Inchicronan Lough

Sampling Fish for the Water Framework Directive - Lakes 2009

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

1.1 Introduction

Inchicronan Lough (Plate 1.1, Fig. 1.1) is located in the upper reaches of the Fergus system. It is situated approximately 2km south of Crusheen, Co Clare. It has a surface area of 120ha and a maximum depth of 18.8m. The lake is categorised as typology class 10 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and high alkalinity (>100mg/l $CaCO_3$).

Inchicronan Lough and the surrounding area contain a diverse range of habitats and species, including reed beds, scrub islands, cut-over bog, woodland, wet grassland, marsh lands and a variety of bird species (Clare Library, 2009). Threats to the lake include agricultural improvement, land reclamation, drainage and housing (Clare Library, 2009). The lake was previously surveyed by the Inland Fisheries Trust in 1986 and was found to contain pike, perch and rudd (IFT unpublished data).
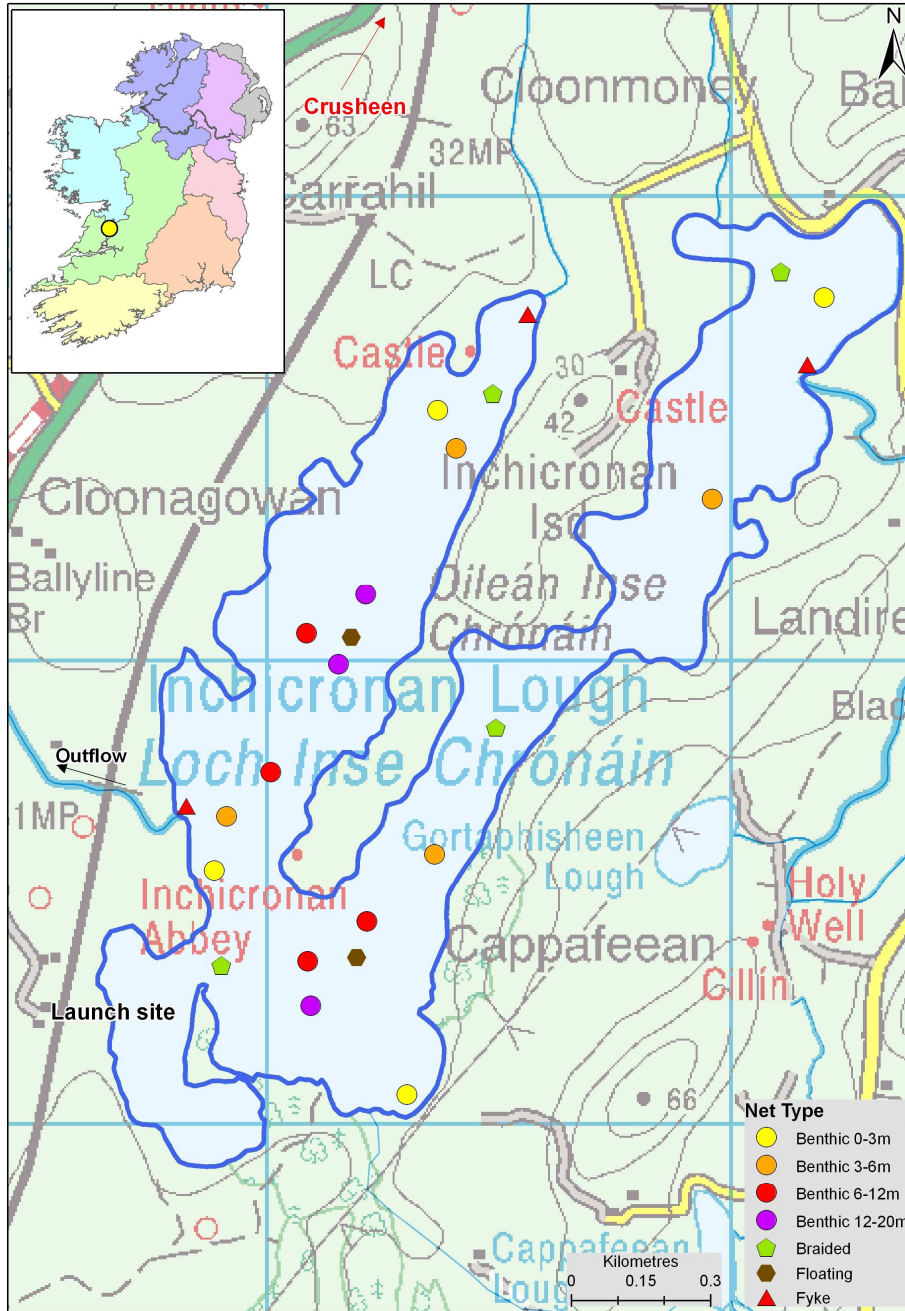

Plate 1.1. Inchicronan Lough

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

1.2 Methods

Inchicronan Lough was surveyed over two nights between the 7th and the 9th of September 2009. A total of three sets of Dutch fyke nets, 15 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 4 @ 6-11.9m and 3 @ 12-19.9) and two surface monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed randomly in the lake (20 sites). The netting effort was supplemented using four

benthic braided survey gill nets (62.5mm mesh knot to knot) at four additional sites. Survey locations were randomly selected within each depth zone 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 all rudd 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 were recorded on Inchicronan Lough in September 2009, with 295 fish being captured (Table 1.1). Perch was the most abundant fish species recorded. Small numbers of pike and rudd were also recorded. Eels were captured in fyke nets only.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on Inchicronan Lough, September 2009

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Benthic braided gill nets	Surface mono multimesh gill nets	Fyke nets	Total
Perca fluviatilis	Perch	242	0	2	0	244
Scardinius erythropthalmus	Rudd	15	0	7	0	22
Esox lucius	Pike	3	4	0	0	7
Anguilla anguilla	European eel	0	0	0	22	22

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 are summarised in Table 1.2.

The differences in the mean perch CPUE between Inchicronan Lough and four other similar lakes were assessed and found to be statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.2). Independent-Samples Mann-Whitney U tests between each lake showed that Inchicronan Lough had a significantly higher mean perch CPUE than Muckanagh Lough ($z = -1.996$, $P<0.05$).

The differences in the mean rudd CPUE between Inchicronan Lough and four other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P<0.001$) (Fig. 1.3). Independent-Samples Mann-Whitney U tests between each lake showed that Inchicronan Lough had a significantly lower mean rudd CPUE than Lough Gur ($z = -4.144$, $P<0.001$).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Inchicronan Lough, September 2009

Scientific name	Common name	
		Mean CPUE
Perca fluviatilis	Perch	0.339 (0.091)
Scardinius erythropthalmus	Rudd	0.031 (0.017)
Esox lucius	Pike	0.010 (0.005)
Anguilla anguilla	European eel	0.244 (0.122)
		Mean BPUE
Esox lucius	Pike	23.856 (13.181)
Perca fluviatilis	Perch	11.069 (3.511)
Scardinius erythropthalmus	Rudd	3.828 (2.888)
Anguilla anguilla	European eel	77.833 (39.825)

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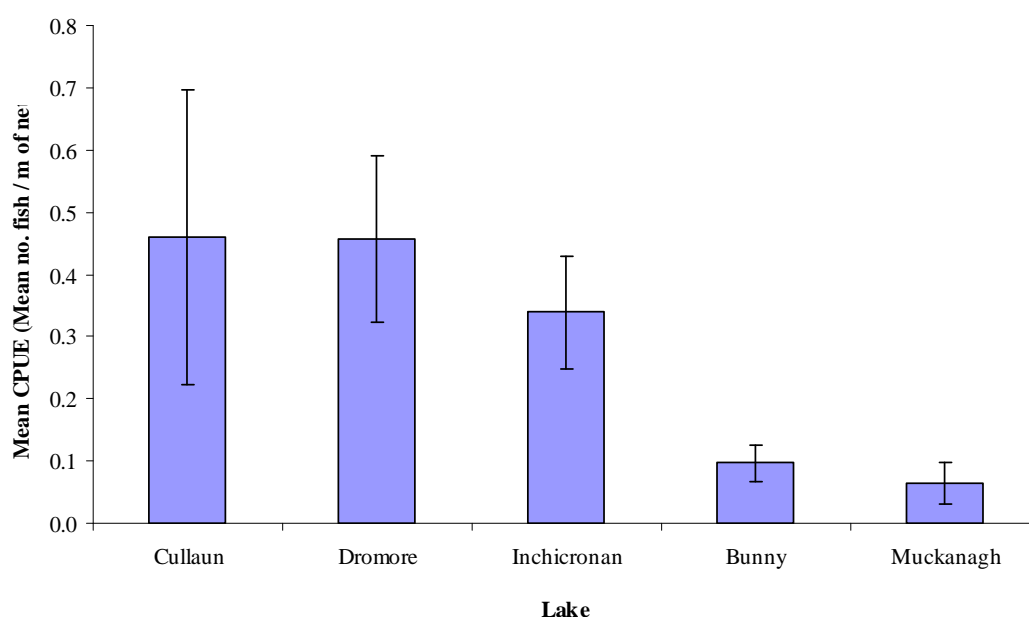

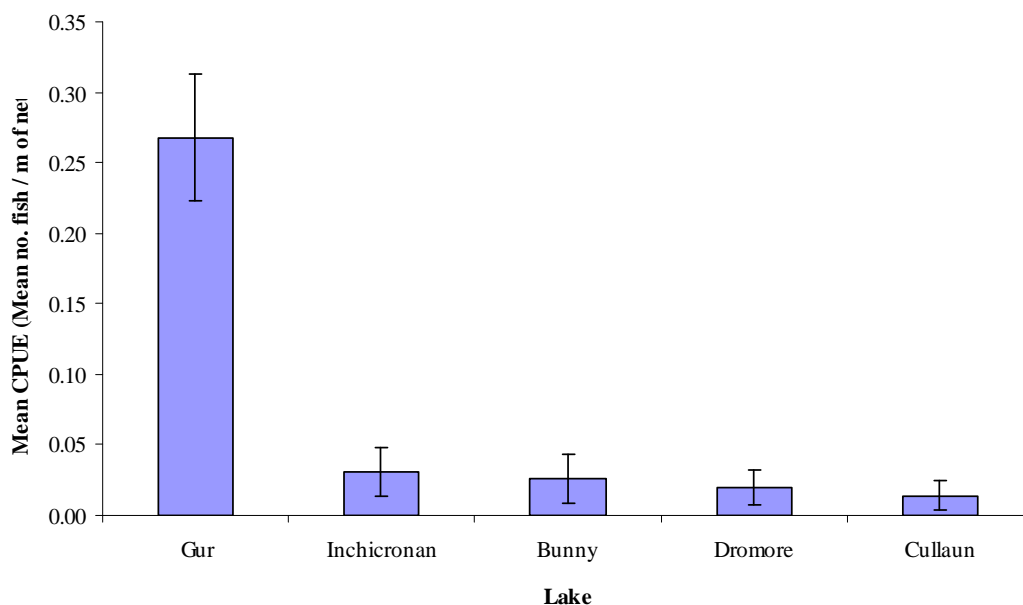**Fig. 1.2. Mean (±S.E.) perch CPUE in five lakes surveyed during 2009**

Fig. 1.3. Mean (±S.E.) rudd CPUE in five lakes surveyed during 2009

1.3.3 Length frequency distributions

Perch ranged in length from 4.6cm to 24.3cm (mean = 10.6cm) (Fig. 1.4). Rudd ranged in length from 8.7cm to 25.3cm (mean = 17.5cm) (Fig.1.5). Pike ranged in length from 35.2cm to 77.0cm. Eels ranged in length from 32.0cm to 74.0cm.
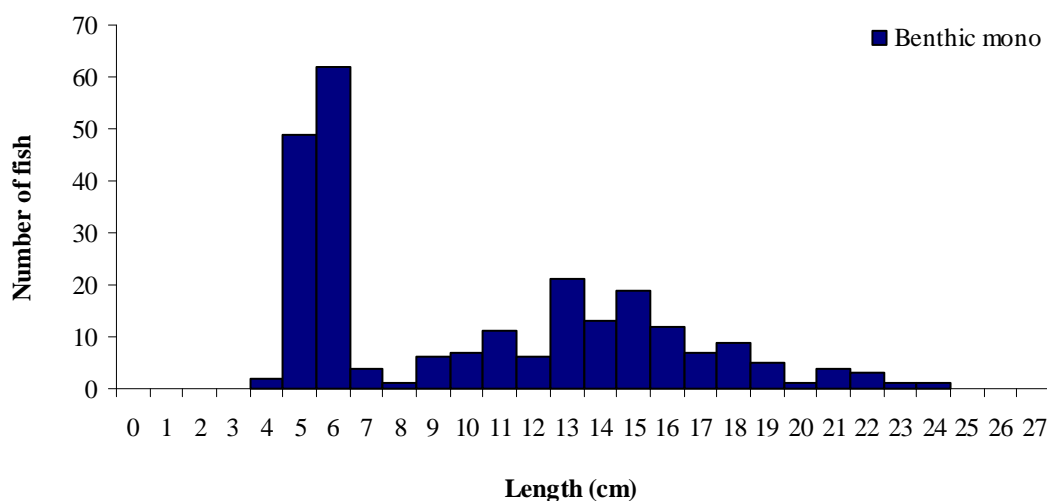

Fig. 1.4. Length frequency of perch (n=244) captured on Inchicronan Lough, September 2009
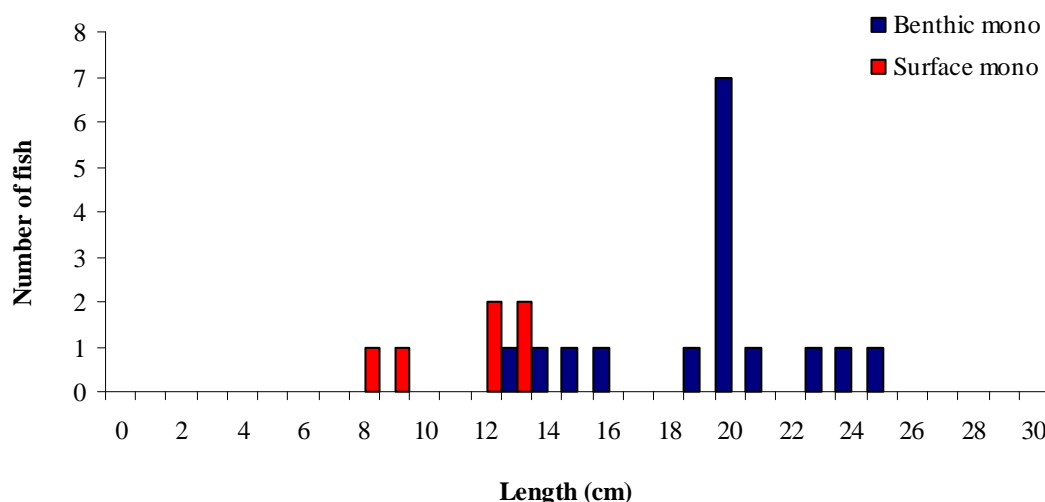
Fig. 1.5. Length frequency of rudd (n=22) captured on Inchicronan Lough, September 2009

1.3.4 Fish age and growth

Six age classes of perch were present, ranging from 0+ to 5+, with a mean L1 of 6.8cm (Table 1.3). The dominant age class of perch was 0+ corresponding to the 4cm to 7cm length class (Fig. 1.4).

Four age classes of rudd were present, ranging from 1+ to 4+, with a mean L1 of 2.3cm (Table 1.4). Three age classes of pike were present, ranging from 1+ to 4+.

Table 1.3. Mean (±SE) perch length at age for Inchicronan Lough, September 2009

	L_1	L_2	L_3	L_4	L_5
Mean	6.8 (0.1)	12.2 (0.2)	16.6 (0.3)	20.0 (0.4)	20.7
N	97	72	29	8	1
Range	4.6-9.9	7.9-17.0	12.9-20.2	18.5-21.9	20.7-20.7

Table 1.4. Mean (±SE) rudd length at age for Inchicronan Lough, September 2009

	L_1	L_2	L_3	L_4
Mean	2.3 (0.2)	7.5 (0.2)	14.2 (0.3)	18.8 (0.7)
N	21	19	12	6
Range	1.6-3.7	6.2-9.7	11.8-15.8	17.1-21.4

1.4 Summary

Perch was the dominant fish species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets.

The mean perch CPUE in Inchicronan Lough was significantly higher than Muckanagh Lough; however, there were no statistically significant differences between the other lakes assessed. The dominant age class of perch was 0+, with age classes ranging from 0+ to 5+, indicating reproductive success in each of the previous five years.

The mean rudd CPUE in Inchicronan Lough was significantly lower than Lough Gur but not significantly different when compared to the other three lakes assessed. Rudd ranged in age from 1+ to 4+, indicating reproductive success in the last four years.

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 WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using CFB and Agri-Food and Biosciences Northern Ireland (AFBINI) data generated during the NSSHARE Fish in Lakes project (Kelly *et al.*, 2008). Using this tool, Inchicronan Lough has been assigned an ecological status classification of Moderate based on the fish populations present.

The EPA has assigned an overall status of Moderate to Inchicronan Lough in an interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish.

1.5 References

ANON (2009)
    www.crusheen.com/V4/index.php?option=com_content&view=article&id=25&Itemid=41

Clare Library (2009) Site Brief: Inchicronan Lough
    www.clarelibrary.ie/eolas/coclare/heritage/site_brief.htm

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.

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