

National Research Survey Programme

Lakes 2016

Derryhick Lough

IFI/2017/1-4371



Iascach Intíre Éireann
Inland Fisheries Ireland



Inland Fisheries Ireland

National Research Survey Programme - Coarse Fish and Pike

Fish Stock Survey of Derryhick 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 Derryhick Lough, September 2016. National Research Survey Programme - Coarse Fish and 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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1.1 Introduction

Derryhick Lough is located approximately 8 km north of Castlebar, Co. Mayo in the River Moy catchment (Fig. 1.1). The lake is connected to Lough Cullin via an outflowing stream at the northern end of the lake. The lake is situated at an altitude of 24 m.a.s.l., has a surface area of 54ha, mean depth of 5.2m and maximum depth of 14.6m. The geology of the area is a mix of granite and quartzite. Land use is predominantly pasture.

The lake is categorised as typology class 2 for the purposes of Water Framework Directive (WFD) monitoring, i.e. deep (>4m), greater than 50ha and moderately alkaline (< 20mg/l CaCO₃). The lake has been assigned a moderate ecological status with respect to physico chemical properties (EPA, 2014). The lake is deemed to be at risk for morphology and water abstraction (WFD Ireland, 2010)

The lake was last surveyed in 1996 by Inland Fisheries Ireland. At that time roach, perch, pike and eels were recorded. This was the first record for roach in the Moy Catchment (IFI unpublished data).

Derryhick Lough supports a pike fishery and pike stocks have been augmented by regular transfer of pike relocated from Lough Conn during annual stock management operations conducted on the donor lake.



Plate 1.1 Derryhick Lough

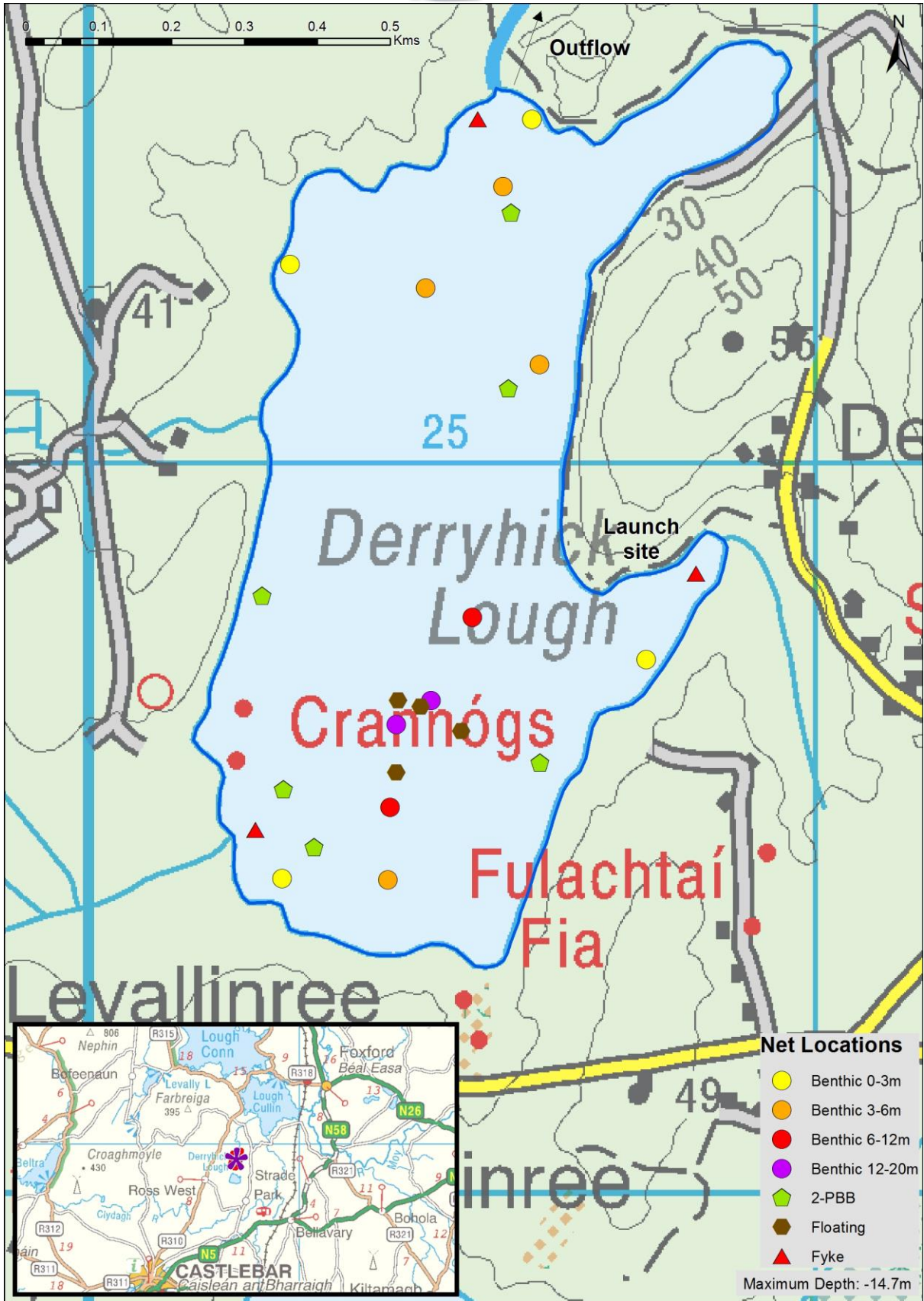


Fig. 1.1. Location map of Derryhick Lough showing net locations and depths of each net (outflow is indicated on map)



1.2 Methods

1.2.1 Netting methods

Derryhick Lough was surveyed over two nights from the 6th to the 8th 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, 2 @ 6-11.9m and 2 @ 12-19.9m) and four floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (19 sites). 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 a sub sample of roach 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).

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

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.



1.3 Results

1.3.1 Species Richness

A total of six fish species were recorded in Derryhick Lough in September 2016, with 734 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 roach and eel respectively. Single specimens of trout, pike, and tench were also captured.

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

Scientific name	Common name	Number of fish captured				
		2-PBB	BMCEN	FMCEN	Fyke	Total
<i>Perca fluviatilis</i>	Perch	1	389	1	8	399
<i>Rutilus rutilus</i>	Roach	0	302	14	6	322
<i>Esox lucius</i>	Pike	0	1	0	0	1
<i>Salmo trutta</i>	Brown trout	0	1	0	0	1
<i>Tinca tinca</i>	Tench	0	0	0	1	0
<i>Anguilla anguilla</i>	European eel	0	0	0	10	10

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 roach was the dominant fish species in terms of biomass (BPUE) captured in the survey gill nets (Table 1.2). The mean CPUE and BPUE for all species captured in 2016 are presented in Figure 1.2 and 1.3.



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

Scientific name	Common name	Mean CPUE (\pm S.E.)	Mean BPUE (\pm S.E.)
<i>Perca fluviatilis</i>	Perch	0.526 (0.158)	12.370 (3.122)
<i>Rutilus rutilus</i>	Roach	0.419 (0.130)	21.561 (6.199)
<i>Esox lucius</i>	Pike	0.001 (0.001)	0.337 (0.337)
<i>Salmo trutta</i>	Brown trout	0.001 (0.001)	0.412 (0.412)
<i>Tinca tinca</i>	Tench	0.001 (0.001)	1.400 (1.400)
<i>Anguilla anguilla</i>	European eel	0.056 (0.047)	29.444 (28.204)

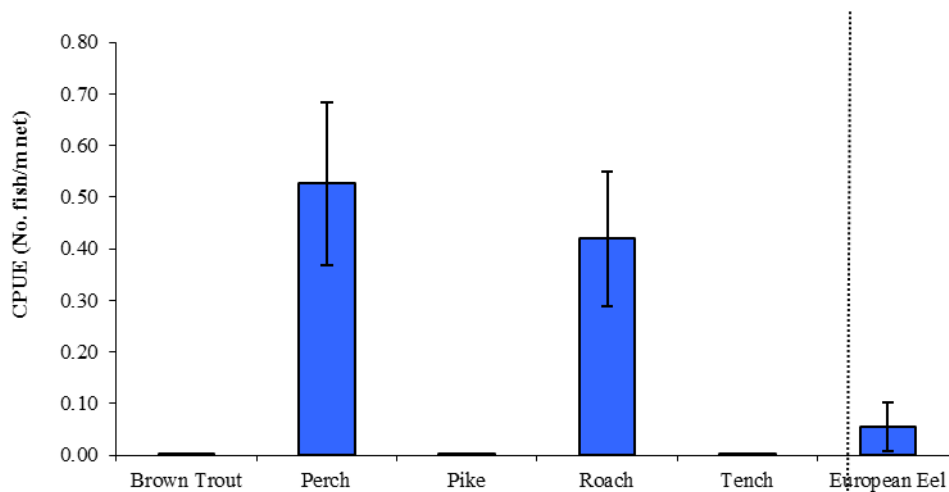


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Derryhick Lough in September 2016 (Eel CPUE based on fyke nets only)

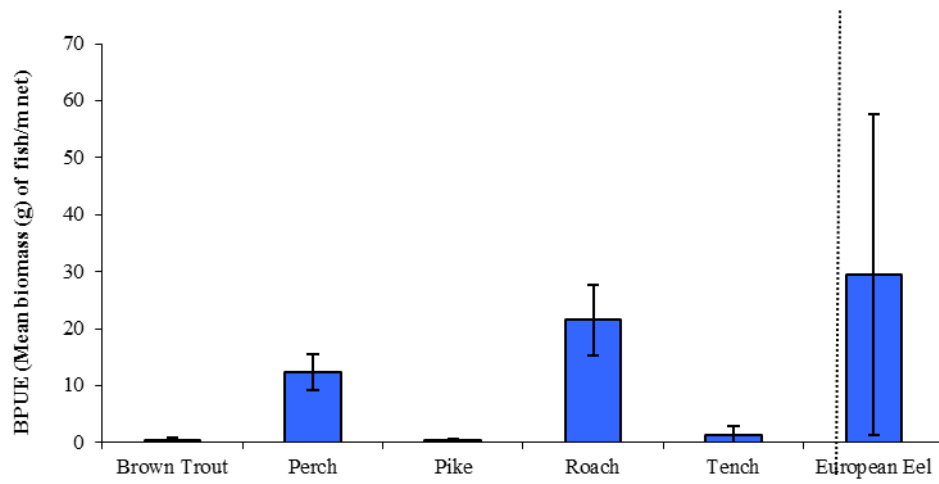


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Derryhick Lough in September 2016 (Eel BPUE based on fyke nets only)

1.3.3 Length frequency distributions and growth

Perch

Perch captured during the 2016 survey ranged in length from 4.1cm to 32.1 (mean = 10.2cm) (Fig.1.4). Perch were aged from 0+ to 7+ with all intervening age classes represented in the sample (Fig. 1.5). The dominant age class was 0+ (Fig. 1.4)

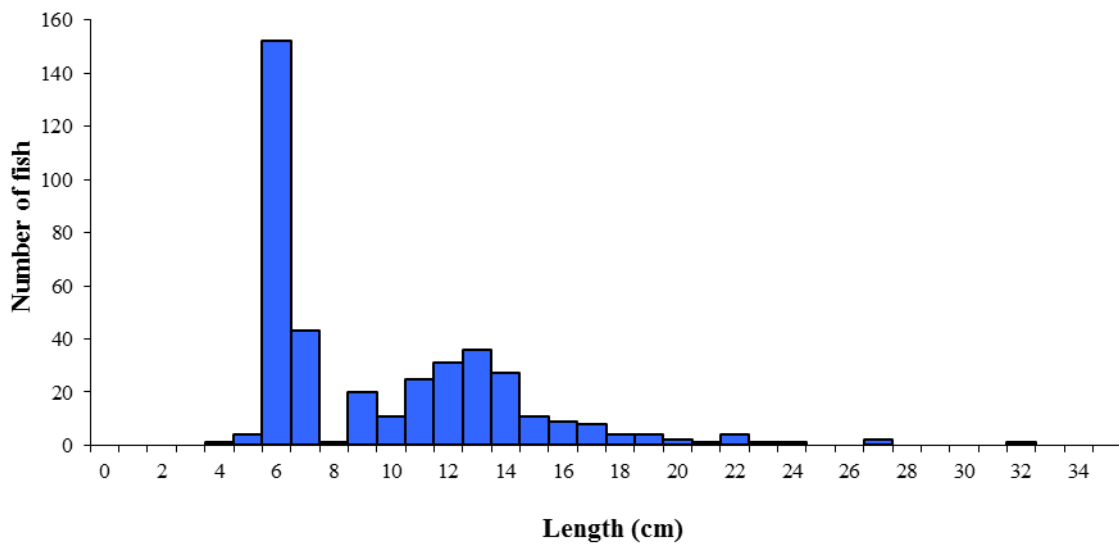


Fig. 1.4. Length frequency of perch captured on Derryhick Lough in September 2016

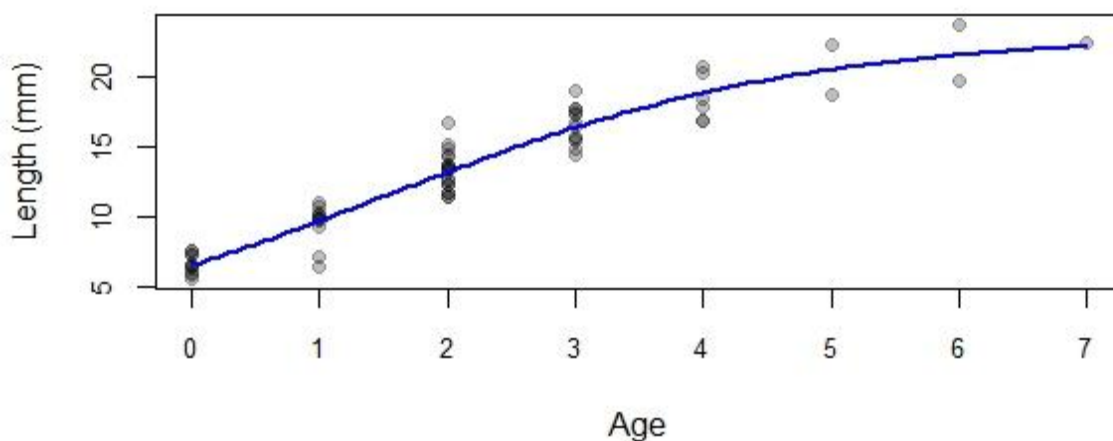


Fig. 1.5. Length at age for perch captured on Derryhick Lough in September 2016

Roach

Roach captured during the 2016 survey ranged in length from 4.8cm to 27.4cm (mean = 13.0cm) (Fig.1.6). Roach were aged from 1+ to 10+ and all intervening age classes were present in the sample. The dominant age class was 3+ (Fig. 1.7). The large proportion of smaller fish is indicative of successful recent recruitment.

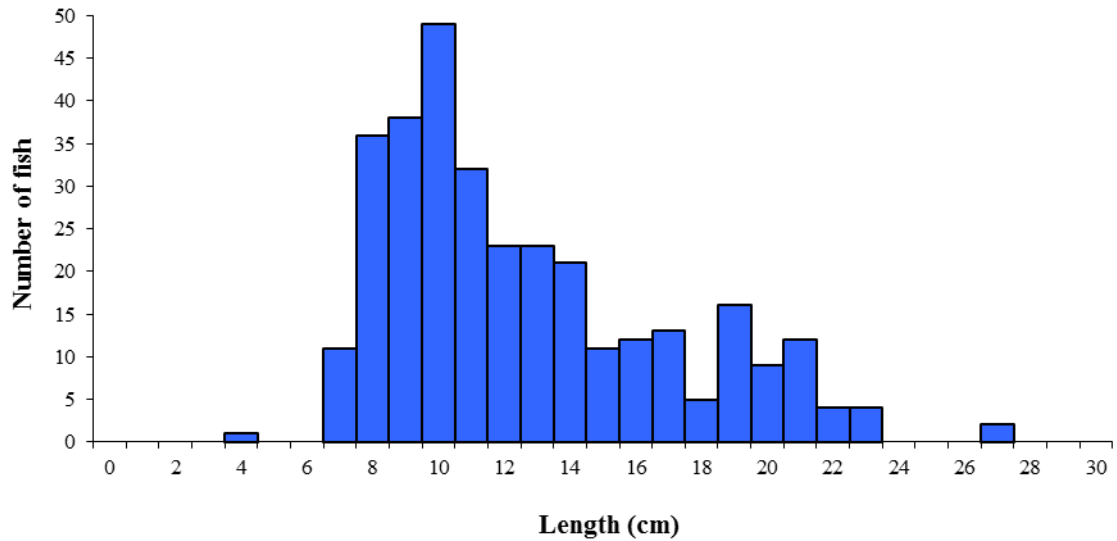


Fig. 1.6. Length frequency of roach captured on Derryhick Lough in September 2016

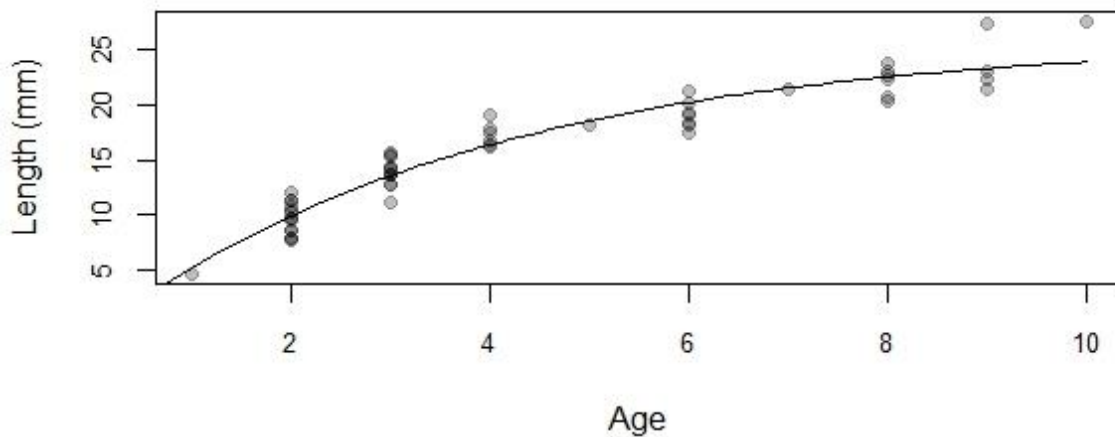


Fig. 1.7. Length at age of roach captured on Derryhick Lough in September 2016



Pike, trout and tench.

One pike, measuring 32.6 cm in length was captured. One brown trout, an individual of 30cm was captured. One tench (46.3cm in length) was recorded in the fyke nets.

Eel

Ten eels were recorded in the fyke nets. These ranged in length from 44.5 to 77.5 cm (mean 59.5cm).

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 64 perch stomachs were examined. Of these 39 were found to contain no prey items. Of the 25 stomachs containing food, eight (32%) were feeding on fish, seven (28%) contained invertebrates and ten (40%) contained unidentified digested material (Fig. 1.8).

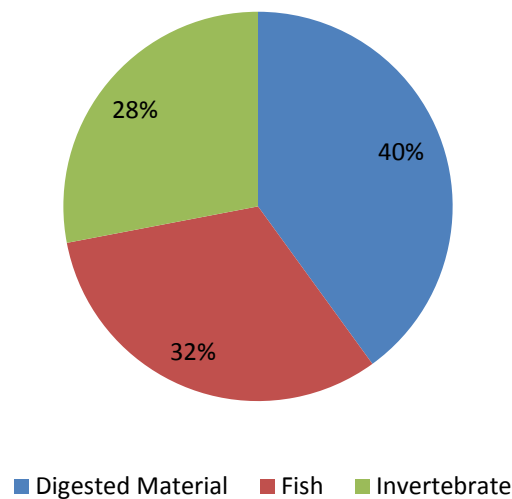


Fig. 1.8 Diet of perch captured on Derryhick Lough in September 2016 (% occurrence) n=25.

Fourteen empty stomachs are not presented.



1.4 Summary and ecological status

Six fish species were recorded during the 2016 survey of Derryhick Lough. These were, perch, roach, pike, trout tench and eel. Perch and roach dominated stocks with respect to both numbers and biomass. Stocks of both species were dominated by small individuals, with few large fish (> 25cm) recorded. A similar species mix was recorded during a survey of the lake conducted in 1996. On that occasion, however, no trout or tench were recorded. This was the first record of tench from the lake.

The lake has received regular stockings of pike from Lough Conn in recent years and is promoted as a pike fishery (anglers were pike fishing at the time of the survey). One pike (32.6cm) was captured during the survey. This corresponds to a CPUE of 0.001pike. Levally Lough for example, which was also surveyed in September 2016, and is also in the Lough Conn catchment recorded a CPUE of 0.005pike/net (Kelly *et al.*, 2017).

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.*, 2012). Using the FIL2 classification tool, Derryhick Lough has been assigned an ecological status of Good for 2016 based on the fish populations present.

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



1.5 References

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