

National Research Survey Programme

Lakes 2017

Derrybrick Lough

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Iascach Intíre Éireann
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National Research Survey Programme

**Fish Stock Survey of Derrybrick Lough,
August 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

Derrybrick Lough is located in the Erne catchment, north-east of Killeshandra and approximately five kilometres south-west of Belturbet. The lake is situated at an altitude of 48m above sea level, has a surface area of 36ha, a mean depth of 2.1m and a maximum depth of 4.9m. The lake is categorised as typology class 9 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), less than 50ha and high alkalinity (>100mg/l CaCO₃). Derrybrick Lough is located within the Lough Oughter and associated loughs Special Area of Conservation (NPWS, 2002). The geology of the area is predominantly Lower Carboniferous Limestone.

A previous survey by the Inland Fisheries Trust (IFT) in 1969 established rudd, bream, perch, pike and rudd x bream hybrids to be present in the lake (IFT, unpublished data). A second survey in August 1980 found that roach, rudd, bream, perch, pike and roach x bream hybrids were present (IFT, unpublished data). The lake was also surveyed by Inland Fisheries Ireland (formerly the Central Fisheries Board and the Northern Regional Fisheries Board) in 2005 as part of the NS Share Fish in Lakes project, and this survey found that roach followed by perch were the dominant fish species in the lake (Kelly *et al.*, 2007). Pike, roach x bream hybrids and eels were also present. Subsequent surveys were undertaken on Derrybrick Lough 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, perch were found to be the dominant species present in the lake. Roach, pike and 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 and IFI's national coarse fish and pike research programme.



Plate 1.1. Derrybrick Lough

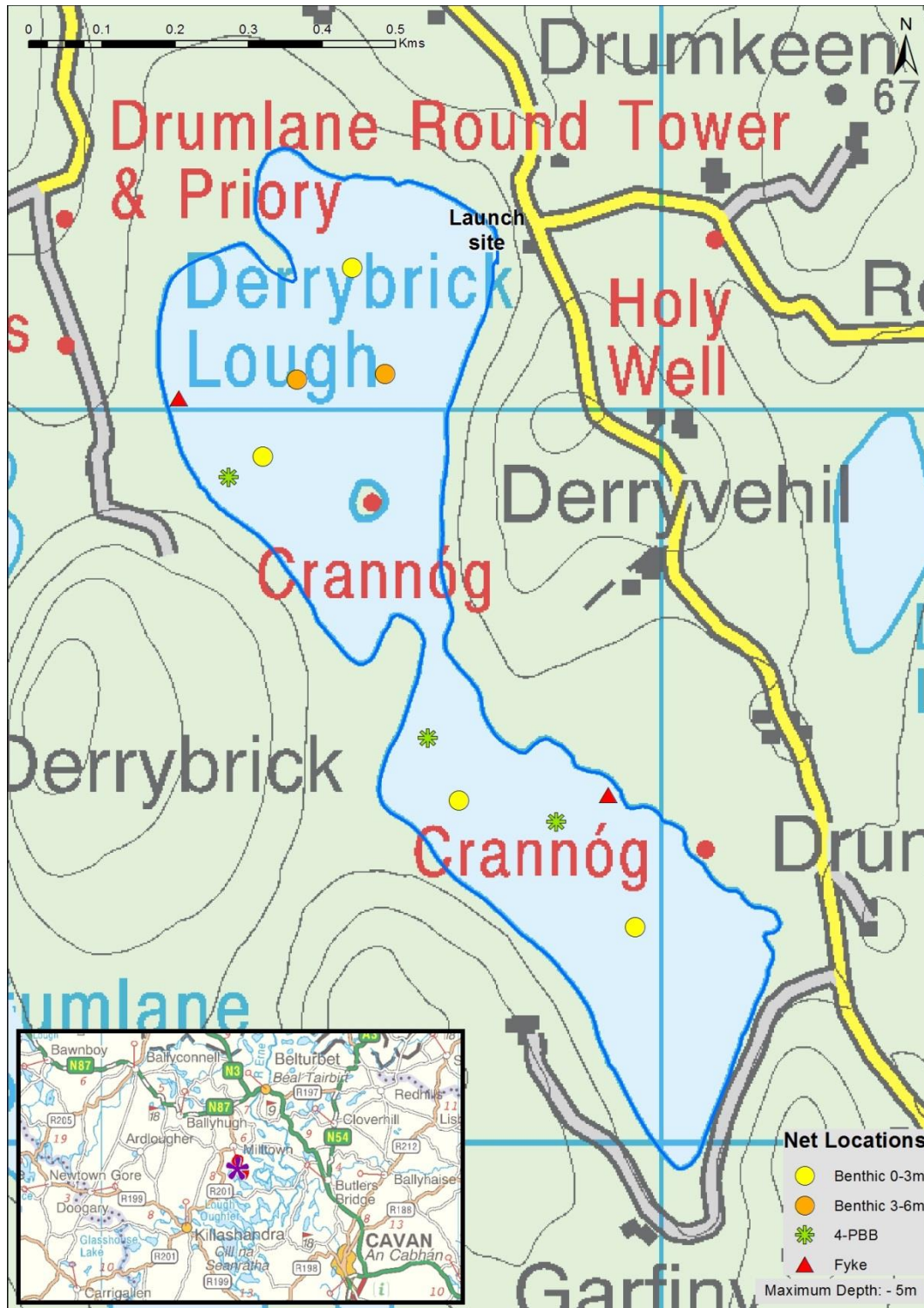


Fig. 1.1 Location map of Derrybrick Lough showing locations and depths of each



1.2 Methods

1.2.1 Netting methods

Derrybrick Lough was surveyed over one night on the 16th of August 2017. A total of two sets of Dutch fyke nets (Fyke) and six benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m and 2 @ 3-5.9m) were deployed in the lake (eight sites) (Fig. 1.1). The netting effort was supplemented using three four-panel benthic braided survey gill nets (4-PBB) at three additional sites (Fig. 1.1). The 4-PBB nets are composed of four 27.5m long panels each a different mesh size (55mm, 60mm, 70mm and 90mm knot to knot) tied together randomly. 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 apart from perch were measured and weighed on site and scales were removed from all 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 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 four fish species and one type of hybrid were recorded on Derrybrick Lough in August 2017, with 240 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Perch was the most common fish species recorded. Roach x bream hybrids, tench, pike and eels were also recorded. During the previous surveys in 2008, 2011 and 2014 the same species composition was recorded, with the exception of bream which were only recorded in 2008, roach x bream hybrids which were not recorded in 2014 and tench which were only recorded in 2017. In addition, roach were not captured in the 2017 survey (Kelly *et al.*, 2009, 2012a, 2015a and 2015b).

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

Scientific name	Common name	Number of fish captured			
		BM CEN	4-PBB	Fyke	Total
<i>Perca fluviatilis</i>	Perch	188	16	0	204
<i>Esox lucius</i>	Pike	2	2	1	5
<i>Rutilus rutilus</i> x <i>Abramis brama</i>	Roach x bream hybrid	17	2	0	19
<i>Tinca tinca</i>	Tench	0	10	0	10
<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 2017 survey are summarised in Table 1.2.

Perch was the dominant fish species in terms of abundance (CPUE) and tench was the dominant fish species in terms of biomass (BPUE) captured during the 2017 survey (Table 1.2).



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

Scientific name	Common name	Mean CPUE (\pm S.E) **
<i>Perca fluviatilis</i>	Perch	0.583 (0.386)
<i>Rutilus rutilus x Abramis brama</i>	Roach x bream hybrid	0.053 (0.048)
<i>Esox lucius</i>	Pike	0.009 (0.004)
<i>Tinca tinca</i>	Tench	0.008 (0.006)
<i>Anguilla anguilla</i>	European eel*	0.017 (0.017)
		Mean BPUE (\pm S.E) **
<i>Perca fluviatilis</i>	Perch	12.208 (6.830)
<i>Rutilus rutilus x Abramis brama</i>	Roach x bream hybrid	3.668 (3.615)
<i>Esox lucius</i>	Pike	4.919 (2.519)
<i>Tinca tinca</i>	Tench	16.311 (10.978)
<i>Anguilla anguilla</i>	European eel*	8.125 (8.125)

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

**CPUE and BPUE data above for all fish species except eels are not comparable to earlier surveys as extra panels were added to the 1-PBB to provide additional information on large fish.

The mean CPUE and BPUE (excluding the 55mm, 70mm and 90mm mesh panels of each 4-PBB) for all species captured in the 2008, 2011, 2014 and 2017 surveys are illustrated in Figures 1.2 and 1.3.

Although the mean perch 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).

The mean roach CPUE and BPUE also fluctuated slightly over the four sampling occasions; the main reason was that this species was not captured during the 2017 survey and therefore the CPUE and BPUE were significantly lower than 2008, 2011 and 2014 (Kruskal-Wallis $H=6.806$, $P<0.05$, $H=7.144$, $P<0.05$) (Table 1.2; Figs. 1.2 and 1.3).

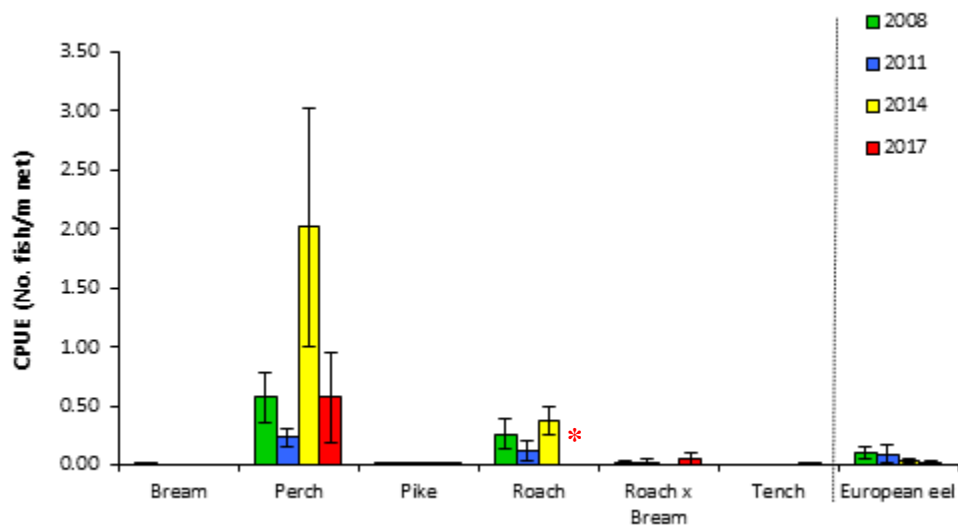


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Derrybrick Lough (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2017 (*roach were not recorded in 2017)

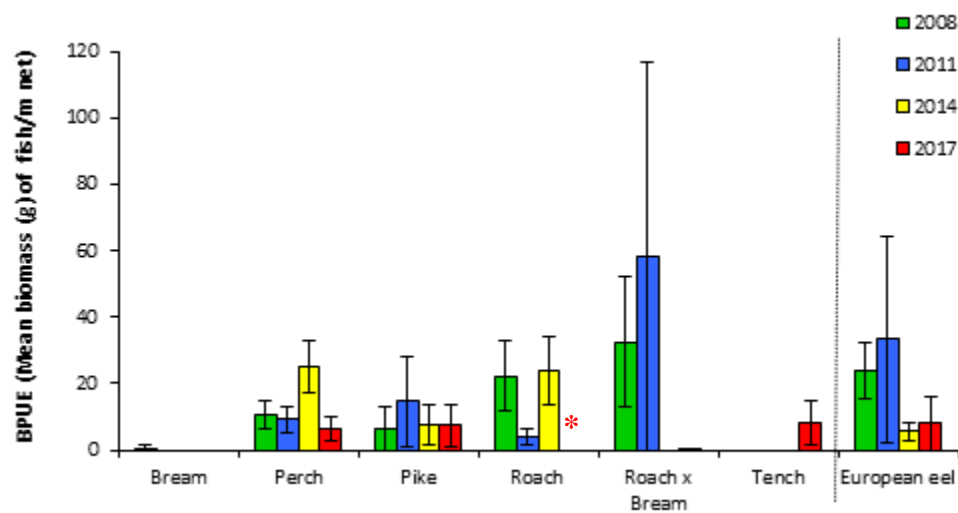


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Derrybrick Lough (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2017 (*roach were not recorded in 2017)

1.3.3 Length frequency distributions and growth

Perch

Perch captured during the 2017 survey ranged in length from 6.0cm to 37.5cm (mean = 9.9cm) (Fig.1.4) with three age classes present, ranging from 1+ to 4+ with a mean L1 of 6.1cm (Table 1.3). The dominant age class was 1+ (Fig. 1.4). Perch captured during the 2008, 2011 and 2014 surveys had a similar length and age range (Fig.1.4), with larger fish recorded in the 2017 survey.

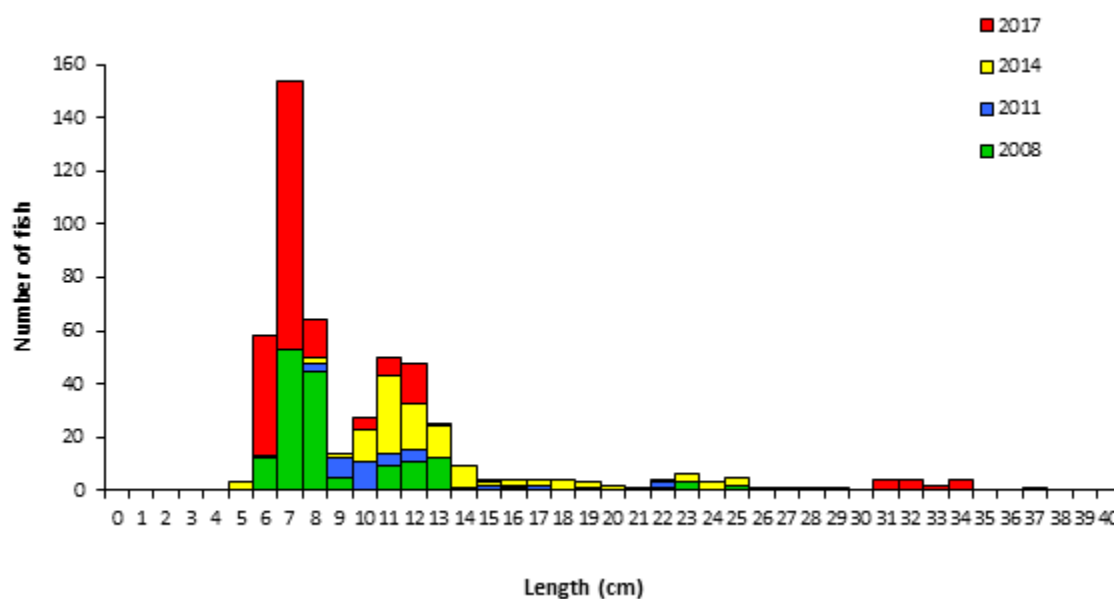


Fig. 1.4. Length frequency of perch captured on Derrybrick Lough, 2008, 2011, 2014 and 2017

Table 1.3. Mean (\pm S.E.) perch length (cm) at age for Derrybrick Lough, August 2017

	L ₁	L ₂	L ₃	L ₄
Mean (\pm S.E.)	6.1 (0.2)	9.8 (0.5)	9.5	10.4
N	26	11	1	1
Range	3.6-7.9	7.2-12.1	9.5-9.5	10.4-10.4



Other fish species

Two eels were captured during the 2017 survey and were measured at 59.7cm and 63.9cm. Tench ranged in length from 32.0cm to 52.0cm. Roach x bream hybrids ranged in length from 3.7cm to 48.7cm (aged 0+ to 20+) and pike ranged in length from 20.2cm to 73.0cm (aged 0+ to 4+).

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 perch captured during the survey were examined and are presented below.

Perch

Perch initially start to feed on pelagic zooplankton. Once they reach an intermediate size they start feeding on benthic resources eventually moving on to feed on fish once they are large enough (Hjelm *et al.*, 2000). A total of 25 stomachs were examined. Of these eight were empty and of the remaining 17 stomachs containing food, 59% contained invertebrates, 23% zooplankton, 12% unidentified digested material and 6% invertebrates/zooplankton (Fig. 1.6).

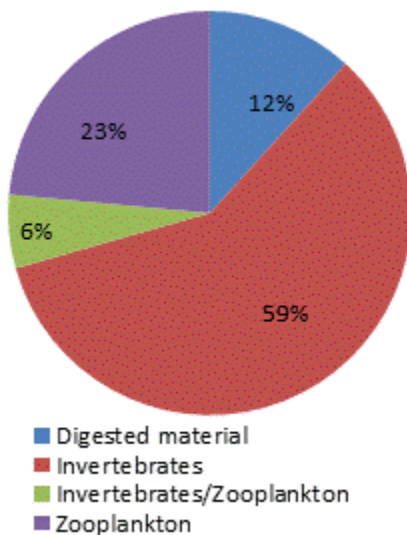


Fig 1.6. Diet of perch (n=17) captured on Derrybrick Lough, 2017 (% FO)



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**Inland Fisheries Ireland
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland.
D24 Y265**

**www.fisheriesireland.ie
info@fisheriesireland.ie**

+353 1 8842 600

