Sampling Fish for the Water Framework Directive

Lakes 2010

Lattone Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the co-operation of the Department of Culture, Arts and Leisure (DCAL). The authors would also like to gratefully acknowledge the help and cooperation of all their colleagues in IFI, Swords.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2010.

1.1 Introduction

Lattone Lough (Plate 1.1, Fig. 1.1) lies along the B52 Garrison-Belcoo road, almost 9km from Garrison, Co. Fermanagh. It is divided almost equally in a north-west/south-east direction by the Northern Ireland/Republic of Ireland border. Lattone Lough is located within the Garrison Lowlands Landscape Character Area (NIEA, 2010) and the Lough Melvin catchment. The lake has a surface area of 32ha, a mean depth > 4m and a maximum depth of 14.7m. The lake falls into typology class 7 (as designated by the EPA for the Water Framework Directive), i.e. deep (>4m), less than 50ha and moderate alkalinity (20-100mg/l $CaCO_3$). It holds a stock of brown trout averaging 0.23kg (O'Reilly, 2007).

Lattone Lough was previously surveyed in 2005 as part of the NSSHARE Fish in Lakes Project, with perch being the dominant species recorded (CFB, unpublished data).

Plate 1.1. Lattone Lough

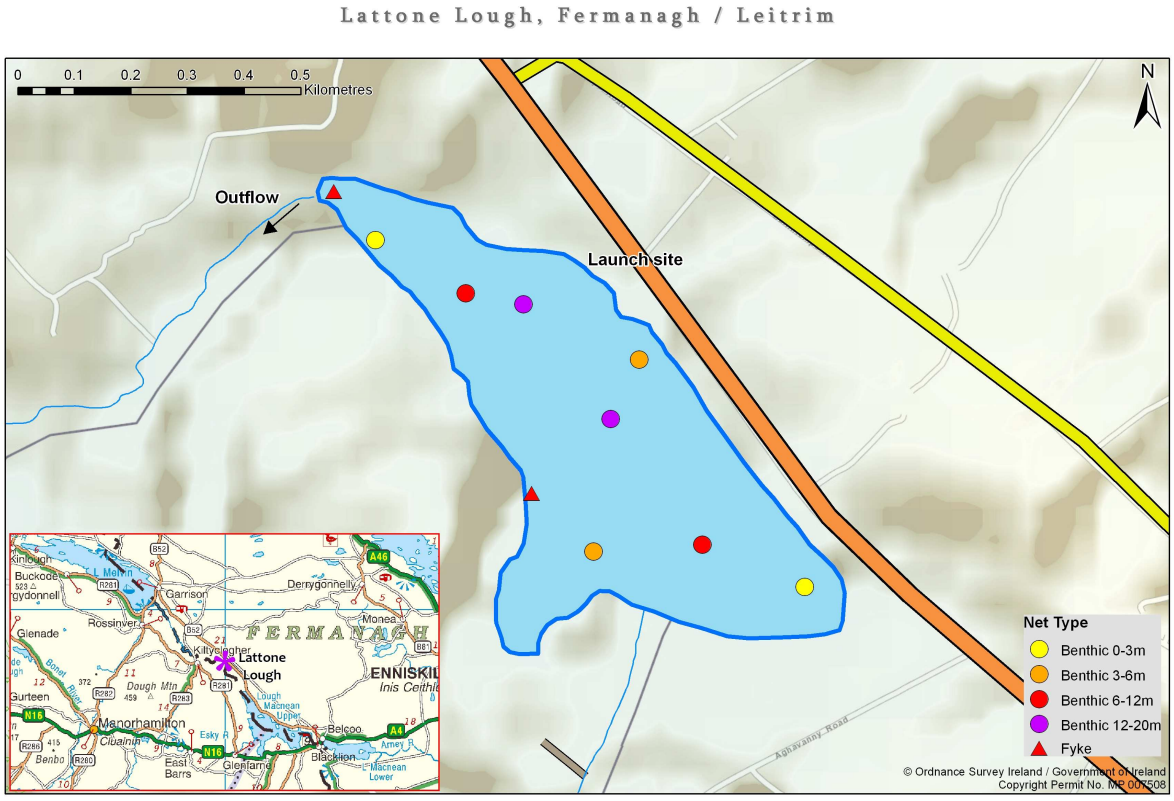

Fig. 1.1. Location map of Lattone Lough showing net locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lattone Lough was surveyed over one night on the 18th of August 2010. A total of two sets of Dutch fyke nets and eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m and 2 @ 12-19.9m) were deployed in the lake (10 sites). Nets were deployed in the same locations as were randomly selected in the previous survey. 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 brown trout, roach, bream, tench and roach x bream 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 six fish species and one type of hybrid were recorded in Lattone Lough in August 2010, with 392 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 brown trout and bream.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lattone Lough, August 2010

Scientific name	Common name	Number of fish captured		
		Benthic mono multimesh gill nets	Fyke nets	Total
Perca fluviatilis	Perch	352	26	378
Salmo trutta	Brown trout	6	0	6
Abramis brama	Bream	4	0	4
Anguilla anguilla	European eel	0	1	1
Rutilus rutilus	Roach	1	0	1
Rutilus rutilus x Abramis brama	Roach x bream hybrid	1	0	1
Tinca tinca	Tench	0	1	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 2005 and 2010 are summarised in Table 1.2. Mean CPUE is illustrated in Figure 1.2.

Although the mean perch CPUE was higher in 2010 than in 2005, this was not statistically significant. The difference in the mean perch CPUE between Lattone Lough and Glenade Lough, a similar lake type, was assessed and was not statistically significant (Fig. 1.3).

Although the mean brown trout CPUE was lower in 2010 than in 2005, this was not statistically significant. The differences in the mean brown trout CPUE between Lattone Lough and three other similar lakes were assessed and found to be overall statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.4). However, Independent-Samples Mann-Whitney U tests between each lake showed that the mean brown trout CPUE in Lattone Lough was not significantly different to any of the other three lakes.

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured in Lattone Lough, 2005 and 2010

Scientific name	Common name	2005	2010
		Mean CPUE	
Salmo trutta	Brown trout	0.008 (0.005)	0.020 (0.011)
Perca fluviatilis	Perch	1.039 (0.321)	1.216 (0.497)
Rutilus rutilus	Roach	-	0.003 (0.003)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	-	0.003 (0.003)
Abramis brama	Bream	-	0.013 (0.010)
Tinca tinca	Tench	-	0.002 (0.002)
Esox lucius	Pike	0.003 (0.003)	-
Anguilla anguilla	European eel	0.033 (0.025)	0.008 (0.008)
		Mean BPUE	
Salmo trutta	Brown trout	11.442 (5.945)	1.966 (1.075)
Perca fluviatilis	Perch	55.794 (16.682)	52.135 (26.268)
Rutilus rutilus	Roach	-	1.500 (1.500)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	-	1.443 (1.443)
Abramis brama	Bream	-	1.910 (1.689)
Tinca tinca	Tench	-	0.600 (0.600)
Esox lucius	Pike	1.365 (1.365)	-
Anguilla anguilla	European eel	6.136 (4.259)	1.983 (1.983)

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

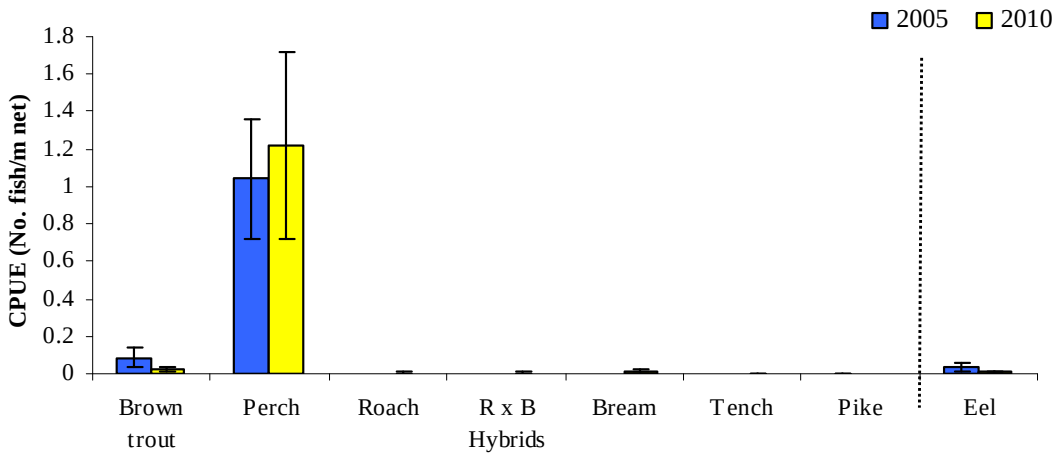

Fig. 1.2. Mean (±S.E.) CPUE in Lattone Lough (Eel CPUE based on fyke nets only), 2005 and 2010

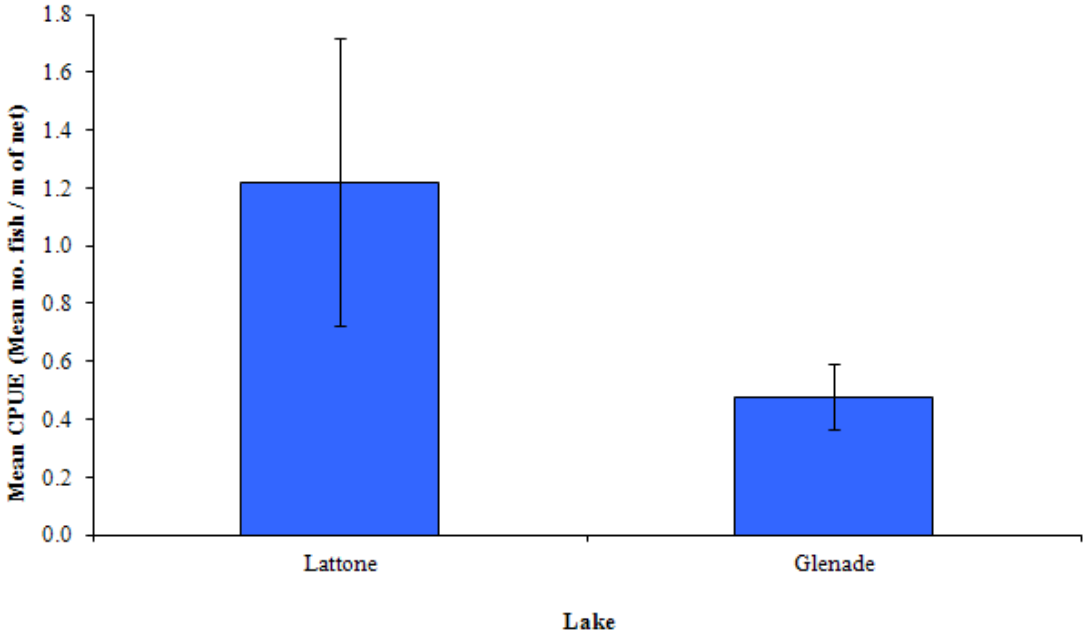

Fig. 1.3. Mean (±S.E.) perch CPUE in two lakes surveyed during 2010

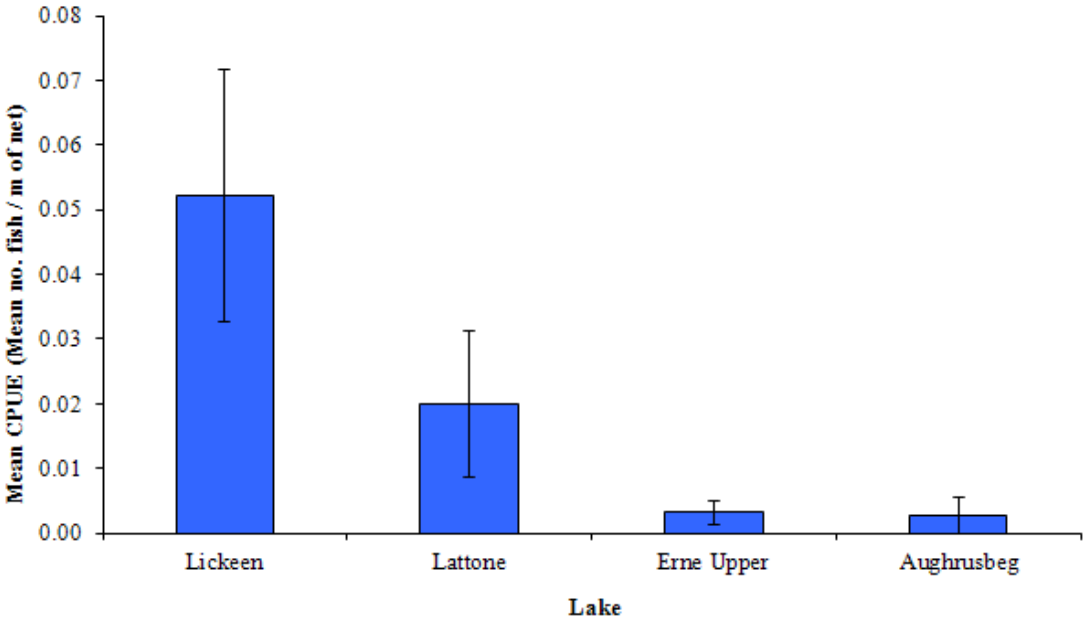

Fig. 1.4. Mean (±S.E.) brown trout CPUE in four lakes surveyed during 2010

1.3.3 Length frequency distributions

Perch captured during the 2010 survey ranged in length from 4.1cm to 30.7cm (mean = 13.4cm) (Fig. 1.5). Perch captured during the 2005 survey had a length range of 4.0cm to 34.2cm (Fig. 1.5). Brown trout captured during the 2010 survey ranged in length from 17.2cm to 25.0cm (mean = 20.3cm) (Fig.1.6). Brown trout captured during the 2005 survey had a length range of 11.2cm to 31.1cm (Fig.1.6). Bream captured during the 2010 survey ranged in length from 15.8cm to 27.0cm. The one eel captured measured 57.3cm, one tench measured 31.0cm, one roach measured 27.8cm and one roach x bream hybrid measured 28.9cm in length.

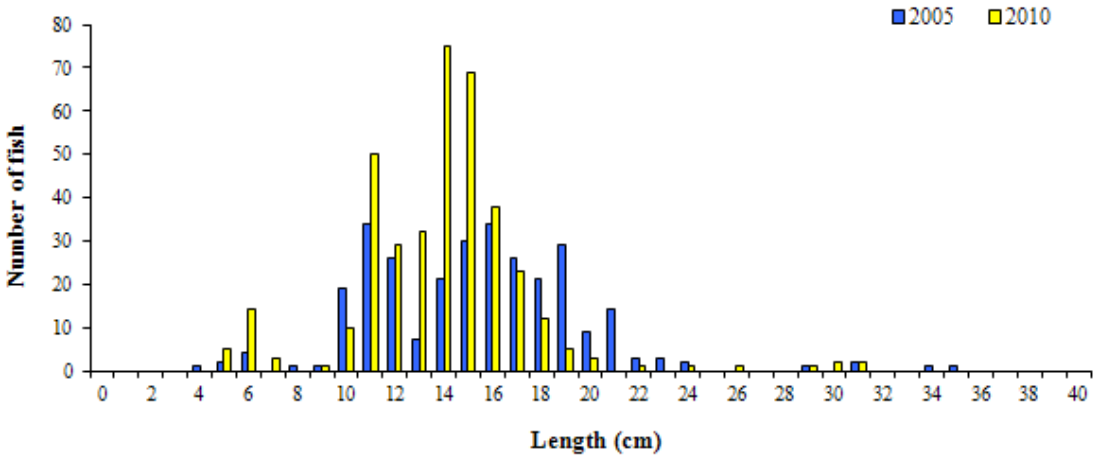

Fig. 1.5. Length frequency of perch captured in Lattone Lough, 2005 and 2010

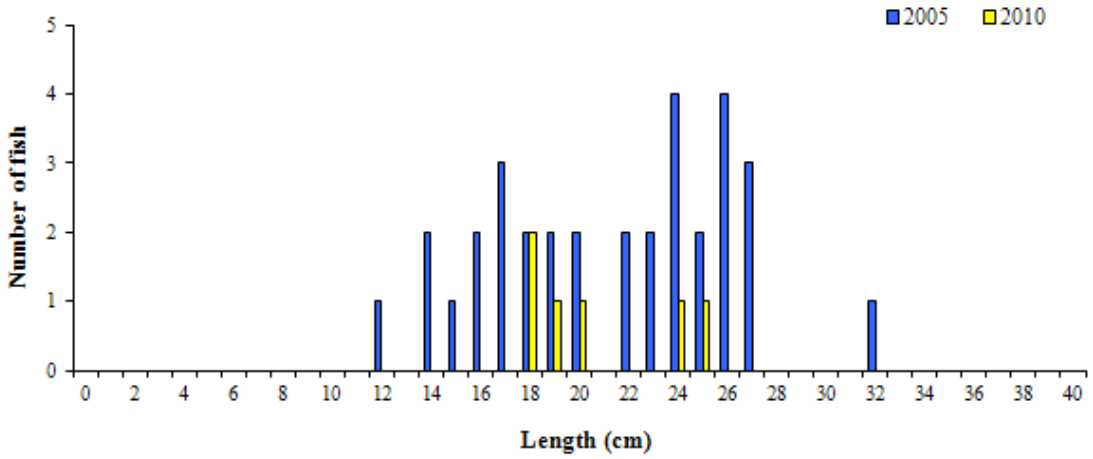

Fig. 1.6. Length frequency of brown trout captured in Lattone Lough

1.3.4 Fish age and growth

Twelve age classes of perch were present, ranging from 0+ to 11+, with a mean L1 of 5.3cm (Table 1.3). In the 2007 survey, perch ranged in age from 1+ to 6+ with a mean L1 of 6.2cm.

Three age classes of brown trout were present, ranging from 2+ to 4+, with a mean L1 of 6.5cm (Table 1.4). In the 2007 survey, brown trout ranged in age from 1+ to 5+ with a mean L1 of 6.2cm.

Two age classes of bream were present, ranging from 2+ to 5+, with a mean L1 of 3.8cm. The single roach x bream hybrid and roach captured were aged 5+ and 9+ respectively.

Table 1.3. Mean (±SE) perch length at age (cm) for Lattone Lough, August 2010

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}
Mean	5.3 (0.1)	10.2 (0.2)	12.8 (0.2)	14.7 (0.2)	16.4 (0.3)	17.8 (0.5)	20.9 (1.4)	21.7 (1.3)	23.7 (1.2)	24.6 (0.5)	27.4 (1.5)
N	65	53	47	39	23	14	6	5	4	3	2
Range	3.3-6.5	6.5-12.3	9.0-15.1	10.2-18.1	13.6-18.7	15.3-21.8	16.3-26.2	18.3-25.7	22.3-27.2	23.6-25.2	26.0-28.9

Table 1.4. Mean (±SE) brown trout length (cm) at age for Lattone Lough, August 2010

	L_1	L_2	L_3	L_4
Mean	6.5 (0.4)	13.7 (0.6)	19.9 (0.4)	22.8
N	6	6	2	1
Range	5.7-8.3	11.16-15.6	19.5-20.4	22.8-22.8

1.4 Summary

Perch was the dominant species in terms of both abundance (CPUE) and biomass (BPUE).

The mean perch CPUE in Lattone Lough was relatively high when compared to Glenade Lough, the only other similar lake assessed; however, this was not statistically significant. Perch ranged in age from 0+ to 11+ indicating reproductive success in the previous twelve years.

The mean brown trout CPUE in Lattone Lough was relatively low when compared to Lickeen Lough; however, this difference was not statistically significant. Brown trout ranged in age from 2+ to 4+, with no 0+ or 1+ fish being captured

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. Using the FIL2 classification tool, Lattone Lough has been assigned an ecological status of Poor/Bad for both 2005 and 2010 based on the fish populations present.

Lattone Lough has been subject to the illegal stocking of non-native fish species over the last six years, with roach, bream, roach x bream hybrids and tench all being recorded in the most recent survey. Non-native species can have significant impacts on the native fish species present. Direct effects such as predation by pike on native salmonid species (Fitzmaurice, 1984) and indirect effects such as highly fecund roach populations out competing brown trout for limited resources (Fitzmaurice, 1984) can have serious ecological consequences on the native fish species. The fact that Lattone Lough is situated upstream from Lough Melvin, an ecologically sensitive water body with unique brown trout populations, serves to heighten the threat caused by the illegal stocking of non-native species to this lake. Furthermore, introduction of non-native species will serve to downgrade the ecological status of a water body for WFD purposes.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lattone Lough an overall ecological status of Moderate, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised at the end of 2012.

1.5 References

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

NIEA (2010) http://www.ni-environment.gov.uk/print/landscape/country_landscape/1/1-bio.htm

O' Reilly (2007) *Loughs of Ireland. A Flyfisher's Guide.* 4th Edition. Merlin Unwin Books.

Inland Fisheries Ireland
Swords Business Campus,
Swords,
Co. Dublin,
Ireland.

Web: www.fisheriesireland.ie
Email: info@fisheriesireland.ie
Tel: +353 1 8842 600
Fax: +353 1 8360 060