impression of levels of illegal activity since the cessation of the commercial fishery: Low

Management Action 2. Trap & Transport

Was trap & transport undertaken in your RBD? No

(If 'Yes', please insert quantity transported).

What was the total catch transported (kg)?:

Was there any evidence of illegal trading of eel in conjunction with the T&T programme:

General impression of the programme: N/A

Management Action 3. Ensure Upstream Migration at Barriers

(List any sites etc where barriers were removed or elver access improved etc)

Nil

RE: Eel management Questionnaire, 2022

Management Action 4. Improve Water Quality

(List any sites or actions which have significantly improved WQ to the benefit of eels)

IFI Galway's SFEO took legal action against a farmer whom permitted the discharge of raw silage effluent into the Annagh River in Gort on 20th June 2022. The pollution which is believed to have been ongoing for some time, had a severe ecological impact upon ~4.5km of the Annagh River. The catchment provides habitat for brown trout and eels, therefore the cessation of this severe point source of pollution will undoubtedly improve the water quality/fish status of that waterbody.

News clipping relating to the Gort District Court proceedings are attached along with photographs of the affected watercourse.

Appendix 4: Silver Eel Trap and Transport Tables: Erne, Shannon and Lee

Appendix 4- 1 River Shannon Silver Eel Weekly Collection Sheet 2022/23

Wk No.	Week Ending	Jolly Mariner, Athlone	Yacht Club, Athlone	Kilaloe Eel Weir	Others (see comment)	Total for Week
1	27/08/22	0	0	Not Fishing		0
2	03/09/22	0	0	Not Fishing		0
3	10/09/22	0	0	Not Fishing		0
4	17/09/22	216	0	0		216
5	24/09/22	0	0	0		0
6	01/10/22	0	0	0		0
7	08/10/22	0	0	0		0
8	15/10/22	0	0	0		0
9	22/10/22	1146	224	95		1465
10	29/10/22	1946	107	119		2172
11	05/11/22	1696	158	580		2434
12	12/11/22	3134	0	638		3772
13	19/11/22	0	0	1860		1860
14	26/11/22	1924	454	845		3223
15	03/12/22	1132	0	375		1507
16	10/12/22	0	0	0		0
17	17/12/22	0	0	0		0
18	24/12/22	508	91	0		599
19	31/12/22	0	0	0		0
20	07/01/23	176	0	660		836
21	14/01/23	Not Fishing	Not Fishing	1505		1505
22	21/01/23	Not Fishing	Not Fishing	185		185
23	28/01/23	Not Fishing	Not Fishing	75		75
Total to Date(kgs)		11878	1034	6937	0	19849
Wk No.	Week Ending	Jolly Mariner, Athlone	Yacht Club, Athlone	Kilaloe Eel Weir	Others (see comment)	Total for Week
Catch Quota per Location		No Quota	No Quota	No Quota		

Appendix 4- 2 River Erne Silver Eel Weekly Collection Sheet 2022/23

Week No.	Week Ending	Lisnaskea	Ferny gap	Portora	Urney Bridge	Roscor Bridge	Lough Gowna	Total for Week
1	27/08/2022	0	0	0	0	0	0	0
2	03/09/2022	0	0	0	0	0	0	0
3	10/09/2022	0	0	0	0	0	0	0
4	17/09/2022	914	0	588	0	0	0	1502
5	24/09/2022	502	371	514	0	0	0	1387
6	01/10/2022	282	923	400	0	0	0	1605
7	08/10/2022	0	643	0	0	0	0	643
8	15/10/2022	394	0	1107	0	0	0	1501
9	22/10/2022	1029	2485	1246	0	0	1519	6279
10	29/10/2022	945	707	1639	1684	0	2731	7706
11	05/11/2022	861	605	1083	987	0	2753	6289
12	12/11/2022	0	0	0	0	0	1299	1299
13	19/11/2022	0	1310	0	0	0	0	1310
14	26/11/2022	584	1441	585	0	0	1196	3806
15	03/12/2022	0	614	481	0	0	710	1805
16	10/12/2022	0	0	0	0	0	0	0
17	17/12/2022	0	0	0	0	0	0	0
18	24/12/2022	519	257	132	0	0	0	908
19	31/12/2022	0	0	0	0	0	0	0
20	07/01/2023	580	659	1150	0	0		2389
21	14/01/2023	Not Fishing	0	Not Fishing	Not Fishing	Not Fishing		0
22	21/01/2023	Not Fishing	1752	Not Fishing	Not Fishing	Not Fishing		1752
Total to Date(kgs)		6610	11767	8925	2671	0	10208	40181
Week No.	Week Ending	Brian Reid	Patrick Quinn	Roy Shaw	James Dalton -Urney Bridge	Kevin Taylor - Roscor Bridge	Ruairi Coleman -Lough Gowna	Total for Week

Table 4-3 River Lee Silver Eel Weekly Collection Sheet 2022

Date	Location	Total Weight of Catch	Total to Date
15/09/2022	Boat Centre Iniscarra	54	54
16/09/2022	Boat Centre Iniscarra	128	182
20/09/2022	Boat Centre Iniscarra	152	334
21/09/2022	Boat Centre Iniscarra	135	469
22/09/2022	Boat Centre Iniscarra	218	687
23/09/2022	Boat Centre Iniscarra	130	817
24/09/2022	Boat Centre Iniscarra	81	898
25/09/2022	Boat Centre Iniscarra	79	977
26/09/2022	Boat Centre Iniscarra	52	1029
27/09/2022	Boat Centre Iniscarra	58	1087
Fishing completed for 2022/23 season on 27/9/22, as quota has been reached.			
Total Catch for Season			1087

Appendix 5: Silver eel flow diagram explanation

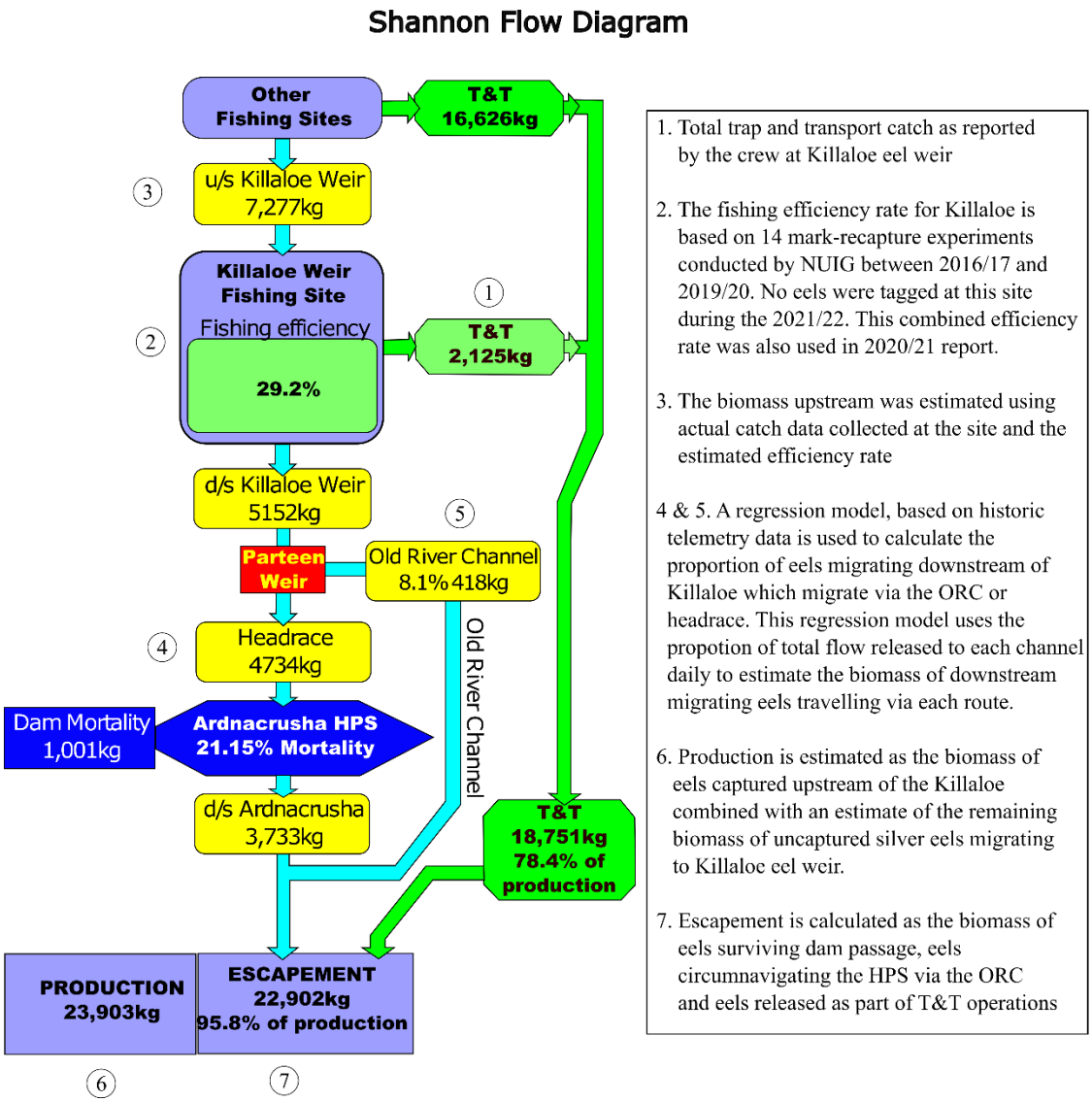

Figure A5-0-1 Flow diagram explanation for the Shannon catchment

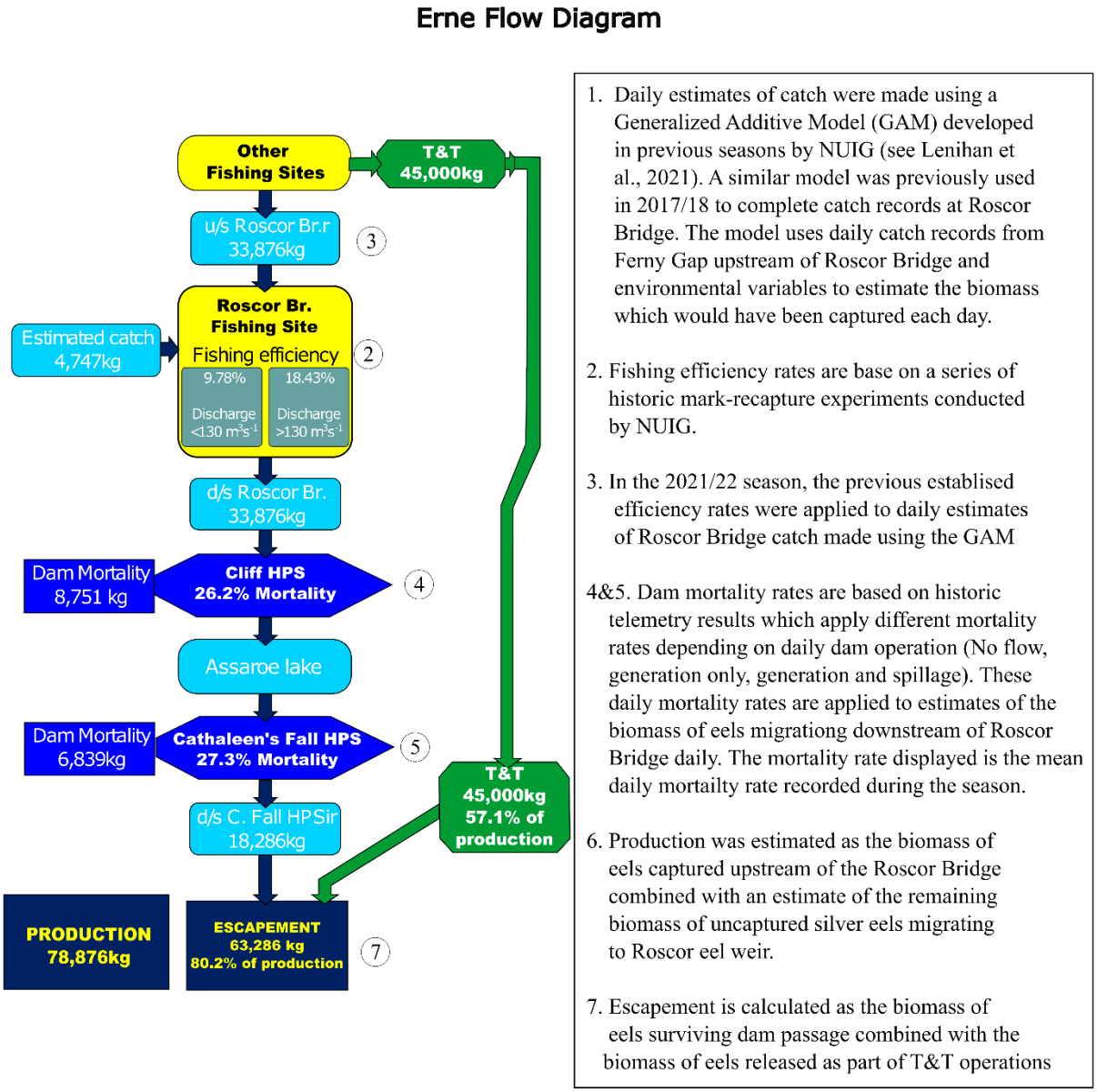

Figure A5-0-2 Flow diagram explanation for Erne catchment

Appendix 6: Water Framework Directive

Table A6 1 Summary data from WFD Lakes Survey, 2021.

RBD	Lake	No Nights	No of Eels	CPUE	Average Length (cm)	Min Length (cm)	Max Length (cm)	Average weight (kg)	Min weight (kg)	Max Weight (kg)	Total Weight (kg)
ERBD	Dan, Lough	2	3	0.167	67.8	64.1	72.2	0.566	0.422	0.763	1.699
NBiRBD	Muckno, Lough	1	13	1.444	47.0	34.0	61.0	0.204	0.093	0.452	2.655
NWRBD	Dungloe, Lough	1	5	0.556	39.9	35.0	44.5	0.120	0.081	0.160	0.598
NWRBD	Kiltooris Lough	1	5	0.556	33.2	30.0	40.0	0.072	0.052	0.118	0.360
NWRBD	Kindrum, Lough	1	2	0.667	42.0	41.9	42.0	0.154	0.122	0.186	0.308
NWRBD	Melvin, Lough	2	81	1.227	48.51	33.00	70.00	0.215	0.074	0.583	18.268
NWRBD	Nasnahida, Lough	1	2	0.333	43.25	40.00	46.50	0.150	0.118	0.182	0.300
NWRBD	Sessiagh, Lough	1	4	0.667	43.5	37.5	48.5	0.144	0.099	0.215	0.721
SHRBD	Alewnaghta, Lough	1	3	0.500	55.5	48.2	61.7	0.305	0.188	0.398	0.914
SHRBD	Atedaun, Lough	1	1	0.333	65.5	65.5	65.5	0.482	0.482	0.482	0.482
SHRBD	Cullaun, Lough	1	9	1.000	55.7	46.5	66.0	0.290	0.138	0.586	2.611
SHRBD	Dromore Lough	1	9	1.000	52.9	38.0	63.0	0.274	0.102	0.432	2.466
SWRBD	Leane, Lough	3	6	0.133	41.0	29.0	46.0	0.122	0.045	0.174	0.855
SWRBD	Upper Lake	1	11	0.917	47.7	39.5	62.5	0.171	0.094	0.462	2.390
WRBD	Adrehid, Lough	1	1	0.333	45.5	45.5	45.5	0.145	0.145	0.145	0.145
WRBD	Aughrusbeg, Lough	1	21	1.750	42.1	31.5	55.7	0.127	0.054	0.269	2.791
WRBD	Bunny, Lough	1	1	0.333	49.0	49.0	49.0	0.211	0.211	0.211	0.211
WRBD	Corrib Lower, Lough	2	13	0.722	46.6	35.0	57.0	0.181	0.081	0.315	2.353
WRBD	Corrib Upper, Lough	5	31	0.344	55.2	35.0	79.0	0.333	0.081	1.000	10.310
WRBD	Loughaphreaghaun	1	1	0.333	71.50	71.50	71.50	0.625	0.625	0.625	0.625
WRBD	Shannaghree Lough	1	1	0.333	53.00	53.00	53.00	0.264	0.264	0.264	0.264
WRBD	Templehouse Lake	2	8	0.444	65.1	52.5	78.0	0.545	0.250	0.905	4.362

Table A6 2 Length frequency data from WFD Lakes Surveys, 2021.

RBD	Lake	No of Eels	20 29 cm	30 - 39 cm	40 - 49 cm	50 - 59 cm	60 - 69 cm	70 - 79 cm	> 80 cm
ERBD	Dan, Lough	3	0	0	0	0	2	1	0
NBiRBD	Muckno, Lough	13	0	1	8	3	1	0	0
NWRBD	Dungloe, Lough	5	0	2	3	0	0	0	0
NWRBD	Kiltooris Lough	5	0	4	1	0	0	0	0
NWRBD	Kindrum, Lough	2	0	0	2	0	0	0	0
NWRBD	Melvin, Lough	81	0	9	38	31	5	2	0
NWRBD	Nasnahida, Lough	2	0	0	2	0	0	0	0
NWRBD	Sessiagh, Lough	4	0	1	4	0	0	0	0
SHRBD	Alewnaghta, Lough	3	0	0	1	1	1	0	0
SHRBD	Atedaun, Lough	1	0	0	0	0	1	0	0
SHRBD	Cullaun, Lough	9	0	0	1	6	2	0	0
SHRBD	Dromore Lough	9	0	1	1	6	1	0	0
SWRBD	Leane, Lough	6	1	0	6	0	0	0	0
SWRBD	Upper Lake	11	0	0	9	4	1	0	0
WRBD	Adrehid, Lough	1	0	0	1	0	0	0	0
WRBD	Aughrusbeg, Lough	21	0	7	13	2	0	0	0
WRBD	Bunny, Lough	1	0	0	1	0	0	0	0
WRBD	Corrib Lower, Lough	13	0	1	7	5	0	0	0
WRBD	Corrib Upper, Lough	31	0	2	6	15	5	3	0
WRBD	Loughaphreaghaun	1	0	0	0	0	0	1	0
WRBD	Shannaghree Lough	1	0	0	0	1	0	0	0
WRBD	Templehouse Lake	8	0	0	0	4	1	3	0

Table A6 3 Summary data from WFD Rivers Survey, 2021.

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
ERBD	Blackwater Kells, River	Just u/s L. Ramor_A	ADEF (Handset)	1	0.0043	2
NBIRBD	Dee, River	Br. at Drumcar_A	ADEF (Handset)	1	0.0178	9
NBIRBD	Dee, River	Burley Br._B	ADEF (Handset)	1	0.0000	0
NBIRBD	Fane River	Br. d/s of Inniskeen_A	ADEF (Handset)	1	0.0072	3
NBIRBD	White River (Louth)	Coneyburrow Br._B	TEF (Handset)	1	0.0000	0
NWIRBD	Owentocker (Owenroe) River	Tullybane Br._A	TEF (Handset)	1	0.0000	0
NWIRBD	Owentocker River	500 m d/s Br. in Ardara_A	TEF (Handset)	1	0.0582	6
NWIRBD	Swilly (Corranagh), River	Corranagh Br._A	TEF (Handset)	1	0.0000	0
NWIRBD	Swilly (Corravaddy), River	NW of Curragh_A	TEF (Handset)	1	0.0000	0
NWIRBD	Swilly (Farnoge), River	Treanakeel_A	TEF (Handset)	1	0.0000	0
NWIRBD	Swilly, River	Altadush_A	TEF (Handset)	1	0.0000	0
NWIRBD	Swilly, River	Arena 7_A	TEF (Handset)	1	0.2273	8
NWIRBD	Swilly, River	Bomany Br._A	TEF (Handset)	1	0.0547	1
NWIRBD	Swilly, River	High Road_A	TEF (Handset)	1	0.0000	0
NWIRBD	Swilly, River	Rashedoge_A	TEF (Handset)	1	0.0126	1
NWIRBD	Swilly, River	Swilly Br. (near Breenagh)_A	TEF (Handset)	1	0.0439	2
NWIRBD	Swilly, River	Upper Ballymacool_A	TEF (Handset)	1	0.0000	0
SERBD	Arrigle River	Ballyconnaught_A	TEF (Handset)	1	0.0000	0
SERBD	Arrigle River	Brabstown_A	TEF (Handset)	1	0.0000	0
SERBD	Ballyphilip (Nore) (Kings) River	Gortanassy East_A	TEF (Handset)	1	0.0000	0
SERBD	Ballyphilip (Nore) (Kings) River	Reabaun_A	TEF (Handset)	1	0.0000	0
SERBD	Ballyroan River	Ballydine Br._A	TEF (Handset)	1	0.0000	0
SERBD	Ballyroan River	Sallagh Br._A	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	Clonterry_A	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	Pass Br._A	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	Pass Br._B	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	Portarlington School Br._A	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	Rose Court_A	TEF (Handset)	1	0.0000	0
SERBD	Barrow, River	u/s Portarlington_A	TEF (Handset)	1	0.0000	0
SERBD	Breagagh (Stony), River	Kylebeg South_A	TEF (Handset)	1	0.0000	0
SERBD	Breagagh (trib), River	Michaelschurch_A	TEF (Handset)	1	0.0000	0
SERBD	Breagagh, River	Shellumsrath_A	TEF (Handset)	1	0.0000	0
SERBD	Breagagh, River	Water Barrack Park_A	TEF (Handset)	1	0.0000	0
SERBD	Cappanacloghy River	Derryroe_A	TEF (Handset)	1	0.0000	0
SERBD	Cappanacloghy River	The Hollow Br._A	TEF (Handset)	1	0.0000	0
SERBD	Clonawoolan Stream	Clondouglas_A	TEF (Handset)	1	0.0000	0
SERBD	Cushina (Trib) River	Kelly's Br._A	TEF (Handset)	1	0.0000	0
SERBD	Cushina River	Enaghan_A	TEF (Handset)	1	0.0000	0
SERBD	Cushina (Enaghan) River	Lords Br._A	TEF (Handset)	1	0.0000	0
SERBD	Delour River	Castleconor_A	TEF (Handset)	1	0.0000	0
SERBD	Delour River	Garrafin Br._A	TEF (Handset)	1	0.0000	0
SERBD	Desart Stream	Greatwood_A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
SERBD	Dinin (Clogh) River	Clogh Br._A	TEF (Handset)	1	0.0195	1
SERBD	Dinin (Coolcullen) River	Philip's Br._A	TEF (Handset)	1	0.0000	0
SERBD	Dinin (Gloshia) River	Tobar Muire_A	TEF (Handset)	1	0.0000	0
SERBD	Dinin River	Ballyhimmin_A	TEF (Handset)	1	0.0000	0
SERBD	Dinin River	Cloneen Br._A	TEF (Handset)	1	0.0133	1
SERBD	Dinin River	Dinin Br._A	TEF (Handset)	1	0.0064	3
SERBD	Dinin River	u/s Cloneen Br._A	TEF (Handset)	1	0.0000	0
SERBD	Donaghmore Stream	Ballybrophy_A	TEF (Handset)	1	0.0000	0
SERBD	Ennisnag Stream	Baunlusk_A	TEF (Handset)	1	0.0000	0
SERBD	Ennisnag Stream	Sunhill_A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Ballygowdan_A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Beleady Br._A	TEF (Handset)	1	0.0132	1
SERBD	Erkina River	Carrick Br._A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Clarneyball Br._A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Coolkerry Br._A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Donaghmore Br._A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Durrow_A	TEF (Handset)	1	0.0019	1
SERBD	Erkina River	Errill Graveyard_A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Harristown_Br._A	TEF (Handset)	1	0.0206	1
SERBD	Erkina River	Kildellig_A	TEF (Handset)	1	0.0000	0
SERBD	Erkina River	Rathsaran Br._A	TEF (Handset)	1	0.0133	1
SERBD	Erkina River	Rathsaran Glebe_A	TEF (Handset)	1	0.0000	0
SERBD	Figile River	Bog Road_A	TEF (Handset)	1	0.0000	0
SERBD	Figile River	Cushaling Br._A	TEF (Handset)	1	0.0000	0
SERBD	Goul, River	Crossoges_A	TEF (Handset)	1	0.0359	1
SERBD	Goul, River	Tranagh_A	TEF (Handset)	1	0.0000	0
SERBD	Goul, River	Urlingford Castle_A	TEF (Handset)	1	0.0000	0
SERBD	Gully, River	Gully Br._A	TEF (Handset)	1	0.0497	2
SERBD	Gully, River	Knockamullin_A	TEF (Handset)	1	0.0000	0
SERBD	Killeen River	Cardtown_A	TEF (Handset)	1	0.0000	0
SERBD	King's Kilkenny River	Kells Br._A	TEF (Handset)	1	0.0000	0
SERBD	King's Kilkenny River	Killinny_A	TEF (Handset)	1	0.0000	0
SERBD	King's Kilkenny River	D/s of Castletown Br._A	TEF (Handset)	1	0.0000	0
SERBD	King's Kilkenny River	Kells Mill_A	TEF (Handset)	1	0.0019	1
SERBD	King's Kilkenny River	West of Ennisnag Br._A	TEF (Handset)	1	0.0100	6
SERBD	Mountrath, River	Clonard_A	TEF (Handset)	1	0.0000	0
SERBD	Mountrath, River	Drim_A	TEF (Handset)	1	0.0000	0
SERBD	Needleford stream	Paul's Hill_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (Feathallagh), River	Clarabricken_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (Garranacool), River	Gortnasmuttaun South_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (Kilderry), River	Kingsland_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (Lisdowney), River	Seskin_South_A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
SERBD	Nore (Lisdowney), River	U/s of Grange Br._A	TEF (Handset)	1	0.0424	1
SERBD	Nore (Srunnasilloge), River	Fiddaun Lower_A	TEF (Handset)	1	0.0287	1
SERBD	Nore (trib), River	Ballyhenry_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	Clonoonagh_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	d/s Kilfane Br._A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	Derrymore_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	Lisduff West_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	Lisduff_A	TEF (Handset)	1	0.0000	0
SERBD	Nore (trib), River	Thomastown Hospital_A	TEF (Handset)	1	0.0383	2
SERBD	Nore, River	Brownsbarn Br._A	TEF (Handset)	1	0.0000	0
SERBD	Nore, River	Clonakenny_A	TEF (Handset)	1	0.0000	0
SERBD	Nore, River	Quaker's Br._A	TEF (Handset)	1	0.0000	0
SERBD	Nore, River	Quaker's Br._B	TEF (Handset)	1	0.0000	0
SERBD	Nore, River	u/s Castletown Weir_A	TEF (Handset)	1	0.0000	0
SERBD	Nuenna (Arigna) River	Clashacrow_A	TEF (Handset)	1	0.0707	3
SERBD	Nuenna River	Ballyguider Br._A	TEF (Handset)	1	0.0268	1
SERBD	Nuenna River	Bawntanameenagh_A	TEF (Handset)	1	0.0337	1
SERBD	Nuenna River	Monabrika_A	TEF (Handset)	1	0.0000	0
SERBD	Owenass River	Owenass Br._A	TEF (Handset)	1	0.0000	0
SERBD	Owenbeg River	Baunogemeely_A	TEF (Handset)	1	0.0000	0
SERBD	Owenbeg River	Boleybeg Br. North_A	TEF (Handset)	1	0.0000	0
SERBD	Owenbeg River	Castlecoole_A	TEF (Handset)	1	0.0000	0
SERBD	Owenbeg River	Chapel Crossroads_A	TEF (Handset)	1	0.0000	0
SERBD	Owenbeg River	Rossconnell Br._A	TEF (Handset)	1	0.0000	0
SERBD	Pococke River	Foot Golf_A	TEF (Handset)	1	0.0000	0
SERBD	Tonet River	Birchgrove Br._A	TEF (Handset)	1	0.0000	0
SERBD	Triogue River	Triogue Br._A	TEF (Handset)	1	0.0000	0
SERBD	Tullaroan Stream	Ballykeefe Br._A	TEF (Handset)	1	0.0000	0
SERBD	Tullaroan Stream	Tullaroan GAA Club_A	TEF (Handset)	1	0.0000	0
ShIRBD	Black River	Dunnes _Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Bunow River	Benamore_Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Bunow River	Killavilla_Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Bunow River	Willison_Br_A	TEF (Handset)	1	0.0000	0
ShIRBD	Caher River	Br. 2 km d/s Formoyle_A	TEF (Handset)	1	0.0000	0
ShIRBD	Caher River	Derrynavanagh_A	TEF (Handset)	1	0.0000	0
ShIRBD	Caher River	Fanore Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Caher River	Murroogh_A	TEF (Handset)	1	0.0282	3
ShIRBD	Camcor (Roscomore) River	Hundredacres_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor (trib) River	Knockkarley Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor (trib) River	Lofus Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor River	Ballyshane Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor River	Drumbane Br._A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
ShIRBD	Camcor River	E. of Pass Cross Roads_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor River	Oxmantown Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor River	u/s Maltings Pool_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camcor River	Upper Oxmantown Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin (Fallan) River	Ballyclare_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin (Fallan) River	Calfpark_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin (Rhine) River	Ballymacroly_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Br. W. of Lisnabo_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Aghaward Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Ballynascraw_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Creenagh_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Creeve_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	d/s Ballykenny Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Derryharrow_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Drumnahara_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Kilnatruan Cross Rds_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Lisnamuck_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Moat Farrell_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Mount Jessop Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Prucklishtown_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	Soran Southeast_A	TEF (Handset)	1	0.0000	0
ShIRBD	Camlin River	u/s of Gorteen Lough_A	TEF (Handset)	1	0.0000	0
ShIRBD	Fuarawn Stream	Grange_A	TEF (Handset)	1	0.0000	0
ShIRBD	Glasderry River	Agnadouglas_A	TEF (Handset)	1	0.0000	0
ShIRBD	Glasderry River	Roscrea_A	TEF (Handset)	1	0.0000	0
ShIRBD	Glenafelly River	Br. 3km E of longford_B	TEF (Handset)	1	0.0000	0
ShIRBD	Glenfelly stream	Drumcullen Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Golden Grove stream	Ballyrickard More_A	TEF (Handset)	1	0.0000	0
ShIRBD	Inny River	Br. 1 km S of Oldcastle_B	TEF (Handset)	1	0.0000	0
ShIRBD	Kilcomin stream	Caolroe Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Kilcomin stream	Cloghmoyle_A	TEF (Handset)	1	0.0000	0
ShIRBD	Kilcomin stream	Clucka North_A	TEF (Handset)	1	0.0000	0
ShIRBD	Kilcomin stream	Driminduff_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Breaghmore) River	Breaghmore Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Fuarawn) River	Clareen_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Keeloge) River	Franckfort_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Keeloge) River	South of Motte_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Pallas) River	Holy Well_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Pallas) River	Pallas Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (Rock) River	Whiteford_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna (trib) River	Moutheaton_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna River	Ballindarra_A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
ShIRBD	Little Brosna River	Clonlisk Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna River	Gorteen_A	TEF (Handset)	1	0.0000	0
ShIRBD	Little Brosna River	Riverstown Br._A	TEF (Handset)	1	0.0006	1
ShIRBD	Mountnugent River	Mountnugent Br._A	TEF (Handset)	1	0.0000	0
ShIRBD	Mountnugent River	Mountnugent Br._B	TEF (Handset)	1	0.0000	0
SWRBD	Argideen (Ihernagh) River	Kilmeen Track_A	TEF (Handset)	1	0.0506	2
SWRBD	Argideen (Ihernagh) River	Rossmore Southwest_A	TEF (Handset)	1	0.0800	2
SWRBD	Argideen (Lisroe) River	Mid Lyre_A	TEF (Handset)	1	0.1268	3
SWRBD	Argideen (Owenkeagh) River	Ballinascarty Br._A	TEF (Handset)	1	0.0138	1
SWRBD	Argideen (Owenkeagh) River	Dromgarriff North_A	TEF (Handset)	1	0.0000	0
SWRBD	Argideen (Owenkeagh) River	Kilmoylerane Track_A	TEF (Handset)	1	0.0481	1
SWRBD	Argideen (Owenkeagh) River	Monteen Castle_A	TEF (Handset)	1	0.0000	0
SWRBD	Argideen (Owenkeagh) River	Monteen Southwest_A	TEF (Handset)	1	0.0000	0
SWRBD	Argideen (Owenkeagh) River	Tullymurrihy_A	TEF (Handset)	1	0.0000	0
SWRBD	Argideen River	Argideen Br._A	TEF (Handset)	1	0.0105	1
SWRBD	Argideen River	Gearagh Br._A	TEF (Handset)	1	0.0000	0
SWRBD	Argideen River	Glanbrack Southeast_A	TEF (Handset)	1	0.0150	1
SWRBD	Bandon (Ballymahan) River	Tullyglen North_A	TEF (Handset)	1	0.1237	2
SWRBD	Bandon (Ballynacarriga) River	Ballingurteen_A	TEF (Handset)	1	0.0265	1
SWRBD	Bandon (Ballynacarriga) River	Monaneurig Bog_A	TEF (Handset)	1	0.0305	1
SWRBD	Bandon (Bealanscartane) River	Bealanscartane Br._A	TEF (Handset)	1	0.0179	1
SWRBD	Bandon (Bealanscartane) River	Drinagh East_A	TEF (Handset)	1	0.0466	4
SWRBD	Bandon (Blackwater) River	Ahakeera_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Brewery) River	Cloonties_A	TEF (Handset)	1	0.0329	1
SWRBD	Bandon (Brewery) River	Tonafora_A	TEF (Handset)	1	0.0184	1
SWRBD	Bandon (Bridewell) River	Meelon Br._A	TEF (Handset)	1	0.0264	1
SWRBD	Bandon (Bridewell) River	Service Station_A	TEF (Handset)	1	0.0498	2
SWRBD	Bandon (Brinny) River	Ballygarvey Br._A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Caha) River	Coolmountain Br._A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Caha) River	Poulnaberry Br._A	TEF (Handset)	1	0.0180	1
SWRBD	Bandon (Cashel More) River	Gaggan Br._A	TEF (Handset)	1	0.0355	1
SWRBD	Bandon (Coom) River	Coorycullane_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Coom) River	Darkwood_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Cummernamart) River	Cummernamart_A	TEF (Handset)	1	0.0407	3
SWRBD	Bandon (Curraghnacarton) River	Palaceanne North_A	TEF (Handset)	1	0.0189	1
SWRBD	Bandon (Derragh) River	Keenrath_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Derragh) River	Shanacrane_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Derrymeeleen) River	Roseville Br._A	TEF (Handset)	1	0.0553	1
SWRBD	Bandon (Enniskean) River	Castlelands_A	TEF (Handset)	1	0.0610	2
SWRBD	Bandon (Garranbeg) River	Moanarone_A	TEF (Handset)	1	0.0567	n.a.
SWRBD	Bandon (Garrown) River	Derrynacaheragh_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Glasheenacauha) River	Balteenbrack_A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
SWRBD	Bandon (Glasheenahielan) River	Kilronane West_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Kealrootha) River	Mohana_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon (Sall) River	Aghaphona Br._A	TEF (Handset)	1	0.0656	2
SWRBD	Bandon (Sall) River	Finnis_A	TEF (Handset)	1	0.0758	3
SWRBD	Bandon (Sall) River	Lisnagat Br._A	TEF (Handset)	1	0.0213	1
SWRBD	Bandon (Tuough) River	Ballinacurra Br._A	TEF (Handset)	1	0.0843	3
SWRBD	Bandon (Tuough) River	Rathculleen South_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon River	Br. nr Desert Station_A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon River	d/s Murragh Br._A	TEF (Handset)	1	0.0000	0
SWRBD	Bandon River	Farnanes Br._A	TEF (Handset)	1	0.0000	0
SWRBD	Blackwater (Kerry) River	Derreenagreer_A	TEF (Handset)	1	0.0000	0
SWRBD	Blackwater (Kerry) River	Gearha_A	TEF (Handset)	1	0.0000	0
SWRBD	Blackwater (Kerry) River	Tooreennahone Ford_A	TEF (Handset)	1	0.0000	0
SWRBD	Blackwater (Kerry) River	u/s Lough Brin_A	TEF (Handset)	1	0.0000	0
SWRBD	Blackwater Kerry, (Derreendarragh) River	Derreendarragh_A	TEF (Handset)	1	0.0000	0
SWRBD	Garrivagh River	An Com Dubh_A	TEF (Handset)	1	0.1264	5
SWRBD	Owenascaul (trib) River	NE of Anascaul_A	TEF (Handset)	1	0.0604	2
SWRBD	Owenascaul (trib) River	Us of Anascaul bridge_A	TEF (Handset)	1	0.1334	6
SWRBD	Owenascaul River	Anascaul_A	TEF (Handset)	1	0.0442	2
WRBD	Ballinglen (Clydagh) River	Clydagh South_A	TEF (Handset)	1	0.0082	1
WRBD	Ballinglen (Glenedagh) River	Glenedagh Eighter_A	TEF (Handset)	1	0.0000	0
WRBD	Ballinglen (Keerglen) River	Kilkeerglen_A	TEF (Handset)	1	0.0000	0
WRBD	Ballinglen River	Ballinglen Br._B	TEF (Handset)	1	0.0000	0
WRBD	Ballinglen River	East Ford_A	TEF (Handset)	1	0.0450	1
WRBD	Ballinglen River	Kilkeerglen West_A	TEF (Handset)	1	0.0316	2
WRBD	Benlevy River	Tonlegee_A	TEF (Handset)	1	0.0000	0
WRBD	Cloghbrack Stream	d/S of Tonlegee Br._A	TEF (Handset)	1	0.0000	0
WRBD	Cloghbrack Stream	d/S of Tonlegee Br._B	TEF (Handset)	1	0.0000	0
WRBD	Dunneill (Carrowcor) River	Carrowcor Br._A	TEF (Handset)	1	0.0107	1
WRBD	Dunneill (Doonbeakin) River	Altans_A	TEF (Handset)	1	0.0511	2
WRBD	Dunneill (Doonbeakin) River	Doonbeakin_A	TEF (Handset)	1	0.0573	1
WRBD	Dunneill (Doonbeakin) River	Sligo Way_A	TEF (Handset)	1	0.0000	0
WRBD	Dunneill (Owenduff) River	Dunowla East_A	TEF (Handset)	1	0.0000	0
WRBD	Dunneill River	Ballygilcash Br._A	TEF (Handset)	1	0.0639	5
WRBD	Dunneill River	Behind Farm_A	TEF (Handset)	1	0.0000	0
WRBD	Dunneill River	Dromore West_A	TEF (Handset)	1	0.0111	1
WRBD	Dunneill River	Dunneill North_A	TEF (Handset)	1	0.0000	0
WRBD	Dunneill River	Windfarm_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Bunowen) River	Knockbaun_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Bunowen) River	North of L. Ateeaan_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Bunowen) River	u/s L. Ateeann_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Clooshgereen) River	Clooshgereen Track_A	TEF (Handset)	1	0.0000	0

RBD	River Name	River Site	Methodology	No. Runs	Density (no/m²)	No. Eels
WRBD	Owenriff (Clooshgereen) River	Clooshgereen_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Derryerglinna) River	u/s Derryerglinna Br._A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Derryglinna) River	L. Adrehid_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Derrylaura) River	Clare_B	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Glengawbeg) River	Glengawbeg Br._A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Glengawbeg) River	Glengawbeg Lower_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Glengawbeg) River	Glengawbeg Upper_A	TEF (Handset)	1	0.0148	1
WRBD	Owenriff (Knockmoyle) River	Knockmoyle Br._A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Knockmoyle) River	Knockmoyle_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Letterfore) River	Letterfore Channel_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Letterfore) River	Letterfore Track_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Letterfore) River	Letterfore_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Rusheeny) River	Rusheeny East_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff (Rusheeny) River	Rusheeny Forest_A	TEF (Handset)	1	0.0367	1
WRBD	Owenriff (Torranacat) River	Canrawer West_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff River	1km d/s of Lough Agraffard_A	TEF (Handset)	1	0.0130	1
WRBD	Owenriff River	Carrowmanagh_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff River	d/s of Hatchery_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff River	Glengowla Mine_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff River	Lake Outflow_A	TEF (Handset)	1	0.0000	0
WRBD	Owenriff River	Sweeney's Hotel_A	TEF (Handset)	1	0.0016	1
WRBD	Owenriff River	Water Tower_A	TEF (Handset)	1	0.0000	0

Table A6 4 Length frequency data from WFD River Surveys, 2021.

RBD	River Name	River Site	No. Eels	5-9 cm	10-19 cm	20-29 cm	30-39 cm	40-49 cm	50-59 cm	60-69 cm	70-79 cm	>80 cm
ERBD	Blackwater Kells, River	Just u/s L. Ramor_A	2	0	0	0	1	0	1	0	0	0
NBIRBD	Dee, River	Br. at Drumcar_A	9	2	7	0	0	0	0	0	0	0
NBIRBD	Fane River	Br. d/s of Inniskeen_A	3	0	1	0	2	0	0	0	0	0
NWIRBD	Owentocker River	500 m d/s Br. in Ardara_A	6	0	0	5	1	0	0	0	0	0
NWIRBD	Swilly, River	Arena 7_A	8	0	7	0	1	0	0	0	0	0
NWIRBD	Swilly, River	Bomany Br._A	1	0	0	1	0	0	0	0	0	0
NWIRBD	Swilly, River	Rashedoge_A	1	0	0	0	1	0	0	0	0	0
NWIRBD	Swilly, River	Swilly Br. (near Breenagh)_A	2	0	2	0	0	0	0	0	0	0
SERBD	Dinin (Clogh) River	Clogh Br._A	1	0	0	0	0	1	0	0	0	0
SERBD	Dinin River	Cloneen Br._A	1	0	0	1	0	0	0	0	0	0
SERBD	Dinin River	Dinin Br._A	3	0	0	3	0	0	0	0	0	0
SERBD	Erkina River	Beleady Br._A	1	0	0	0	0	0	1	0	0	0
SERBD	Erkina River	Durrow_A	1	0	0	0	1	0	0	0	0	0
SERBD	Erkina River	Harristown_Br._A	1	0	1	0	0	0	0	0	0	0
SERBD	Erkina River	Rathsaran Br._A	1	0	1	0	0	0	0	0	0	0
SERBD	Goul, River	Crossoges_A	1	0	0	0	1	0	0	0	0	0
SERBD	Gully, River	Gully Br._A	2	0	0	1	1	0	0	0	0	0
SERBD	King's Kilkenny River	Kells Mill_A	1	0	0	1	0	0	0	0	0	0
SERBD	King's Kilkenny River	West of Ennisnag Br._A	6	0	0	4	2	0	0	0	0	0
SERBD	Nore (Lisdowney), River	U/s of Grange Br._A	1	0	1	0	0	0	0	0	0	0
SERBD	Nore (Srunnasilloge), River	Fiddaun Lower_A	1	0	1	0	0	0	0	0	0	0
SERBD	Nore (trib), River	Thomastown Hospital_A	2	0	1	0	0	0	0	1	0	0
SERBD	Nuenna (Arigna) River	Clashacrow_A	3	0	0	3	0	0	0	0	0	0
SERBD	Nuenna River	Ballyguider Br._A	1	0	1	0	0	0	0	0	0	0

RBD	River Name	River Site	No. Eels	5-9 cm	10-19 cm	20-29 cm	30-39 cm	40-49 cm	50-59 cm	60-69 cm	70-79 cm	>80 cm
SERBD	Nuenna River	Bawntanameenagh_A	1	0	1	0	0	0	0	0	0	0
ShIRBD	Caher River	Murroogh_A	3	0	1	2	0	0	0	0	0	0
ShIRBD	Little Brosna River	Riverstown Br._A	1	0	0	0	0	0	0	1	0	0
SWRBD	Argideen (Ihernagh) River	Kilmeen Track_A	2	0	1	1	0	0	0	0	0	0
SWRBD	Argideen (Ihernagh) River	Rossmore Southwest_A	2	0	1	0	1	0	0	0	0	0
SWRBD	Argideen (Lisroe) River	Mid Lyre_A	3	0	3	0	0	0	0	0	0	0
SWRBD	Argideen (Owenkeagh) River	Ballinascarty Br._A	1	0	1	0	0	0	0	0	0	0
SWRBD	Argideen (Owenkeagh) River	Kilmoylerane Track_A	1	0	1	0	0	0	0	0	0	0
SWRBD	Argideen River	Argideen Br._A	1	0	1	0	0	0	0	0	0	0
SWRBD	Argideen River	Glanbrack Southeast_A	1	0	0	0	1	0	0	0	0	0
SWRBD	Bandon (Ballymahan) River	Tullyglen North_A	2	0	1	0	1	0	0	0	0	0
SWRBD	Bandon (Ballynacarriga) River	Ballingurteen_A	1	0	1	0	0	0	0	0	0	0
SWRBD	Bandon (Ballynacarriga) River	Monaneurig Bog_A	1	0	0	1	0	0	0	0	0	0
SWRBD	Bandon (Bealanscartane) River	Bealanscartane Br._A	1	0	0	0	1	0	0	0	0	
SWRBD	Bandon (Bealanscartane) River	Drinagh East_A	4	0	4	0	0	0	0	0	0	0
SWRBD	Bandon (Brewery) River	Cloonties_A	1	0	0	0	1	0	0	0	0	0
SWRBD	Bandon (Brewery) River	Tonafora_A	1	0	1	0	0	0	0	0	0	0
SWRBD	Bandon (Bridewell) River	Meelon Br._A	1	0	1	0	0	0	0	0	0	0
SWRBD	Bandon (Bridewell) River	Service Station_A	2	0	1	1	0	0	0	0	0	0
SWRBD	Bandon (Caha) River	Poulnaberry Br._A	1	0	1	0	0	0	0	0	0	0
SWRBD	Bandon (Cashel More) River	Gaggan Br._A	1	0	1	0	0	0	0	0	0	0
SWRBD	Bandon (Cummernamart) River	Cummernamart_A	3	0	1	2	0	0	0	0	0	0
SWRBD	Bandon (Curraghnacarton) River	Palaceanne North_A	1	0	0	0	0	1	0	0	0	0
SWRBD	Bandon (Derrymeeleen) River	Roseville Br._A	1	0	0	1	0	0	0	0	0	0
SWRBD	Bandon (Enniskean) River	Castlelands_A	2	0	0	1	1	0	0	0	0	0
SWRBD	Bandon (Sall) River	Aghaphona Br._A	2	0	0	2	0	0	0	0	0	0
SWRBD	Bandon (Sall) River	Finnis_A	3	0	1	1	1	0	0	0	0	0
SWRBD	Bandon (Sall) River	Lisnagat Br._A	1	0	0	0	1	0	0	0	0	0
SWRBD	Bandon (Tuough) River	Ballinacurra Br._A	3	0	3	0	0	0	0	0	0	0

RBD	River Name	River Site	No. Eels	5-9 cm	10-19 cm	20-29 cm	30-39 cm	40-49 cm	50-59 cm	60-69 cm	70-79 cm	>80 cm
SWRBD	Garrivagh River	An Com Dubh_A	5	0	0	4	1	0	0	0	0	0
SWRBD	Owenascaul (trib) River	NE of Anascaul_A	2	0	1	0	1	0	0	0	0	0
SWRBD	Owenascaul (trib) River	Us of Anascaul bridge_A	6	0	3	3	0	0	0	0	0	0
SWRBD	Owenascaul River	Anascaul_A	2	0	1	1	0	0	0	0	0	0
WRBD	Ballinglen (Clydagh) River	Clydagh South_A	1	0	0	1	0	0	0	0	0	0
WRBD	Ballinglen River	East Ford_A	1	0	1	0	0	0	0	0	0	0
WRBD	Ballinglen River	Kilkeerglen West_A	2	0	0	2	0	0	0	0	0	0
WRBD	Dunneill (Carrowcor) River	Carrowcor Br._A	1	0	0	0	0	1	0	0	0	0
WRBD	Dunneill (Doonbeakin) River	Altans_A	2	0	0	0	0	1	0	1	0	0
WRBD	Dunneill (Doonbeakin) River	Doonbeakin_A	1	0	1	0	0	0	0	0	0	0
WRBD	Dunneill River	Ballygilcash Br._A	5	0	0	2	3	0	0	0	0	0
WRBD	Dunneill River	Dromore West_A	1	0	0	0	1	0	0	0	0	0
WRBD	Owenriff (Glengawbeg) River	Glengawbeg Upper_A	1	0	0	0	0	0	0	1	0	0
WRBD	Owenriff (Rusheeny) River	Rusheeny Forest_A	1	0	0	1	0	0	0	0	0	0
WRBD	Owenriff River	1km d/s of Lough Agraffard_A	1	0	0	1	0	0	0	0	0	0
WRBD	Owenriff River	Sweeney's Hotel_A	1	0	0	0	0	0	1	0	0	0

Table A6 5 Summary length and weight data from WFD Rivers Surveys, 2021.

RBD	River Name	River Site	No. Eels	Average Length (cm)	Min Length (cm)	Max Length (cm)	Average Weight (kg)	Min Weight (kg)	Max Weight (kg)	Total Weight (kg)
ERBD	Blackwater Kells, River	Just u/s L. Ramor_A	2	47.0	39.0	55.0	n.a.	n.a.	n.a.	n.a.
NBIRBD	Dee, River	Br. at Drumcar_A	9	11.6	8.5	18.0	n.a.	n.a.	n.a.	n.a.
NBIRBD	Fane River	Br. d/s of Inniskeen_A	3	28.5	14.5	36.0	n.a.	n.a.	n.a.	n.a.
NWIRBD	Owentocker River	500 m d/s Br. in Ardara_A	6	23.8	19.5	33.0	n.a.	n.a.	n.a.	n.a.
NWIRBD	Swilly, River	Arena 7_A	8	17.5	12.0	30.0	n.a.	n.a.	n.a.	n.a.
NWIRBD	Swilly, River	Bomany Br._A	1	24.2	24.2	24.2	n.a.	n.a.	n.a.	n.a.
NWIRBD	Swilly, River	Rashedoge_A	1	26.0	26.0	26.0	n.a.	n.a.	n.a.	n.a.
NWIRBD	Swilly, River	Swilly Br. (near Breenagh)_A	2	16.5	14.0	19.0	n.a.	n.a.	n.a.	n.a.
SERBD	Dinin (Clogh) River	Clogh Br._A	1	45.0	45.0	45.0	n.a.	n.a.	n.a.	n.a.
SERBD	Dinin River	Cloneen Br._A	1	20.0	20.0	20.0	n.a.	n.a.	n.a.	n.a.
SERBD	Dinin River	Dinin Br._A	3	26.3	24.0	29.0	n.a.	n.a.	n.a.	n.a.
SERBD	Erkina River	Beleady Br._A	1	50.0	50.0	50.0	n.a.	n.a.	n.a.	n.a.
SERBD	Erkina River	Durrow_A	1	35.0	35.0	35.0	n.a.	n.a.	n.a.	n.a.
SERBD	Erkina River	Harristown_Br._A	1	19.0	19.0	19.0	n.a.	n.a.	n.a.	n.a.
SERBD	Erkina River	Rathsaran Br._A	1	12.0	12.0	12.0	n.a.	n.a.	n.a.	n.a.
SERBD	Goul, River	Crossoges_A	1	32.0	32.0	32.0	n.a.	n.a.	n.a.	n.a.
SERBD	Gully, River	Gully Br._A	2	25.0	20.0	30.0	n.a.	n.a.	n.a.	n.a.
SERBD	King's Kilkenny River	Kells Mill_A	1	23.0	23.0	23.0	n.a.	n.a.	n.a.	n.a.
SERBD	King's Kilkenny River	West of Ennisnag Br._A	6	29.0	23.0	35.0	n.a.	n.a.	n.a.	n.a.
SERBD	Nore (Lisdowney), River	U/s of Grange Br._A	1	18.0	18.0	18.0	n.a.	n.a.	n.a.	n.a.
SERBD	Nore (Srunnasilloge), River	Fiddaun Lower_A	1	19.5	19.5	19.5	n.a.	n.a.	n.a.	n.a.
SERBD	Nore (trib), River	Thomastown Hospital_A	2	36.5	12.0	61.0	n.a.	n.a.	n.a.	n.a.
SERBD	Nuenna (Arigna) River	Clashacrow_A	3	21.7	20.0	25.0	n.a.	n.a.	n.a.	n.a.
SERBD	Nuenna River	Ballyguider Br._A	1	15.0	15.0	15.0	n.a.	n.a.	n.a.	n.a.
SERBD	Nuenna River	Bawntanameenagh_A	1	18.0	18.0	18.0	n.a.	n.a.	n.a.	n.a.
ShIRBD	Caher River	Murroogh_A	3	20.3	17.0	23.0	n.a.	n.a.	n.a.	n.a.

RBD	River Name	River Site	No. Eels	Average Length (cm)	Min Length (cm)	Max Length (cm)	Average Weight (kg)	Min Weight (kg)	Max Weight (kg)	Total Weight (kg)
ShIRBD	Little Brosna River	Riverstown Br._A	1	60.0	60.0	60.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen (Ihernagh) River	Kilmeen Track_A	2	21.5	15.0	28.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen (Ihernagh) River	Rossmore Southwest_A	2	24.0	18.0	30.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen (Lisroe) River	Mid Lyre_A	3	16.0	15.0	18.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen (Owenkeagh) River	Ballinascarty Br._A	1	11.0	11.0	11.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen (Owenkeagh) River	Kilmoylerane Track_A	1	12.0	12.0	12.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen River	Argideen Br._A	1	15.0	15.0	15.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Argideen River	Glanbrack Southeast_A	1	34.0	34.0	34.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Ballymahan) River	Tullyglen North_A	2	22.3	13.5	31.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Ballynacarriga) River	Ballingurteen_A	1	12.0	12.0	12.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Ballynacarriga) River	Monaneurig Bog_A	1	21.3	21.3	21.3	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Bealanscartane) River	Bealanscartane Br._A	1	38.6	38.6	38.6	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Bealanscartane) River	Drinagh East_A	4	12.4	9.5	17.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Brewery) River	Cloonties_A	1	33.5	33.5	33.5	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Brewery) River	Tonafora_A	1	19.0	19.0	19.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Bridewell) River	Meelon Br._A	1	17.0	17.0	17.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Bridewell) River	Service Station_A	2	19.3	15.5	23.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Caha) River	Poulnaberry Br._A	1	18.0	18.0	18.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Cashel More) River	Gaggan Br._A	1	11.5	11.5	11.5	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Cummernamart) River	Cummernamart_A	3	23.0	19.0	26.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Curraghnacarton) River	Palaceanne North_A	1	44.0	44.0	44.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Derrymeeleen) River	Roseville Br._A	1	20.0	20.0	20.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Enniskean) River	Castlelands_A	2	27.3	24.5	30.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Sall) River	Aghaphona Br._A	2	25.3	23.5	27.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Sall) River	Finnis_A	3	23.3	11.0	30.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Sall) River	Lisnagat Br._A	1	36.0	36.0	36.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Bandon (Tuough) River	Ballinacurra Br._A	3	14.6	11.8	17.5	n.a.	n.a.	n.a.	n.a.
SWRBD	Garrivagh River	An Com Dubh_A	5	26.3	21.0	30.0	n.a.	n.a.	n.a.	n.a.

RBD	River Name	River Site	No. Eels	Average Length (cm)	Min Length (cm)	Max Length (cm)	Average Weight (kg)	Min Weight (kg)	Max Weight (kg)	Total Weight (kg)
SWRBD	Owenascaul (trib) River	NE of Anascaul_A	2	23.0	16.0	30.0	n.a.	n.a.	n.a.	n.a.
SWRBD	Owenascaul (trib) River	Us of Anascaul bridge_A	6	18.6	10.0	25.4	n.a.	n.a.	n.a.	n.a.
SWRBD	Owenascaul River	Anascaul_A	2	20.0	15.0	25.0	n.a.	n.a.	n.a.	n.a.
WRBD	Ballinglen (Clydagh) River	Clydagh South_A	1	20.0	20.0	20.0	n.a.	n.a.	n.a.	n.a.
WRBD	Ballinglen River	East Ford_A	1	15.0	15.0	15.0	n.a.	n.a.	n.a.	n.a.
WRBD	Ballinglen River	Kilkeerglen West_A	2	20.5	20.0	21.0	n.a.	n.a.	n.a.	n.a.
WRBD	Dunneill (Carrowcor) River	Carrowcor Br._A	1	45.0	45.0	45.0	n.a.	n.a.	n.a.	n.a.
WRBD	Dunneill (Doonbeakin) River	Altans_A	2	50.0	40.0	60.0	n.a.	n.a.	n.a.	n.a.
WRBD	Dunneill (Doonbeakin) River	Doonbeakin_A	1	17.0	17.0	17.0	n.a.	n.a.	n.a.	n.a.
WRBD	Dunneill River	Ballygilcash Br._A	5	30.4	21.0	36.0	n.a.	n.a.	n.a.	n.a.
WRBD	Dunneill River	Dromore West_A	1	32.0	32.0	32.0	n.a.	n.a.	n.a.	n.a.
WRBD	Owenriff (Glengawbeg) River	Glengawbeg Upper_A	1	60.0	60.0	60.0	n.a.	n.a.	n.a.	n.a.
WRBD	Owenriff (Rusheeny) River	Rusheeny Forest_A	1	25.0	25.0	25.0	n.a.	n.a.	n.a.	n.a.
WRBD	Owenriff River	1km d/s of Lough Agraffard_A	1	20.0	20.0	20.0	n.a.	n.a.	n.a.	n.a.
WRBD	Owenriff River	Sweeney's Hotel_A	1	55.0	55.0	55.0	n.a.	n.a.	n.a.	n.a.

Table A6 6 Summary data from WFD Transitional Waters Surveys, 2021.

RBD	Transitional Water	No. Nights	No. Nets	No. Eels	CPUE	Average Length (cm)	Min Length (cm)	Max Length (cm)
ShIRBD	Lough Gill	1	6	9	1.500	25.8	10.0	40.0
ShIRBD	Lower Shannon Estuary	1	12	1	0.083	45.0	45.0	45.0
ShIRBD	Limerick Dock	1	6	10	1.667	46.4	34.0	65.0
SWRBD	Cromane	1	4	0	0.000	n.a.	n.a.	n.a.
SWRBD	Castlemaine Harbour	1	4	6	1.500	26.1	6.0	44.0
SWRBD	Drongawn Lough, Sneem	1	6	11	1.833	47.9	34.0	60.0

Table A6 7 Length frequency data from WFD Transitional Waters Surveys, 2021.

RBD	Transitional Water	No. Eels	0-9 cm	10-19 cm	20-29 cm	39-39 cm	40-49 cm	50-59 cm	60-69 cm	70-79 cm	>80 cm
ShIRBD	Lough Gill	9	0	3	6	3	1	0	0	0	0
ShIRBD	Lower Shannon Estuary	1	0	0	0	0	1	0	0	0	0
ShIRBD	Limerick Dock	10	0	0	0	3	3	3	1	0	0
SWRBD	Castlemaine Harbour	6	1	1	1	3	1	0	0	0	0
SWRBD	Drongawn Lough, Sneem	11	0	0	0	2	4	4	1	0	0