

National Research Survey Programme

Lakes 2023

Lough Easky

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Iascach Iníre Éireann
Inland Fisheries Ireland

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Fish Stock Survey of Lough Easky, August 2023



**Iascach Intíre Éireann
Inland Fisheries Ireland**

National Research Survey Programme

Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

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1. Introduction

Lough Easky is located in the Ox Mountains, south of Dromore West, Co. Sligo (Plate 1.1 and Figure 1.1). The lake has a surface area of 119ha, a mean depth of 3m and a maximum depth of 13m. The lake is categorised as typology class 2 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), greater than 50ha and low alkalinity (<20mg/l CaCO₃).

Lough Easky forms part of the Ox Mountain Bogs Special Area of Conservation. Several oligotrophic lakes occur within the SAC, the largest of which is Lough Easky. Lough Easky is a stony-bottomed lake which supports aquatic vegetation typical of such oligotrophic lakes e.g. shoreweed (*Littorella uniflora*), quillwort (*Isoetes* sp.), bulbous rush (*Juncus bulbosus*), water lobelia (*Lobelia dortmanna*), common spike-rush (*Eleocharis palustris*), water horsetail (*Equisetum fluviatile*), sharp-flowered rush (*Juncus acutiflorus*) and bog pondweed (*Potamogeton polygonifolius*) (NPWS, 2016). Lough Easky historically contained brown trout, sea trout, salmon and Arctic char (O' Reilly, 1998).

In the first half of 2008 a small landslide was observed on the eastern shore of the lake due to high levels of rainfall. It resulted in the accumulation of silt and debris on the shore of the lake (Collins, P. *pers. comm.*).

The lake was surveyed to assess its fish stocks in 1986 and 1991 by Inland Fisheries Ireland (previously the Central Fisheries Board and the North Western Regional Fisheries Board) (IFI, unpublished data). Brown trout was the dominant fish species recorded during both surveys and Arctic char were recorded in the latter survey (IFI, unpublished data). A survey in 2004 on Lough Easky, carried out by the Irish Char Conservation Group, found no record of Arctic char in the lake (Neylon, *pers. comm.*).

Lough Easky has been surveyed on four occasions since 2008 (2008, 2011, 2014, 2017 and 2020) as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009, 2012a, 2015, Connor *et al.*, 2018 and Corcoran *et al.*, 2021). Brown trout has been the dominant fish species recorded in all surveys. European eel and salmon have also been captured in each survey since 2011. No Arctic char have been recorded in any of these surveys.

This report summarises the results of the 2023 fish stock survey carried out on the lake using Inland Fisheries Ireland's fish in lakes monitoring protocol. The protocol is WFD compliant and provides insight into fish stock status in the lake.

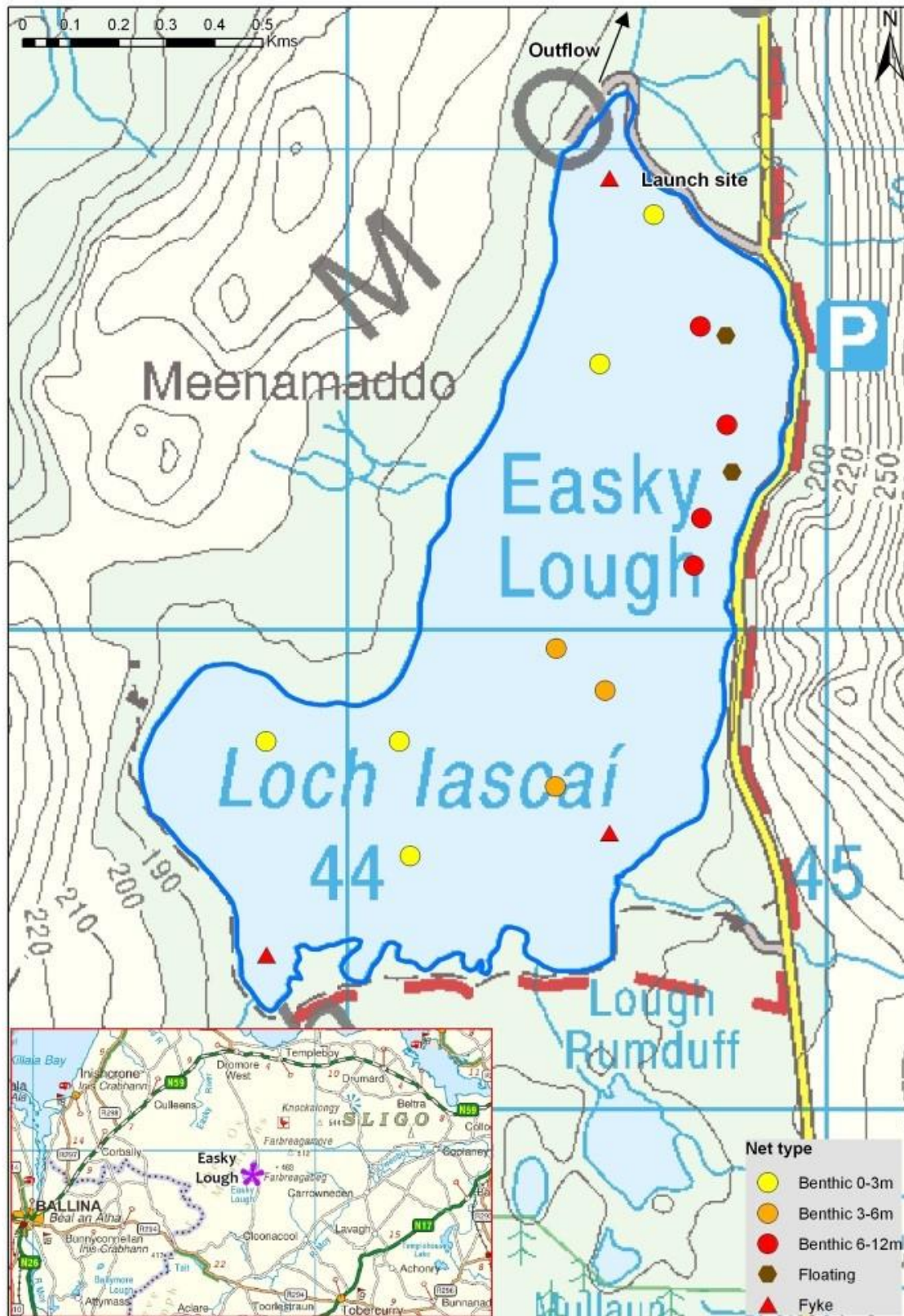


Figure 1.1. Location map of Lough Easky showing net locations and depths of each net (outflow is indicated on map).

2. Methods

2.1. Netting methods

Lough Easky was surveyed over one night from the 1st to the 2nd of August 2023. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets (5 @ 0-2.9m, 3 @ 3-5.9m and 4 @ 6-11.9m) and two floating monofilament multi-mesh (FM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (17 sites) (Figure 1.1). Survey nets were deployed in the same locations as were randomly selected in the previous survey. A handheld GPS was used to mark the precise location of each net. The angle of each gill net in relation to the shoreline was randomised.

All fish were measured and weighed on site and scales were removed from a sub-sample of other species. Live fish were returned to the water whenever possible (i.e. when the likelihood of their survival was considered to be good). Samples of fish were retained for further analysis. Fish were frozen immediately after the survey and transported back to the IFI laboratory for later dissection.

2.2. Fish diet

Total stomach contents were inspected, and individual items were identified to the lowest taxonomic level possible. The percentage frequency occurrence (%FO) of prey items were then calculated to identify key prey items (Amundsen *et al.*, 1996).

$$FO_i = \left(\frac{N_i}{N} \right) * 100$$

Where:

FO_i is the percentage frequency of prey item i ,

N_i is the number of fish with prey i in their stomach,

N is total number of fish with stomach contents.

2.3. Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment to prevent dispersal of alien species and other organisms to uninfected waters. A standard operating procedure was compiled by Inland Fisheries Ireland for this purpose (Caffrey, 2010) and is followed by staff in IFI when moving between water bodies.

3. Results

3.1. Species Richness

Two fish species were recorded in Lough Easky in August 2023. A total of 252 fish were captured (Table 3.1). Brown trout was the most numerous fish species recorded. European eel was also captured. These species have been recorded on all previous surveys of the lake (Kelly *et al.*, 2009, 2012a, 2015, Connor *et al* 2018 and Corcoran *et al.*, 2021). Salmon, having been present in the last four surveys since 2011, was not recorded during this survey.

Table 3.1. Number of each fish species captured by each gear type during the survey on Lough Easky, August 2023.

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
<i>Salmo trutta</i>	Brown trout	198	28	16	242
<i>Anguilla anguilla</i>	European eel	1	0	9	10

3.2. Fish abundance

Fish abundance (mean CPUE) and biomass (mean BPUE) were calculated as the mean number/weight of fish caught per metre of net. For all fish species except eel, CPUE/BPUE is based on all nets, whereas eel CPUE/BPUE is based on fyke nets only. Brown trout was the dominant species with respect to both abundance (CPUE) and biomass (BPUE) (Table 3.2).

Table 3.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Easky, August 2023.

Scientific name	Common name	Mean CPUE (\pm S.E)	Mean BPUE (\pm S.E)
<i>Salmo trutta</i>	Brown trout	0.447 (0.100)	29.416 (6.861)
<i>Anguilla anguilla</i> *	European eel	0.050 (0.033)	9.597 (7.681)

Note: Where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species (Connor *et al.*, 2017). *Eel CPUE and BPUE based on fyke nets only.

3.3 Species Profiles

Brown trout

Brown trout captured during the 2023 survey ranged in length from 7.3cm to 24.7cm (mean 17.1cm) (Figure 3.2). Brown trout captured in previous surveys had similar length and age ranges. Small fish (i.e. < 20cm) have dominated the population on all sampling occasions, with very few larger fish recorded. In 2023 fish <10cm were less prominent than previous sampling occasions (Figure 3.2). Brown trout were aged between 1+ and 3+. One and two year old fish (9cm - 21cm) dominated the population, together accounting for c. 78% of all fish aged (Figure 3.2). Mean L1 (i.e. length at the end of the 1st year) was 6.9cm (Table 3.3).

Brown trout abundance (CPUE) and biomass (BPUE) have remained relatively stable across all surveys of the lake (Figure 3.1).

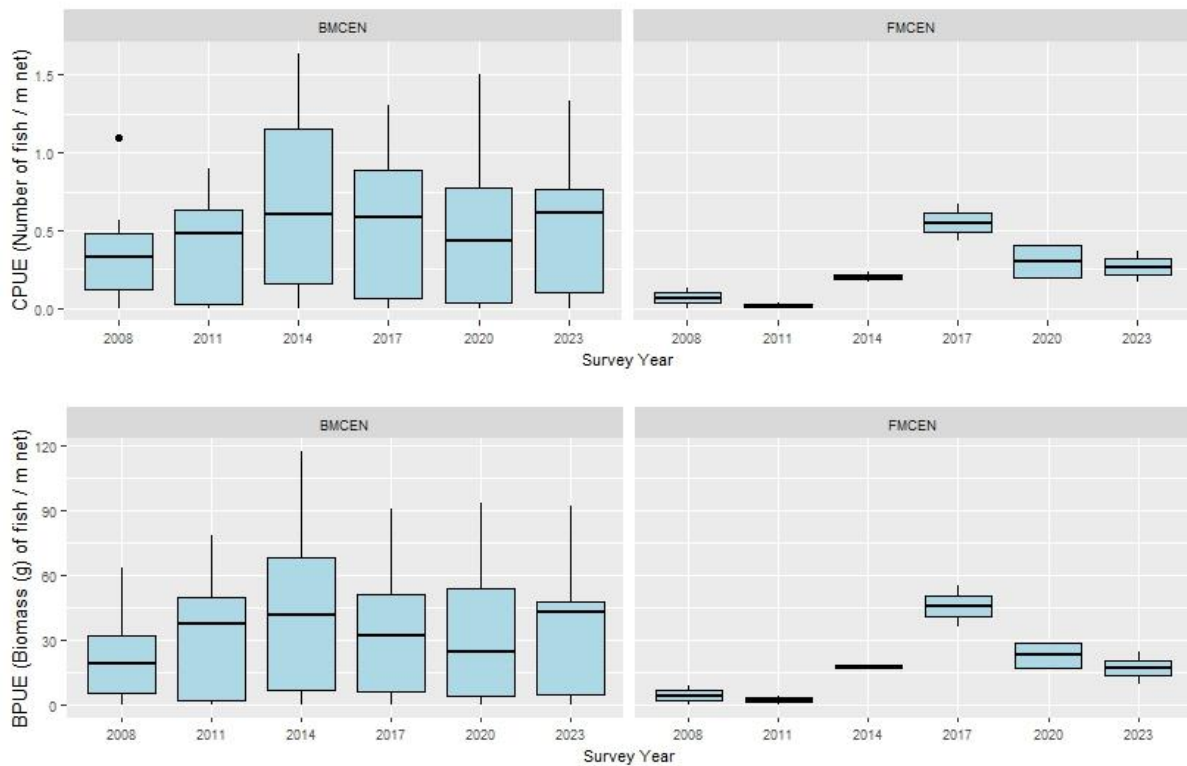


Figure 3.1. CPUE and BPUE of brown trout captured during surveys of Lough Easky between 2008 and 2023. Figures are expressed as numbers of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

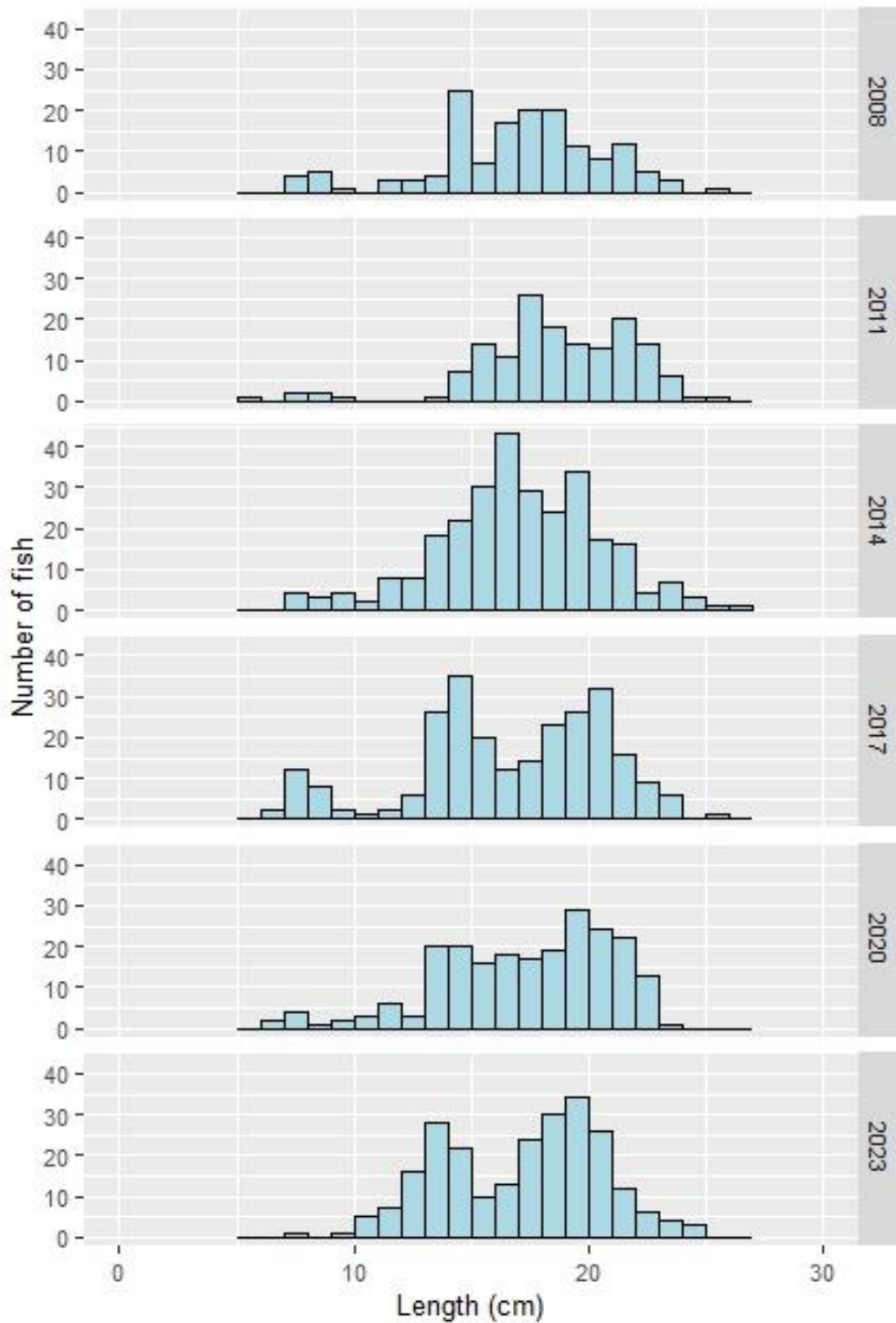


Figure 3.2. Length frequency of brown trout captured on Lough Easky between 2008 and 2023.

Table 3.3. Mean (\pm S.E.) brown trout length (cm) at age for Lough Easky, August 2023

Length (cm)	L ₁	L ₂	L ₃
Mean (\pm S.E.)	6.9 (0.07)	13.5 (0.12)	18.8 (0.32)
N	68	40	15
Range	5.1-7.8	12.0-15.1	17.0-21.5



Plate 3.1. Lough Easky, August, 2023

European eel

European eel captured during the 2023 survey ranged in length from 33.1cm to 64.5cm (mean = 45.3cm) (Figure 3.4).

Eel abundance (CPUE) has fluctuated since 2008 and the median CPUE was lower than previous surveys. Biomass (BPUE) of eel appears to have declined between 2008 and 2023 (Figure 3.3).

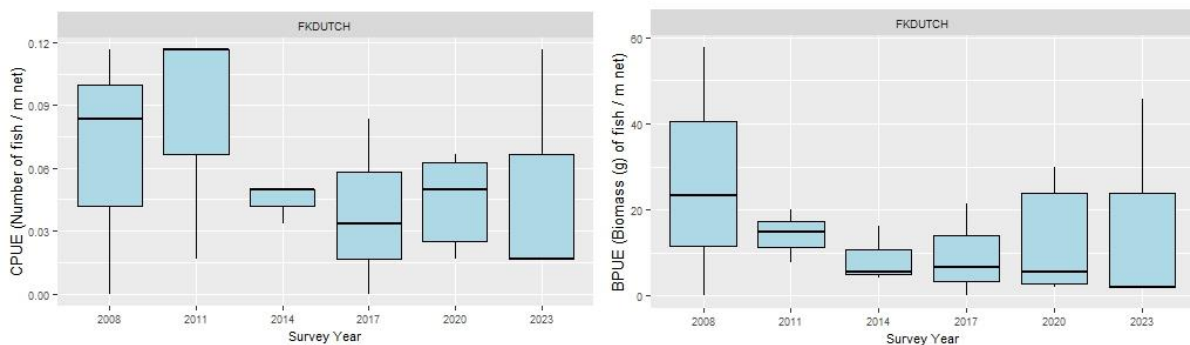


Figure 3.3. CPUE and BPUE of European eel captured during surveys of Lough Easky between 2008 and 2023. Figures are expressed as numbers of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical ‘whiskers’ show the data range. Outliers are marked by dots.

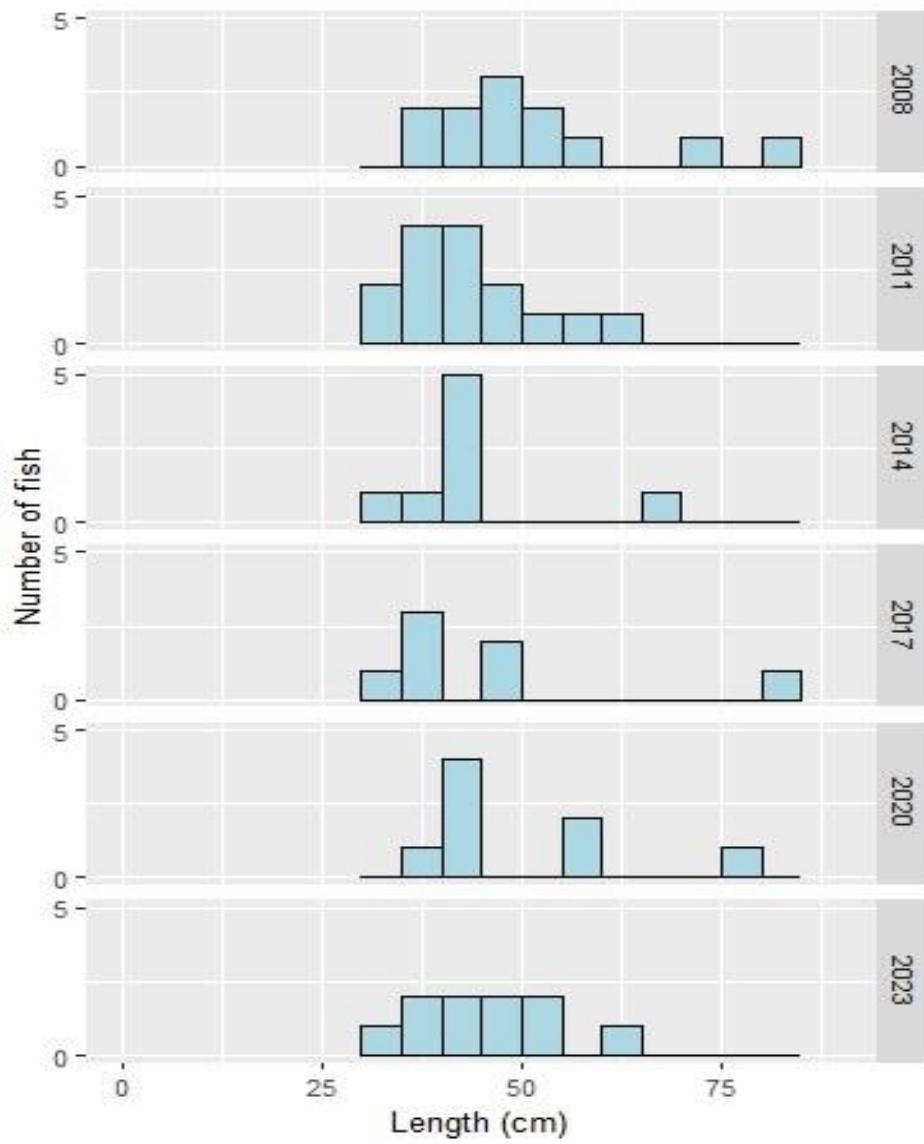


Figure 3.4. Length frequency of European eel captured on Lough Easky between 2008 and 2023

4. Summary and fish ecological status

Two fish species were recorded in Lough Easky in August 2023. Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2023 survey. Recruitment appears to be regular. In common with previous surveys of the lake, the population was dominated by younger and smaller individuals and no fish older than three years old were recorded.

Classification and assigning lakes with an ecological status is a critical part of the WFD monitoring programme. It allows for the identification and prioritisation of lakes that currently fall short of the minimum “Good Ecological Status” that is required if Ireland is not to incur penalties. A multimetric fish ecological classification tool (Fish in Lakes – ‘FIL’) was developed for the island of Ireland (Ecoregion 17) using IFI and Agri-Food and Biosciences Institute Northern Ireland (AFBINI) data generated during the NSSHARE Fish in Lakes project (Kelly *et al.*, 2008). This tool was further developed during 2010 (FIL2) in order to make it fully WFD compliant, including producing EQR (Ecological Quality Ratio) values for each lake and associated confidence in classification (Kelly *et al.*, 2012).

Using the FIL2 classification tool, Lough Easky has been assigned an ecological status of Good for 2023 based on the fish populations present. The lake was assigned a status of Good following all other surveys with the exception of 2008 when it was assigned a status of High (Figure 4.1).

In the 2016 to 2021 surveillance monitoring reporting period, the EPA assigned Lough Easky an overall ecological status of Good, based on all monitored physico-chemical and biological elements, including fish (EPA 2021).

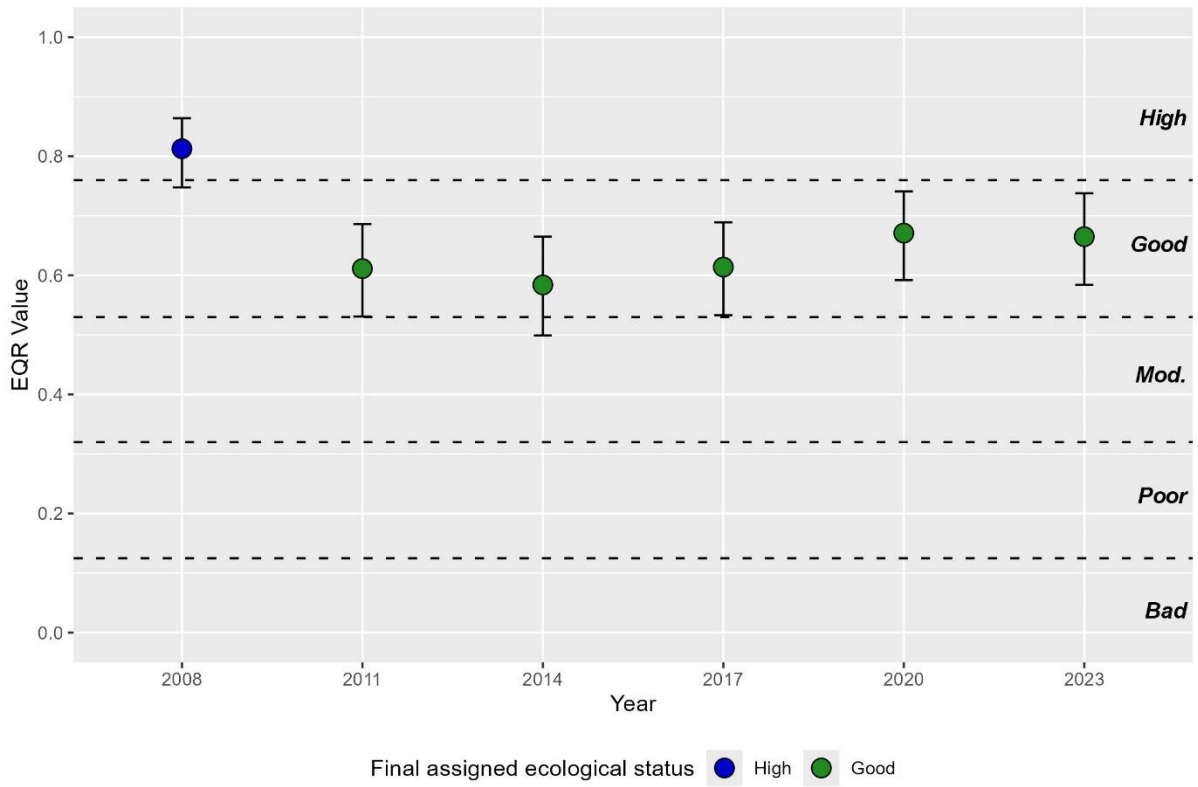


Figure 4.1. Fish ecological status of Lough Easky between 2008 and 2023 (dashed line indicates EQR status boundaries).

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