Glenbeg Lough

Sampling Fish for the Water Framework Directive - Lakes 2008

The Central and Regional Fisheries Boards

ACKNOWLEDGEMENTS

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1.1 Introduction

Glenbeg Lough (Plate 1.1, Fig. 1.1) is located near Ardgroom on the Beara Pennisula, Cork–Kerry county border. The lake has a surface area of 66ha, a maximum depth of 13m and falls into typology class 4 (as designated by the EPA for the Water Framework Directive), i.e. deep (mean depth >4m), greater than 50ha and low alkalinity (<20mg/l $CaCO_3$). The Ownagappul River exiting Glenbeg Lough contains freshwater pearl mussels and the lake itself is known for its oligotrophic waters and associated vegetation.

Glenbeg Lough forms part of the Glanmore Bog Special Area of Conservation. The site is of particular interest as it contains active blanket bog, an EU Habitats Directive Annex I priority habitat. Glenbeg Lough is an oligotrophic lake, which is representative of another EU Habitats Directive Annex I habitat. Some of the vegetation found on this lake includes quillwort (*Isoetes lacustris*), shoreweed (*Littorella uniflora*), water lobelia (*Lobelia dortmanna*), floating bur-reed (*Sparganium angustifolium*) and six-stamened waterwort (*Elatine hexandra*) (NPWS, 2000).

Cattle graze some of the lower slopes around the lake, and recently an area of forestry west of the outflow of Glenbeg Lough has been planted. If significant additional areas were to be planted in the future, the risks of eutrophication and siltation in the catchment could increase (Ownagappul Sub-Basin Management Plan, 2009). Glenbeg Lough is also a water abstraction lake (Shellfish Pollution Reduction Programme, 2006), with water being utilised for public supplies.

Glenbeg Lough is known to contain large stocks of small trout, generally around 0.14kg in weight (O'Reilly, 2007), with the lake shore being readily accessible for angling.

Plate 1.1. Glenbeg Lough

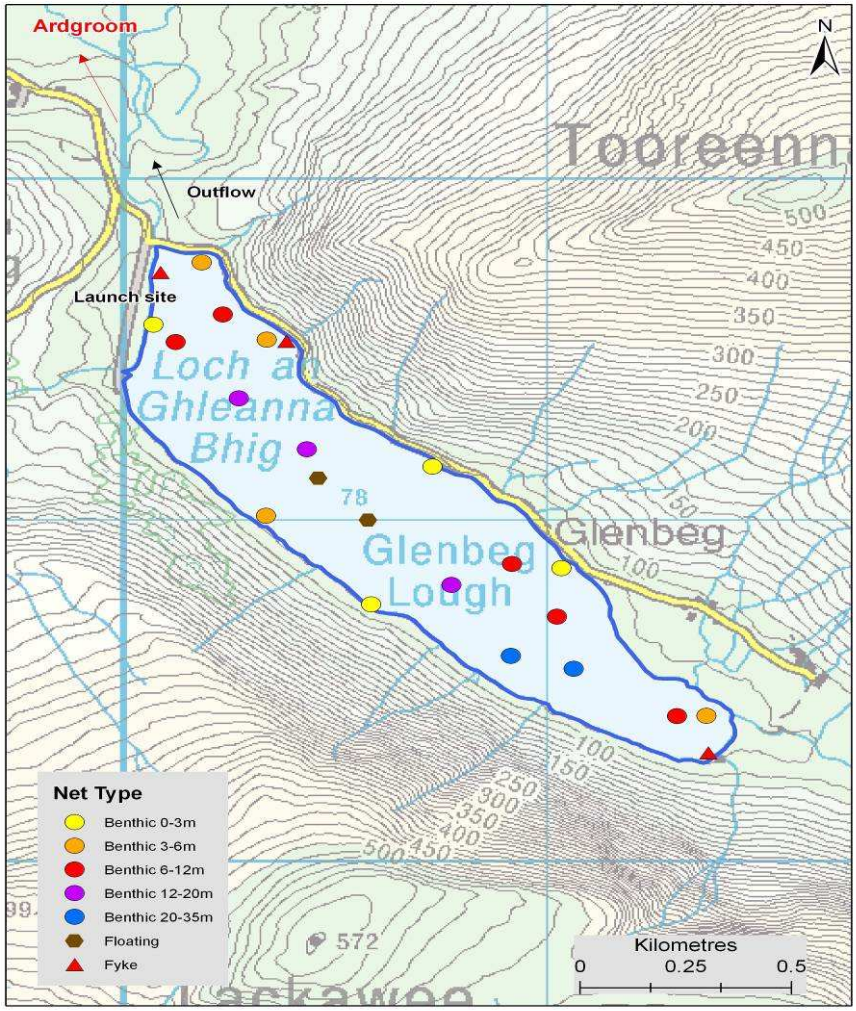

Fig. 1.1. Location map of Glenbeg Lough showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

The lake was surveyed over two nights from the 3rd of September to the 5th of September 2008. A total of three sets of Dutch fyke nets, 18 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 5 @ 6-11.9m, 3 @ 12-19.9m and 2 @ 20-34.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gillnets were deployed randomly in the lake (23 sites). Survey locations were selected randomly 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 and scales were removed from brown trout on site. 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 on Glenbeg Lough in September 2008. A list of the species encountered and numbers captured by each gear type is compiled in Table 1.1. A total of 288 fish were recorded during the survey. Brown trout were the most common fish species encountered in the benthic gill nets. Eels were captured using Dutch fyke nets.

Table 1.1. List of fish species recorded (including numbers captured) during the WFD fish stock survey on Glenbeg Lough, September 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	216	19	20	255
Anguilla anguilla	Eel	0	0	33	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 m of net) and mean BPUE (mean weight of fish per m of net) for all fish species recorded on Glenbeg Lough, September 2008

Gear type	Brown trout	Eel
	Mean CPUE (mean number of fish/m of net)	
Gill nets (all)	0.392	-
Fyke nets	0.111	0.183
	Mean BPUE (mean weight (g) of fish/m of net)	
Gill nets (all)	28.922	-
Fyke nets	5.900	46.789

* In 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 8.1cm to 27.0cm (mean = 18.5cm) (Fig. 1.2). The length frequency distribution for eels is shown in Figure 1.3. Eels ranged in length from 32.0cm to 84.0cm (mean = 48.8cm).

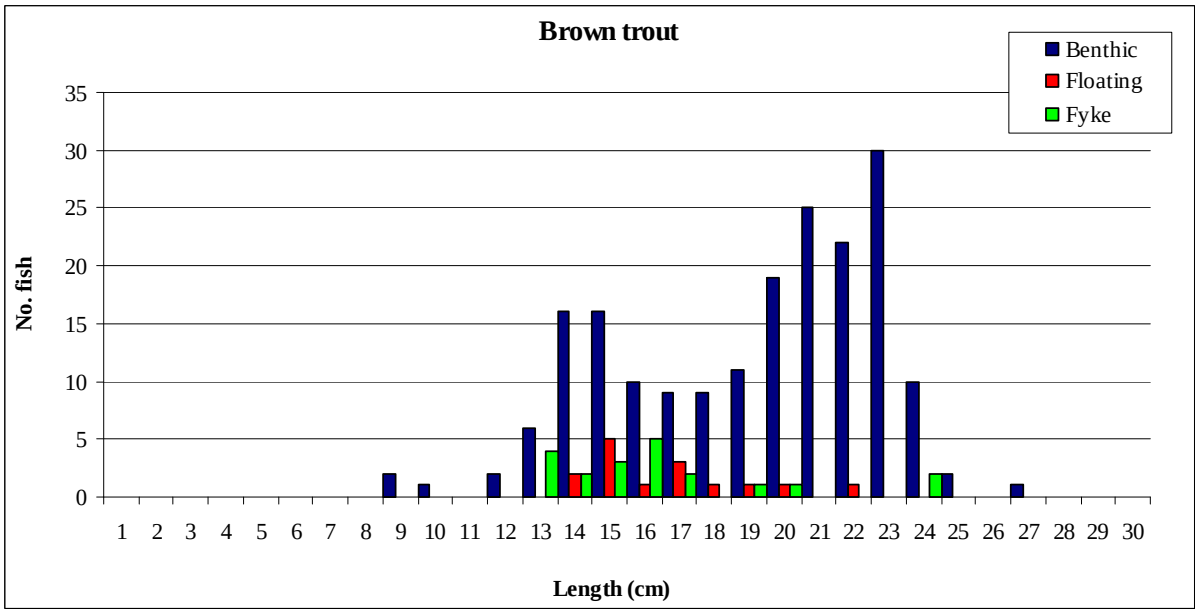

Fig. 1.2. Length frequency of brown trout captured on Glenbeg Lough, September 2008

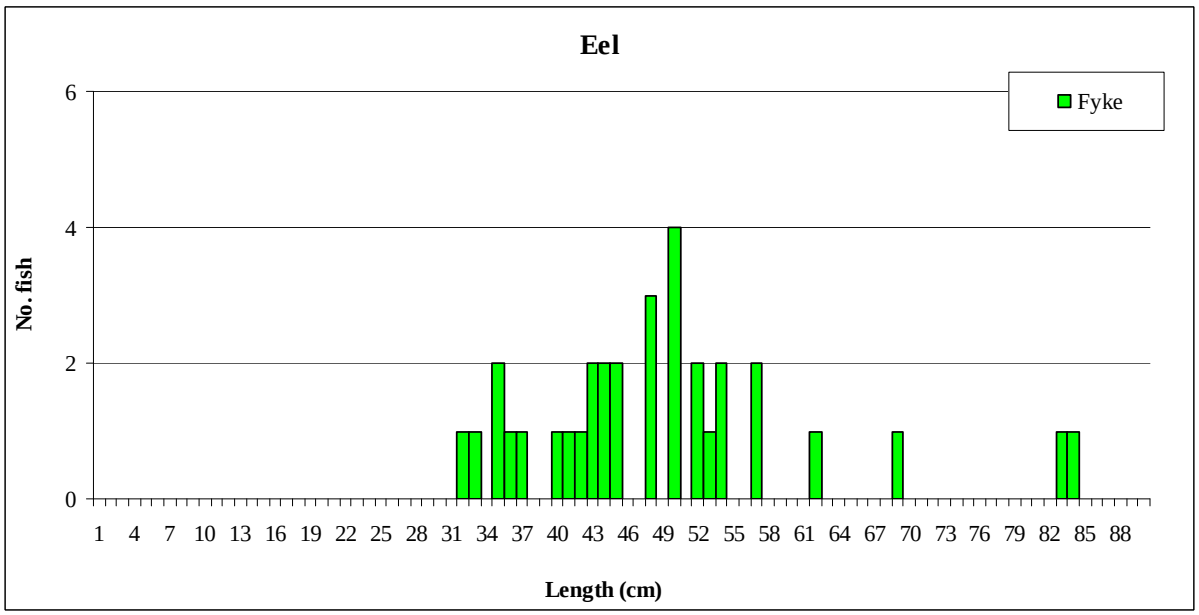

Fig. 1.3. Length frequency of eels captured on Glenbeg Lough, September 2008

1.3.4 *Fish age and growth*

Brown trout ranged in age from 1+ to 4+. Mean brown trout L4 was 23.9cm (Table 1.3), indicating that the growth of trout in the lake is very slow based on a classification developed by Kennedy and Fitzmaurice (1971). Length frequency and age analysis revealed that 1+ and 2+ were the dominant age groups in the population accounting for approximately 88% of the fish recorded during the survey.

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

	L_1	L_2	L_3	L_4
Mean	6.7 (1.65)	16.0 (2.38)	20.3 (2.63)	23.9 (2.22)
N	58	40	12	2
Range	3.3-9.9	9.7-18.9	13.4-22.5	22.3-25.5

1.4 Summary

Brown trout and eels were the only species recorded in Glenbeg Lough, with brown trout being the most abundant. The mean CPUE for brown trout in Glenbeg Lough was higher than average when compared to other low alkalinity lakes, e.g. Lough Beagh and Lough Caragh. The same was also true for eel CPUE (Kelly *et al*., 2009).

Kennedy and Fitzmaurice (1971) related growth rates to alkalinity and classified the growth of lake trout generally into four different categories. This description was applied to trout from Glenbeg Lough and therefore growth of trout in the lake was classified as very slow. Brown trout growth was fast for the first two years in comparison with other low alkalinity lakes surveyed during 2008, e.g. Lough Accose and Lough Caragh (Kelly *et al*., 2009) but was classified as very slow thereafter. When brown trout stomach contents were examined, no change in diet after the second year was observed that could explain this decrease in growth rate.

It is suggested that the fish population in Glenbeg Lough should be monitored closely due to the current practice of water abstraction. Duration of drawdown and extent of exposure will determine the impact on macroinvertebrates, lake productivity and the availability and type of food for fish (Igoe and Hammar, 2004). Water level fluctuations are particularly detrimental to species such as *Gammarus* sp. that are an important food base for trout (Igoe, *pers. comm*.). The lowering of water levels as a consequence of water abstraction can also be detrimental to the spawning success of resident fish populations that may utilise shallow, gravelly lake margins as spawning substrate in the absence of suitable inflowing streams. In the case of Glenbeg Lough, there are thirteen inflowing streams; however many of these are of a relatively high gradient and may not be suitable for brown trout spawning. Assessing/monitoring spawning activity in suitable inflowing streams would be useful to establish the importance (if any) of the littoral lake area as spawning habitat. An appropriate water abstraction management regime needs to take into account the spawning times and ova incubating period of the resident brown trout population in order to prevent egg desiccation.

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

1.5 References

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