



Sampling Fish for the Water Framework Directive

Lakes 2012

Lough Caum



Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough Caum, September 2012

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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 of 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 and rainbow trout are stocked regularly into the lake by Inland Fisheries Ireland (O’ Reilly, 2007). 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 also previously surveyed in September 2009 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2010). During this survey, brown trout were found to be the dominant species present in the lake. Rainbow trout and eels were also captured during the survey.



Plate 1.1. Lough Caum

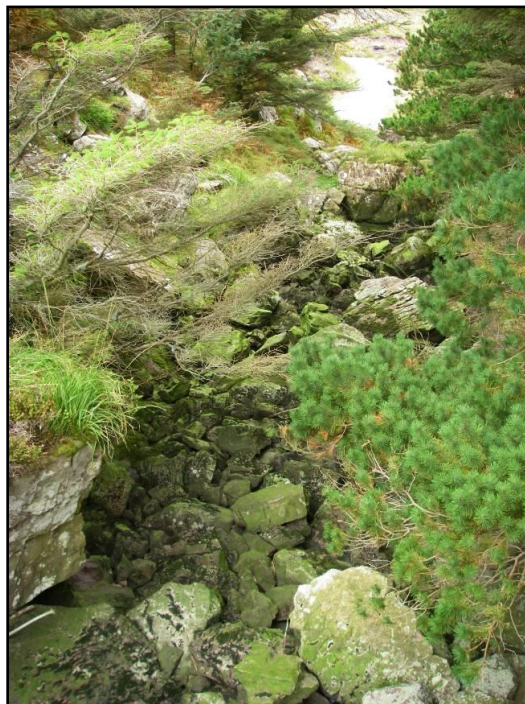


Plate 1.2. Modified outflow of Lough Caum



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

1.2 Methods

Lough Caum was surveyed over one night on the 19th of September 2012. A total of two sets of Dutch fyke nets, seven benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m and 1 @ 12-19.9m) and two surface monofilament multi-mesh (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 in 2009. 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 possible (i.e. when the likelihood of their survival was considered to be good). Samples of fish were returned to the laboratory for further analysis.

1.3 Results

1.3.1 Species Richness

A total of three fish species were recorded on Lough Caum in September 2012, with 171 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, followed by rainbow trout and eels. A similar species composition was recorded during the previous survey in 2009 (Kelly *et al.*, 2010).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Caum, September 2012

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	Total
<i>Salmo trutta</i>	Brown trout	113	2	43	158
<i>Oncorhynchus mykiss</i>	Rainbow trout	8	2	0	10
<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 2009 and 2012 are summarised in Table 1.2. Mean CPUE and BPUE for all fish species is illustrated in Figures 1.2 and 1.3.

Although the mean brown trout CPUE and BPUE appeared higher in 2012 than in 2009, these differences were not statistically significant (Fig. 1.2 and Fig. 1.3).

The differences in the mean brown trout CPUE and BPUE between Lough Caum and three similar lakes was assessed, with no overall significant differences being found (Fig. 1.4 and Fig. 1.5).

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

Scientific name	Common name	2009	2012
Mean CPUE			
<i>Salmo trutta</i>	Brown trout	0.178 (0.062)	0.417 (0.143)
<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)
Mean BPUE			
<i>Salmo trutta</i>	Brown trout	15.598 (5.759)	20.095 (7.645)
<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)

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.

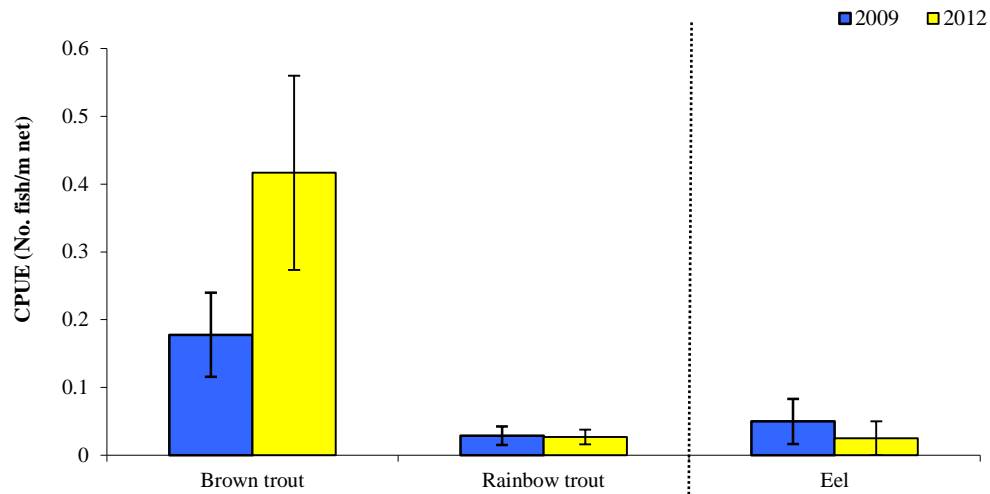


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Caum (Eel CPUE based on fyke nets only), 2009 and 2012

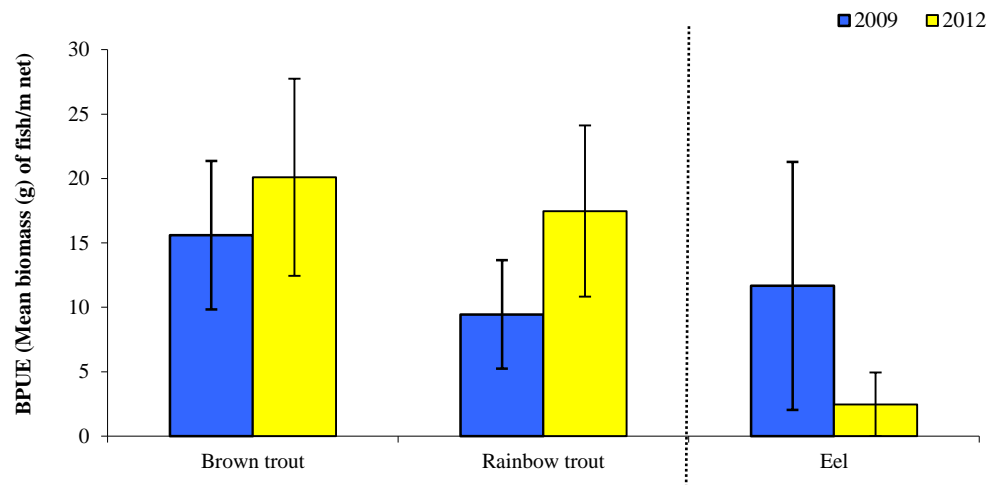


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Caum (Eel BPUE based on fyke nets only), 2009 and 2012

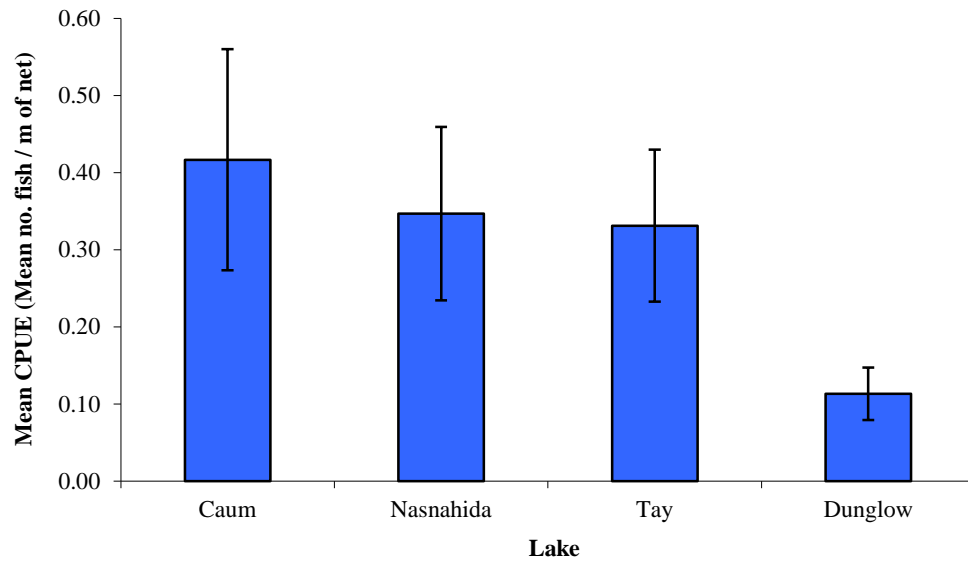


Fig. 1.4. Mean (\pm S.E.) brown trout CPUE in four lakes surveyed during 2012

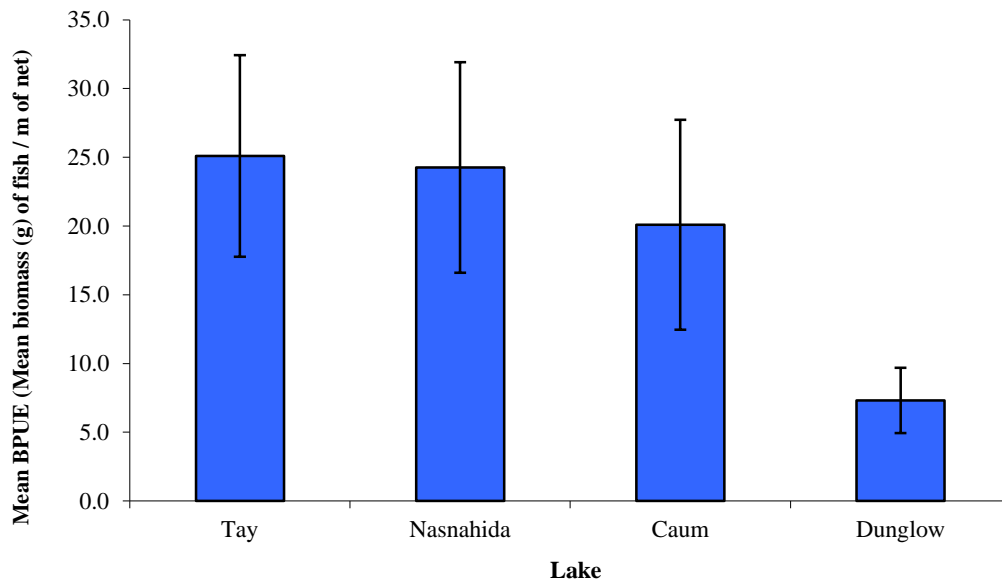


Fig. 1.5. Mean (\pm S.E.) brown trout BPUE in four lakes surveyed during 2012

1.3.3 Length frequency distributions

Brown trout captured during the 2012 survey ranged in length from 9.9cm to 24.1cm (mean = 15.7cm) (Fig. 1.6). Brown trout captured during the 2009 survey ranged in length from 7.8cm to 25.8cm (Fig. 1.6).

Rainbow trout captured during the 2012 survey ranged in length from 29.4cm to 43.0cm (mean = 35.1cm) (Fig. 1.7). Rainbow trout captured during the 2009 survey ranged in length from 26.0cm to 35.7cm (Fig. 1.7).

Eels captured during the 2012 survey ranged in length from 32.6cm to 43.0cm.

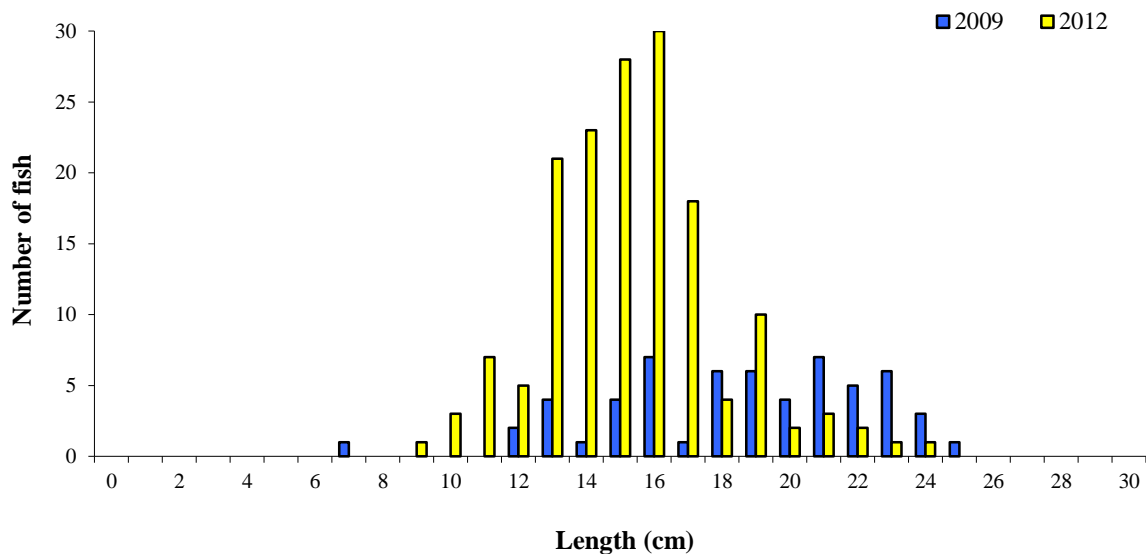


Fig. 1.6. Length frequency of brown trout captured on Lough Caum, 2009 and 2012

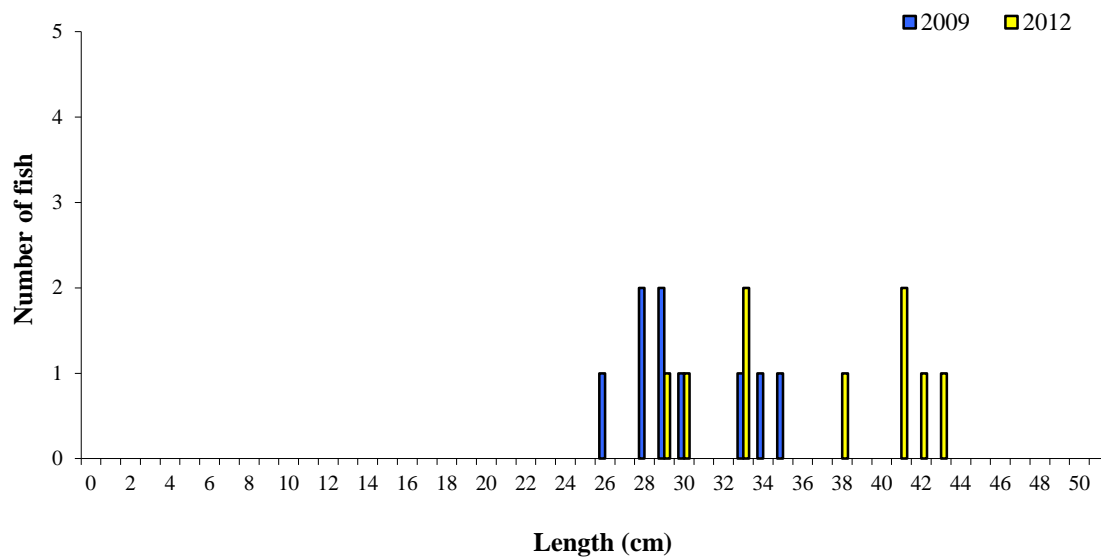


Fig. 1.7. Length frequency of rainbow trout captured on Lough Caum, 2009 and 2012

1.3.4 Fish age and growth

Three age classes of brown trout were present, ranging from 1+ to 3+, with a mean L1 of 6.3cm (Table 1.3). In the 2009 survey, brown trout ranged from 0+ to 4+ with a mean L1 of 5.9cm.

Rainbow trout ranged in age from 2+ to 3+.

Table 1.3. Mean (\pm SE) brown trout length (cm) at age for Lough Caum, September 2012

	L ₁	L ₂	L ₃
Mean	6.3 (0.2)	13.3 (0.3)	17.8 (0.7)
N	78	59	13
Range	3.5-10.9	8.0-17.6	13.8-22.2

1.4 Summary

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets.

Although the mean brown trout CPUE and BPUE in Lough Caum was higher in 2012 than in the 2009 survey, these differences were not statistically significant. The mean brown trout CPUE and BPUE in Lough Caum was similar to three other similar lakes assessed during 2012, with no statistically significant differences being found between lakes. Brown trout ranged in age from 1+ to 3+, indicating reproductive success in three 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 by 2015 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 (AFBNI) 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 Moderate based on the fish populations present in 2012. The ecological status assigned to the lake based on the 2009 survey data was Good.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Caum an overall ecological status of Moderate, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised at the end of 2012.

1.5 References

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