Lough Tay

Sampling Fish for the Water Framework Directive - Lakes 2009

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

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1.1 Introduction

Lough Tay (Plate 1.1, Fig. 1.1) is located in Luggala Estate in County Wicklow, lying between the mountains of Djouce and Luggala at an altitude of 250m a.s.l. It is a small lake with a surface area of approximately 50ha, a maximum depth of 35.0m and a mean depth of 10.1m. It is fed by the Cloghoge River and drains into Lough Dan to the south. Lough Tay is categorised as typology class 3 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. deep (>4m), less than 50ha and low alkalinity (<20mg/l CaCO3).

Arctic char were historically known to be present in three lakes in Co.Wicklow, including Lough Tay. The first recorded Arctic char in Lough Tay was reported in 1832; however, they are believed to be extinct since the 1930's (Tierney *et al*., 2000). Gill net surveys carried out in 1984, 1985 and 1994 revealed that brown trout were the only species present in this lake (Walsh, 1987; Tierney *et al*., 2000). Lough Tay was surveyed by the Irish Char Conservation Group during 2005, with brown trout again being the only fish species recorded (Igoe *et al*., 2005).

Plate 1.1. Lough Tay

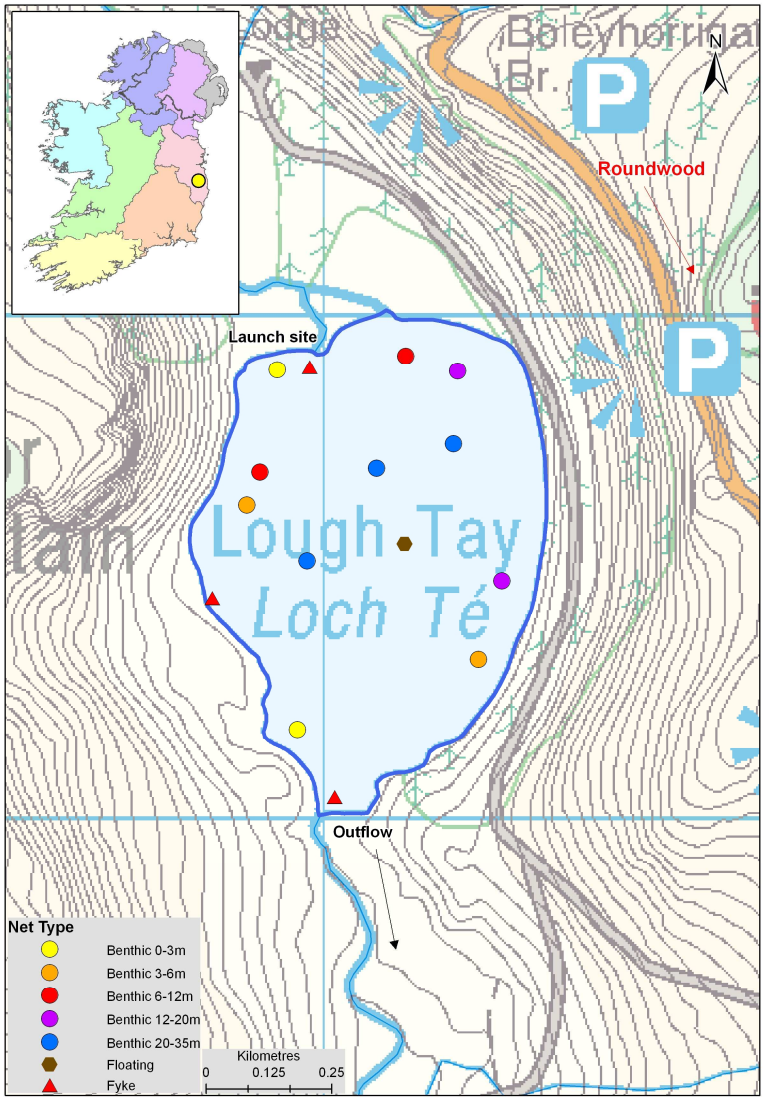

Fig. 1.1. Location map of Lough Tay showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Tay was surveyed over two nights from the 19th to the 21st of August 2009. A total of three sets of Dutch fyke nets, 11 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m, 2 @ 12-19.9 and 3 @ 20-34.9m) and two surface monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed randomly in the lake (16 sites). Survey locations were randomly selected within each depth zone using a grid placed over a map of the lake. 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. 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

Two fish species were recorded in Lough Tay during the survey, with 114 fish being captured (Table 1.1). Brown trout was the only fish species recorded in the gill nets. One eel was captured in a fyke net.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on Lough Tay, August 2009

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	96	13	4	113
Anguilla anguilla	European eel	0	0	1	1

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 Tay and three other similar lakes were assessed, with no statistically significant differences being found (Fig. 1.2).

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

Scientific name	Common name	
		Mean CPUE
Salmo trutta	Brown trout	0.231 (0.088)
Anguilla anguilla	European eel	0.006 (0.006)
		Mean BPUE
Salmo trutta	Brown trout	17.010 (6.658)
Anguilla anguilla	European eel	2.828 (2.828)

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

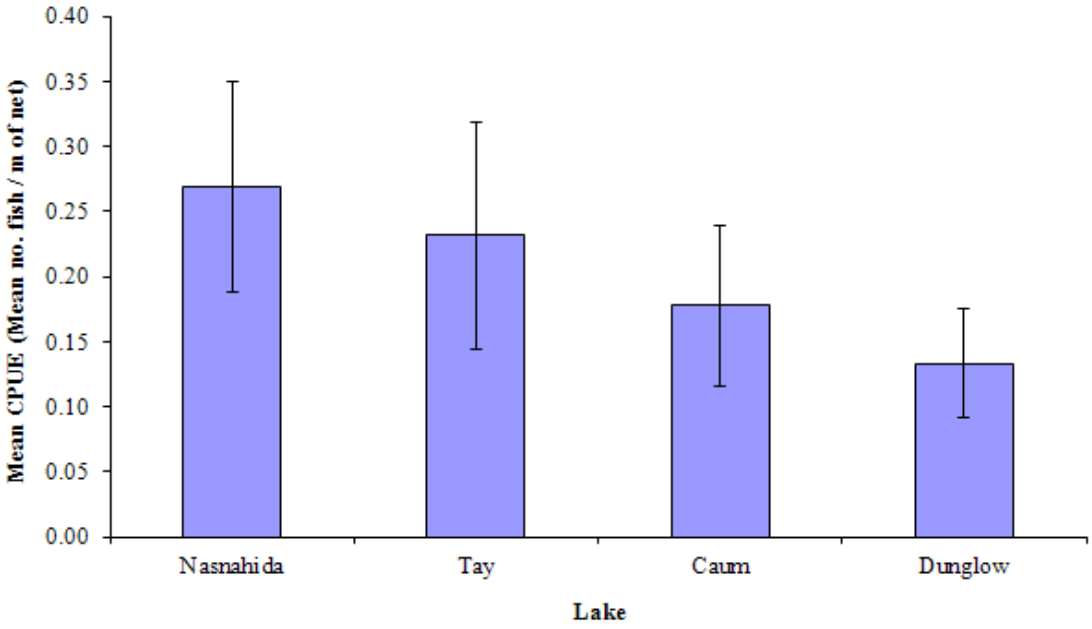

Fig. 1.2. Mean (±S.E.) brown trout CPUE in four lakes surveyed during 2009

1.3.3 Length frequency distributions

Brown trout ranged in length from 10.0cm to 26.8cm (mean = 18.1cm) (Fig. 1.3). Brown trout from the 2005 survey had a similar mean length of 18.3cm with lengths ranging from 9.5cm to 25.0cm (Igoe *et al.*, 2005). The one eel captured measured 62.0cm in length.

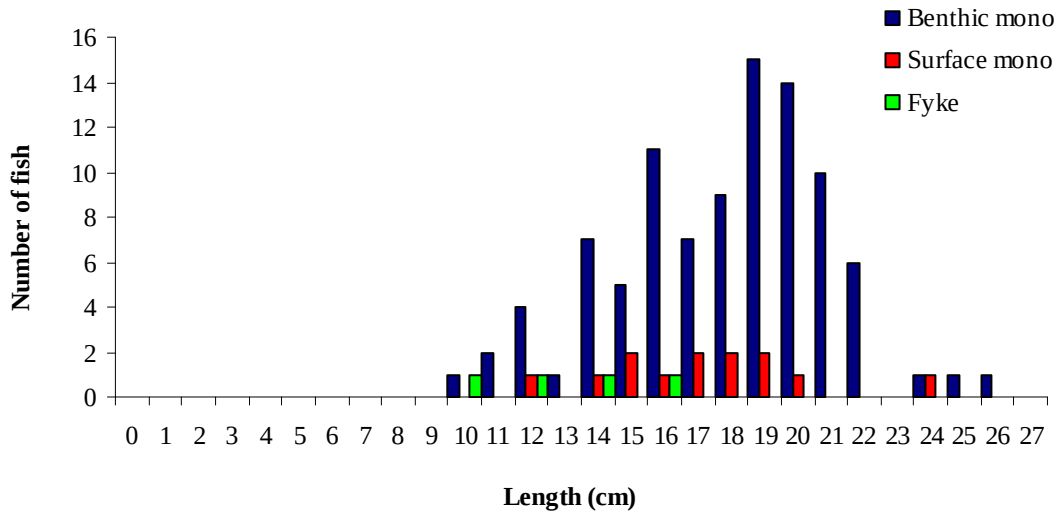

Fig. 1.3. Length frequency of brown trout (n=112) captured on Lough Tay, August 2009

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 5.3cm (Table 1.3). Mean brown trout L4 was 21.6cm indicating a very slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971).

Table 1.3. Mean (±SE) brown trout length at age for Lough Tay, August 2009

	L_1	L_2	L_3	L_4
Mean	5.3 (0.1)	12.2 (0.2)	18.2 (0.4)	21.6 (1.3)
N	86	74	32	2
Range	3.2-8.7	7.3-19.0	12.7-24.2	20.3-22.8

1.4 Summary

There were only two fish species recorded in Lough Tay, brown trout and eel. Brown trout was the dominant species in terms of both abundance (CPUE) and biomass (BPUE).

The mean brown trout CPUE in Lough Tay was not significantly different when compared with other similar type lakes. The age classes 1+ to 4+ were present, indicating reproductive success in four of the previous five years. No 0+ fish were captured during the current survey. 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 WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using CFB and Agri-Food and Biosciences Northern Ireland (AFBINI) data generated during the NSSHARE Fish in Lakes project (Kelly *et al.*, 2008). Using this tool, Lough Tay has been assigned an ecological status classification of Good based on the fish populations present.

The EPA has assigned an overall status of Good to Lough Tay in an interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish.

1.5 References

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