

National Research Survey Programme

Lakes 2018

Lough Scur

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National Research Survey Programme

**Fish Stock Survey of Lough Scur,
July 2018**

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Cover photo: Netting survey on Lough Gur © Inland Fisheries Ireland

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1.1 Introduction

Lough Scur is located on the watershed boundary separating the Shannon and Erne Catchments near the village of Keshcarrigan in Co. Leitrim (Fig. 1.1). The lake sits at the summit of the Shannon-Erne Waterway, a navigable watercourse (canal) which links the Shannon and Erne catchments at Leitrim Village and Belturbet respectively. The canal exits the western shore of the lake and flows downstream to where it joins the Shannon at Leitrim Village. At the eastern exit, the navigation flows through a series of canal, lake and river sections, linking with the River Erne at Belturbet. The lake is situated at an altitude of 61 m.a.s.l., has a surface area of 114ha, mean depth of 2.1m and maximum depth of 9.8m. The lake is categorised as typology class 6 for the purposes of WFD (as designated by the EPA), i.e. shallow (<4m), greater than 50ha and medium alkalinity (20-100mg/l CaCO₃). Surrounding land is primarily agricultural, with significant amounts of natural vegetation and an area of transitional woodland to the North-west. The geology of the area is predominantly limestone and calcareous shale.

The ecological status of the lake has deteriorated in recent years (Trodd and O' Boyle, 2018). In the 2010 to 2015 surveillance monitoring reporting period, the EPA assigned Lough Scur an overall ecological status of Poor.

Lough Scur is regarded as an excellent coarse fish and pike fishery and has been developed as such. Angling, with parking is available at the Southern (Pumphouse) shore and from an area known as 'The Rocks' on the northern shore. Several prestigious national and international angling competitions are held on the lake on an annual basis.

Inland Fisheries Ireland (previously the Central Fisheries Board) have undertaken relatively frequent fish stock surveys on the lake, the most recent of which was conducted in 2010. Roach, bream, roach x bream hybrids, perch, and pike were recorded at that time (IFI, 2011).

This report summarises the results of the 2018 fish stock survey (e.g. species composition, abundance and age structure) on the lake.



Plate 1.1. Aerial photograph of Lough Scur, looking West along the lake.

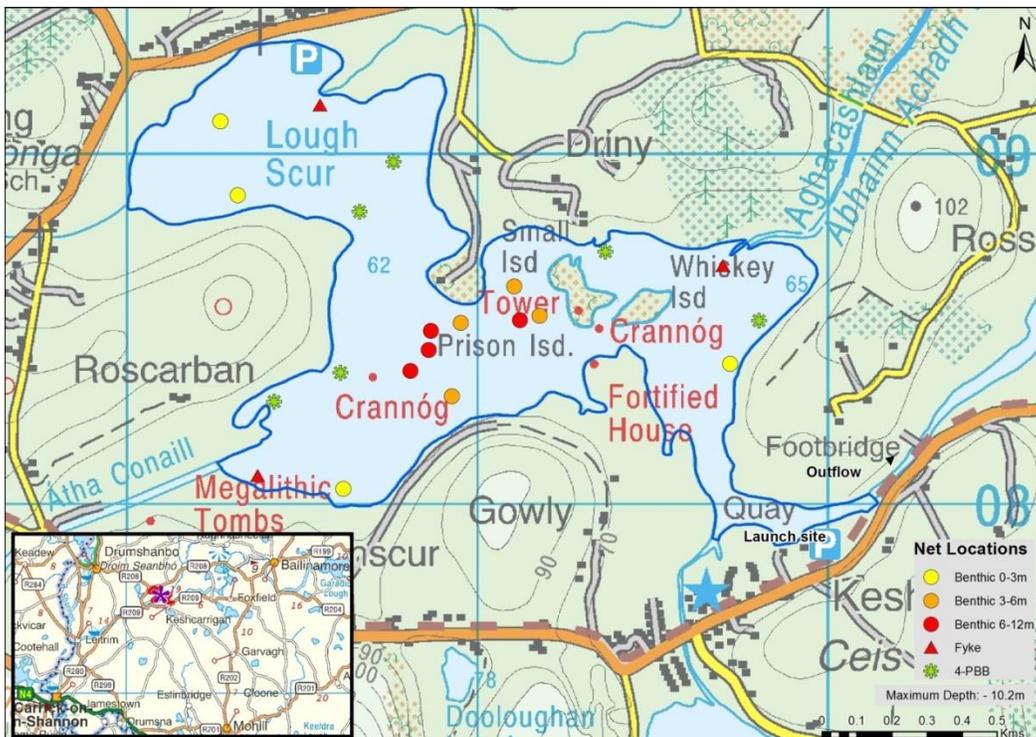


Fig. 1.1. Location map of Lough Scur showing locations and depths of each net (outflow is indicated on map)



1.2 Methods

1.2.1 Netting methods

Lough Scur was surveyed over two nights from the 17th to the 19th of July 2018. A total of three sets of Dutch fyke nets (Fyke) and 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (BM CEN) (4 @ 0-2.9m, 4 @ 3-5.9m, 4 @ 6-11.9m) (16 sites) were deployed in the lake (15 sites). The netting effort was supplemented using four-panel benthic braided survey gill nets (4-PBB) at six additional random sites. The 4-PBB nets are composed of four 27.5m long panels each a different mesh size (55mm, 60mm, 70mm and 90mm), tied together randomly.

The site locations for the benthic monofilament multi-mesh gill nets (BM CEN) and the four-panel braided survey gill nets (4-PBB) were chosen randomly within fixed depth zones (0-2.9m, 3-5.9m, 6-11.9m, 12-19.9m and 20-34.9m), based upon available lake bathymetry. 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 also randomised.

All fish apart from perch were measured and weighed on site and scales were removed from a sample of all cyprinid species (i.e roach, bream, bream hybrids, rudd, tench) and pike. Live fish were returned to the water whenever practical or when the likelihood of their survival was considered to be good. Samples of fish were retained for further analysis. Fish were frozen immediately after the survey and transported back to the IFI laboratory for later dissection.

1.2.2 Fish diet

Total stomach contents were inspected and individual items were counted and identified to the lowest taxonomic level possible. The percentage frequency occurrence (FO) of prey items were calculated to identify key prey items (Amundsen *et al.*, 1996).

$$FO_i = \left(\frac{N_i}{N} \right) * 100$$

Where:

FO_i is the percentage frequency of prey item i ,

N_i is the number of pike with prey i in their stomach,

N is total number of pike with stomach contents.



1.2.3 Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment in order to prevent dispersal of alien species and other organisms to uninfected waters. A standard operating procedure was compiled by Inland Fisheries Ireland for this purpose (Caffrey, 2010) and is followed by staff in IFI when moving between water bodies.

1.3 Results

1.3.1 Species Richness

A total of seven fish species and one type of hybrid were recorded on Lough Scur in July 2018, with 1281 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, bream, pike, tench, rudd and eel were also captured.

Table 1.1. Number of each fish species captured by each method during the survey on Lough Scur, July 2018

Scientific name	Common name	Number of fish captured			
		BM CEN	4-PBB	Fyke	Total
<i>Perca fluviatilis</i>	Perch	1038	1	-	1039
<i>Rutilus rutilus</i>	Roach	589		1	590
<i>Rutilus rutilus x Abramis brama</i>	Roach x bream hybrid	124		1	125
<i>Abramis brama</i>	Bream	40	9	-	49
<i>Esox lucius</i>	Pike	4	2	-	6
<i>Tinca tinca</i>	Tench	1	-	-	1
<i>Scardinius erythrophthalmus</i>	Rudd	1	-	-	1
<i>Anguilla anguilla</i>	European eel	-	-	10	10



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 2018 survey are summarised in Table 1.2 (Fig. 1.2 and 1.3).

Overall perch and roach were the dominant species captured in all nets in terms of CPUE and BPUE (Fig. 1.2 and 1.3). A relatively high eel biomass was recorded in the fyke nets deployed.

Table 1.2. Mean (S.E.) CPUE and BPUE (per metre of net) for all fish species captured on Lough Scurl, July 2018

Scientific name	Common name	Mean CPUE (\pm S.E)	Mean BPUE (\pm S.E)
<i>Perca fluviatilis</i>	Perch	1.648 (0.025)	15.974 (6.95)
<i>Rutilus rutilus</i>	Roach	0.936 (0.367)	14.266 (5.595)
<i>Rutilus rutilus x Abramis brama</i>	Roach x bream hybrid	0.198 (0.093)	6.259 (2.422)
<i>Abramis brama</i>	Bream	0.067 (0.025)	13.517 (4.693)
<i>Esox lucius</i>	Pike	0.007 (0.004)	8.831 (4.560)
<i>Tinca tinca</i>	Tench	0.002 (0.002)	0.370 (0.370)
<i>Scardinius erythrophthalmus</i>	Rudd	0.002 (0.002)	0.111 (0.111)
<i>Anguilla anguilla</i> *	European eel*	0.056 (0.024)*	19.544 (12.137)*

Note: Where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species (Connor *et al.*, 2017).

*Eel CPUE and BPUE based on fyke nets only

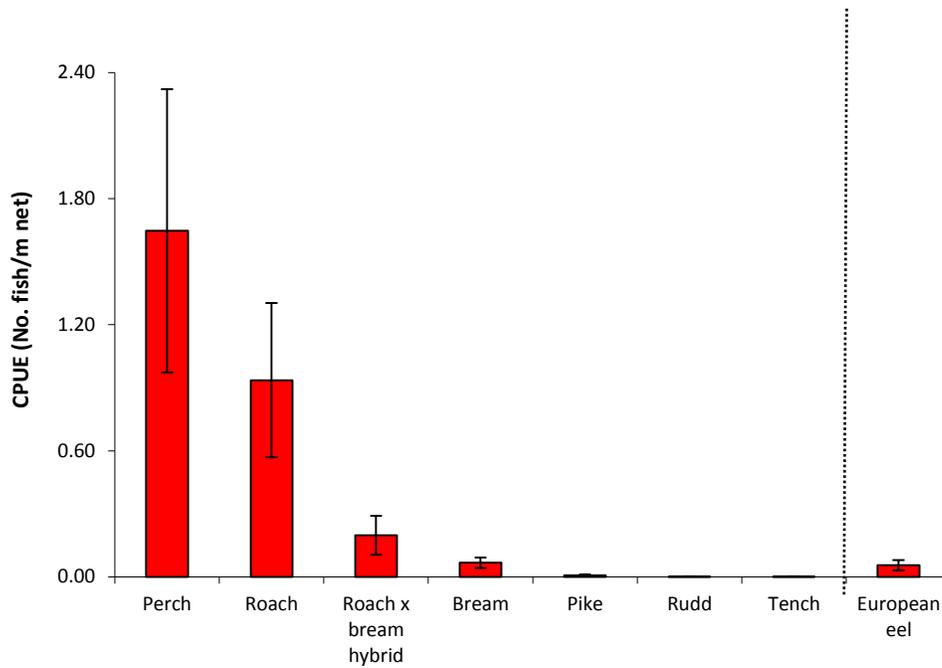


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Scire (Eel CPUE based on fyke nets only), July 2018

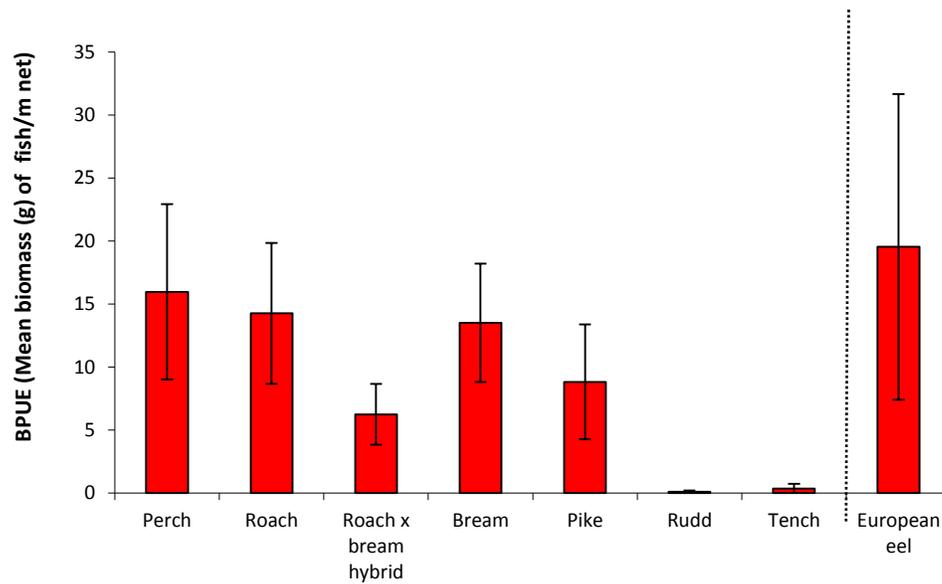


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Scire (Eel BPUE based on fyke nets only), July 2018

1.3.3 Length frequency distributions and growth

Perch

Perch captured during the 2018 survey ranged in length from 3.9cm to 31.0cm (mean = 6.4cm) (Fig.1.4). Perch were aged from 0+ to 12+ with a mean L1 of 5.2cm (Table 1.3). Nine age classes were present in the aged sample, which was dominated by younger fish, with c. 90% of the sample aged 5+ or under. The dominant age class was 0+, composed of fish <7cm in length (Fig. 1.4).

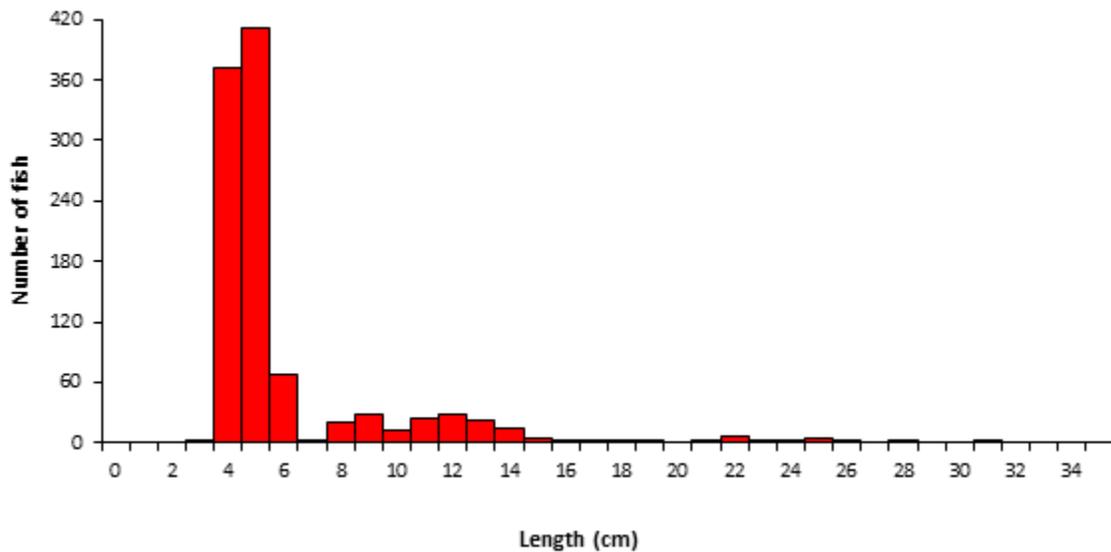


Fig. 1.4. Length frequency of perch captured on Lough Scire, July 2018

Table 1.3. Mean (\pm S.E.) perch length (cm) at age for Lough Scire, July 2018

	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	5.2	9.5	13.1	17.6	20.4	21.5	23.3	24.3	25.6	26.7	27.4	28.3
(\pmS.E.)	(0.1)	(0.2)	(0.3)	(0.4)	(0.4)	(0.5)	(0.5)	(0.8)	(0.9)	(1.0)	(1.7)	(2.2)
N	68	53	28	22	20	6	6	3	3	3	2	2
Range	3.8- 7.5	7.1- 12.6	10.3- 16.0	15.0- 20.7	17.6- 23.3	20.4- 23.5	22.2- 24.9	23.2- 25.8	24.0- 27.3	24.7- 28.1	25.6- 29.1	26.0- 30.5



Roach

Roach captured during the 2018 survey ranged in length from 4.0cm to 23.5cm (mean = 9.4cm) with few larger fish captured (Fig.1.5). Roach were aged between 2+ and 9+. All age classes with the exception of 7 and 8 year old fish were present in the sample aged, indicating regular recruitment to the population in the lake (Table 1.4).

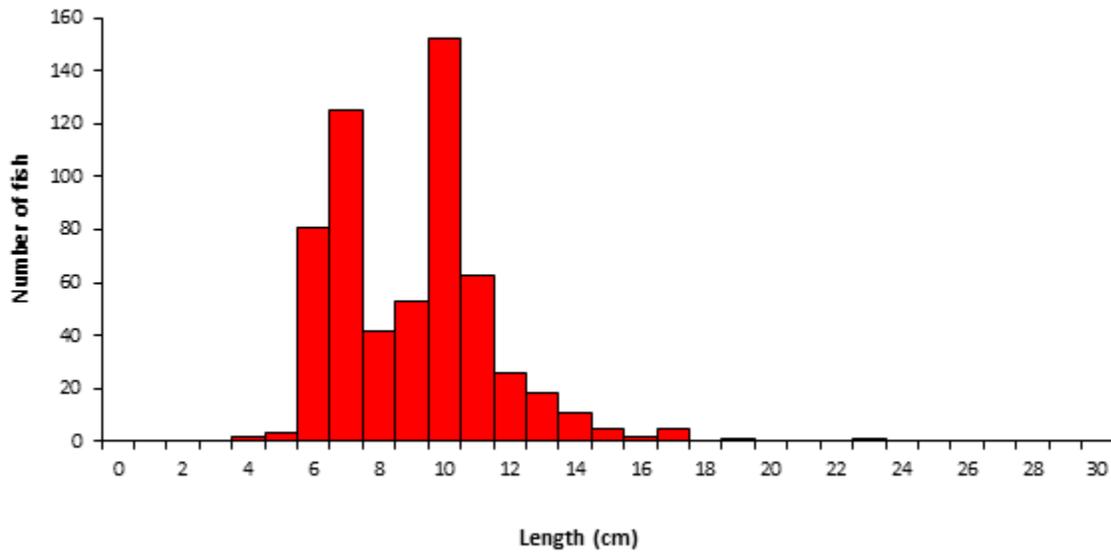


Fig. 1.5. Length frequency of roach captured on Lough Scurl, July 2018

Table 1.4. Summary age data from a sub-sample of roach captured on Lough Scurl, July 2018. Number of fish and length ranges of all fish aged in the sample is presented

	Age class									
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+
Mean (cm)	-	-	7.2	10.4	12.9	15	17.3	-	-	21.7
N	-	-	20	15	11	11	6	-	-	2
Range (cm)	-	-	5.9-8.8	9.4-11.5	12-13.7	14-16.9	16.6-17.8	-	-	19.9-23.5



Roach x bream hybrids

Roach x bream hybrids captured during the 2018 survey ranged in length from 3.6cm to 40.0cm (mean 11.6cm) (Fig. 1.6). Nine age classes were present, ranging from 1+ to 9+ (Table 1.5). All intervening year classes were present, suggesting regular recruitment to the hybrid population in recent years. Younger age cohorts dominated the population, with strong 1, 3 and 4 year age groups (Fig. 1.6, Table 1.5). Few older, larger fish were captured.

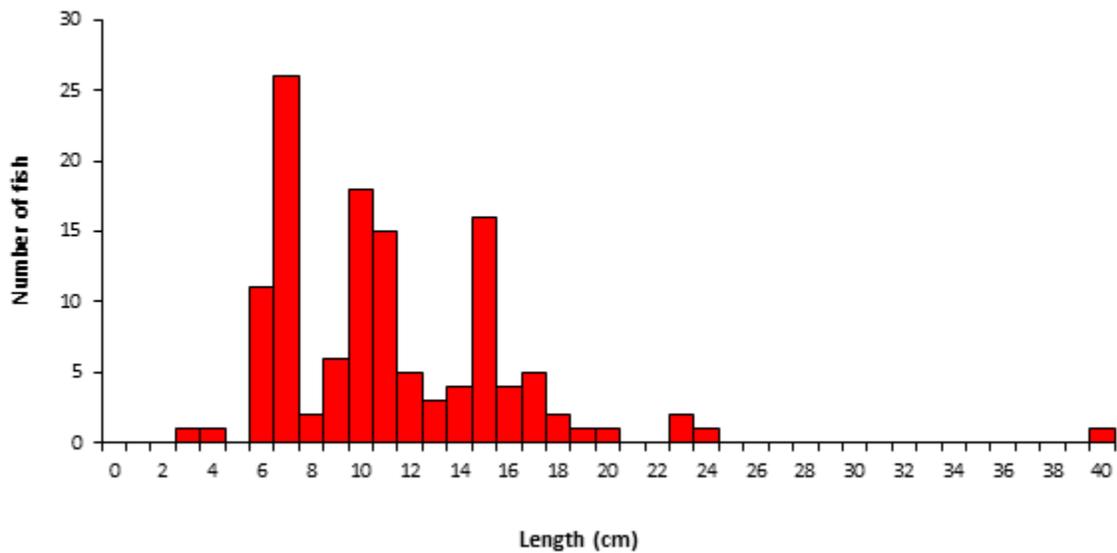


Fig. 1.6. Length frequency of roach x bream hybrids captured on Lough Scur, July 2018

Table 1.5. Summary age data from a sub-sample of roach x bream hybrids captured on Lough Scur, July 2018. Number of fish and length ranges of all fish aged in the sample is presented

	Age class									
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+
Mean (cm)	-	7.0	8.9	10.9	14.1	16.1	17.2	18.5	23.2	23.7
N	-	10	5	14	18	3	3	4	1	1
Range (cm)	-	6.5-7.5	7.5-9.8	10.2-12.4	11.0-15.5	15.8-16.7	17.0-17.5	17.5-19.3	23.2	23.7



Other fish

Eels (n = 10) recorded during the 2018 survey ranged in length from 47.0cm to 69.6cm. One rudd was measured at 16.0cm and was aged 5+. Pike ranged in length from 47.0cm to 61.0cm. One tench, measuring 23.3cm was also captured.

1.3.4 Stomach and diet analysis

Perch

Perch initially start to feed on pelagic zooplankton. Once they reach an intermediate size they start feeding on benthic resources eventually moving on to feed on fish once they are large enough (Hjelm *et al.*, 2000). A total of 69 perch stomachs were examined. Of these 42 were empty. Of the remaining 27 stomachs containing food, 15 (56%) contained unidentified digested material. Twelve (44%) perch contained fish (Fig. 1.8). Piscivorous perch ranged in length from 9.8cm (1+) to 25.8cm (7+).

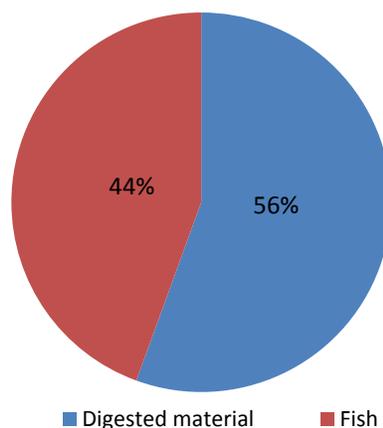


Fig 1.8. Diet of perch (n=27) captured on Lough Scur, July 2018 (% FO)

Pike

A total of four pike were available for dietary analysis. Of these, two stomachs contained prey items. Both stomachs contained roach.



1.4 Summary and ecological status

A total of seven fish species and one type of hybrid were recorded on Lough Scur in the July 2018 survey. Perch and roach were the dominant fish species in terms of abundance (CPUE) and biomass (BPUE). The population of the former species was dominated by young of the year (YOY) individuals.

Lough Scur was previously surveyed in 2010. At that time, a similar range of species was captured (IFI 2011). Rudd and tench were not recorded in 2010, but were recorded in previous surveys. The 2010 survey was conducted using standard 8 panel benthic braided survey gill nets (8-PBB) which capture different size ranges of fish species when compared to the CEN standard nets used to sample fish for this survey. In particular, the 8-PBB survey gill nets fail to capture smaller fish (IFI unpublished data). The current suite of nets used combines standard CEN and the four largest panels of the 8-PBB survey gill nets to capture the full size range of fish species in the lake. This method has been adopted as the standard method for sampling all coarse, brown trout and mixed fisheries by Inland Fisheries Ireland.

On the last survey occasion, roach x bream hybrids were the dominant species recorded in the survey nets deployed, and occurred in greater numbers than either parent species, a common feature in Irish lakes (Hayden *et al.*, 2014). In 2018, however, roach were recorded in greater numbers than its hybrid with bream. The roach x bream hybrid population was also dominated by younger individuals, in contrast to the previous survey, when 10+ fish were the largest year class. This assessment, however, is biased by the nets used on each occasion. Nevertheless, the presence of a large number of younger fish indicates that recruitment of hybrids, which requires spawning between both parent species (Hayden *et al.*, 2010), occurs regularly in the lake. In contrast, few young or juvenile bream were recorded in the 2018 survey and this merits further monitoring in future years. Other important angling species such as roach and perch are also recruiting regularly.

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 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, Lough Scur has been assigned an ecological status of Poor for 2018 based on the fish populations present.



Plate 1.2. The Rocks Shore, Lough Scur



1.5 References

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