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Sampling Fish for the Water Framework Directive

Lakes 2011

Derrybrick Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Derrybrick Lough, October 2011

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Cover photo: Lynda and Fiona gill netting © Inland Fisheries Ireland

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1.1 Introduction

Derrybrick Lough is located in the Erne catchment, north-east of Killeshandra and approximately five kilometres south-west of Belturbet. The lake is situated at an altitude of 48m above sea level, has a surface area of 36ha, a mean depth of 2.1m and a maximum depth of 4.9m. The lake is categorised as typology class 9 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), less than 50ha and high alkalinity (>100mg/l CaCO3). Derrybrick Lough is located within the Lough Oughter and associated loughs Special Area of Conservation (NPWS, 2002). The geology of the area is predominantly Lower Carboniferous Limestone.

A previous survey by the Inland Fisheries Trust (IFT) in 1969 established rudd, bream, perch, pike and rudd x bream hybrids to be present in the lake (IFT, unpublished data). A second survey in August 1980 found that roach were numerous, there was a poor stock of rudd, small bream, small perch, a fair stock of pike and a good stock of roach x bream hybrids (up to 1.125g) (IFT, unpublished data). The lake was also surveyed by Inland Fisheries Ireland (formerly the Central Fisheries Board and the Northern Regional Fisheries Board) in 2005 as part of the NS Share Fish in Lakes project, and this survey found that roach followed by perch were the dominant fish species in the lake (Kelly *et al*., 2007). Pike, roach x bream hybrids and eels were also present. A subsequent survey was undertaken on Derrybrick Lough in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009). During this survey, perch and roach were found to be the dominant species present in the lake. Bream, pike, roach x bream hybrids and eels were also captured during the survey.

This report summarises the results of the 2011 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

Plate 1.1. Derrybrick Lough, looking north across the lake

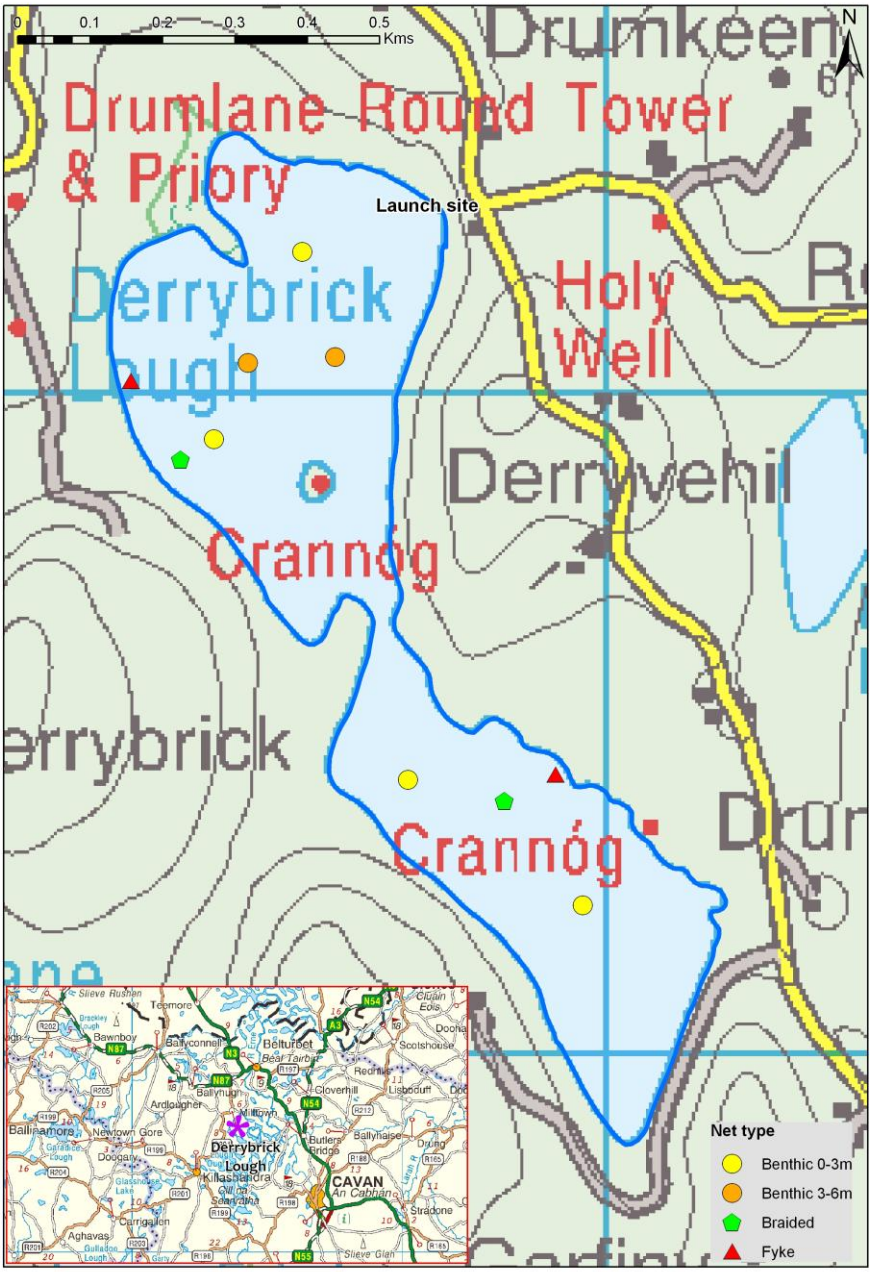

Fig. 1.1. Location map of Derrybrick Lough showing locations and depths of each net

1.2 Methods

Derrybrick Lough was surveyed over one night between the 10th and the 11th of October 2011. A total of two sets of Dutch fyke nets and six benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m and 2 @ 3-5.9m) were deployed in the lake (eight sites). The netting effort was supplemented using two benthic braided survey gill nets (62.5mm mesh knot to knot) at two additional sites. Nets were deployed in the same locations as were randomly selected in the previous survey in 2008. 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 roach, pike 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 four fish species and one type of hybrid were recorded on Derrybrick Lough in October 2011, with 127 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 roach, eels, roach x bream hybrids and pike. During the previous survey in 2008 the same species composition was recorded with the exception of bream, which were present during the 2008 survey but were not captured in the current survey.

Table 1.1. Number of each fish species captured by each gear type during the survey on Derrybrick Lough, October 2011

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	70	0	0	70
Esox lucius	Pike	1	1	0	2
Rutilus rutilus	Roach	37	0	0	37
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0	7	0	7
Anguilla anguilla	European eel	0	0	11	11

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 2008 and 2011 are summarised in Table 1.2. Mean CPUE and BPUE for all fish species is illustrated in Figures 1.2 and 1.3.

Although the mean perch and roach CPUEs and BPUEs were lower in 2011 than in 2008, these differences were not statistically significant (Table 1.2; Figs 1.2 and 1.3).

The differences in the mean perch CPUE and BPUE between Derrybrick Lough and three other similar lakes was assessed, with no overall significant differences being found (Fig. 1.4 and 1.5).

The differences in the mean roach CPUE between Derrybrick Lough and three other similar lakes were assessed, and found to be statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.6). Independent-Samples Mann-Whitney U tests between each lake showed that Derrybrick Lough had a significantly lower mean roach CPUE than Templehouse Lake ($z = -3.319$, $P<0.05$).

The differences in the mean roach BPUE between Derrybrick Lough and three other similar lakes were assessed, and found to be statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.7). Independent-Samples Mann-Whitney U tests between each lake showed that Derrybrick Lough had a significantly lower mean roach BPUE than Templehouse Lake, Lough Egish and Corglass Lough ($z = -3.350$ $P<0.05$, $z = -2.098$ $P<0.05$, $z = -2.273$ $P<0.05$).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Derrybrick Lough, 2008 and 2011

Scientific name	Common name	2008	2011
		Mean CPUE	
Perca fluviatilis	Perch	0.571 (0.216)	0.233 (0.081)
Esox lucius	Pike	0.003 (0.003)	0.007 (0.004)
Rutilus rutilus	Roach	0.256 (0.128)	0.123 (0.085)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.021 (0.012)	0.025 (0.025)
Abramis brama	Bream	0.003 (0.003)	-
Anguilla anguilla	European eel	0.1 (0.05)	0.091 (0.075)
		Mean BPUE	
Perca fluviatilis	Perch	10.856 (4.250)	9.291 (4.003)
Esox lucius	Pike	6.666 (6.666)	14.622 (13.448)
Rutilus rutilus	Roach	22.373 (10.515)	3.848 (2.251)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	32.498 (19.541)	58.492 (58.492)
Abramis brama	Bream	0.6633 (0.663)	-
Anguilla anguilla	European eel	24.183 (8.449)	33.266 (31.166)

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

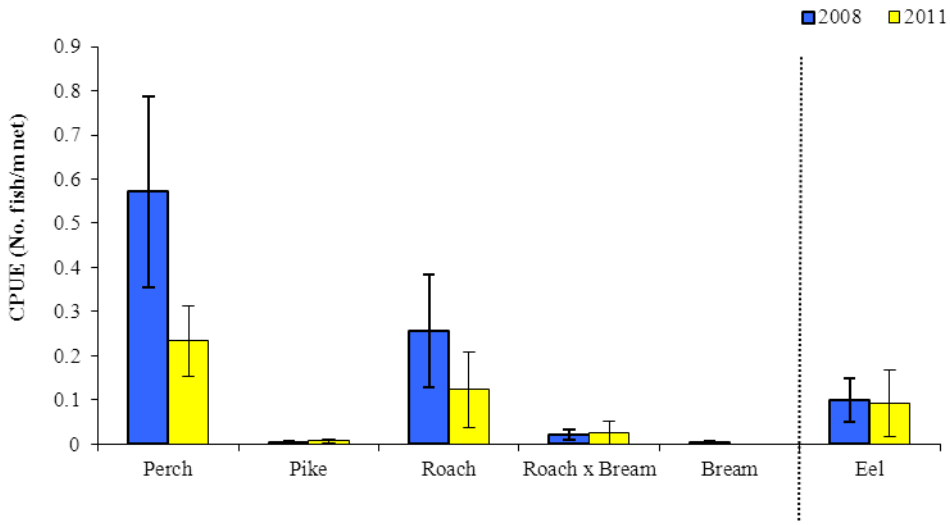

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Derrybrick Lough (Eel CPUE based on fyke nets only), 2008 and 2011

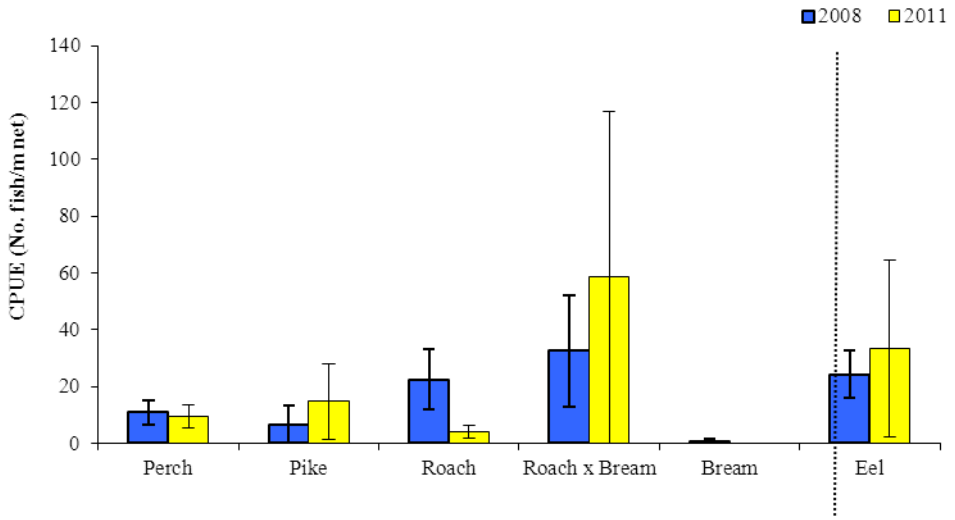

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Derrybrick Lough (Eel CPUE based on fyke nets only), 2008 and 2011

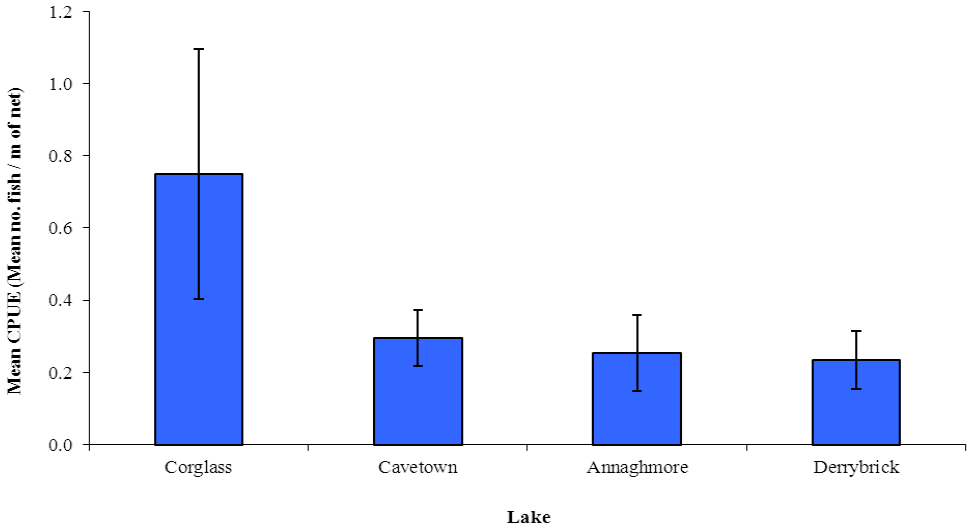

Fig. 1.4. Mean (±S.E.) perch CPUE in four lakes surveyed during 2011

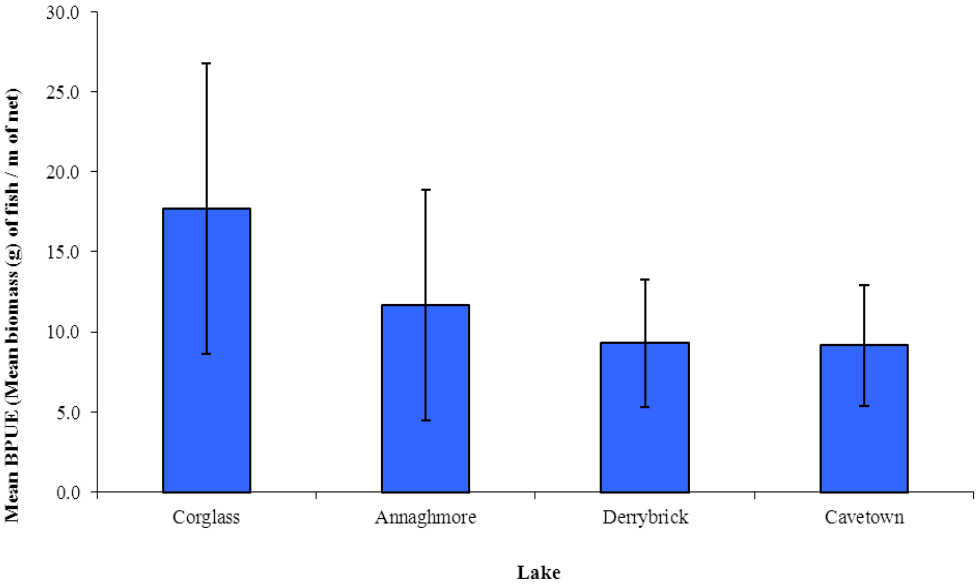

Fig. 1.5. Mean (±S.E.) perch BPUE in four lakes surveyed during 2011

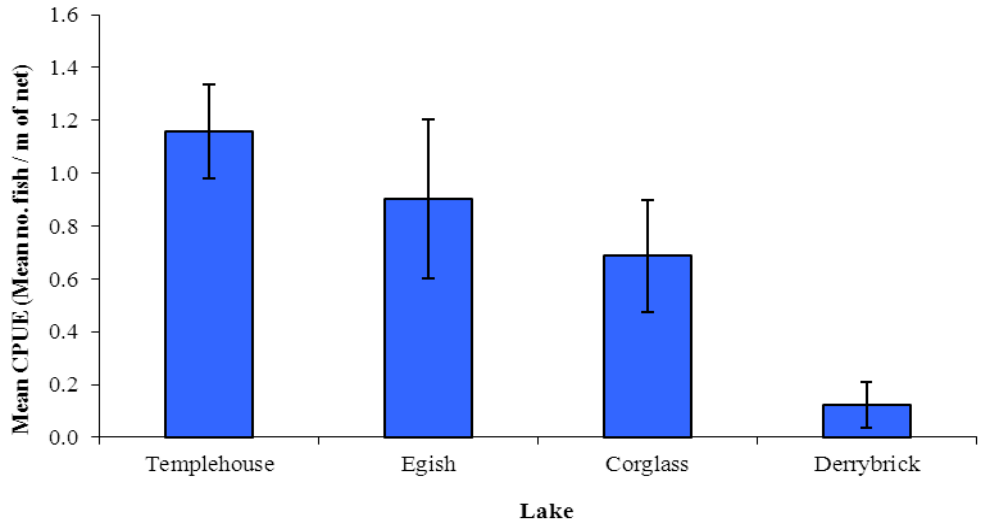

Fig. 1.6. Mean (±S.E.) roach CPUE in four lakes surveyed during 2011

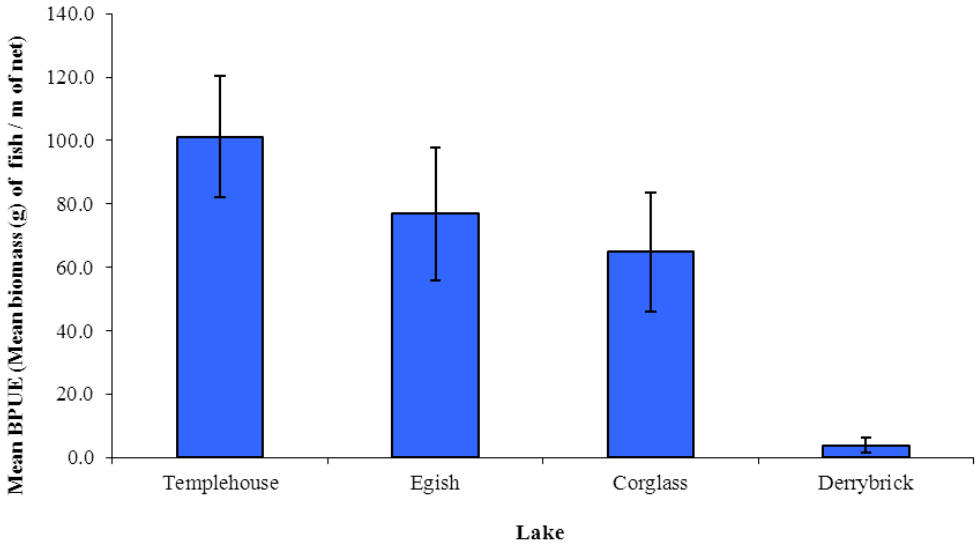

Fig. 1.7. Mean (±S.E.) roach BPUE in four lakes surveyed during 2011

1.3.3 Length frequency distributions

Perch captured during the 2011 survey ranged in length from 4.7cm to 27.8cm (mean = 11.5cm) (Fig.1.8). Perch captured during the 2008 survey had lengths ranging from 5.6cm to 27.5cm (Fig.1.8).

Roach captured during the 2011 survey ranged in length from 7.8cm to 21.7cm (mean = 11.1cm) (Fig. 1.9). Roach captured during the 2008 survey were larger than those captured 2011 and ranged in length from 4.0cm to 32.5cm (Fig. 1.9).

Roach x bream hybrids captured during the 2011 survey ranged in length from 42.1cm to 50.5cm, pike ranged in length from 35.3cm to 79.2cm and eels ranged from 40.0cm to 67.0cm.

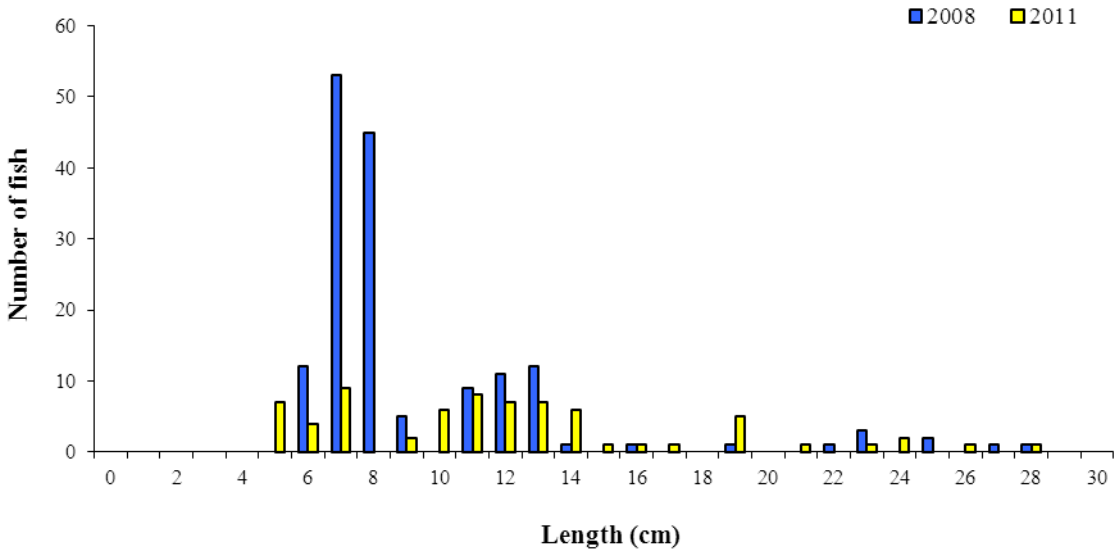

Fig. 1.8. Length frequency of perch captured on Derrybrick Lough

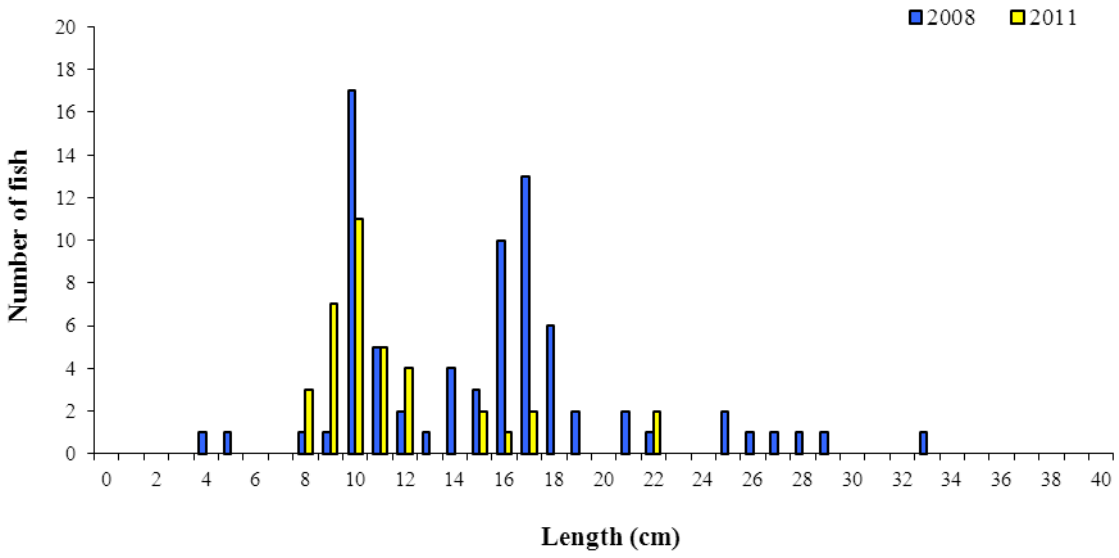

Fig. 1.9. Length frequency of roach captured on Derrybrick Lough

1.3.4 Fish age and growth

Six age classes of perch were present, ranging from 0+ to 5+, with a mean L1 of 5.9cm (Table 1.3). In the 2008 survey, perch also ranged in age from 0+ to 5+ with a mean L1 of 6.9cm.

Four age classes of roach were present, ranging from 1+ to 4+, with a mean L1 of 3.3cm (Table 1.4). In the 2008 survey, roach ranged from 1+ to 7+ with a mean L1 of 4.4cm.

Table 1.3. Mean (±SE) perch length (cm) at age for Derrybrick Lough, October 2011

	L_1	L_2	L_3	L_4	L_5
Mean	5.9 (0.1)	10.9 (0.2)	17.5 (0.4)	21.3 (1.1)	25.0 (1.9)
N	41	14	6	3	2
Range	4.6-7.4	9.3-12.3	15.7-18.6	19.1-22.7	23.0-26.9

Table 1.4. Mean (±SE) roach length (cm) at age for Derrybrick Lough, October 2011

	L_1	L_2	L_3	L_4
Mean	3.3 (0.1)	6.9 (0.4)	12.7 (1.6)	18.3 (0.3)
N	27	12	3	2
Range	1.9-4.6	5.2-10.0	9.3-14.8	17.9-18.7

1.4 Summary

Perch was the dominant species in terms of abundance (CPUE) and roach x bream hybrids were the dominant species in terms of biomass (BPUE) captured in the survey gill nets during the 2011 survey.

Although the mean perch and roach CPUEs and BPUEs were lower in 2011 than in 2008, these differences were not statistically significant.

The mean perch CPUE and BPUE in Derrybrick Lough was similar to the other lakes assessed, with no statistically significant differences being found between lakes. Perch ranged in age from 0+ to 5+, with 0+ and 1+ fish being captured indicating reproductive success in recent years. The dominant age class of perch was 1+.

The mean roach CPUE in Derrybrick Lough was significantly lower than Templehouse Lake and the mean roach BPUE in Derrybrick Lough was significantly lower than three other similar lakes surveyed; Templehouse Lake, Lough Egish and Corglass Lough. Roach ranged in age from 1+ to 4+, with 1+ fish being captured indicating reproductive success in in recent 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 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 (Kelly *et al.*, 2012). Using the FIL2 classification tool, Derrybrick Lough has been assigned an ecological status of Poor/Bad based on the fish populations present. The ecological status assigned to the lake based on the 2008 survey data was Moderate.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Derrybrick 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

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