National Research Survey Programme

Lakes 2017

Lough Brin

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Inland Fisheries Ireland

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Fish Stock Survey of Lough Brin, September 2017

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

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

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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Ireland (previously the Central Fisheries Board and South Western Regional Fisheries Board) in July 1995 (CFB, unpublished data).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, 2011 and 2014 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009, 2012a, 2015a and 2015b). During the 2014 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 2017 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

Plate 1.1. Lough Brin

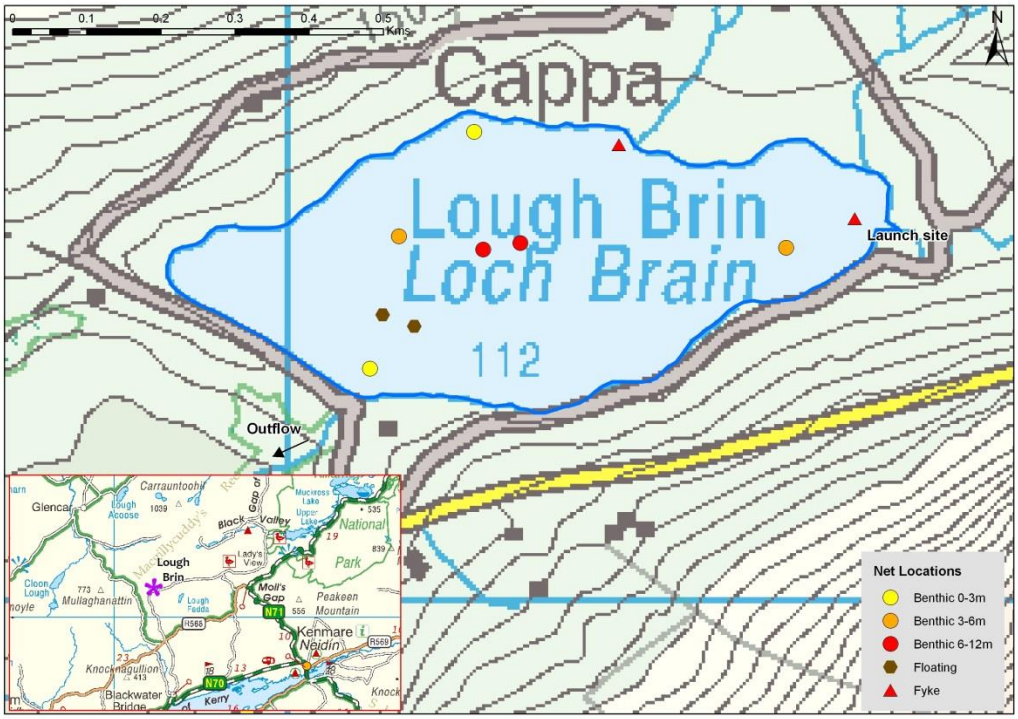

Fig. 1.1 Location map of Lough Brin showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

1.2.1 Netting methods

Lough Brin was surveyed over one night from the 4th to the 5th of September 2017. 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 (BM CEN) (2 @ 0-2.9m, 2 @ 3-5.9m and 2 @ 6-11.9m) and two floating monofilament multi-mesh (FM CEN) (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. 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. 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 three fish species were recorded on Lough Brin in September 2017, with 115 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most common fish species recorded, followed by minnow and eels. During the previous surveys in 2008, 2011 and 2014 the same species composition was recorded with the exception of sea trout which were not recorded in 2017 (Kelly *et al*., 2009, 2012a, 2015a and 2015b).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Brin, September 2017

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
Salmo trutta	Brown trout	82	9	9	100
Phoxinus phoxinus	Minnow	10	0	0	10
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, 2014 and 2017 surveys are summarised in Table 1.2 and illustrated in Figures 1.2 and 1.3.

Brown trout

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 four sampling occasions, 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, 2014 and 2017

Scientific name	Common name	2008	2011	2014	2017
			Mean CPUE (±S.E.)		
Salmo trutta	Brown trout	0.385 (0.066)	0.241 (0.06)	0.236 (0.073)	0.318 (0.088)
Phoxinus phoxinus	Minnow	0.117 (0.061)	0.007 (0.007)	0.140 (0.67)	0.033 (0.023)
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)	0.042 (0.008)
			Mean BPUE (±S.E.)		
Salmo trutta	Brown trout	39.003 (7.975)	20.618 (5.524)	23.752 (7.551)	28.242 (9.521)
Phoxinus phoxinus	Minnow	0.48 (0.275)	0.02 (0.02)	0.332 (0.158)	0.063 (0.045)
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)	11.383 (6.017)

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

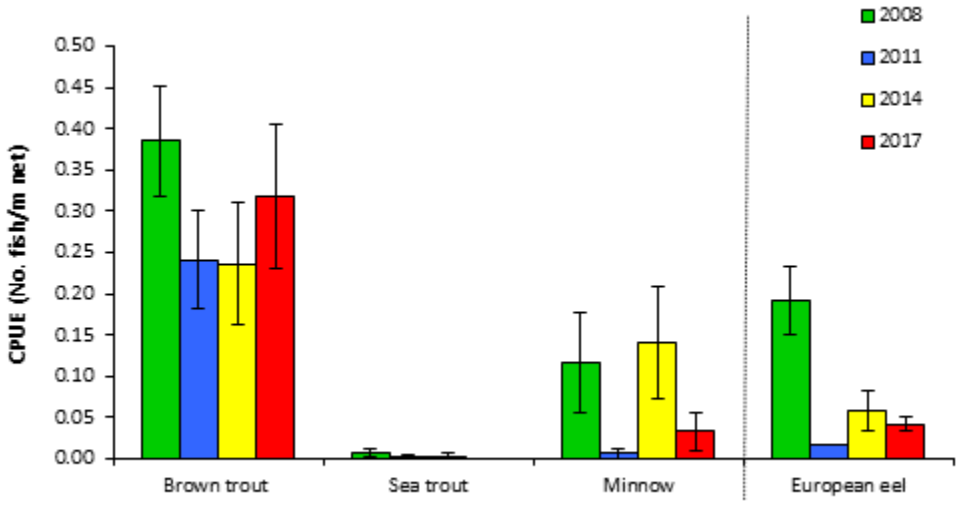

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Brin (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2017

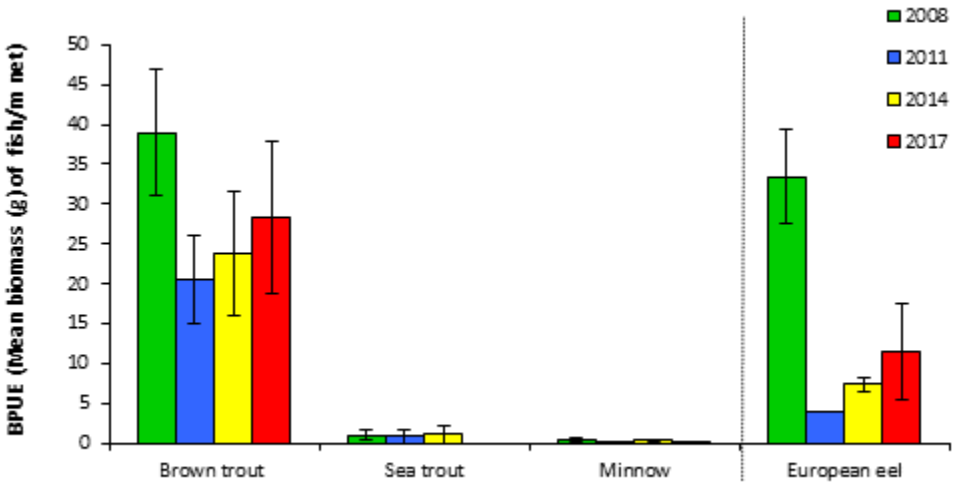

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Brin (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2017

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2017 survey ranged in length from 7.1cm to 25.5cm (mean = 19.4cm) (Fig. 1.4). Three age classes were present, ranging from 1+ to 3+, with a mean L1 of 6.3cm (Table 1.3). The dominant age class was 2+ (Fig. 1.4). Brown trout captured during the 2008, 2011 and 2014 surveys had similar length and age ranges, with some smaller fish recorded in the 2011 and 2017 surveys (Fig.1.4).

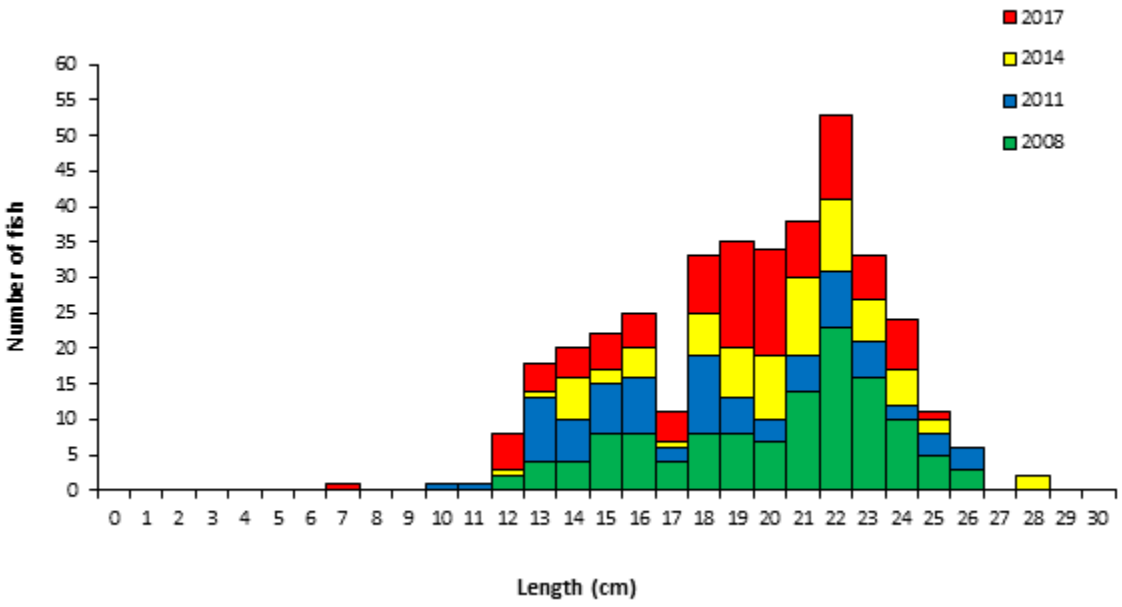

Fig. 1.4. Length frequency of brown trout captured on Lough Brin, 2008, 2011, 2014 and 2017

Table 1.3. Mean (±S.E.) brown trout length (cm) at age for Lough Brin, September 2017

	L_1	L_2	L_3
Mean (±S.E.)	6.3 (0.2)	14.6 (0.5)	19.7 (0.8)
N	41	31	4
Range	3.9-9.6	7.9-19.2	18.8-22.1

Other fish species

Eels captured during the 2017 survey ranged in length from 43.2cm to 68.7cm. Minnow ranged in length from 5.3cm to 6.8cm.

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 54 stomachs were examined. Of these 24 were found to contain no prey items. Of the remaining 30 stomachs containing food, 40% contained invertebrates, 27% zooplankton, 13% unidentified digested material, 13% zooplankton/invertebrates and 7% fish (Fig. 1.5).

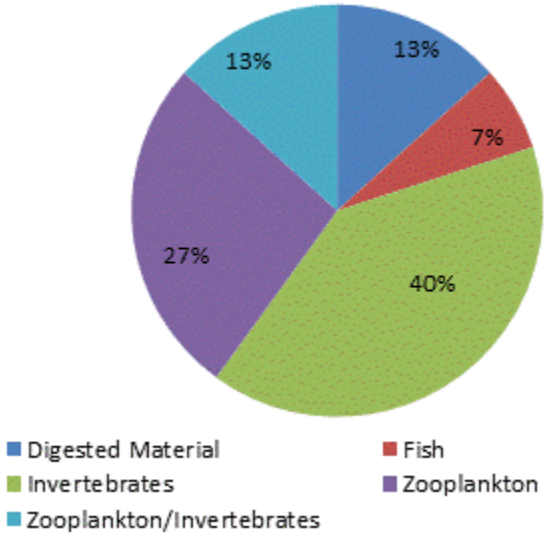

Fig 1.5. Diet of brown trout (n=30) captured on Lough Brin, 2017 (% FO)

1.4 Summary and ecological status

A total of three fish species were recorded in Lough Brin in September 2017. Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2017 survey.

Although the mean brown trout CPUE and BPUE fluctuated slightly over the four sampling occasions, these differences were not statistically significant. Brown trout ranged in age from 1+ to 3+, indicating reproductive success in the previous three out of previous four years. The dominant age class was 2+.

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*., 2012b). Using the FIL2 classification tool, Lough Brin has been assigned an ecological status of Good for 2017 based on the fish populations present. In previous years the lake was assigned a fish status of High in 2008/2014 and Good in 2011.

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

1.5 References

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