Upper Lough Skeagh

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. Pat Doherty, the ACEO Mr. William Walsh and the staff of the Eastern Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and cooperation 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

Upper Lough Skeagh (Plate 1.1 and Fig. 1.1) is located seven kilometres north-west of Bailieborough, Co. Cavan, in the Boyne catchment. The lake has a surface area of 61ha and a maximum depth of 4.9m. 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 (20-100mg/l $CaCO_3$).

Upper Lough Skeagh historically holds stocks of bream, pike, roach and perch. The lake is a public water supply and a pump house is present on the shores of the lake. According to the draft river basin management plan for the Eastern River Basin District, the major pressures affecting the ecological status of Upper Lough Skeagh include excess nutrients from agriculture and septic tanks (ERBD, 2008).

Plate 1.1. Upper Lough Skeagh

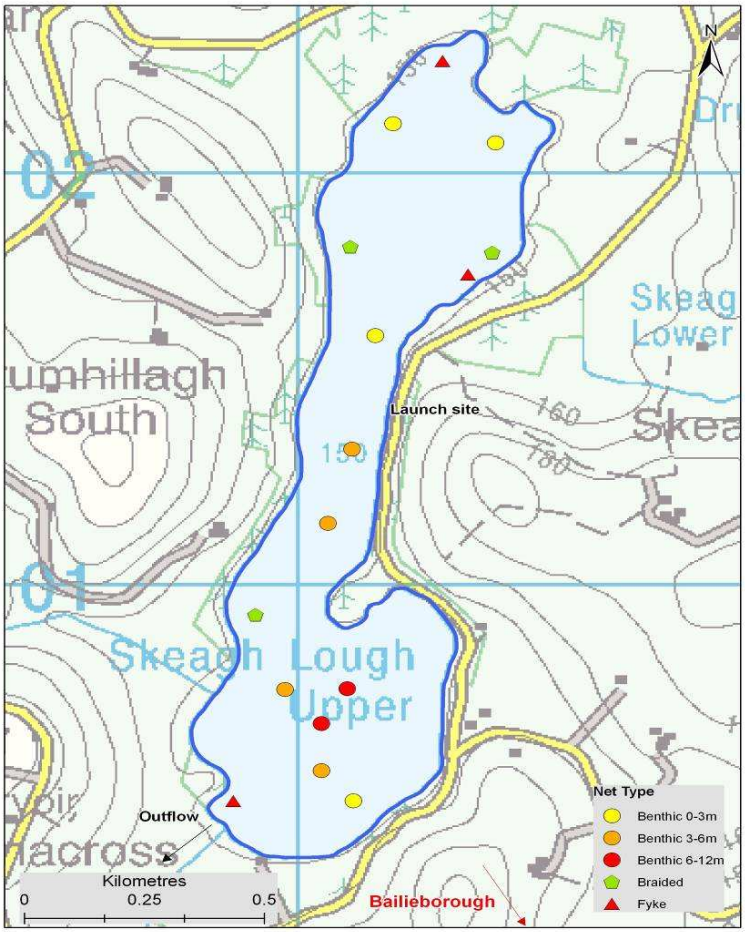

Fig. 1.1: Location map of Upper Lough Skeagh showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

The lake was surveyed over one night on the 8th of October 2008. A total of three sets of Dutch fyke nets and ten benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m and 2 @ 6-11.9m) were deployed randomly in the lake (13 sites). The netting effort was supplemented using three benthic braided (62.5mm mesh knot to knot) survey gill nets (3 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 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 returned to the laboratory for further analysis.

1.3 Results

1.3.1 *Species Richness*

A total of four fish species and one hybrid (roachxbream) were recorded on Upper Lough Skeagh in October 2008. A list of the species encountered and numbers captured by each gear type is compiled in Table 1.1. A total of 763 fish were recorded during the survey. Perch were the most common fish species encountered in the benthic gill nets followed by roach. No eels were captured during the survey. Crayfish were also present.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on Upper Lough Skeagh, October 2008

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	515	0	2	517
Rutilus rutilus	Roach	200	0	0	200
Abramis brama	Bream	20	3	0	23
Esox lucius	Pike	4	2	1	7
	Roach x bream hybrids	12	4	0	16

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 captured 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. Perch had the highest CPUE during the survey, whereas roach had the highest BPUE (Table 1.2).

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 Upper Lough Skeagh, October 2008

Gear type	Perch	Bream	Roach	Pike	Roach x Bream hybrids
Mean CPUE (mean number of fish/m of net)					
Gill nets (all)	1.321	0.059	0.513	0.016	0.042
Fyke nets	0.011	0	0	0.006	0
Mean BPUE (mean weight (g) of fish/m of net)					
Gill nets (all)	21.131	14.948	33.886	26.691	11.458
Fyke nets	0.278	0	0	0.250	0

* In 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 22.5cm (mean = 9.1cm) (Figure 1.2). Roach ranged in length from 4.6cm to 24.0cm (mean = 15.1cm) (Fig. 1.3). Bream lengths ranged from 9.8cm to 32.3cm (Fig. 1.4). Roach x bream hybrids ranged from 8.0cm to 30.3cm. Seven pike were also recorded, ranging from 17.5cm to 72.1cm.

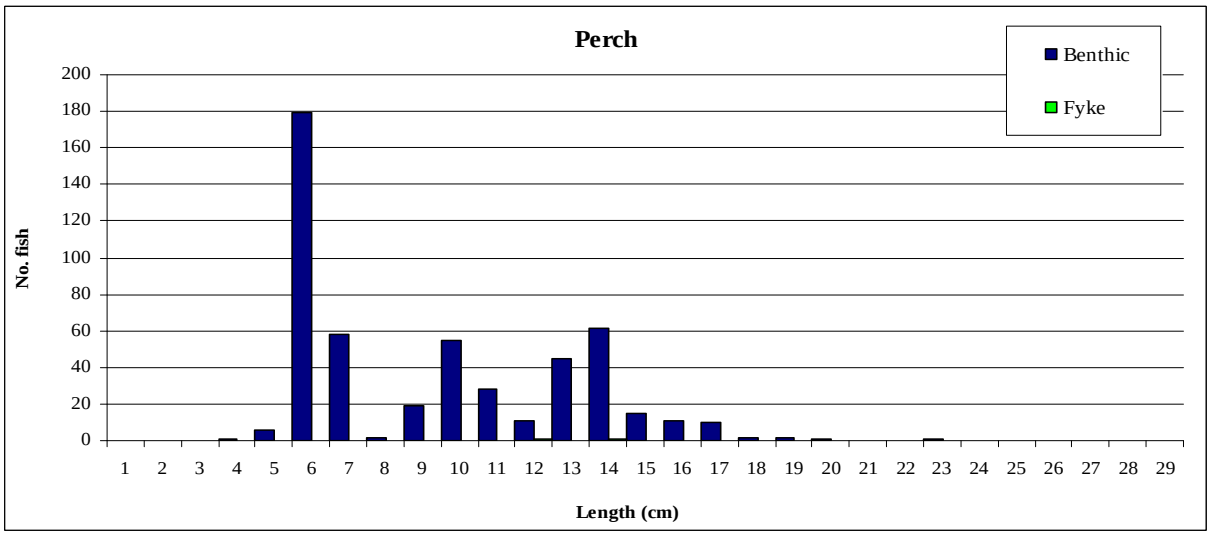

Fig. 1.2. Length frequency of perch captured on Upper Lough Skeagh, October 2008

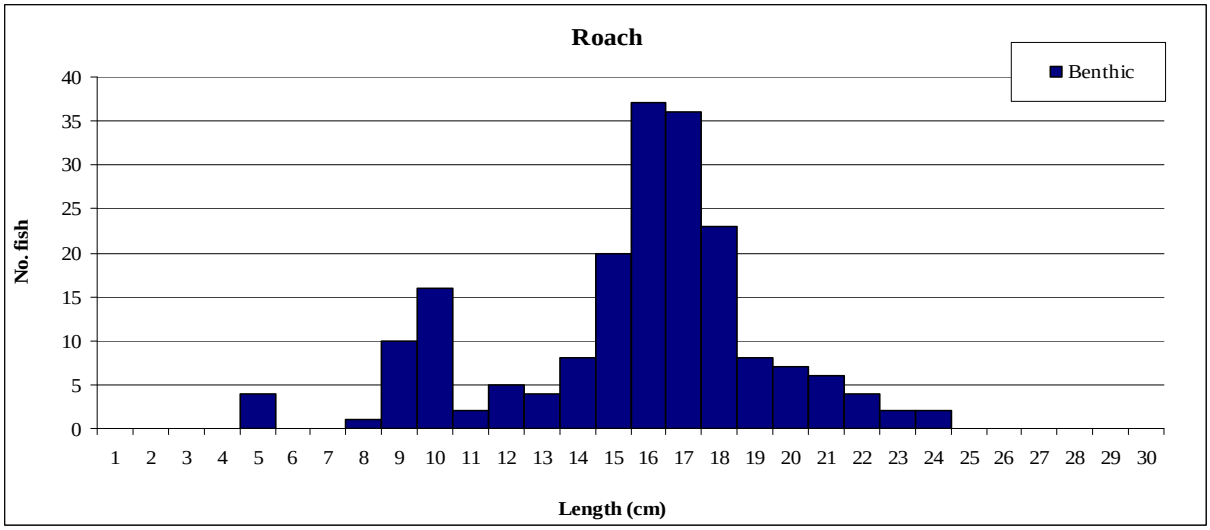

Fig. 1.3. Length frequency of roach captured on Upper Lough Skeagh, October 2008

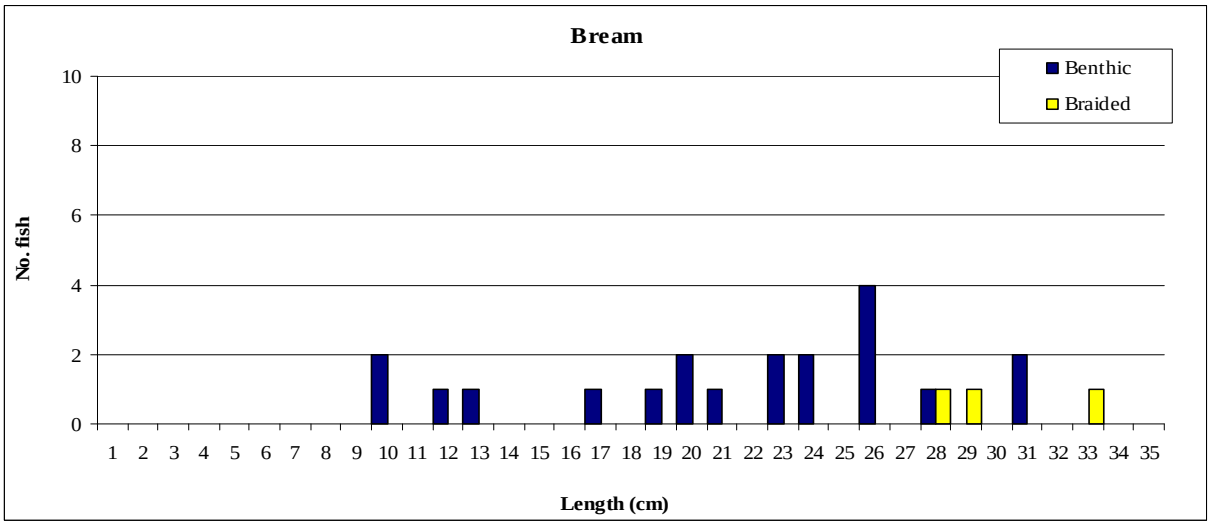

Fig. 1.4. Length frequency of bream captured on Upper Lough Skeagh, October 2008

1.3.4 *Fish age and growth*

Five age classes of perch were present in the population; 0+ fry was the dominant age group and accounted for almost 50% of the population in the lake during the survey. This was followed by 2+ (25%), 1+ (21%), 3+ (4%) and 4+ (2%). Mean perch L1 was 5.3cm.

Roach ranged in age from 1+ to 6+; 3+ was the dominant age class accounting for 57% of the population, this was followed by 2+ (19%), 4+ (10%), 5+ (9%), 6+ (3%) and 1+ (2%). Mean roach L1 was 3.7cm (Table 1.4).

Table 1.3. Mean (SD) perch length at age (cm) in Upper Lough Skeagh, October 2008

	L_1	L_2	L_3	L_4
Mean	5.3 (0.89)	9.2 (0.79)	12.5 (0.62)	14.9 (2.51)
N	30	25	17	7
Range	4.1-8.4	7.5-11.0	11.6-13.7	12.7-18.9

Table 1.4. Mean (SD) roach length at age (cm) in Upper Lough Skeagh, October 2008

	L_1	L_2	L_3	L_4	L_5	L_6
Mean	3.7 (0.56)	7.6 (0.68)	11.9 (0.87)	15.3 (0.82)	18.3 (1.07)	20.6 (1.44)
N	57	57	44	26	15	5
Range	2.1-4.7	5.9-8.8	9.7-13.1	14.1-17	16.2-20.3	18.2-21.7

Bream were aged from 2+ to 9+, 6+ (30%) being the dominant age class; however the 5+ class was absent in the sample. A small number of roach x bream hybrids were recorded, represented by four age classes, i.e. 1+, 5+, 6+ and 7+. Four age classes of pike were also present (0+, 2+, 3+ and 5+).

1.4 Summary

In terms of abundance, perch was the dominant fish species, followed by roach and bream. The mean CPUE for perch was the highest recorded for all lakes sampled during 2008, however biomass of perch was lower when compared with many (seven) other lakes and only ranked third highest in terms of biomass of the moderate alkalinity lakes (Kelly *et al*, 2009). This was mainly due to the dominance of small juvenile fish in the population (i.e. fry accounted for 50% of the numbers recorded).

Roach abundance was relatively high when compared to other lakes surveyed during 2008 (ranked fourth highest abundance after two high alkalinity lakes – Cavetown and Corglass and one moderate alkalinity lake - Lough Meelagh) (Kelly *et al*, 2009). Roach were the dominant species in terms of biomass in the lake, followed by perch, bream and pike. This was due to larger older fish dominating the population; 3+ roach accounted for 57% of the population.

Perch growth was slow in comparison to other moderate alkalinity lakes surveyed during 2008, e.g. Lough Meelagh in the Shannon Regional Fisheries Board (Kelly *et al*, 2009). In fact their growth was the slowest observed in all the lakes sampled in 2008. Roach from Lough Skeagh Upper also had one of the slowest growth rates overall. When compared to other moderate alkalinity lakes, e.g. Lough Gill and Inniscarra Reservoir it was found to have the slowest growth rate for this lake category (Kelly *et al*, 2009).

Bream had the second highest mean CPUE for all the lakes sampled in 2008, while pike recorded the second highest mean CPUE when compared to other moderately alkalinity lakes (Kelly *et al*, 2009).

An essential step in the WFD monitoring process is the classification of the status of lakes, which in turn will assist in identifying the objectives that must be set in the individual River Basin Management Plans. This work 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 17) using Republic of Ireland and Northern Ireland data generated during the North South Share "Fish in Lakes" project (Kelly *et al*, 2008). Using this tool, combined with expert opinion on non-native/alien species, Lough Skeagh Upper has been assigned a draft classification of moderate status for fish. The EPA has assigned poor status to Lough Skeagh Upper in an interim draft classification. This further downgrade is based on failures in physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish (Deirdre Tierney, EPA, pers. comm.).

1.5 References

ERBD (2008) *Eastern River Basin District - Draft River Basin Management Plan.*

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.

Kelly, F.L., Connor, L., Wightman, G., Matson, R., Morrissey, E., O' Callaghan, R., Feeney, R., Hanna, G. and Rocks, K., (2009) *Sampling fish for the Water Framework Directive - Summary report 2008*. Central and Regional Fisheries Board report.

The Central Fisheries Board
Swords Business Campus,
Swords,
Co. Dublin,
Ireland.

Web: www.wfdfish.ie
www.cfb.ie
Email: info@cfb.ie
Tel: +353 1 8842600
Fax: +353 1 8360060

The Central and Regional
Fisheries Boards