Sampling Fish for the Water Framework Directive

Lakes 2012

Dromore Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Dromore Lough, September 2012

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ACKNOWLEDGEMENTS

1.1 Introduction

Dromore Lough is a limestone rich water body located approximately 10km north of Ennis and 6km east of Corrofin, County Clare (Plate 1.1, Fig. 1.1). It has a surface area of 49ha, a maximum depth of 20m and a mean depth of 5.9m. The main outflow from Dromore Lough to the River Fergus is via Black Lake (Fig. 1.1). The lake is categorised as typology class 11 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. deep (mean depth >4 m), less than 50 ha and high alkalinity (>100 mg/l $CaCO_3$).

Dromore Lough is located in the Dromore Woods and Loughs Special Area of Conservation (NPWS, 2002). The lake is important both regionally and nationally as a waterfowl sanctuary. Dromore Lough and its surrounding area also provides important habitat for a number of mammal species such as pine marten, stoat and otter. One of the largest nursery colonies of the Lesser Horseshoe Bat in Ireland is located along the shores of Dromore Lough. This nursery is of international importance as the lesser horseshoe bat is a rare and endangered species listed on Annex II of the EU Habitats Directive (NPWS, 2002).

The lake holds tench, perch, rudd, pike and eels (IFT unpublished data). Historically, the lake has produced brown trout up to 2.5kg in weight (O'Reilly, 2007).

The lake was previously surveyed in September 2009 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2010). During this survey, perch were found to be the dominant species present in the lake. Rudd, pike and eels were also captured during the survey.
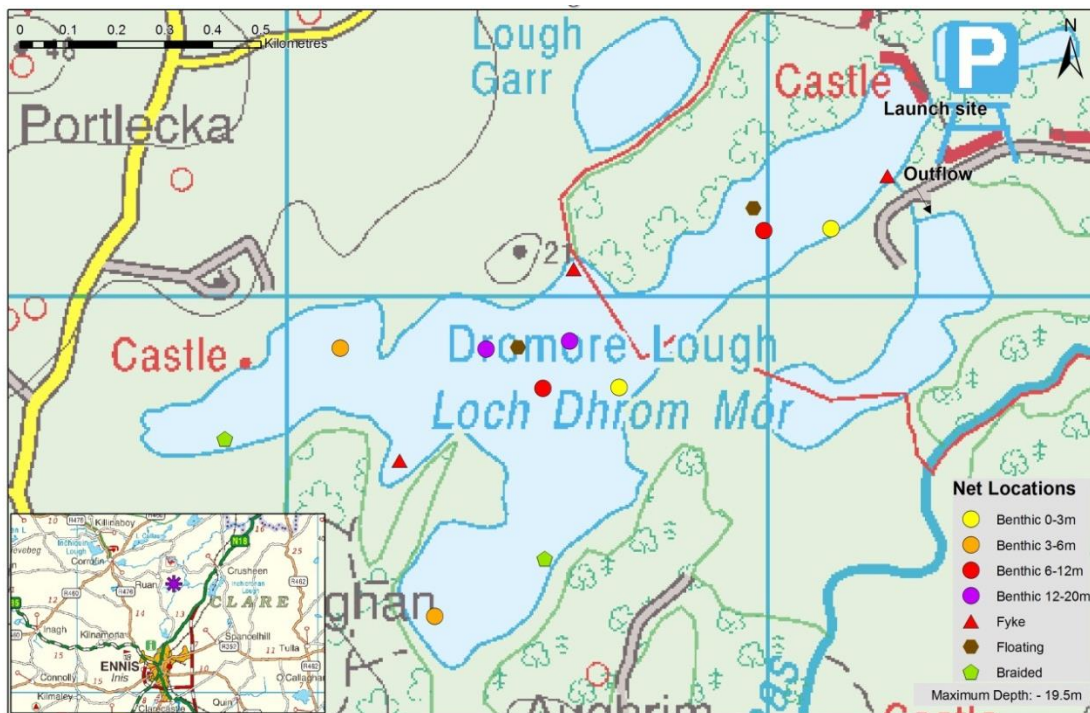
Plate 1.1. Dromore Lough

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

1.2 Methods

Dromore Lough was surveyed over two nights between the 3rd and the 5th of September 2012. A total of three sets of Dutch fyke nets, eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m and 2 @ 12-19.9m) and two surface monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed randomly in the lake (13 sites). The netting effort was supplemented using two benthic braided survey gill nets (62.5mm mesh knot to knot) at two additional sites. Nets were deployed in the same locations as were randomly selected in the previous survey in 2009. 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 rudd 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 returned to the laboratory for further analysis.

1.3 Results

1.3.1 Species Richness

A total of four fish species were recorded on Dromore Lough in September 2012, with 214 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 rudd, pike and eels. A similar species composition was recorded during the previous survey in 2009 (Kelly *et al.*, 2010).

Table 1.1. Number of each fish species captured by each gear type during the survey on Dromore Lough, September 2012

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Benthic braided gill nets	Surface mono multimesh gill nets	Fyke nets	Total
Perca fluviatilis	Perch	189	0	0	5	194
Scardinius erythropthalmus	Rudd	0	0	2	0	2
Esox Lucius	Pike	1	0	0	0	1
Anguilla anguilla	European eel	1	0	0	16	17

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 2009 and 2012 are summarised in Table 1.2. Mean CPUE and BPUE for all fish species is illustrated in Figures 1.2 and 1.3.

Although the mean perch CPUE and BPUE were slightly lower in 2012 than in 2009, this difference was not statistically significant (Fig. 1.2 and Fig. 1.3).

The differences in the mean perch CPUE and BPUE between Dromore Lough and three similar lakes was assessed, with no overall significant differences being found (Fig. 1.4 and Fig. 1.5).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Dromore Lough, 2009 and 2012

Scientific name	Common name	2009	2012
		Mean CPUE	
Perca fluviatilis	Perch	0.457 (0.134)	0.425 (0.145)
Scardinius erythropthalmus	Rudd	0.020 (0.012)	0.004 (0.004)
Esox Lucius	Pike	0.009 (0.004)	0.002 (0.002)
Anguilla anguilla	European eel	0.100 (0.019)	0.088 (0.049)
		Mean BPUE	
Perca fluviatilis	Perch	34.270 (11.952)	22.036 (10.334)
Scardinius erythropthalmus	Rudd	1.264 (0.763)	0.283 (0.283)
Esox Lucius	Pike	15.402 (8.853)	4.841 (4.841)
Anguilla anguilla	European eel	25.833 (6.403)	19.266 (12.363)

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.
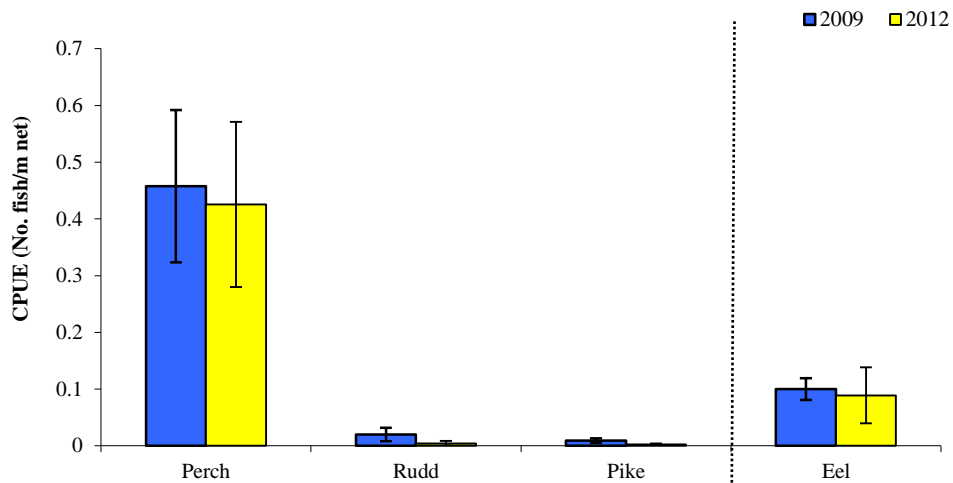
Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Dromore Lough (Eel CPUE based on fyke nets only), 2009 and 2012
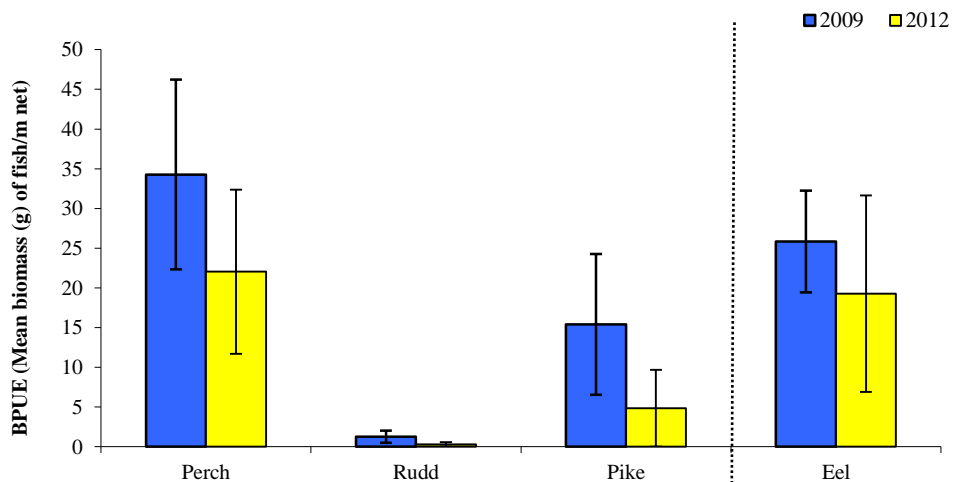

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Dromore Lough (Eel BPUE based on fyke nets only), 2009 and 2012
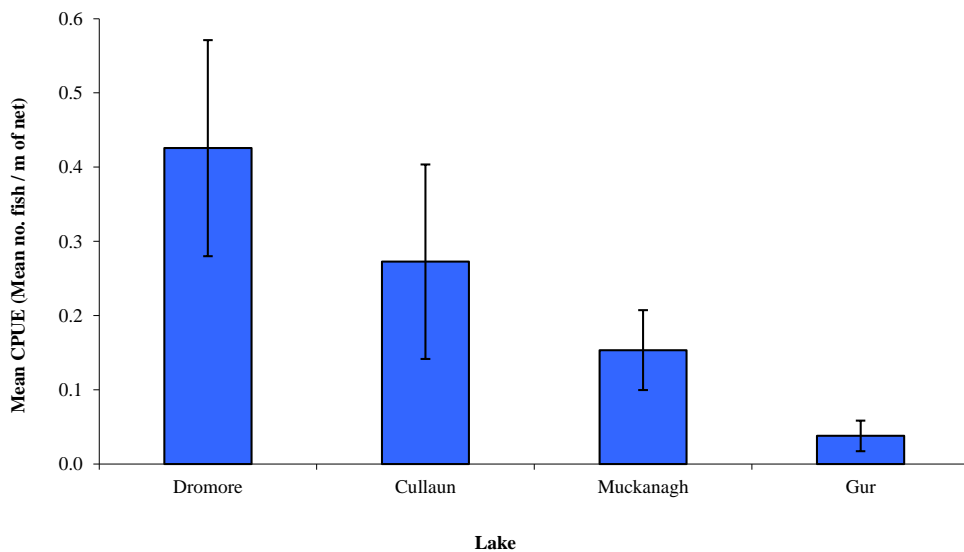
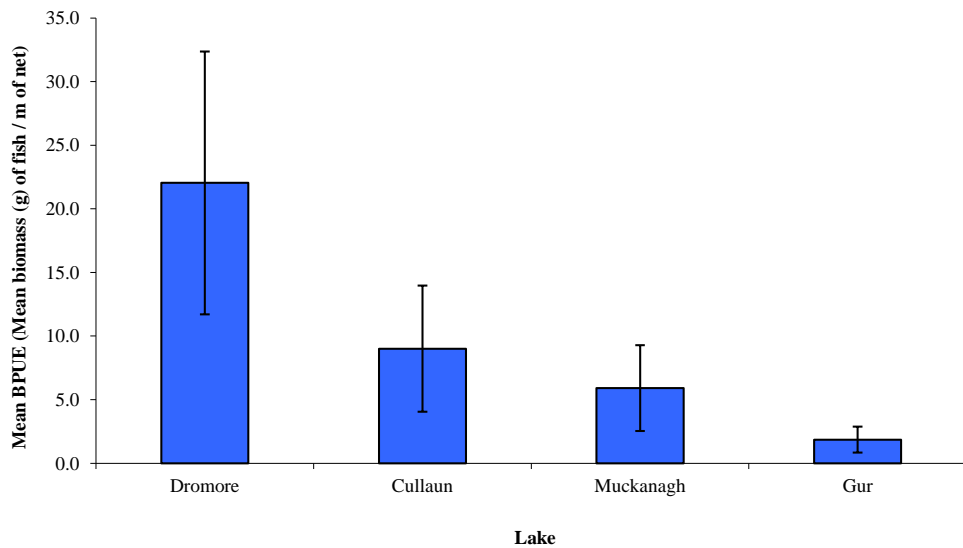**Fig. 1.4. Mean (±S.E.) perch CPUE in four lakes surveyed during 2012**

Fig. 1.5. Mean (±S.E.) perch BPUE in four lakes surveyed during 2012

1.3.3 Length frequency distributions

Perch captured during the 2012 survey ranged in length from 5.4cm to 24.8cm (mean = 11.9cm) (Fig. 1.6). Perch captured during the 2009 survey ranged in length from 5.6cm to 26.5cm (Fig. 1.6).

Rudd captured during the 2012 survey ranged in length from 11.0cm to 18.0cm (mean = 14.5cm) (Fig. 1.7). Rudd captured during the 2009 survey ranged in length from 6.8cm to 24.8cm (Fig. 1.7).

Eels captured during the 2012 survey ranged in length from 42.0cm to 58.1cm and one pike was recorded at 65.0cm.
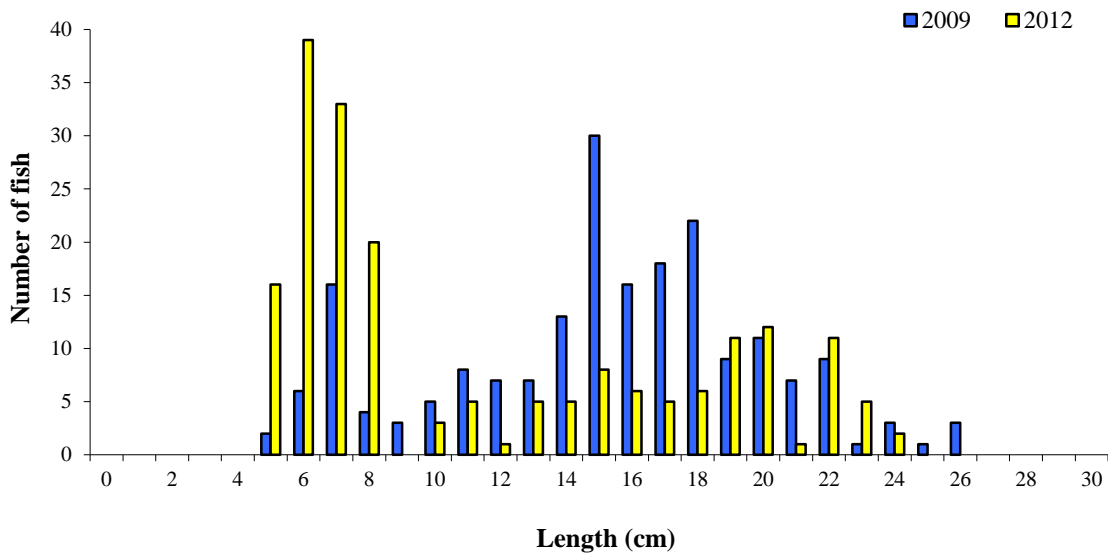

Fig. 1.6. Length frequency of perch captured on Dromore Lough, 2009 and 2012
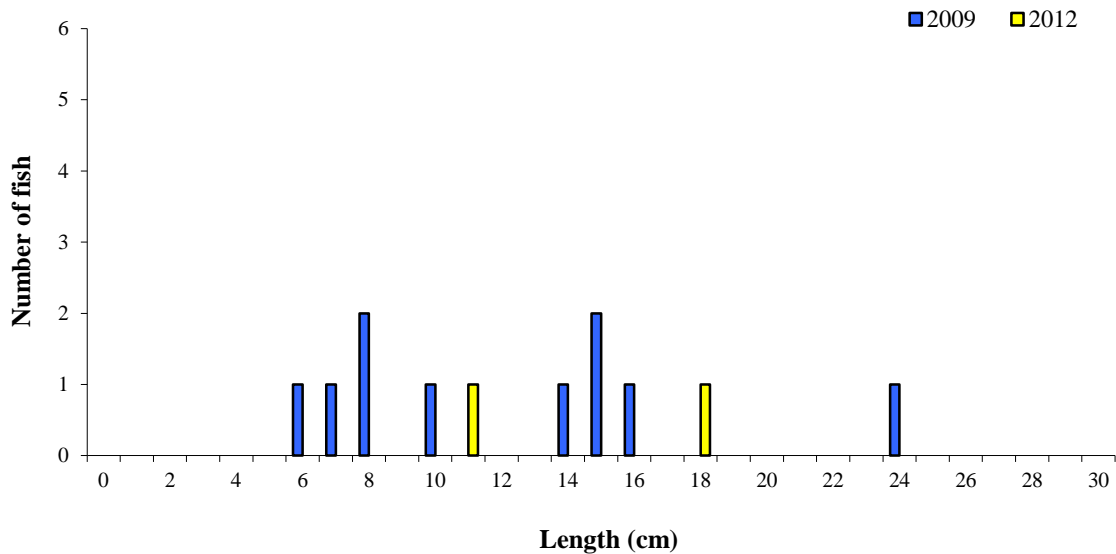
Fig. 1.7. Length frequency of rudd captured on Dromore Lough, 2009 and 2012

1.3.4 Fish age and growth

Nine age classes of perch were present, ranging from 0+ to 8+, with a mean L1 of 7.2cm (Table 1.3). The dominant age class was 0+ (Fig. 1.6). In the 2009 survey, perch ranged from 0+ to 5+ with a mean L1 of 7.1cm.

Rudd captured were aged at 2+ and 3+ and the one pike captured was aged at 4+.

Table 1.3. Mean (±SE) perch length (cm) at age for Dromore Lough, September 2012

	L_1	L_2	L_3	L_4	L_5	L_6	L7	L_8
Mean	7.2 (0.1)	12.3 (0.2)	15.9 (0.3)	18.2 (0.4)	20.0 (0.5)	21.3 (0.7)	19.6 (1.4)	18.9
N	59	41	31	23	14	7	2	1
Range	5.9-9.2	9.5-16.0	13.5-20.7	15.3-23.0	16.5-22.2	17.3-22.7	18.2-21.1	18.9

1.4 Summary

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

Although the mean perch CPUE and BPUE in Dromore Lough were lower in 2012 than in the 2009 survey, these differences were not statistically significant. The mean perch CPUE and BPUE in Dromore Lough was similar to the other lakes assessed during 2012, with no statistically significant differences being found between lakes. Perch ranged in age from 0+ to 8+, indicating reproductive success in the previous nine years. The dominant age class was 0+.

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*., 2012). Using the FIL2 classification tool, Dromore Lough has been assigned an ecological status of High based on the fish populations present in 2012. The ecological status assigned to the lake based on the 2009 survey data was Good.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Dromore Lough an overall ecological status of Poor, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised at the end of 2012.

1.5 References

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, NS Share project.

Kelly, F., Harrison A., Connor, L., Matson, R., Morrissey, E., O'Callaghan, R., Wogerbauer, C., Feeney, R., Hanna, G. and Rocks, K. (2010) *Sampling Fish for the Water Framework Directive – Summary Report 2009*. The Central and Regional Fisheries Boards.

Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.

NPWS (2002) Site *synopsis: Dromore Woods and Loughs. Site code: 000032*.Site Synopsis report, National Parks and Wildlife Service.

O' Reilly, P. (2007) *Loughs of Ireland - A Flyfisher's Guid*e. 4th Edition. Merlin Unwin Books.