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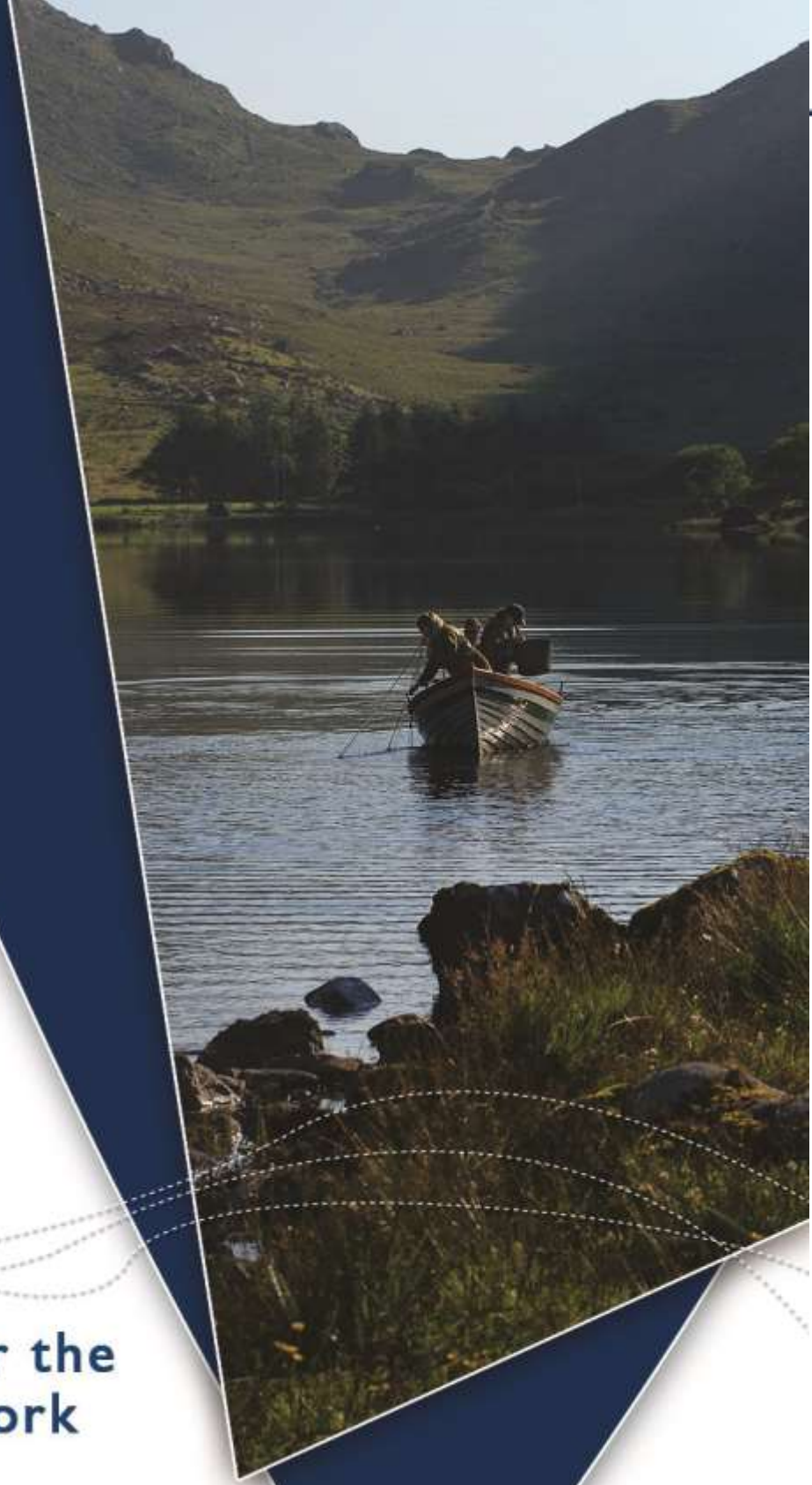

Sampling Fish for the Water Framework Directive

Lakes 2014

Cavetown Lough

IASCACH INTIRE ÉIREANN
INLAND FISHERIES IRELAND

Water Framework Directive Fish Stock Survey of Cavetown Lough, June/July 2014

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

Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

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Cover photo: Netting survey on Lough Brin © 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 is categorised as 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Inland Fisheries Ireland (previously the Central Fisheries Board and the Shannon Regional Fisheries Board in 1988 (IFI unpublished data)).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 and 2011 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009 and Kelly *et al*., 2012a). During the 2011 survey, perch followed by 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 2014 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

Plate 1.1. Cavetown Lough

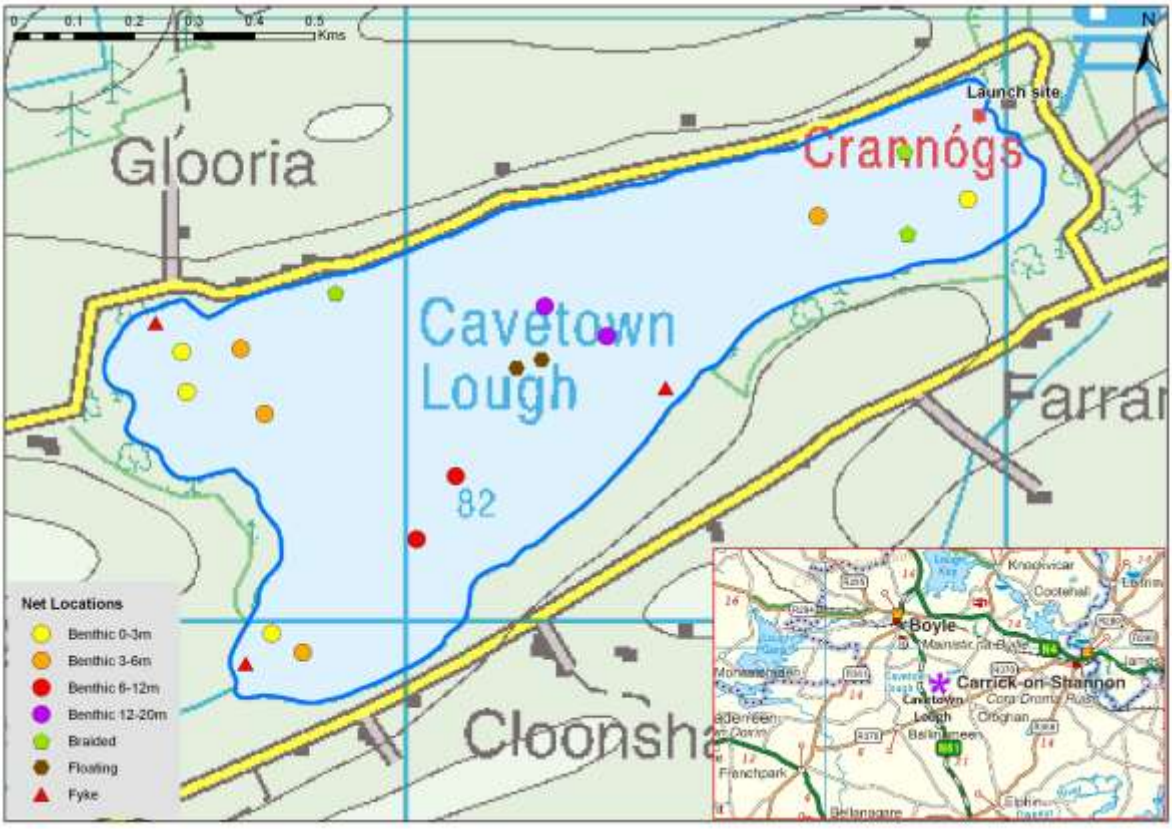

Fig. 1.1. Location map of Cavetown Lough indicating locations and depths of each net

1.2 Methods

Cavetown Lough was surveyed over two nights between the 30th June and the 2nd of July 2014. 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 surveys in 2008 and 2011. 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 in Cavetown Lough in June/July 2014, with 1112 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, roach x bream hybrids, roach x rudd hybrids, pike, eels and bream. During the previous survey in 2011 and 2008 the same species composition was recorded with the exception of perch, which were not captured during the 2008 survey but were recorded during the 2011 and 2014 surveys.

Table 1.1. Number of each fish species captured by each gear type during the survey on Cavetown Lough, June/July 2014

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	612	78	0	2	692
Rutilus rutilus	Roach	258	108	0	2	368
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	14	1	1	0	16
Anguilla anguilla	Eel	0	0	0	14	14
Esox lucius	Pike	7	0	2	1	10
Abramis brama	Bream	2	0	6	0	8
Rutilus rutilus x Scardinius erythrophthalmus	Roach x Rudd hybrid	3	2	0	0	5

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 the 2008, 2011 and 2014 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Perch was the dominant species in terms of abundance (CPUE) and roach was the dominant species in terms of biomass (BPUE). Although the mean perch CPUE and BPUE was higher in 2014 than in 2011, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3). The mean roach CPUE and BPUE fluctuated slightly over the three sampling occasions; however, these differences were also not statistically significant (Table 1.2; Fig 1.2 and 1.3).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Cavetown Lough, 2008, 2011 and 2014

Scientific name	Common name	2008	2011	2014
			Mean CPUE	
Perca fluviatilis	Perch	-	0.295 (0.077)	1.151 (0.326)
Rutilus rutilus	Roach	0.523 (0.152)	0.228 (0.078)	0.611 (0.205)
Esox lucius	Pike	0.018 (0.006)	0.011 (0.004)	0.016 (0.005)
Abramis brama	Bream	0.002 (0.002)	0.010 (0.006)	0.014 (0.008)
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	0.015 (0.006)	0.01 (0.004)	0.026 (0.008)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x Rudd hybrid	0.003 (0.002)	0.033 (0.013)	0.008 (0.003)
Anguilla anguilla	Eel	0.044 (0.011)	0.011 (0.005)	0.077 (0.036)
			Mean BPUE	
Perca fluviatilis	Perch	-	9.158 (3.783)	15.203 (4.405)
Rutilus rutilus	Roach	17.089 (4.688)	25.097 (7.671)	49.425 (10.044)
Esox lucius	Pike	4.459 (1.917)	7.025 (3.443)	10.169 (8.003)
Abramis brama	Bream	0.923 (0.923)	5.975 (4.044)	12.605 (7.494)
Rutilus rutilus x Abramis brama	Roach x Bream hybrid	5.116 (2.189)	3.28 (1.650)	7.747 (3.256)
Rutilus rutilus x Scardinius erythrophthalmus	Roach x Rudd hybrid	1.178 (0.839)	11.726 (4.572)	4.340 (1.748)
Anguilla anguilla	Eel	19.427 (6.569)	3.65 (1.975)	40.888 (15.633)

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

*Eel CPUE and BPUE based on fyke nets only

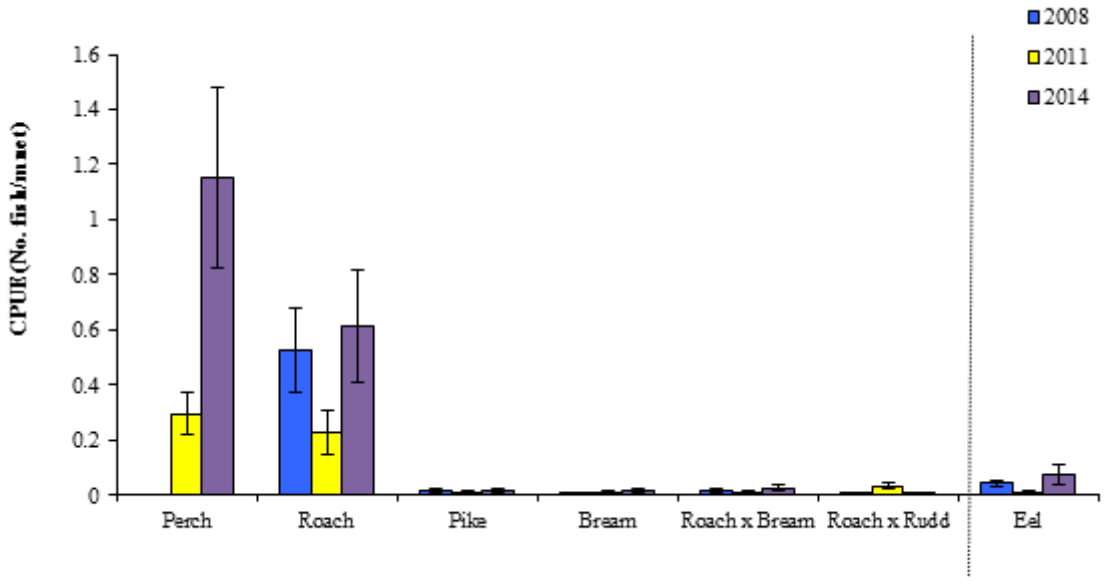

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Cavetown Lough (Eel CPUE based on fyke nets only), 2008, 2011 and 2014

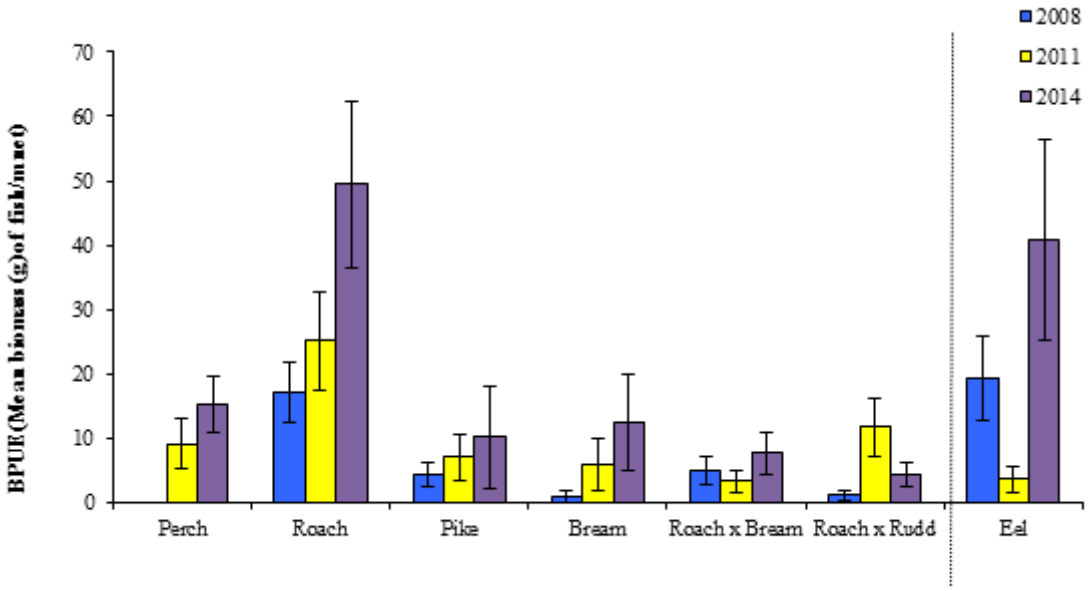

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Cavetown Lough (Eel BPUE based on fyke nets only), 2008, 2011 and 2014

1.3.3 Length frequency distributions and growth

Perch captured during the 2014 survey ranged in length from 3.0cm to 29.0cm (mean = 8.7cm) (Fig. 1.4) with six age classes present, ranging from 0+ to 5+, with a mean L1 of 6.9cm (Table 1.3). The dominant age class was 1+ (Fig. 1.4). No perch were recorded in 2008 and those captured during the 2011 had a similar length range to the 2014 survey (with some larger fish recorded in 2014) (Fig. 1.4). Perch recorded in 2011 had a similar age range and growth rate to the 2014 survey (Fig. 1.4).

Roach captured during the 2014 survey ranged in length from 5.0cm to 31.5cm (mean = 12.5cm) (Fig.1.5) with twelve age classes present, ranging from 1+ to 12+, with a mean L1 of 2.5cm (Table 1.4). The dominant age class was 1+ (Fig. 1.5). Roach captured during the 2008 and 2011 surveys had a narrower age and length range to the 2014 (Fig.1.5).

Bream captured during the 2014 survey ranged in length from 21.3cm to 47.9cm and eels ranged from 50.3cm to 73.5cm. Pike ranged in length from 8.0cm to 65.8cm, roach x bream hybrids ranged in length from 6.0cm to 33.0cm and roach x rudd hybrids ranged from 25.5cm to 30.8cm.

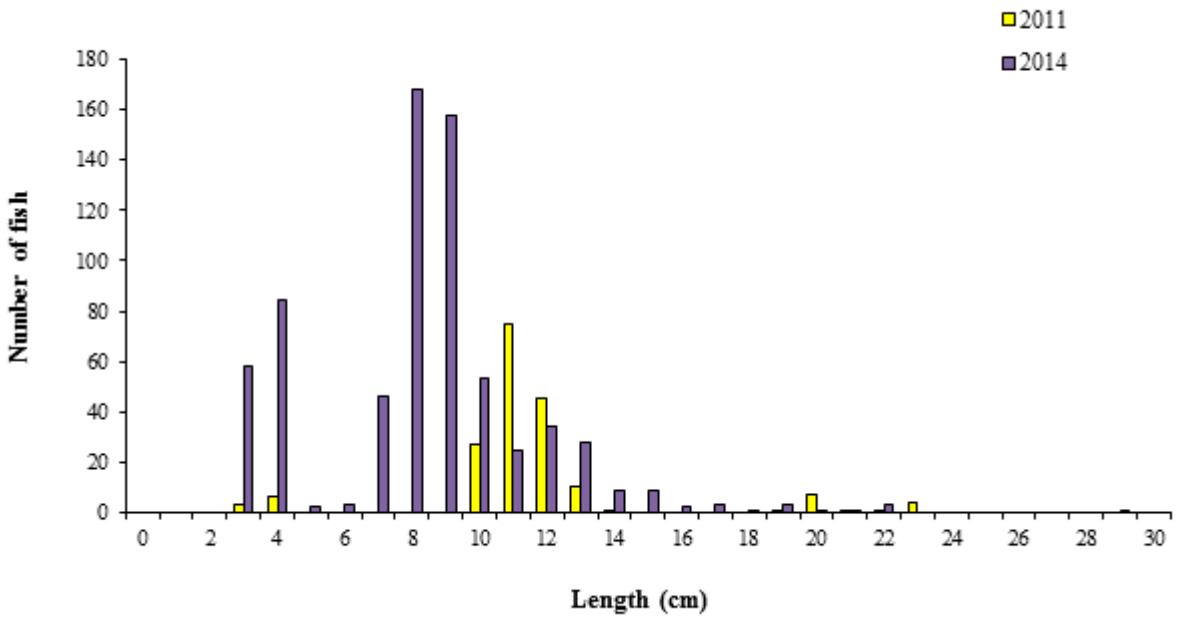

Fig. 1.4. Length frequency of perch captured on Cavetown Lough, 2008, 2011 and 2014

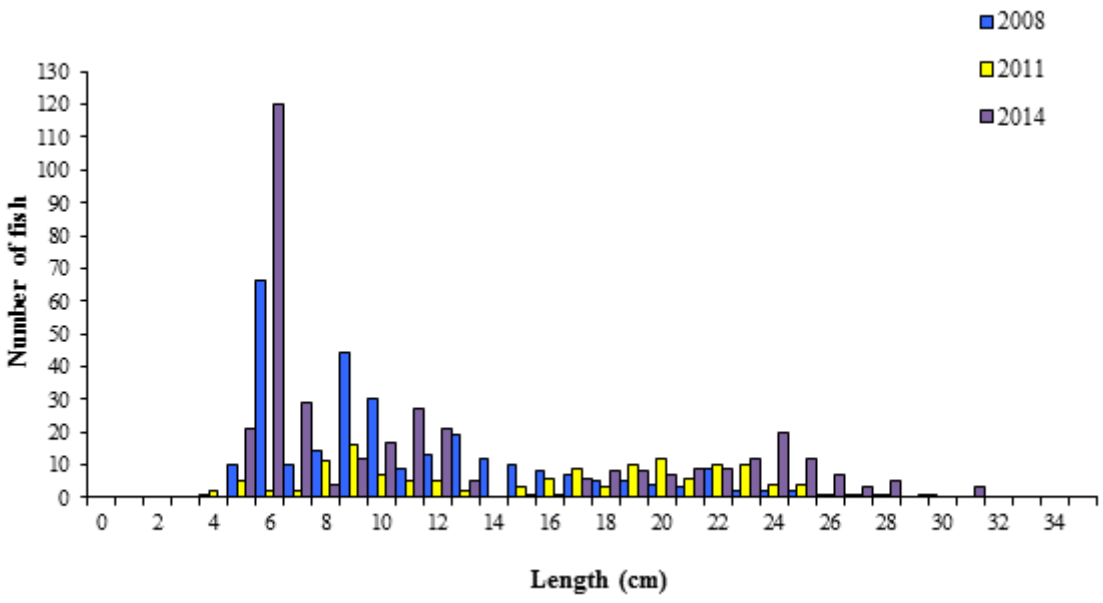

Fig. 1.5. Length frequency of roach captured on Cavetown Lough, 2008, 2011 and 2014

Table 1.3. Mean (±SE) perch length (cm) at age for Cavetown Lough, June/July 2014

	L_1	L_2	L_3	L_4	L_5
Mean	6.9 (0.2)	12.2 (0.4)	16.0 (0.6)	19.4 (0.7)	27.8
N	44	29	16	10	1
Range	5.1-9.9	9.4-19.9	13.1-22.3	16.5-24.4	27.8-27.8

Table 1.4. Mean (±SE) roach length (cm) at age for Cavetown Lough, June/July 2014

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}
Mean	2.5 (0.1)	5.9 (0.2)	9.7 (0.3)	14.1 (0.3)	17.4 (0.3)	20.3 (0.4)	22.6 (0.4)	24.6 (0.4)	25.9 (0.4)	27.6 (0.6)	29.6 (0.4)	30.4
N	64	55	43	39	34	26	20	15	8	4	3	1
Range	1.3-4.9	3.6-9.6	6.3-15.6	9.8-18.6	13.7-22.1	17.0-24.1	20.2-25.6	22.1-27.1	24.2-27.9	26.1-28.8	28.9-30.3	30.4-30.4

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 during the 2014 survey.

Although the mean perch CPUE and BPUE was higher in 2014 than in 2011, these differences were not statistically significant. Perch ranged in age from 0+ to 5+, indicating reproductive success in each of the previous six years. The dominant age class was 1+.

The mean roach CPUE and BPUE fluctuated slightly over the three sampling occasions; however, these differences were also not statistically significant. Roach ranged in age from 1+ to 12+, indicating reproductive success in twelve of the previous thirteen years. No 0+ fish were captured. The dominant age class was 1+.

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*., 2012b). Using the FIL2 classification tool, Cavetown Lough has been assigned an ecological status of Good for both 2008 and 2011, and Moderate in 2014 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Cavetown Lough an overall draft ecological status of Moderate, based on all monitored physico-chemical and biological elements, including fish.

1.5 References

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IFI Dublin,
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland

www.fisheriesireland.ie
dublin@fisheriesireland.ie
+353 1 8842 600