



# Sampling Fish for the Water Framework Directive

*Lakes 2014*

**Lough O'Flynn**





## Water Framework Directive Fish Stock Survey of Lough O'Flynn, July 2014

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

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## 1.1 Introduction

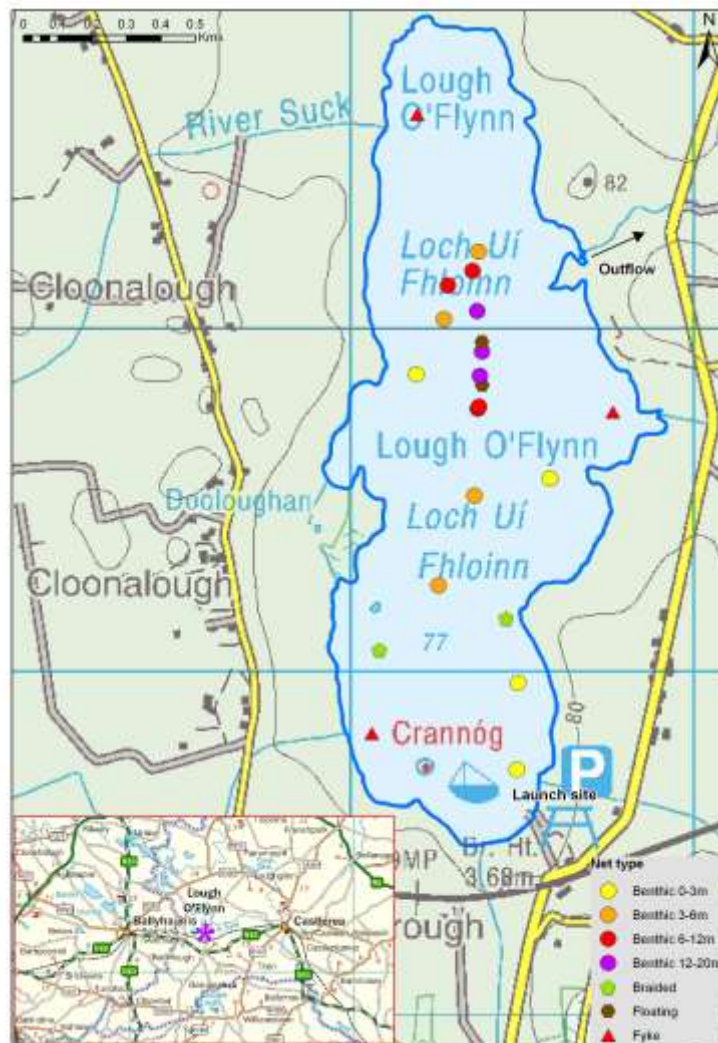
Lough O' Flynn is situated in Co. Roscommon in the Suck catchment. The lake is located approximately one kilometre due north of the village of Ballinlough on the N60 Castlerea-Ballyhaunis road (Plate 1.1, Fig. 1.1). This rich limestone lake has a surface area of 136ha, a mean depth of 4-5m and a maximum depth of 16.5m. Lough O' Flynn is categorised as 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<sub>3</sub>). 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 and 2011 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009 and Kelly *et al.*, 2012a). During the 2011 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**



**Fig. 1.1. Location map of Lough O'Flynn indicating the locations and depths of each net (outflow is shown on map)**

## 1.2 Methods

Lough O'Flynn was surveyed over two nights between the 2<sup>nd</sup> and the 4<sup>th</sup> of July 2014. 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 surveys in 2008 and 2011. 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 2014, with 433 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Roach was the most abundant fish species recorded, followed by perch, stocked brown trout, eels and pike. During the previous surveys in 2008 and 2011 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 2014**

Scientific name	Common name	Number of fish captured				Total
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Benthic braided gill nets	Fyke nets	
<i>Rutilus rutilus</i>	Roach	274	33	0	0	307
<i>Perca fluviatilis</i>	Perch	79	0	0	0	79
<i>Salmo trutta</i>	Brown trout (stocked)	31	1	0	0	32
<i>Esox lucius</i>	Pike	3	0	0	3	6
<i>Anguilla anguilla</i>	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 the 2008, 2011 and 2014 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Roach was the dominant species in terms of abundance (CPUE) and biomass (BPUE). The mean roach CPUE and BPUE was significantly higher in 2014 than in 2008 and 2011 (Mann-Whitney,  $P < 0.001$  and  $P < 0.001$  respectively) (Table 1.2; Fig 1.2 and 1.3). The mean perch CPUE and BPUE fluctuated slightly over the sampling period from 2008 to 2014; however, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3).

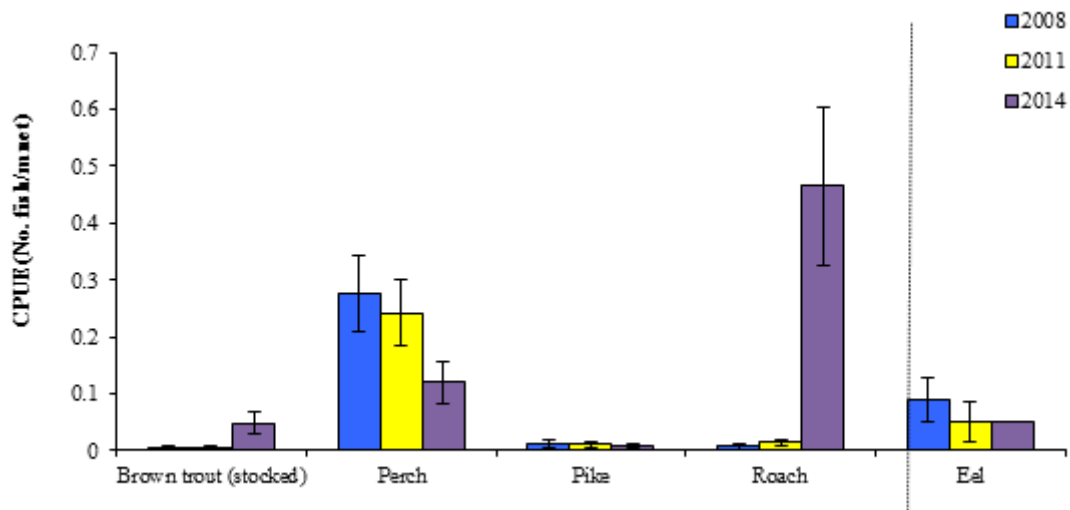


**Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough O' Flynn, 2008, 2011 and 2014**

Scientific name	Common name	2008	2011	2014
<b>Mean CPUE</b>				
<i>Rutilus rutilus</i>	Roach	0.007 (0.004)	0.013 (0.006)	0.465 (0.140)
<i>Perca fluviatilis</i>	Perch	0.275 (0.067)	0.242 (0.058)	0.119 (0.037)
<i>Salmo trutta</i>	Brown trout (stocked)	0.0045 (0.003)	0.006 (0.003)	0.048 (0.019)
<i>Esox lucius</i>	Pike	0.012 (0.006)	0.011 (0.004)	0.006 (0.003)
<i>Anguilla anguilla</i>	Eel	0.088 (0.040)	0.05 (0.034)	0.050
<b>Mean BPUE</b>				
<i>Rutilus rutilus</i>	Roach	5.446 (4.413)	1.979 (1.418)	37.625 (8.360)
<i>Perca fluviatilis</i>	Perch	6.864 (2.376)	12.109 (3.359)	2.561 (1.080)
<i>Salmo trutta</i>	Brown trout (stocked)	1.342 (0.974)	3.527 (2.230)	31.652 (12.767)
<i>Esox lucius</i>	Pike	0.394 (0.255)	1.426 (0.716)	1.744 (1.326)
<i>Anguilla anguilla</i>	Eel	40.377 (17.070)	23.366 (13.50)	25.094 (4.539)

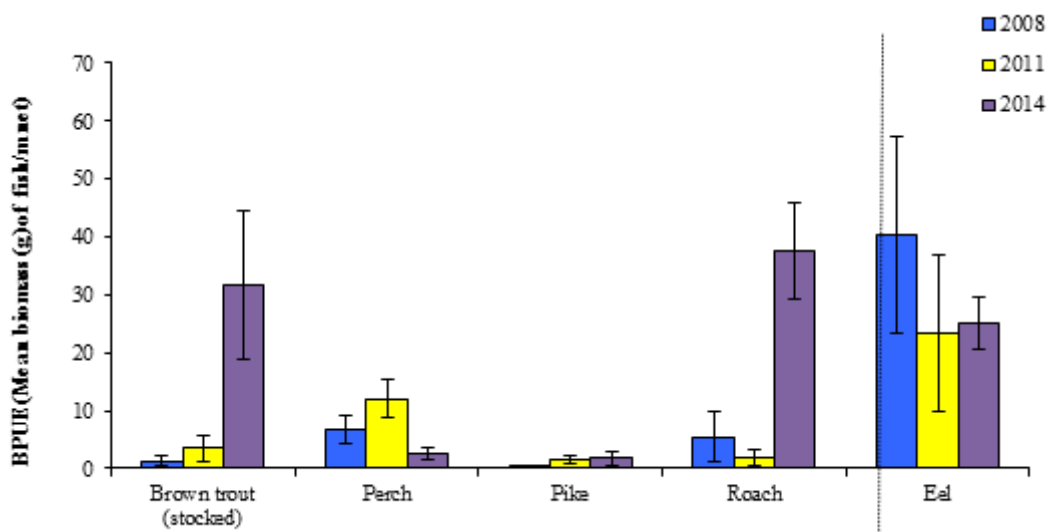
Note: On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.

\*Eel CPUE and BPUE based on fyke nets only



**Fig. 1.2. Mean ( $\pm$ S.E.) CPUE for all fish species captured in Lough O' Flynn (Eel CPUE based on fyke nets only), 2008, 2011 and 2014**





**Fig. 1.3. Mean ( $\pm$ S.E.) BPUE for all fish species captured in Lough O' Flynn (Eel BPUE based on fyke nets only), 2008, 2011 and 2014**

### ***1.3.3 Length frequency distributions and growth***

Brown trout (all stocked) captured during the 2014 survey ranged in length from 30.5cm to 46.0cm (mean = 38.0cm) (Fig. 1.4) with one age class present, 2+. The mean L1 was 10.1cm (Table 1.3). Brown trout captured during the 2008 and 2011 surveys ranged in length from 29.8cm to 33.5cm in 2008 and 33.3cm to 39.6cm in 2011 (Fig. 1.4) and had a similar age range (2+) and growth rate to the 2014 survey (Fig. 1.4).

Roach captured during the 2014 survey ranged in length from 5.5cm to 30.5cm (mean = 15.3cm) (Fig.1.5) with eight age classes present, ranging from 1+ to 8+, with a mean L1 of 2.9cm (Table 1.4). The dominant age class was 3+ (Fig. 1.5). Roach captured during the 2008 and 2011 surveys had a narrower length range and age range than the 2014 survey (Fig.1.5).

Perch captured during the 2014 survey ranged in length from 3.4cm to 25.5cm (mean = 9.3cm) (Fig.1.6) with six age classes present, ranging from 0+ to 5+, with a mean L1 of 6.2cm (Table 1.5). The dominant age class was 1+ (Fig. 1.6). Perch captured during the 2008 and 2014 surveys had a similar age and length range; however, a much wider age and length range was recorded in 2011 (Fig.1.6).

Pike captured during the 2014 survey ranged in length from 21.0cm to 44.5cm and eels ranged from 55.6cm to 87.2cm.

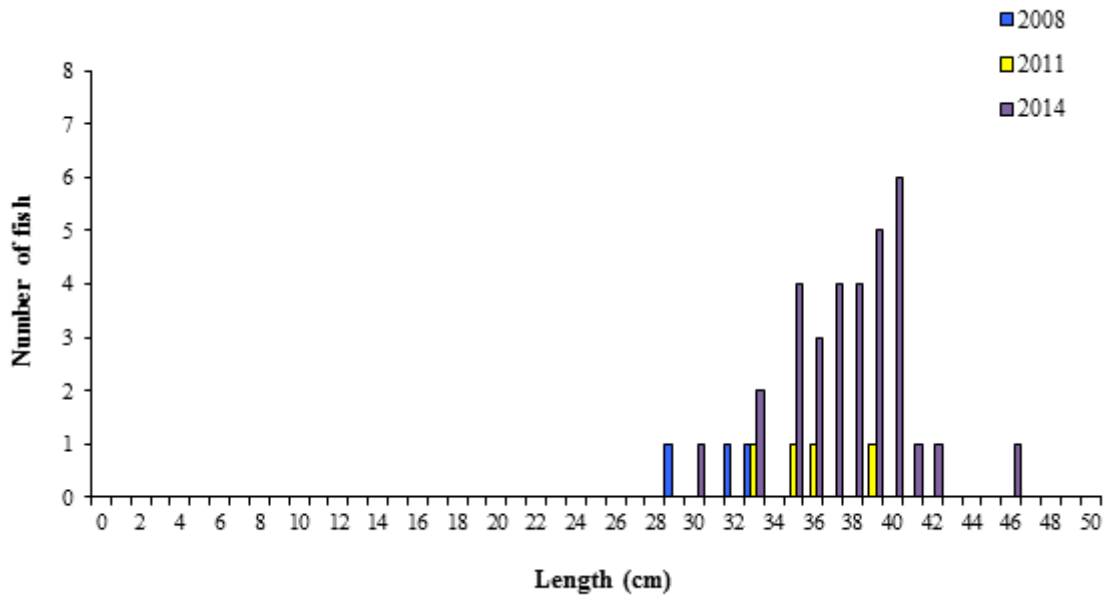


Fig. 1.4. Length frequency of brown trout captured on Lough O' Flynn, 2008, 2011 and 2014

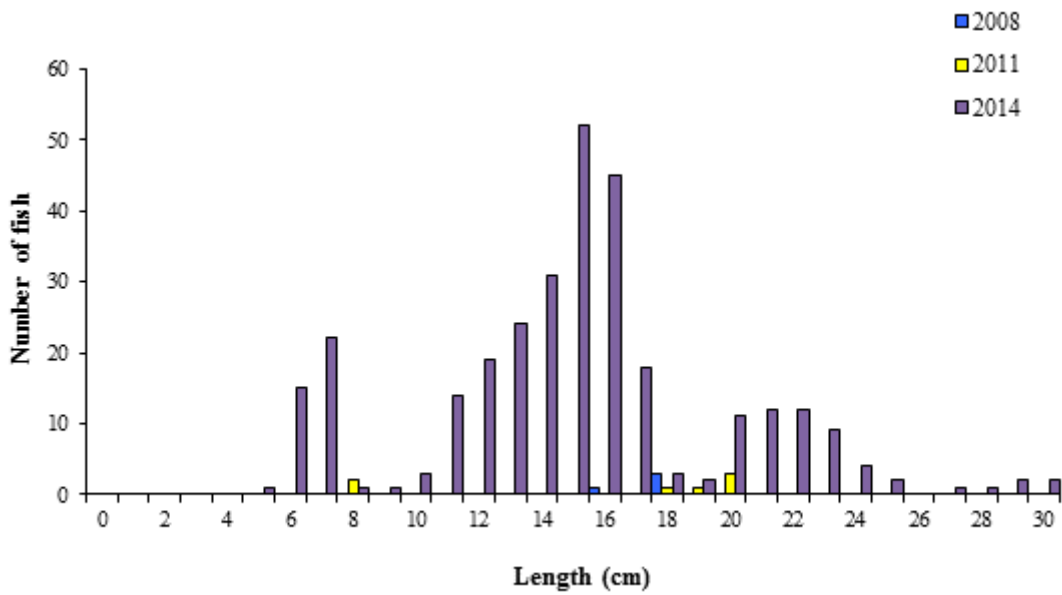


Fig. 1.5. Length frequency of roach captured on Lough O' Flynn, 2008, 2011 and 2014

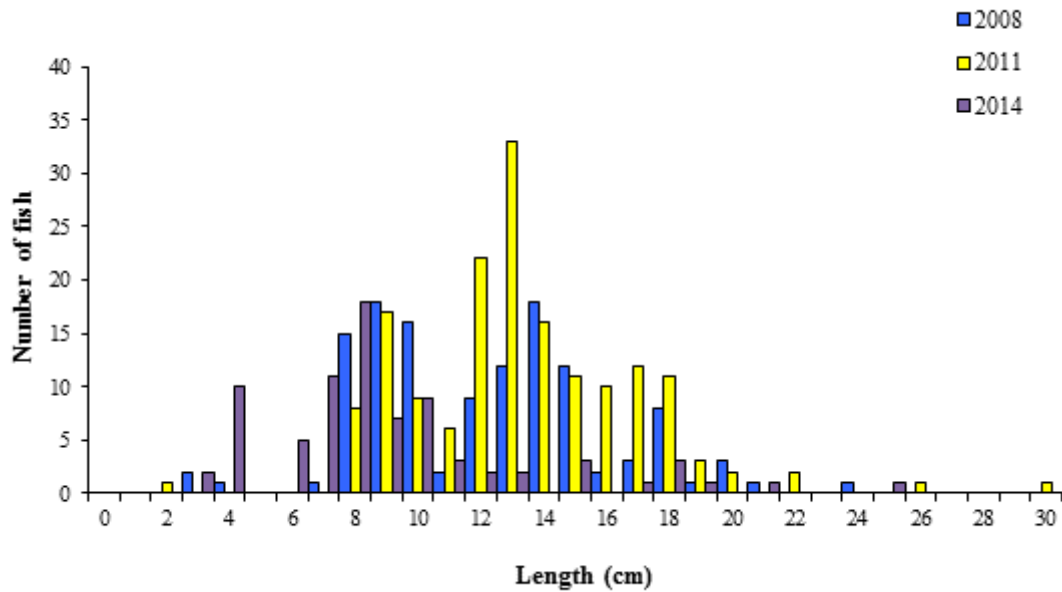


Fig. 1.6. Length frequency of perch captured on Lough O' Flynn, 2008, 2011 and 2014

Table 1.3. Mean ( $\pm$ SE) brown trout length (cm) at age for Lough O' Flynn, July 2014

	L <sub>1</sub>	L <sub>2</sub>
Mean	10.1 (0.5)	33.3 (0.7)
N	21	21
Range	7.2-14.1	24.1-39.0

Table 1.4. Mean ( $\pm$ SE) roach length (cm) at age for Lough O' Flynn, July 2014

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>	L <sub>6</sub>	L <sub>7</sub>	L <sub>8</sub>
Mean	2.9 (0.1)	8.2 (0.2)	14.6 (0.4)	19.4 (0.5)	22.3 (0.6)	25.9 (0.8)	27.7	29.6
N	59	53	46	28	12	6	1	1
Range	1.6-4.3	3.9-11.0	8.9-19.8	14.4-23.1	18.7-25.5	23.2-28.1	27.7-27.7	29.6-29.6

Table 1.5. Mean ( $\pm$ SE) perch length (cm) at age for Lough O' Flynn, July 2014

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>
Mean	6.2 (0.3)	10.3 (0.6)	15.6 (0.7)	18.8 (1.1)	17.7
N	30	15	10	7	1
Range	3.6-10.8	8.1-17.4	13.9-21.4	16.4-25.0	17.7-17.7



## 1.4 Summary

Roach was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2014 survey.

All brown trout recorded were stocked and aged at 2+.

The mean roach CPUE and BPUE was significantly higher in 2014 than in 2008 and 2011. Roach ranged in age from 1+ to 8+, indicating reproductive success in the previous eight years. The dominant age class was 3+.

The mean perch CPUE and BPUE fluctuated slightly over the sampling period from 2008 to 2014; however, these differences were also not statistically significant. Perch ranged in age from 0+ to 5+, indicating reproductive success in each of the previous six years. The dominant age class was 1+.

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, Lough O’ Flynn has been assigned an ecological status of Good for both 2008 and 2011 and Poor in 2014 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Lough O’ Flynn an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish.



## 1.5 References

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