IFI/2012/1-4064

Sampling Fish for the Water Framework Directive

Lakes 2011

Lough Brin

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough Brin, September 2011

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CITATION: Kelly, F.L., Connor, L., Morrissey, E., Wogerbauer, C., Matson, R., Feeney, R. and Rocks, K. (2012) Water Framework Directive Fish Stock Survey of Lough Brin, September 2011. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.

Cover photo: Lynda and Fiona gill netting © Inland Fisheries Ireland

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the regional director Dr. Patrick Buck and the staff from IFI, Macroom. The authors would also like to gratefully acknowledge the help and cooperation of all their colleagues in IFI, Swords.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2011.

1.1 Introduction

Lough Brin is located near Moll's Gap in the Macgillycuddy Reeks, Co. Kerry, six kilometres north-west of Kenmare (Plate 1.1, Fig. 1.1). The lake is approximately 600m in length and has a surface area of 24ha. The mean depth of the lake is 5.9m and it has a maximum depth of 13m. The lake falls into typology class 3 (as designated by the EPA for the Water Framework Directive), i.e. deep (mean depth >4m), less than 50ha and low alkalinity (<20mg/l $CaCO_3$).

Lough Brin forms part of the Killarney National Park, Macgillycuddy's Reeks and Caragh River catchment candidate Special Area of Conservation. This is a large area that encompasses a wide variety of habitats designated under Annex I of the EU Habitats Directive, including blanket bog, alluvial woodlands, alpine heath and both upland and lowland oligotrophic lakes. The site has also been selected for the following species, Killarney fern, slender naiad, freshwater pearl mussel, Kerry slug, marsh fritillary, Killarney shad, Atlantic salmon, brook lamprey, river lamprey, sea lamprey, lesser horseshoe bat and otter; all species listed in Annex II of the EU Habitats Directive (NPWS 2005).

The lake was previously surveyed by the Central Fisheries Board in July 1995, in conjunction with colleagues from the South Western Regional Fisheries Board (CFB, unpublished data). During this survey, brown trout and sea trout were recorded. The majority of trout captured were two and three years old with only two 4-year old fish being recorded. Lough Brin also receives a run of spring salmon and sea trout.

Lough Brin was also previously surveyed in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009). During this survey, brown trout were found to be the dominant species present in the lake. Sea trout, minnow and eels were also captured during the survey.

Plate 1.1. Lough Brin

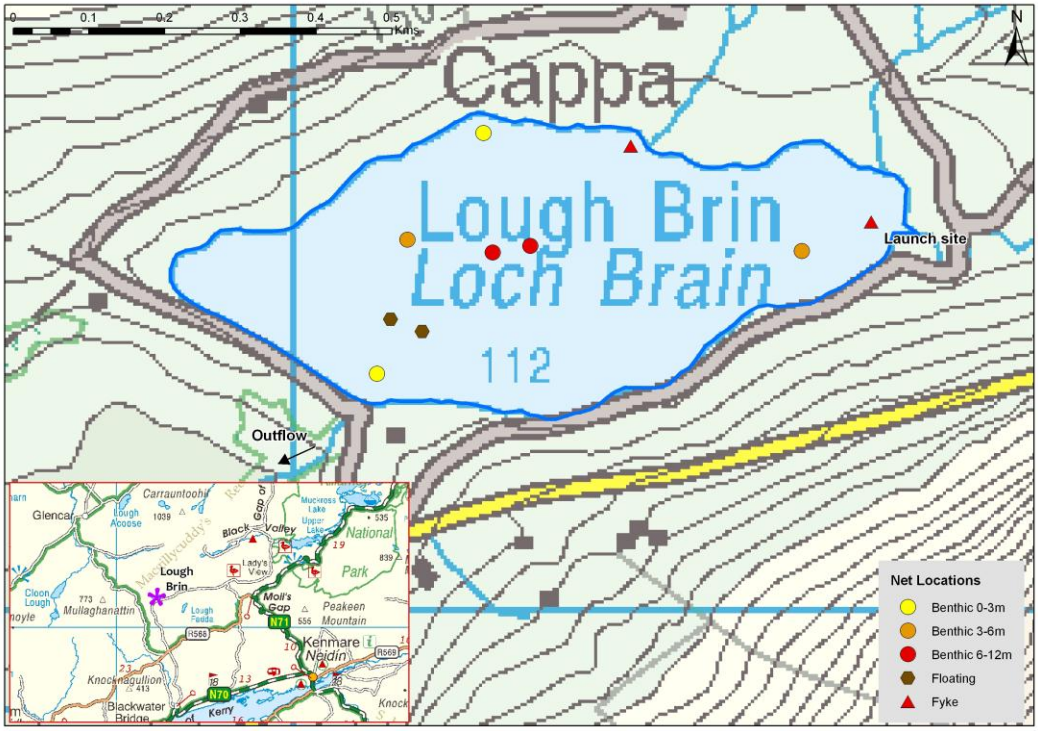

Fig. 1.1. Location map of Lough Brin showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Brin was surveyed over one night from the 12th to the 13th of September 2011. A total of two sets of Dutch fyke nets, six benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m and 2 @ 6-11.9m) and two floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (10 sites). Nets were deployed in the same locations as were randomly selected in the previous survey in 2008. 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 brown trout and sea 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 retained for further analysis.

1.3 Results

1.3.1 Species Richness

A total of three fish species (sea trout are included as a separate 'variety' of trout) were recorded on Lough Brin in September 2011, with 84 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 sea trout, minnow and eels. During the previous survey in 2008 the same species composition was recorded.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Brin, September 2011

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	Total
Salmo trutta	Brown trout	58	8	13	79
	Sea trout	1	0	0	1
Phoxinus phoxinus	Minnow	2	0	0	2
Anguilla anguilla	European eel	0	0	2	2

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 2008 and 2011 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 was lower in 2011 than in 2008, this difference was not statistically significant. The differences in the mean brown trout CPUE between Lough Brin and four similar lakes was assessed, with no overall significant differences being found (Fig. 1.4).

Although the mean brown trout BPUE was also lower in 2011 than in 2008, this difference was not statistically significant. The differences in the mean brown trout BPUE between Lough Brin and four similar lakes was assessed, with no overall significant differences being found (Fig. 1.5).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Brin, 2008 and 2011

Scientific name	Common name	2008	2011
		Mean CPUE	
Salmo trutta	Brown trout	0.385 (0.066)	0.241 (0.06)
	Sea trout	0.007 (0.004)	0.003 (0.003)
Phoxinus phoxinus	Minnow	0.117 (0.061)	0.007 (0.007)
Anguilla anguilla	European eel	0.191 (0.041)	0.0166
		Mean BPUE	
Salmo trutta	Brown trout	39.003 (7.975)	20.618 (5.524)
	Sea trout	1.013 (0.705)	0.873 (0.873)
Phoxinus phoxinus	Minnow	0.48 (0.275)	0.02 (0.02)
Anguilla anguilla	European eel	33.458 (5.958)	3.9 (0.1)

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

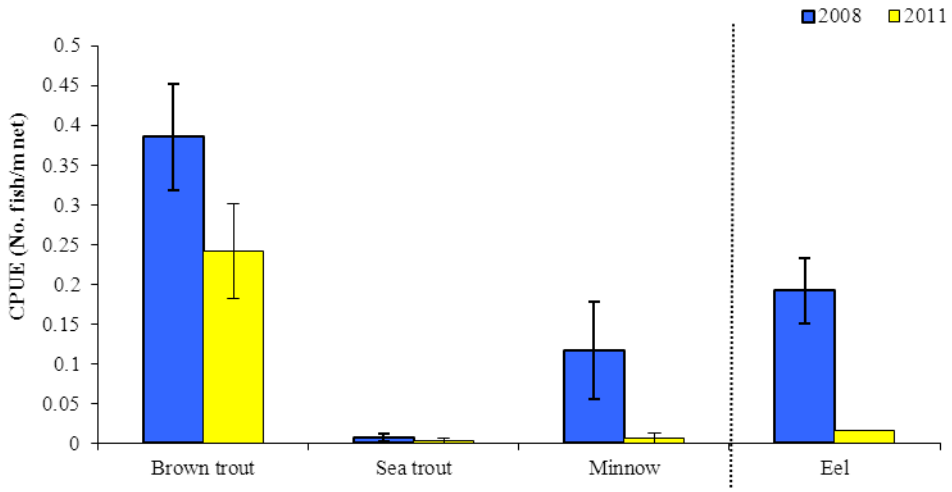

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Brin (Eel CPUE based on fyke nets only), 2008 and 2011

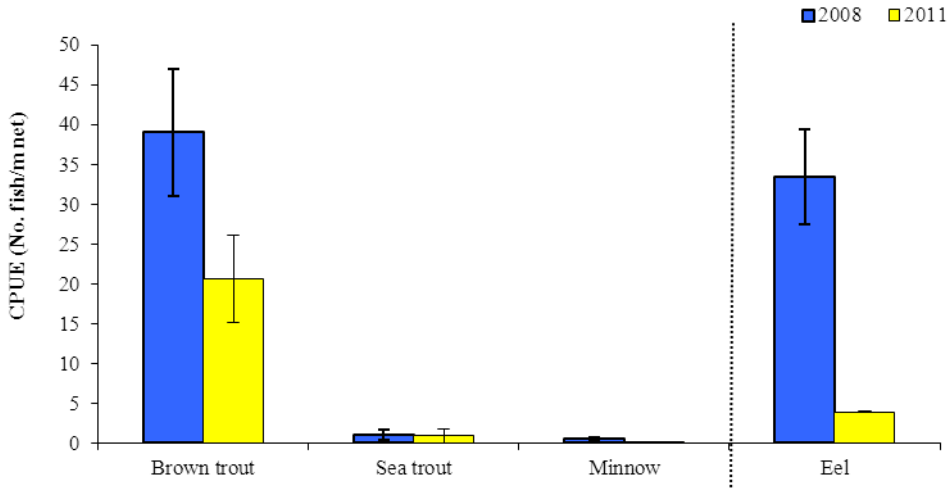

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Brin (Eel CPUE based on fyke nets only), 2008 and 2011

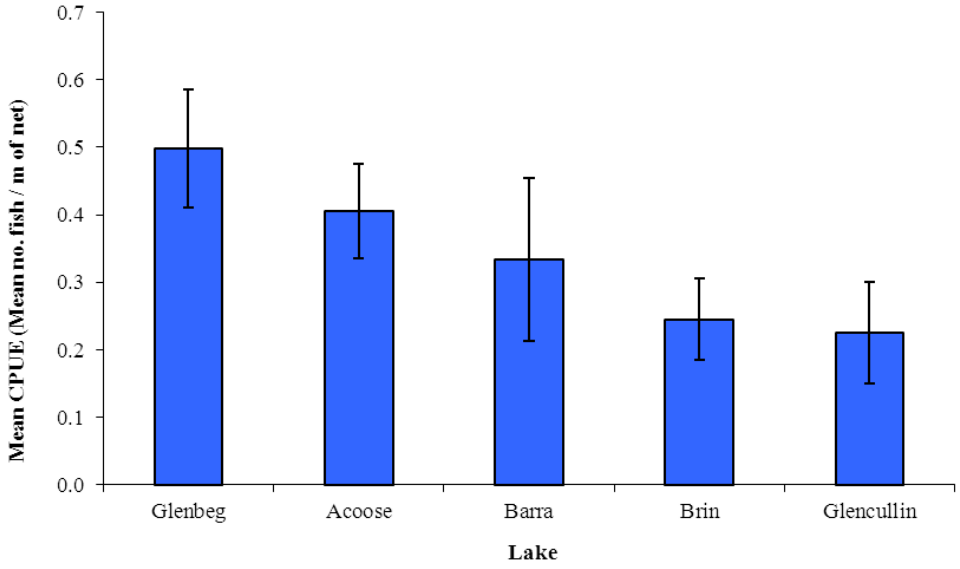

Fig. 1.4. Mean (±S.E.) brown trout CPUE in five lakes surveyed during 2011

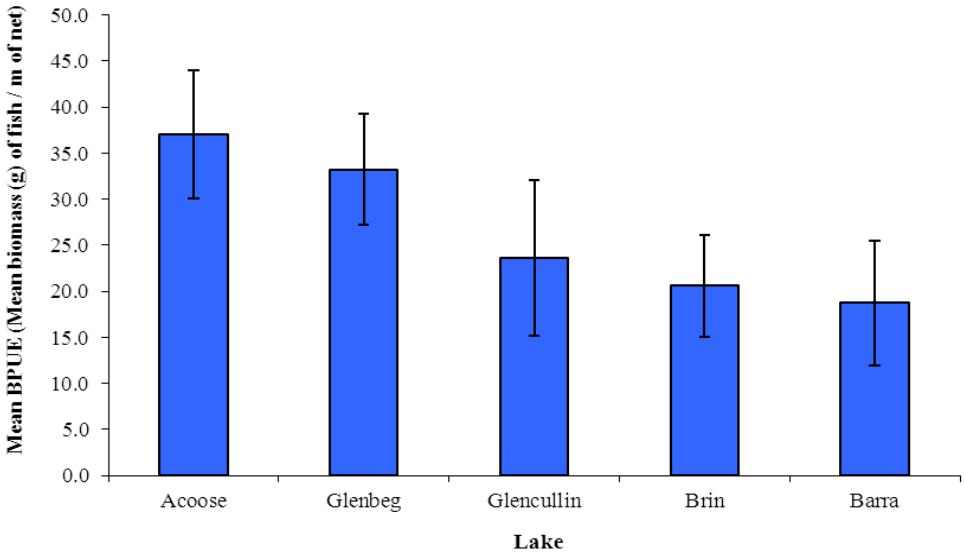

Fig. 1.5. Mean (±S.E.) brown trout BPUE in five lakes surveyed during 2011

1.3.3 Length frequency distributions

Brown trout captured during the 2011 survey ranged in length from 10.3cm to 26.7cm (mean = 18.6cm) (Fig. 1.6). Brown trout captured during the 2008 survey had similar lengths ranging from from 12.0cm to 26.1cm (Fig. 1.6).

Eels captured during the 2011 survey ranged in length from 46.0cm to 48.0cm (mean = 47.0cm). Eels captured during the 2008 survey had lengths ranging from 30.6cm to 54.2cm. Minnow captured during the 2011 survey ranged in length from 6.0cm to 7.5cm and one sea trout was recorded at 28.2cm.

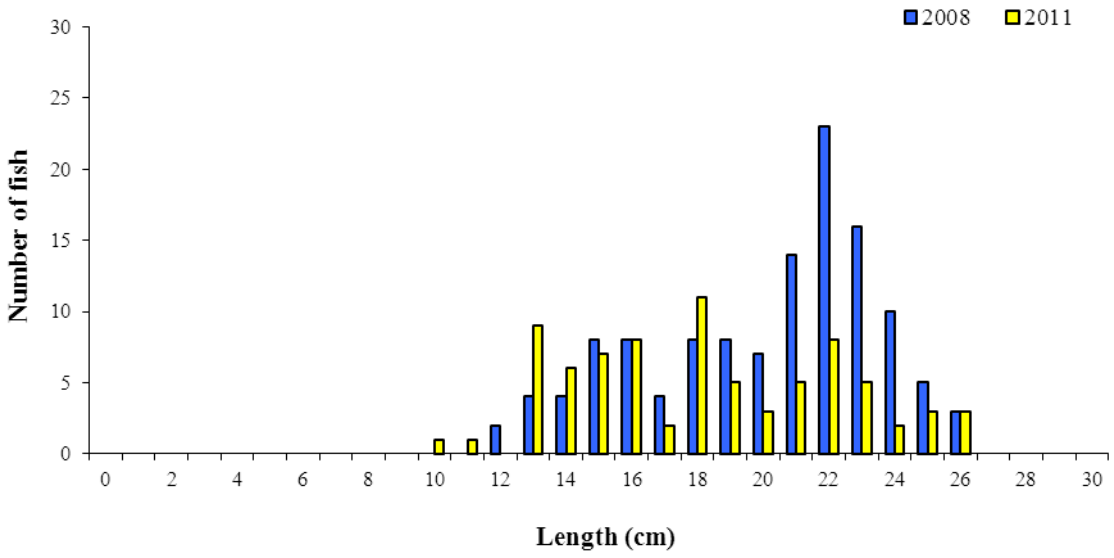

Fig. 1.6. Length frequency of brown trout captured on Lough Brin, 2008 and 2011

1.3.4 Fish age and growth

Four age classes of brown trout were present, ranging from 1+ to 4+, with a mean L1 of 5.4cm (Table 1.3). In the 2008 survey, brown trout also ranged from 1+ to 4+ with a mean L1 of 6.1cm. Mean brown trout L4 in 2011 was 23.3cm indicating a very slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971).

Table 1.3. Mean (±SE) brown trout length (cm) at age for Lough Brin, September 2011

	L_1	L_2	L_3	L_4
Mean	5.4 (0.1)	14.2 (0.6)	19.0 (0.6)	23.3 (1.1)
N	59	44	14	3
Range	3.2-9.2	7.3-21.5	14.5-23.1	21.6-25.4

1.4 Summary

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

The mean perch CPUE and BPUE in Lough Brin was slightly lower in 2011 than in 2008, however this difference was not statistically significant. The mean brown trout CPUE and BPUE in the lake was similar to the other low alkalinity lakes assessed during 2011, with no statistically significant differences being found between lakes. Brown trout ranged in age from 1+ to 4+, indicating reproductive success in four of the previous five years. Length at age analyses revealed that brown trout in the lake exhibit a very slow rate of growth according to the classification scheme of Kennedy and Fitzmaurice (1971).

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 (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 Brin has been assigned an ecological status of Good based on the fish

populations present in 2011. The ecological status assigned to the lake based on the 2008 survey data was High.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Brin an overall ecological status of Good, 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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