Lough Egish

Sampling Fish for the Water Framework Directive - Lakes 2008

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

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1.1 Introduction

Lough Egish is located in the Erne catchment, approximately eight kilometres south of Castleblaney in Co. Monaghan. The lake is situated at an altitude of 160.8m above sea level. It has a surface area of 117ha, mean depth of 3.3m and maximum depth of 10m. The lake is categorised as typology class 10 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and high alkalinity (>100mg/l $CaCO_3$). The geology of the area is predominantly Silurian Quartzite.

The lake has been classed as 1a (i.e. at risk of failing to meet good status by 2015) in the WFD Characterisation report (EPA, 2005). The lake was classified as strongly eutrophic by the Environmental Protection Agency in 2002 (McGarrigle *et al*., 2002). Lough Egish was previously used as the main water supply for Castleblaney, however this supply was upgraded and is no longer extracted from the lake. Lakeland Dairies Drying Plant also extracted their process and cooling water from the lake prior to 2008.

The most recent fish stock survey on Lough Egish was carried out in 2006 by the Central Fisheries Board (CFB) and the Northern Regional Fisheries Board (NRFB) as part of the NS Share "Fish in Lakes" project (Kelly *et al*., 2007). This survey recorded perch, roach, eels and pike. Zebra mussels are also present in this lake. Historical records of char exist for Lough Egish (Went 1945; Went, 1971); however, none have been captured in recent years.

Plate 1.1. Lough Egish looking northeast across the lake towards Lakeland Dairies Drying Plant

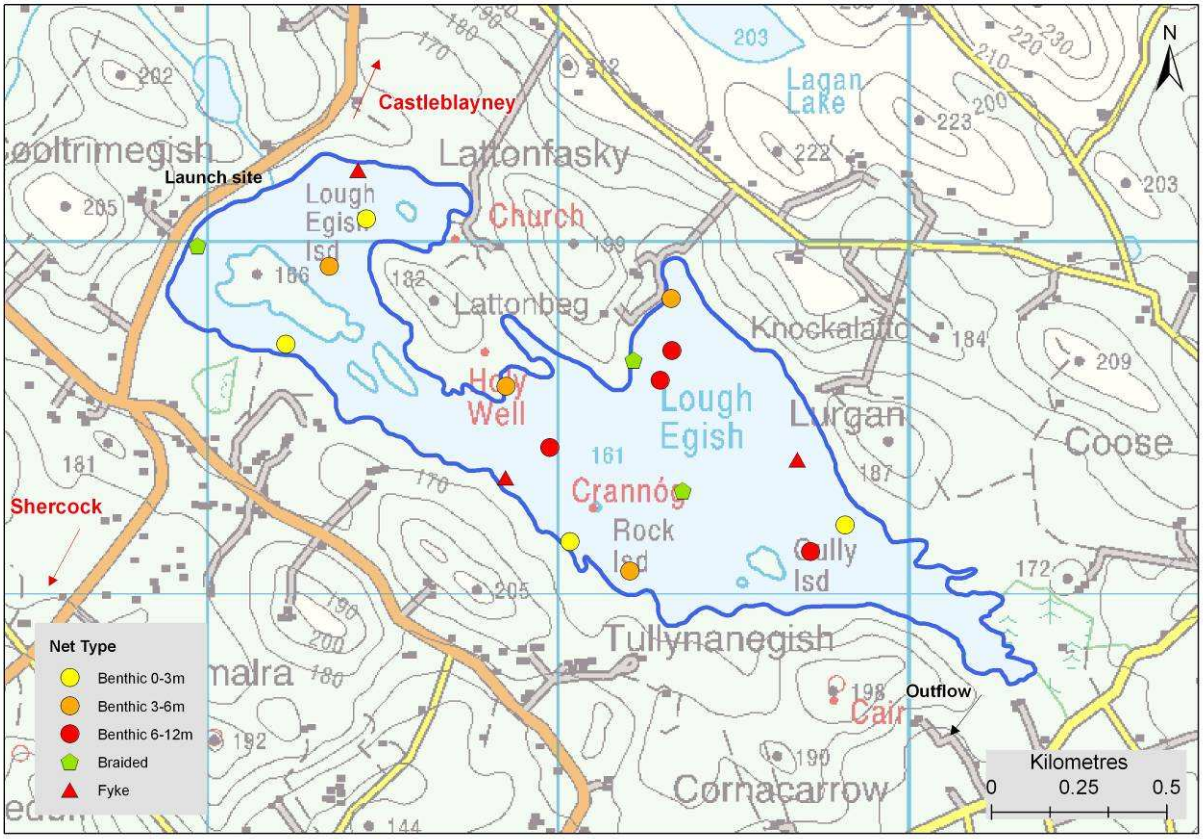

Fig. 1.1. Location map of Lough Egish showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Fishing was conducted over two nights from the 25th to the 27th of August 2008. A total of three sets of Dutch fyke nets and 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) were deployed randomly in the lake (15 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 similar to those from the 2006 survey, apart from the three additional braided survey gill net sites. These were added in the 2008 survey to ensure that large fish such as pike were captured and recorded.

All fish apart from perch were measured and weighed on site, and scales were removed from roach 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 S*pecies richness*

Four fish species were recorded in Lough Egish during the survey, and the numbers captured in each type of net are compiled in Table 1.1. A total of 593 fish were captured during the survey. Perch were the most common fish species captured, followed by roach. Eel, pike and crayfish were also recorded. In the 2006 survey the same number of species were captured and perch was also recorded as the dominant species (Kelly *et al.*, 2007).

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

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	399	0	6	405
Rutilus rutilus	Roach	181	0	0	181
Esox lucius	Pike	0	6	0	6
Anguilla anguilla	Eel	0	0	1	1

1.3.2 *Fish abundance*

Fish abundance (mean CPUE) and biomass (mean BPUE) was 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 are summarised in Table 1.2. Mean CPUE is illustrated in Figure 1.2. There was no statistically significant difference in mean perch CPUE between 2006 and 2008; however roach CPUE was significantly lower in 2008 than in 2006 (Independent t-test, $t_{29} = -2.114$, $p < 0.05$).

Table 1.2. Mean CPUE and Mean BPUE on Lough Egish

Year	2006	2008
	Mean CPUE (mean no. of fish per m of net)	
Perch	1.036 (0.4409)	0.788 (0.2322)
Roach	0.773 (0.178)	0.355 (0.1043)
Pike	0.002 (0.0024)	0.013 (0.0089)
Eel	0.033 (0.0254)	0.006 (0.0056)
	Mean BPUE (mean weight (g) of fish/m of net)	
Perch	34.440 (10.7094)	48.680 (14.3609)
Roach	84.3551(17.5004)	53.500 (13.4629)
Pike	10.238 (10.2381)	33.115 (23.0455)
Eel	22.056 (12.6071)	2.644 (2.6444)

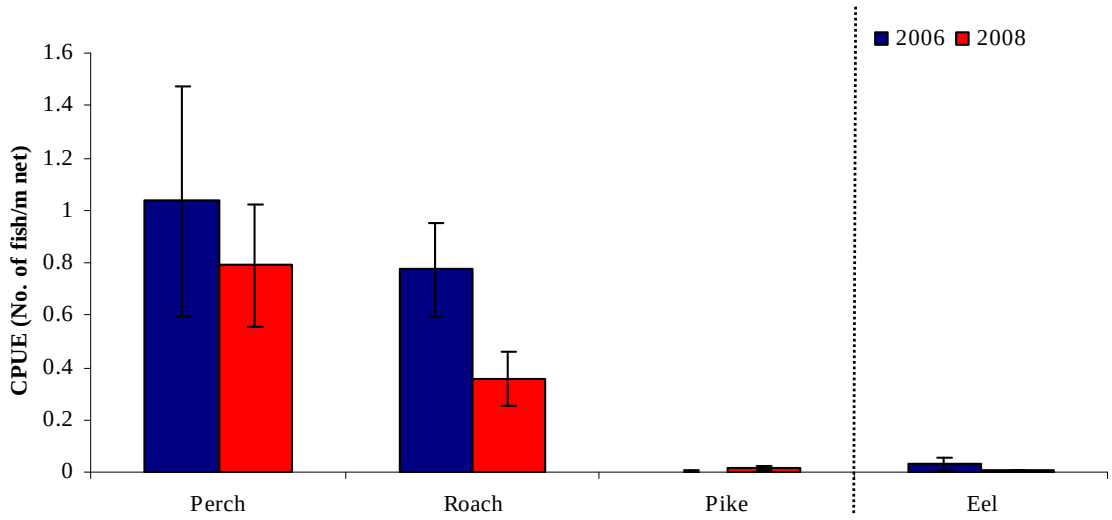

Fig. 1.2. Mean (±S.E.) CPUE on Lough Egish (Eel CPUE based on fyke nets only)

1.3.3 *Length frequency distributions*

Length frequency data for perch and roach from 2006 and 2008 are shown in Figures 1.3 and 1.4 respectively. Perch ranged in length from 5.0cm to 38.0cm in 2008 (mean = 12.9cm) (Fig. 1.3). Similar ranges in lengths of perch were observed in the 2006 data (Fig. 1.3). Roach ranged in length from 6.0cm to 28.0cm in 2008 (mean = 18.5cm) (Fig. 1.4). In 2006, roach lengths ranged from 4.0cm to 29.8cm (Fig. 1.4). Pike ranged in length from 58.5cm to 76.4cm. A single pike was captured in 2006 and it measured 82.0cm. One eel at 70.5cm was captured in the current survey. In 2006, eels ranged in length from 57.0cm to 85.0cm.

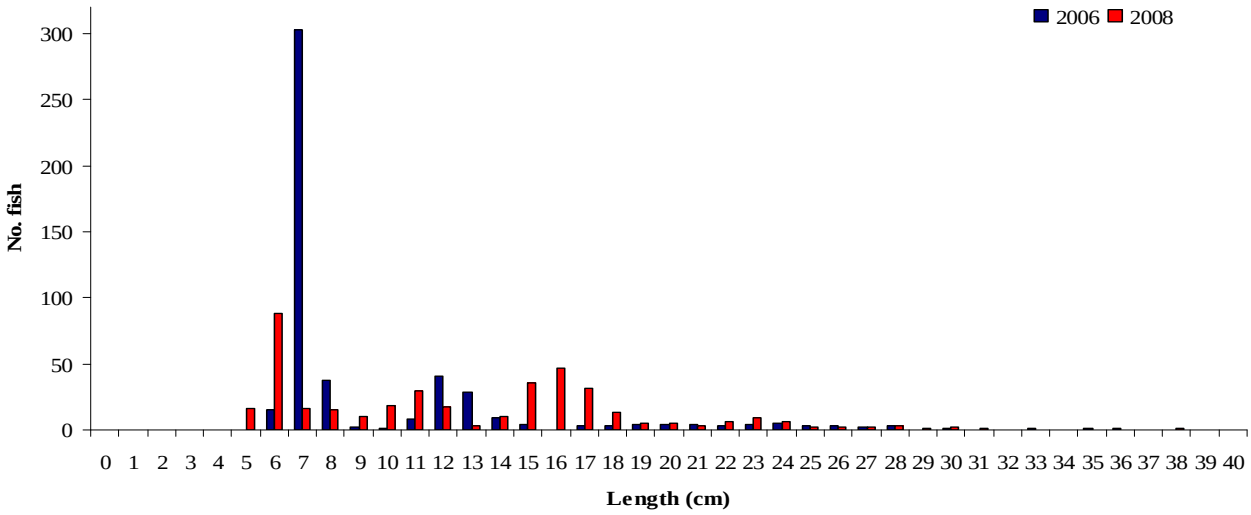

Fig. 1.3. Length frequency of perch captured on Lough Egish

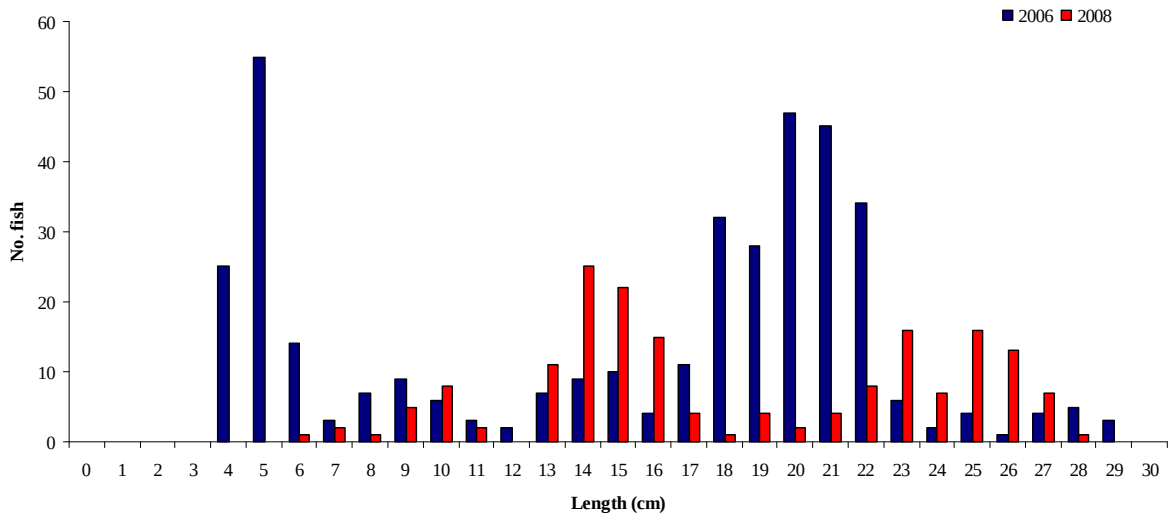

Fig. 1.4. Length frequency of roach captured on Lough Egish

2.3.4 *Fish age and growth*

Perch ranged in age from 0+ to 9+ in the 2008 survey. The age range for perch was similar in 2008, apart from the absence of the 0+ age class. Mean perch L1 was 6.2cm which was similar to that calculated for the 2006 survey of 6.4cm (Table 1.3). Roach ranged in age from 1+ to 6+ during the present survey (Table 1.4). In 2006, roach ages were similar but an additional age class (7+) was also recorded. The mean roach L1 was 3.9cm, slightly higher than the 2006 value of 2.9cm (Table 1.4). Pike ranged in age from 4+ to 6+ in the 2008 survey.

Table 1.3. Mean (±SE) perch length at age for Lough Egish, August 2008

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Mean & SE	6.2 (0.084)	11.9 (0.149)	18.0 (0.374)	22.2 (0.676)	24.6 (2.1)	30.5	33.77	35.2	37.4
N	99	75	56	21	4	1	1	1	1
Range	4.7-7.7	7.5-14.9	12.1-26.7	16.7-27.6	18.8-29				

Table 1.4. Mean (±SE) roach length at age for Lough Egish, August 2008

	L_1	L_2	L_3	L_4	L_5	L_6
Mean	3.9 (0.059)	8.8 (0.140)	14 (0.161)	19 (0.289)	22.7 (0.288)	27.4 (0.416)
N	56	53	37	32	24	6
Range	3-4.8	6.5-10.8	12.1-15.8	16.1-22	19.9-25.3	23.1-25.8

1.4 Summary

Perch were the dominant species in Lough Egish in 2008, followed by roach, pike and eels. Mean CPUE for perch was also high in comparison with other high alkalinity lakes sampled (Kelly *et al*., 2009). The current survey has shown that the mean CPUE for roach in the lake was above average when compared with other high alkalinity lakes surveyed (Kelly *et al*., 2009). This trend was also observed in the 2006 survey when CPUE values were compared with other high alkalinity lakes in the area. Lough Egish had an average CPUE for pike when compared with other high alkalinity lakes studied. The results also revealed that eel had the second lowest CPUE for high alkalinity lakes (Kelly *et al*., 2009).

Perch growth has continued to be quite fast when compared with other high alkalinity lakes surveyed, e.g. Corglass Lake and Lough Nanoge. In both 2006 and 2008, roach were found to have fast growth in comparison with other high alkalinity lakes, e.g. Corglass Lake and Lough Nanoge.

Historical records indicate that there was once a population of char present in Lough Egish; however, this survey and a previous survey conducted in 2006 (Kelly *et al.*, 2007) have confirmed that they are now extinct from this lake. The water quality of Lough Egish has been poor since the 1970s (Flanagan and Toner, 1975; Lucey *et al.*, 1999); consequently, char were unlikely to have been able to survive in the lake.

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 multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using Agri-Food and Bisosciences Institute Northern Ireland (AFBINI) and CFB data (Kelly *et al*., 2008). Using this tool and expert opinion, Lough Egish has been assigned a draft classification of bad status for fish. This has not improved since 2006, when it was assigned the same classification. The EPA has assigned an overall classification of bad status to Lough Egish in an interim draft classification. This was based on physico-chemical parameters and biotic elements, such as macroinvertebrates, macrophytes and fish.

1.5 References

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