Sampling Fish for the Water Framework Directive

Lakes 2010

Lough Nambrackmore

Iascach Intíre Éireann
Inland Fisheries Ireland

ACKNOWLEDGEMENTS

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1.1 Introduction

Lough Nambrackmore (Plate 1.1, Fig. 1.1) is located approximately 5.5km north of Roundstone, Co. Galway. The lake has a surface area of 10.4ha, mean depth of 2.1m, maximum depth of 10m (WRFB, 2006) and falls into typology class 1 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), less than 50ha and low alkalinity (<20mg/l $CaCO_3$).

Lough Nambrackmore is situated within the Connemara Bog Complex candidate SAC, a large site that encompasses a wide range of habitats, including extensive tracts of blanket bog, heath, woodland, lakes, rivers and streams (NPWS, 2005). The Connemara Bog Complex is underlain by various Galway granites, with small areas along the northern boundary made up of schist and gneiss (NPWS, 2005). The SAC has been designated due to the presence of active blanket bog, floating river vegetation, wet and dry heath, alkaline fen, transition mires, lowland oligotrophic lakes, dystrophic lakes, Rhynchosporion, old oak woodlands, *Molinia* meadows and lagoons, all priority habitats on Annex I of the E.U. Habitats Directive (NPWS, 2005).

The cSAC is also selected for containing the following species listed on Annex II of the same Directive - Atlantic salmon, otter, the plant slender naiad and the marsh fritillary butterfly. Nine legally protected plant species which are listed on the Irish Red Data Book also occur within this candidate SAC, including bog orchid (*Hammarbya paludosa*) and pale dog-violet (*Viola lactea*) (NPWS, 2005). The cSAC is internationally important for cormorants, nationally important for Greenland white-fronted geese and contains nesting sites for golden plover, merlin, choughs and common terns (NPWS, 2005).

The main threats that occur within the Connemara Bog Complex are peat cutting, overgrazing and afforestation. Forestry affects habitat uniformity, lake and river catchments, nesting and feeding habitats for animals, and landscape integrity (NPWS, 2005).

Atlantic salmon occurs in many of the rivers within the complex and Arctic char, a species listed in the Irish Red Data Book as vulnerable (King *et al*., 2011), also occur in a number of lakes within the site (NPWS, 2005).

Lough Nambrackmore was previously surveyed in 2007 as part of the WFD surveillance monitoring programme (Kelly and Connor, 2007). During this survey brown trout and eels were the only two species recorded.

Plate 1.1. Lough Nambrackmore

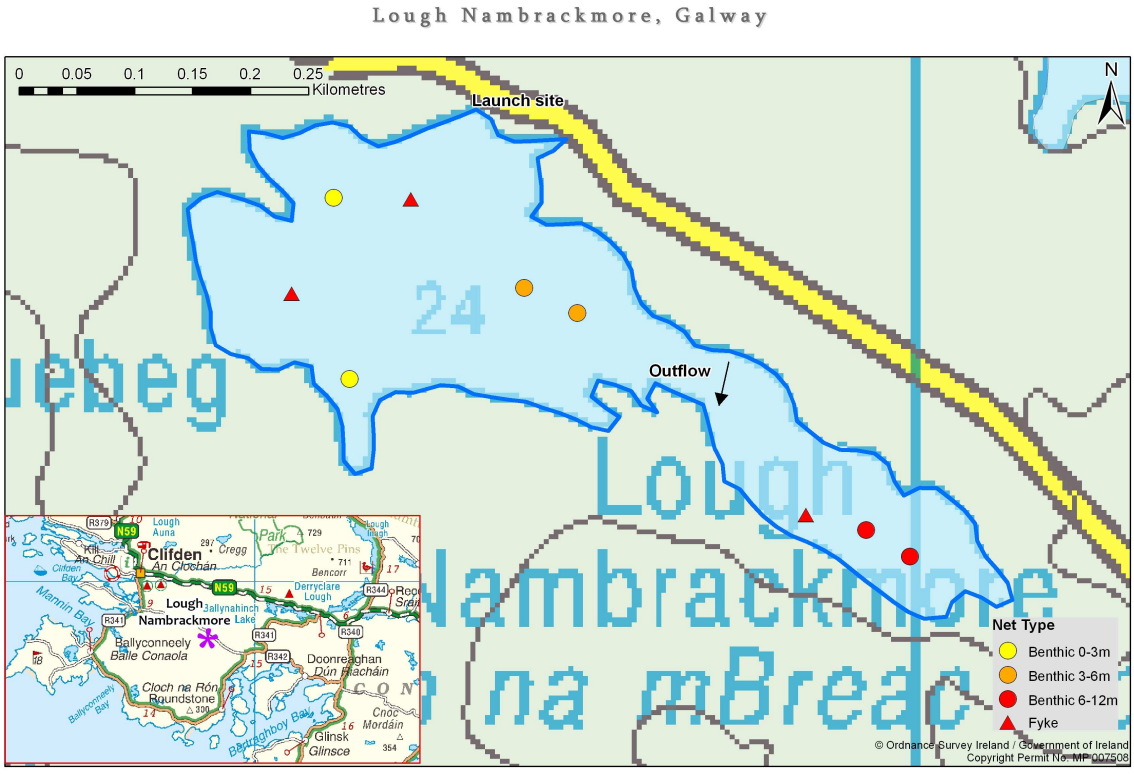

Fig. 1.1. Location map of Lough Nambrackmore showing net locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Nambrackmore was surveyed over one night on the 25th of August 2010. A total of three 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) were deployed in the lake (9 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 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 retained for further analysis.

1.3 Results

1.3.1 Species Richness

A total of two fish species were recorded on Lough Nambrackmore in August 2010, with 18 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. During the previous survey in 2007 the same species composition was recorded, although most brown trout in the 2007 survey were stocked fish, in contrast to the wild brown trout captured in the current survey.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Nambrackmore, August 2010

Scientific name	Common name	Number of fish captured		
		Benthic mono multimesh gill nets	Fyke nets	Total
Salmo trutta	Brown trout (wild)	16	0	16
Anguilla anguilla	European eel	0	2	2

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 are summarised in Table 1.2.

The differences in the mean brown trout CPUE between Lough Nambrackmore and three other similar lakes were assessed and found to be statistically significant (Kruskal-Wallis, $P<0.001$) (Fig. 1.2). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Nambrackmore had a significantly lower mean brown trout CPUE than Maumwee Lough ($z = -2.752$, $P<0.05$).

Table 1.2. Mean (S.E.) CPUE and BPUE in Lough Nambrackmore, August 2010

Scientific name	Common name	2007	2010
		Mean CPUE	
Salmo trutta	Brown trout (stocked)	0.022 (0.007)	-
Salmo trutta	Brown trout (wild)	-	0.059 (0.025)
Anguilla anguilla	European eel	0.022 (0.005)	0.011 (0.006)
		Mean BPUE	
Salmo trutta	Brown trout (stocked)	4.707 (1.630)	-
Salmo trutta	Brown trout (wild)	-	5.503 (2.175)
Anguilla anguilla	European eel	2.961 (0.595)	1.055 (0.527)

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

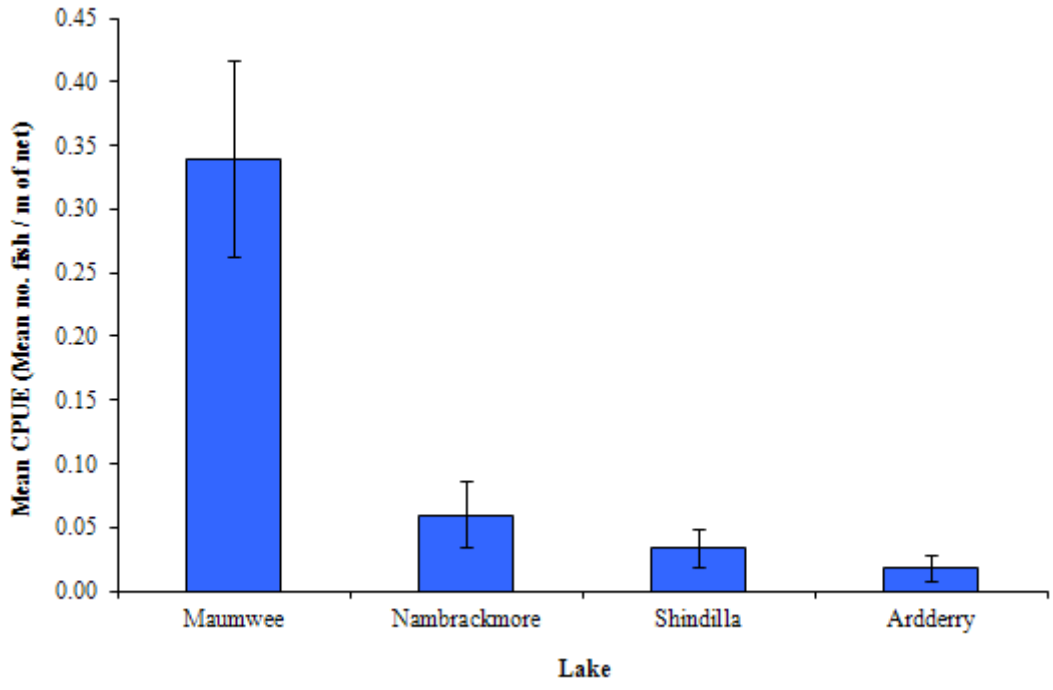

Fig. 1.2. Mean (±S.E.) brown trout CPUE in four lakes surveyed during 2010

1.3.3 Length frequency distributions

Brown trout (wild) captured during the 2010 survey ranged in length from 14.8cm to 29.5cm (mean = 19.6cm) (Fig. 1.3). Brown trout (stocked) captured during the 2007 survey ranged in length from 21.8cm to 31.9cm (Fig. 1.3). Eels captured during the 2010 survey ranged in length from 34.0cm to 35.0cm (mean = 34.5cm) (Fig.1.4). Eels captured during the 2007 survey ranged in length from 37.0cm to 45.5cm (Fig.1.4).

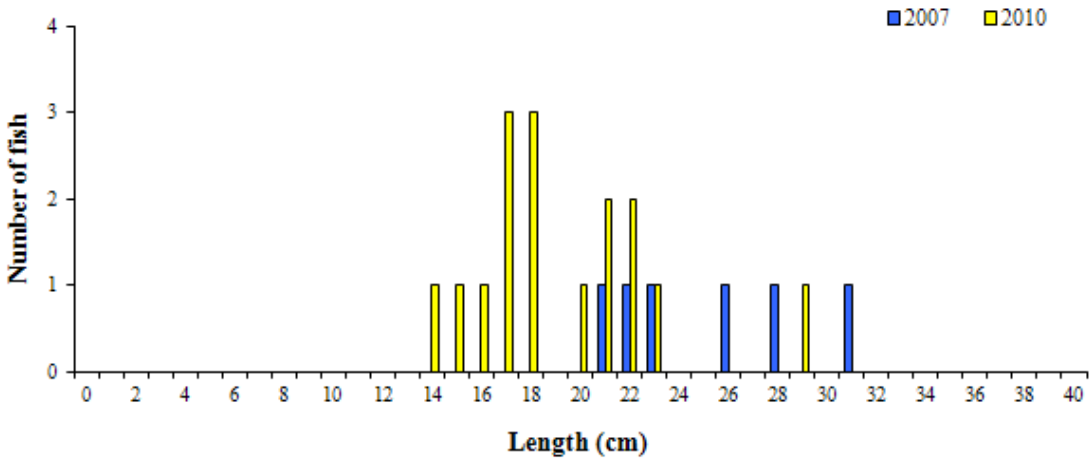

Fig. 1.3. Length frequency of brown trout captured on Lough Nambrackmore, 2007 and 2010

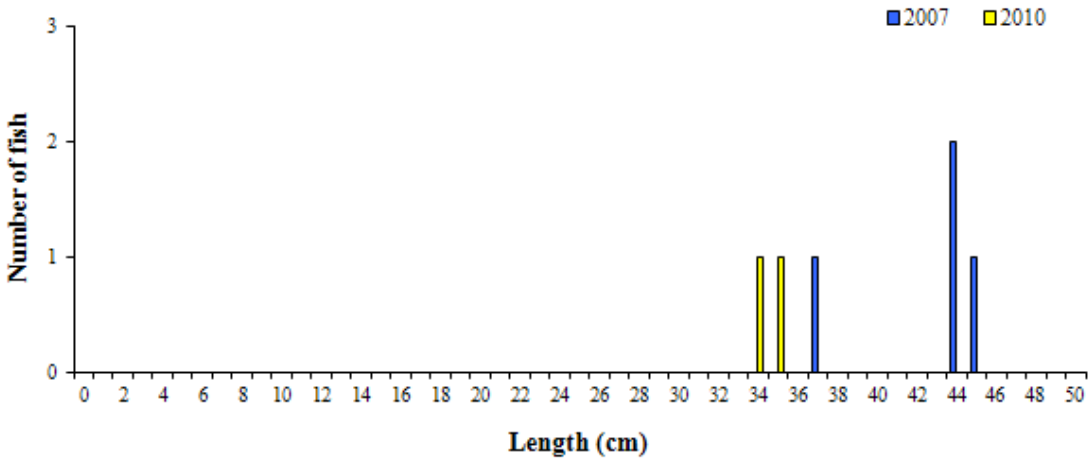

Fig. 1.4. Length frequency of eels captured on Lough Nambrackmore, 2007 and 2010

1.3.4 Fish age and growth

Two age classes of brown trout were present, ranging from 2+ to 3+, with a mean L1 of 6.5cm (Table 1.3). In the 2007 survey, stocked brown trout ranged from 2+ to 3+ with a mean L1 of 7.6cm.

Table 1.3. Mean (±SE) brown trout length (cm) at age for Lough Nambrackmore, August 2010

	L_1	L_2	L_3
Mean	6.5 (0.4)	12.8 (0.7)	20.3 (2.7)
N	14	14	3
Range	4.1-8.4	9.5-18.1	17.2-25.7

1.4 Summary

Brown trout was the dominant species in terms of both abundance (CPUE) and biomass (BPUE).

The mean brown trout CPUE in Lough Nambrackmore was significantly lower than Maumwee Lough but not significantly different from the other two similar lakes surveyed (Shindilla and Ardderry). Brown trout ranged in age from 2+ to 3+, with no younger age classes being recorded.

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. Using the FIL2 classification tool, Lough Nambrackmore has been assigned an ecological status of High based on the fish populations present.

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