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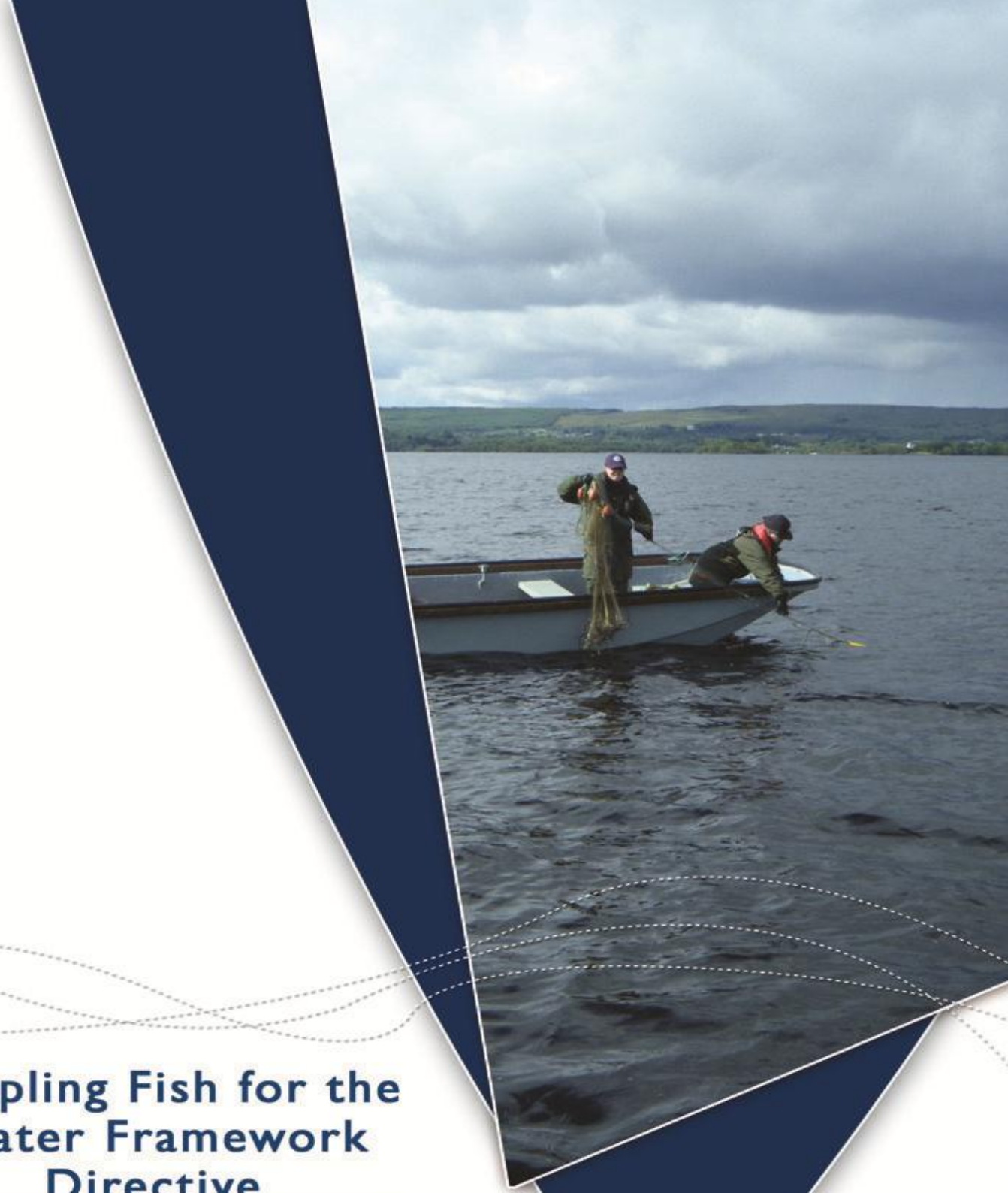

Sampling Fish for the Water Framework Directive

Lakes 2011

Cavetown Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Cavetown Lough, July 2011

Fiona L. Kelly, Lynda Connor, Emma Morrissey, Ciara Wogerbauer, Ronan Matson, Rory Feeney and Kieran Rocks

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

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

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1.1 Introduction

Cavetown Lough is situated in Co. Leitrim in the Upper Shannon catchment (Plate 1.1, Fig. 1.1). 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 into the lake by the local angling club; however Inland Fisheries Ireland stocking records show that it has not been stocked in recent years. The lake was surveyed previously by Inland Fisheries Ireland (previously the Central Fisheries Board and the Shannon Regional Fisheries Board in 1988 (IFI unpublished data)).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. A subsequent survey was undertaken on the lake in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009). During this survey, roach were found to be the dominant species present in the lake. Bream, pike, roach x bream hybrids, roach x rudd 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. Cavetown Lough

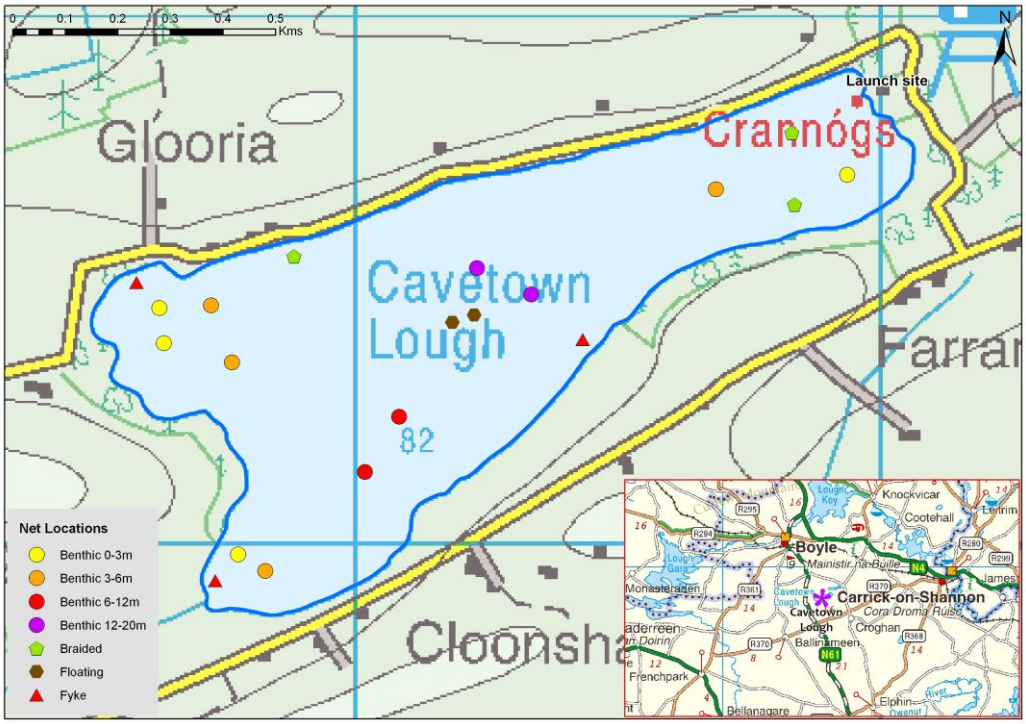

Fig. 1.1. Location map of Cavetown Lough indicating locations and depths of each net

1.2 Methods

Cavetown Lough was surveyed over two nights between the 6th and the 8th of July 2011. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 2 @ 6-11.9m and 2 @ 12-19.9m) and two floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (17 sites). The netting effort was supplemented using three benthic braided survey gill nets (62.5mm mesh knot to knot) at three 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, bream and 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 five fish species and two types of hybrids were recorded on Cavetown Lough in July 2011, with 359 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, bream, roach x bream hybrids, roach x rudd hybrids and pike were also recorded. During the previous survey in 2008 the same species composition was recorded with the exception of perch, which were present during the 2011 survey but were not captured in the 2008 survey.

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

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	168	5	0	8	181
Rutilus rutilus	Roach	126	11	0	0	137
Rutilus rutilus x Scardinius erythrophthalmus	Roach x rudd hybrid	20	0	0	0	20
Esox lucius	Pike	6	0	0	1	7
Abramis brama	Bream	4	0	2	0	6
Rutilus rutilus x Abramis brama	Roach x bream hybrid	6	0	0	0	6
Anguilla anguilla	European eel	0	0	0	2	2

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 roach CPUE was lower in 2011 than in 2008, this difference was not statistically significant. The differences in the mean perch CPUE from 2011 between Cavetown Lough and three other similar lakes was assessed, with no overall significant differences being identified (Fig. 1.4).

Although the mean roach BPUE was higher in 2011 than in 2008, this difference was not statistically significant. The differences in the mean perch BPUE between Cavetown Lough and three other similar lakes was assessed, with no overall significant differences being found (Fig. 1.5).

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

Scientific name	Common name	2008	2011
		Mean CPUE	
Perca fluviatilis	Perch	-	0.295 (0.077)
Esox lucius	Pike	0.018 (0.006)	0.011 (0.004)
Rutilus rutilus	Roach	0.523 (0.152)	0.228 (0.078)
Abramis brama	Bream	0.002 (0.002)	0.010 (0.006)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.015 (0.006)	0.01 (0.004)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x rudd hybrid	0.003 (0.002)	0.033 (0.013)
Anguilla anguilla	European eel	0.044 (0.011)	0.011 (0.005)
		Mean BPUE	
Perca fluviatilis	Perch	-	9.158 (3.783)
Esox lucius	Pike	4.459 (1.917)	7.025 (3.443)
Rutilus rutilus	Roach	17.089 (4.688)	25.097 (7.671)
Abramis brama	Bream	0.923 (0.923)	5.975 (4.044)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	5.116 (2.189)	3.28 (1.650)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x rudd hybrid	1.178 (0.839)	11.726 (4.572)
Anguilla anguilla	European eel	19.427 (6.569)	3.65 (1.975)

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

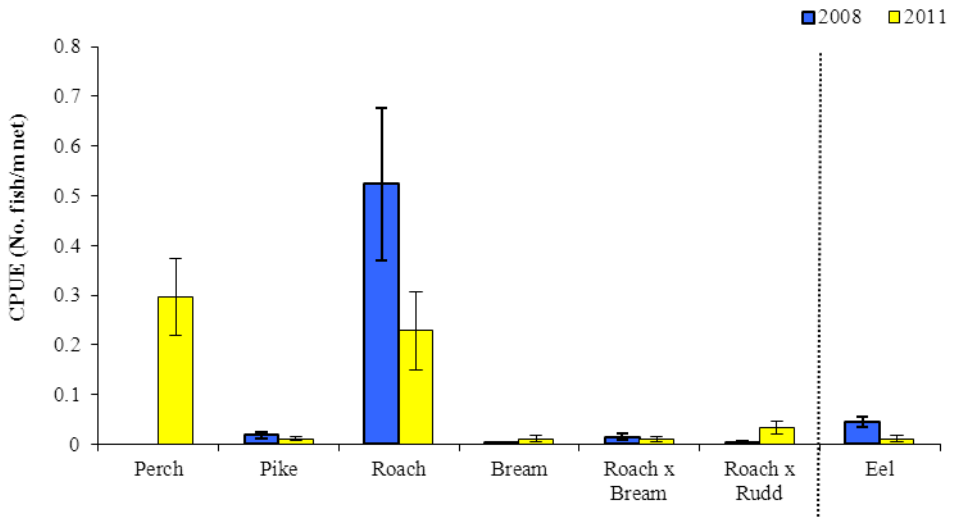

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Cavetown Lough (Eel CPUE based on fyke nets only), 2008 and 2011

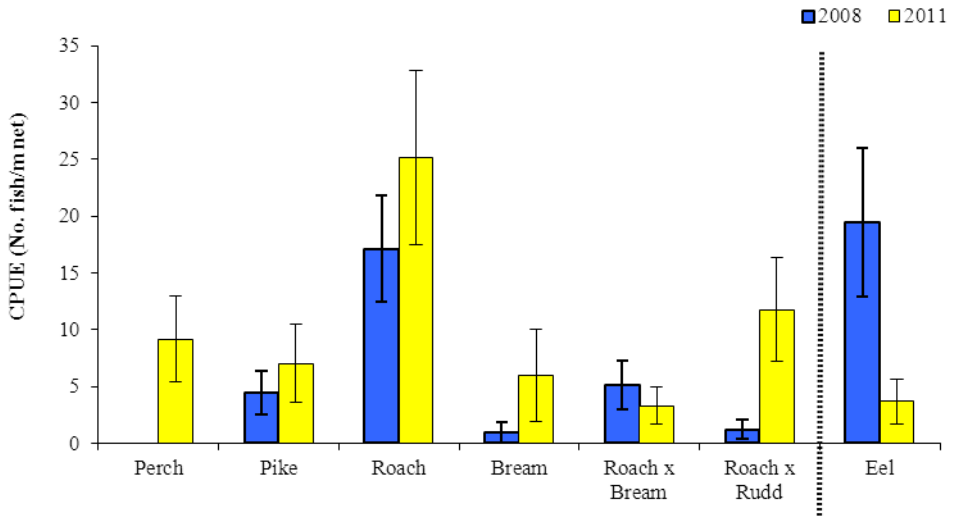

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Cavetown Lough (Eel CPUE based on fyke nets only), 2008 and 2011

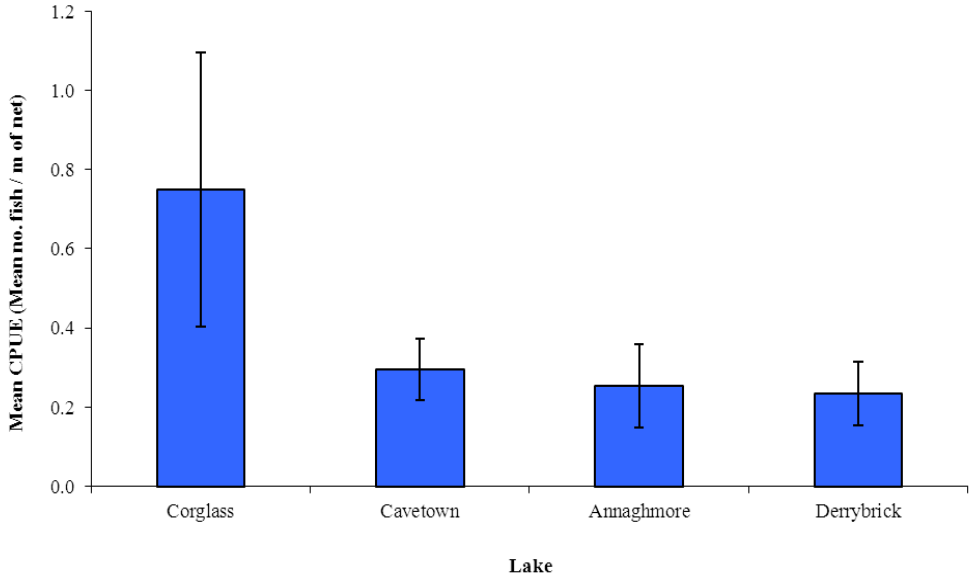

Fig. 1.4. Mean (±S.E.) perch CPUE in four lakes surveyed during 2011

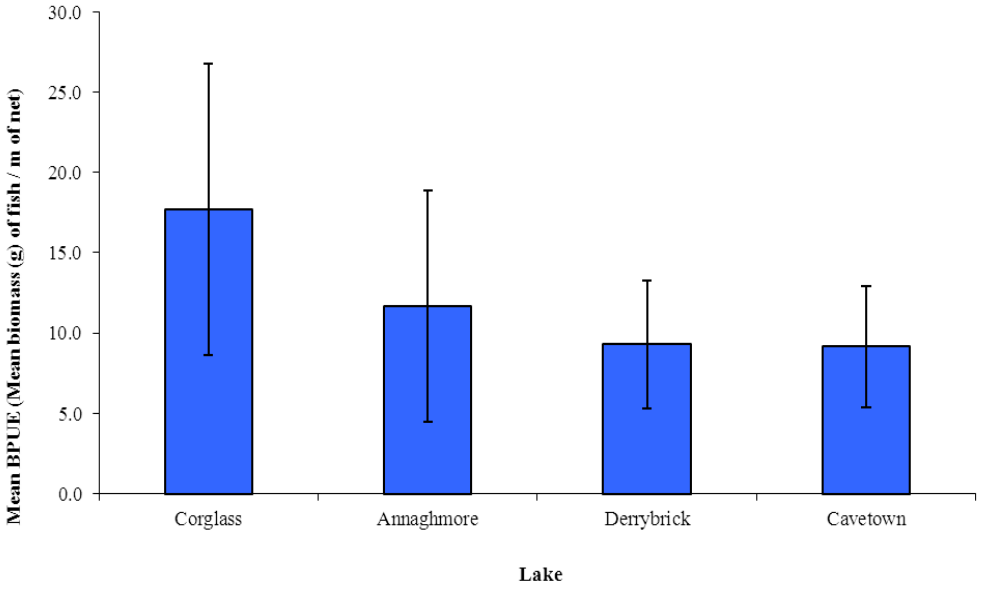

Fig. 1.5. Mean (±S.E.) perch BPUE in four lakes surveyed during 2011

1.3.3 Length frequency distributions

Perch captured during the 2011 survey ranged in length from 3.1cm to 23.8cm (mean = 12.0cm) (Fig.1.6). No perch were recorded during the 2008 survey.

Roach captured during the 2011 survey ranged in length from 4.5cm to 28.0cm (mean = 15.9cm) (Fig. 1.7). Roach captured during the 2008 survey displayed a similar length range from 4.0cm to 30.2cm (Fig. 1.7).

Roach x bream hybrids captured during the 2011 survey ranged in length from 9.7cm to 31.2cm, roach x rudd hybrids ranged in length from 21.8cm to 28.2cm, pike ranged in length from 9.2cm to 60.0cm and bream ranged from 21.3cm to 40.3cm. Two eels were recorded at 52.3cm and 58.0cm.

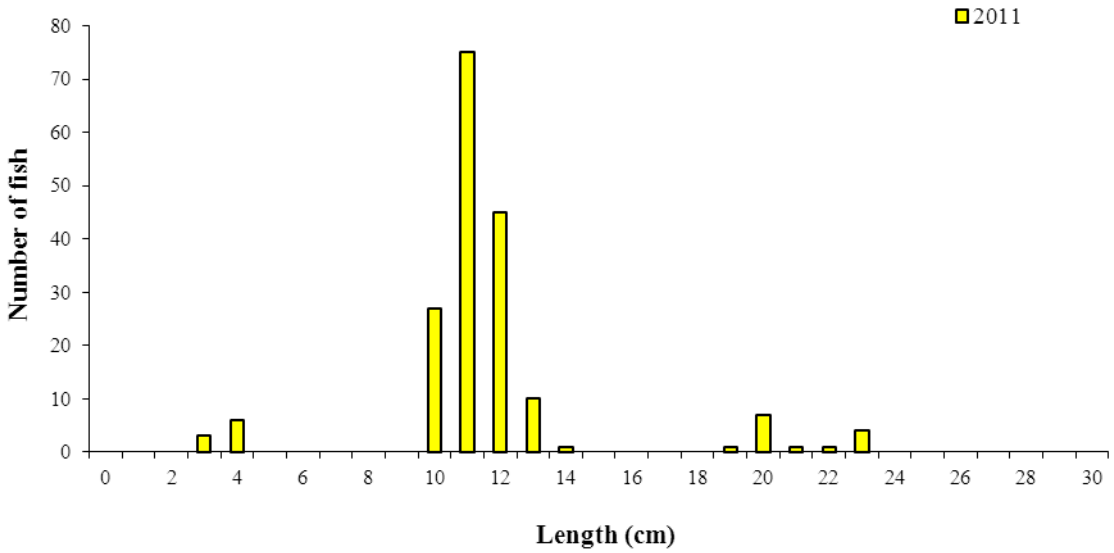

Fig. 1.6. Length frequency of perch captured on Cavetown Lough, 2008 and 2011

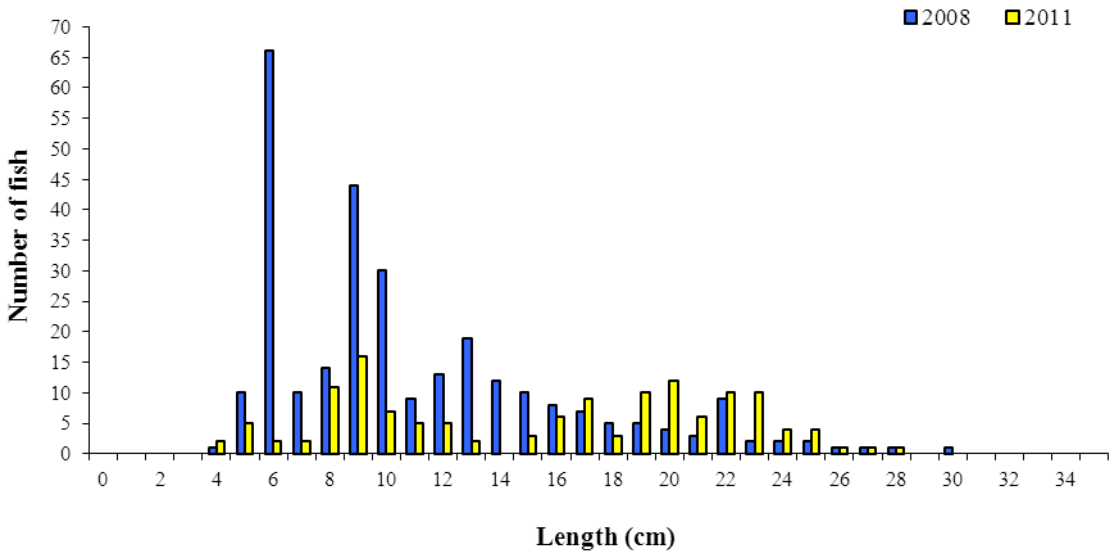

Fig. 1.7. Length frequency of roach captured on Cavetown Lough, 2008 and 2011

1.3.4 Fish age and growth

Four age classes of perch were present, ranging from 0+ to 3+, with a mean L1 of 8.4cm (Table 1.3).

Seven age classes of roach were present, ranging from 2+ to 8+, with a mean L1 of 1.9cm (Table 1.4). In the 2008 survey, roach ranged from 0+ to 7+ with a mean L1 of 3.4cm.

Two age classes of bream were present, ranging from 5+ to 12+, five age classes of pike were present ranging from 2+ to 6+, roach x rudd hybrids ranged from 6+ to 9+ and seven age classes of roach x bream hybrids ranged from 5+ to 6+. Bream ranged in age from 5+ to 12+.

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

	L_1	L_2	L_3
Mean	8.4 (0.3)	15.3 (1.3)	19.1 (0.2)
N	33	17	4
Range	4.5-10.7	8.6-21.5	18.8-19.5

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

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8
Mean	1.9 (0.1)	5.1 (0.2)	8.8 (0.2)	13.4 (0.3)	17.1 (0.3)	19.8 (0.3)	22.1 (0.5)	23.7
N	60	60	51	43	36	29	16	1
Range	1.2-3.7	2.2-9.5	5.8-12.3	8.3-17.5	12.5-20.9	16.0-23.7	17.8-25.7	23.7-23.7

1.4 Summary

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

The mean perch CPUE and BPUE in Cavetown Lough was similar to the other high alkalinity lakes surveyed during 2011, with no statistically significant differences being found between lakes. Perch ranged in age from 0+ to 3+, indicating reproductive success in recent years. The dominant age class of perch was 1+.

Although the mean roach CPUE was lower in 2011 than in 2008and the mean roach BPUE was higher in 2011 than in 2008, these differences were not statistically significant. Roach ranged in age from 2+ to 8+, with no 0+ or 1+ fish being captured indicating a decrease in reproductive success in recent years.

During the 1988 survey, a healthy population of rudd were captured; however rudd were completely absent in the 2008 and the current survey. An abundant roach population, along with specimens of roach x rudd hybrids in both the current and 2008 surveys, would suggest that roach were introduced to the lake post 1988 and have subsequently displaced the rudd population through competition and hybridization. The source and reason for the introduction of roach to the lake is also unknown. 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.

Perch were not recorded in the lake during earlier fish stock surveys carried out by Inland Fisheries Ireland (IFI unpublished data; Kelly *et al*., 2009), therefore this is a new record of perch for this lake. The reason for the introduction and source of the perch is unknown. Anglers often transfer fish from water body to water body without any authorisation in the hope of improving their local angling amenity. However the unregulated movement of fish by anglers from one water body to another contravenes current Inland Fisheries Ireland policy and the Fish Health Regulations (S.I. No 261 of 2008). Legislation is also in place preventing the movement of live roach from one water to another (Bye-Law No. 561, 1973, Transfer of Live Roach). Unauthorised movements of fish from water body to waterbody carry significant risk of disease to resident fish populations in the receiving water. In addition the deliberate spreading of invasive/non-native species by human influence is not consistent with maintaining the natural biodiversity of Irish waters.

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, combined with expert opinion on non-native/alien species, Cavetown Lough has been assigned an ecological status of Good based on the fish populations present in 2011. The ecological status assigned to the lake based on the 2008 survey data was Good.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Cavetown Lough an overall ecological status of Poor, 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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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