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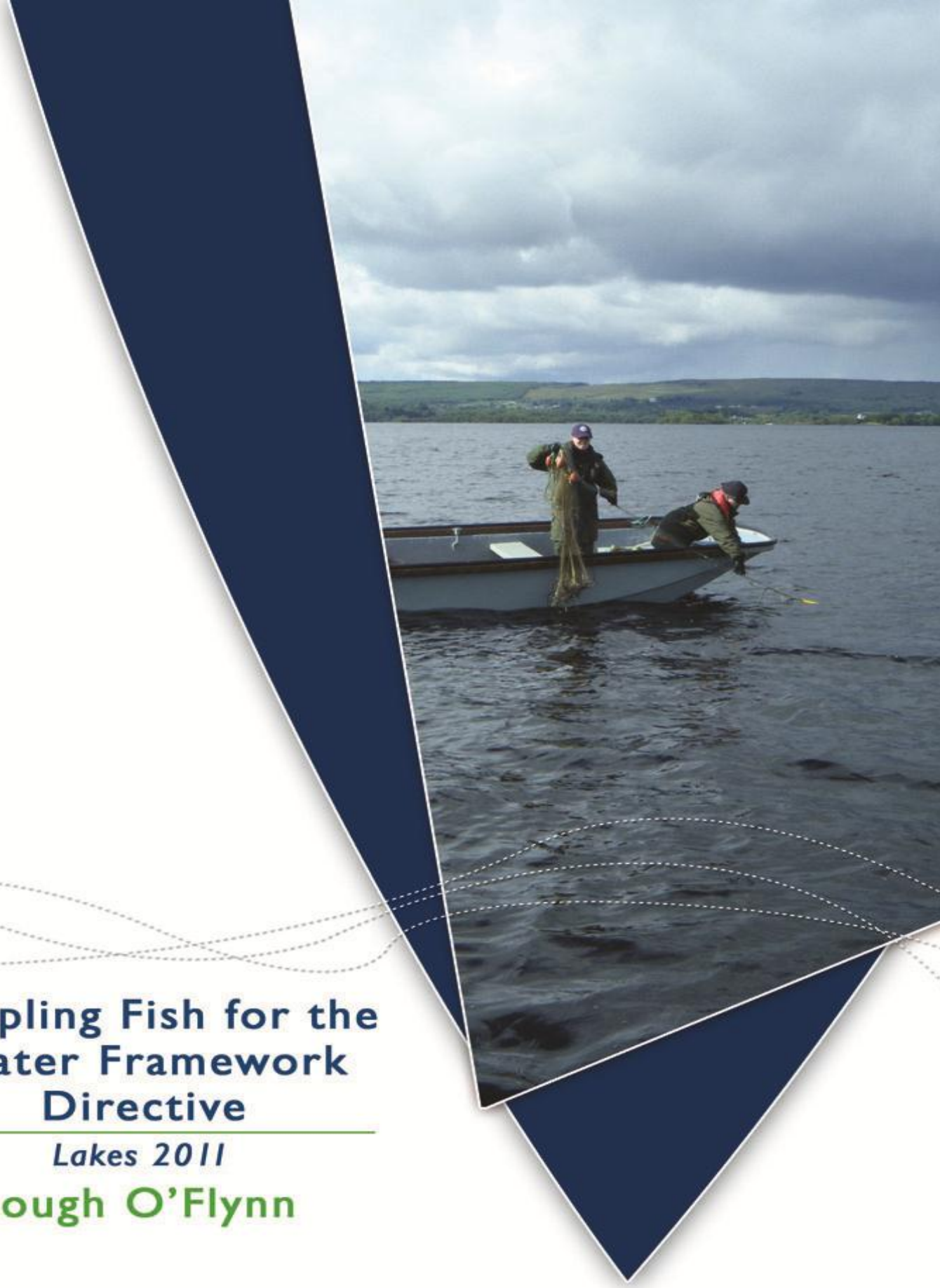

Sampling Fish for the Water Framework Directive

Lakes 2011

Lough O'Flynn

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough O' Flynn, July 2011

Fiona L. Kelly, Lynda Connor, Emma Morrissey, Ciara Wogerbauer, Ronan Matson, Rory Feeney and Kieran Rocks

Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin

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Cover photo: Lynda and Fiona gill netting © Inland Fisheries Ireland

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1.1 Introduction

Lough O'Flynn is situated in Co. Roscommon in the Suck catchment. The lake is located approximately one kilometre due north of the village of Ballinlough on the N60 Castlerea-Ballyhaunis road (Plate 1.1, Fig. 1.1). This rich limestone lake has a surface area of 136ha, a mean depth of 4-5m and a maximum depth of 16.5m. Lough O'Flynn falls into 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 lake overlies limestone geology.

Lough O'Flynn holds good stocks of wild and stocked brown trout averaging about 0.7kg with fish 1.4kg to 1.8kg sometimes caught. It also holds pike, perch, roach and eels. Crayfish are also present. This lake was initially developed as a trout fishery by the Inland Fisheries Trust and development work continues under Inland Fisheries Ireland (formerly the Shannon Regional Fisheries Board). The lake is stocked annually by Inland Fisheries Ireland with approximately 3,000 2+ brown trout. Lough O'Flynn is renowned for its prolific mayfly hatches and anglers have reported 'good' fishing from May to July.

Lough O'Flynn was previously surveyed in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009). During this survey, perch were found to be the dominant species present in the lake. Brown trout, roach, pike and eels were also captured during the survey.

Plate 1.1. Lough O'Flynn (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps (Aer Chór na hÉireann))

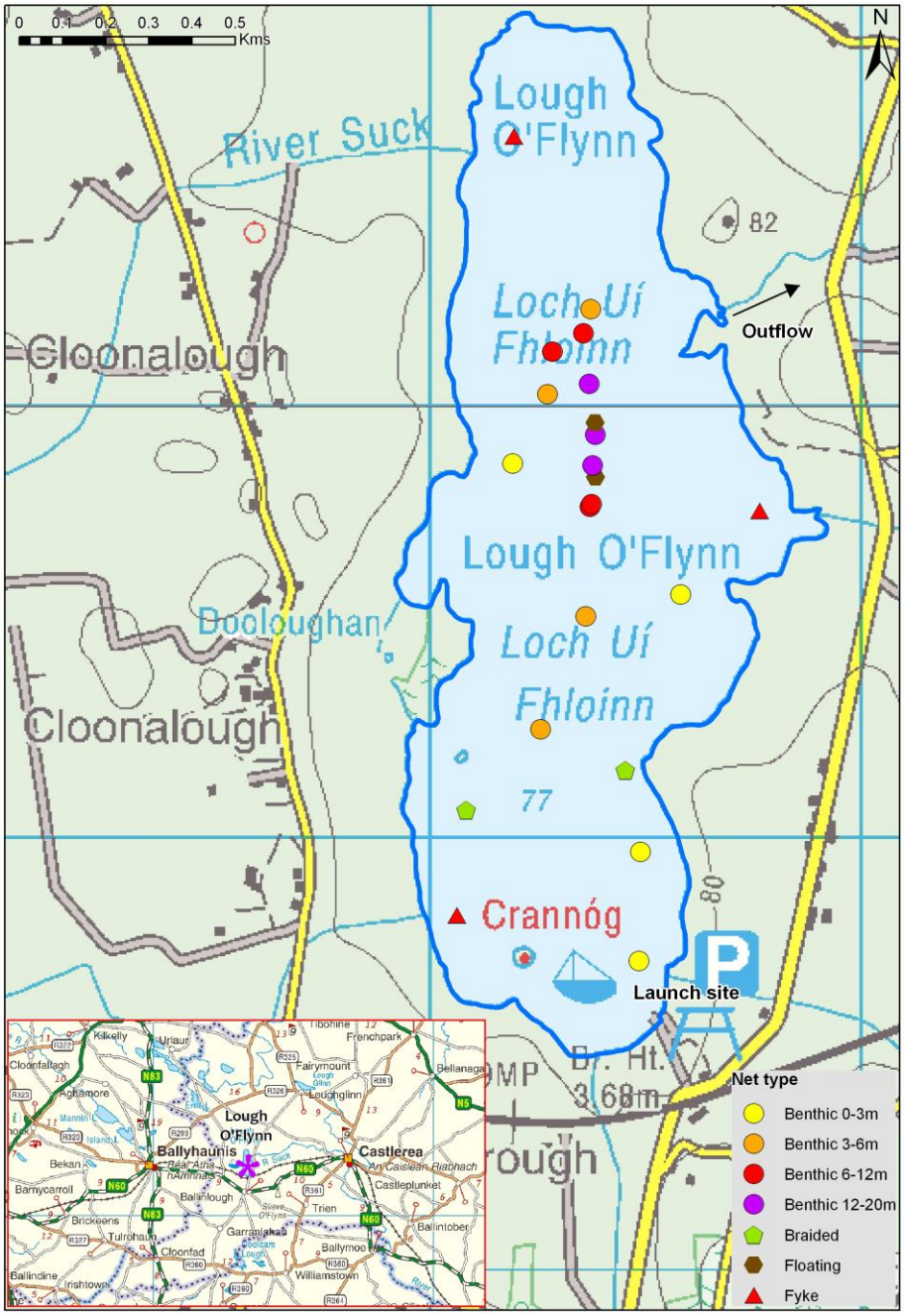

Fig. 1.1. Location map of Lough O'Flynn showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough O'Flynn was surveyed over two nights from the 4th to the 6th of July 2011. A total of three sets of Dutch fyke nets, 15 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 4 @ 6-11.9m and 3 @ 12-19.9m) and two floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (20 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. 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 brown trout, roach 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 five fish species were recorded on Lough O'Flynn in July 2011, with 194 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 pike, eels, roach and brown trout. During the previous survey in 2008 the same species composition was recorded.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough O'Flynn, July 2011

Scientific name	Common name	Number of fish captured				
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Salmo trutta	Brown trout (stocked)	3	1	0	0	4
Perca fluviatilis	Perch	160	1	0	4	165
Rutilus rutilus	Roach	5	2	0	0	7
Esox lucius	Pike	5	0	0	4	9
Anguilla anguilla	European eel	0	0	0	9	9

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 2008 and 2011 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 appeared slightly lower in 2011 than in 2008, these differences were not statistically significant.

The differences in the mean perch CPUE between Lough O'Flynn and five other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.4). Independent-Samples Mann-Whitney U tests between each lake showed that Lough O'Flynn had a significantly higher mean perch CPUE than Lough Corrib Upper and Lough Corrib Lower ($z = -2.694$ $P<0.05$ and $z = 2.573$ $P<0.05$).

Although the mean perch BPUE appeared slightly higher in 2011 than in 2008, these differences were also not statistically significant.

The differences in the mean perch BPUE between Lough O'Flynn and five other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P<0.05$) (Fig. 1.5). Independent-Samples Mann-Whitney U tests between each lake showed that Lough O'Flynn had a significantly higher mean perch BPUE than Lough Corrib Upper and Lough Corrib Lower ($z = -2.063$ $P<0.05$ and $z = -2.050$ $P<0.05$).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough O'Flynn, 2008 and 2011

Scientific name	Common name	2008	2011
		Mean CPUE	
Salmo trutta	Brown trout (stocked)	0.0045 (0.003)	0.006 (0.003)
Perca fluviatilis	Perch	0.275 (0.067)	0.242 (0.058)
Rutilus rutilus	Roach	0.012 (0.006)	0.011 (0.004)
Esox lucius	Pike	0.007 (0.004)	0.013 (0.006)
Anguilla anguilla	European eel	0.088 (0.040)	0.05 (0.034)
		Mean BPUE	
Salmo trutta	Brown trout (stocked)	1.342 (0.974)	3.527 (2.230)
Perca fluviatilis	Perch	6.864 (2.376)	12.109 (3.359)
Rutilus rutilus	Roach	0.394 (0.255)	1.426 (0.716)
Esox lucius	Pike	5.446 (4.413)	1.979 (1.418)
Anguilla anguilla	European eel	40.377 (17.070)	23.366 (13.50)

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

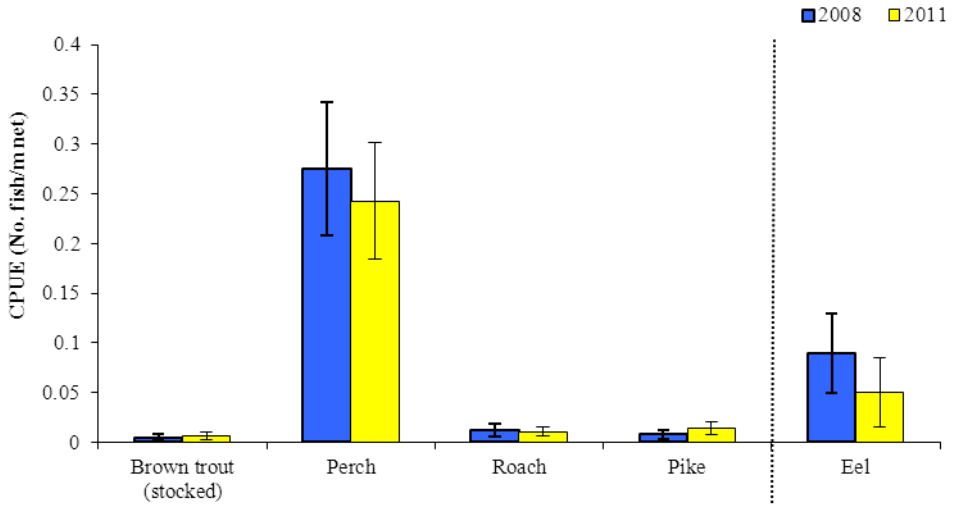

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough O'Flynn (Eel CPUE based on fyke nets only), 2008 and 2011

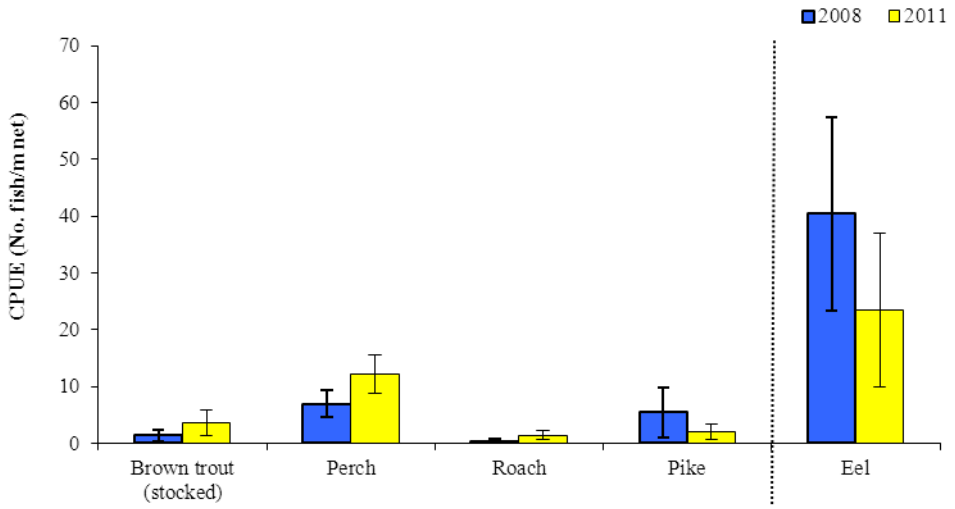

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough O'Flynn (Eel CPUE based on fyke nets only), 2008 and 2011

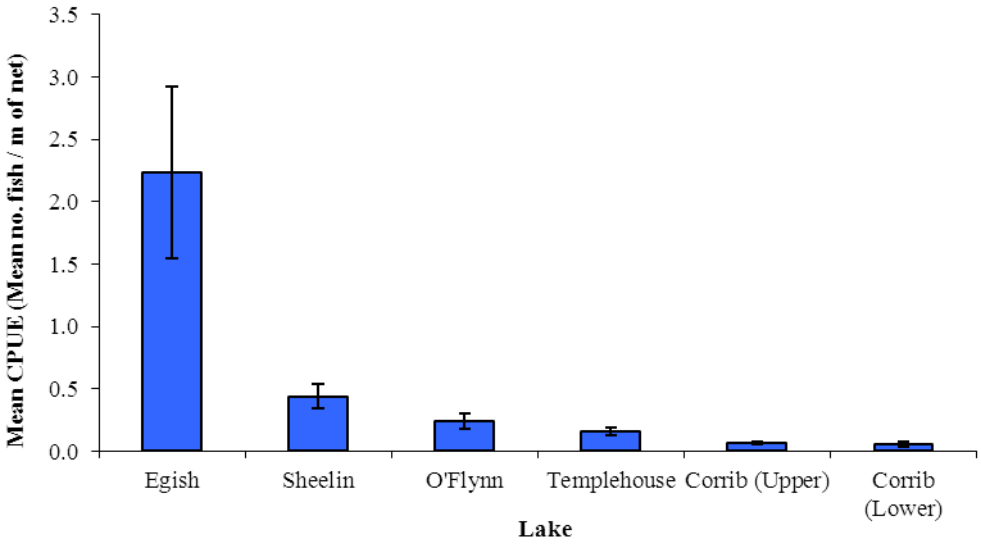

Fig. 1.4. Mean (±S.E.) perch CPUE in six lakes surveyed during 2011

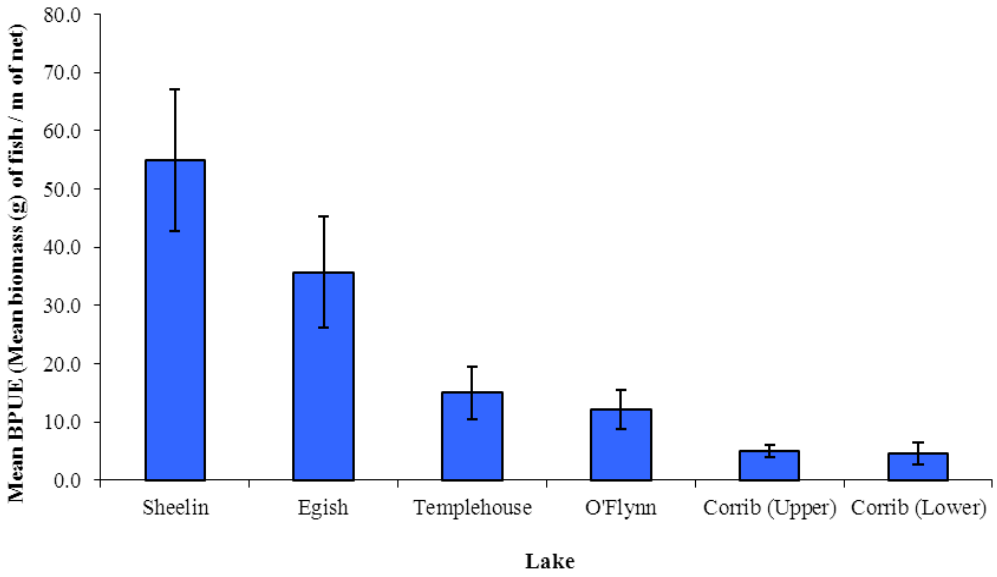

Fig. 1.5. Mean (±S.E.) perch BPUE in six lakes surveyed during 2011

1.3.3 Length frequency distributions

Brown trout captured during the 2011 survey ranged in length from 33.3cm to 39.6cm (mean = 36.2cm) (Fig. 1.6). Brown trout captured during the 2008 survey ranged in length from 29.8cm to 33.5cm (Fig. 1.6).

Perch captured during the 2011 survey ranged in length from 2.5cm to 30.1cm (mean = 13.8cm) (Fig.1.7). Perch captured during the 2008 survey had lengths ranging from 3.4cm to 24.0cm (Fig.1.7).

Pike captured during the 2011 survey ranged in length from 18.0cm to 48.0cm, roach ranged in length from 8.4cm to 20.9cm and eels ranged in length from 53.8cm to 76.0cm.

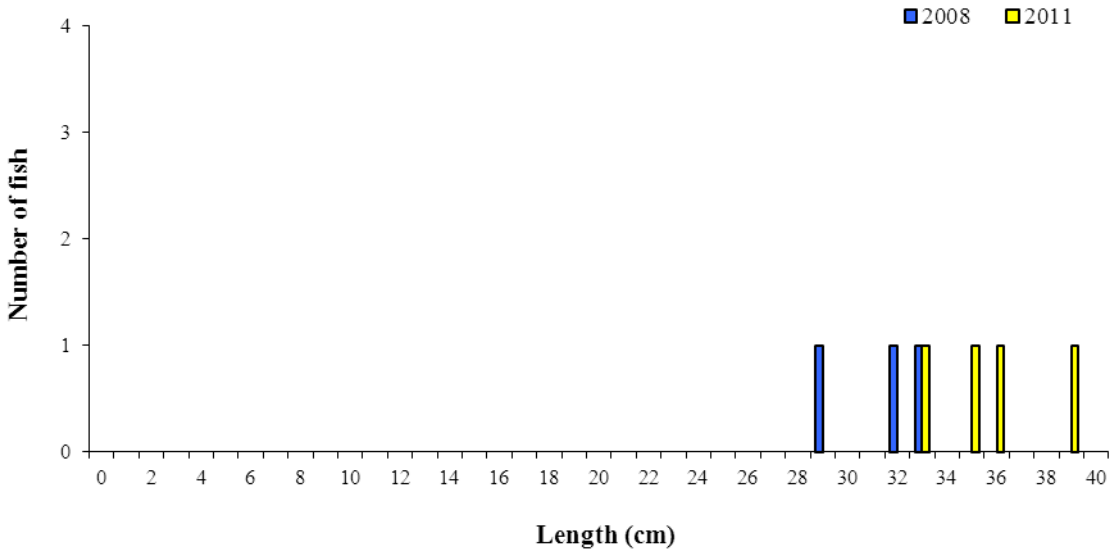

Fig. 1.6. Length frequency of brown trout captured on Lough O'Flynn

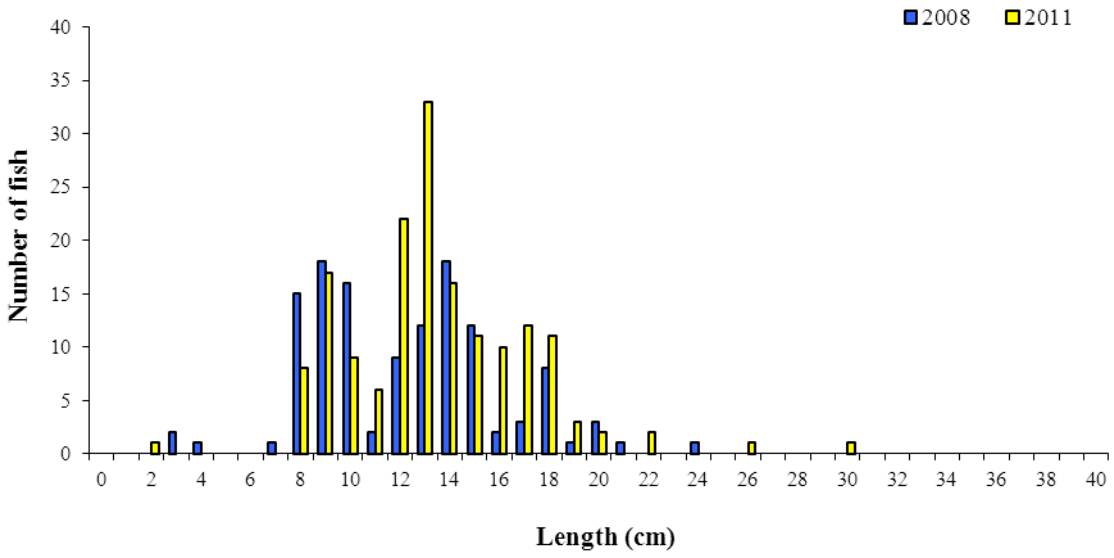

Fig. 1.7. Length frequency of perch captured on Lough O'Flynn

1.3.4 Fish age and growth

Eight age classes of perch were present, ranging from 0+ to 10+, with a mean L1 of 5.6cm (Table 1.3). In the 2008 survey, perch ranged from 0+ to 5+ with a mean L1 of 6.4cm. Two age classes of roach were present, ranging from 1+ to 3+, with a mean L1 of 3.6cm. Two age classes of pike were present, ranging from 1+ to 3+ and all brown trout captured were aged at 2+.

Table 1.3. Mean (±SE) perch length (cm) at age for Lough O'Flynn, July 2011

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}
Mean	5.6 (0.1)	10.1 (0.2)	14.5 (0.3)	17.7 (0.4)	20.3 (1.1)	22.8 (3.6)	24.7 (4.7)	20.9	21.6	22.4
N	80	63	36	16	7	2	2	1	1	1
Range	4.3-8.4	7.9-13.7	11.3-16.9	15.1-20.5	17.1-24.3	19.1-26.4	20.0-29.4	20.9-20.9	21.6-21.6	22.4-22.4

1.4 Summary

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

The mean perch CPUE and BPUE in Lough O'Flynn was significantly higher than the figures for Lough Corrib Upper and Lough Corrib Lower. Perch ranged in age from 0+ to 10+, with 0+ and 1+ fish being captured indicating reproductive success in recent years. The dominant age class of perch was 2+.

No wild brown trout were captured in Lough O'Flynn during the survey. The absence of wild brown trout indicates that the population in the lake is likely to be small and currently cannot sustain the fishing pressure. It is recommended that a review of habitat and spawning potential of the wild brown trout population in the lake and feeder stream is carried out. Fisheries enhancement work may be required on the feeder stream to enhance productivity.

Stocking of fish (including non indigenous species such as rainbow trout) has been identified as an action with potential to impact on the quality status of rivers and lakes and is listed as a pressure in the WFD REFCOND guidance document (Wallin *et al.*, 2005). In WFD terms, it could impact on the ecological status class scoring system and would serve to drive down the water body's quality rating. While this classifying may seem arbitrary to some it does reflect the concern of WFD to identify issues that are not appropriate in water resource (in broadest terms) management. Deterioration of ecological status is not permissible under WFD, unless in cases of major public or national importance.

A review of the survival of stocked fish in this lake is recommended, and the stocking policy for the lake should also be reviewed and revised. Stocking programmes developed should be consistent with EU legislation (Water Framework Directive, Habitats Directive and the Fish Health Directive) and national programmes such as the National Biodiversity Plan. The revised stocking policy for the lake should include a review of habitat and spawning potential of the wild brown trout population, catch and release policy, bag limits, etc.

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, combined with expert opinion on non-native/alien species, Lough O'Flynn has been assigned an ecological status of Good based on the fish populations present. The ecological status assigned to the lake based on the 2008 survey data was also Good.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough O'Flynn an overall ecological status of Moderate, 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

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Inland Fisheries Ireland
Swords Business Campus,
Swords,
Co. Dublin,
Ireland.

Web: www.fisheriesireland.ie
Email: info@fisheriesireland.ie
Tel: +353 1 8842 600
Fax: +353 1 8360 060