



Sampling Fish for the Water Framework Directive

Lakes 2012

Lough Nasnanida



Iascach Intíre Éireann
Inland Fisheries Ireland

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

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1.1 Introduction

Lough Nasnahida is located in western Donegal, close to the village of Doochary and approximately 10km southeast of Dungloe (Plate 1.1, Fig. 1.1). It is a small oligotrophic lake on the Owenamarve system, situated at an altitude of 189m a.s.l., with an approximate area of 12.1ha and a maximum depth of 11m. It is located within the Cloghernagore Bog and Glenveagh National Park Special Area of Conservation (SAC). This is a particularly large SAC located in north-west Donegal containing many different habitats ranging from exposed rock and scree mountains to blanket bogs, lakes and rivers (NPWS, 2009).

The lake is not heavily fished and appears to be in a natural state with good spawning streams (Gerry McCafferty IFI, *pers. comm.*) The lake is categorised as typology class 1 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), less than 50ha and low alkalinity (<20 mg/l CaCO₃).

The lake was previously surveyed in August 2009 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2010). During this survey, brown trout were found to be the dominant species present in the lake. Eels were also captured during the survey.



Plate 1.1. Lough Nasnahida

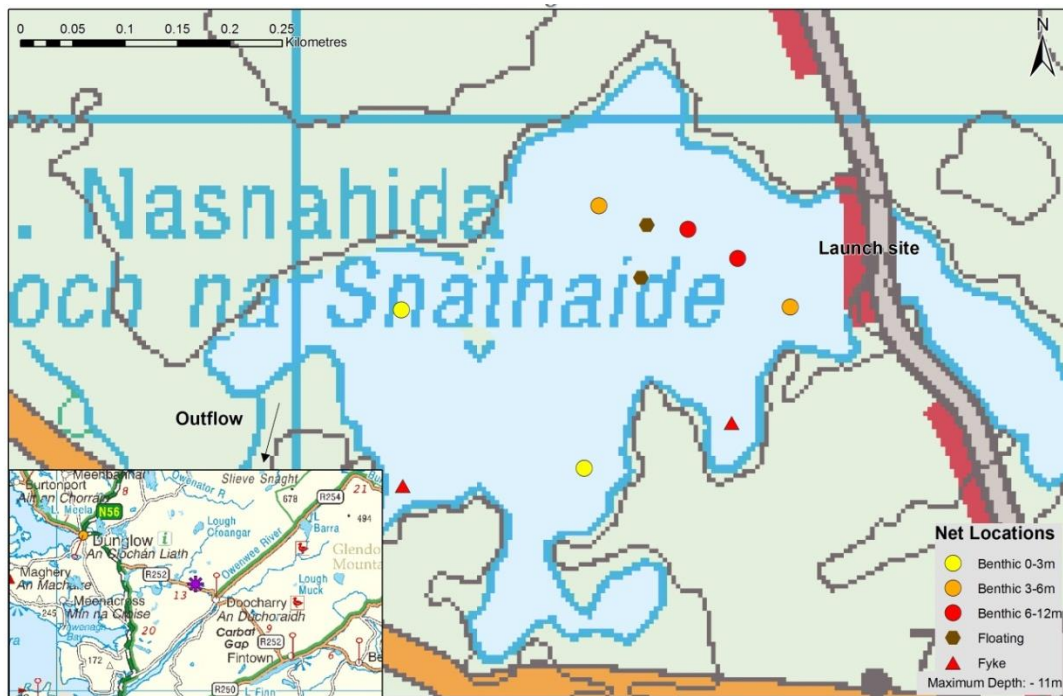


Fig. 1.1. Location map of Lough Nasnahida showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Nasnahida was surveyed over one night on the 8th August 2012. A total of two sets of Dutch fyke nets and six benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m and 2 @ 6-11.9m) and two surface monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed randomly in the lake (10 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 were measured and weighed on site and scales were removed from all brown trout. 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 two fish species were recorded on Lough Nasnahida in August 2012, with 112 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 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 Lough Nasnahida, August 2012

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	Total
<i>Salmo trutta</i>	Brown trout	92	7	8	107
<i>Anguilla anguilla</i>	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 were higher in 2012 than in 2009, these differences were not significantly different (Fig. 1.2 and Fig. 1.3).

The differences in the mean brown trout CPUE and BPUE between Lough Nasnahida and three similar lakes was assessed, with overall significant differences being found (Kruskal-Wallis, $P > 0.05$) (Fig. 1.4 and Fig. 1.5). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Nasnahida had a significantly higher mean brown trout CPUE and BPUE than Dunglow Lough ($P < 0.05$).

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

Scientific name	Common name	2009	2012
Mean CPUE			
<i>Salmo trutta</i>	Brown trout	0.268 (0.080)	0.347 (0.112)
<i>Anguilla anguilla</i>	European eel	0.017 (0.017)	0.041 (0.041)
Mean BPUE			
<i>Salmo trutta</i>	Brown trout	15.121 (4.465)	24.265 (7.659)
<i>Anguilla anguilla</i>	European eel	3.900 (3.900)	5.801 (5.801)

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

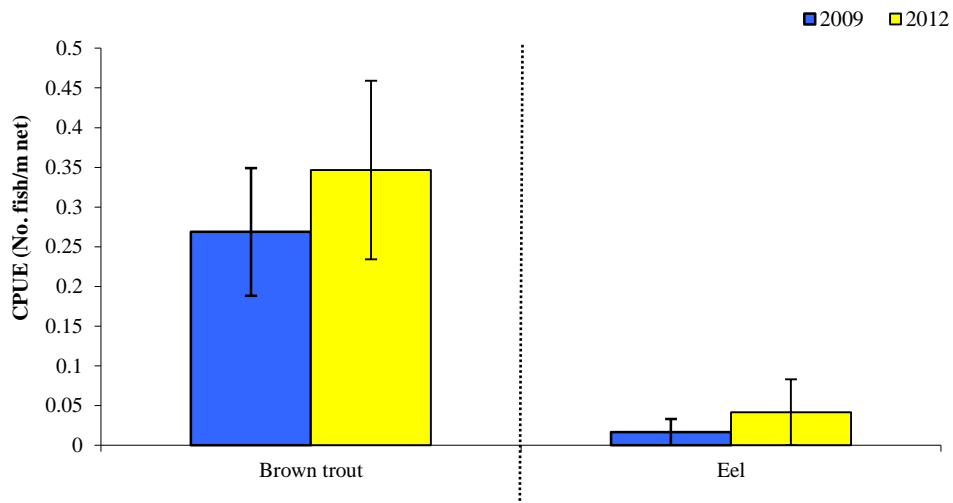


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Nasnahida (Eel CPUE based on fyke nets only), 2009 and 2012

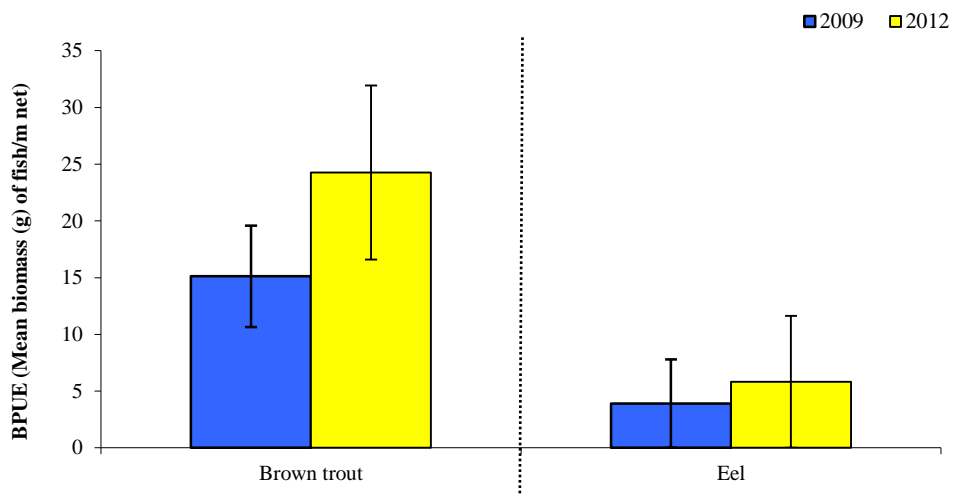


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Nasnahida (Eel BPUE based on fyke nets only), 2009 and 2012

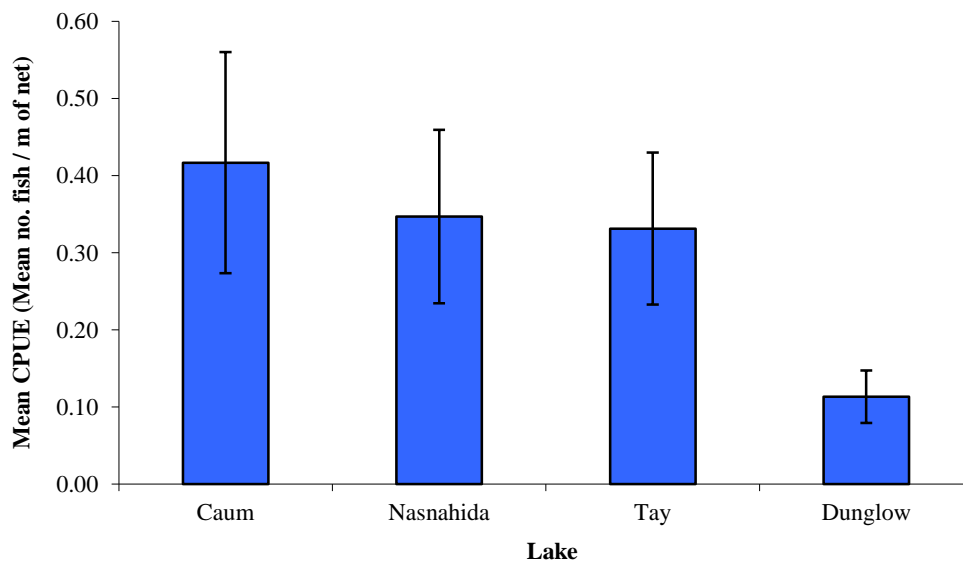


Fig. 1.4. Mean (\pm S.E.) brown trout CPUE in four lakes surveyed during 2012

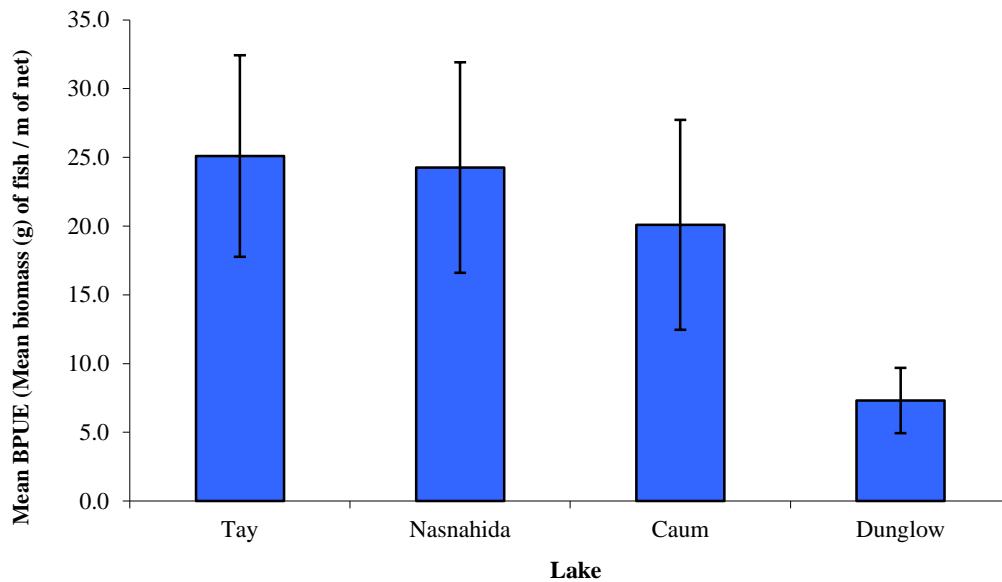


Fig. 1.5. Mean (\pm S.E.) brown trout BPUE in four lakes surveyed during 2012

1.3.3 Length frequency distributions

Brown trout captured during the 2012 survey ranged in length from 6.0cm to 25.0cm (mean = 17.4cm) (Fig. 1.6). Brown trout captured during the 2009 survey ranged in length from 9.8cm to 24.8cm (Fig. 1.6).

Eels captured during the 2012 survey ranged in length from 28.5cm to 51.6cm. Eels captured during the 2009 survey had lengths ranging from 49.0cm to 53.0cm.

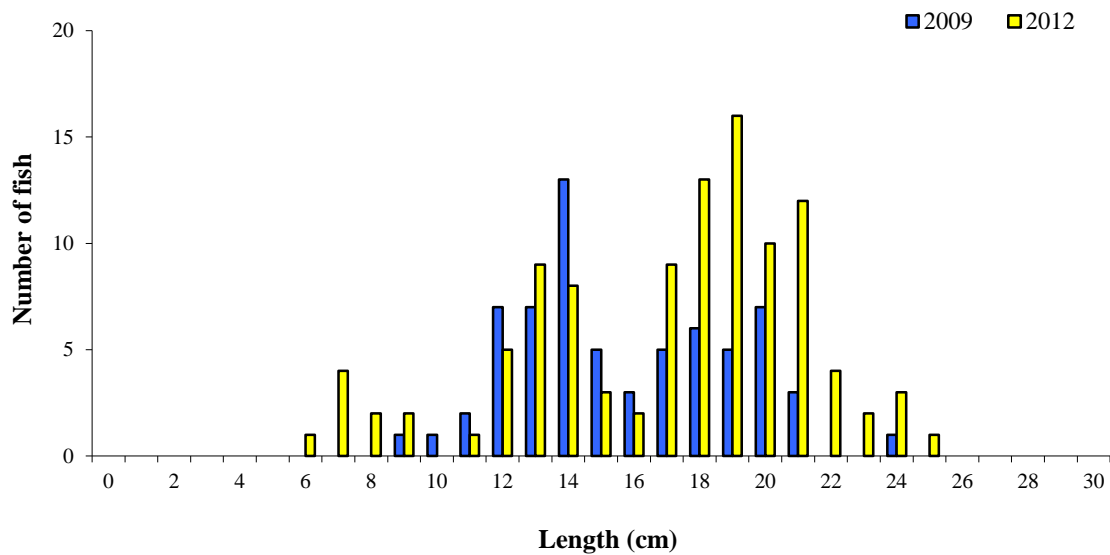


Fig. 1.6. Length frequency of brown trout captured on Lough Nasnahida, 2009 and 2012

1.3.4 Fish age and growth

Six age classes of brown trout were present, ranging from 0+ to 5+, with a mean L1 of 5.3cm (Table 1.3). In the 2009 survey, brown trout ranged from 0+ to 3+ with a mean L1 of 6.5cm. Brown trout exhibited a very slow rate of growth in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971).

Table 1.3. Mean (\pm SE) brown trout length (cm) at age for Lough Nasnahida, August 2012

	L₁	L₂	L₃	L₄	L₅
Mean	5.3 (0.2)	10.8 (0.3)	16.2 (0.4)	18.9 (0.5)	23.0
N	56	52	33	12	1
Range	3.1-8.7	7.0-18.1	11.2-22.8	16.5-22.4	23.0-23.0

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 Lough Nasnahida were slightly higher in 2012 than in the 2009 survey, these differences were not statistically significant. The mean brown trout CPUE and BPUE in Lough Nasnahida was significantly higher than Dunglow Lough, another similar lake surveyed. Brown trout ranged in age from 0+ to 5+, indicating reproductive success in the previous six years. Length at age analyses revealed that brown trout in the lake exhibit a very slow rate of growth.

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, Lough Nasnahida has been assigned an ecological status of Good based on the fish populations present in 2012. The ecological status assigned to the lake based on the 2009 survey data was also Good.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Nasnahida 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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