National Research Survey Programme

Lakes 2017

Glenbeg Lough

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Iascach Intíre Éireann
Inland Fisheries Ireland

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Fish Stock Survey of Glenbeg Lough, September 2017

Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

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Cover photo: Netting survey on Lough Derravaragh © 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 is categorised 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 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, 2011 and 2014 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009, 2012a, 2015a and 2015b). During the 2014 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 2017 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.

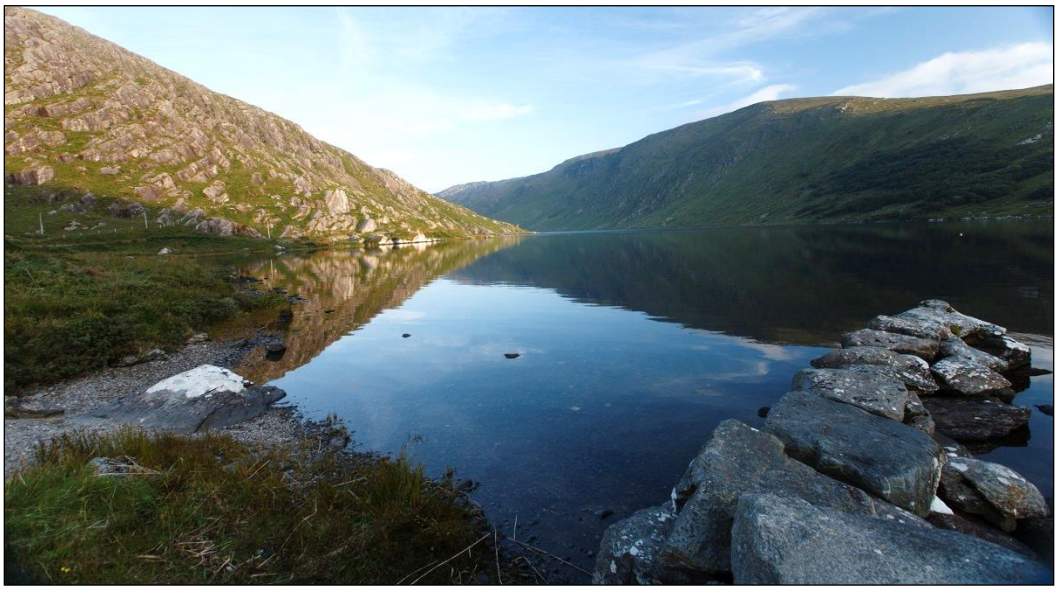

Plate 1.1. Glenbeg Lough

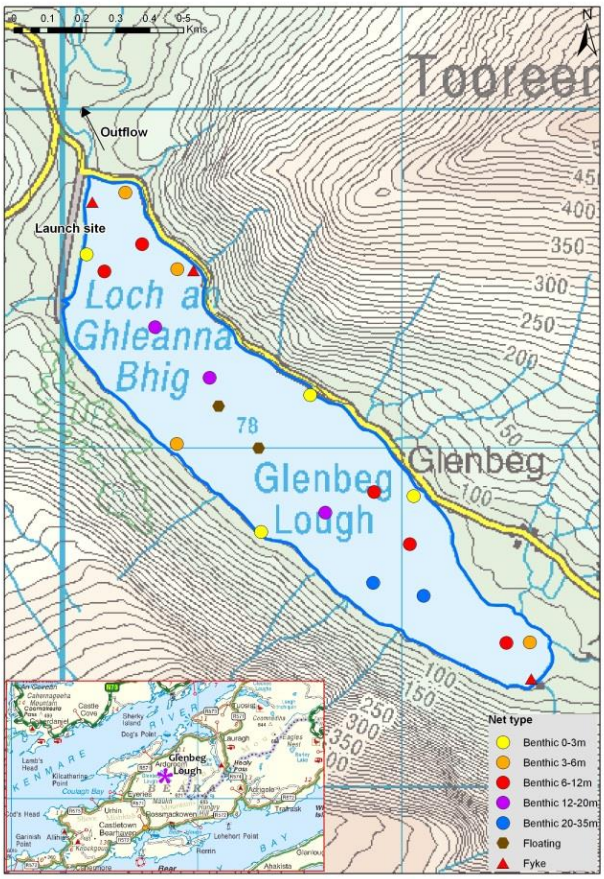

Fig. 1.1 Location map of Glenbeg Lough showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

1.2.1 Netting methods

Glenbeg Lough was surveyed over two nights from the 5th to the 7th of September 2017. A total of three sets of Dutch fyke nets, 18 benthic monofilament multi-mesh (BM CEN) (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 (FM CEN) (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. 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. Fish were frozen immediately after the survey and transported back to the IFI laboratory for later dissection.

1.2.2 Fish diet

Total stomach contents were inspected and individual items were counted and identified to the lowest taxonomic level possible. The percentage frequency occurrence (%FO) of prey items were then calculated to identify key prey items (Amundsen *et al.*, 1996).

$$\%FO_i = (N_i / N) \times 100$$

Where:

$\%FO_i$ is the percentage frequency of prey item i,
N_i is the number of a particular species with prey i in their stomach,
N is total number of a particular species with stomach contents.

1.2.3 Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment in order to prevent dispersal of alien species and other organisms to uninfected waters. A standard operating procedure was compiled by Inland Fisheries Ireland for this purpose (Caffrey, 2010) and is followed by staff in IFI when moving between water bodies.

1.3 Results

1.3.1 Species Richness

A total of two fish species were recorded on Glenbeg Lough in September 2017, with 483 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most common fish species recorded, followed by eels. During the previous survey in 2008, 2011 and 2014 the same species composition was recorded with the exception of salmon, which were only recorded during the 2014 survey (Kelly *et al*., 2009, Kelly *et al*., 2012a and Kelly *et al*., 2015a and 2015b).

Table 1.1. Number of each fish species captured by each gear type during the survey on Glenbeg Lough, September 2017

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
Salmo trutta	Brown trout	413	25	32	470
Anguilla anguilla	European eel	0	0	13	13

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 the 2008, 2011, 2014 and 2017 surveys are summarised in Table 1.2 and illustrated in Figures 1.2 and 1.3.

Brown trout

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated slightly over the four sampling occasions, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Glenbeg Lough, 2008, 2011, 2014 and 2017

Scientific name	Common name	2008	2011	2014	2017
			Mean CPUE (±S.E.)		
Salmo trutta	Brown trout	0.355 (0.089)	0.497 (0.087)	0.323 (0.057)	0.658 (0.131)
Salmo salar	Salmon	-	-	0.004 (0.004)	-
Anguilla anguilla	European eel*	0.183 (0.063)	0.036 (0.0114)	0.033 (0.019)	0.072 (0.043)
			Mean BPUE (±S.E.)		
Salmo trutta	Brown trout	25.919 (7.042)	33.242 (6.039)	28.966 (5.101)	59.440 (11.881)
Salmo salar	Salmon	-	-	0.123 (0.123)	-
Anguilla anguilla	European eel*	46.788 (25.204)	11.583 (3.701)	6.208 (3.112)	8.775 (4.782)

Note: On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species (Connor *et al.*, 2017).

*Eel CPUE and BPUE based on fyke nets only

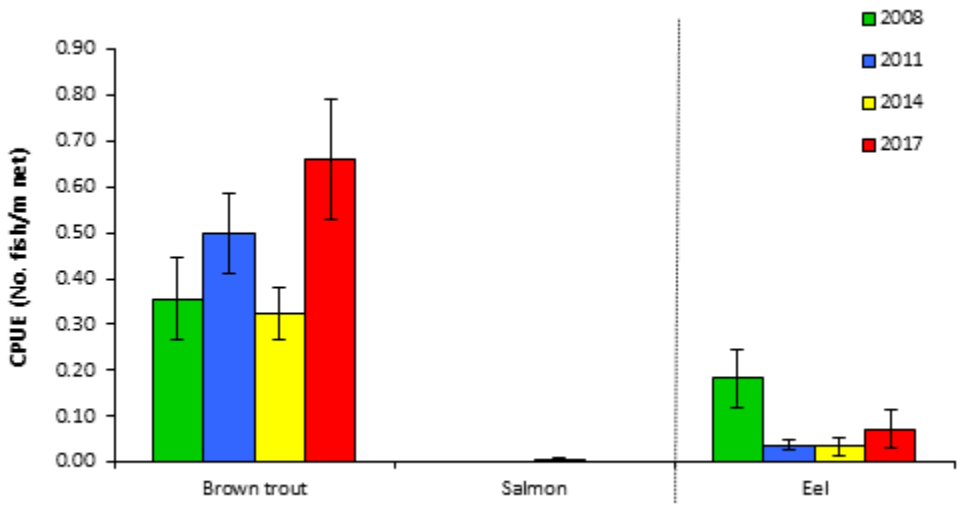

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Glenbeg Lough (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2017

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Glenbeg Lough (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2017

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2017 survey ranged in length from 4.0cm to 41.6cm (mean = 19.3cm) (Fig. 1.4). Seven age classes were present, ranging from 0+ to 6+, with a mean L1 of 6.6cm (Table 1.3). The dominant age class was 2+ (Fig. 1.4). Mean brown trout L4 in 2017 was 22.4cm 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). Brown trout captured during the 2008, 2011 and 2014 surveys had similar length and age ranges, with the smallest range exhibited in the 2014 survey and the largest range in 2017 (Fig.1.4).

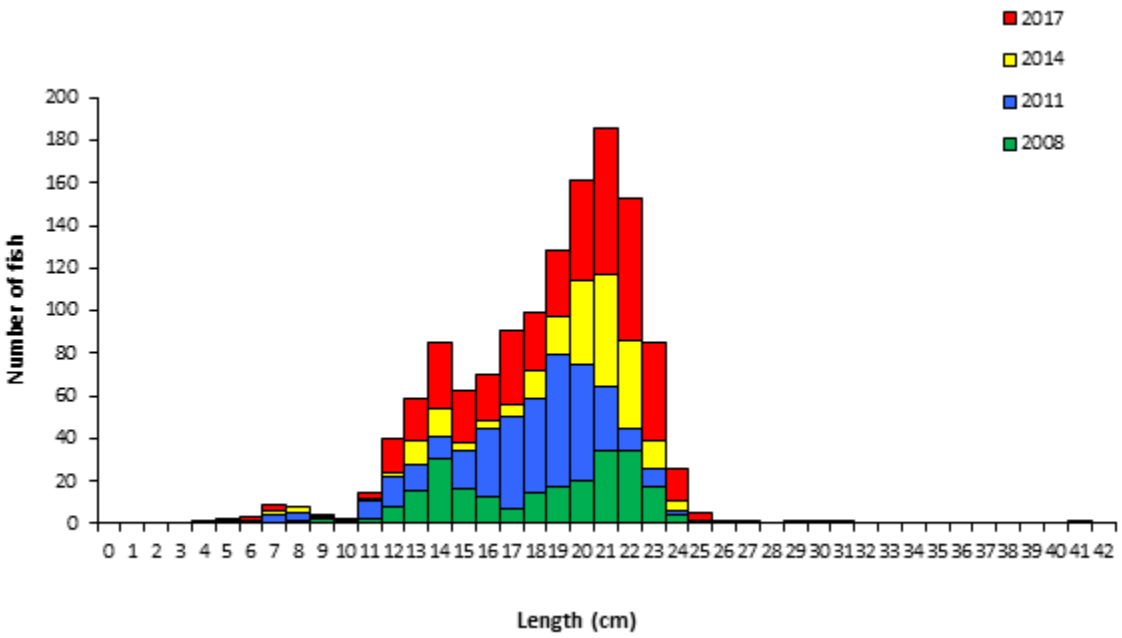

Fig. 1.4. Length frequency of brown trout captured on Glenbeg Lough, 2008, 2011, 2014 and 2017

Table 1.3. Mean (±S.E.) brown trout length (cm) at age for Glenbeg Lough, September 2017

	L_1	L_2	L_3	L_4	L_5	L_6	Growth Category
Mean (±S.E.)	6.6 (0.3)	13.0 (0.5)	17.7 (0.6)	22.4 (1.2)	26.9 (3.4)	31.3 (3.4)	Very slow
N	46	38	16	6	3	3	
Range	4.0-11.1	8.1-18.0	14.0-20.9	18.3-25.8	21.8-33.3	27.4-38.0	

Other fish species

Eels captured during the 2017 survey ranged in length from 30.1cm to 50.48cm.

1.3.4 Stomach and diet analysis

Dietary analysis studies provide a good indication of the availability of food items and the angling methods that are likely to be successful. However, the value of stomach content analysis is limited unless undertaken over a long period as diet may change on a daily basis depending on the availability of food items. The stomach contents of a subsample of brown trout captured during the survey were examined and are presented below.

Brown trout

Adult trout usually feed principally on crustaceans (*Asellus* sp. and *Gammarus* sp.), insects (principally chironomid larvae and pupae) and molluscs (snails) (Kennedy and Fitzmaurice, 1971, O'Grady, 1981). A total of 77 stomachs were examined. Of these 42 were found to contain no prey items. Of the remaining 35 stomachs containing food, 46% contained invertebrates, 23% zooplankton, 23% unidentified digested material and 8% invertebrates/zooplankton (Fig. 1.5).

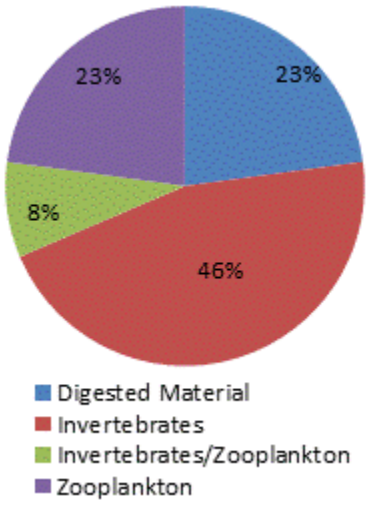

Fig 1.5. Diet of brown trout (n=35) captured on Glenbeg Lough, 2017 (% FO)

1.4 Summary and ecological status

A total of two fish species were recorded in Glenbeg Lough in September 2017. Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2017 survey.

Although the mean brown trout CPUE and BPUE fluctuated slightly over the four sampling occasions, these differences were not statistically significant. Brown trout ranged in age from 0+ to 6+, indicating reproductive success in each of the previous seven years. The dominant age class was 2+. 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 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*., 2012b). Using the FIL2 classification tool, Glenbeg Lough has been assigned an ecological status of Good for 2017 based on the fish populations present. In previous years the lake was assigned a fish status of Good in 2008 and High in 2011 and 2014.

In the 2010 to 2015 surveillance monitoring reporting period, the EPA assigned Glenbeg Lough an overall ecological status of Good.

1.5 References

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