

National Research Survey Programme

Lakes 2016

Belhavel Lough

IFI/2017/1-4368



Iascach Intíre Éireann
Inland Fisheries Ireland



Inland Fisheries Ireland

National Research Survey Programme - Coarse Fish and Pike

Fish Stock Survey of Belhavel Lough,

September 2016

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

CITATION: McLoone, P., Connor, L., Coyne, J., Morrissey, E., Corcoran, W., Cierpial, D., Delanty, K., Matson, R., Gordon, P., O' Briain, R., Rocks, K., O' Reilly, S., Puttharee, D., McWeeney, D., Robson S., Buckley, S. and Kelly, F.L. (2017) Fish Stock Survey of Belhavel Lough, September 2016. National Research Survey Programme - Coarse Fish and Pike, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

Cover photo: Netting survey on Lough Tay © Inland Fisheries Ireland

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ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of all their colleagues in Inland Fisheries Ireland.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Climate Action and Environment for 2016.

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1.1 Introduction

Belhavel Lough is located approximately 3km north of Drumkeeran in Co. Leitrim (Fig. 1.1). The lake is included within the Western River Basin District (WRBD), but drains both east to Lough Allen (Shannon River Basin District) via the Diffagher River and west into the Garavogue Catchment (WRBD). The outfall to the Garavogue system occurs as a result of drainage works (McGarrigle, 2014). The lake is situated at an altitude of 60 m.a.s.l., has a surface area of 101ha, mean depth of <4m and maximum depth of 9.6m. The dominant geology underlying the lake is mudstone and sandstone. Adjacent land use is predominantly agricultural with large areas of natural vegetation, and some coniferous forestry present.

The lake is categorised as typology class 6 for the purposes of Water Framework Directive (WFD) monitoring, i.e. shallow (<4m), greater than 50ha and moderately alkaline (>20mg/l CaCO₃). The lake has been assigned a moderate ecological status (EPA, 2014).

The lake was previously surveyed in 1968 (unpublished IFI data) and 1999 (CFB, 2000). On both occasions, perch, pike and bream were captured. Brown trout were captured on the first occasion but were not recorded in the latter survey.

The lake is seldom fished but is noted for its catches of bream.



Plate 1.1. Belhavel Lough, September 2016



Belhavel Lough, Leitrim

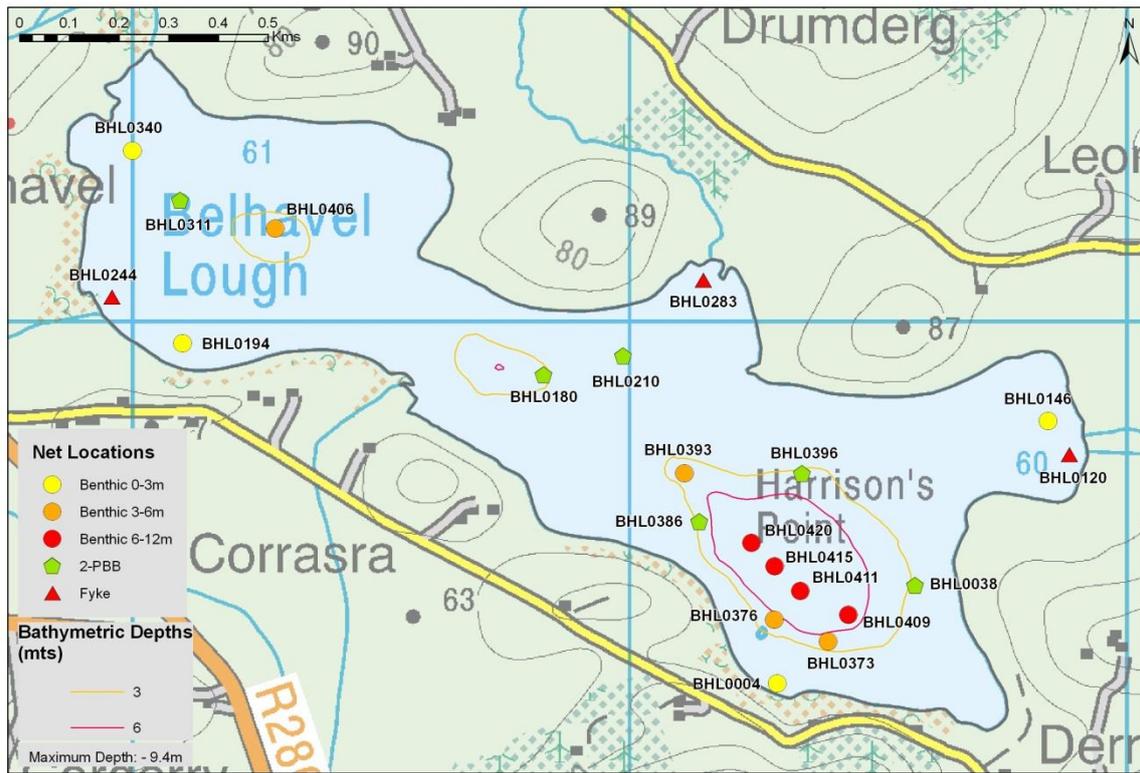


Figure 1.1. Location and depth of nets set on Belhavel Lough, September 2016



1.2 Methods

1.2.1 Netting methods

Belhavel Lough was surveyed over two nights on the 15th and 19th of September 2016. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m and 4 @ 6-11.9m) were deployed in the lake (15 sites) (Fig. 1.1). The netting effort was supplemented using six two-panel benthic braided (63.5mm and 88.9mm mesh knot to knot) survey gill nets (2-PBB).

A handheld GPS was used to locate the precise location of each net. The angle of each gill net in relation to the shoreline was randomised.

All fish apart from perch were measured and weighed on site and scales were removed from all bream, and pike. 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 subsequently dissected in the IFI laboratory.

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 (%O) of prey items was then calculated to identify key prey items (Amundsen *et al.*, 1996).

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

Where:

%O_i is the percentage frequency of prey items 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 on the IFI NRSP team when moving between water bodies.



Plate 1.2 Recording dissolved oxygen and temperature on Belhavel Lough, September 2016



1.3 Results

1.3.1 Species Richness

A total of four fish species were recorded in Belhavel Lough in September 2016, with 148 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Perch were the most common fish species recorded, followed by bream and pike respectively. The same species composition was recorded in surveys conducted in 1999 and 1968. However, several brown trout were also captured in the nets set during the earlier survey (IFI unpublished data).

Table 1.1. Number of each fish species captured by each gear type during the survey on Belhavel Lough, September 2016

Scientific name	Common name	Number of fish captured			
		2-PBB	BM CEN	Fyke	Total
<i>Perca fluviatilis</i>	Perch	0	67	15	82
<i>Abramis brama</i>	Bream	2	52	6	60
<i>Esox lucius</i>	Pike	0	4	0	4
<i>Anguilla anguilla</i>	European eel	0	0	2	2

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 2016 survey are summarised in Table 1.2.

Perch was the dominant fish species in terms of abundance (CPUE) and pike was the dominant fish species in terms of biomass (BPUE) (Table 1.2). Bream were the sole cyprinid species recorded during the survey and were the second most dominant fish with respect to both CPUE and BPUE.

The mean CPUE and BPUE for all species captured in the 2016 survey are illustrated in Figure 1.2 and 1.3.



Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Belhavel Lough, in September 2016

Scientific name	Common name	Mean CPUE (\pm S.E.)	Mean BPUE (\pm S.E.)
<i>Perca fluviatilis</i>	Perch	0.118 (0.043)	3.755 (1.304)
<i>Abramis brama</i>	Bream	0.089 (0.028)	6.297 (1.900)
<i>Esox lucius</i>	Pike	0.006 (0.003)	9.952 (5.099)
<i>Anguilla anguilla</i>	European eel	0.011 (0.006)	6.275 (3.307)

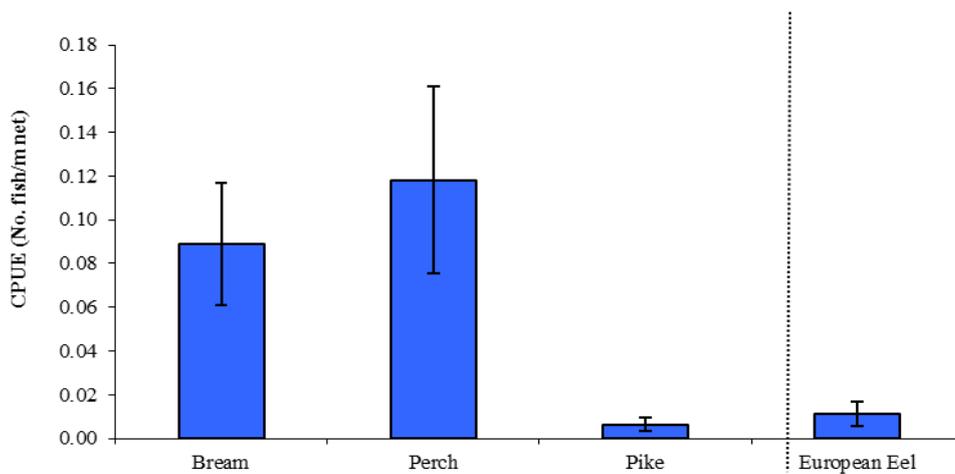


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Belhavel Lough in September 2016 (Eel CPUE based on fyke nets only)

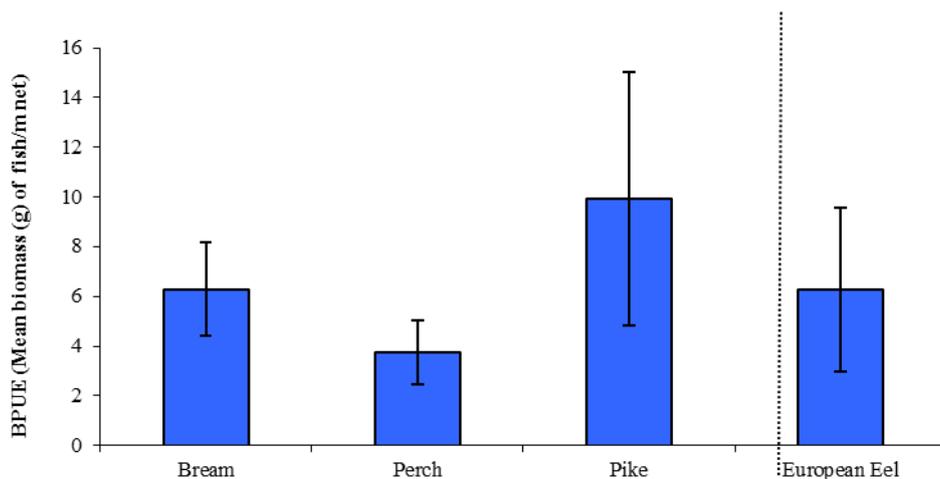


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Belhavel Lough in September 2016 (Eel BPUE based on fyke nets only).



1.3.3 Length frequency distributions and growth

Perch

Perch captured during the 2016 survey ranged in length from 4.6cm to 25.7 (mean = 10.7cm) (Fig.1.4). Perch were aged between 0+ and 5+ years old, and all intervening year classes were represented (Fig. 1.5). Young fish dominated the population and 0+ fish (4-6cm) were the most abundant cohort recorded in the nets (Fig 1.4).

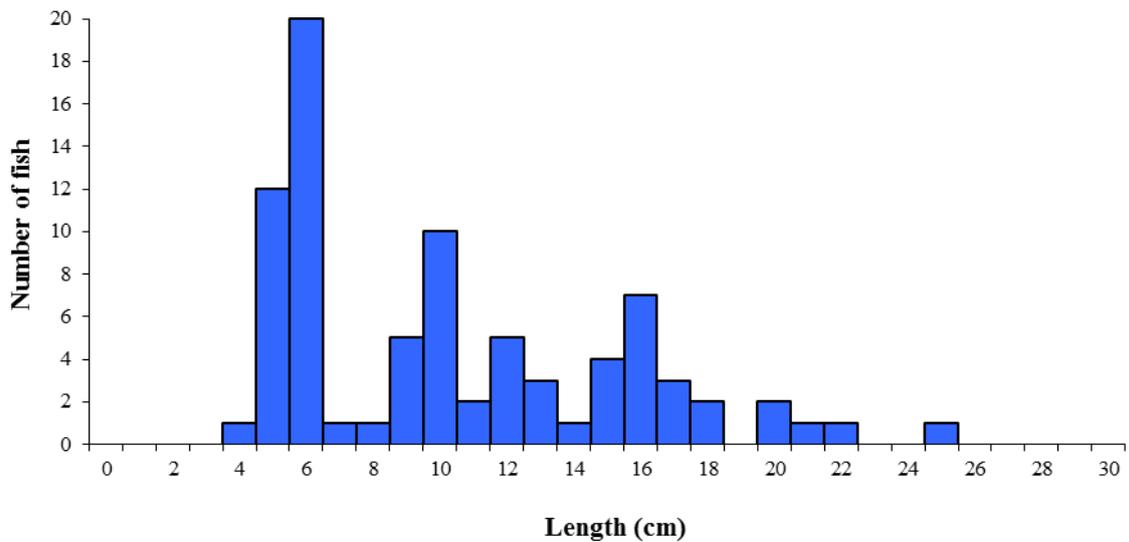


Fig. 1.4. Length frequency of perch captured on Belhavel Lough in September 2016

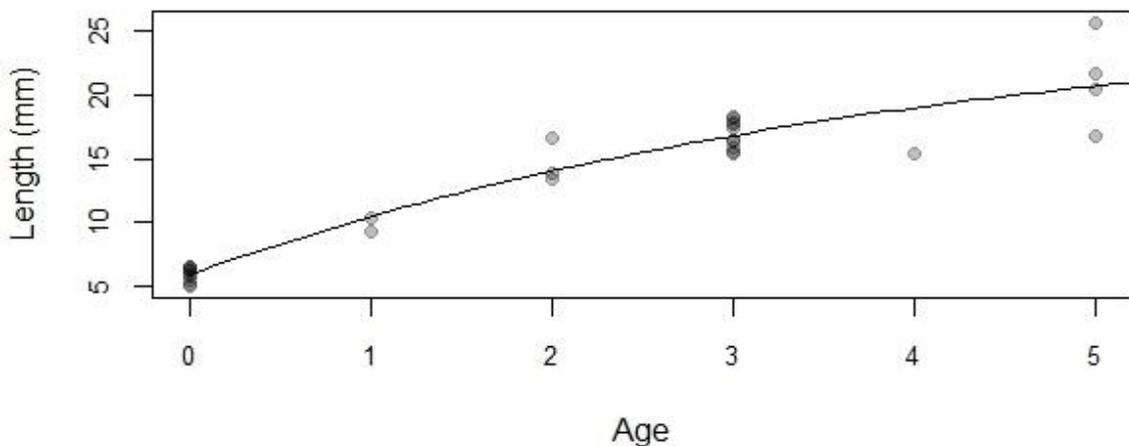


Fig. 1.5. Length at age of perch captured on Belhavel Lough in September 2016



Bream

Bream captured during the 2016 survey ranged in length from 5cm to 37.8 (mean = 12.8cm) (Fig.1.6). Bream were aged between 0+ and 11+. With the exception of 8 and 9 year old fish (those fish that were 'born' in 2007) all intervening year classes were represented (Fig. 1.7). This indicates that recruitment of bream is regularly successful in the lake.

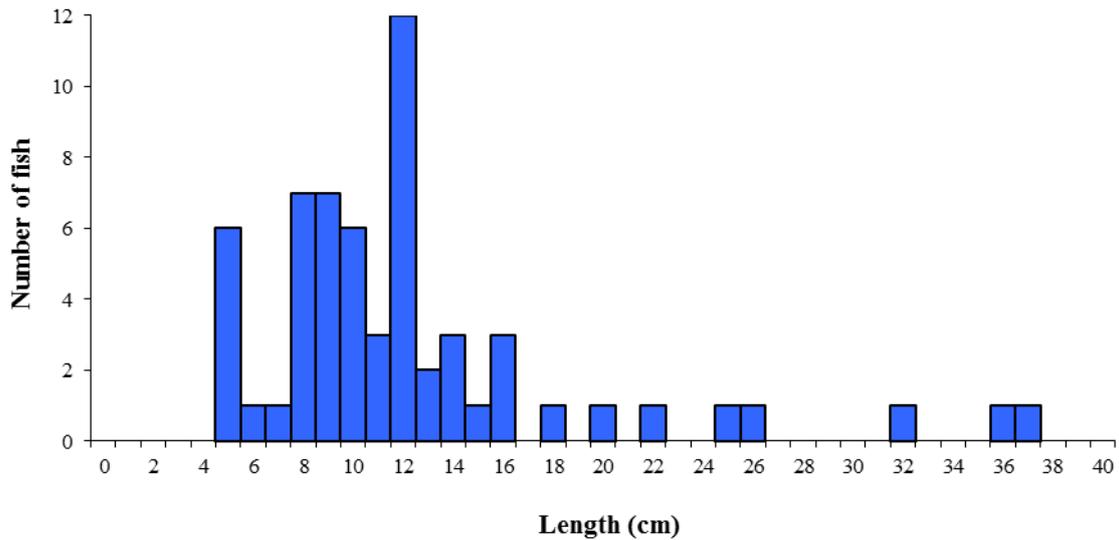


Fig. 1.6. Length frequency of bream captured on Belhavel Lough in September 2016

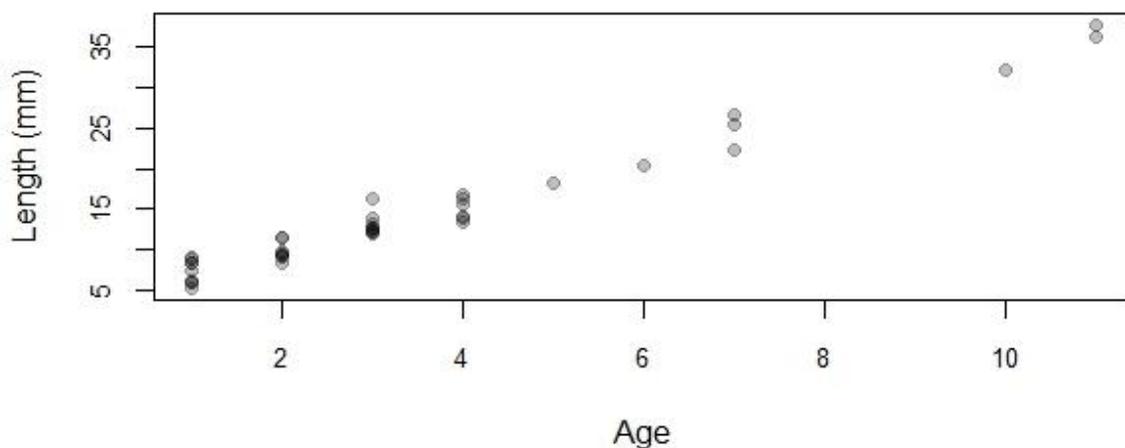


Fig. 1.7. Length at age of bream captured on Belhavel Lough in September 2016



Pike

Four pike were captured. These ranged in length from 47.5cm to 67cm (mean = 56.6cm). All pike were aged between 4+ and 6+ years old.

Eel

Two eels were recorded in the fyke nets. These measured 63.5cm and 75.5cm.

1.3.4 Stomach and diet analysis

Feeding 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.

Perch

A total of 25 perch stomachs were examined. Of these 15 were found to contain no prey items. Of the 10 stomachs containing food, 70% were feeding on fish, and 30% contained unidentified digested material (Fig. 1.8).

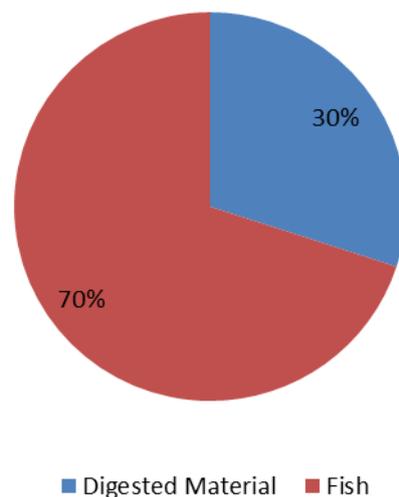


Fig. 1.8. Diet of perch captured on Belhaven Lough in September 2016 (% occurrence) n=10. Fifteen empty stomachs are not presented.



1.4 Summary and ecological status

Four fish species were recorded during the 2016 survey of Belhavel Lough. These were, perch, bream, pike and eel. The same species mix was recorded during a survey of the lake conducted in 1999 (CFB, 2000). Catchment wide electrofishing conducted on the Bonet Catchment in 2016 recorded a similar species composition in inflowing and outflowing streams to the lake (Brian Coghlan *pers comm*). Perch was the dominant fish species in terms of abundance (CPUE) and pike was the dominant fish species in terms of biomass (BPUE). Bream was the sole cyprinid species recorded during the survey and was the second most dominant fish with respect to both CPUE and BPUE.

No roach were recorded during the survey. This is now extremely unusual in Irish coarse fisheries where roach have spread to many inland watercourses where they are typically the dominant cyprinid species recorded. In their absence, bream are the dominant cyprinid in Belhavel, with evidence of recent and continued recruitment to the adult population.

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, Belhavel Lough has been assigned an ecological status of Bad for 2016 based on the fish populations present.

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



1.5 References

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