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Sampling Fish for the Water Framework Directive

Lakes 2011

Glenbeg Lough

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Glenbeg Lough, September 2011

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Cover photo: Lynda and Fiona gill netting © Inland Fisheries Ireland

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1.1 Introduction

Glenbeg Lough is located near Ardgroom on the Beara Pennisula, Cork–Kerry county border (Plate 1.1, Fig. 1.1). 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.

Glenbeg Lough was previously surveyed in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009). During this survey, brown trout were found to be the dominant species present in the lake. Eels were also captured during the survey.

This report summarises the results of the 2011 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

Plate 1.1. Glenbeg Lough

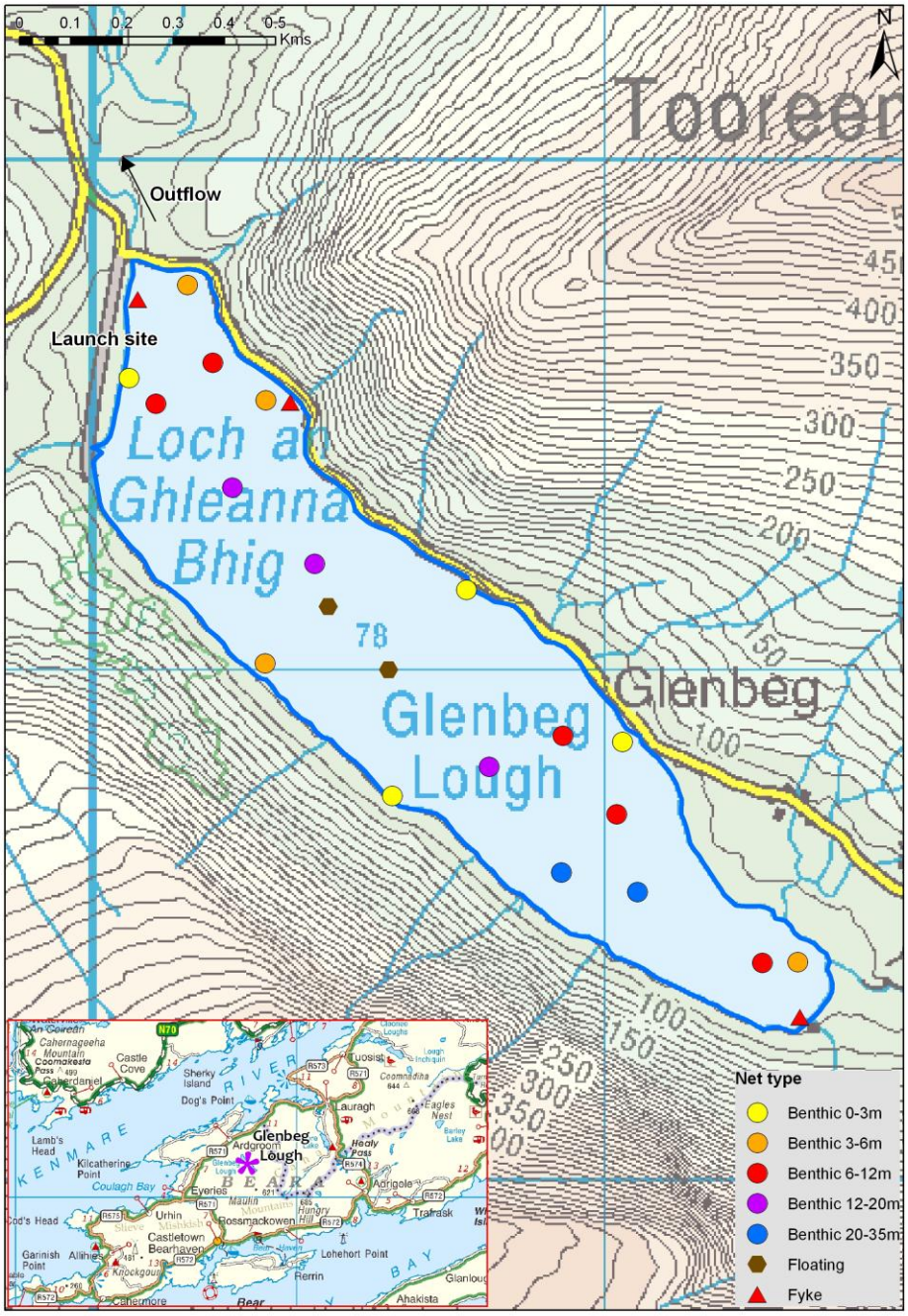

Fig. 1.1. Location map of Glenbeg Lough showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Glenbeg Lough was surveyed over two nights between the 13th and the 15th of September 2011. A total of three sets of Dutch fyke nets, 18 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard 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 floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (23 sites). Nets were deployed in the same locations as were randomly selected in the previous survey in 2008. 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 Glenbeg Lough in September 2011, with 374 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 2008 the same species composition was recorded.

Table 1.1. Number of each fish species captured by each gear type during the survey on Glenbeg Lough, September 2011

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	305	17	43	365
Anguilla anguilla	European eel	2	0	7	9

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 2008 and 2011 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 appeared slightly higher in 2011 than in 2008, these differences were not statistically significant (Figs. 1.2 and 1.3).

The differences in the mean brown trout CPUE and BPUE between Glenbeg Lough and four similar lakes was assessed, with no overall significant differences being found (Figs. 1.4 and 1.5).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Glenbeg Lough, 2008 and 2011

Scientific name	Common name	2008	2011
		Mean CPUE	
Salmo trutta	Brown trout	0.355 (0.089)	0.497 (0.087)
Anguilla anguilla	European eel	0.183 (0.063)	0.036 (0.011)
		Mean BPUE	
Salmo trutta	Brown trout	25.919 (7.042)	33.242 (6.039)
Anguilla anguilla	European eel	46.788 (25.204)	11.583 (3.701)

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

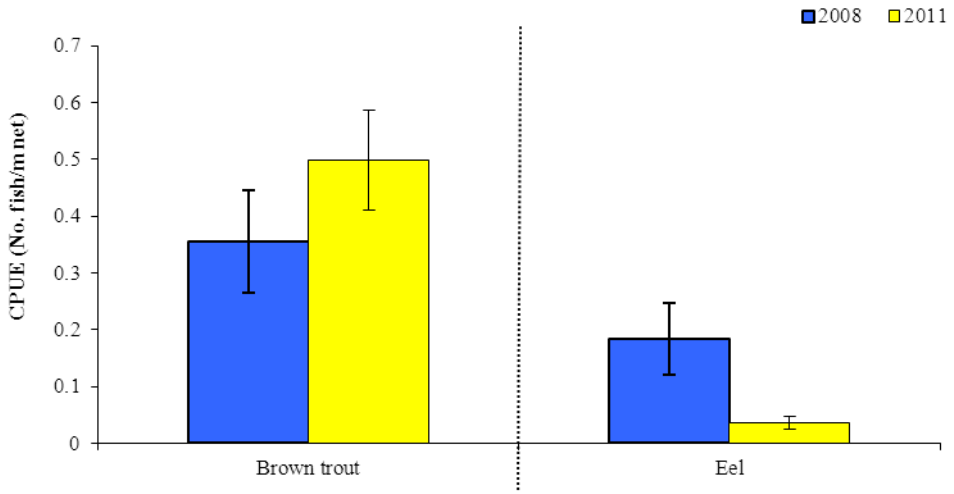

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Glenbeg Lough (Eel CPUE based on fyke nets only), 2008 and 2011

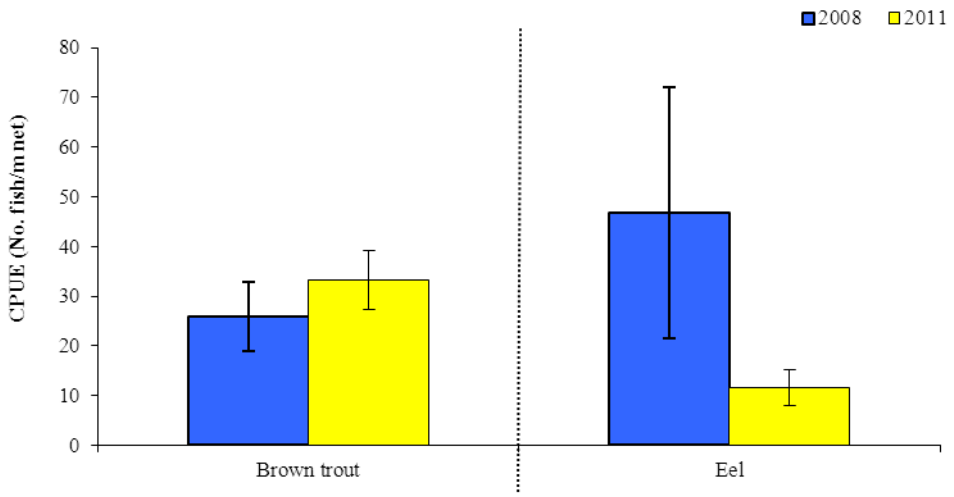

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Glenbeg Lough (Eel CPUE based on fyke nets only), 2008 and 2011

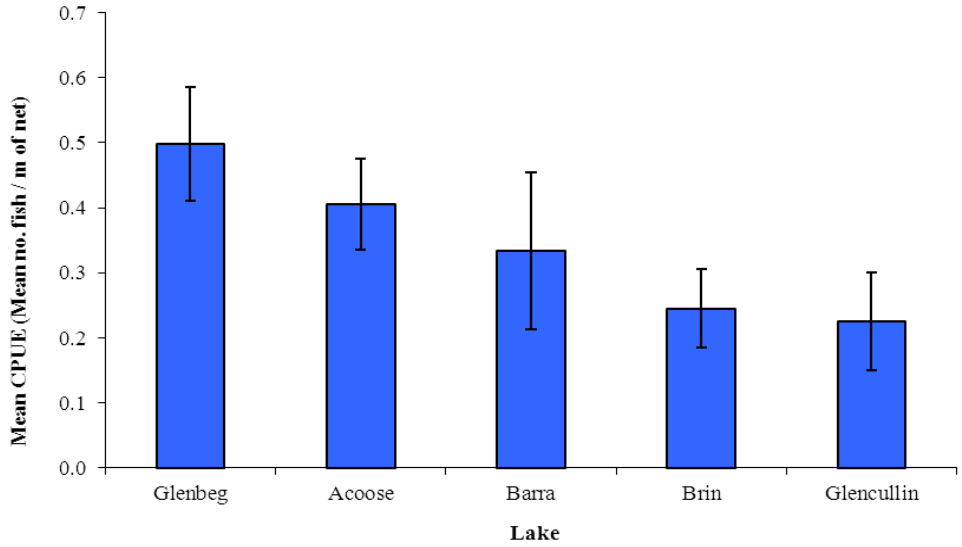

Fig. 1.4. Mean (±S.E.) brown trout CPUE in five lakes surveyed during 2011

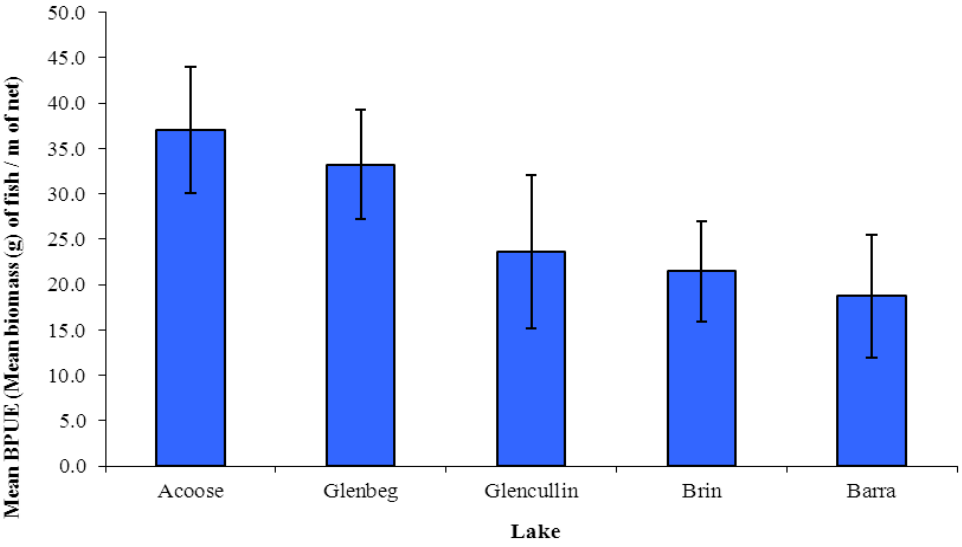

Fig. 1.5. Mean (±S.E.) brown trout BPUE in five lakes surveyed during 2011

1.3.3 Length frequency distributions

Brown trout captured during the 2011 survey ranged in length from 5.5cm to 25.8cm (mean = 17.9cm) (Fig. 1.6). Brown trout captured during the 2008 survey ranged in length from 8.1cm to 27.0cm (Fig. 1.6).

Eels captured during the 2011 survey ranged in length from 42.0cm to 69.0cm (mean = 52.4cm). Eels captured during the 2008 survey had lengths ranging from 32.0cm to 84.0cm.

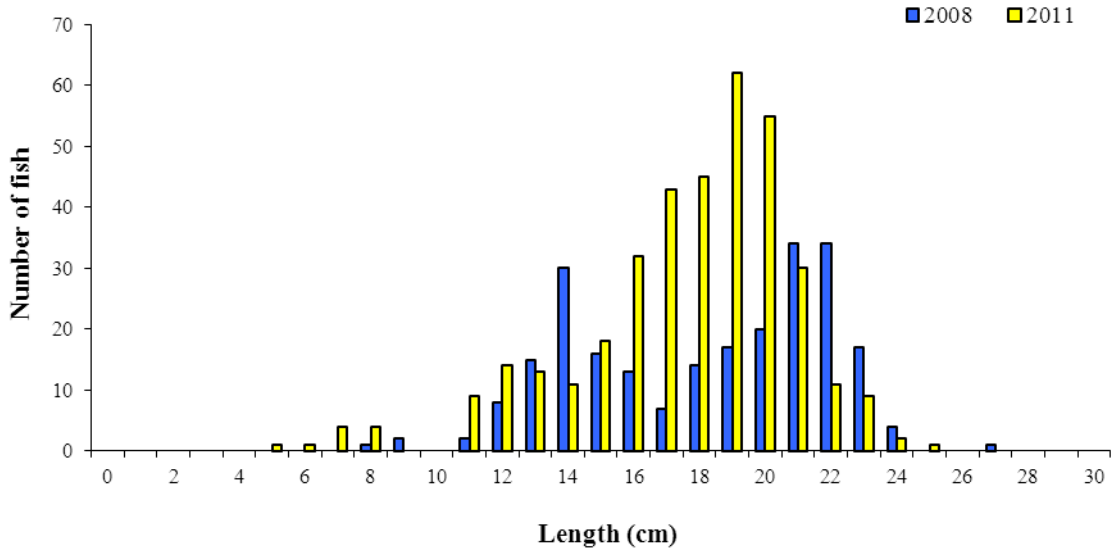

Fig. 1.6. Length frequency of brown trout captured on Glenbeg Lough

1.3.4 Fish age and growth

Four age classes of brown trout were present, ranging from 0+ to 3+, with a mean L1 of 6.9cm (Table 1.3). In the 2008 survey, brown trout ranged from 1+ to 4+ with a mean L1 of 6.7cm.

Table 1.3. Mean (±SE) brown trout length (cm) at age for Glenbeg Lough, September 2011

	L_1	L_2	L_3
Mean	6.9 (0.2)	16.0 (0.4)	21.5 (0.6)
N	66	42	3
Range	2.8-10.3	9.9-21.9	20.4-22.8

1.4 Summary

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets.

The mean brown trout CPUE and BPUE in Glenbeg Lough was similar to four other similar lakes assessed during 2011, with no statistically significant differences being found between lakes. Brown trout ranged in age from 0+ to 3+, indicating reproductive success in each of the previous four years.

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, Glenbeg Lough has been assigned an ecological status of High based on the fish populations present. The ecological status assigned to the lake based on the 2008 survey data was Good.

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

Kelly, F.L., Harrison, A., Connor, L., Allen, M., Rosell, R. and Champ, T. (2008) *FISH IN LAKES Task 6.9: Classification tool for Fish in Lakes. FINAL REPORT*. Central Fisheries Board, NS Share project.

Kelly, F.L., Connor, L., Wightman, G., Matson, R. Morrissey, E., O'Callaghan, R., Feeney, R., Hanna, G. and Rocks, K. (2009) *Sampling fish for the Water Framework Directive – Summary report 2008*. Central and Regional Fisheries Boards report.

Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.

Kennedy, M. and Fitzmaurice, P. (1971) Growth and Food of Brown Trout *Salmo Trutta* (L.) in Irish Waters. *Proceedings of the Royal Irish Academy*, **71 (B) (18),** 269-352.

NPWS (2000) Site synopsis*: Glanmore Bog cSAC. Site code: 1879*. National Parks and Wildlife Service Conservation Statement 2009.

O' Reilly, P., (1998) *Loughs of Ireland, A Flyfisher's Guide.* UK. Merlin Unwin Books.

Ownagappul Sub-Basin Management Plan (2009) www.wfdireland.ie

Shellfish Pollution Reduction Programme (2006) http://www.environ.ie/en/Publications/Environment/Water/PublicConsultations-ShellfishWatersDirective/FileDownLoad,22083,en.pdf

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