National Research Survey Programme

Lakes 2015

White Lough

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**Fish Stock Survey of White Lough,
September 2015**

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1.1 Introduction

White Lough is located in the Erne catchment, approximately 5km south-west of Ballybay, Co. Monaghan (Plate 1.1, Fig. 1.1). The lake is situated at an altitude of 80m a.s.l. It has a surface area of 54ha, a mean depth of <4m and a maximum depth of 6m. The lake is categorised as typology class 6 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and moderately alkaline (20-100mg/l CaCO3). The lake has been classed as 1a (i.e. risk of failing to meet good status by 2015) in the WFD Characterization report (EPA, 2005).

White Lough was previously surveyed in 1969 by the Inland Fisheries Trust (IFT unpublished data). Bream and rudd were abundant during the 1969 survey, with pike (up to 63kg), perch (up to 0.67kg), roach (up to 0.675kg), and roach x bream hybrids also being recorded (Inland Fisheries Trust, unpublished data).

The lake was also surveyed in 2006, 2009 and 2012 as part of the NSSHARE Fish in Lakes Project (Kelly *et al*., 2007) and the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2010 and 2013). In all years perch was found to be the dominant species, followed by roach, bream, roach x bream hybrids, eel and tench. Tench were not captured in 2009 and bream were not recorded in 2012 (Kelly *et al.*, 2010 and 2013).
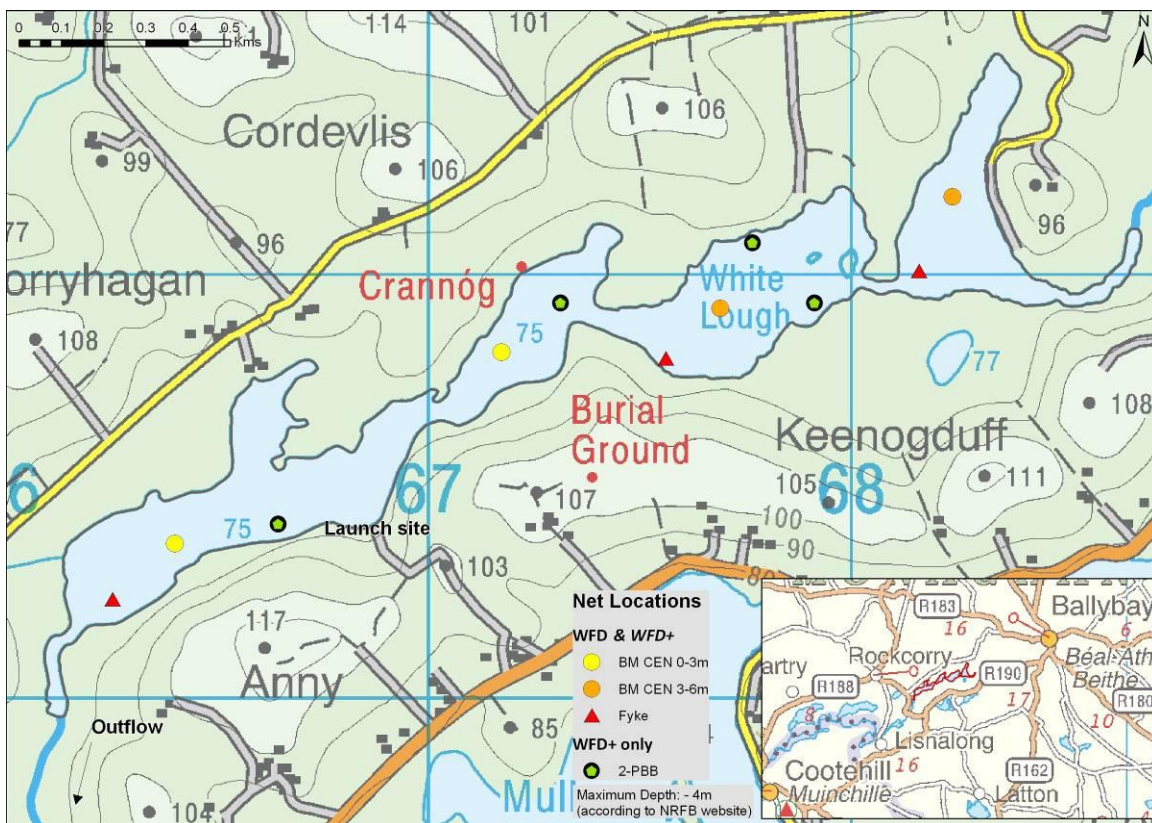

Plate 1.1. White Lough (Ballybay)

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

1.2 Methods

1.2.2 Netting methods

White Lough was surveyed over one night on the 7th of September 2015. A total of three sets of Dutch fyke nets and four benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (BM CEN) (2 @ 0-2.9m and 2 @ 3-5.9m) were deployed in the lake (7 sites). The netting effort was supplemented using two-panel benthic braided (63.5mm and 88.9mm mesh knot to knot) survey gill nets (2-PBB).

The nets were deployed in the same locations as randomly chosen in the previous surveys. The site locations for additional two-panel benthic braided survey gill net sites (2-PBB) locations were chosen randomly within fixed depth zones. 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 all roach, roach x bream hybrids, bream, pike and tench. 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 returned to the laboratory for further analysis.

1.2.2 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 on the IFI NRSP team when moving between water bodies.

1.3 Results

1.3.1 Species Richness

A total of six fish species and one type of hybrid were recorded on White Lough in September 2015, with 202 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, eels, tench and pike. During the previous WFD surveys in 2009 and 2012 the same species composition was recorded with the exception of tench, which were not captured during the 2009 survey but were recorded during the 2012 and 2015 survey and bream which were present during the 2009 and 2015 survey but were not captured in 2012 (Kelly *et al.*, 2010 and 2013).

Table 1.1. Number of each fish species captured by each gear type during the survey on White Lough, September 2015

Scientific name	Common name	Number of fish captured			
		2-PBB	**BM CEN**	**Fyke**	**Total**
Perca fluviatilis	Perch	0	89	0	89
Rutilus rutilus	Roach	0	71	0	71
Rutilus rutilus x Abramis brama	Roach x bream hybrid	6	16	0	22
Esox lucius	Pike	2	0	0	2
Tinca tinca	Tench	3	0	0	3
Abramis brama	Bream	11	0	0	11
Anguilla anguilla	European eel	0	0	4	4

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 are summarised in Table 1.2. Perch was the dominant fish species in terms of abundance and bream was the dominant species in terms of biomass (Table 1.2).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on White Lough, 2015

Scientific name	Common name	WFD+ (per m of net)**
		Mean CPUE
Perca fluviatilis	Perch	0.269 (0.116)
Rutilus rutilus	Roach	0.215 (0.090)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.058 (0.020)
Esox lucius	Pike	0.003 (0.003)
Tinca tinca	Tench	0.005 (0.004)
Abramis brama	Bream	0.018 (0.011)
Anguilla anguilla	European eel	0.022 (0.022)*
		Mean BPUE
Perca fluviatilis	Perch	11.254 (5.694)
Rutilus rutilus	Roach	14.292 (6.369)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	29.990 (8.424)
Esox lucius	Pike	10.269 (10.269)
Tinca tinca	Tench	8.585 (6.229)
Abramis brama	Bream	41.603 (24.243)
Anguilla anguilla	European eel	6.655 (6.655)*

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

**CPUE and BPUE data above for all fish species except eels are not comparable to earlier surveys as an extra panel was added to the 2-PBB to provide additional information on large coarse fish.

1.3.3 Length frequency distributions and growth

Perch

Perch captured during the 2015 survey ranged in length from 6.1cm to 31.0cm (mean = 12.0cm) (Fig.1.2) with seven age classes present, ranging from 0+ to 9+ with a mean L1 of 5.5cm (Table 1.3). The dominant age class was 1+ (Fig. 1.2).
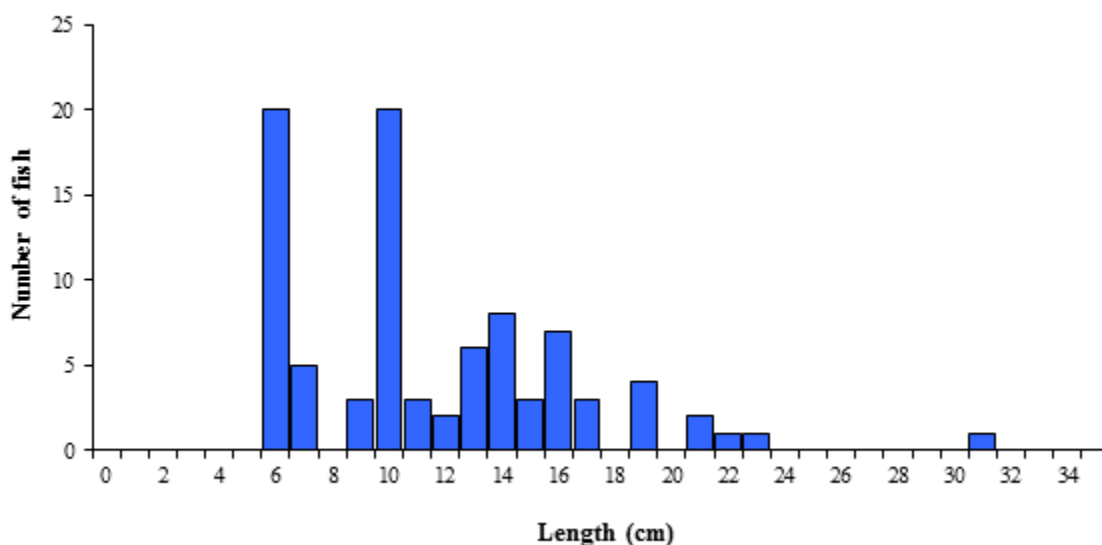

Fig. 1.2. Length frequency of perch captured on White Lough, 2015

Table 1.3. Mean (±S.E.) perch length (cm) at age for White Lough, September 2015

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Mean (±S.E.)	5.5	10.0	14.7	16.6	19.3	22.6	24.7	26.5	28.6
N	34	25	15	7	2	1	1	1	1
Range	4.5-7.6	8.1-12.0	13.0-17.5	14.4-19.7	17.4-21.3	22.6-22.6	24.7-24.7	26.5-26.5	28.6-28.6

Roach

Roach captured during the 2015 survey ranged in length from 6.2cm to 24.6cm (mean = 14.3cm) (Fig.1.3) with eight age classes present, ranging from 1+ to 8+ with a mean L1 of 2.3cm (Table 1.4). The dominant age class was 3+ (Fig.1.3).
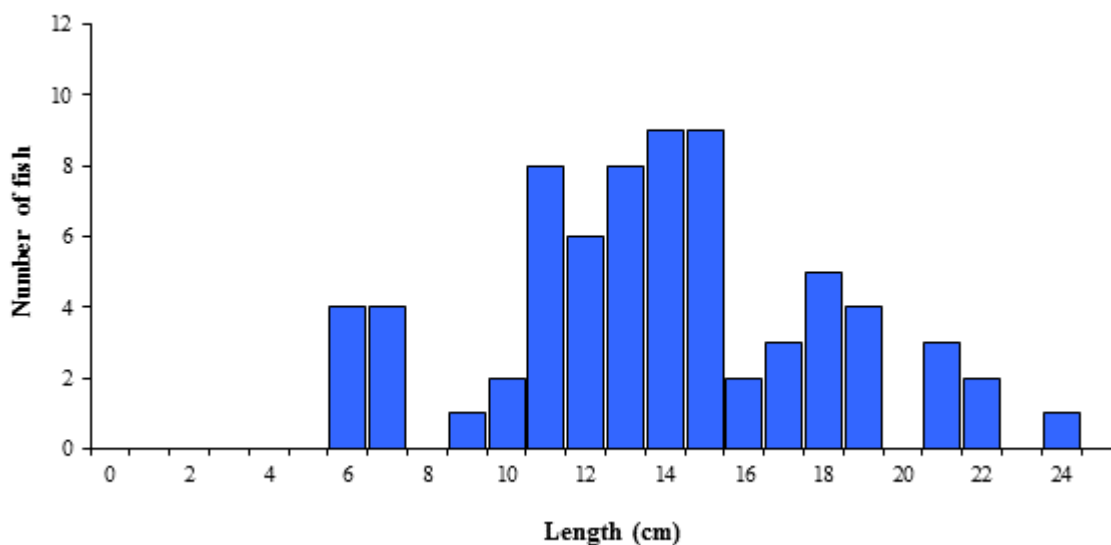

Fig. 1.3. Length frequency of roach captured on White Lough, 2015

Table 1.4. Mean (±S.E.) roach length (cm) at age for White Lough, September 2015

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8
Mean (±S.E.)	2.3 (0.1)	5.7 (0.2)	9.7 (0.4)	12.5 (0.4)	15.1 (0.4)	17.6 (0.5)	20.2 (1.3)	19.0
N	41	38	28	15	14	8	3	1
Range	1.5-3.2	2.9-8.7	5.7-12.9	9.6-15.3	12.8-18.5	16.0-20.3	17.6-22.1	19.0-19.0

Other fish

Eels captured during the 2015 survey ranged in length from 51.0cm to 62.0cm and tench ranged in length from 44.1cm to 47.0cm. Bream ranged in length from 39.0cm to 52.0cm, pike ranged from 64.9cm to 79.5cm and roach x bream hybrids ranged from 18.1cm to 37.5cm.

1.3.4 Stomach and diet analysis

Feeding studies provide a good indication of the availability of food items and the angling methods that are likely to be successful. However, the value of stomach content analysis is limited unless undertaken over a long period as diet may change on a daily basis depending on the availability of food items.

Perch

Perch initially start to feed on pelagic zooplankton. Once they reach an intermediate size they begin feeding on benthic resources eventually moving on to feed on fish once they are large enough (Hjelm *et al*., 2000). The food items recorded in a subsample of perch captured during the survey were dominated by unidentified insect and fish remains (Fig 1.4).
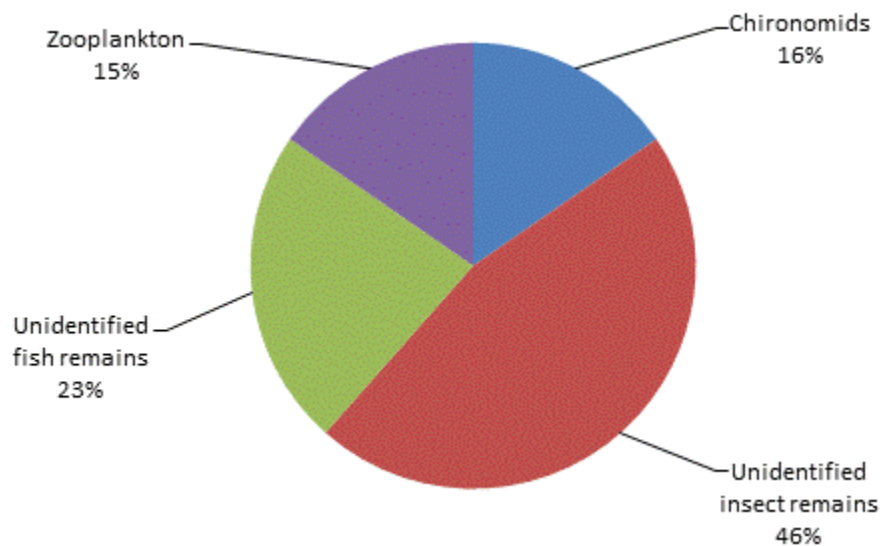

Fig. 1.4. Diet of perch captured on White Lough 2015 (% occurrence) n=12

1.4 Summary and ecological status

Perch was the dominant species in terms of abundance (CPUE) and bream was the dominant species in terms of biomass (BPUE) captured in the survey gill nets during the 2015 survey.

Perch ranged in length from 6.1cm to 31.0cm and ranged in age from 0+ to 9+, indicating reproductive success in each of the previous ten years. The dominant age class was 1+.

Roach ranged in length from 6.2cm to 24.6cm and ranged in age from 1+ to 8+, indicating reproductive success in each of the previous seven years. The dominant age class was 3+.

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, White Lough has been assigned an ecological status of Bad for 2006 and 2012 and Moderate for 2009 and 2015 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned White Lough an overall draft ecological status of Bad, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised during 2016.

1.5 References

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