

White Lough



Sampling Fish for the Water Framework Directive - Lakes 2009



The Central and Regional
Fisheries Boards

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the Acting CEO Dr. Milton Matthews and the staff from the Northern Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and cooperation of all their colleagues in the Central Fisheries Board (CFB).

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2009.

The report includes Ordnance Survey Ireland data reproduced under OSi Copyright Permit No. MP 007508.

*Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright.
© Ordnance Survey Ireland, 2009*

1.1 Introduction

White Lough (Plate 1.1, Fig. 1.1) is located in the Erne catchment, approximately 5km south-west of Ballybay, Co. Monaghan. 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White Lough was previously surveyed in 1969 by the Inland Fisheries Trust (IFT unpublished data) and also during 2006 by the Central and Northern Regional Fisheries Boards (Kelly *et al.*, 2007). Bream and rudd were abundant during the 1969 survey, with pike (up to 6300g), perch (up to 675g), roach (up to 675g), and roach x bream hybrids also being recorded (Inland Fisheries Trust, unpublished data). During the 2006 survey, perch was the dominant species in the lake, followed by roach, bream, roach x bream hybrids, eel and tench (Kelly *et al.*, 2007).



Plate 1.1. White Lough (Ballybay) looking northwest across the lake

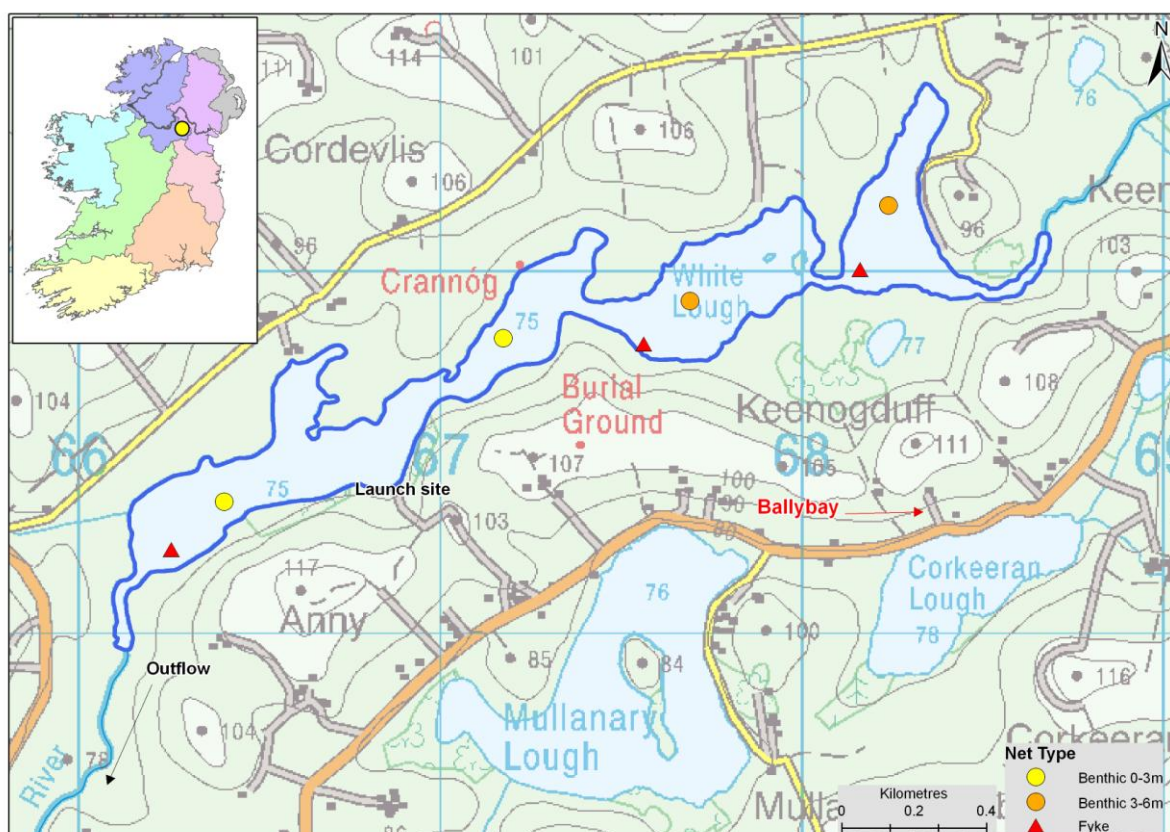


Fig. 1.1. Location map of White Lough (Ballybay) showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

White Lough was surveyed over one night on the 31st of August 2009. 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 (2 @ 0-2.9m and 2 @ 3-5.9m) were deployed in the lake (7 sites). Nets were deployed in the same locations as were randomly selected in the previous survey. 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, hybrids and bream. 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.

1.3 Results

1.3.1 Species Richness

A total of five fish species and one type of hybrid were recorded in White Lough in August 2009, with 278 fish being captured (Table 1.1). Perch was the most abundant fish species recorded, followed by roach. During the previous survey in 2006 (Kelly, *et al.*, 2007), the same species composition was recorded, with the exception of tench, which were present during the 2006 survey but were not captured in the current survey. However, pike were present in the current survey and were not recorded during the 2006 survey.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on White Lough, August 2009

Scientific name	Common name	Number of fish captured		
		Benthic mono multimesh gill nets	Fyke nets	Total
<i>Perca fluviatilis</i>	Perch	182	0	182
<i>Rutilus rutilus</i>	Roach	82	0	82
<i>Rutilus rutilus x Abramis brama</i>	Roach x bream hybrid	10	0	10
<i>Abramis brama</i>	Bream	2	0	2
<i>Esox lucius</i>	Pike	1	0	1
<i>Anguilla anguilla</i>	European eel	0	1	1

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 mean CPUE of both perch and roach were lower in 2009 than 2006 (Fig. 1.2); however, these differences were not statistically significant. The differences in the mean perch CPUE and mean roach CPUE between White Lough and two other similar lakes were also assessed, with no statistically significant differences being found (Figs. 1.3 and 1.4).

Table 1.2. Mean (S.E.) CPUE and BPUE of all fish species captured on White Lough, 2006 and 2009

Scientific name	Common name	2006	2009
Mean CPUE			
<i>Perca fluviatilis</i>	Perch	1.604 (0.714)	0.867 (0.416)
<i>Rutilus rutilus</i>	Roach	0.673 (0.291)	0.390 (0.161)
<i>Rutilus rutilus</i> <i>x Abramis brama</i>	Roach x bream hybrid	0.117 (0.048)	0.048 (0.020)
<i>Abramis brama</i>	Bream	0.012 (0.008)	0.010 (0.010)
<i>Esox lucius</i>	Pike	0	0.005 (0.005)
<i>Tinca tinca</i>	Tench	0.003 (0.003)	0
<i>Anguilla anguilla</i>	European eel	0.011 (0.011)	0.006 (0.006)
Mean BPUE			
<i>Rutilus rutilus</i>	Roach	48.831 (17.800)	27.524 (10.795)
<i>Perca fluviatilis</i>	Perch	36.289 (14.797)	11.867 (5.182)
<i>Esox lucius</i>	Pike	0	11.429 (11.429)
<i>Rutilus rutilus</i> <i>x Abramis brama</i>	Roach x bream hybrid	19.135 (8.746)	8.057 (4.146)
<i>Abramis brama</i>	Bream	22.466 (19.455)	0.271 (0.271)
<i>Tinca tinca</i>	Tench	5.782 (5.782)	0
<i>Anguilla anguilla</i>	European eel	5.556 (5.556)	2.628 (2.628)

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

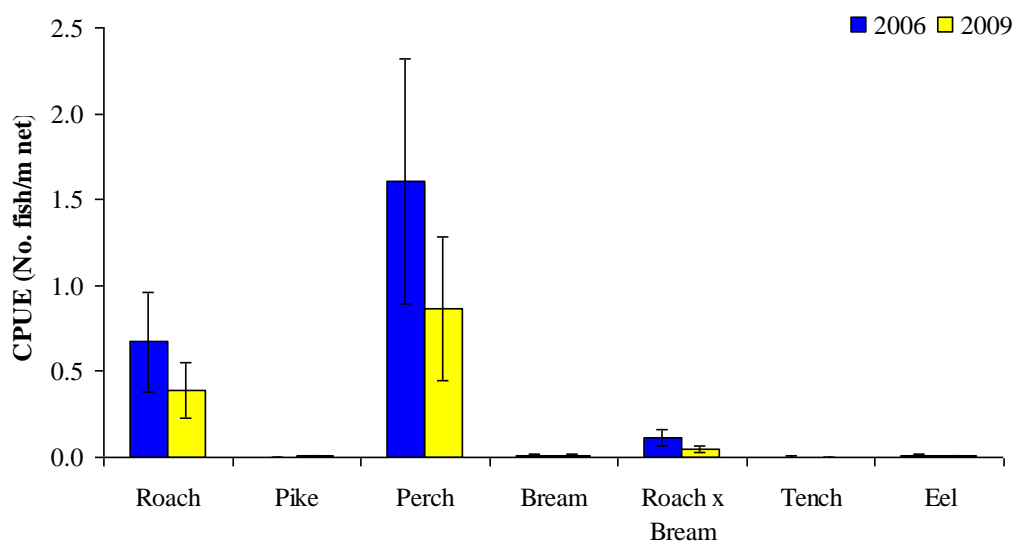


Fig. 1.2. Mean (\pm S.E.) CPUE of all fish species captured on White Lough 2006 and 2009 (Eel CPUE based on fyke nets only)

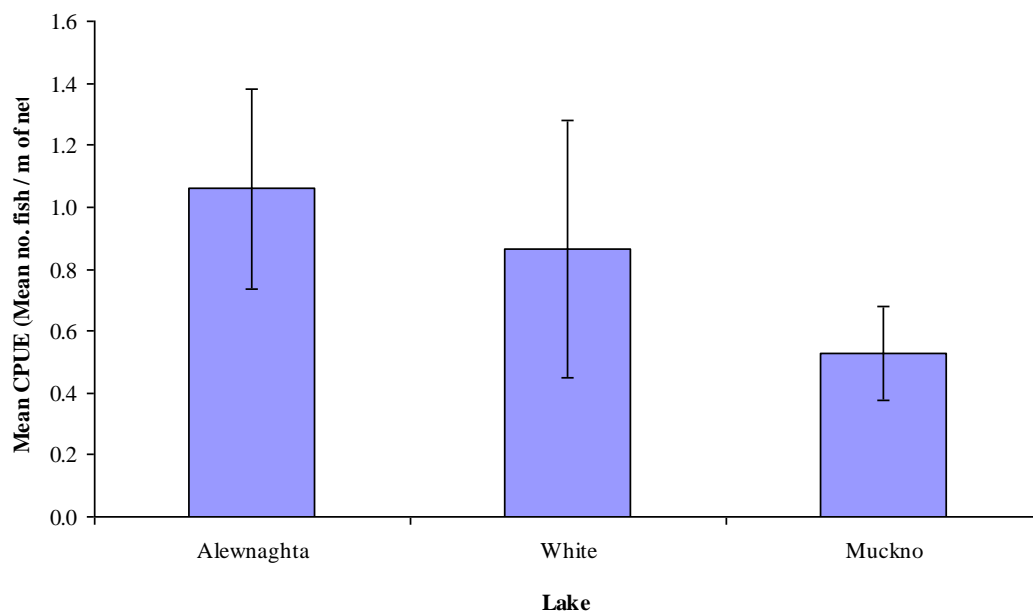


Fig. 1.3. Mean (\pm S.E.) perch CPUE in three lakes surveyed during 2009

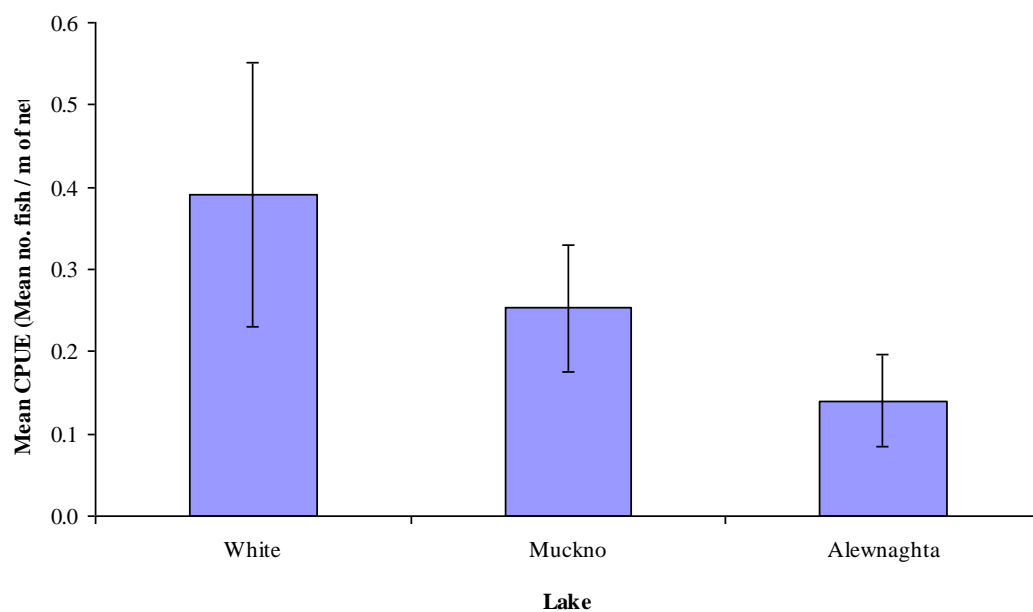


Fig. 1.4. Mean (\pm S.E.) roach CPUE in three lakes surveyed during 2009

1.3.3 Length frequency distributions

Perch ranged in length from 5.0cm to 20.5cm (mean = 8.8cm) (Fig. 1.5). Perch captured during the 2006 survey ranged in length from 6.0cm to 21.6cm (Fig. 1.5) (Kelly *et al.*, 2007). Roach ranged in length from 10.8cm to 25.0cm (mean = 15.4cm) (Fig.1.6). Roach captured during the 2006 survey ranged in length from 4.0cm to 27.4cm (Fig. 1.6) (Kelly *et al.*, 2007). Roach x bream hybrids ranged in length from 9.2cm to 27.3cm. The one eel captured measured 63.5cm in length and bream ranged in length from 11.2cm to 13.0cm. One pike measuring 67.5cm was also recorded.

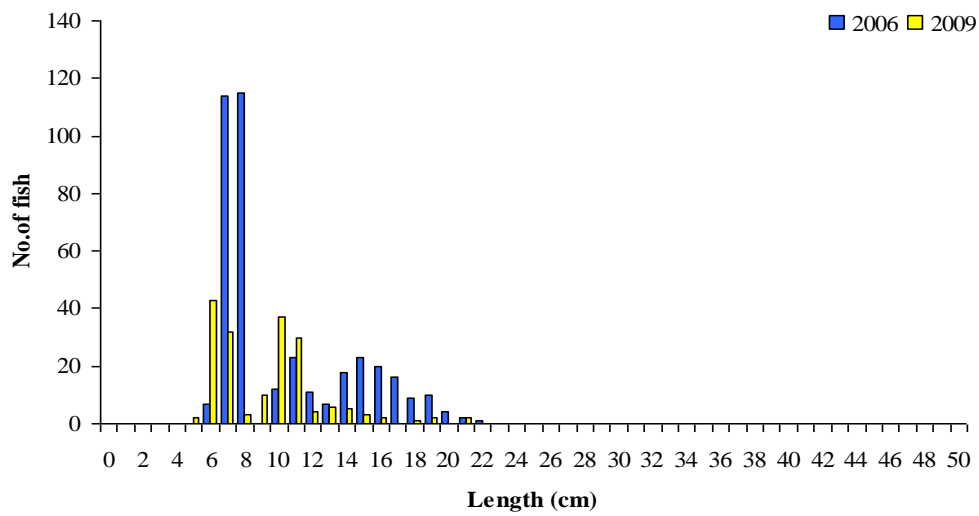


Fig. 1.5. Length frequency of perch captured on White Lough

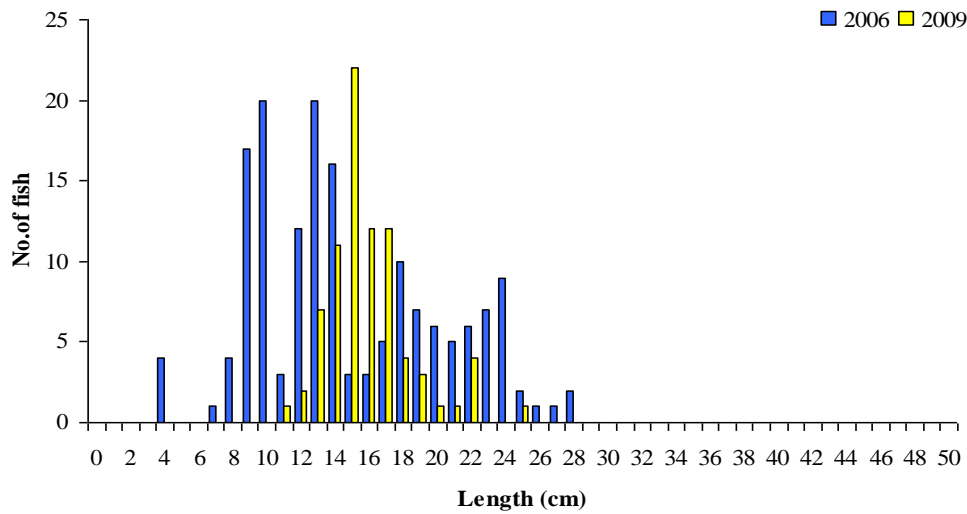


Fig. 1.6. Length frequency of roach captured on White Lough

1.3.4 Fish age and growth

Three age classes of perch were present, ranging from 1+ to 3+, with a mean L1 of 5.7cm (Table 1.3). Perch captured during the 2006 survey ranged from 0+ to 5+, with a mean L1 of 6.2cm (Kelly *et al.*, 2007). The dominant length class in both 2006 and 2009 was 5cm to 8cm, corresponding to the 0+ and 1+ age classes (Fig. 1.5).

Six age classes of roach were present, ranging from 2+ to 9+, with a mean L1 of 3.5cm (Table 1.4). Roach captured during the 2006 survey ranged in age from 1+ to 10+, with a mean L1 of 2.7cm (Kelly *et al.*, 2007). Four age classes of roach x bream hybrids were present, ranging from 3+ to 7+ (similar to the 2006 survey where they ranged in age from 2+ to 8+). Two bream were captured, both aged 2+ and one pike was captured aged 9+.

Table 1.3. Mean (\pm SE) perch length at age for White Lough, August 2009

	L ₁	L ₂	L ₃
Mean	5.7 (0.1)	9.6 (0.2)	14.9 (0.6)
N	70	26	7
Range	4.4-6.9	8.1-12.2	12.8-16.9

Table 1.4. Mean (\pm SE) roach length at age for White Lough, August 2009

	L ₁	L ₂	L ₃	L ₄	L ₅	L ₆	L ₇	L ₈	L ₉
Mean	3.5 (0.7)	7.5 (0.1)	11.7 (0.2)	15.6 (0.3)	18.1 (0.6)	20.0 (0.4)	21.2	22.5	24.4
N	57	57	53	12	5	3	1	1	1
Range	2.5-5.2	5.1-9.8	9.0-14.4	14.4-17.2	16.5-19.6	19.3-20.6	21.2- 21.2	22.5- 22.5	25.4- 25.4

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 CPUE of perch was lower in 2009 than in 2006 however this was not statistically significant. The mean perch CPUE in White Lough was also not significantly different to other similar lakes surveyed. The dominant age class of perch was 0+ and 1+, with age classes ranging from 1+ to 3+, indicating reproductive success in each of the previous three years.

The mean CPUE of roach was also lower in 2009 than in 2006 however this was not statistically significant. The mean roach CPUE in White Lough was relatively high when compared to other similar lakes; however, this difference was not statistically significant. Roach ranged in age from 2+

to 9+, indicating reproductive success in the last number of years. However, no 0+ or 1+ individuals were captured during the current survey.

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 WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using CFB and Agri-Food and Biosciences Northern Ireland (AFBINI) data generated during the NSSHARE Fish in Lakes project (Kelly *et al.*, 2008). Using this tool, White Lough has been assigned a fish classification of Good status.

The EPA has assigned an overall status of Moderate to White Lough in an interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish.

1.5 References

- EPA (2005) Submission in accordance with Article 5 of Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000 establishing a framework for community action in the field of water policy, and in accordance with EC-DE Environment D.2 document “Reporting Sheets for 2005 Reporting” dated 19 November 2004. Version 2, May 2005. Prepared by the Office of the Environment Assessment EPA, Johnstown Castle, Wexford
- Kelly, F., Connor, L. and Champ T. (2007) *A Survey of the Fish Populations in 46 lakes in the Northern Regional Fisheries Board, June to September 2005 and 2006*. Central Fisheries Board, unpublished report.
- 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.

**The Central Fisheries Board
Swords Business Campus,
Swords,
Co. Dublin,
Ireland.**

**Web: www.wfdfish.ie
www.cfb.ie
Email: info@cfb.ie
Tel: +353 1 8842600
Fax: +353 1 8360060**



**The Central and Regional
Fisheries Boards**