Sampling Fish for the Water Framework Directive

Lakes 2012

Dunglow Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Dunglow Lough, August 2012

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1.1 Introduction

Dunglow Lough is located in the Rosses fishery, 1.3km from Dunglow town, Co. Donegal (Plate 1.1, Fig. 1.1). The Rosses fishery is composed of six salmon/sea trout/brown trout systems with isolated loughs interspersed throughout the fishery. Dunglow Lough is the furthest downstream of the lakes in the system. The lake is situated at an altitude of 17m a.s.l. It has a surface area of 61ha, a mean depth of 1.3m and a maximum depth of 7.5m. The lake is categorised as typology class 2 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and low alkalinity (<20mg/l $CaCO_3$). The lake has been classed as 2b (i.e. expected to meet good status by 2015) in the WFD characterization report (EPA, 2005). The geology of the area is predominantly granite, felsite and other intrusive rocks rich in silica.

The lake holds a good stock of small, wild brown trout which has historically been augmented by regularly stocking larger brown trout into the lake. There was also additional stocking of rainbow trout up to 680g in previous years (Cooke *et al*., 1997). In an effort to regenerate the sea trout population, the Rosses Anglers Association discontinued their stocking policy in 2006 (Gerry McCafferty IFI, *pers. comm.*). The sea trout run into the lake starts in July (O' Reilly, 2007). Dunglow Lough was previously surveyed in 1996 (Cooke *et al*., 1997) and the lake was also surveyed in August 2006 and 2009 as part of the NSSHARE Fish in Lakes Project (Kelly *et al*., 2007) and as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2010). In both years brown trout was found to be the dominant species, followed by eel and sea trout.
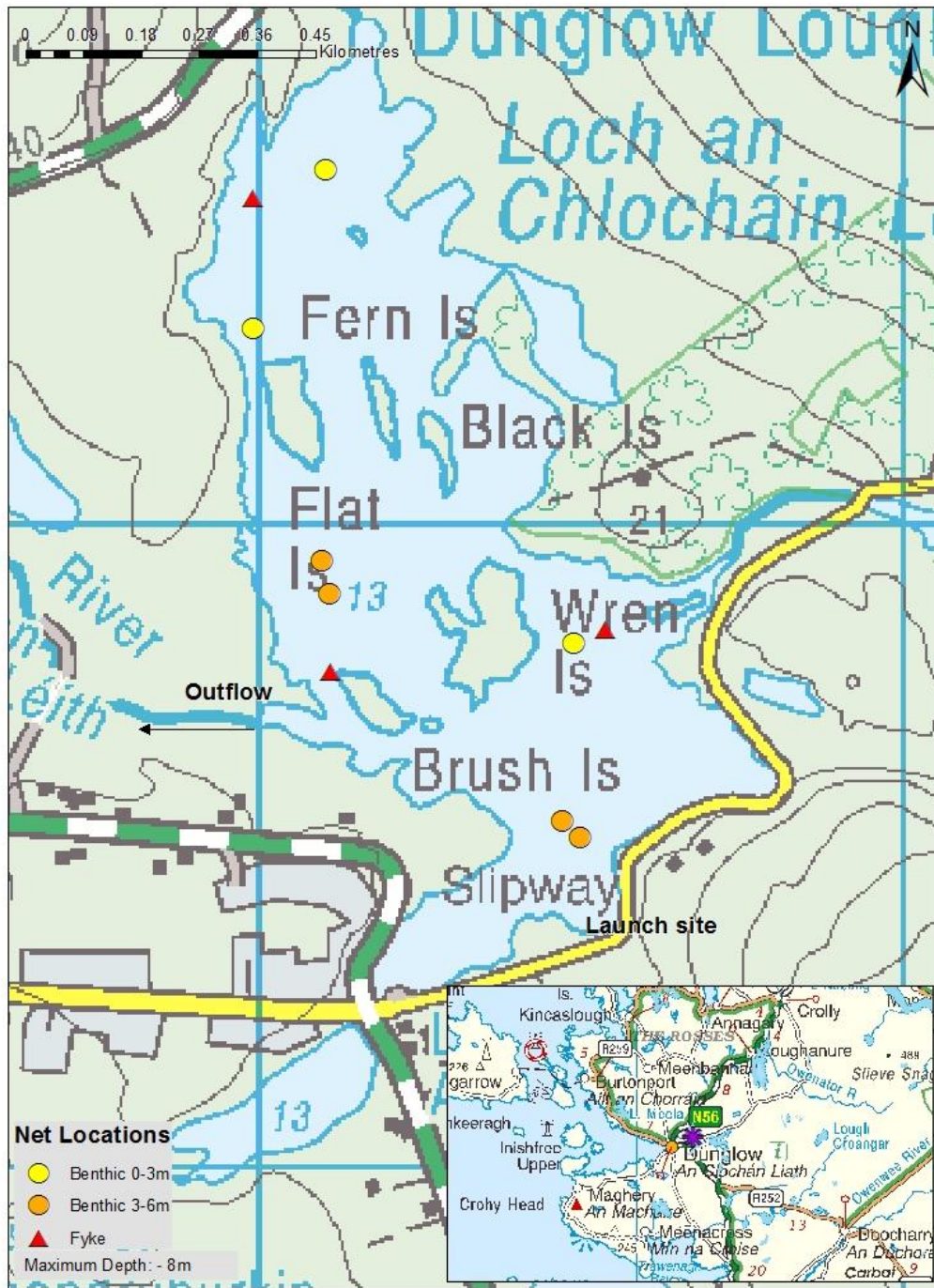

Plate 1.1. Dunglow Lough

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

1.2 Methods

Dunglow Lough was surveyed over one night on the 1st of August 2012. A total of three sets of Dutch fyke nets and seven benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (3 @ 0-2.9m and 4 @ 3-5.9m) were deployed in the lake (10 sites). Nets were deployed in the same locations as were randomly selected in the previous surveys 2009 and 2006. 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 were measured and weighed on site and scales were removed from all trout and salmon. 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 three fish species (sea trout are included as a separate 'variety' of trout) were recorded in Dunglow Lough in August 2012, with 41 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most abundant fish species recorded, followed by sea trout, eels and salmon. During the previous survey in 2009 the same species composition was recorded with the exception of salmon, which were present during the 2012 survey but were not captured in 2009 (Kelly *et al.*, 2010).

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

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	Total
Salmo trutta	Brown trout	34	0	0	34
	Sea trout	1	0	0	1
Salmo salar	Salmon	1	0	0	1
Anguilla anguilla	European eel	0	0	5	5

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 brown trout CPUE and BPUE appeared different in 2012 than in 2009, these differences were not statistically significant (Fig. 1.2 and Fig. 1.3).

The differences in the mean brown trout CPUE between Dunglow Lough and three similar lakes was assessed, with no overall significant differences being found (Fig. 1.4 and Fig. 1.5). However, Independent-Samples Mann-Whitney U tests between each lake showed that Dunglow Lough had a significantly lower mean brown trout CPUE and BPUE than Lough Tay ($P<0.05$) and Lough Nasnahida ($P<0.05$).

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

Scientific name	Common name	2009	2012
		Mean CPUE	
Salmo trutta	Brown trout	0.133 (0.041)	0.113 (0.034)
	Sea trout	0.006 (0.004)	0.003 (0.003)
Salmo salar	Salmon	-	0.003 (0.003)
Anguilla anguilla	European eel	0.1 (0.067)	0.027 (0.005)
		Mean BPUE	
Salmo trutta	Brown trout	4.758 (1.637)	7.311 (2.367)
	Sea trout	2.240 (1.509)	0.940 (0.940)
Salmo salar	Salmon	-	0.073 (0.073)
Anguilla anguilla	European eel	11.633 (7.619)	4.583 (1.534)

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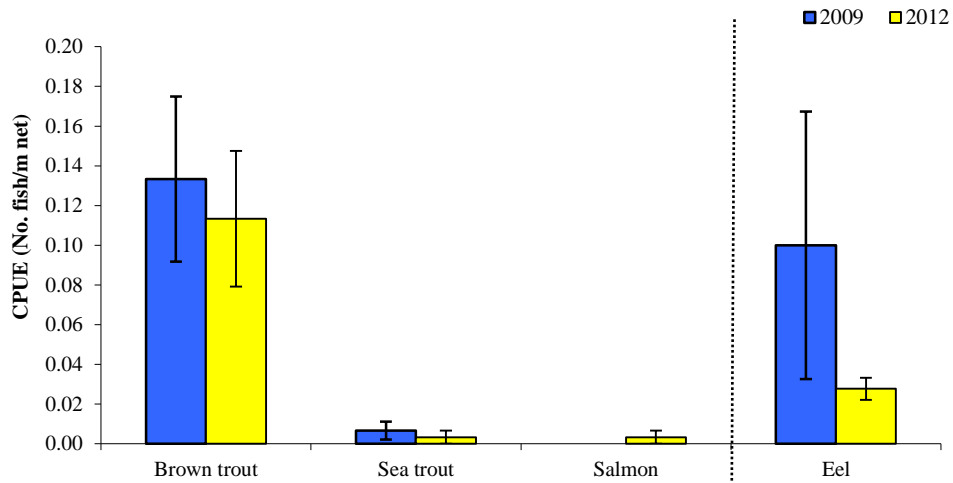
Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Dunglow Lough (Eel CPUE based on fyke nets only), 2009 and 2012
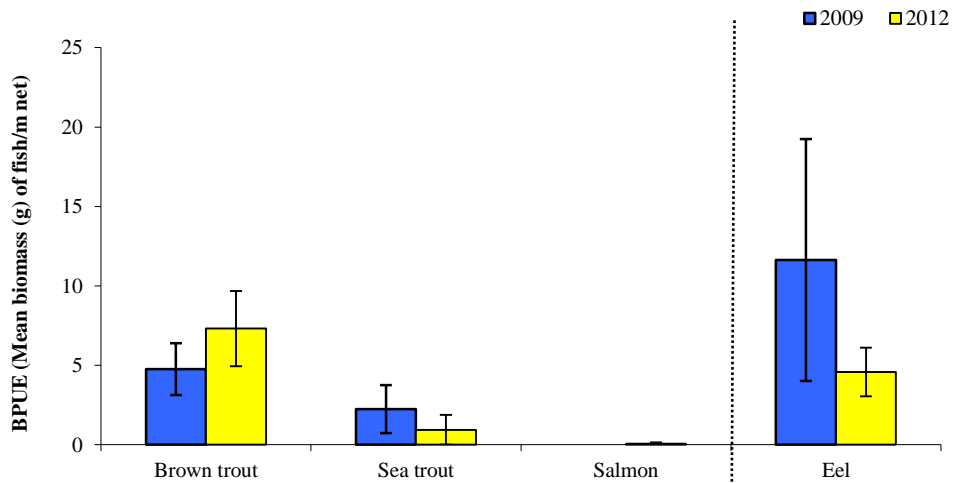

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Dunglow Lough (Eel BPUE based on fyke nets only), 2009 and 2012
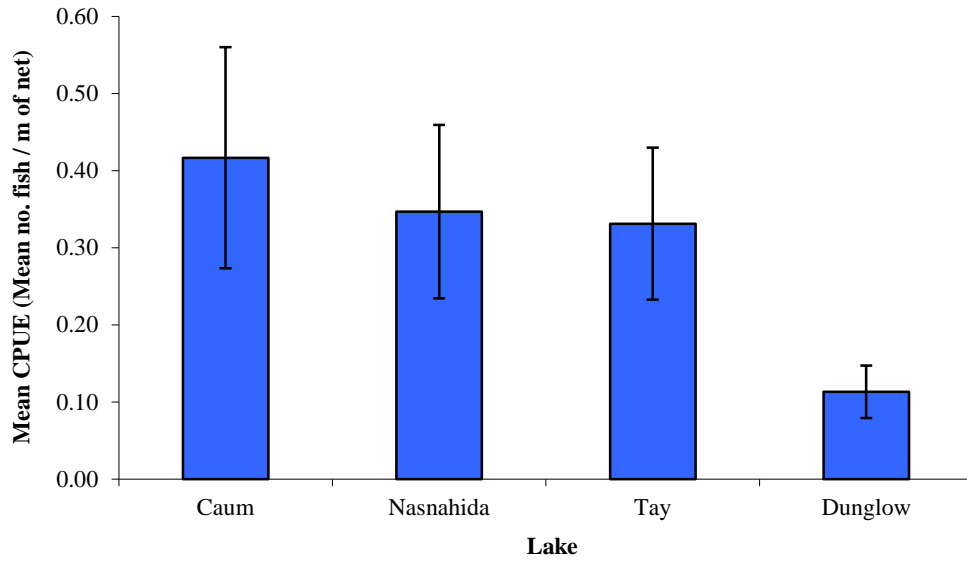
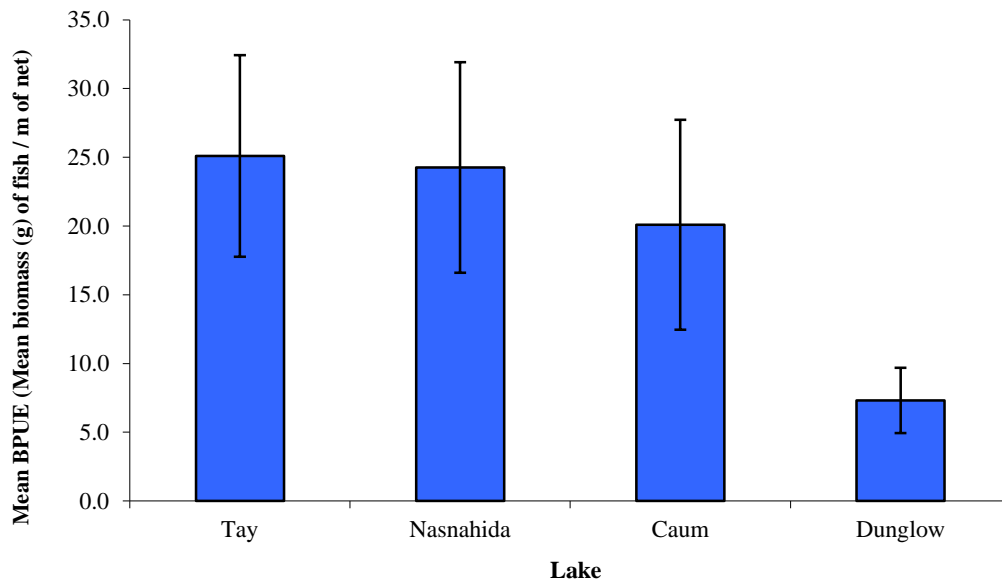**Fig. 1.4. Mean (±S.E.) brown trout CPUE in four lakes surveyed during 2012**

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

1.3.3 Length frequency distributions

Brown trout captured during the 2012 survey ranged in length from 12.5cm to 25.8cm (mean = 17.2cm) (Fig. 1.6). Brown trout captured during the 2009 survey ranged in length from 11.0cm to 23.3cm (Fig. 1.6).

Eels captured during the 2012 survey ranged in length from 33.0cm to 60.0cm, one sea trout was recorded at 29.3cm and one salmon was recorded at 12.0cm.
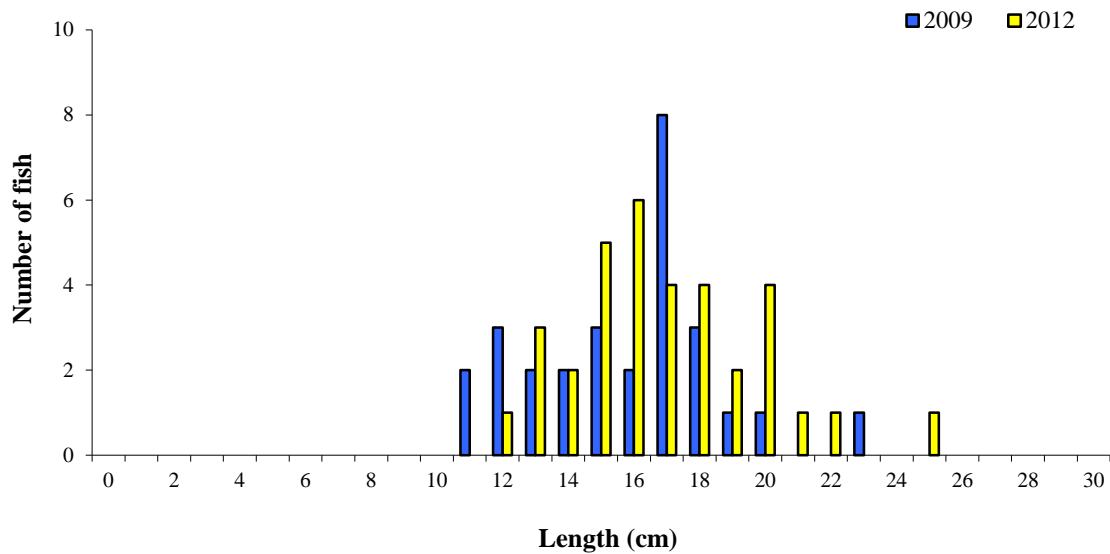

Fig. 1.6. Length frequency of brown trout captured on Dunglow Lough, 2009 and 2012

1.3.4 Fish age and growth

Four age classes of brown trout were present, ranging from 1+ to 4+, with a mean L1 of 6.2cm (Table 1.3). In the 2009 survey, brown trout ranged from 1+ to 2+ with a mean L1 of 6.5cm. Mean brown trout L4 in 2012 was 21.3cm indicating a very slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971).

The sea trout captured was aged at 2.0+.

Table 1.3. Mean (±SE) brown trout length (cm) at age for Dunglow Lough, August 2012

	L_1	L_2	L_3	L_4
Mean	6.2 (0.4)	13.1 (0.6)	17.0 (0.6)	21.3 (0.6)
N	21	18	8	2
Range	3.3-11.0	8.5-16.8	14.7-19.1	20.7-21.8

1.4 Summary

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

Although the mean brown trout CPUE and BPUE in Dunglow Lough were slightly different in 2012 than in the 2009 survey, these differences were not statistically significant. The mean brown trout CPUE and BPUE in Dunglow Lough were significantly lower than Lough Tay and Lough Nasnahida, other similar lakes surveyed. Brown trout ranged in age from 1+ to 4+, indicating reproductive success in four of the previous five years. Length at age analyses revealed that brown trout in the lake exhibit a very slow rate of growth according to the classification scheme of Kennedy and Fitzmaurice (1971).

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, Dunglow 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 also High.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Dunglow Lough an overall ecological status of Good, 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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