

National Research Survey Programme

Lakes 2021

Dromore Lough

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Iascach Intíre Éireann
Inland Fisheries Ireland

**Fish Stock Survey of Dromore Lough,
September 2021**



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Inland Fisheries Ireland**

National Research Survey Programme

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

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1. Introduction

Dromore Lough is a limestone rich water body located approximately 10km north of Ennis and 6km east of Corofin, County Clare (Plate 1.1 and Figure 1.1). It has a surface area of 49ha, a maximum depth of 20m and a mean depth of 5.9m. The main outflow from Dromore Lough to the River Fergus is via Black Lake (Figure 1.1). The lake is categorised as typology class 11 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. deep (mean depth >4 m), less than 50 ha and high alkalinity (>100 mg/l CaCO₃).

Dromore Lough is located in the Dromore Woods and Loughs Special Area of Conservation (NPWS, 2020). The lake is important both regionally and nationally as a waterfowl sanctuary. Dromore Lough and its surrounding area also provides important habitat for a number of mammal species such as pine marten, stoat and otter. One of the largest nursery colonies of the Lesser Horseshoe Bat in Ireland is located along the shores of Dromore Lough. This nursery is of international importance as the lesser horseshoe bat is a rare and endangered species listed on Annex II of the EU Habitats Directive (NPWS, 2020).

The lake holds tench, perch, rudd, pike and eels (IFT unpublished data). Historically, the lake has produced brown trout up to 2.5kg in weight (O' Reilly, 2007).

The lake has been surveyed on three occasions since 2009 (2009, 2012 and 2015) (Kelly *et al.*, 2010, Kelly *et al.*, 2013 and Kelly *et al.*, 2016). During these surveys, perch were the dominant species present in the lake. Rudd, pike and eels have also been captured.

This report summarises the results of the 2021 fish stock survey carried out on the lake using Inland Fisheries Ireland's fish in lakes monitoring protocol. The protocol is WFD compliant and also provides insight into fish stock status in the lake.



Plate 1.1. Dromore Lough

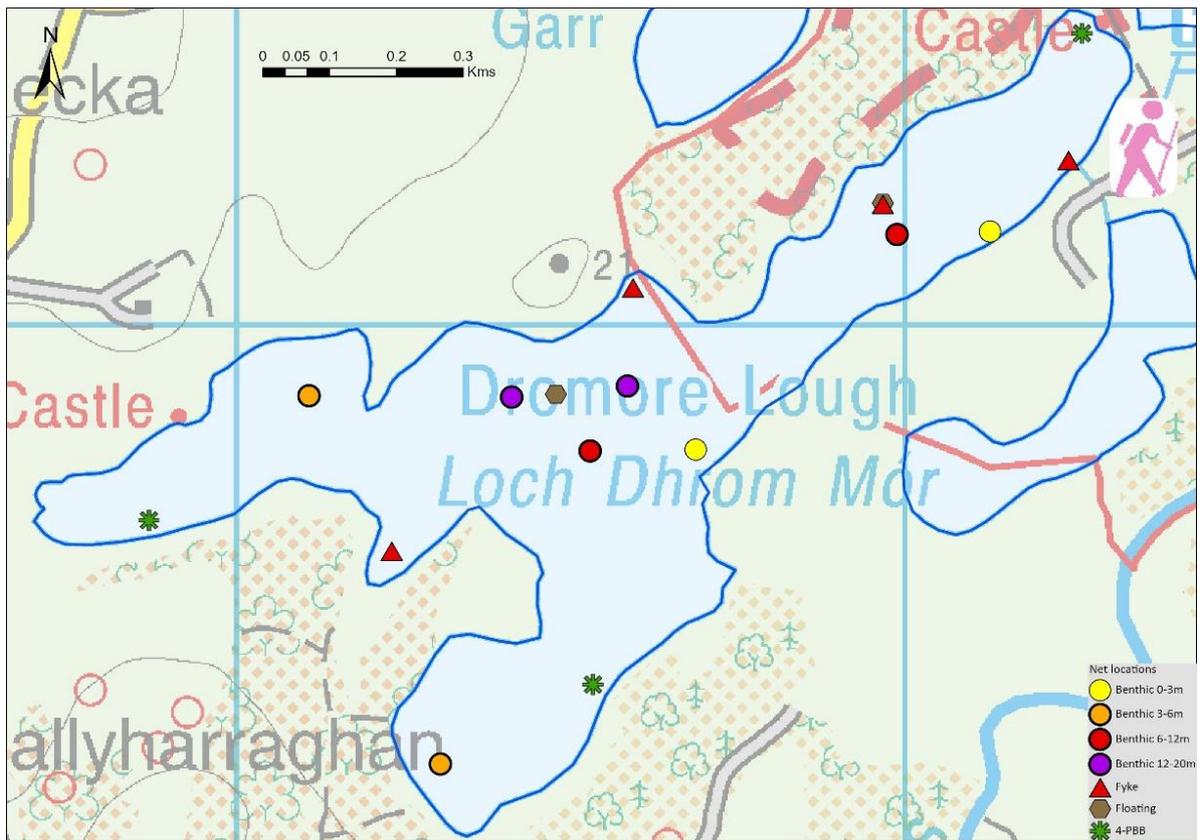


Figure 1.1. Location map of Dromore Lough showing locations and depths of each net (outflow is indicated on map)

2. Methods

2.1. Netting methods

Dromore Lough was surveyed over one night on the 13th of September 2021. A total of three sets of Dutch fyke nets, eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh knot to knot) CEN standard survey gill nets (BM CEN) (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m, 2 @ 12-19.9m and 2 @ 20-34.9m) and two surface monofilament multi-mesh (FM CEN) (12 panel, 5-55mm mesh knot to knot) CEN standard survey gill nets were deployed in the lake (13 sites). The netting effort was supplemented using four-panel benthic braided survey gill nets (4-PBB) at three additional sites. The four-panel survey gill nets are composed of four 27.5m long panels each a different mesh size (55mm, 60mm, 70mm and 90mm knot to knot). These nets were deployed in random locations throughout the lake. 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 a subsample of other species except eels. 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.

2.3. 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).

$$FO_i = \left(\frac{N_i}{N} \right) * 100$$

Where:

FO_i is the percentage frequency of prey item i ,

N_i is the number of fish with prey i in their stomach,

N is total number of fish with stomach contents.

2.3. Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment 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.

3. Results

3.1. Species Richness

Five fish species were recorded on Dromore Lough in September 2021. A total of 549 fish were captured. The number of each species captured by each gear type is shown in Table 3.1. Perch was the most abundant fish species recorded, accounting for more than 95% of all fish captured during the survey. Rudd, eels, pike and tench were also captured (Table 3.1).

Table 3.1. Number of each fish species captured by each gear type during the survey on Dromore Lough, September 2021.

Scientific name	Common name	Number of fish captured				
		BM CEN	FM CEN	4-PBB	Fyke	Total
<i>Perca fluviatilis</i>	Perch	495	16	0	8	519
<i>Scardinius erythrophthalmus</i>	Rudd	0	12	0	0	12
<i>Esox lucius</i>	Pike	4	0	0	3	7
<i>Tinca tinca</i>	Tench	0	0	2	0	2
<i>Anguilla anguilla</i>	Eel	0	0	0	9	9

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. In 2021, perch was by far the dominant fish species both in terms of abundance (CPUE) and biomass (BPUE) (Table 3.2).

For comparison purposes CPUE and BPUE for each species captured per net type in all surveys per net type between 2009 and 2021 are presented in Figures 3.1 and 3.2 respectively and illustrates fish community change over time. Perch have strongly dominated catches across all survey periods, with all other species recorded in comparatively smaller numbers. The apparent increase in perch numbers in 2021 was driven by the capture of large numbers of 0+ fish. There was an apparent downward trend in the catch of eel in fyke nets between 2009 and 2021 (Figure 3.1 and 3.2).

Table 3.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Dromore Lough, 2021

Scientific name	Common name	Mean CPUE (\pm S.E)	Mean BPUE (\pm S.E)
<i>Perca fluviatilis</i>	Perch	1.073 (0.416)	17.576 (8.514)
<i>Scardinius erythrophthalmus</i>	Rudd	0.025 (0.021)	1.708 (1.589)
<i>Esox lucius</i>	Pike	0.011 (0.006)	4.003 (2.270)
<i>Tinca tinca</i>	Tench	0.001 (0.001)	0.537 (0.537)
<i>Anguilla Anguilla</i> *	Eel	0.050 (0.010)	13.599 (3.482)

Note: Where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species (O'Connor *et al.* 2017). *Eel CPUE and BPUE based on fyke nets only



Plate 3.1. Dromore Castle, on the north-eastern shore of the lake

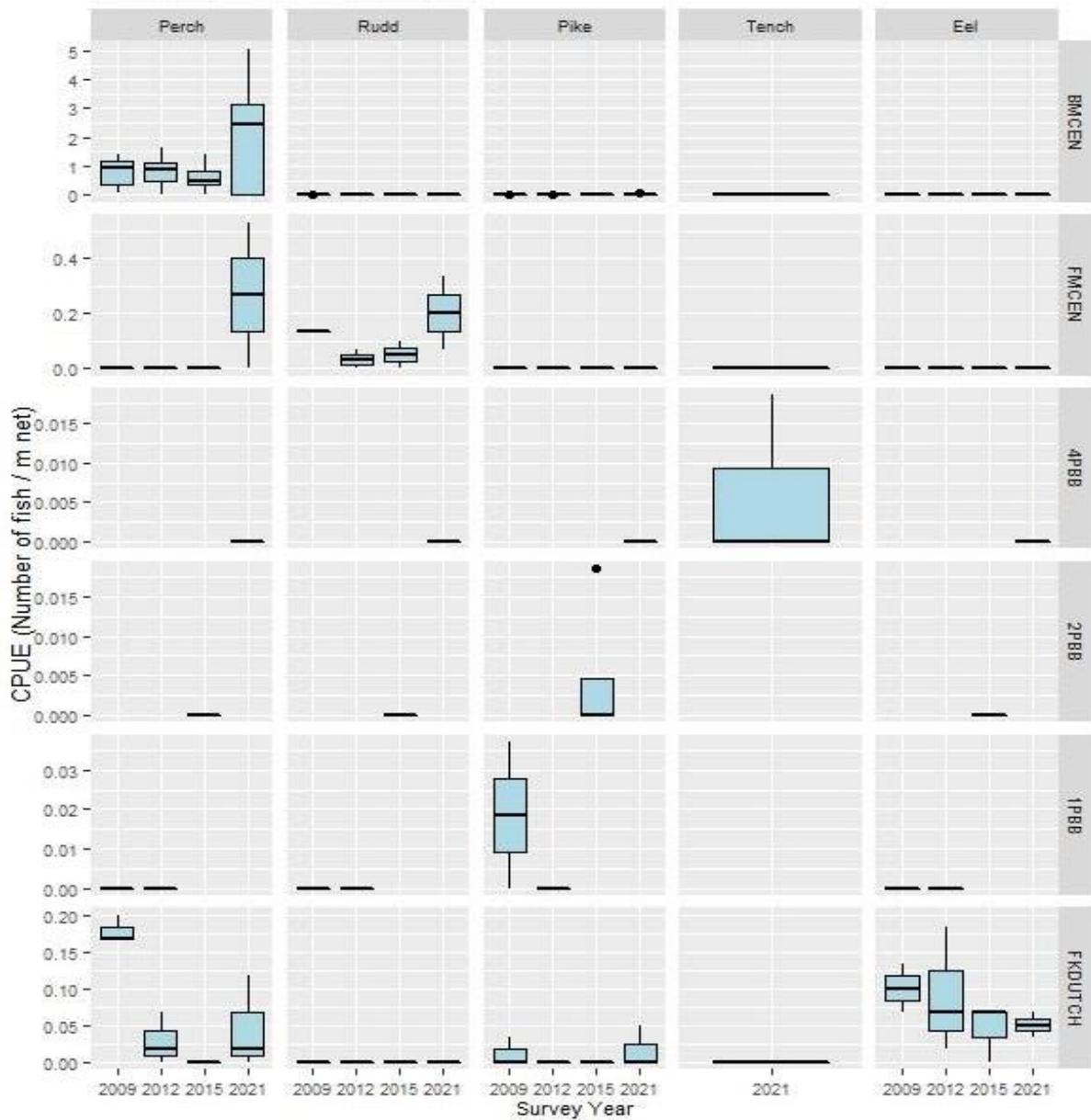


Figure 3.1. CPUE of all fish species captured in each net type during surveys of Dromore Lough between 2009 and 2021. Figures are expressed as number of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots. The y axis (CPUE) is unique for each net type.

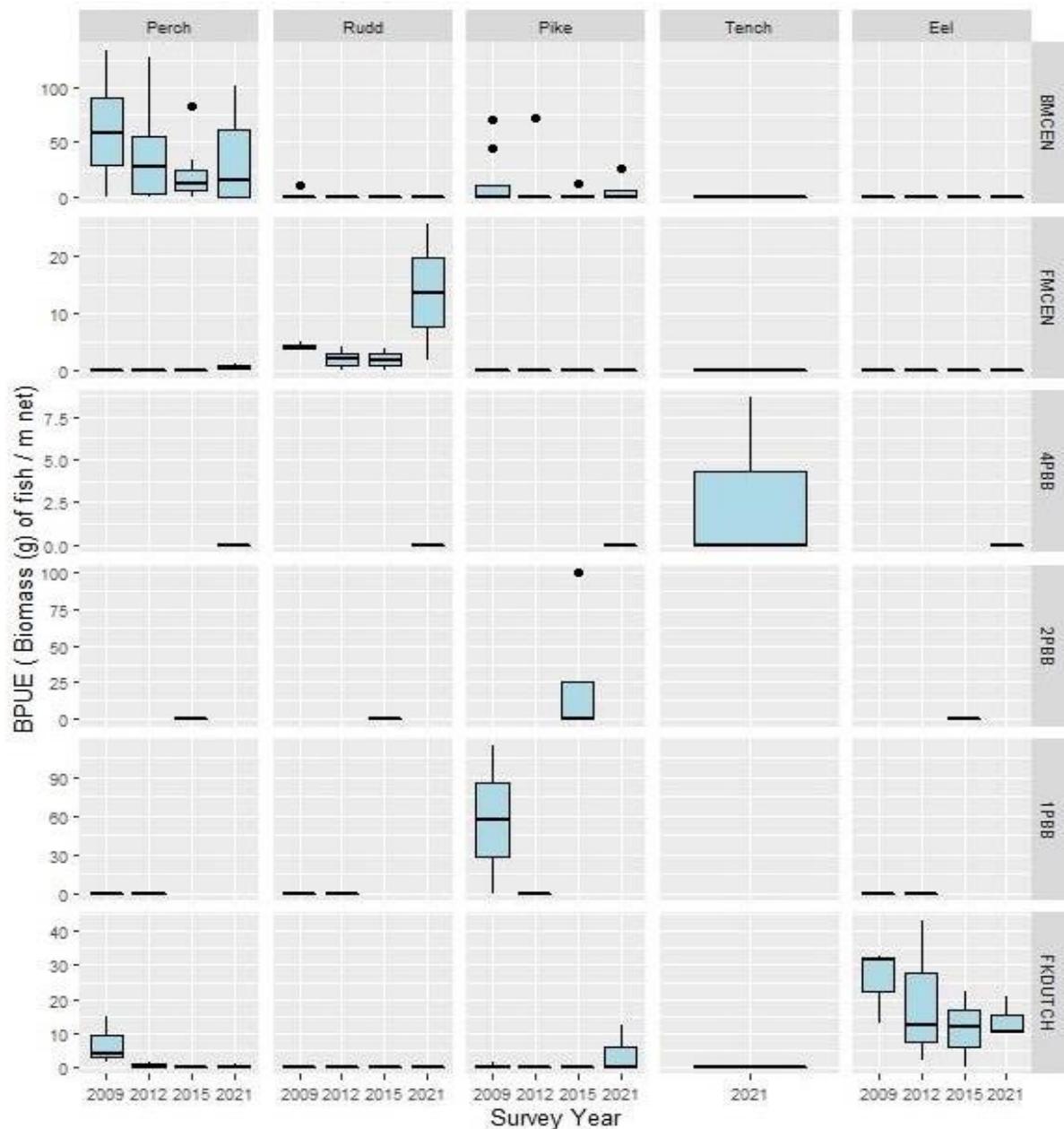


Figure 3.2. BPUE of all fish species captured in each net type during surveys of Dromore Lough between 2009 and 2021. Figures are expressed as biomass (g) of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical ‘whiskers’ show the data range. Outliers are marked by dots. The y axis (BPUE) is unique for each net type.

3.3. Length frequency distributions and growth

Perch

Perch captured during the 2021 survey ranged in length from 5.0cm to 23.0cm (mean = 8.2cm) (Figure 3.3). Five age classes were present in the sample aged, ranging from 0+ to 5+ (Table 3.3). In 2021 the population was strongly dominated by 0+ (young of the year) (Figure 3.3). This cohort was more prominent, and there were proportionally less fish greater than 20cm in length in this survey compared to previous surveys of the lake (Figure 3.3).

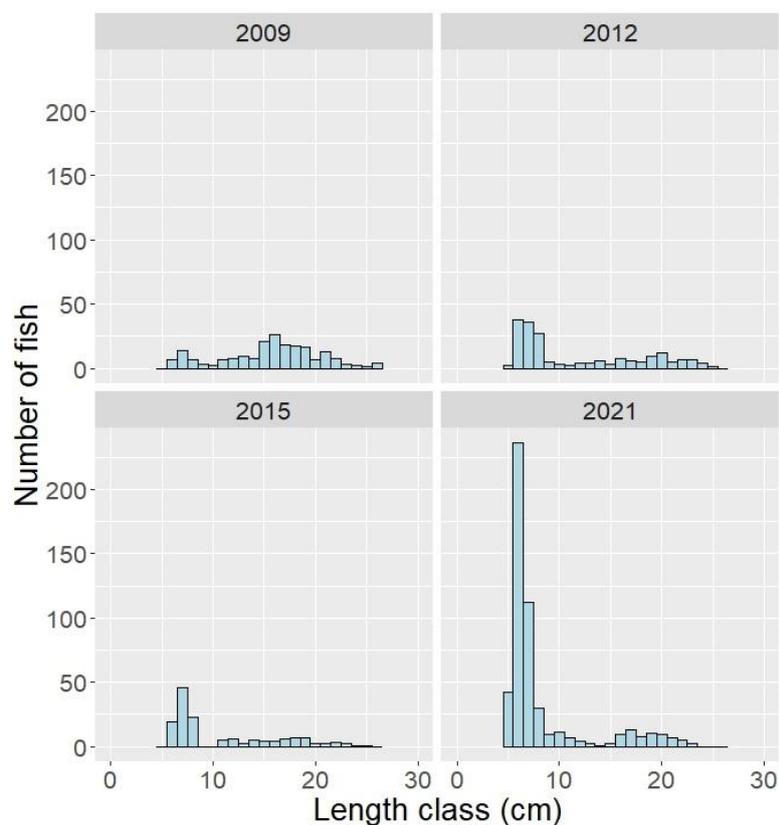


Figure 3.3. Length frequency of perch captured on Dromore Lough, 2009, 2012, 2015 and 2021

Table 3.3. Summary age data from perch captured on on Dromore Lough, September 2021. Number (N) of fish and length ranges of all fish aged in the sample is presented.

	Age Class					
	0+	1+	2+	3+	4+	5+
N	7	20	6	15	3	3
Mean L (cm)	6.7	9.1	12.0	17.2	19.9	17.0
Min L (cm)	5.8	6.2	10.5	15.3	19.1	6.6
Max L (cm)	8.8	12.8	14.3	20.8	21.4	22.6

Other Species

Twelve rudd ranged in length from 7.3cm to 22.3cm (mean = 14.1cm). Seven pike captured ranged in length from 23.1cm to 46.0cm (mean = 32.8cm). Two tench were captured in the current survey. Both tench measured 29.5cm.

Nine eels were captured during the 2021 survey. They ranged in length from 38.0cm to 63.0cm (mean = 52.9cm).

3.4. Stomach and diet analysis

The dietary analysis conducted provides insight to the prey of examined fish immediately prior to capture. Longer term and seasonal studies provide a more robust assessment of fish diet.

A subsample of 75 perch stomachs captured during the survey were examined, with 31 empty. The food items recorded in the remaining 44 stomachs were dominated by unidentified digested material and fish remains (Figure 3.4).

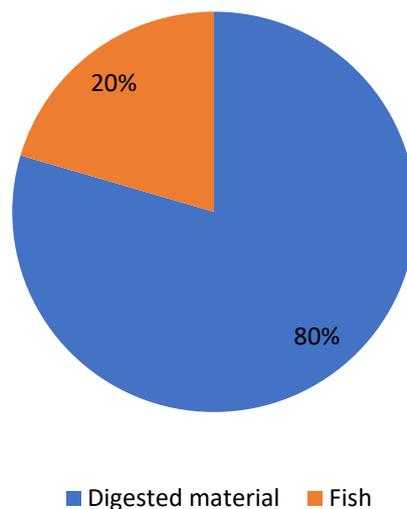


Figure 3.4. Diet of perch (n = 44) captured on Dromore Lough 2021 (% frequency occurrence)

Pike

Four pike stomachs were available for analysis. All pike contained fish prey. Perch were found in the stomach of three pike (23.cm to 44.9cm). The remaining pike (46cm) contained unidentified fish prey.

4. Summary and ecological status

Perch was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2021 survey. This species represented approximately 95% of all fish captured during the survey. In 2021, the population was strongly dominated by 0+ perch at the end of their first growing season. Recruitment had been regular, and all year classes between 0+ and 5+ were recorded.

In common with previous surveys of the lake, rudd, pike and eel were also captured. Tench were known to occur in the lake but had not previously been recorded in surveys conducted since 2009.

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, Dromore Lough has been assigned an ecological status of High for 2021 (Figure 3.5). In previous years the lake was assigned Good fish ecological status in 2009 and High in 2012 and 2015 (Figure. 4.1).

In the 2013 to 2018 surveillance monitoring reporting period, the EPA assigned Dromore Lough an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised during 2022.

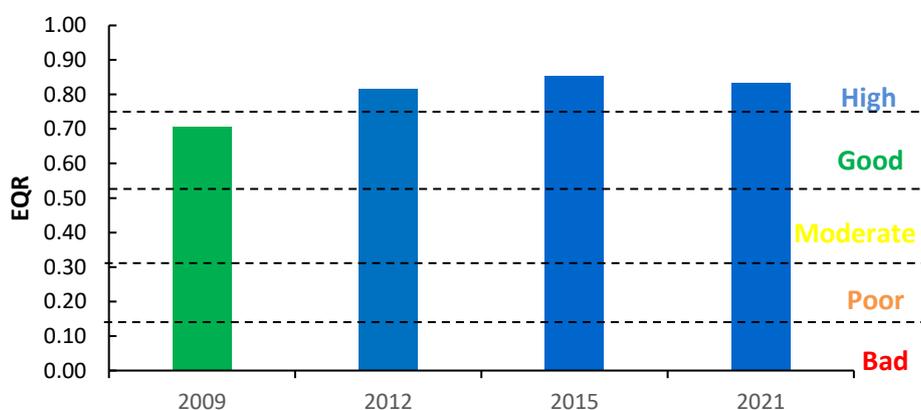


Figure 4.1 Fish ecological status of Dromore Lough, 2009, 2012, 2015 and 2021.

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