Cavetown Lough

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

Cavetown Lough (Plate 1.1, Fig. 1.1) is situated in Co. Leitrim in the Upper Shannon catchment. The lake is located approximately eight kilometres south of Boyle and just over nine kilometres west of Carrick-on-Shannon. It has a surface area of 64ha and a maximum depth of 20m. The lake falls into typology class 10 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), greater than 50ha and high alkalinity (>100mg/l $CaCO_3$). The inflowing streams drain poor marshland and are spring fed. The lake overlies a limestone area and discharges into Clogher Lake. It is also utilised as a public water supply.

Cavetown Lough has a long history of trout angling and an angling club has been active on the lake for many years. Brown trout have historically been stocked by the angling club; however records show that it has not been stocked in recent years. The lake was surveyed previously by the Central Fisheries Board (CFB) and the Shannon Regional Fisheries Board in 1988 (CFB unpublished data). During this survey, good stocks of trout aged 3+ or younger were recorded, with some 4+ and 5+ fish also being present. A large stock of introduced rudd was also recorded.

Plate 1.1. Cavetown Lough

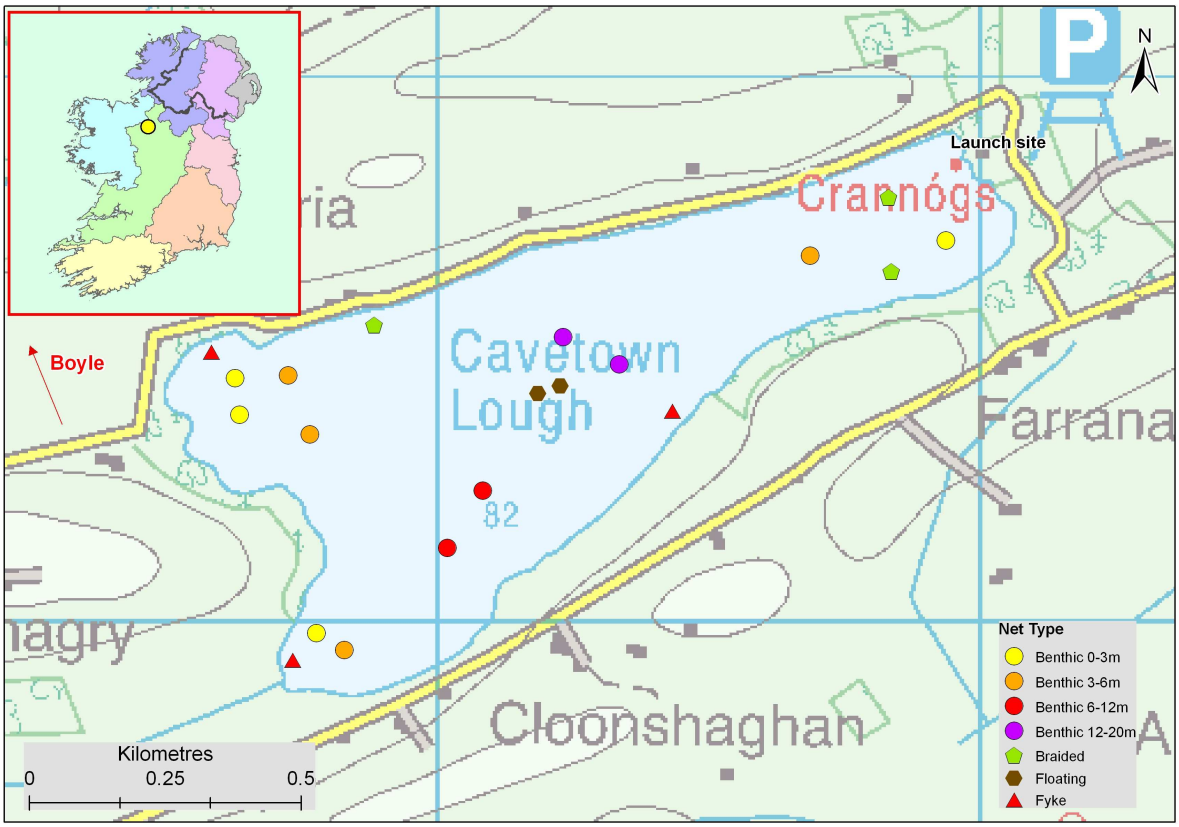

Fig. 1.1. Location map of Cavetown Lough indicating locations and depths of each net

1.2 Methods

Cavetown Lough was surveyed over two nights on the 9th and 10th of July 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, 2 @ 6-11.9m and 2 @ 12-19.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets were deployed randomly in the lake (17 sites). The netting effort was supplemented using three benthic single panel braided (62.5mm mesh knot to knot) survey gill nets. Survey locations were randomly selected using a grid placed over the 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, bream, hybrids 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 four fish species and two types of hybrids were recorded on Cavetown Lough in July 2008. A list of the species encountered and numbers captured by each gear type is shown in Table 1.1. A total of 345 fish were captured during the survey. Roach were the most abundant fish species captured. No trout were captured during the survey. Crayfish were also recorded.

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

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Benthic braided gill nets	Surface mono multimesh gill nets	Dutch fykes	Total
Rutilus rutilus	Roach	312	0	2	0	314
Esox lucius	Pike	11	0	0	0	11
	Roach x Bream hybrid	9	0	0	0	9
	Roach x Rudd hybrid	2	0	0	0	2
Abramis brama	Bream	1	0	0	0	1
Anguilla anguilla	Eel	0	0	0	8	8

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 were the dominant fish species in terms of both abundance (CPUE) and biomass (BPUE).

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 Cavetown Lough, 2008

Gear type	Roach	Pike	Roach x Bream	Bream	Eel	Roach x Rudd
Mean CPUE (mean number of fish/m of net)						
Gill nets (all)	0.616	0.022	0.018	0.002	-	0.004
Fyke nets	0.000	0.000	0.000	0.000	0.044	0.000
Mean BPUE (mean weight (g) of fish/m of net)						
Gill nets (all)	20.105	5.246	6.019	1.086	-	1.386
Fyke nets	0.000	0.000	0.000	0.000	19.428	0.000

* 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*

Roach ranged in length from 4.0cm to 30.2cm (mean = 11.3cm) (Fig. 1.2). Pike ranged in length from 7.0cm to 46.0cm (Fig. 1.3). Roach x bream hybrids ranged in length from 9.8cm to 36cm. Eels ranged in length from 51.0cm to 76.0cm, and one bream (length = 32.1cm) was also recorded.

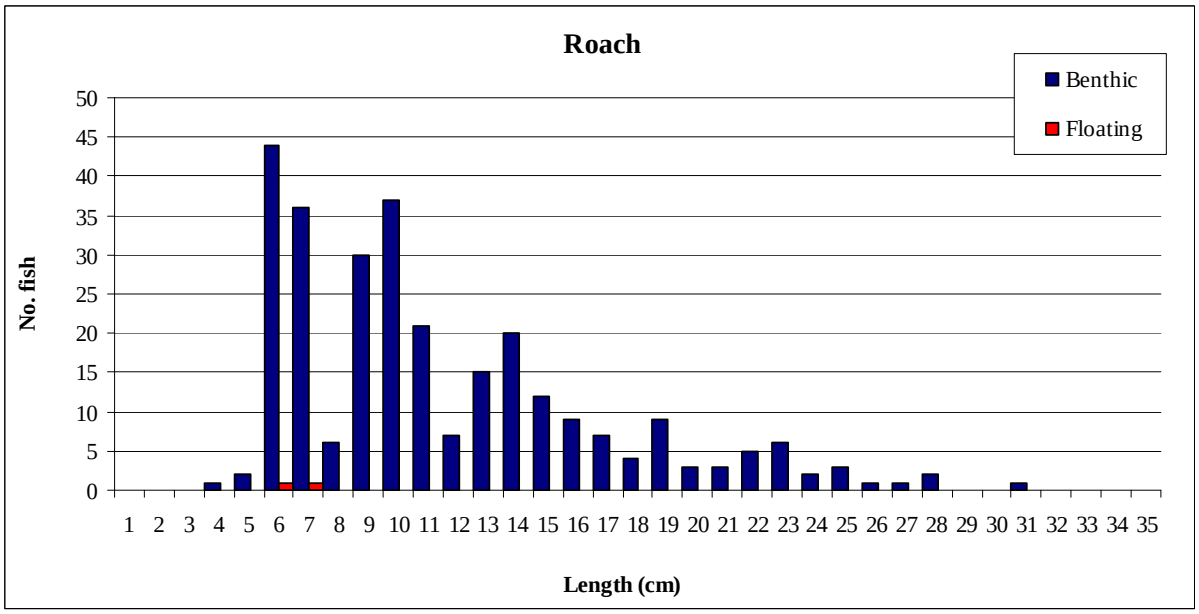

Fig. 1.2. Length frequency of roach captured on Cavetown Lough, July 2008

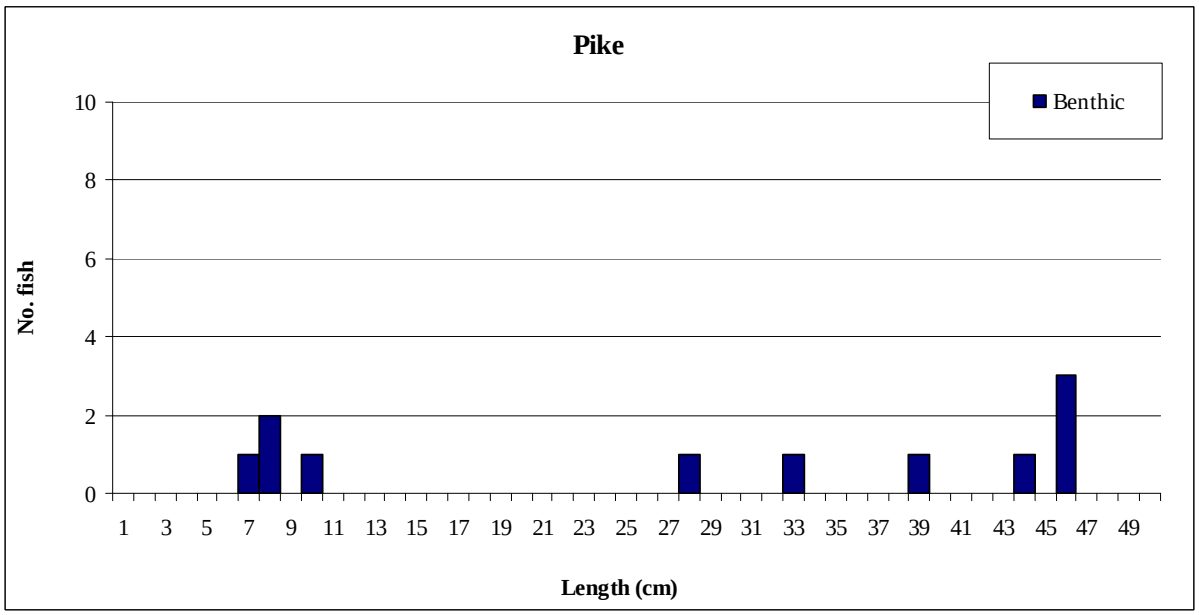

Fig. 1.3. Length frequency of pike captured on Cavetown Lough, July 2008

1.3.4 *Fish age and growth*

Eight age classes of roach were identified during the survey. Length frequency and age analysis revealed that 1+, 2+ and 3+ were the dominant age groups in the population, accounting for 31%, 32% and 20% of the population respectively. The remaining roach were aged at 0+ and 4+ to 7+. Mean roach L1 was 3.4cm. Pike ranged in age from 0+ to 3+. Four age classes of roach x bream hybrids were present, i.e. 5+ to 8+ and 11+. One bream aged 7+ was also recorded.

Table 1.3: Mean (SD) roach length at age for Cavetown Lough, July 2008

	L_1	L_2	L_3	L_4	L_5	L_6	L_7
Mean	3.4 (0.58)	7.5 (1.25)	12.4 (2.04)	17.5 (2.1)	22.0 (1.84)	25.8 (1.87)	29.8
N	57	52	35	17	9	3	1
Range	2.2-4.9	5.6-11.2	9.5-17.5	14.5-21.5	18.9-24.2	23.6-26.9	29.8

1.4 Summary

Roach was the dominant species in terms of abundance and biomass in Cavetown Lough, followed by pike and roach x bream hybrids. The survey has shown that Cavetown Lough had the highest mean CPUE for roach of all lakes sampled during 2008; however roach biomass was low in comparison to other lakes. Pike displayed a similar trend, i.e. a high CPUE but low BPUE when compared to other high alkalinity lakes surveyed in 2008 (Kelly *et al*, 2009). Cavetown Lough also exhibited a below average CPUE for eels when compared with other lakes sampled during 2008 (Kelly *et al*, 2009).

Roach growth was slow for the first two years in comparison with other high alkalinity lakes, e.g. Lough Corrib and Lough Gill. However, after L2 there was a steep increase in growth rate that gave the roach an overall growth rate that is typical of a high alkalinity lake (Kelly *et al*, 2009). During the 1988 survey, a healthy population of rudd were captured; however rudd were completely absent during the current survey. An abundant roach population, along with captured specimens of roach x rudd hybrids in the current survey, would suggest that roach have been introduced to the lake post 1988 and have subsequently 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.

An essential step in the WFD monitoring process is the classification of the ecological status of lakes. This in turn will assist in identifying the objectives that must be set in the individual River Basin Management Plans, allowing 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, Cavetown Lough has been assigned a draft classification of poor status for fish. The EPA has assigned an overall status of poor to Cavetown Lough in an interim draft classification. This is based on physico-chemical parameters and biotic elements, such as macroinvertebrates and macrophytes.

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.

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