IFI/2015/1-4283

Sampling Fish for the Water Framework Directive

Lakes 2014

Lough Brin

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INLAND FISHERIES IRELAND

Water Framework Directive Fish Stock Survey of Lough Brin, September 2014

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CITATION: Kelly, F.L., Connor, L., Morrissey, E., Coyne, J., Feeney, R., Matson, R. and Rocks, K. (2015e) Water Framework Directive Fish Stock Survey of Lough Brin, September 2014. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

Cover photo: Netting survey on Lough Brin © 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 2014.

We would also like to thank Ms. Ruth Hanniffy for the photographs.

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 is categorised as 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 Inland Fisheries Ireland (previously the Central Fisheries Board and South Western Regional Fisheries Board) in July 1995 (CFB, unpublished data).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 receives a run of spring salmon and sea trout.

Lough Brin was also previously surveyed in 2008 and 2011 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009 and Kelly *et al*., 2012a). During the 2011 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.

This report summarises the results of the 2014 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

Plate 1.1. Lough Brin

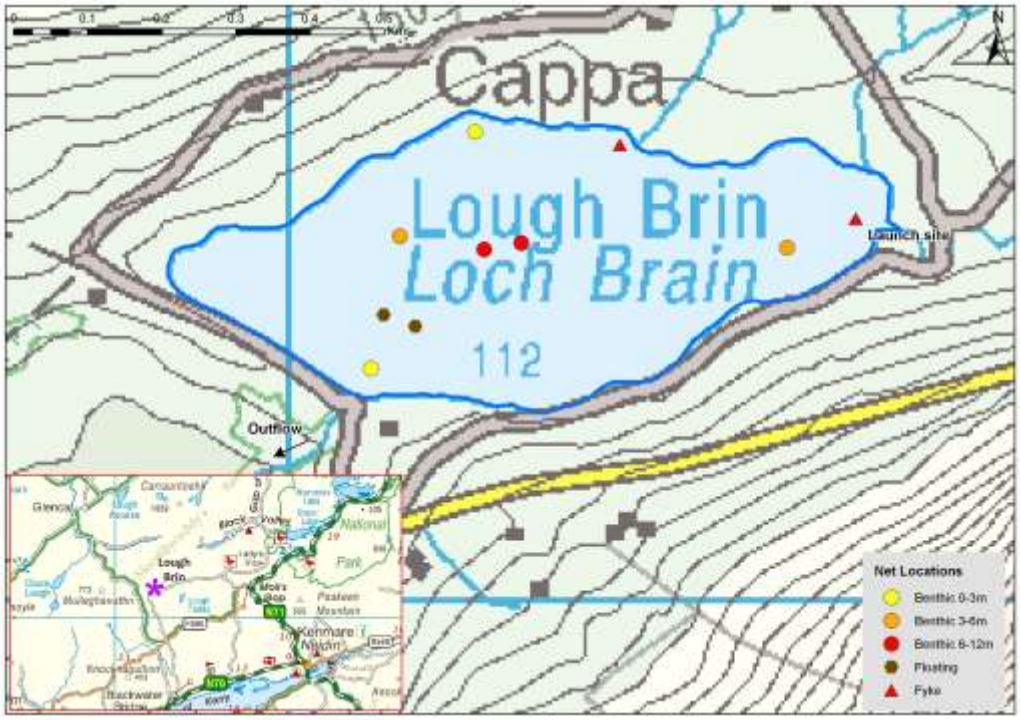

Fig. 1.1 Location map of Lough Brin showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Brin was surveyed over one night from the 9th to the 10th of September 2014. 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 surveys in 2008 and 2011. 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 2014, with 121 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 minnow, eels and sea trout. During the previous surveys in 2008 and 2011 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 2014

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	65	4	4	73
Phoxinus phoxinus	Minnow	40	2	0	42
Salmo trutta	Sea trout	1	0	0	1
Anguilla anguilla	European eel	0	0	5	5

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 2008, 2011 and 2014 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figures 1.2 and 1.3.

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated slightly over the three sampling years, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Brin, 2008, 2011 and 2014

Scientific name	Common name	2008	2011	2014
			Mean CPUE	
Salmo trutta	Brown trout	0.385 (0.066)	0.241 (0.06)	0.236 (0.073)
Phoxinus phoxinus	Minnow	0.117 (0.061)	0.007 (0.007)	0.140 (0.67)
Salmo trutta	Sea trout	0.007 (0.004)	0.003 (0.003)	0.003 (0.003)
Anguilla anguilla	European eel	0.191 (0.041)	0.0166	0.058 (0.025)
			Mean BPUE	
Salmo trutta	Brown trout	39.003 (7.975)	20.618 (5.524)	23.752 (7.551)
Phoxinus phoxinus	Minnow	0.48 (0.275)	0.02 (0.02)	0.332 (0.158)
Salmo trutta	Sea trout	1.013 (0.705)	0.873 (0.873)	1.036 (1.036)
Anguilla anguilla	European eel	33.458 (5.958)	3.9 (0.1)	7.358 (0.808)

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.

*Eel CPUE and BPUE based on fyke nets only

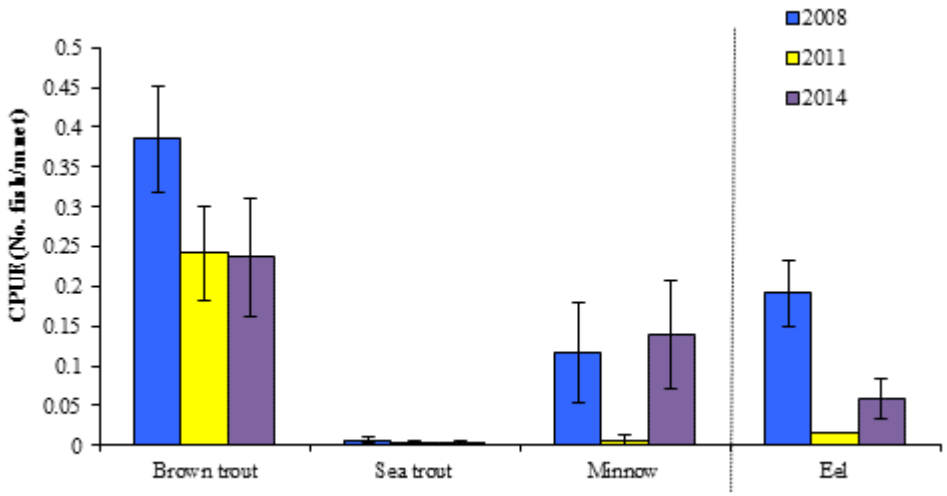

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Brin (Eel CPUE based on fyke nets only), 2008, 2011 and 2014

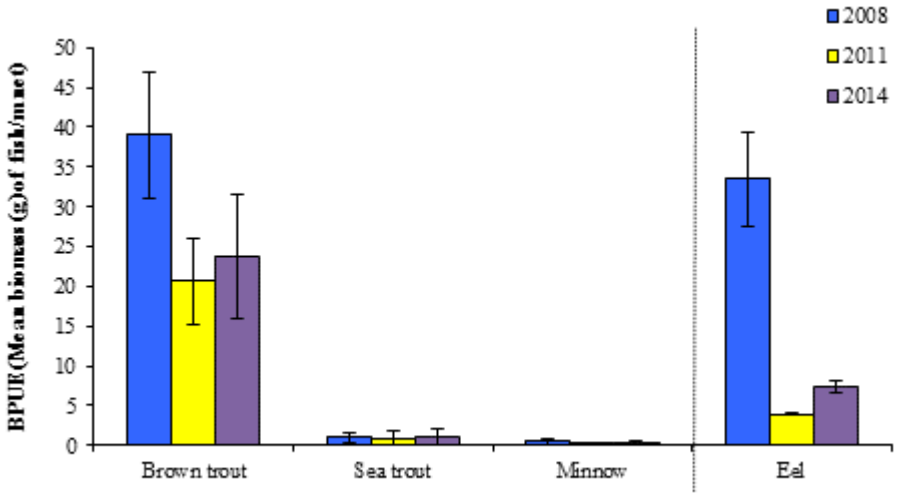

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Brin (Eel BPUE based on fyke nets only), 2008, 2011 and 2014

1.3.3 Length frequency distributions and growth

Brown trout captured during the 2014 survey ranged in length from 12.3cm to 28.9cm (mean = 20.2cm) (Fig. 1.4). Five age classes were present, ranging from 1+ to 5+, with a mean L1 of 5.4 cm (Table 1.3). The dominant age class was 3+ (Fig. 1.4). Mean brown trout L4 in 2013 was 20.5cm 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). Brown trout captured during the 2008 and 2011 surveys had a similar length range, age range and growth rate to the 2014 survey (Fig. 1.4).

Minnow captured during the 2014 survey ranged in length from 4.5cm to 7.2cm and eels ranged from 41.3cm to 56.2cm. One sea trout measuring 29.8cm were also recorded and was aged at 3.0+.

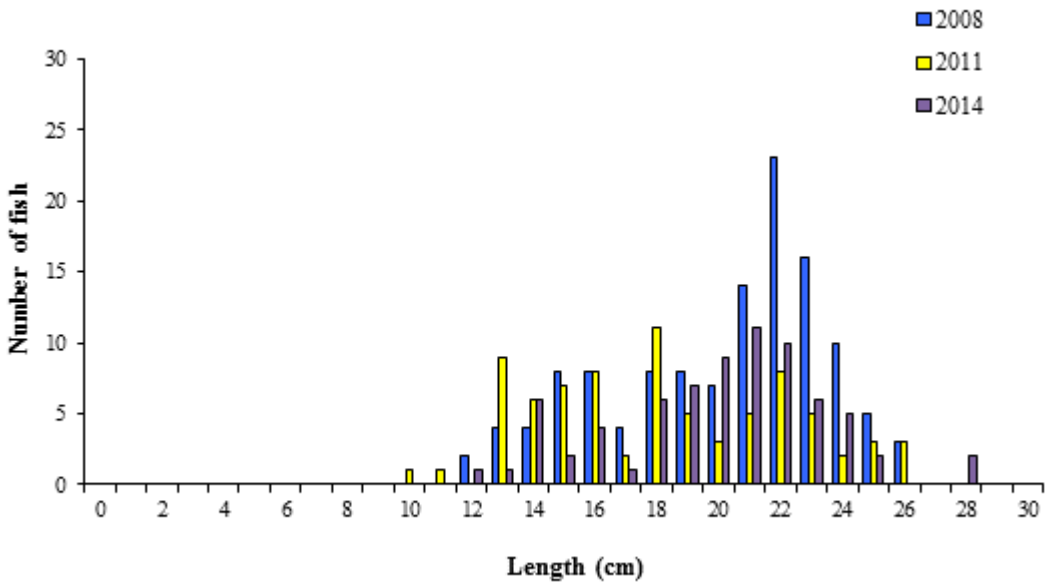

Fig. 1.4. Length frequency of brown trout captured on Lough Brin, 2008, 2011 and 2014

Table 1.3. Mean (±SE) brown trout length (cm) at age for Lough Brin, September 2014

	L_1	L_2	L_3	L_4	L_5	Growth Category
Mean	5.4 (0.2)	11.4 (0.4)	17.3 (0.4)	20.5 (0.6)	23.4 (1.9)	Very slow
N	70	64	50	18	3	
Range	2.2-9.1	55.5-18.6	12.5-21.9	16.8-26.6	20.4-26.9	

1.4 Summary

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2014 survey.

Although the mean brown trout CPUE and BPUE fluctuated slightly over the three sampling years, these differences were not statistically significant. Brown trout ranged in age from 1+ to 5+, indicating reproductive success in five of the previous years. The dominant age class was 3+. 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*., 2012b). Using the FIL2 classification tool, Lough Brin has been assigned an ecological status of High for both 2008 and 2014 and Good in 2011 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Lough Brin an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish.

1.5 References

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