

Lough Barra



Sampling Fish for the Water Framework Directive - Lakes 2008



The Central and Regional
Fisheries Boards

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1.1 Introduction

Lough Barra is situated in the upper part of the Gweebarra River catchment close to the south-western perimeter of Glenveagh National Park in Co. Donegal. The lake is situated at an altitude of 88.6m above sea level. It has a surface area of 63ha, mean depth of 4.4m and a maximum depth of 11.6m (Fig. 1.1). The lake is categorised as typology class 4 (as designated by the EPA for the Water Framework Directive), i.e. deep (>4m), greater than 50ha and low alkalinity (<20mg/l CaCO₃). The lake has been classed as 2a (i.e. expected to meet good status by 2015, pending further investigation) in the WFD Characterisation report (EPA, 2005).

The geology of the area is predominantly granite, felsite and other intrusive rocks rich in silica. Lough Barra Bog SPA is situated immediately to the south-west of the lake (Fig. 1.1) and part of the bog is a nature reserve (NPWS, 2005). Lough Barra itself forms part of the Cloghernagore Bog and Glenveagh National Park Special Area of Conservation. This is a particularly large SAC located in north-west Donegal. It contains many different habitats ranging from exposed rock and scree mountains to blanket bogs, lakes and rivers.

According to O' Reilly (1998), the brown trout in the lake are small and an occasional salmon and sea trout reach the lake. The lake was previously surveyed in August 2005 by the Central Fisheries Board and the Northern Regional Fisheries Board as part of the NS Share "Fish in Lakes" project (Kelly *et al.*, 2007). Brown trout, salmon and eels were recorded in this survey.



Plate1.1. Lough Barra looking north-east towards the River Barra (inflow) (Photo courtesy of CFB and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

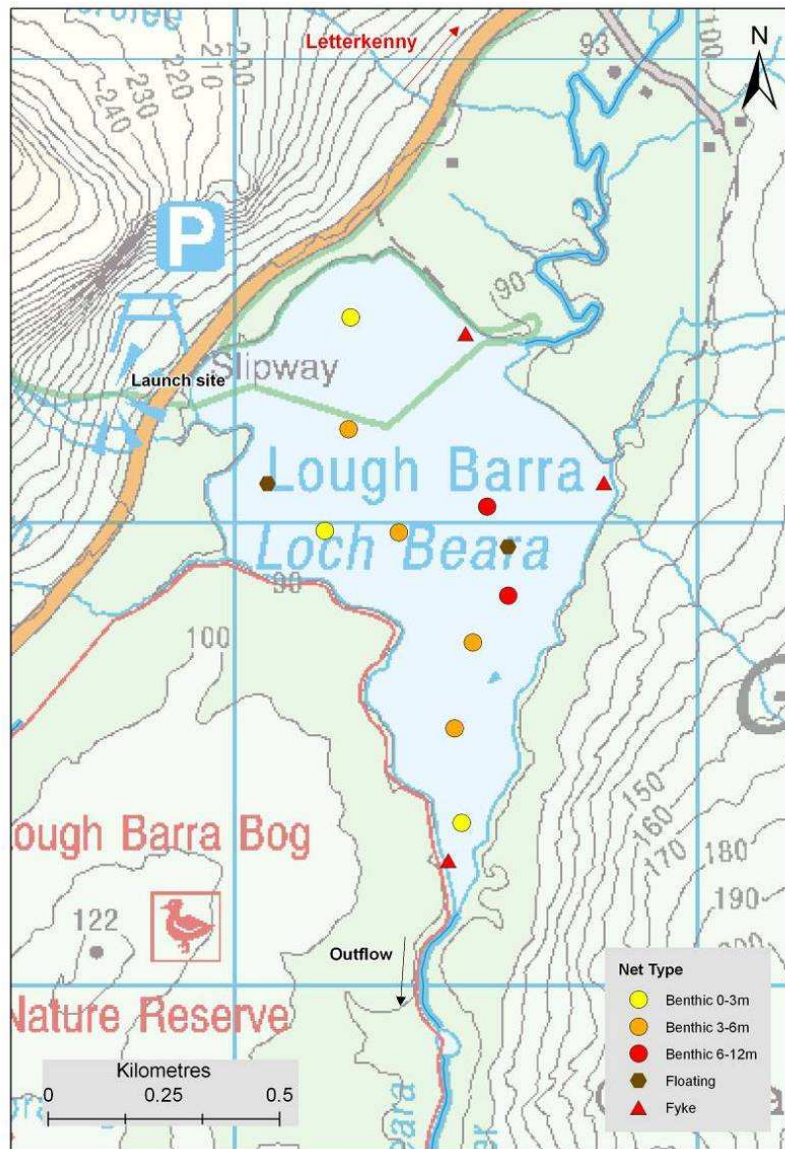


Figure 1.1. Location map of Lough Barra showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Fishing was conducted over one night on the 6th of August 2008. A total of three sets of Dutch fyke nets, nine benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (3 @ 0-2.9m, 4 @ 3-5.9m and 2 @ 6-11.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets were deployed randomly in the lake (14 sites) (Fig. 1.1). The netting effort was increased by two benthic monofilament multi-mesh survey gill nets (1 @ 0-2.9m and 1 @ 3-5.9m) in

comparison to the netting effort carried out in 2005. Nets were deployed in similar locations as those randomly selected in the previous 2005 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 randomized.

All fish were measured and weighed and scales were removed from brown trout and salmon on site. 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 Barra in August 2008. The number of each species captured by each gear type is shown in Table 1.1. A total of 226 fish were captured during the survey. Brown trout were the most common fish species encountered in both the gill nets and fyke nets. Salmon parr and eels were also captured. One large adult salmon was captured and released (Table 1.1).

Table 1.1: List of fish species recorded (including numbers captured) during the survey

Scientific name	Common name	Number of fish captured			Total
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	
<i>Salmo trutta</i>	Brown trout	173	8	32	213
<i>Salmo salar</i>	Salmon	3	0	4	7
<i>Anguilla anguilla</i>	Eel	0	0	6	6

1.3.2 Fish abundance

Fish abundance (mean CPUE) and biomass (mean BPUE) was 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 are summarised in Table 1.2. Mean CPUE is illustrated in Figure 1.2. For comparative purposes, 2005 data is also displayed. There was an increase in both mean brown trout CPUE and mean brown trout BPUE from 2005 to 2008, however this increase was not statistically significant.

Table 1.2. Mean CPUE and Mean BPUE on Lough Barra

Year	2005	2008
Mean CPUE (mean no. of fish per m of net)		
Brown trout	0.309 (0.0982)	0.469 (0.1100)
Salmon (parr)	0.001 (0.0013)	0.011 (0.0051)
Salmon (adult)	-	0.001 (0.0011)
Eel	0.083 (0.0167)	0.033 (0.0096)
Mean BPUE (mean weight (g) of fish/m of net)		
Brown trout	17.456 (5.678)	22.911 (5.390)
Salmon (parr)	0.222 (0.222)	0.124 (0.068)
Salmon (adult)	-	2.976 (2.976)
Eel	16.333 (4.995)	3.039 (1.464)

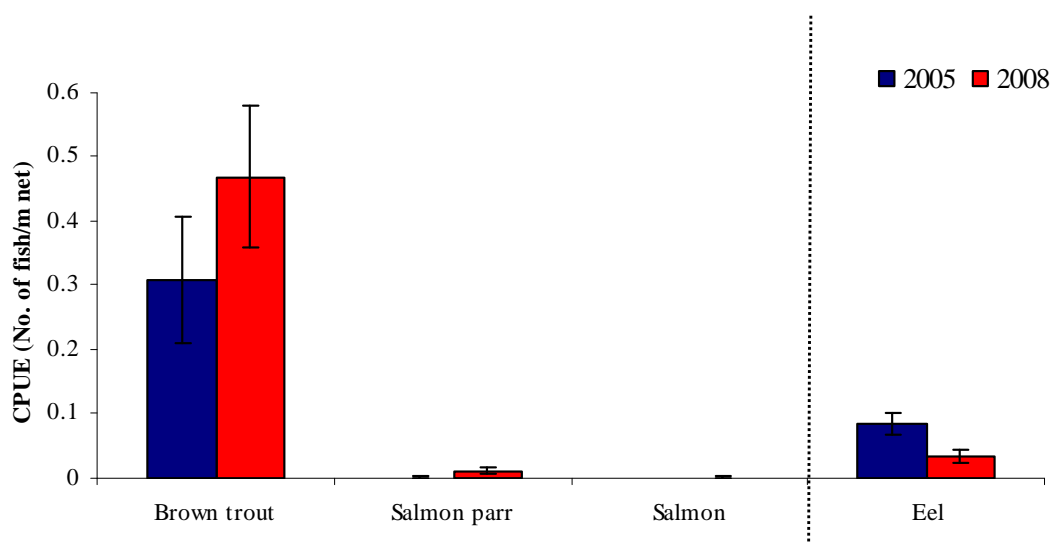


Fig. 1.2. Mean (\pm S.E.) CPUE on Lough Barra (Eel CPUE based on fyke nets only)

1.3.3 Length frequency distributions

Brown trout ranged in length from 6.6cm to 26.5cm (mean = 16.0cm) (Fig. 1.3). Brown trout from the 2005 survey also had similar lengths, ranging from 5.6cm to 23.5cm (Fig. 1.3). Eels ranged in length from 29.2cm to 46.6cm. Eels from the 2005 survey also grew to a similar length. Salmon parr captured in the current survey ranged in length from 10.2cm to 11cm.

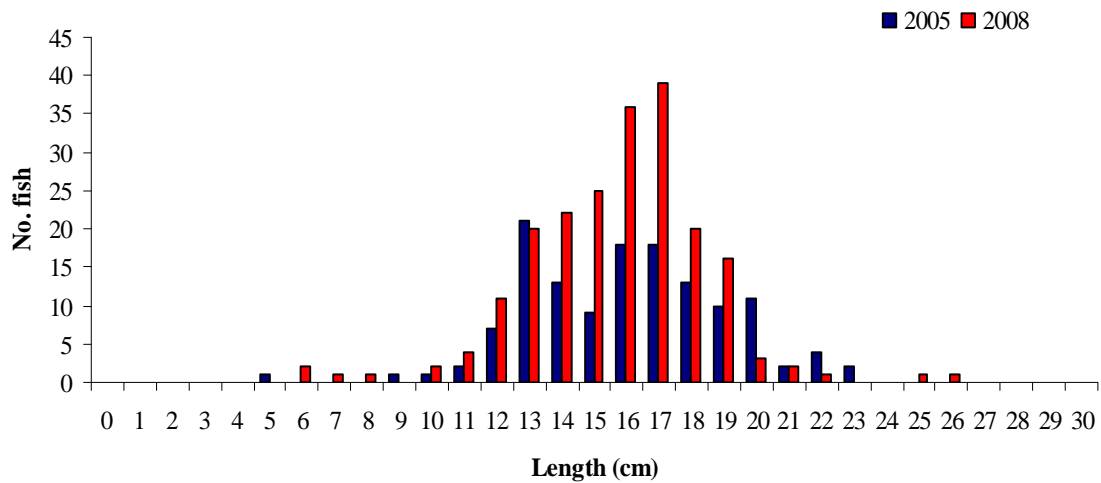


Fig. 1.3. Length frequency of brown trout captured on Lough Barra, 2005 and 2008

1.3.4 Fish age and growth

Brown trout recorded during the survey were aged 0+ to 5+. Mean brown trout L4 was 20.8cm, indicating that the growth of brown trout in Lough Barra is very slow based on a classification developed by Kennedy and Fitzmaurice (1971) (Table 1.3). Brown trout aged 2+ accounted for the largest proportion of the populations captured in the gill nets (64%), followed by 1+ (34%) and 3+ (23%).

Table 1.3. Mean (\pm SE) brown trout length at age (cm) for Lough Barra, August 2008

	L ₁	L ₂	L ₃	L ₄	L ₅
Mean	5.6 (0.16)	12.3 (0.25)	16.6 (0.21)	20.8 (0.80)	25.6
N	54	40	26	3	1
Range	3.8-8.3	8.7-15.2	14.6-18.7	19.5-22.2	-

1.4 Summary

Lough Barra is an oligotrophic lake with a resident population of wild brown trout and a run of migrating fish species such as salmon and eels. Brown trout was the dominant species in Lough Barra during both surveys. Mean CPUE for brown trout in the lake was the highest of all the lakes sampled during 2008 (Kelly *et al.*, 2009). There was also an increase in mean brown trout CPUE and mean BPUE between 2005 and 2008.

Kennedy and Fitzmaurice (1971) related growth rates to alkalinity and classified the growth of lake trout generally into four different categories. This description was applied to trout from Lough Barra and therefore trout were classified as very slow. Little change has been observed in the growth of brown trout since 2005. Brown trout growth in the lake was considerably slower in comparison with other low alkalinity lakes surveyed in 2008, e.g. Lough Brin and Glencullin Lake. Two year old brown trout were the dominant age class during both surveys.

Lough Barra is at the top of the Gweebarra River which receives a spring salmon run. One large adult salmon weighing 2.5kg was captured in a fyke net during the 2008 survey and released. Although no adult salmon were captured during the 2005 survey, two large targets were detected by a portable fish finder while setting the survey nets. These were presumed to be adult salmon due to the size of the signal. A number of salmon parr were also captured in the lake during both surveys.

The mean CPUE for eels was the one of the lowest when compared to other low alkalinity lakes surveyed during 2008, e.g. Glencullin Lake and Lough Acoose (Kelly *et al.*, 2009).

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 new WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using AFBINI and CFB data. Using this tool and expert opinion Lough Barra was assigned a draft classification of good status for fish in 2005 and high status in 2008. The EPA has assigned good status to Lough Barra in an overall interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish.

1.5 References

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