

National Research Survey Programme

Lakes 2018

Lough Caum

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Iascach Intíre Éireann
Inland Fisheries Ireland



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**Fish Stock Survey of Lough Caum,
October 2018**

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

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Cover photo: Netting survey on Lough Gur © Inland Fisheries Ireland

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1.1 Introduction

Lough Caum is a corrie lake situated in the Brandon Mountains in north County Kerry (Plate 1.1, Fig. 1.1). The lake is located in the “Mount Brandon” SAC which occupies the central and north-western parts of the Dingle peninsula. The geology of the area comprises old red sandstone and Dingle beds (the oldest Devonian rocks in Ireland) (NPWS, 2002).

The lake has a surface area of 8ha, a mean depth of 2.7m and a maximum depth of 15m. Lough Caum is categorised as typology class 1 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), less than 50ha and low alkalinity (<20mg/l CaCO₃). The lake holds a population of wild brown trout. Rainbow trout were stocked regularly into the lake by Inland Fisheries Ireland (O’ Reilly, 2007) in the past, however, all stocking has now ceased on the lake. Lough Caum is surrounded by extensive coniferous woodland and the outflow has been modified in order to facilitate a forestry track for removing felled trees (Plates 1.1 and 1.2).

Peregrine falcons and chough are resident around the lake – both species feature in Annex I of the EU Habitats Directive (Burke and Witkowska 2009). The otter (*Lutra lutra*), an Annex II species listed on the Habitats Directive, is a common sight along the shores of the lake. The common frog (*Rana temporaria*), also a protected species listed in Annex V of the Habitats Directive (NPWS 2007), is also prevalent in the area.

The lake was previously surveyed in 2009 and 2012 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2010 and 2013). During the 2012 survey, brown trout were found to be the dominant species present in the lake. Rainbow trout and eels were also captured during the survey.

This report summarises the results of the 2018 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.



Plate 1.1. Lough Caum



Plate 1.2. Modified outflow of Lough Caum

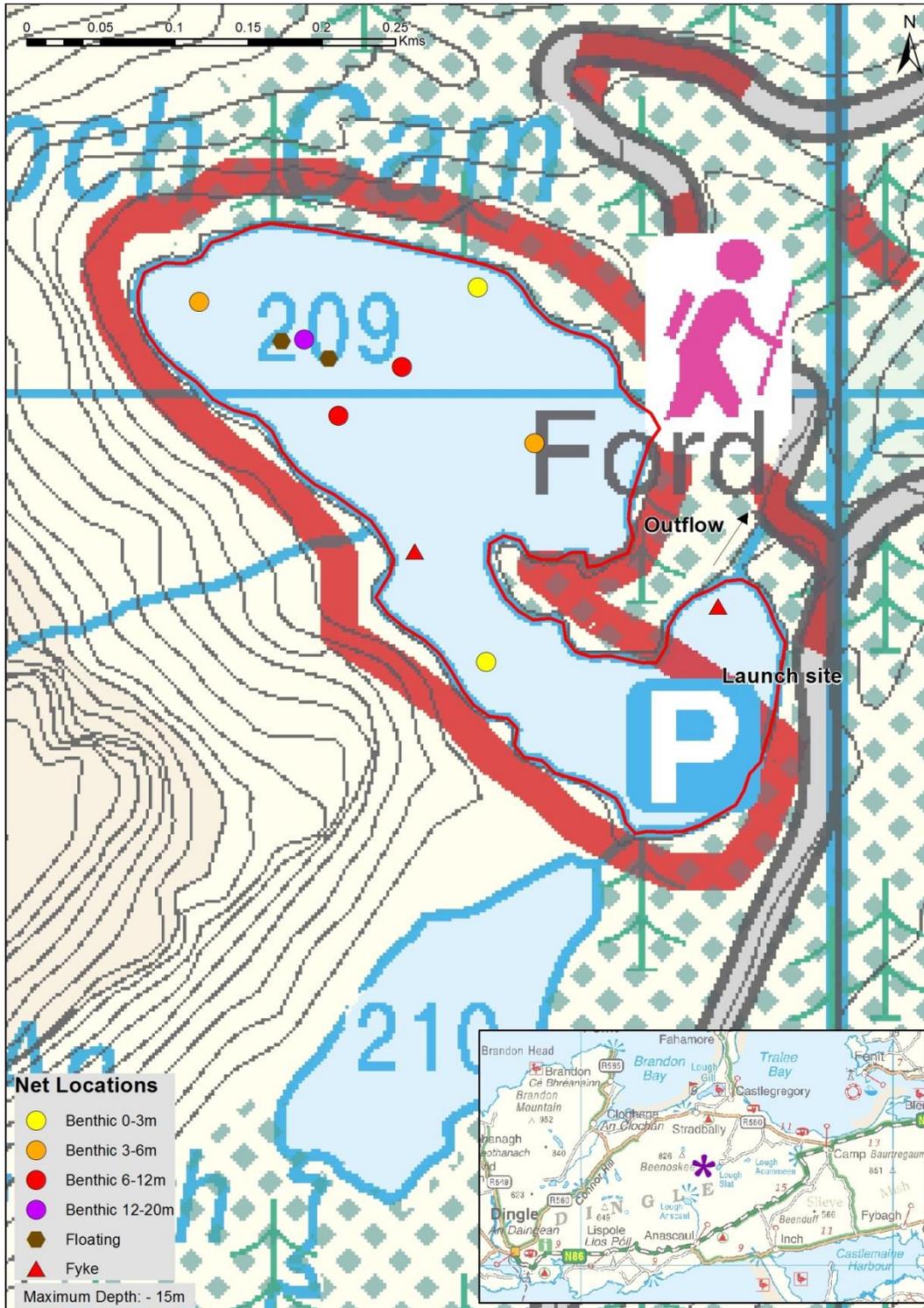


Fig. 1.1. Location map of Lough Caum showing locations and depths of each net (outflow is indicated on map)



1.2 Methods

1.2.1 Netting methods

Lough Caum was surveyed over one night from the 1st to the 2nd of October 2018. A total of two sets of Dutch fyke nets (Fyke), seven benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (BM CEN) (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m and 1 @ 12-19.9m) and two floating monofilament multi-mesh (FM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed randomly in the lake (11 sites). 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 all trout. Live fish were returned to the water whenever practical or 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.

1.2.2 Fish diet

Total stomach contents were inspected and individual items were counted and 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).

$$\%FO_i = (N_i / N) \times 100$$

Where:

%FO_i is the percentage frequency of prey item *i*,
N_i is the number of a particular species with prey *i* in their stomach,
N is total number of a particular species with stomach contents.



1.2.3 Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment in order 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.



1.3 Results

1.3.1 Species Richness

A total of two fish species were recorded on Lough Caum in October 2018, with 196 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most abundant fish species recorded, eels were also recorded. During the previous surveys in 2009 and 2012 the same species composition was recorded, with the exception of rainbow trout which were not recorded in 2018 but were captured in 2009 and 2012 (Kelly *et al.*, 2010 and Kelly *et al.*, 2013).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Caum, October 2018

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
<i>Salmo trutta</i>	Brown trout	159	13	21	193
<i>Anguilla anguilla</i>	European eel	0	0	3	3

1.3.2 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. Mean CPUE and BPUE for all fish species captured in the 2009, 2012 and 2018 surveys are summarised in Table 1.2 and illustrated in Figures 1.2 and 1.3.

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). The mean brown trout CPUE and BPUE increased over the three sampling occasions (Table 1.2; Figs. 1.2 and 1.3).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Caum, 2009, 2012 and 2018

Scientific name	Common name	2009	2012	2018
Mean CPUE				
<i>Salmo trutta</i>	Brown trout	0.178 (0.062)	0.417 (0.143)	0.553 (0.211)
<i>Oncorhynchus mykiss</i>	Rainbow trout	0.029 (0.014)	0.027 (0.011)	-
<i>Anguilla anguilla</i>	European eel	0.050 (0.033)	0.025 (0.025)	0.025 (0.025)
Mean BPUE				
<i>Salmo trutta</i>	Brown trout	15.598 (5.759)	20.095 (7.645)	33.761 (15.953)
<i>Oncorhynchus mykiss</i>	Rainbow trout	9.445 (4.209)	17.476 (6.650)	-
<i>Anguilla anguilla</i>	European eel	11.667 (9.633)	2.467 (2.467)	1.963 (1.963)

Note: On the rare occasion 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

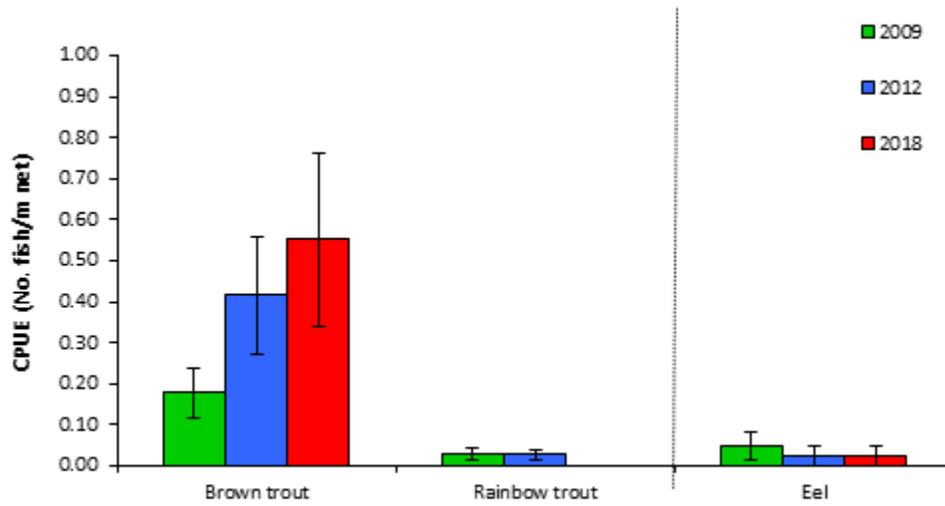


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Caum (Eel CPUE based on fyke nets only), 2009, 2012 and 2018

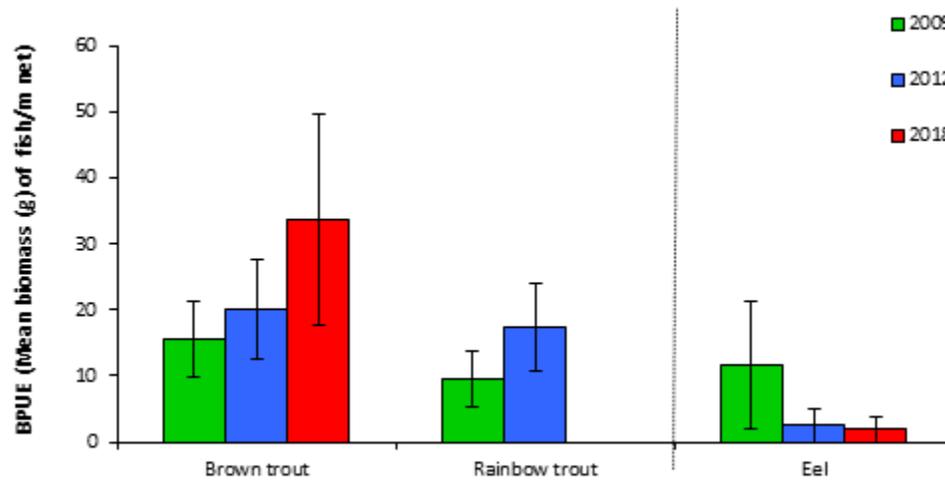


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Caum (Eel BPUE based on fyke nets only), 2009, 2012 and 2018

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2018 survey ranged in length from 7.5cm to 23.4cm (mean = 16.4cm) (Fig. 1.4). Four age classes were present, ranging from 0+ to 3+, with a mean L1 of 6.8cm (Table 1.3). Brown trout captured during the 2009 and 2012 surveys had similar length and age ranges (Fig.1.4).

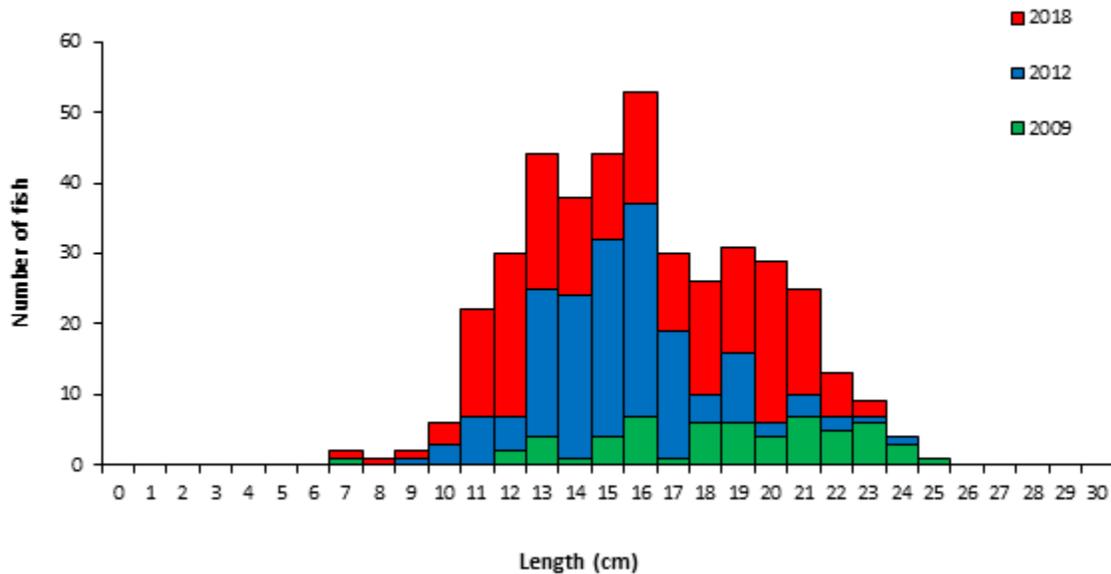


Fig. 1.4. Length frequency of brown trout captured on Lough Caum, 2009, 2012 and 2018

Table 1.3. Mean (\pm S.E.) brown trout length (cm) at age for Lough Caum, October 2018

	L ₁	L ₂	L ₃
Mean (\pm S.E.)	6.8 (0.1)	12.5 (0.2)	15.7 (0.4)
N	99	64	28
Range	4.1-9.5	8.5-17.2	10.9-20.4

Other fish species

Eels captured during the 2018 survey ranged in length from 33.5cm to 39.5cm.

1.3.4 Stomach and diet analysis

Dietary analysis studies provide a good indication of the availability of food items and the angling methods that are likely to be successful. However, the value of stomach content analysis is limited unless undertaken over a long period as diet may change on a daily basis depending on the availability of food items. The stomach contents of a subsample of brown trout captured during the survey were examined and are presented below.

Brown trout

Adult trout usually feed principally on crustaceans (*Asellus* sp. and *Gammarus* sp.), insects (principally chironomid larvae and pupae) and molluscs (snails) (Kennedy and Fitzmaurice, 1971, O'Grady, 1981). A total of 142 stomachs were examined. Of these 89 were found to contain no prey items. Of the remaining 53 stomachs containing food, 43% contained invertebrates, 40% unidentified digested material, 15% zooplankton and 2% zooplankton/invertebrates (Fig. 1.5).

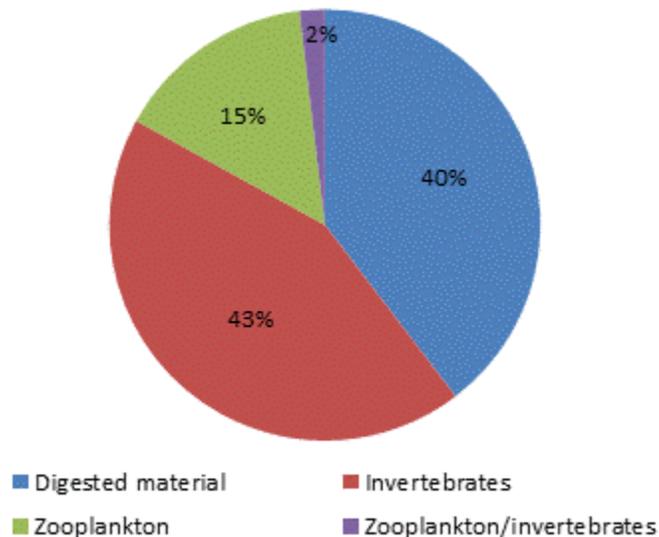


Fig 1.5. Diet of brown trout (n=53) captured on Lough Caum, 2018 (% FO)



1.4 Summary and ecological status

A total of two fish species were recorded in Lough Caum in October 2018. Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2018 survey.

The mean brown trout CPUE and BPUE increased over the three sampling occasions. Brown trout ranged in age from 0+ to 3+, indicating reproductive success in each of the previous four years.

Classification and assigning lakes with an ecological status is a critical part of the WFD monitoring programme. It allows River Basin District managers to identify and prioritise 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 values for each lake and associated confidence in classification (Kelly *et al.*, 2012). Using the FIL2 classification tool, Lough Caum has been assigned an ecological status of Good for 2018 based on the fish populations present. In previous years the lake was assigned a fish status of Good in 2009 and Moderate in 2012.

In the 2010 to 2015 surveillance monitoring reporting period, the EPA assigned Lough Caum an overall ecological status of Moderate.



1.5 References

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