National Research Survey Programme
Lakes 2021

Kiltooris Lough

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Iascach Intíre Éireann
Inland Fisheries Ireland

Fish Stock Survey of Kiltooris Lough, August 2021

National Research Survey Programme

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ACKNOWLEDGEMENTS

1.   Introduction

Kiltooris Lough is located approximately eight kilometres north-west of Ardara, Co. Donegal (Figure 1.1). The lake has a surface area of 43ha, a mean depth of <4m and a maximum depth of 13.5m. The lake is categorised as typology class 5 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), less than 50ha and moderately alkaline (20-100mg/l $CaCO_3$). The lake has been classed as not at risk of meeting WFD objectives by 2027. The geology of the area is predominantly schist and gneiss. Kiltooris Lough is located within the West of Ardara/Maas Road Special Area of Conservation. The site is designated as such for fulfilling a number of criteria, including blanket bog, orchid-rich calcareous grasslands, Atlantic salt meadows and tidal mudflats, etc. (NPWS, 2019).

Kiltooris Lough is reputed to be one of the best trout lakes in the Ardara area. The lake has a sandy bottom with trout averaging 0.34kg up to 0.68kg (O'Reilly, 1998). The Ardara Anglers Association has the fishing rights to the lake and has stocked it in the past with brown trout. The lake is also a public water supply.

The lake has been surveyed on four occasions since 2005 (2005, 2008, 2011 and 2014) (Kelly *et al*., 2007, 2009, 2012a and 2015). Brown trout have dominated fish stocks on all recent survey occasions. Three-spined stickleback and eels were also captured during those surveys.

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.
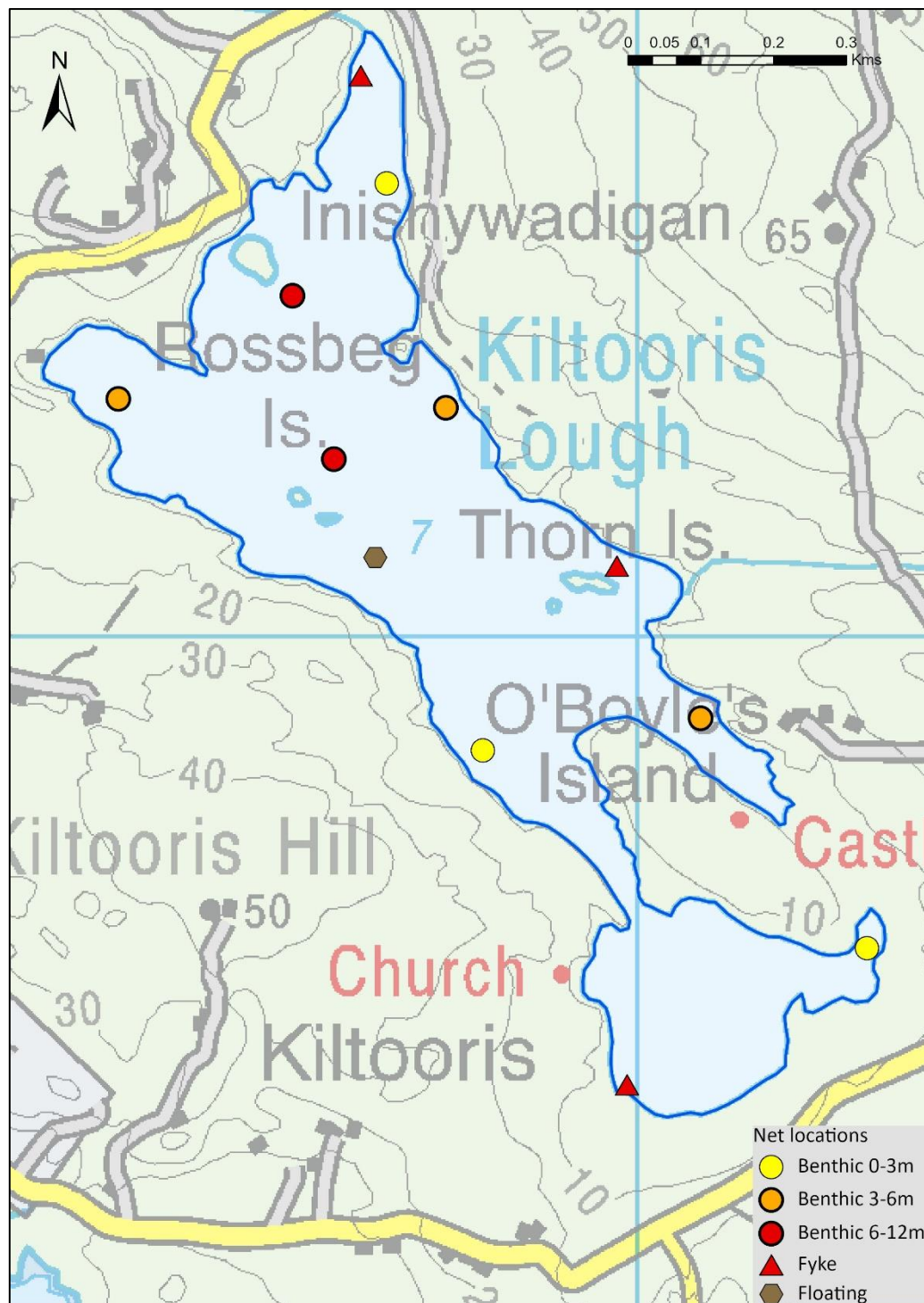

Plate 1.1. Kiltooris Lough

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

2.   Methods

2.1.   Netting methods

Kiltooris Lough was surveyed over one night on the 10th of August 2021. A total of three sets of Dutch fyke nets, eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (3 @ 0-2.9m, 3 @ 3-5.9m and 2 @ 6-11.9m) and one floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill net were deployed in the lake (12 sites). Survey nets were deployed in the same locations as were randomly selected in the previous surveys in 2008 to 2014. 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 were measured and weighed on site and scales were removed from a sample of brown trout. 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).

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

Where:

$\mathbf{FO}_i$ 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

Three fish species were recorded on Kiltooris Lough in August 2021. A total of 82 fish were captured (Table 3.1). Brown trout was the most abundant fish species recorded, followed by three-spined stickleback and eels. The same species have been recorded in previous surveys of the lake conducted since 2005.

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

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
Salmo trutta	Brown trout	67	7	0	74
Gasterosteus aculeatus	Three-spined stickleback	3	0	0	3
Anguilla anguilla	European eel	0	5	0	5

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 brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) (Table 3.2).

CPUE and BPUE for each species captured in all surveys between 2008 and 2021 are presented in Figures 3.1 and 3.2 respectively and illustrates fish community change over time. Brown trout have dominated fish stocks on all sampling occasions. The numbers of fish caught has remained relatively stable and no clear population trends are apparent. Eel catches appear to have declined when compared to those recorded in 2005 and 2008 (Figure 3.1).

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

Scientific name	Common name	Mean CPUE (± S.E)	Mean BPUE (± S.E)
Salmo trutta	Brown trout	0.206 (0.0568)	17.821 (5.353)
Gasterosteus aculeatus	Three-spined stickleback	0.008 (0.004)	0.0125 (0.007)
*Anguilla anguilla**	European eel*	0.0278 (0.006)	1.999 (0.439)

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
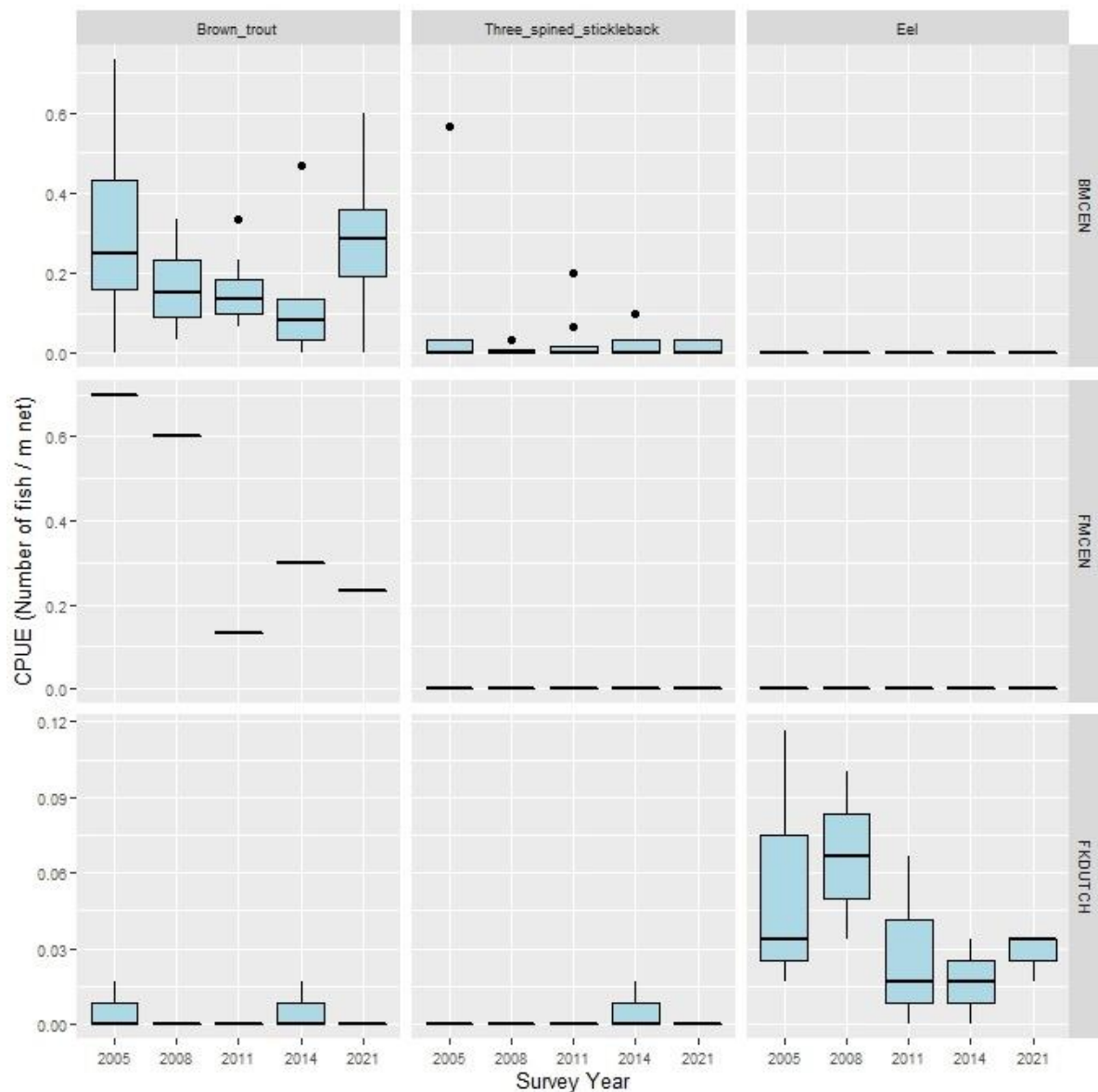
Figure 3.1. Mean CPUE of all fish species captured in each net type during surveys of Kiltooris Lough between 2005 and 2021. Figures are expressed as number of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles 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. Mean BPUE of all fish species captured in each net type during surveys of Kiltooris Lough between 2008 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.
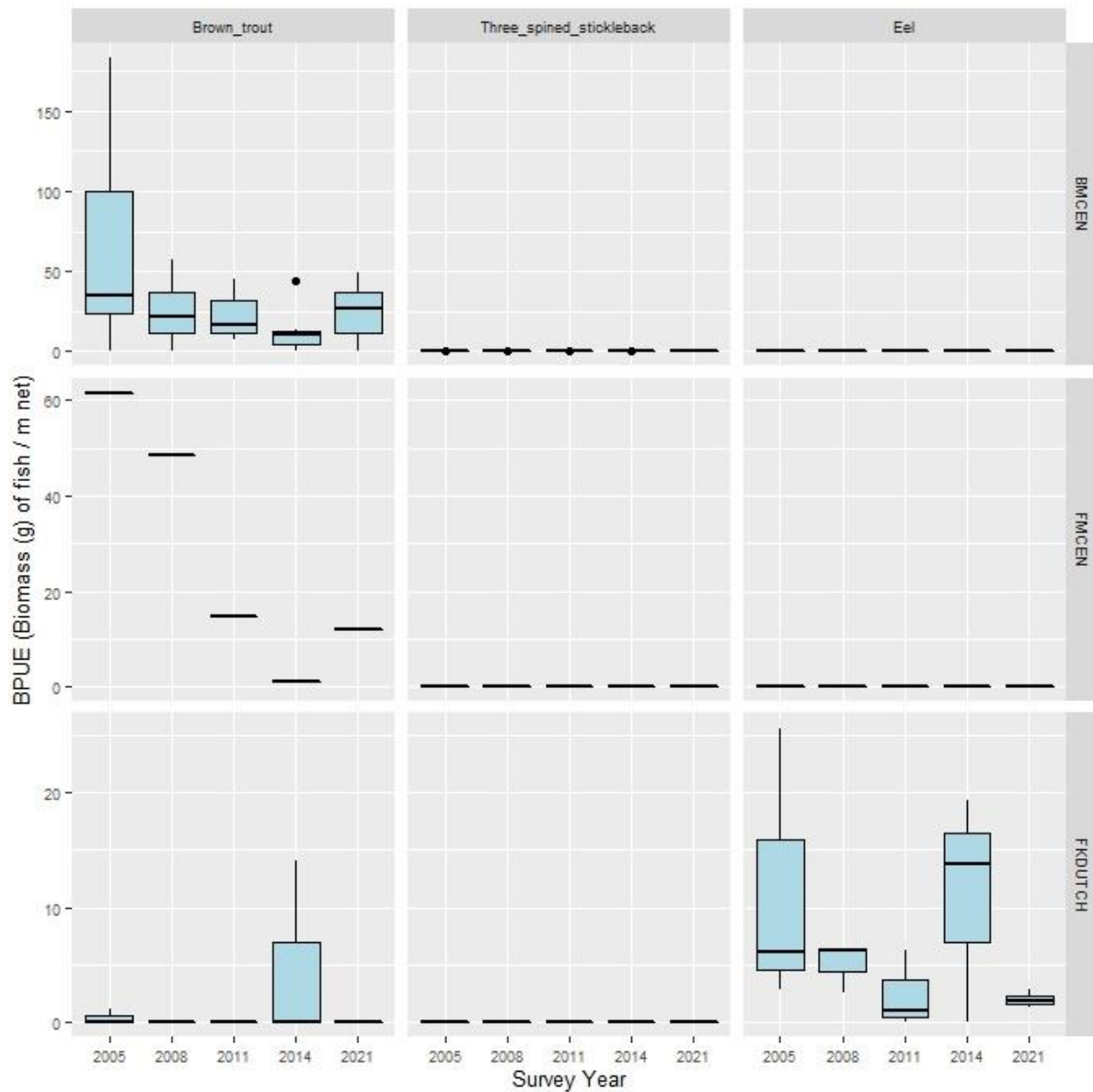
3.3. Length frequency distributions and growth

<u>Brown trout</u>

Brown trout captured during the 2021 survey ranged in length from 10.7cm to 28.7cm (mean = 18.3cm) (Figure 3.3). Brown trout captured in 2021 were aged between 1+ and 4+. While all intervening age classes were present, few fish older than 3+ were captured (*c*. 23-28cm) (Figure 3.3). Mean L1 (i.e. length at the end of the 1st year) was 6.5cm (Table 3.3). Fewer larger brown trout (i.e. >25cm) were captured in 2021 compared to earlier surveys of the lake (Figure 3.3).
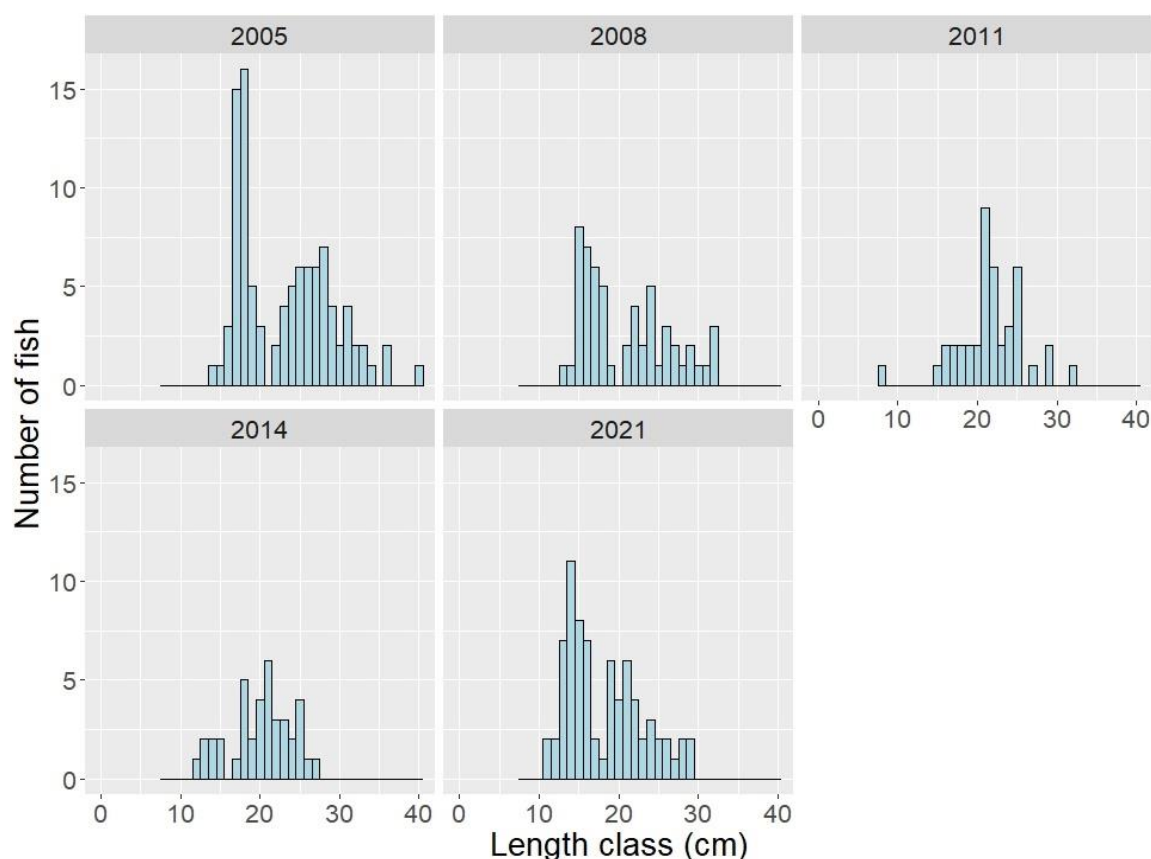

Figure 3.3. Length frequency of brown trout captured on Kiltooris Lough, 2005, 2008, 2011, 2014 and 2021

Table 3.3. Mean (±SE) brown trout length (cm) at age for Kiltooris Lough, August 2021

	L$_1$	L$_2$	L$_3$	L$_4$
Mean	6.5 (0.0)	14.7 (0.2)	20.9 (0.4)	24.7 (0.3)
N	53	32	11	2
Range	5.2-8.2	12.4-16.8	18.3-22.5	24.3-25.0

Other species

Three-spined stickleback captured during the 2021 survey ranged in length from 3.3cm to 4.0cm. Eels captured ranged in length from 30.0cm to 40.0cm.

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 food items recorded in a sub sample of trout captured are presented below (Figure 3.4). A total of 51 stomachs were examined. Twenty stomachs were empty and food was recorded in a total of 31 brown trout stomachs. Fish had been feeding predominantly on invertebrates which were the sole prey type found in 18 (58%) stomachs. Zooplankton were found together with invertebrates in one (3%) stomach and as the sole prey type in four (13%) stomachs. Fish were the sole prey group recorded in two (7%) stomachs, while they were recorded with invertebrates in six (19%) stomachs (Figure 3.4).
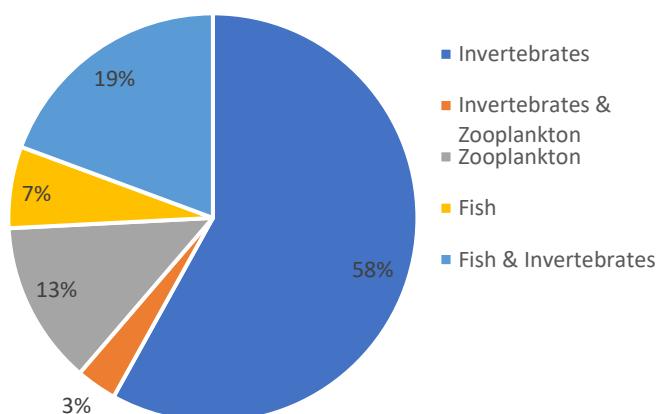

Figure 3.4. Diet of brown trout (n = 31) captured on Kiltooris Lough, August 2021 (% FO)

4.   Summary and ecological status

Brown trout was the dominant species in terms of both abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2021 survey. Three-spined stickleback and eels were also captured. The same species have been recorded on other surveys of Kiltooris Lough conducted since 2005.

Brown trout have been the dominant fish species captured across all surveys, and populations have remained relatively stable over that time. Recruitment to the adult population appears to be regular with no missing year groups. In 2021, the population was dominated by young fish.

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, Kiltooris Lough was assigned an ecological status of Good for 2021 based on the fish populations present. In previous years the lake was assigned High in 2011 and 2014 and Good in 2005 and 2008 (Figure 4.1).

In the 2013 to 2018 surveillance monitoring reporting period, the EPA assigned Kiltooris Lough an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish.
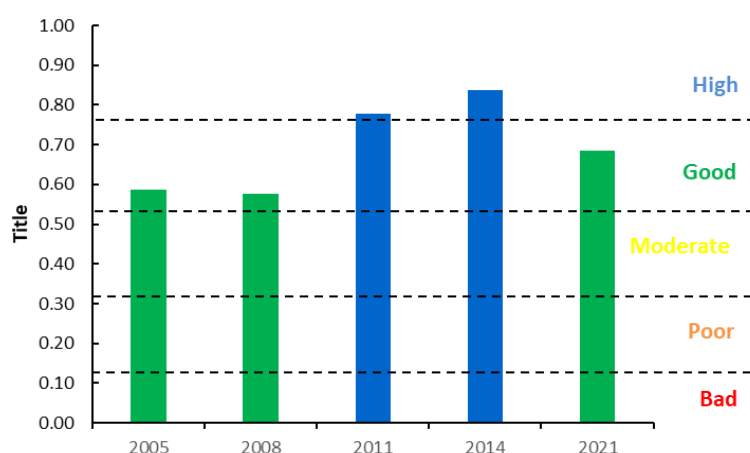

Figure 4.1 Fish ecological status of Kiltooris Lough, 2005 to 2021

5.   References

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