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Sampling Fish for the Water Framework Directive

Lakes 2014

Lough Meelagh

IASCACH INTÍRE ÉIREANN
INLAND FISHERIES IRELAND

Water Framework Directive Fish Stock Survey of Lough Meelagh, August 2014

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

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1.1 Introduction

Lough Meelagh is located west of Keadew, Co. Roscommon (Plate 1.1, Fig. 1.1). The lake has a surface area of 116ha and a maximum depth of 14m. The lake is categorised as typology class 6 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), greater than 50ha and moderate alkalinity (<20mg/l $CaCO_3$). Much of the lake is inaccessible due to the presence of extensive reed beds. However, extensive development of the launch site and the building of two angling stands have been completed by the Keadew Development Association.

Lough Meelagh was previously surveyed in 1981 by the Inland Fisheries Trust and in 2000 by Inland Fisheries Ireland (previously the Central Fisheries Board). In the 1981 survey the proportion of the catch composed of roach was 3%. In the 2000 survey, this figure had risen dramatically to 66%. The greatest component of the 1981 catch was made up of pike (65%), which only comprised 8% of the fish population in the latter survey. The trout component of the catch dropped from 8% to 0.5%, while the percentage of perch remained relatively constant at 24% (1981) and 25% (2000) (IFI, unpublished data).

More recently Lough Meelagh was 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, perch were found to be the dominant species present in the lake, followed by roach. Tench, pike, roach x bream hybrids 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 Meelagh

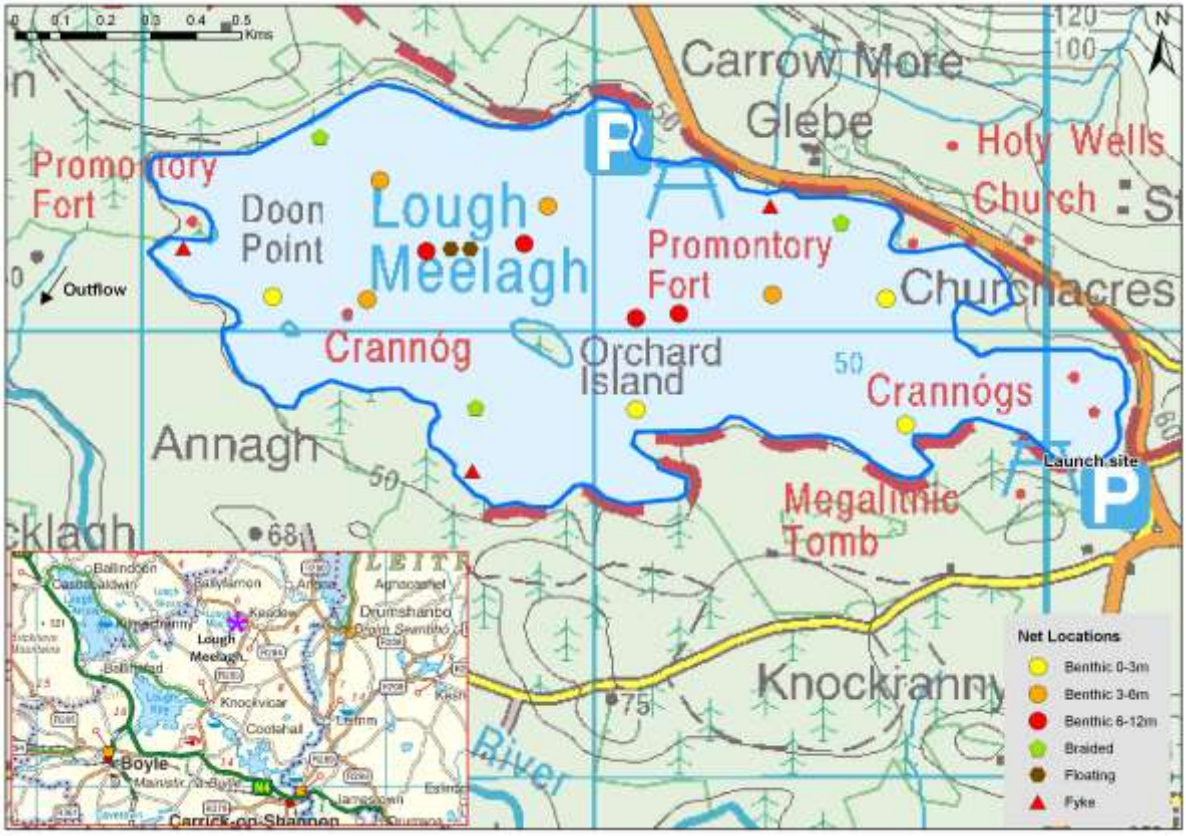

Fig. 1.1 Location map of Lough Meelagh showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Meelagh was surveyed over two nights between the 25th and the 27th of August 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 (4 @ 0-2.9m, 4 @ 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). The netting effort was supplemented using three benthic braided survey gill nets (62.5mm mesh knot to knot) at three additional 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 apart from perch were measured and weighed on site and scales were removed from all roach, pike, bream and hybrids. 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 five fish species and one type of hybrid were recorded on Lough Meelagh in August 2014, with 440 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Perch was the most abundant fish species recorded, followed by roach, roach x bream hybrids, pike, eels and bream. During the previous surveys in 2008 and 2011 the same species composition was recorded with the exception of brown trout and roach x rudd hybrids, which were only recorded in the 2008 survey, tench which were not captured during the 2014 survey but were recorded during the 2008 and 2011 surveys and bream which were not captured during the 2011 survey but were recorded during the 2008 and 2014 surveys.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Meelagh, August 2014

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	206	0	0	2	208
Rutilus rutilus	Roach	163	4	1	0	168
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	33	0	9	0	42
Esox lucius	Pike	12	0	1	2	15
Anguilla anguilla	Eel	0	0	0	6	6
Abramis brama	Bream	1	0	0	0	1

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.

Perch was the dominant species in terms of abundance (CPUE) and roach x bream hybrids were the dominant species in terms of biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated between the three sampling years, these differences were not statistically significant (Table

1.2; Fig 1.2 and 1.3). The mean roach CPUE and BPUE decreased over time from 2008 to 2014; however, these differences were also 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 Meelagh, 2008, 2011 and 2014

Scientific name	Common name	2008	2011	2014
			Mean CPUE	
Salmo trutta	Brown trout	0.001 (0.001)	-	-
Perca fluviatilis	Perch	0.425 (0.089)	0.685 (0.167)	0.345 (0.087)
Rutilus rutilus	Roach	0.459 (0.086)	0.241 (0.052)	0.280 (0.066)
Esox lucius	Pike	0.028 (0.005)	0.009 (0.003)	0.023 (0.008)
Tinca tinca	Tench	0.003 (0.003)	0.003 (0.003)	-
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	0.021 (0.006)	0.053 (0.013)	0.071 (0.013)
Abramis brama	Bream	0.001 (0.001)	-	0.002 (0.002)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x rudd hybrid	0.01 (0.005)	-	-
Anguilla anguilla	Eel	0.144 (0.048)	0.016	0.033 (0.033)
			Mean BPUE	
Salmo trutta	Brown trout	0.013 (0.013)	-	-
Perca fluviatilis	Perch	8.921 (2.50)	26.192 (7.514)	9.761 (2.981)
Rutilus rutilus	Roach	68.235 (11.301)	54.332 (11.609)	31.825 (7.269)
Esox lucius	Pike	20.189 (6.928)	5.964 (3.250)	13.062 (4.924)
	Tench	2.592 (2.592)	5.171 (5.171)	-
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	19.329 (6.429)	17.105 (5.002)	39.706 (8.655)
Abramis brama	Bream	0.026 (0.026)	-	0.023 (0.023)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x rudd hybrid	2.768 (1.520)	-	
Anguilla anguilla	Eel	45.594 (18.06)	6.016 (0.659)	9.133 (9.133)

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

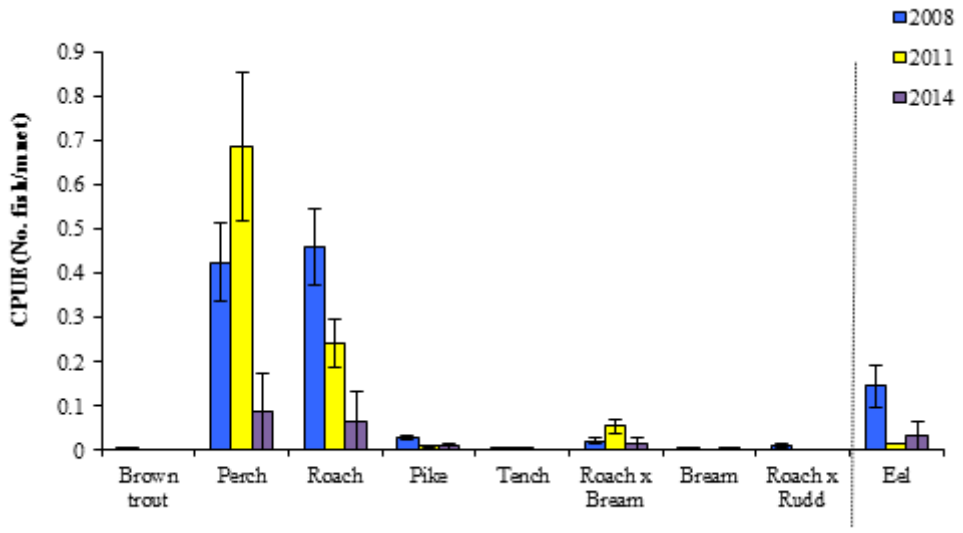

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Meelagh (Eel CPUE based on fyke nets only), 2008, 2011 and 2014

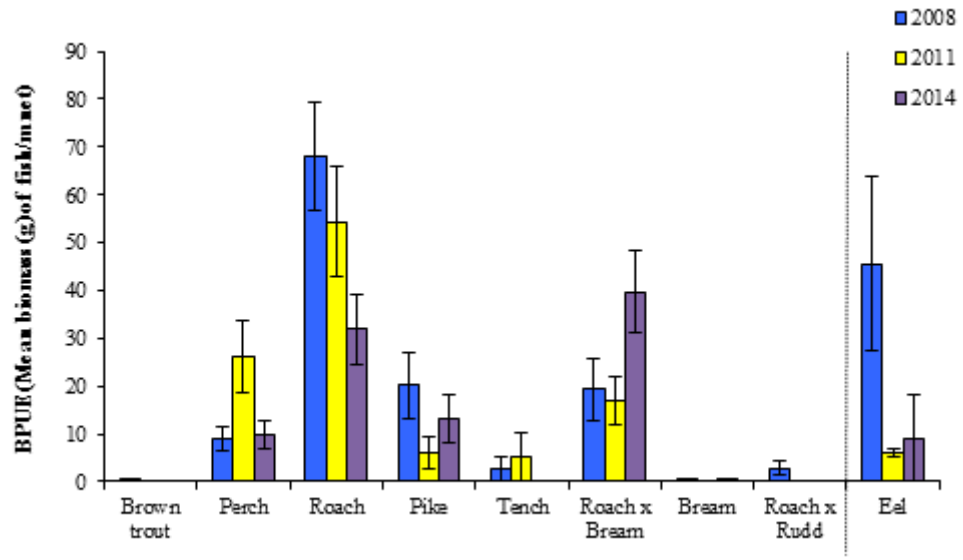

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Meelagh (Eel BPUE based on fyke nets only), 2008, 2011 and 2014

1.3.3 Length frequency distributions and growth

Perch captured during the 2014 survey ranged in length from 5.0cm to 27.3cm (mean = 9.7cm) (Fig. 1.4) with nine age classes present, ranging from 0+ to 9+, with a mean L1 of 5.6cm (Table 1.3). The dominant age class was 1+ (Fig. 1.4). Perch captured during the 2008 and 2011 surveys had a similar

length range with some larger fish captured in 2008 and 2014 (Fig. 1.4). Age ranges and growth rates were similar in the 2008 and the 2011 surveys (Fig. 1.4).

Roach captured during the 2014 survey ranged in length from 4.0cm to 31.8cm (mean = 15.6cm) (Fig.1.5) with ten age classes present, ranging from 0+ to 9+, with a mean L1 of 2.7cm (Table 1.4). The dominant age class was 2+ (Fig. 1.5). Roach captured during the 2008 and 2011 surveys had a similar length range, age range and growth rate to the 2014 survey (Fig.1.5).

Pike captured during the 2014 survey ranged in length from 17.3cm to 62.1cm and eels ranged from 44.5cm to 62.0cm. Roach x bream hybrids ranged in length from 7.9cm to 37.1cm and one bream measuring 10.2cm was also recorded.

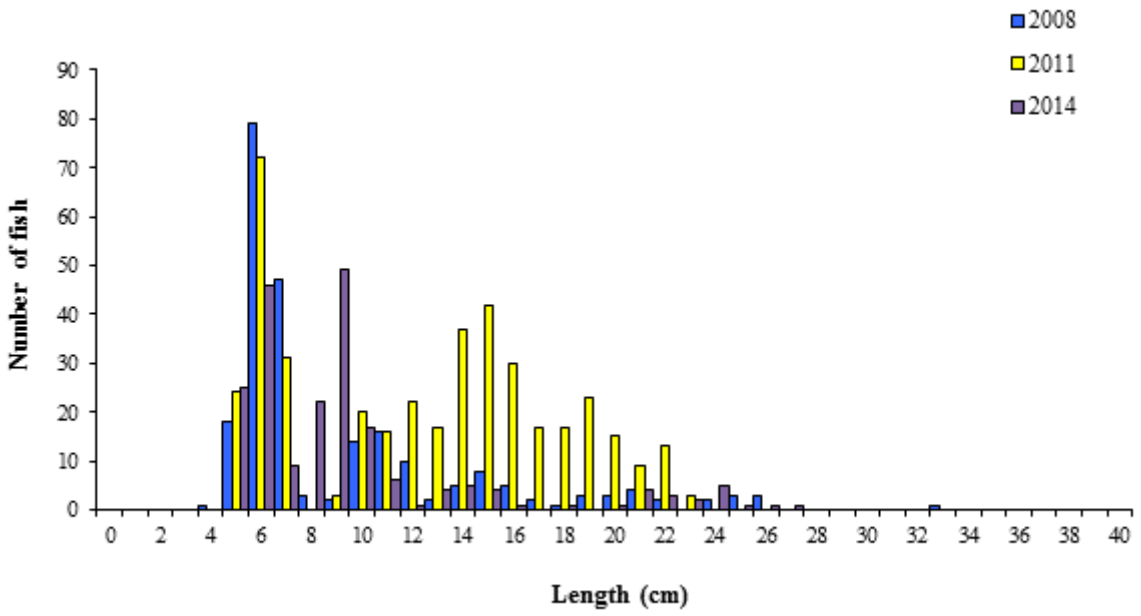

Fig. 1.4. Length frequency of perch captured on Lough Meelagh, 2008, 2011 and 2014

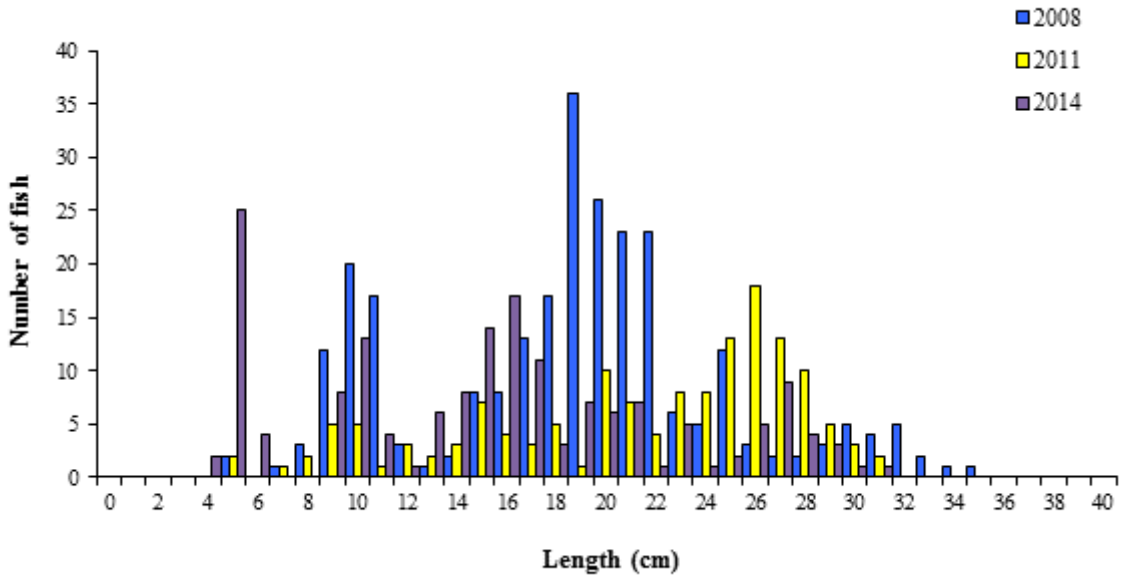

Fig. 1.5. Length frequency of roach captured on Lough Meelagh, 2008, 2011 and 2014

Table 1.3. Mean (±SE) perch length (cm) at age for Lough Meelagh, August 2014

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Mean	5.6 (0.2)	9.5 (0.3)	14.0 (0.4)	17.5 (0.5)	19.4 (0.6)	20.3 (0.8)	22.0 (1.0)	23.7 (1.0)	25.9
N	44	27	17	17	14	7	5	3	1
Range	4.0-9.2	7.9-14.4	12.4-18.1	14.4-22.6	15.2-23.8	17.4-22.5	19.6-24.5	21.8-25.2	25.9-25.9

Table 1.4. Mean (±SE) roach length (cm) at age for Lough Meelagh, August 2014

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Mean	2.7 (0.1)	7.2 (0.2)	12.7 (0.3)	17.4 (0.3)	21.4 (0.3)	24.5 (0.3)	26.3 (0.2)	28.5 (0.3)	31.0
N	64	56	37	24	19	14	11	6	1
Range	1.8-4.0	5.3-10.2	8.5-15.4	12.7-20.2	19.3-23.5	23.1-25.9	25.2-27.3	27.8-29.8	31.0-31.0

1.4 Summary

Perch was the dominant species in terms of abundance (CPUE) and roach x bream hybrids were dominant in terms of biomass (BPUE) captured in the survey gill nets during the 2014 survey.

Although the mean brown trout CPUE and BPUE fluctuated between the three sampling years, these differences were not statistically significant. Perch ranged in age from 0+ to 9+, indicating reproductive success in nine of the previous ten years, as no 3+ fish were recorded. The dominant age class was 1+.

The mean roach CPUE and BPUE decreased over time from 2008 to 2014; however, these differences were also not statistically significant. Roach ranged in age from 0+ to 9+, indicating reproductive success in each of the previous ten 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 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 Meelagh has been assigned an ecological status of Poor for 2008, 2011 and 2014 based on the fish populations present.

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

1.5 References

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