Lough Meelagh

Sampling Fish for the Water Framework Directive - Lakes 2008

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the CEO Mr. Eamon Cusack, the ACEO Mr. Sean Ryan and the staff of the Shannon Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and co-operation from all their colleagues in the Central Fisheries Board (CFB).

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2008.

1.1 Introduction

Lough Meelagh (Fig. 1.1) is located west of Keadew, Co. Roscommon. The lake has a surface area of 116ha and a maximum depth of 14m. The lake falls into 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 $CaCO_3$). Lough Meelagh historically holds stocks of pike, perch, roach and brown trout.

Much of the lake is inaccessible due to the presence of extensive reed beds. However, extensive development of the launch site at Lough Meelagh and the building of two angling stands have taken place, largely due to the Keadew Development Association. Lough Meelagh was previously surveyed in 1981 by the Inland Fisheries Trust and in 2000 by the Central Fisheries Board. In the 1981 survey the proportion of the catch made up by 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from 8% to 0.5%, while the percentage of perch h remained relatively constant at 24% (1981) and 25% (2000) (CFB, unpublished data).

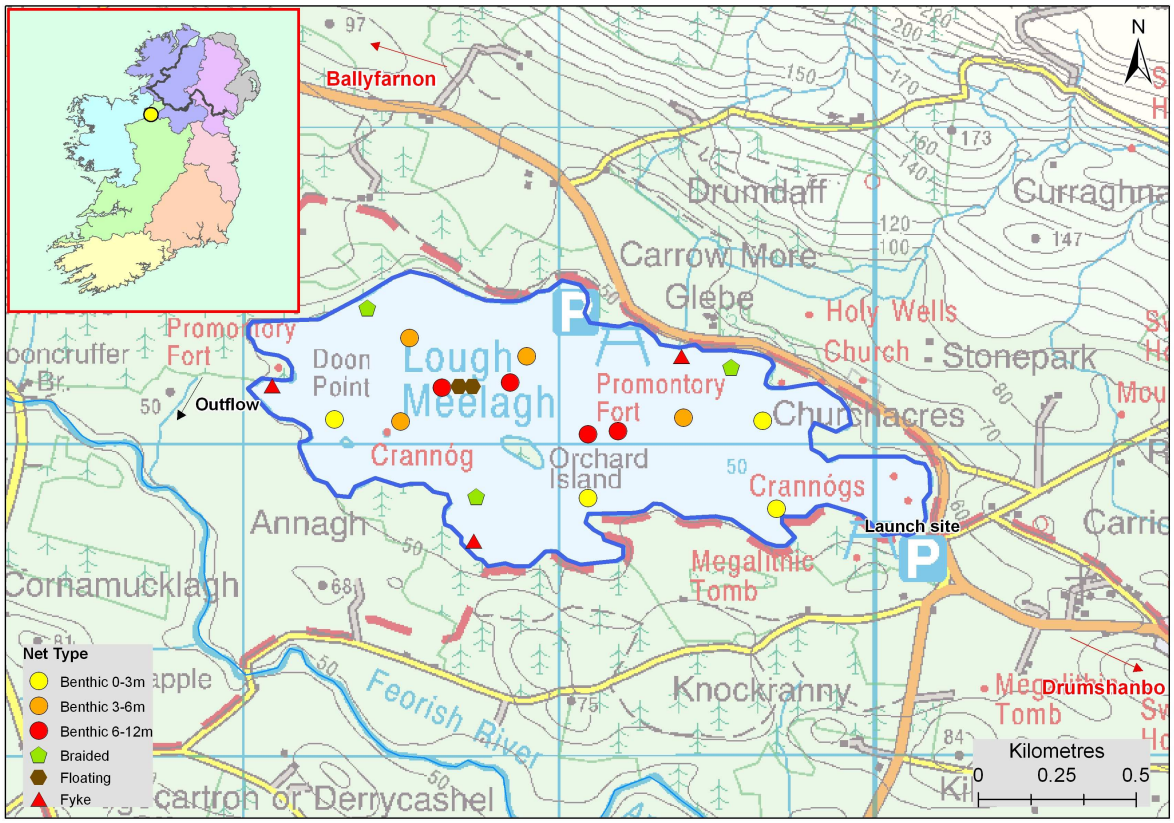

Fig. 1.1. Location map of Lough Meelagh showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Meelagh was surveyed over two nights from the 27th to the 29th of August 2008. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m and 4 @ 6-11.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gillnets were deployed randomly in the lake (15 sites). The netting effort was supplemented using three benthic braided single panel (62.5mm mesh knot to knot) survey gill nets (three additional sites). Survey locations were randomly selected using a grid placed over a map of the lake. 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 trout, roach, hybrids, bream and pike. 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 returned to the laboratory for further analysis.

1.3 Results

1.3.1 *Species Richness*

A total of seven fish species and two types of hybrids were recorded on Lough Meelagh in August 2008. A list of the species encountered and numbers captured by each gear type is compiled in Table 1.1. A total of 596 fish were captured during the survey. Roach were the most common fish species encountered in the benthic gill nets followed by perch. One small trout was captured in a surface gill net. Eels were captured in fyke nets during the survey. Zebra mussels were also present in the lake.

Table 1.1. List of fish species recorded (including numbers captured) during the fish stock survey on Lough Meelagh, August 2008

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Benthic braided gill nets	Surface mono multimesh gill nets	Fykes	Total
Rutilus rutilus	Roach	257	7	11	0	275
Perca fluviatilis	Perch	254	0	0	2	256
Esox lucius	Pike	13	3	0	1	17
	Roach x bream hybrid	9	3	0	0	12
	Roach x rudd hybrid	6	0	0	0	6
Tinca tinca	Tench	0	2	0	0	2
Salmo trutta	Brown trout	0	0	1	0	1
Abramis brama	Bream	1	0	0	0	1
Anguilla anguilla	Eel	0	0	0	26	26

1.3.2 *Fish abundance*

Fish abundance was calculated as the mean number of fish caught per metre of net, i.e. mean CPUE. Fish biomass was calculated as the mean weight of fish caught per metre of net, i.e. mean BPUE. A summary of CPUE and BPUE data for each species and gear type is shown in Table 1.2. Roach recorded both the highest abundance and biomass of all fish.

Table 1.2. Mean CPUE (mean number of fish per m of net) and mean BPUE (mean weight of fish per m of net) for all fish species recorded on Lough Meelagh, August 2008

Gear type	Brown trout	Perch	Roach	Bream	Tench	Rudd x Roach	Roach x Bream	Pike	Eel
Mean CPUE (mean number of fish/m of net)									
Gill nets	0.002	0.498	0.541	0.002	0.004	0.012	0.024	0.032	-
Fyke nets	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.006	0.144
Mean BPUE (mean weight (g) of fish/m of net)									
Gill nets	0.016	10.457	80.277	0.031	3.050	3.257	22.741	23.752	-
Fyke nets	0.000	0.221	0.000	0.000	0.000	0.000	0.000	0.000	45.594

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species

1.3.3 *Length frequency distributions*

Perch ranged in length from 4.0cm to 32.5cm (mean = 9.0cm) (Fig. 1.2). Roach ranged in length from 4.5cm to 34.6cm (mean = 18.4cm) (Fig. 1.3). Eels ranged in length from 34.5cm to 75.5cm. Pike had lengths ranging from 13.5cm to 64.0cm. Two tench, both measuring 35.0cm in length were also captured. Roach x rudd hybrids had lengths ranging from 21.0cm to 29.6cm and roach x bream hybrids ranged in length from 18.5cm to 38.5cm. One bream measuring 9.8cm in length and one brown trout measuring 8.0cm were also recorded.

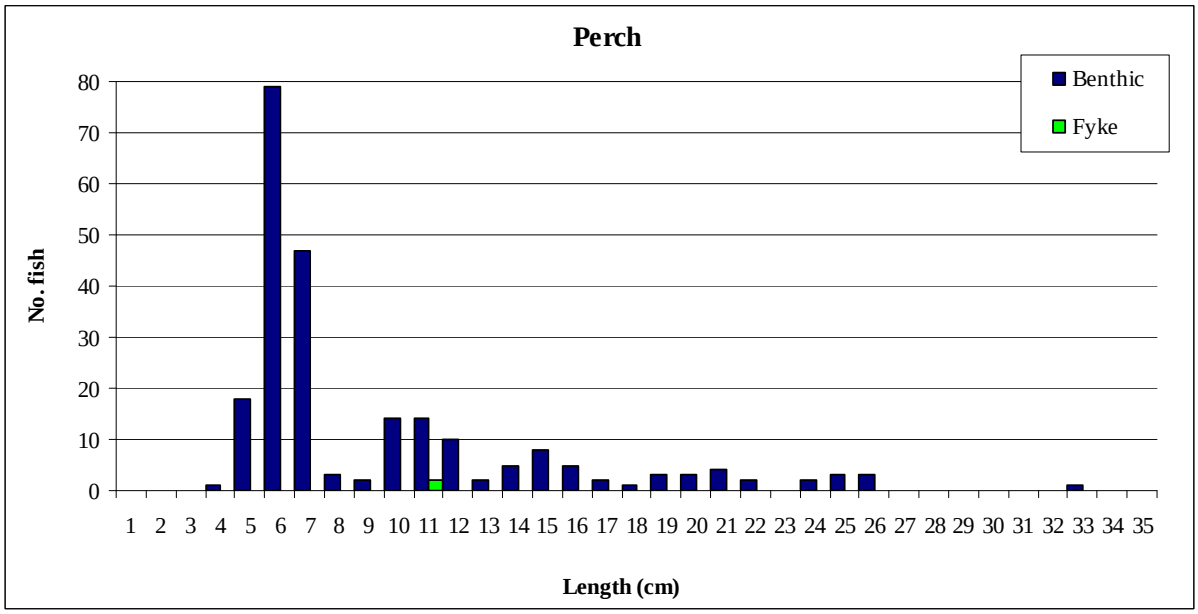

Fig. 1.2. Length frequency of perch captured on Lough Meelagh, August 2008

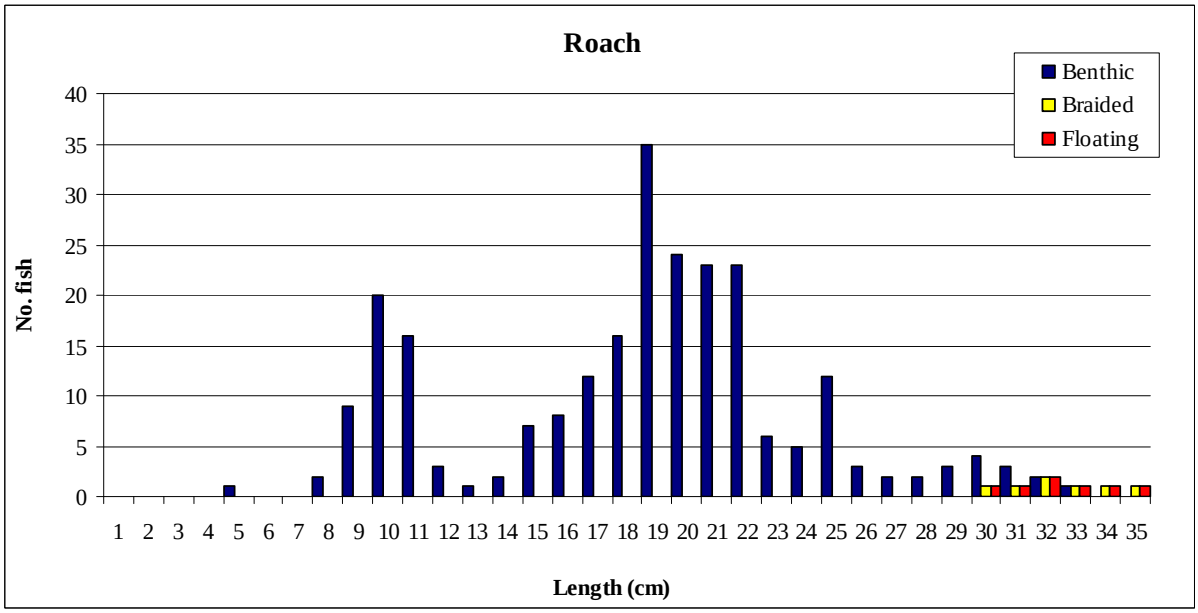

Fig. 1.3. Length frequency of roach captured on Lough Meelagh August 2008

1.3.4 *Fish age and growth*

Perch ranged in age from 0+ to 5+ in age. Length frequency and age analysis revealed that 0+ fry were the dominant age category and accounted for 64% of the population in the lake at the time of sampling, followed by 1+ (21%), 2+ (8%), 3+ (2%), 4+ (4%) and 5+ (1%) perch. Mean perch L1 was 7.8cm (Table 1.3).

Table 1.3. Mean (SD) perch length at age for Lough Meelagh August 2008

	L_1	L_2	L_3	L_4	L_5
Mean	7.8 (2.1)	12.7 (2.56)	17.5 (2.61)	21.8 (2.77)	21.8 (1.09)
N	60	35	18	13	3
Range	4.99-11.7	8.7-18.3	14.5-24.6	18.2-29.4	20.6-22.8

Roach ranged in age from 0+ to 8+. Length frequency and age analysis showed that the dominant age classes were 2+ and 3+ and accounted for 35% and 27% of the population respectively. Mean roach L1 was 5.0cm (Table 1.4).

Table 1.4. Mean roach growth rates (and SD) for Lough Meelagh August 2008

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8
Mean	5.0 (1.22)	10.4 (2.09)	16.5 (1.97)	21.8 (1.6)	25.5 (1.33)	28.1 (1.4)	30.2 (1.01)	33.1
N	62	60	45	25	14	12	7	1
Range	3.07-8.1	6.1-9.6	12.4-19.6	19-24.5	23.2-27.6	25.9-30.2	28.8-31.5	33.1-33.1

Pike ranged in age from 0+ to 3+. Roach x rudd hybrids were present in the age classes 3+, 4+ and 7+. Roach x bream hybrids were in the age classes 6+, 7+ and 9+. The single bream and trout specimens were aged 1+ and 0+ respectively.

1.4 Summary

Roach, followed by perch were the dominant fish species in Lough Meelagh in terms of both abundance (CPUE) and biomass (BPUE). The mean CPUE for roach was the highest recorded amongst all the moderate alkalinity lakes and mean BPUE for roach was the highest of any of the lakes surveyed during 2008 (Kelly *et al*, 2009). Roach growth rates in Lough Meelagh were one of the fastest when compared to other lakes of both moderate and high alkalinity (Kelly *et al*, 2009).

Perch abundance was moderate and biomass was low when compared with other lakes surveyed during 2008. Perch growth rate was moderate in comparison with other moderate alkalinity lakes surveyed (Kelly *et al*., 2009).

Lough Meelagh also had the highest abundance of pike amongst all lakes sampled in 2008; however pike biomass was ranked second, after Lough Corrib Lower (Kelly *et al*, 2009).

During the 1981 survey, a healthy population of rudd were captured; however rudd were completely absent during the current survey. An abundant roach population (a non-native species), along with captured specimens of roach x rudd hybrids in the current survey, would suggest that roach have

displaced the rudd population through competition and hybridization. Roach is one of the most invasive and prolific freshwater species that has been introduced to Irish waters in the last 100 years and has been associated with declines in native fish and other species.

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 new WFD fish classification tool has been developed for the island of Ireland (Ecoregion 1) using Republic of Ireland (CFB) and Northern Ireland (Agri-Food and Biosciences Institute) data generated during the North South Share Fish in Lakes project (Kelly *et al*., 2008). Using this tool and expert opinion on non-native/alien species, Lough Meelagh has been assigned a draft classification of moderate status for fish. The EPA has assigned an overall status of moderate to Lough Meelagh in an interim draft classification for 2009. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates and macrophytes (Deirdre Tierney, EPA, pers. comm.).

1.5 References

Kelly, F.L., Harrison, A., Connor, L., Allen, M., Rosell, R., Champ, T. (2008) *FISH IN LAKES Task 6.9: Classification tool for Fish in Lakes. FINAL REPORT*. Central Fisheries Board – NS Share project.

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