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Sampling Fish for the Water Framework Directive

Lakes 2014

Lough Easky

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INLAND FISHERIES IRELAND

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

Fiona L. Kelly, Lynda Connor, Emma Morrissey, John Coyne, Rory Feeney, Ronan Matson and Kieran Rocks

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

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Cover photo: Netting survey on Lough Brin © 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 previously 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Inland Fisheries Ireland (previously the Central Fisheries Board and the North Western Regional Fisheries Board) (IFI, unpublished data).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the dominant fish species recorded during both surveys; however, Arctic char were recorded in the latter survey (IFI, unpublished data).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 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 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. Eels and salmon 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 Easky

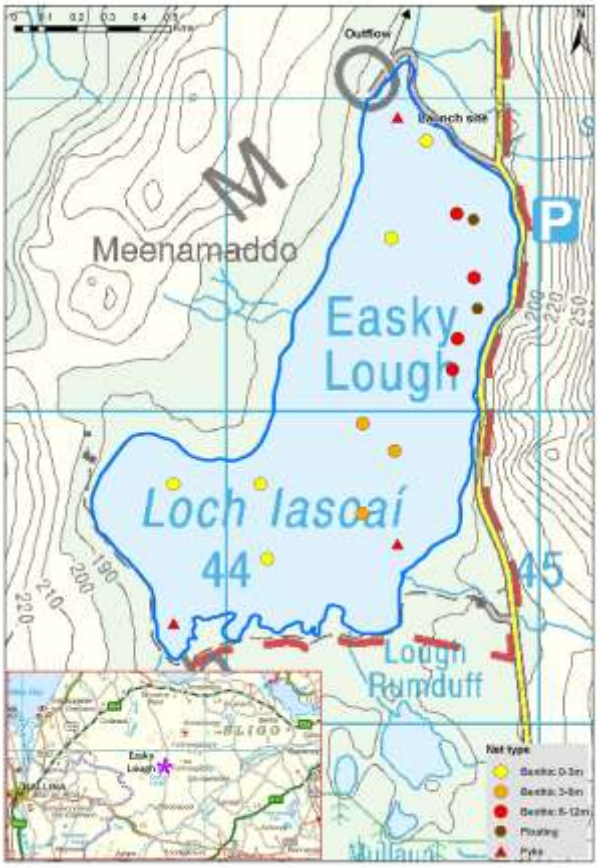

Fig. 1.1 Location map of Lough Easky showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Easky was surveyed over two nights between the 24th and the 26th of September 2014. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (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 (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (17 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 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.

1.3 Results

1.3.1 Species Richness

A total of three fish species were recorded on Lough Easky in September 2014, with 289 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 eels and salmon. During the previous surveys in 2008 and 2011 the same species composition was recorded with the exception of salmon, which were not captured during the 2008 survey but were recorded during the 2011 and 2014 surveys.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Easky, 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	249	12	17	278
Salmo salar	Salmon	3	0	0	3
Anguilla anguilla	European eel	0	0	8	8

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 Figure 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 increased 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 Easky, 2008, 2011 and 2014

Scientific name	Common name	2008	2011	2014
			Mean CPUE	
Salmo trutta	Brown trout	0.274 (0.07)	0.296 (0.082)	0.528 (0.127)
Salmo salar	Salmon	-	0.002 (0.002)	0.005 (0.003)
Anguilla anguilla	European eel	0.066 (0.034)	0.083 (0.033)	0.044 (0.005)
			Mean BPUE	
Salmo trutta	Brown trout	16.411 (4.341)	24.506 (6.892)	33.428 (8.391)
Salmo salar	Salmon	-	0.018 (0.018)	0.132 (0.073)
Anguilla anguilla	European eel	27.016 (16.768)	14.179 (3.531)	8.675 (3.756)

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

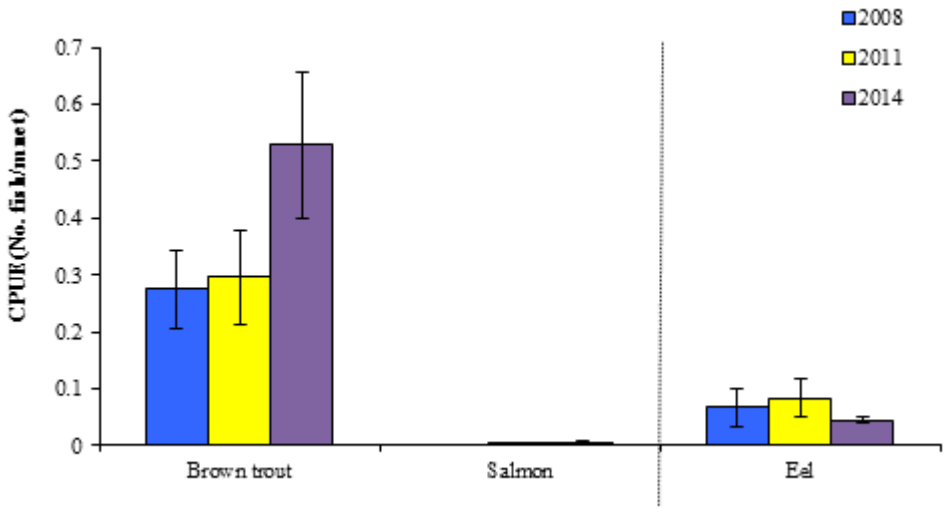

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Easky (Eel CPUE based on fyke nets only), 2008, 2011 and 2014

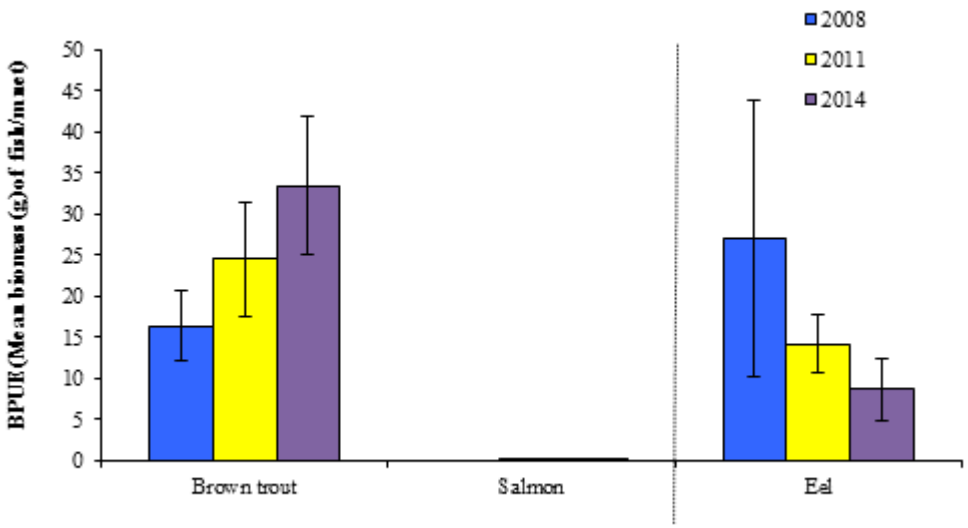

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Easky (Eel BPUE based on fyke nets only), 2008, 2011 and 2014

1.3.3 Length frequency distributions and growth

Brown trout captured during the 2014 survey ranged in length from 7.0cm to 26.8cm (mean = 16.9cm) (Fig. 1.4) with five age classes present, ranging from 0+ to 4+, with a mean L1 of 6.3cm (Table 1.3). The dominant age class was 2+ (Fig. 1.4). Mean brown trout L4 in 2014 was 23.2cm 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 similar length ranges (Fig. 1.4) and had a similar age range and growth rate to the 2014 survey.

Eels captured during the 2014 survey ranged in length from 34.5cm to 68.9cm and three juvenile salmon captured were aged 1+ and ranged in length from 11.0cm to 14.0cm.

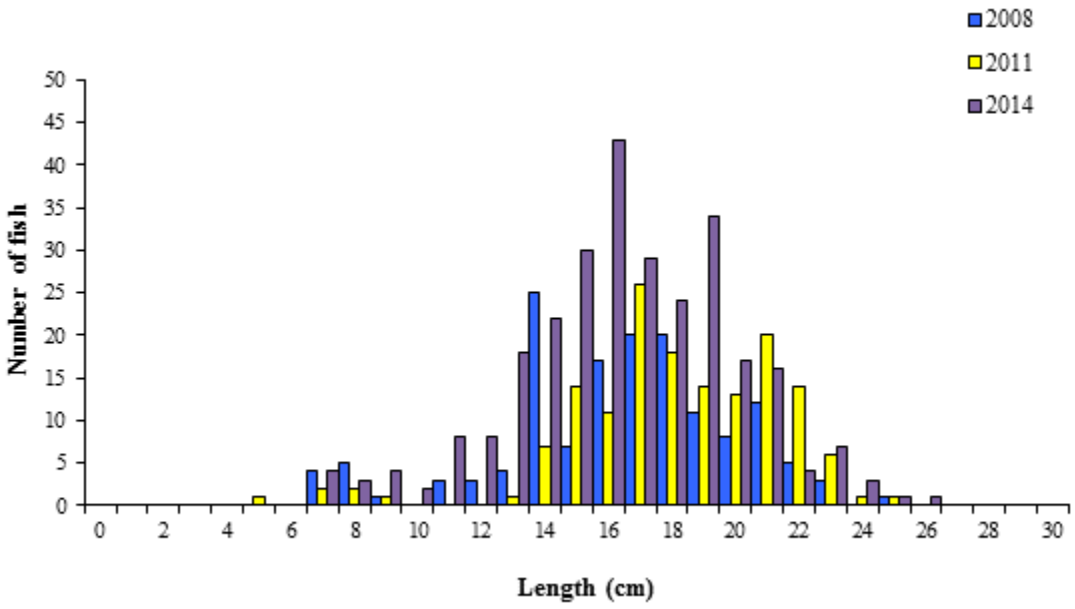

Fig. 1.4. Length frequency of brown trout captured on Lough Easky, 2008, 2011 and 2014

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

	L_1	L_2	L_3	L_4	Growth Category
Mean	6.3 (0.3)	14.7 (0.4)	20.3 (0.5)	23.2 (0.6)	Very slow
N	43	32	10	2	
Range	2.3-9.9	9.0-18.2	18.1-22.1	22.6-23.8	

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 increased over the three sampling years, these differences were not statistically significant. Brown trout ranged in age from 0+ to 4+, indicating reproductive success in the previous five years. The dominant age class was 2+. 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 Easky has been assigned an ecological status of High in 2008 and Good for both 2011 and 2014 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Lough Easky 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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IFI Dublin,
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland

www.fisheriesireland.ie
dublin@fisheriesireland.ie
+353 1 8842 600