Glencullin Lough

Sampling Fish for the Water Framework Directive - Lakes 2008

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the CEO Dr. Greg Forde, the assistant CEO Ms. Amanda Mooney and the staff of the Western Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and cooperation from all their colleagues in the Central Fisheries Board (CFB).

Mr. Peter Mantle from Delphi Fishery, Co. Mayo provided access to the lake and his help is gratefully acknowledged.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2008.

1.1 Introduction

Glencullin Lough (Plate 1.1, Fig. 1.1) is situated in Co. Mayo in the Bundorragha catchment. The lake is one of four situated in the Delphi Fishery and is located just north-west of Doo Lough on the Doo Lough Pass, south of Louisburgh, Co. Mayo. The lake has a surface area of 34ha, a mean depth of 2.6m and a maximum depth of 13m. The lake falls into typology class 1 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), less than 50ha and low alkalinity (<20mg/l $CaCO_3$).

Glencullin Lough is situated in the Mweelrea/Sheefry/Erriff Complex candidate Special Area of Conservation, which has been selected as such for containing a number of priority habitats on Annex I of the EU Habitats Directive including active blanket bog, lagoons, machair, decalcified dunes and petrifying springs. The site is also selected for the following species listed on Annex II of the EU Habitats Directive - Freshwater Pearl Mussel, Atlantic Salmon, Otter, the snails *Vertigo angustior* and *Vertigo geyeri*, the plant Slender Naiad and the liverwort Petalwort (NPWS, 2005).

Glencullin Lough was historically a sea trout fishery and is now fished primarily for brown trout and occasionally salmon (O'Reilly, 2007).

Plate 1.1. Glencullin Lough

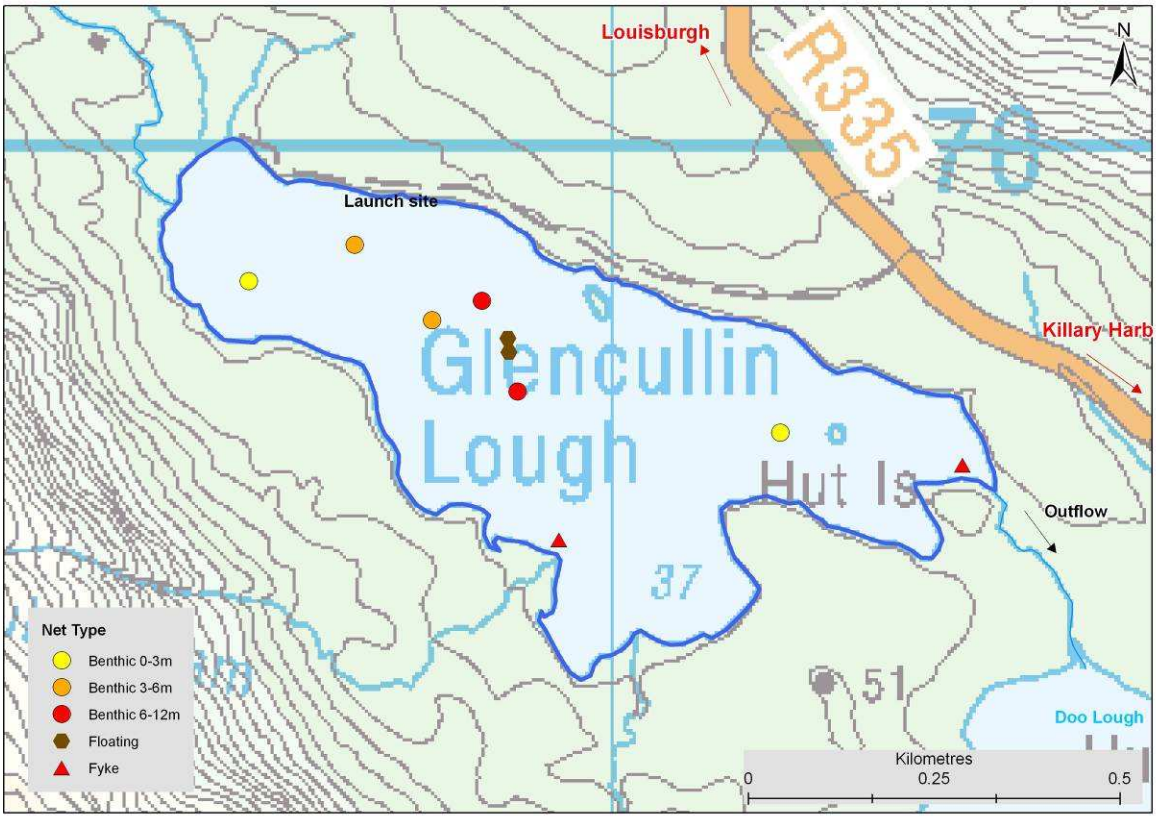

Fig. 1.1. Location map of Glencullin Lough showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Glencullin Lough was surveyed over one night on the 31st of July 2008. A total of two sets of Dutch fyke nets, six benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m and 2 @ 6-11.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets were deployed randomly in the lake (10 sites). Survey locations were randomly selected 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 the 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 three fish species were recorded in Glencullin Lough in July 2008. Two sea trout were also captured. A list of the species encountered and numbers captured by each gear type is compiled in

Table 1.1. A total of 83 fish were recorded. Brown trout was the most common fish species encountered in the benthic gill nets. Thirty-three eels were captured in both the benthic gill nets and the fyke nets.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on Glencullin Lough, July 2008

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Dutch fykes	Total
Salmo trutta	Brown trout	35	5	2	42
	Sea trout	2	0	0	2
Gasterosteus aculeatus	3-spined stickleback	6	0	0	6
Anguilla anguilla	Eel	2	0	31	33

1.3.2 *Fish abundance*

Fish abundance was calculated as the mean number of fish caught per metre of net, i.e. mean CPUE. Fish biomass was calculated as the mean weight of fish caught per metre of net, i.e. mean BPUE. A summary of CPUE and BPUE data for each species and gear type is shown in Table 1.2.

Table 1.2. Mean CPUE (mean number of fish per meter of net) and mean BPUE (mean weight of fish per meter of net) for all fish species recorded on Glencullin Lough, July 2008

Gear type	Brown trout	Sea trout	3-spined stickleback	Eel
Mean CPUE (mean number of fish/m of net)				
Gill nets (all)	0.167	0.008	0.025	-
Fyke nets	0.017	0.000	0.000	0.258
Mean BPUE (mean weight (g) of fish/m of net)				
Gill nets (all)	22.344	3.196	0.096	-
Fyke nets	1.467	0.000	0.000	39.725

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

1.3.3 *Length frequency distributions*

Brown trout ranged in length from 6.7cm to 32.5cm (mean = 20.2cm) (Fig. 1.2). Eels ranged in length from 28.8cm to 70.0cm (Fig. 1.3). Two sea trout measuring 29.2cm (271g) and 35.4cm (495g) were also recorded.

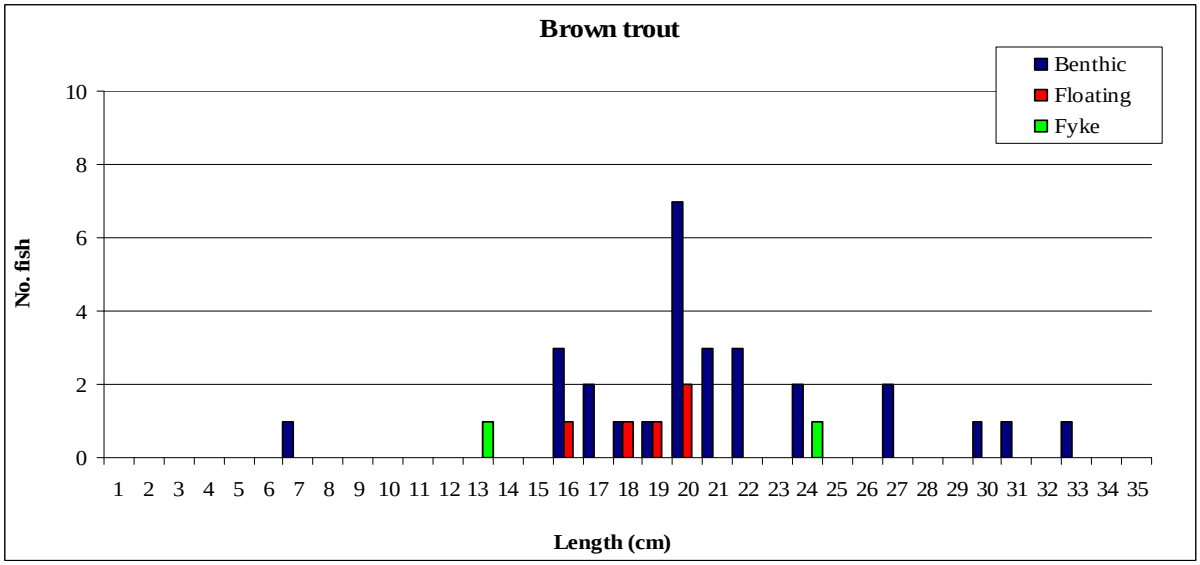

Fig. 1.2. Length frequency of brown trout captured on Glencullin Lough, July 2008

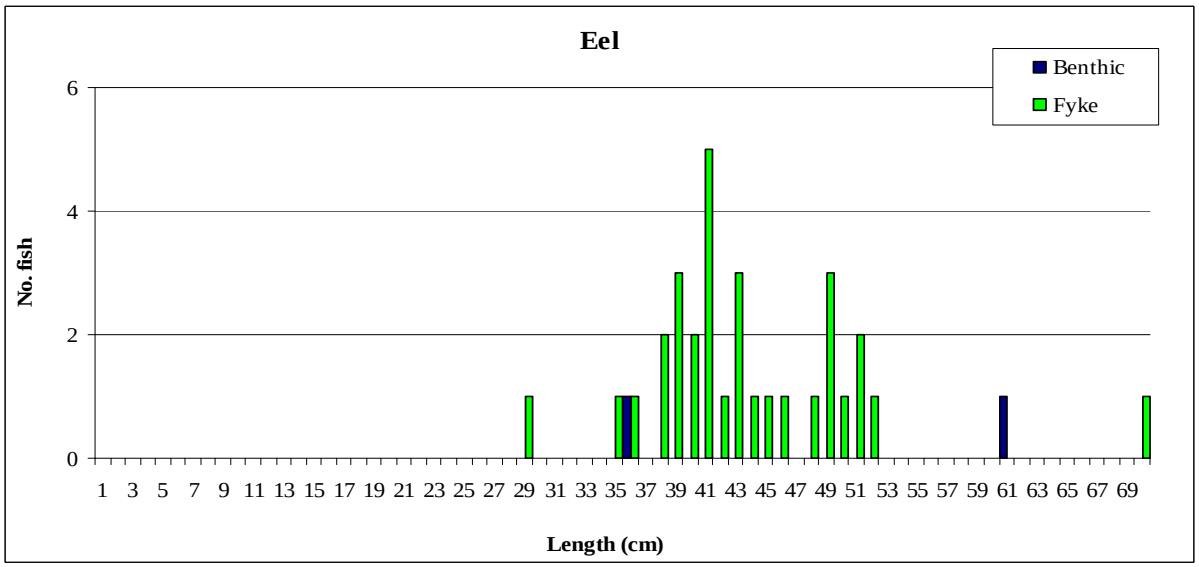

Fig. 1.3. Length frequency of eels captured on Glencullin Lough, July 2008

1.3.4 *Fish age and growth*

Brown trout ranged in age from 0+ to 4+. Length frequency and age analysis revealed that 2+ was the dominant age class in the brown trout population accounting for approximately 67% of the fish recorded during the survey. Mean brown trout L4 (Table 1.3) was 25.3cm, indicating that the growth of brown trout in this lake is slow, based on the classification developed by Kennedy and Fitzmaurice (1971).

Table 1.3. Mean (SD) brown trout length (cm) at age for Glencullin Lough, July 2008

	L_1	L_2	L_3	L_4
Mean	6.2 (1.34)	14.0 (2.75)	21.1 (2.68)	25.3 (1.8)
N	30	29	9	3
Range	3.9-9.2	9.3-19	18-26.9	23.2-26.7

1.4 Summary

Glencullin Lough is an oligotrophic lake which holds a number of native fish species; brown trout, 3-spined stickleback and a run of migratory species, such as salmon, sea trout and eels. Brown trout was the dominant fish species recorded during the survey, followed by eel. The mean CPUE for brown trout in the lake was relatively low when compared with similar low alkalinity lakes surveyed during 2008 (Kelly *et al*., 2009). Glencullin Lough had the highest mean CPUE for eels when compared to all the lakes sampled in 2008 (Kelly *et al*., 2009).

Brown trout growth was slow between L1 and L2 in comparison with other low alkalinity lakes surveyed during 2008, e.g. Lough Easky and Glenbeg lake (Kelly *et al*., 2009). The slow growth between L1 and L2 can be attributed to juvenile trout staying in the feeder streams for up to two years before entering the lake where food is more abundant. A similar pattern of growth was observed in the growth of trout from Lough Caragh and Lough Brin, Co. Kerry. Kennedy and Fitzmaurice (1971) related growth rates to alkalinity and classified the growth of lake trout generally into four different categories. This classification was applied to brown trout from Glencullin Lough, resulting in a growth classification of 'slow'.

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 new WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 1) using Agri-Food and Biosciences Institute Northern Ireland (AFBINI) and CFB data (Kelly *et al*., 2008). Using this tool and expert opinion, Glencullin Lough has been assigned a draft classification of high status for fish. The EPA has assigned an overall classification of high status to Glencullin Lough 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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