National Research Survey Programme

Lakes 2021

Lattone Lough

IFI/2022/1-4599

Iascach Intíre Éireann
Inland Fisheries Ireland

Fish Stock Survey of Lattone Lough, September 2021

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National Research Survey Programme

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

CITATION: McLoone, P., Corcoran, W., Bateman, A., Cierpial, D., Gavin, A., Gordon, P., McCarthy, E., Twomey, C., Burke, E., Matson, R., Robson, S., Duffy, P., Donovan, R. and Kelly, F.L. (2022) Fish Stock Survey of Lattone Lough, September 2021. National Research Survey Programme, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

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ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of all their colleagues in Inland Fisheries Ireland and for the assistance of the staff of Agri-food and Biosciences Institute, Northern Ireland (AFBI NI).

The authors would also like to acknowledge the funding provided for the programme from the Department of Housing, Local Government and Heritage and Department of Communications, Climate Action and Environment for 2022.

1. Introduction

Lattone Lough lies along the B52 Garrison-Belcoo road, almost 9km from Garrison, Co. Fermanagh (Plate 1.1 and Figure 1.1). It is divided almost equally in a north-west/south-east direction by the Northern Ireland/Republic of Ireland border.

Lattone Lough is located within the Garrison Lowlands Landscape Character Area (NIEA, 2010) and the Lough Melvin catchment. The lake has a surface area of 32ha, a mean depth > 4m and a maximum depth of 14.7m. The lake falls into typology class 7 (as designated by the EPA for the Water Framework Directive), i.e. deep (>4m), less than 50ha and moderate alkalinity (20-100mg/l $CaCO_3$).

It holds a stock of brown trout averaging (0.5lb) (0.23kg) (O'Reilly, 2007). The lake has recently been developed as a coarse fishery, and access for angling has been provided along the northern shore of the lake.

Lattone Lough has been surveyed on three occasions (2005, 2010 and 2013) since 2005 (Kelly *et al.*, 2007, 2011 and 2014). Perch was the dominant species recorded on each occasion (Kelly *et al*., 2014). Brown trout and eels were recorded on all three previous sampling occasions. One pike was captured in 2005, but this species has not been reported in subsequent surveys of the lake. The cyprinids, roach, bream, roach x bream hybrids and tench were all recorded for the first time in 2010.

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. Setting a fyke net on Lattone Lough, September 2021

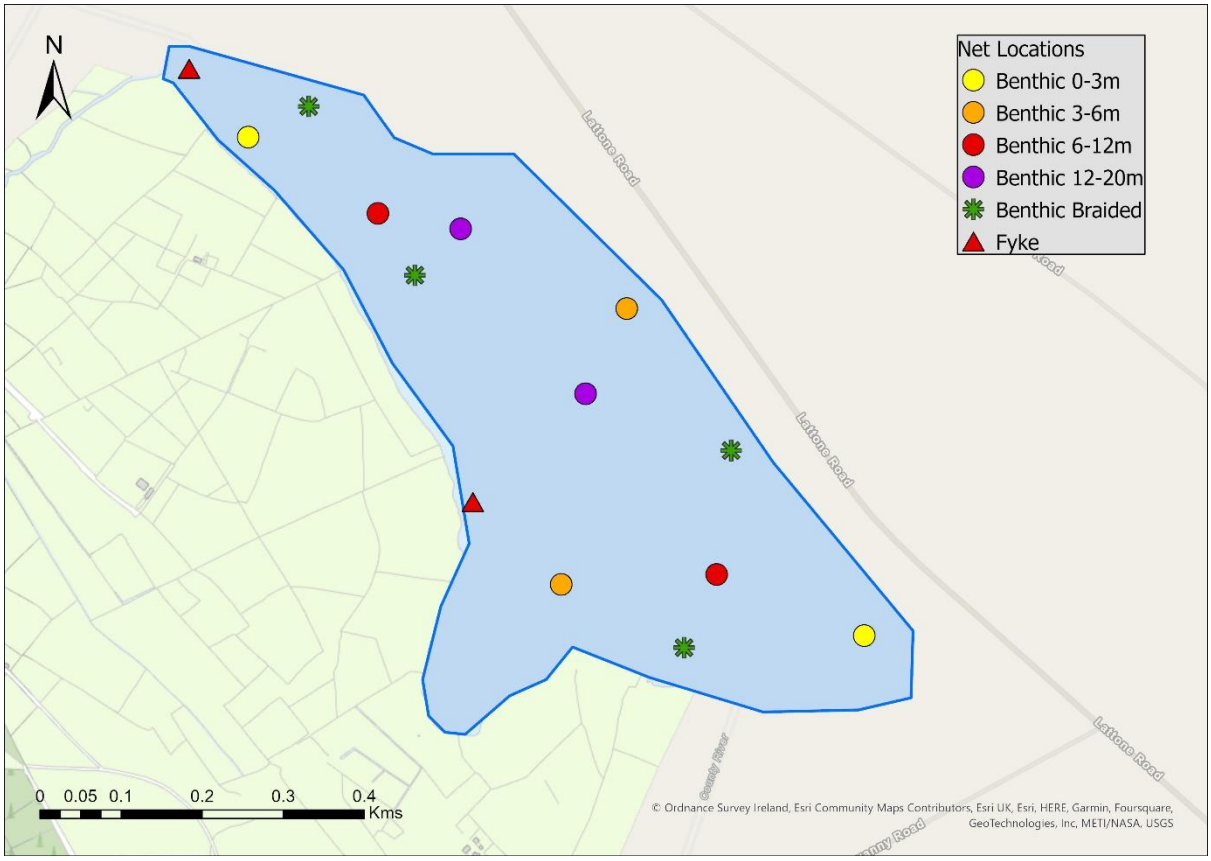

Figure 1.1. Location map of Lattone Lough showing net locations and depths of each net

2. Methods

2.1. Netting methods

Lattone Lough was surveyed over one night from the 20th to the 21st of September 2021. A total of two sets of Dutch fyke nets and eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (BM CEN) (2 @ 0-2.9m, 2 @ 3-5.9m, 2 @ 6-11.9m and 2 @ 12-19.9m) were deployed in the lake (10 sites). The netting effort was supplemented using four-panel benthic braided survey gill nets (4-PBB) at four 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 survey 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 sub-sample 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.

2.2. 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).

$$\mathbf{FO}_i = \left(\frac{\boldsymbol{N}_i}{\boldsymbol{N}}\right) * \mathbf{100}$$

Where:
$\mathbf{FO}_i$ is the percentage frequency of prey item i,
$\boldsymbol{N}_i$ is the number of fish with prey i in their stomach,
$\boldsymbol{N}$ 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

Four fish species and one type of hybrid were recorded on Lattone Lough in September 2021. A total of 180 fish were captured. The number of each species captured by each gear type is shown in Table 3.1. Roach was the most abundant fish species recorded. Perch, bream, roach x bream hybrids and brown trout were also captured.

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

Scientific name	Common name	Number of fish captured			
		BM CEN	4-PBB	Fyke	Total
Rutilus rutilus	Roach	114	0	3	117
Perca fluviatilis	Perch	35	1	0	36
Abramis brama	Bream	9	5	0	14
Rutilus rutilus x Abramis brama	Roach x bream hybrid	9	0	0	9
Salmo trutta	Brown trout	3	1	0	4

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 roach was the dominant species with respect to both abundance and biomass (Table 3.2).

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

Scientific name	Common name	Mean CPUE (± S.E)	Mean BPUE (± S.E)
Rutilus rutilus	Roach	0.275 (0.129)	11.611 (5.251)
Perca fluviatilis	Perch	0.084 (0.037)	2.550 (1.234)
Abramis brama	Bream	0.025 (0.013)	5.736 (2.346)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.021 (0.019)	3.665 (3.103)
Salmo trutta	Brown trout	0.008 (0.004)	2.289 (1.082)

Note: 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

For comparison purposes CPUE and BPUE for each species captured in all surveys, per net type, between 2005 and 2021 are presented in Figures 3.1 (a and b) and 3.2 (and b) respectively and illustrates fish community change over time. A change in fish stock structure, from perch to roach

dominance (abundance and biomass), has been observed since the previous surveys. Roach were not recorded in 2006, and were present in only small numbers in 2010 and 2013; while numbers and biomass of perch have declined in 2021 compared to earlier surveys (Figures 3.1a and 3.1b). There was an apparent decline in both numbers and biomass of brown trout captured across all survey occasions. Eel CPUE and BPUE has fluctuated widely, and no eel were recorded in 2021 (Figures 3.2a and 3.2b)

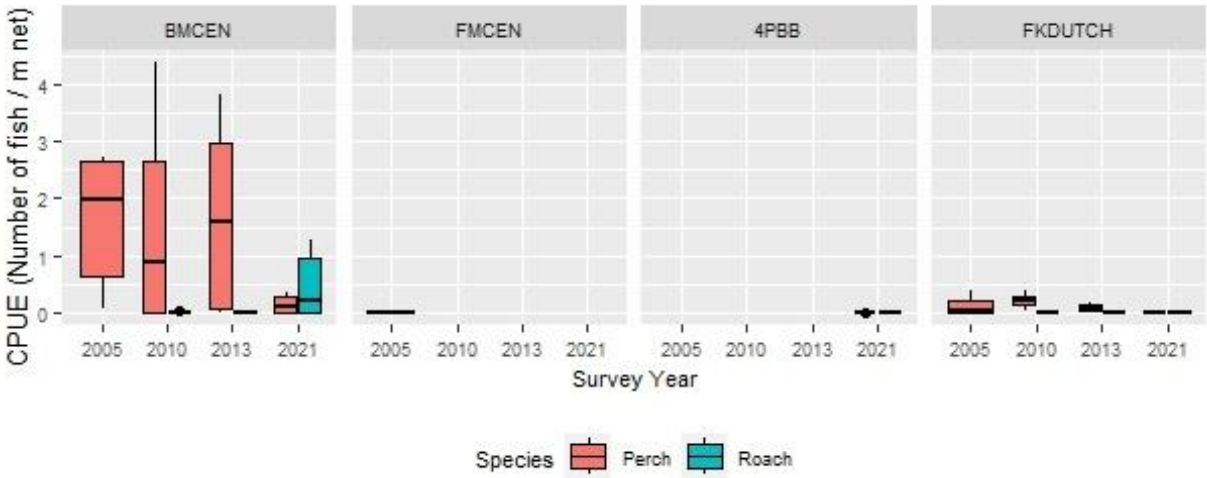

Figure 3.1a. CPUE (numbers of fish captured per linear meter of net) of perch and roach captured in each net type during surveys of Lattone Lough between 2005 and 2021. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

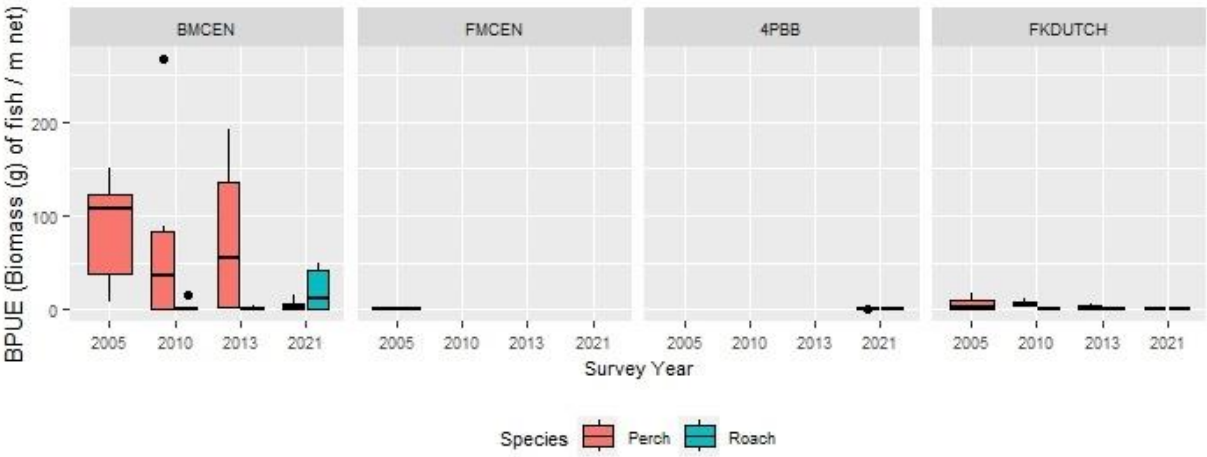

Figure 3.1b. BPUE (biomass (g) of fish captured per linear meter of net) of perch and roach captured in each enet type during surveys of Lattone Lough between 2005 and 2021. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

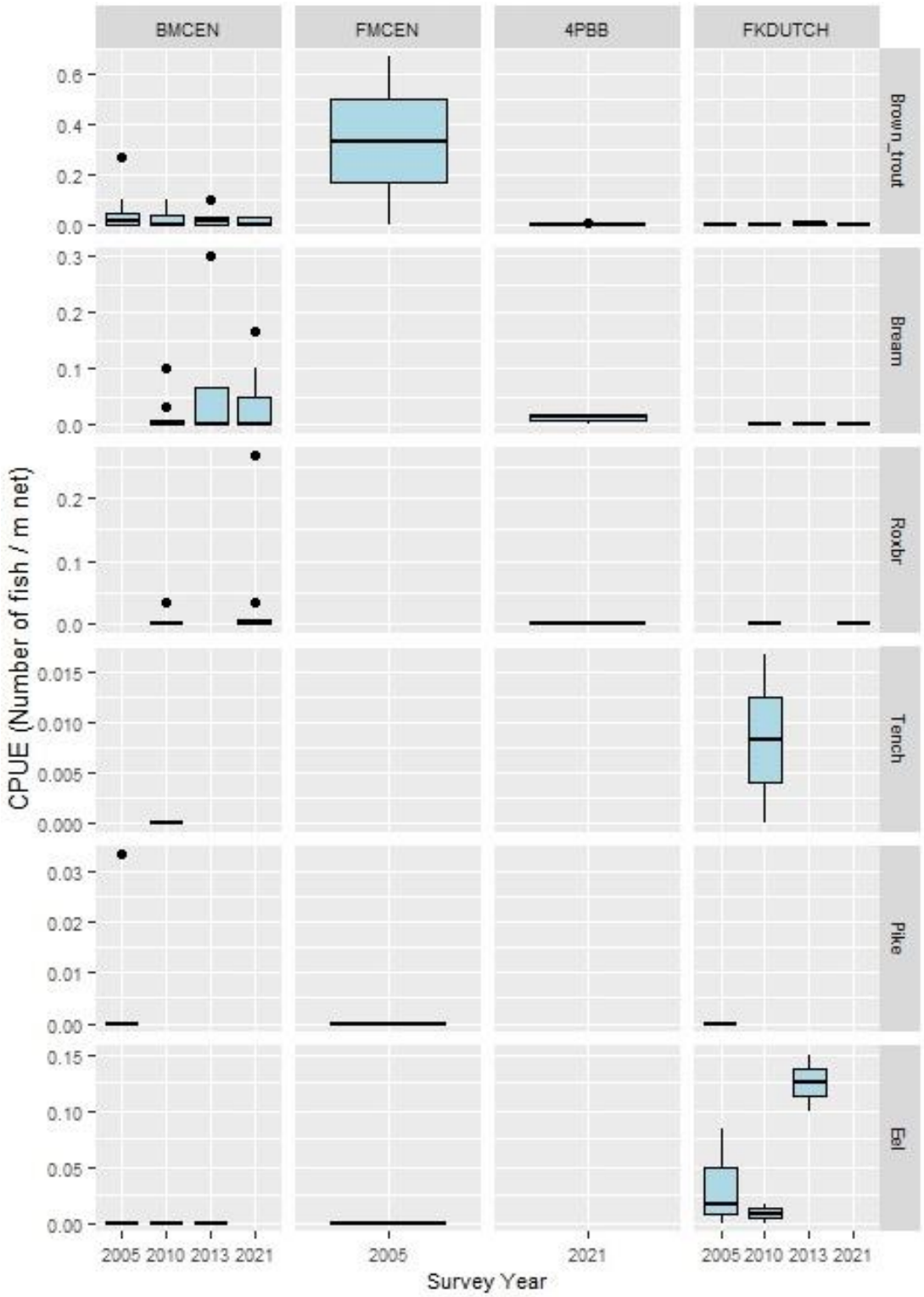

Figure 3.2a. CPUE (numbers of fish captured per linear meter of net) of brown trout and other species captured in each net type during surveys of Lattone Lough between 2005 and 2021. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

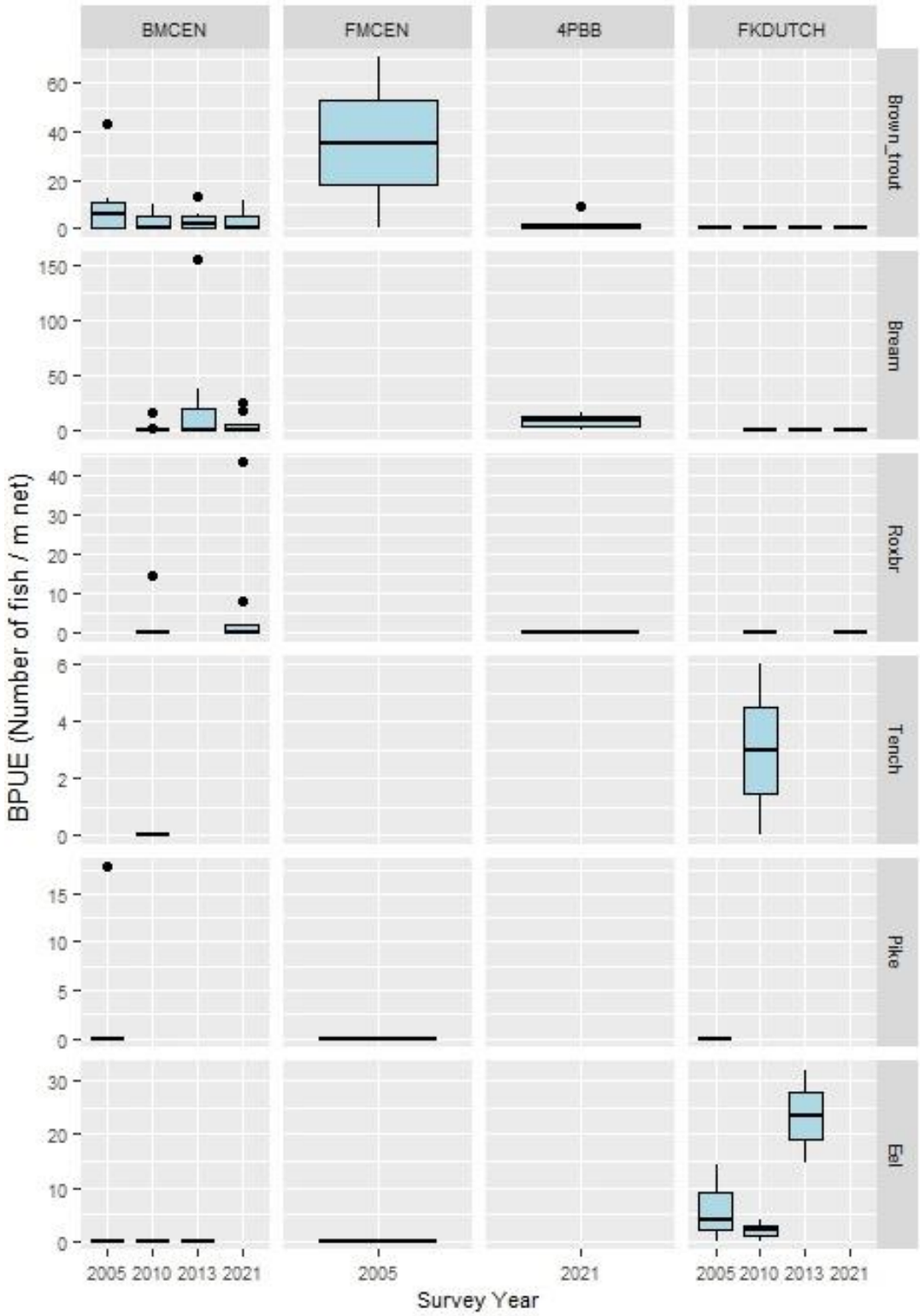

Figure 3.2b. BPUE (biomass (g) of fish captured per linear meter of net) of brown trout and other species captured in each net type during surveys of Lattone Lough between 2005 and 2021. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the 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

Roach

Roach captured during the 2021 survey ranged in length from 8.0cm to 20.3cm (mean = 13.2cm) (Figure 3.3). Roach were aged between 2+ and 6+. All intervening age classes were represented in the sample aged. However, no 1+ fish were recorded (Table 3.3). The population was dominated by fish aged between 2+ and 5+. Roach were first recorded in the lake in 2010. Both the number and length range of roach captured in 2021 has expanded since that time (Figure 3.3).

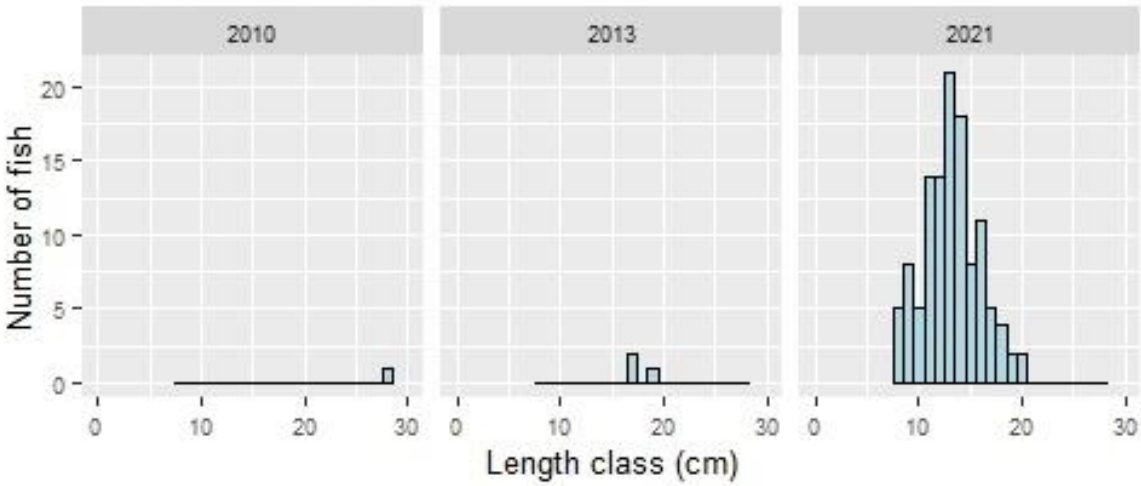

Figure 3.3. Length frequency of roach captured on Lattone Lough, 2010, 2013 and 2021. Roach were recorded for the first time by IFI in Lattone Lough in 2010.

Table 3.3. Summary age data from roach captured on Lattone 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+**	**6+**
N	0	0	12	22	10	2	3
Mean L (cm)	-	-	10.3	13.5	16.9	18.7	19.6
Min L (cm)	-	-	8.6	9.9	16.0	18.7	18.3
Max L (cm)	-	-	12.2	15.6	17.9	18.7	20.3

Perch

Perch captured during the 2021 survey ranged in length from 6.6cm to 24.6cm (mean = 11.2cm) (Figure 3.4). Six age classes were present, ranging from 0+ to 5+. Mean L1 (i.e. length at the end of the first year) was 5.4cm (Table 3.4). Relatively few perch were captured in 2021 compared to earlier surveys, and no strong year groups are apparent (Figure 3.4)

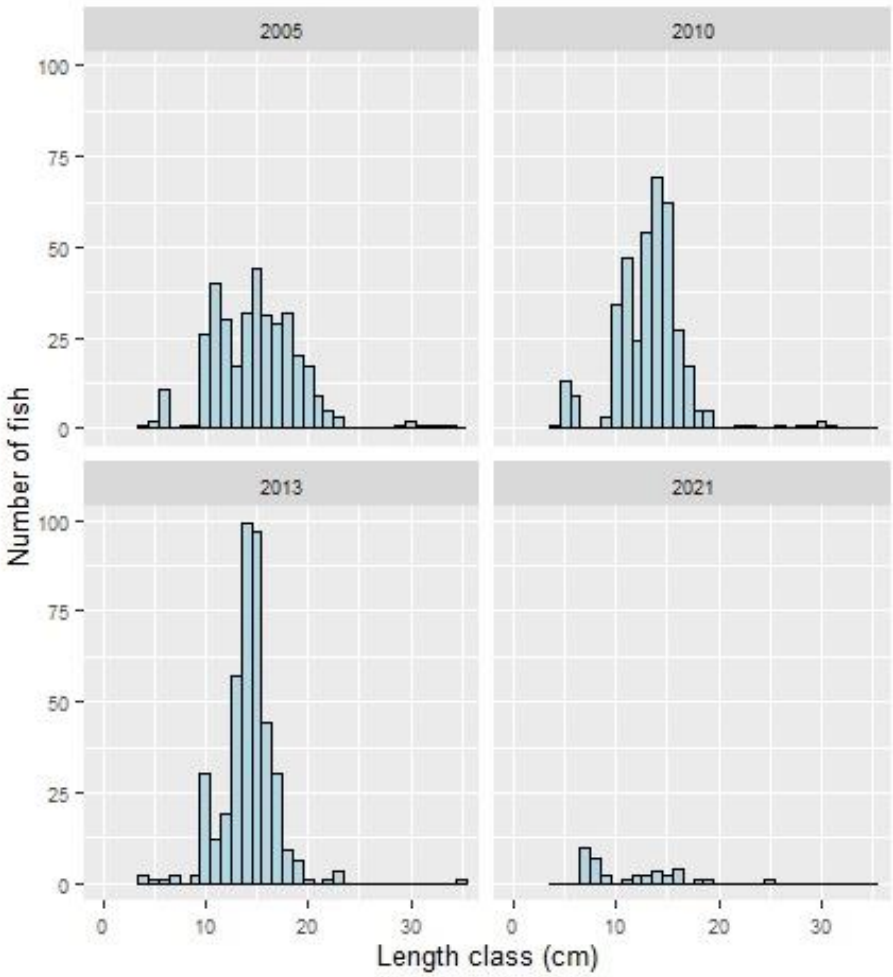

Figure 3.4. Length frequency of perch captured on Lattone Lough, 2005, 2010, 2013 and 2021

Table 3.4. Mean (±S.E.) perch length (cm) at age Lattone Lough, September 2021

	L_1	L_2	L_3	L_4	L_5
Mean (±S.E.)	5.4 (0.2)	10.7 (0.2)	15.1 (0.8)	17.9 (1.5)	19.3 (4.2)
N	16	13	5	4	2
Range	4.3-7.3	8.8-12.1	13.2-17.8	14.3-21.7	15.1-23.4

Bream

Fourteen bream were captured in 2021. They ranged in length from 14.2cm to 40.5cm (mean = 24.0cm) (Figure 3.5). Bream were aged between 2+ and 9+ (no 4+ and 5+ fish were present in the sample aged). This species was first recorded in 2010 and it is evident that some recruitment to the population has occurred since that time.

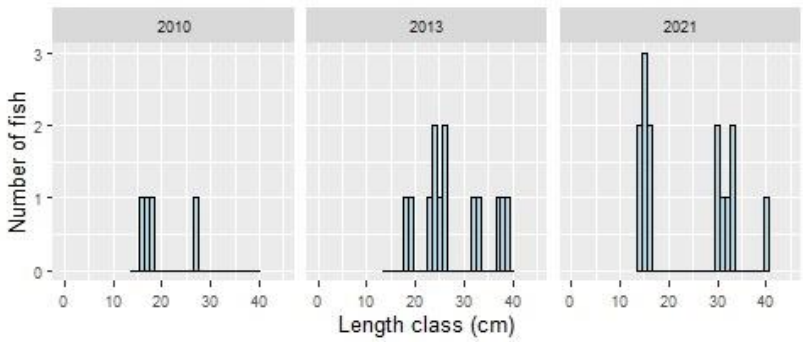

Figure 3.5. Length frequency of bream captured on Lattone Lough, 2010, 2013 and 2021. Bream were recorded for the first time by IFI in Lattone Lough in 2010.

Brown trout

Four brown trout were captured in 2021. They ranged in length from 23.8cm 44.0cm (mean 31.2cm). A contraction in the number and size range of brown trout in the lake was apparent in 2010 compared to the earlier survey in 2006 and this has continued in subsequent surveys (Figure 3.6). In 2021 brown trout in the sample captured were aged between 2+ and 5+.

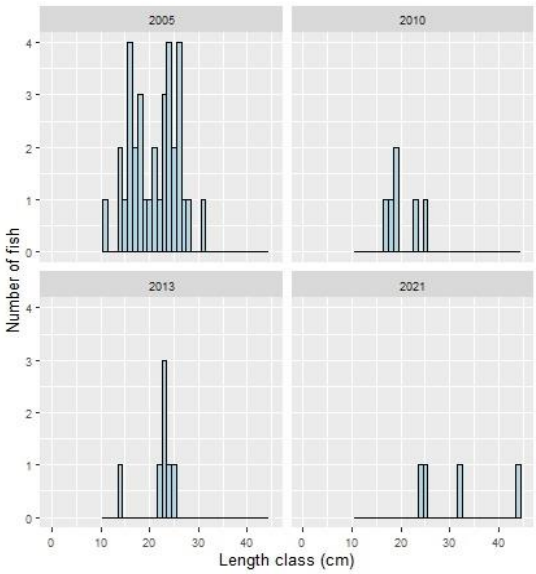

Figure 3.6. Length frequency of brown trout captured on Lattone Lough, 2006 to 2021.

Other fish species

Nine roach x bream hybrids ranging in length from 15.7cm to 28.8cm (mean 21.5cm) were also recorded. They were aged between 4+ and 8+ and all intervening year classes (with the exception of 5+ fish) were recorded.

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.

The stomach contents of a subsample of perch and pike captured during the survey were examined and are presented below.

Perch

A total of 25 stomachs were examined. Of these 17 (68%) were found to contain no prey items. Of the remaining eight stomachs, four (50%) contained maggots (angling bait). It was not possible to identify the stomach contents of four (50%) perch (Figure 3.6).

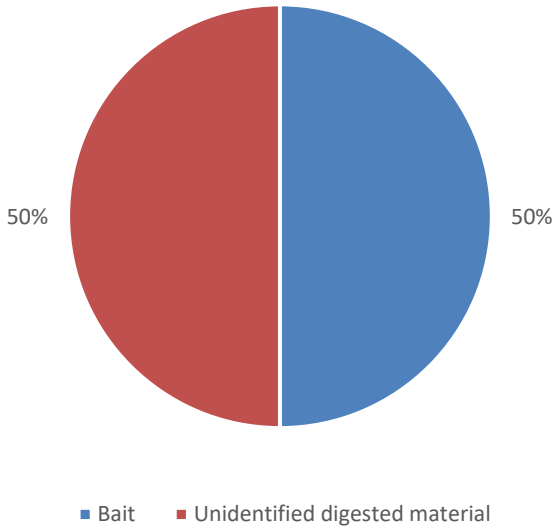

Figure 3.6. Diet of perch (n = 8) captured on Lattone Lough, September 2021 (% FO)

4. Summary and ecological status

A total of four fish species and one type of hybrid were recorded on Lattone Lough in September 2021. Roach was the dominant species with respect to both abundance (CPUE) and biomass (BPUE) captured during the 2021 survey.

This contrasts with previous surveys conducted between 2005 and 2013, when perch was the dominant species. The roach population has expanded since they were first recorded in 2010, and the population is dominated by small and young fish. While no 1+ roach were recorded, it is not clear whether this represents a recruitment failure in 2020 or that the fish were unavailable (i.e. too small) to the survey nets deployed. While perch appear to be recruiting regularly, the population appears to have declined. Numbers of brown trout have also declined since the 2005 survey.

Cyprinids were recorded in the lake for the first time during the 2010 survey, when roach, bream, roach x bream hybrids and tench were all recorded. No tench were captured in 2021. However, roach, bream and their hybrid were all captured. While bream and roach x bream hybrids were recorded in smaller quantities compared to roach, these three species were the dominant species captured in 2021 with respect to biomass. Bream and roach x bream hybrids (which requires both parent species to spawn (Hayden *et al.*, 2010) also appear to be recruiting regularly (though perhaps not annually) in the lake.

Results of the current survey have highlighted how populations of several cyprinid species have increased in Lattone Lough since their first records in 2010. Lattone Lough is part of the Lough Melvin catchment and is directly connected to Lough Melvin *via* the County River. The lake poses a very real potential colonisation source for these species which are not native to Lough Melvin. While the roach is listed as a non-native species subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 [SI. 477], bream and its hybrid with roach are also potentially invasive within Lough Melvin. Roach and roach x bream hybrids were recorded for the first time within Lough Melvin itself in 2021 (McLoone *et al.*, 2022). Should their populations become established the introduction and proliferation of novel cyprinid species poses a potential threat to the endemic salmonid populations in Lough Melvin. The development of the lake as a coarse fishery should, therefore, be reviewed in the context of the overall management and protection of the Lough Melvin catchment and potential impacts to native biota assessed. Further investigative fish stock assessments (potentially harnessing eDNA survey techniques) could also be used to identify the

distribution of novel fish species, particularly the invasive roach in order to inform future management policies and actions within the Lough Melvin Catchment.

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). The tool utilises catch data from all nets deployed in each lake, with the exception of those fish captured in the 55mm, 70mm and 90mm meshes of the benthic braided survey gill nets to ensure comparability of effort between surveys. Using the FIL2 classification tool, Lattone Lough has been assigned an ecological status of Bad for 2021 based on the fish populations present. In previous years the lake was also assigned Bad fish ecological status (Figure 4.1).

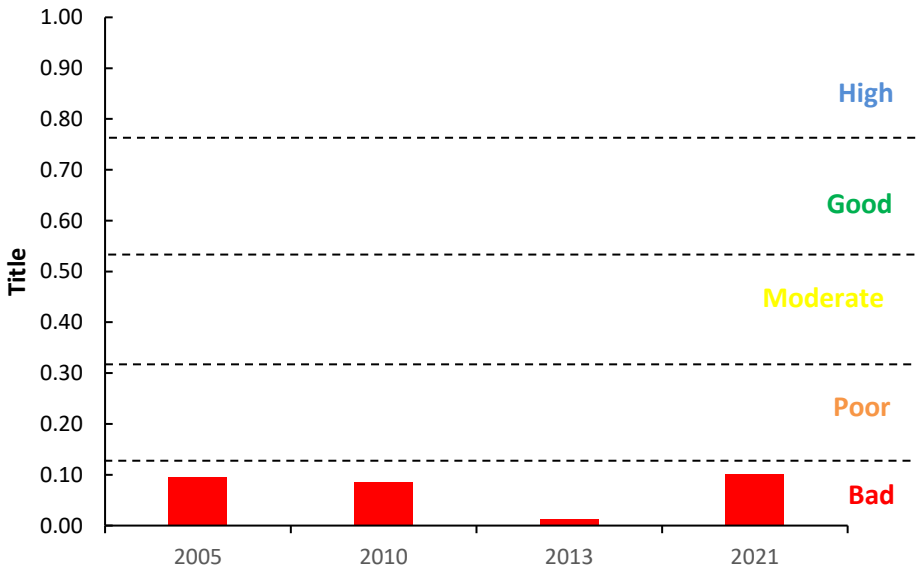

Figure 4.1. Fish ecological status of Lattone Lough, 2005, 2006. 2013 and 2021

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