Sampling Fish for the Water Framework Directive

Lakes 2010

Urlaur Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

ACKNOWLEDGEMENTS

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1.1 Introduction

Urlaur Lough (Plate 1.1, Fig. 1.1) is located approximately 11km south of Ballaghadeareen, Co. Mayo. It has an area of 114.9ha, a mean depth of <4m and a maximum depth of 11m. The lake is categorised as typology class 10 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and high alkalinity (>100mg/l $CaCO_3$).

The under lying geology of the lake is made up of carboniferous limestone. The river Lung rises in Urlaur Lough, flows through the Lung valley until it enters Lough Gara, approximately 22km north-east (ShRFB, 2010). Urlaur Lough, along with Lough Nanoge and Lough Roe, makes up the Urlaur lakes Special Area of Conservation (SAC) (NPWS, 1999). Urlaur Lough is a hard water marl lake, a habitat listed on Annex I of the EU Habitats Directive. The aquatic flora of the lake is dominated by stoneworts (*Chara* spp.). Other aquatic species occurring in the lake include Canadian pondweed (*Elodea canadensis*), yellow and white water-lilies (*Nuphar lutea* and *Nymphaea alba*), pondweeds (*Potamogeton* spp.) and common duckweed (*Lemna minor*). Nationally important numbers of teal, mallard, pochard, whooper swan, widgeon, tufted duck and curlew have been found at the lake (NPWS, 1999). Land use practices within the site boundary are of low-intensity. These include land use for pasture and limited mechanical turf-cutting to the south-east of Urlaur Lough (NPWS, 1999).

Urlaur Lough provides an important local angling amenity and is used for national pike fishing competitions (Angling in Ireland, 2010). The lake was previously stocked with bream in 1961 but these fish failed to establish a population at that time (IFT, unpublished data). The lake was historically known to contain a moderate stock of pike, perch and eels (IFT, unpublished data).
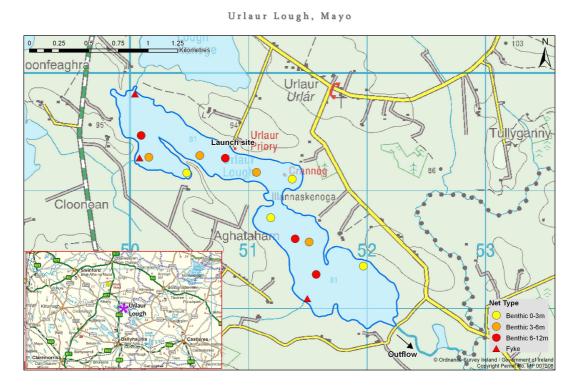
Plate 1.1. Urlaur Lough

Urlaur Lough, Mayo

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

1.2 Methods

Urlaur Lough was surveyed over two nights from the 11th to the 13th of August 2010. A total of three sets of Dutch fyke nets and 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m and 4 @ 6-11.9m) were deployed randomly in the lake (15 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 roach, roach x bream hybrids 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 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 in Urlaur Lough in August 2010, with 497 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. Small numbers of pike, eels and roach x bream hybrids were also captured.

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

Scientific name	Common name	Number of fish captured		
		Benthic mono multimesh gill nets	Fyke nets	Total
Perca fluviatilis	Perch	262	2	264
Rutilus rutilus	Roach	208	4	212
Esox lucius	Pike	9	0	9
Rutilus rutilus x Abramis brama	Roach x bream hybrid	6	0	6
Anguilla anguilla	European eel	0	6	6

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 Urlaur Lough and three 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 Urlaur Lough had a significantly higher mean perch CPUE than Beltra Lough (z = -3.460, P<0.001) and Ross Lake (z = -2.470, P<0.05).

The differences in the mean roach CPUE between Urlaur Lough and two other similar lakes were assessed, with no overall significant differences being found (Kruskal-Wallis) (Fig. 1.3). However, Independent-Samples Mann-Whitney U tests between each lake showed that Urlaur Lough had a significantly higher mean roach CPUE than Ross Lake (z = -2.484, P<0.05).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured Urlaur Lough, August 2010

Scientific name	Common name	
		Mean (S.E.) CPUE
Perca fluviatilis	Perch	0.584 (0.170)
Rutilus rutilus	Roach	0.467 (0.078)
Esox lucius	Pike	0.020 (0.008)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.013 (0.006)
Anguilla anguilla	European eel	0.033 (0.019)
		Mean (S.E.) BPUE
Rutilus rutilus	Roach	76.280 (13.030)
Perca fluviatilis	Perch	25.922 (8.599)
Esox lucius	Pike	14.397 (8.358)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	8.517 (4.095)
Anguilla anguilla	European eel	19.000 (13.638)

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.
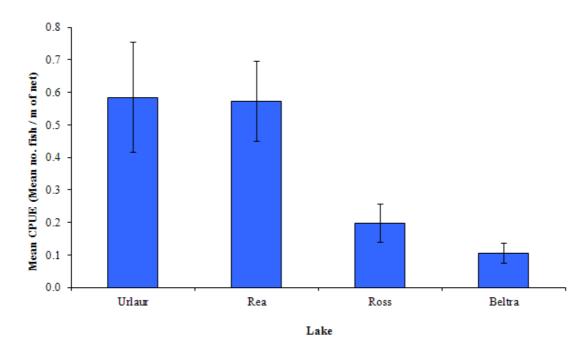
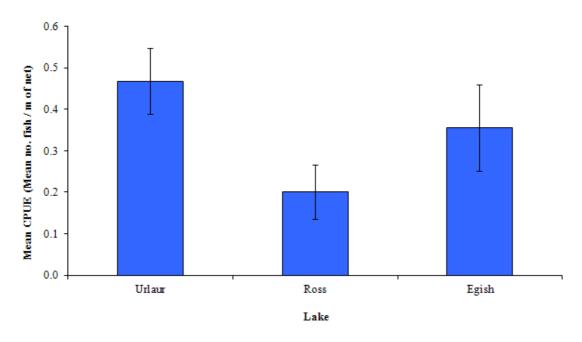**Fig. 1.2. Mean (±S.E.) perch CPUE in four lakes surveyed during 2010**

Fig. 1.3. Mean (±S.E.) roach CPUE in three lakes surveyed during 2010

1.3.3 Length frequency distributions

Perch ranged in length from 3.8cm to 27.5cm (mean = 11.4cm) (Fig. 1.4). Roach ranged in length from 6.8cm to 30.8cm (mean = 19.1cm) (Fig. 1.5). Pike ranged in length from 13.7cm to 67.0cm,

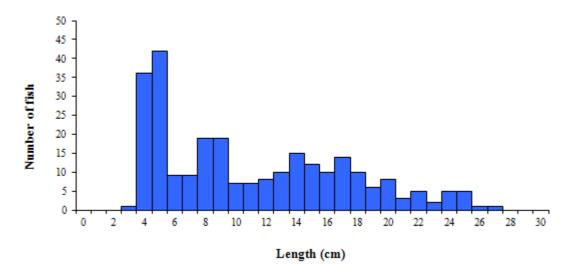roach x bream hybrids ranged in length from 23.7cm to 37.3cm and eels ranged in length from 54.0cm to 81.4cm.

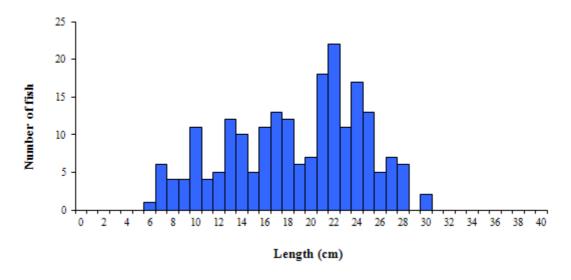**Fig. 1.4. Length frequency of perch captured on Urlaur Lough**

Fig. 1.5. Length frequency of roach captured on Urlaur Lough

1.3.4 Fish age and growth

Seven age classes of perch were present, ranging from 0+ to 6+, with a mean L1 of 4.7cm (Table 1.3). The dominant age class was 0+ which corresponded to the 3cm to 6cm (Fig. 1.4).,

Nine age classes of roach were present, ranging from 1+ to 9+, with a mean L1 of 3.6cm (Table 1.4). Four age classes of roach x bream hybrids were present, ranging from 4+ to 8+ and four age classes of pike were present, ranging from 0+ to 5+.

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

	L_1	L_2	L_3	L_4	L_5	L_6
Mean	4.7 (0.1)	9.3 (0.1)	14.2 (0.2)	18.0 (0.4)	20.8 (0.6)	21.3 (1.1)
N	116	91	73	39	13	7
Range	2.4-6.4	5.6-13.9	8.4-18.3	13.3-25.8	15.7-23.9	16.3-24.7

Table 1.4. Mean (±SE) roach length (cm) at age in Urlaur Lough, August 2010

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Mean	3.6 (0.1)	8.0 (0.2)	13.2 (0.2)	17.8 (0.3)	21.6 (0.3)	24.0 (0.3)	26.0 (0.5)	27.5 (0.6)	29.5
N	93	85	61	48	30	13	7	6	1
Range	2.2-6.3	5.8-11.9	10.0-16.8	13.5-22.2	18.9-25.8	22.0-25.7	24.3-28.1	25.6-29.8	29.4-29.4

1.4 Summary

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

The mean perch CPUE in Urlaur Lough was significantly higher than both Beltra Lough and Ross Lake. The dominant age class of perch was 0+, with ages ranging from 0+ to 6+ indicating reproductive success in each of the previous seven years.

The mean roach CPUE in Urlaur Lough was significantly higher than both Ross Lake and Lough Ree. Roach ranged in age from 1+ to 9+ indicating reproductive success in nine of the last ten years. However, no 0+ fish were recorded.

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, Urlaur Lough has been assigned an ecological status of Poor/Bad based on the fish populations present.

1.5 References

Angling in Ireland (2010) www.angling-in-ireland.com

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.

NPWS (1999) http://www.npws.ie/en/media/Media,4094,en.pdf

ShRFB (2010) http://www.shannon-fishery-board.ie/guides/coarse/ballaghadeareen-urlaur.htm