



Sampling Fish for the Water Framework Directive

Lakes 2014

Glenbeg Lough





Water Framework Directive Fish Stock Survey of Glenbeg Lough, September 2014

Fiona L. Kelly, Lynda Connor, Emma Morrissey, John Coyne, Rory Feeney, Ronan Matson and Kieran
Rocks

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

CITATION: Kelly, F.L., Connor, L., Morrissey, E., Coyne, J., Feeney, R., Matson, R. and Rocks, K. (2015o) Water Framework Directive Fish Stock Survey of Glenbeg Lough, September 2014. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

Cover Photo: Netting survey on Lough Brin © Inland Fisheries Ireland

© Inland Fisheries Ireland 2015



ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the regional director Dr. Patrick Buck and the staff from IFI, Macroom. The authors would also like to gratefully acknowledge the help and cooperation of all their colleagues in IFI, Swords.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2014.

The authors would also like to thank the Glenbeg Angling Club.

We would also like to thank Ms. Ruth Hanniffy for the photographs.

The report includes Ordnance Survey Ireland data reproduced under OSi Copyright Permit No. MP 007508.

*Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright.
© Ordnance Survey Ireland, 2011.*



1.1 Introduction

Glenbeg Lough is located near Ardgroom on the Beara Peninsula, 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 CaCO₃). 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 and 2011 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009 and Kelly *et al.*, 2012a). During the 2011 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 2014 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.



Plate 1.1. Glenbeg Lough

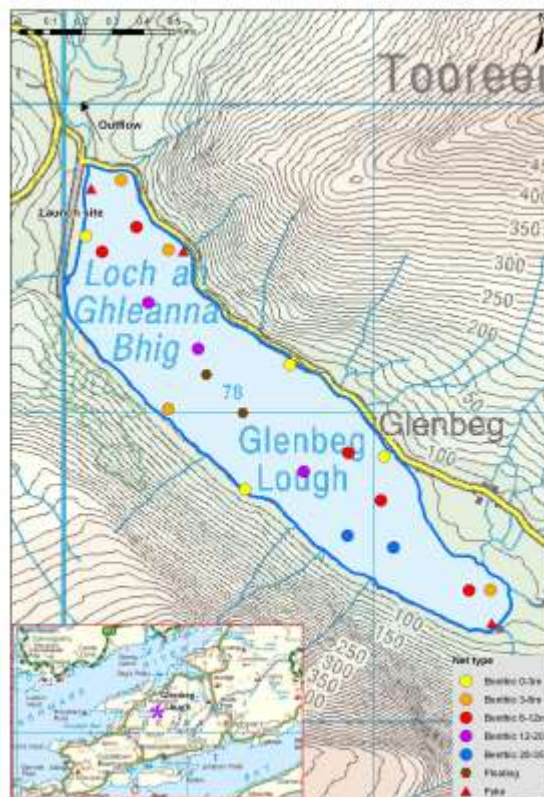


Fig. 1.1 Location map of Glenbeg Lough showing locations and depths of each net (outflow is indicated on map)



1.2 Methods

Glenbeg Lough was surveyed on the night of the 8th of September 2014. 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 surveys in 2008 and 2011. 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 and salmon. 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 three fish species were recorded on Glenbeg Lough in September 2014, with 239 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 and salmon. During the previous survey in 2008 and 2011 the same species composition was recorded with the exception of salmon, which were only recorded during the 2014 survey.

Table 1.1. Number of each fish species captured by each gear type during the survey on Glenbeg Lough, September 2014

Scientific name	Common name	Number of fish captured			Total
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	
<i>Salmo trutta</i>	Brown trout	214	4	11	229
<i>Salmo salar</i>	Salmon	3	0	0	3
<i>Anguilla anguilla</i>	European eel	1	0	6	7



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 and 2014 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). Although the mean brown trout CPUE and BPUE increased from 2008 to 2011 and decreased in 2014, 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 and 2014

Scientific name	Common name	2008	2011	2014
Mean CPUE				
<i>Salmo trutta</i>	Brown trout	0.355 (0.089)	0.497 (0.087)	0.323 (0.057)
<i>Salmo salar</i>	Salmon	-	-	0.004 (0.004)
<i>Anguilla anguilla</i>	European eel	0.183 (0.063)	0.036 (0.0114)	0.033 (0.019)
Mean BPUE				
<i>Salmo trutta</i>	Brown trout	25.919 (7.042)	33.242 (6.039)	28.966 (5.101)
<i>Salmo salar</i>	Salmon	-	-	0.123 (0.123)
<i>Anguilla anguilla</i>	European eel	46.788 (25.204)	11.583 (3.701)	6.208 (3.112)

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.

*Eel CPUE and BPUE based on fyke nets only

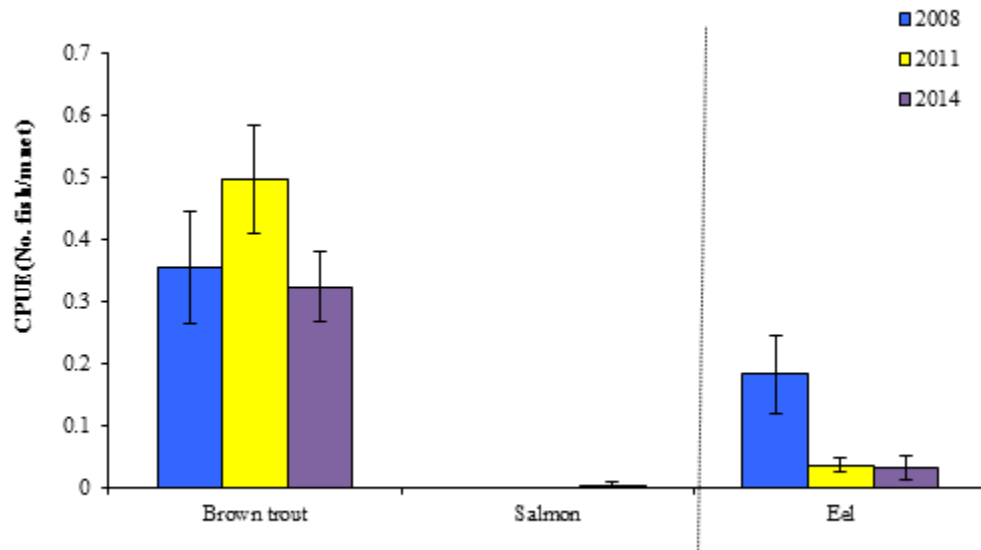


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Glenbeg Lough (Eel CPUE based on fyke nets only), 2008, 2011 and 2014

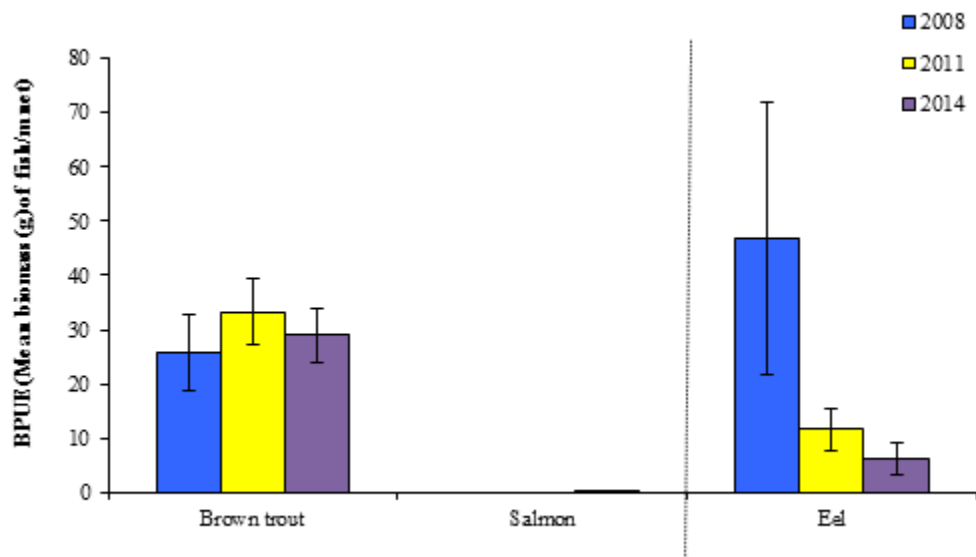


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Glenbeg Lough (Eel BPUE based on fyke nets only), 2008, 2011 and 2014



1.3.3 Length frequency distributions and growth

Brown trout captured during the 2014 survey ranged in length from 7.0cm to 24.6cm (mean = 19.7cm) (Fig. 1.4). Four age classes were present, ranging from 0+ to 3+, with a mean L1 of 6.7cm (Table 1.3). The dominant age class was 3+ (Fig. 1.4). Brown trout captured during the 2008 and 2011 surveys had a similar length range, age range and growth rate to the 2014 survey (Fig. 1.4).

Salmon captured during the 2014 survey ranged in length from 12.1cm to 13.2cm and eels ranged from 39.4cm to 61.8cm. All juvenile salmon captured were aged 1+.

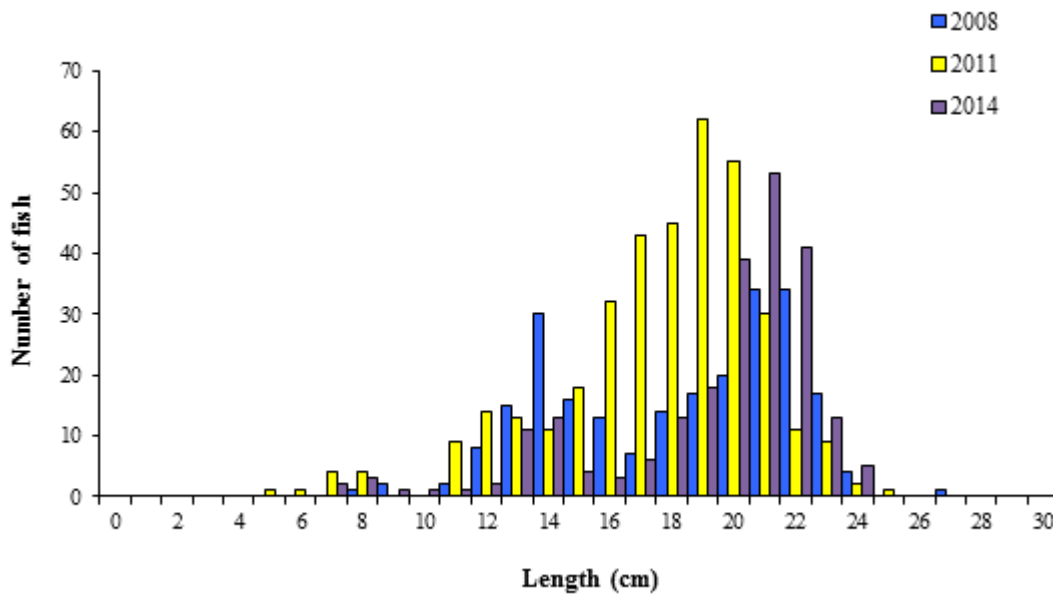


Fig. 1.4. Length frequency of brown trout captured on Glenbeg Lough, 2008, 2011 and 2014

Table 1.3. Mean (\pm SE) brown trout length (cm) at age for Glenbeg Lough, September 2014

	L ₁	L ₂	L ₃
Mean	6.7 (0.3)	14.9 (0.4)	20.4 (0.5)
N	39	28	11
Range	3.1-10.6	10.8-18.5	16.1-22.8



1.4 Summary

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2014 survey.

Although the mean brown trout CPUE and BPUE increased from 2008 to 2011 and decreased in 2014, these differences were not statistically significant. Brown trout ranged in age from 0+ to 3+, indicating reproductive success in each of the previous four years. The dominant age class was 3+.

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.*, 2012b). Using the FIL2 classification tool, Glenbeg Lough has been assigned an ecological status of Good in 2008 and High for both 2011 and 2014 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Glenbeg Lough an overall draft ecological status of Moderate, based on all monitored physico-chemical and biological elements, including fish.



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., Harrison A., Connor, L., Matson, R., Morrissey, E., Wogerbauer, C., Feeney, R., O'Callaghan, R. and Rocks, K. (2012a) *Sampling Fish for the Water Framework Directive – Summary Report 2011*. Inland Fisheries Ireland.
- Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012b) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.
- 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>

A large, dark blue, irregularly shaped graphic element on the left side of the page. It has a white dashed line that curves across its bottom edge. The rest of the page is white.

**IFI Dublin,
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland**

**www.fisheriesireland.ie
dublin@fisheriesireland.ie
+353 1 8842 600**