National Research Survey Programme

Lakes 2017

Lough Easky

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Iascach Intíre Éireann
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Fish Stock Survey of Lough Easky, August 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 Easky is located in the Ox Mountains, south of Dromore West, Co. Sligo (Plate 1.1 and Fig. 1.1). The lake has a surface area of 119ha, a mean depth of 3m and a maximum depth of 13m. The lake is categorised as typology class 2 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), greater than 50ha and low alkalinity (<20mg/l $CaCO_3$).

Lough Easky forms part of the Ox Mountain Bogs Special Area of Conservation. Several oligotrophic lakes occur within the SAC, the largest of which is Lough Easky. Lough Easky is a stony-bottomed lake which supports aquatic vegetation typical of such oligotrophic lakes e.g. shoreweed (*Littorella uniflora*), quillwort (*Isoetes* sp.), bulbous rush (*Juncus bulbosus*), water lobelia (*Lobelia dortmanna*), common spike-rush (*Eleocharis palustris*), water horsetail (*Equisetum fluviatile*), sharp-flowered rush (*Juncus acutiflorus*) and bog pondweed (*Potamogeton polygonifolius*) (NPWS, 1997). Lough Easky historically contained brown trout, sea trout, salmon and Arctic char (O' Reilly, 1998).

In the first half of 2008 a small landslide was observed on the eastern shore of the lake due to high levels of rainfall. It resulted in the accumulation of silt and debris on the shore of the lake (Collins, P. *pers. comm*.).

The lake was surveyed to assess its fish stocks in 1986 and 1991 by Inland Fisheries Ireland (previously the Central Fisheries Board and the North Western Regional Fisheries Board) (IFI, unpublished data). Brown trout was the dominant fish species recorded during both surveys; however, Arctic char were recorded in the latter survey (IFI, unpublished data). A survey in 2004 on Lough Easky, carried out by the Irish Char Conservation Group, found no record of Arctic char in the lake even though the species was recorded in the 1991 survey (Neylon, *pers. comm*.).

Lough Easky 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. Eels and salmon 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 Easky

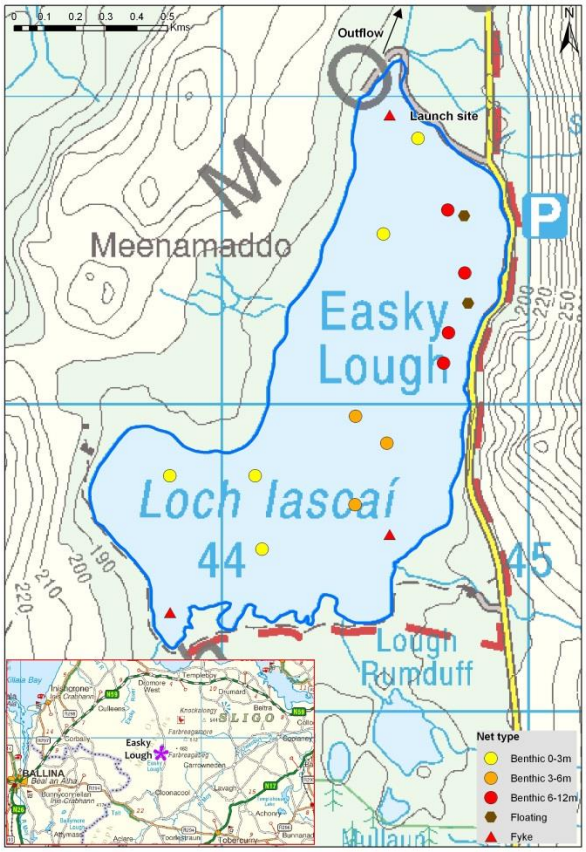

Fig. 1.1 Location map of Lough Easky showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

1.2.1 Netting methods

Lough Easky was surveyed over one night on the 30th August 2017. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets (5 @ 0-2.9m, 3 @ 3-5.9m and 4 @ 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 (17 sites) (Fig. 1.1). 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 salmon. 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 Easky in August 2017, with 261 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, salmon and eels were also recorded during the survey. During the previous surveys in 2008, 2011 and 2014 the same species composition was recorded, with the exception of salmon which were not recorded in the 2008 survey (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 Easky, August 2017

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
Salmo trutta	Brown trout	211	33	9	253
Salmo salar	Salmon	1	0	0	1
Anguilla anguilla	European eel	0	0	7	7

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 survey 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 Easky, 2008, 2011, 2014 and 2017

Scientific name	Common name	2008	2011	2014	2017
			Mean CPUE (±S.E.)		
Salmo trutta	Brown trout	0.274 (0.07)	0.296 (0.082)	0.528 (0.127)	0.487 (0.109)
Salmo salar	Salmon	-	0.002 (0.002)	0.005 (0.003)	0.002 (0.002)
Anguilla anguilla	European eel*	0.066 (0.034)	0.083 (0.033)	0.044 (0.005)	0.039 (0.024)
			Mean BPUE (±S.E.)		
Salmo trutta	Brown trout	16.411 (4.341)	24.506 (6.892)	33.428 (8.391)	30.472 (6.948)
Salmo salar	Salmon	-	0.018 (0.018)	0.132 (0.073)	0.013 (0.013)
Anguilla anguilla	European eel*	27.016 (16.768)	14.179 (3.531)	8.675 (3.756)	9.304 (6.316)

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

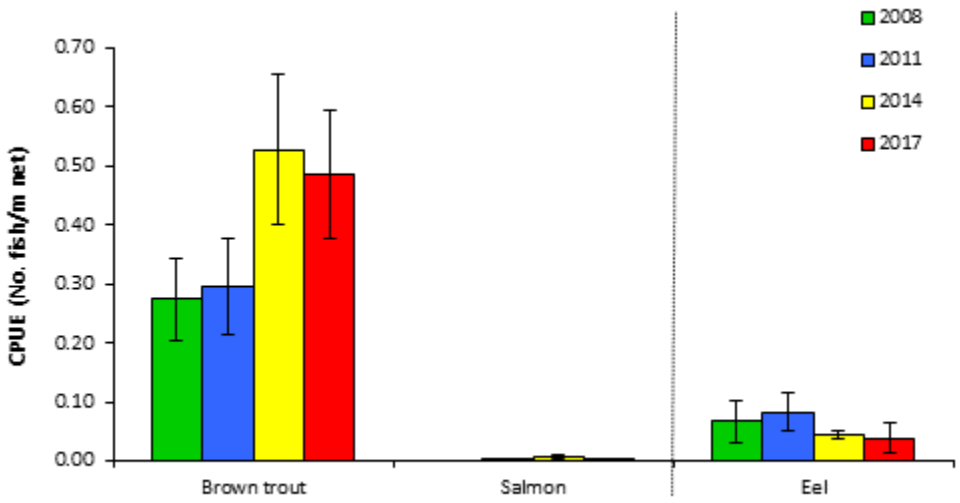

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Easky (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2017

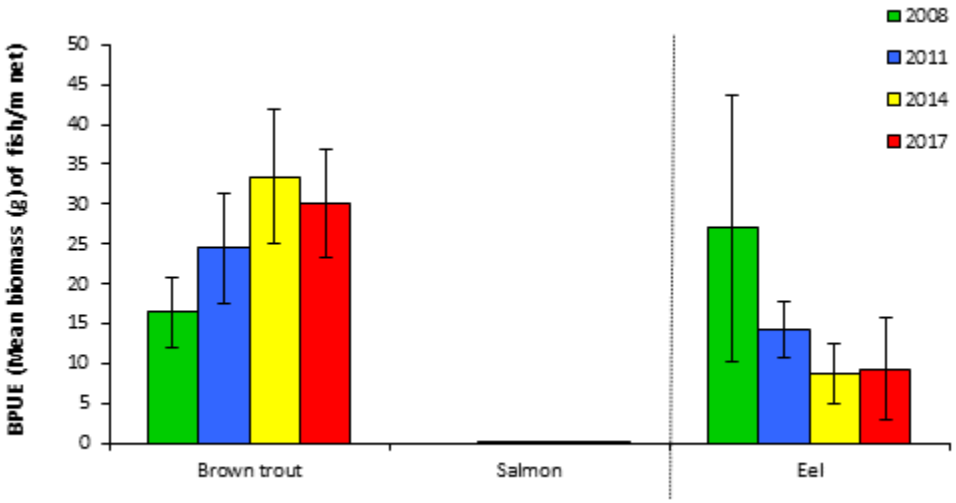

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Easky (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2017

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2017 survey ranged in length from 6.7cm to 25.1cm (mean = 16.6cm) (Fig. 1.4). Four age classes were present, ranging from 0+ to 3+, with a mean L1 of 7.1cm (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 (Fig.1.4).

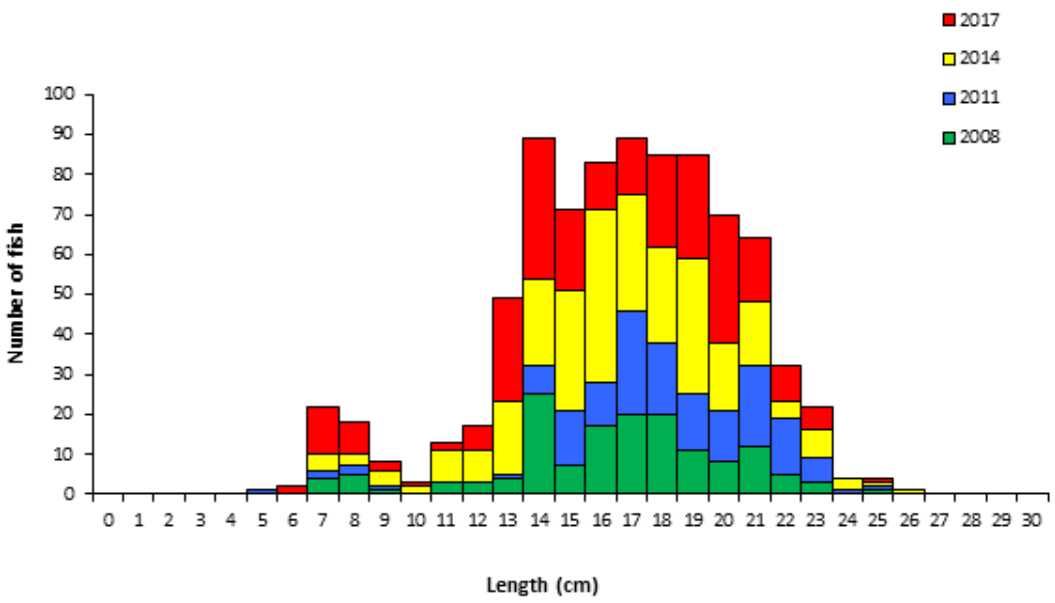

Fig. 1.4. Length frequency of brown trout captured on Lough Easky, 2008, 2011, 2014 and 2017

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

	L_1	L_2	L_3
Mean (±S.E.)	7.1 (0.3)	14.5 (0.5)	19.3 (0.9)
N	35	27	5
Range	3.8-11.0	8.3-18.1	16.7-22.0

Other fish species

Eels captured during the 2017 survey ranged in length from 33.0cm to 82.0cm. One juvenile salmon was captured and measured at 8.1cm.

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 68 stomachs were examined. Of these 21 were found to contain no prey items. Of the remaining 47 stomachs containing food, 45% contained invertebrates, 19% zooplankton, 13% invertebrates/zooplankton, 13% invertebrates/digested material and 10% unidentified digested material (Fig. 1.5).

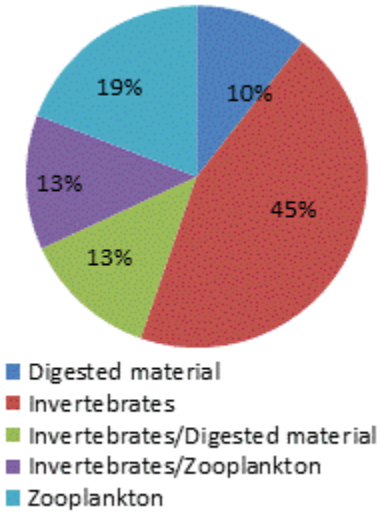

Fig 1.5. Diet of brown trout (n=47) captured on Lough Easky, 2017 (% FO)

1.4 Summary and ecological status

A total of three fish species were recorded in Lough Easky in August 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 0+ to 3+, indicating reproductive success in each of the 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 Easky has been assigned an ecological status of Good for 2017 based on the fish populations present. In previous years the lake also assigned a fish status of High in 2008 and Good in 2011 and 2014.

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

1.5 References

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