National Research Survey Programme

Lakes 2024

Lough Gur

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Fish Stock Survey of Lough Gur, September 2024

National Research Survey Programme

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

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1. Introduction

Lough Gur is located within the River Maigue catchment approximately 20km south-east of Limerick city, north of Bruff in Co. Limerick (Plate 1.1, Figure 1.1). It has a surface area of 78ha, a mean depth of 2.4m and a maximum depth of 5.0m. The lake is categorised as typology class 10 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and high alkalinity (>100mg/l $CaCO_3$). The lake catchment is relatively small and limited to surface run-off from surrounding hills. It is a eutrophic lake with consistently high levels of phosphorus (King and O' Grady, 1994; Lough Gur EMS, 2009). A process of enrichment which has been ongoing for several centuries, has accelerated since the 1950s (Walsh, 2017).

Lough Gur and the surrounding area is internationally and nationally important for migrant wildfowl species and has been designated as a Natural Heritage Area and a Wildfowl Sanctuary (Lough Gur EMS, 2009). The lake and the adjoining Red Bog possess a diverse range of terrestrial and aquatic habitats for both flora and fauna. The flora of the lake was surveyed in 1989 (King and O' Grady, 1994) and was composed mainly of Hornwort sp. (*Ceratophylum* sp.) and Fennel pondweed (*Potamogeton pectinatus)* - indicative of nutrient enriched waters.

The lake was previously surveyed by the Inland Fisheries Trust in March 1978 (IFT, unpublished data) and by IFI (previously the Central Fisheries Board) between December 1988 and October 1989 (King and O' Grady, 1994). These surveys revealed that a relatively large stock of fast growing rudd and pike were present in the lake.

The lake has been surveyed on five occasions (2009, 2012, 2015, 2018 and 2021) using IFI's fish in lakes monitoring protocol (Kelly *et al*., 2010, 2013, 2016, Connor *et al*., 2018; McLoone *et al*., 2022). During the 2021 survey, perch was the most abundant species present in the lake. This species was captured for the first time in the 2012 survey (Kelly *et al*., 2013). Rudd and pike were also captured in 2021.

This report summarises the results of the 2024 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. Launching the IFI survey boat on Lough Gur, September 2024

Plate 1.2 Lough Gur, viewed from the southern end of the lake, September 2024.

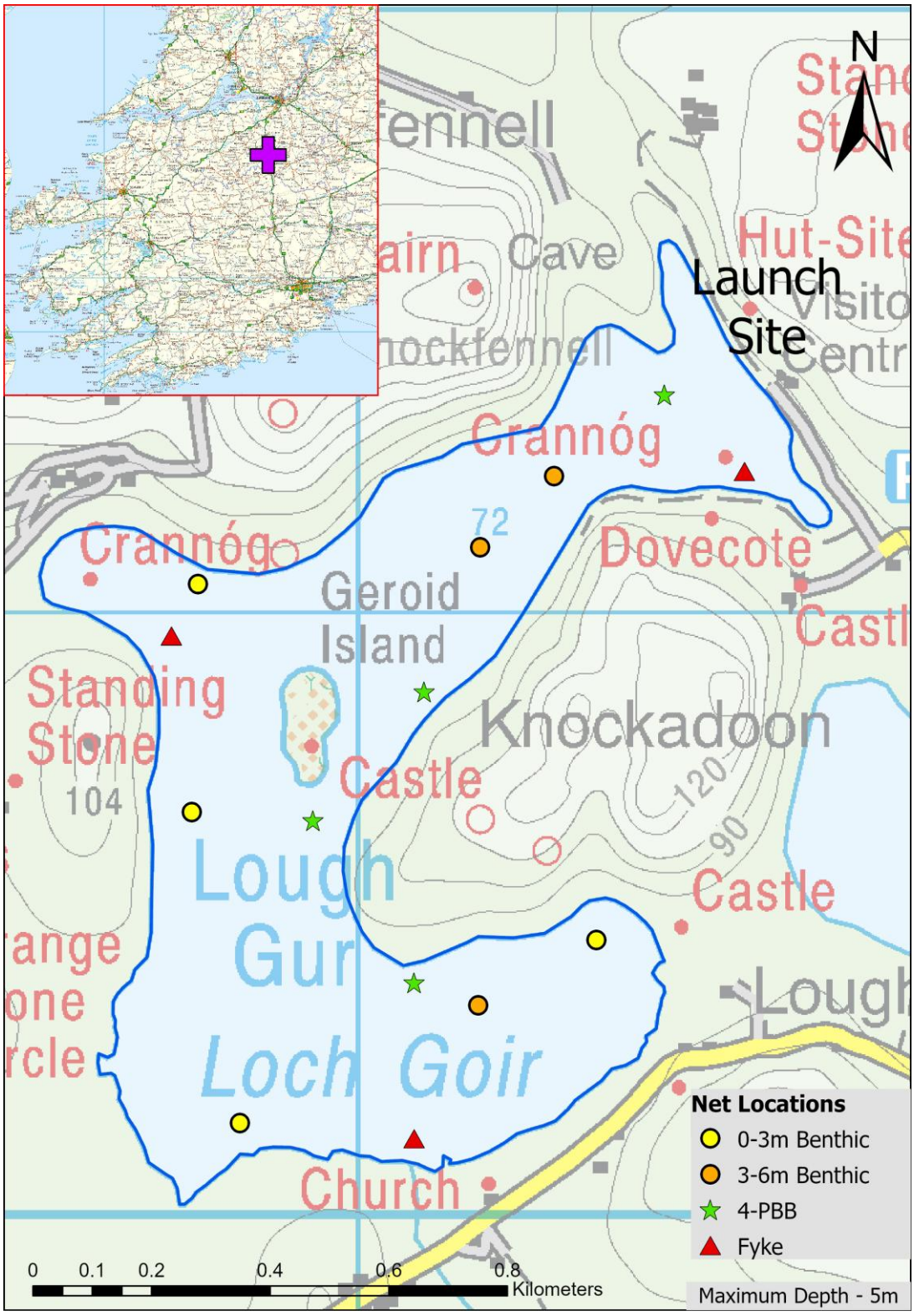

Figure 1.1. Location map of Lough Gur showing locations and depths of each net.

2. Methods

2.1. Netting methods

Lough Gur was surveyed over two nights from the 23rd to the 25th of September 2024. A total of three sets of Dutch fyke nets and eight benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (BM CEN) (4 @ 0-2.9m and 4 @ 3-5.9m) were deployed in the lake (11 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). Nets were deployed in the same locations as were randomly selected in the previous surveys. 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 a sub-sample of other species. 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 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 were recorded on Lough Gur in September 2024. A total of 546 fish were captured. The number of each species captured by each gear type is shown in Table 3.1. Rudd and perch were the most numerous fish species recorded. Together they represented *c*. 99% of all fish captured in the survey. Pike and European eel were also captured in the 2024 survey. All four species have been recorded in previous surveys. Perch were recorded for the first time in 2012 and have been recorded in all subsequent surveys. European eel were captured in all previous surveys with the exception of the most recent survey in 2021 (Kelly *et al*.,2013; McLoone *et al*., 2022)

Table 3.1. Number of each fish species captured by each gear type during the survey on Lough Gur, September 2024.

Scientific name	Common name	Number of fish captured			
		BM CEN	4-PBB	Fyke	Total
Scardinius erythrophthalmus	Rudd	329	3	6	338
Perca fluviatilis	Perch	180	0	21	201
Esox lucius	Pike	4	0	1	5
Anguilla anguilla	European eel	0	0	2	2

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

Table 3.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Gur, September 2024.

Scientific name	Common name	Mean CPUE (± S.E)	Mean BPUE (± S.E)
Scardinius erythrophthalmus	Rudd	0.740 (0.261)	43.694 (12.588)
Perca fluviatilis	Perch	0.423 (0.116)	12.834 (3.741)
Esox lucius	Pike	0.010 (0.004)	7.154 (6.258)
*Anguilla anguilla**	European eel	0.011 (0.006)	2.056 (1.028)

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.

3.3. Species Profiles

Rudd

Rudd captured during the 2024 survey ranged in length from 6.0cm to 34.0cm (mean = 12.7) (Figure 3.1). In 2024 fish measuring less than 10cm were more prominent than in the earlier surveys. Rudd were aged between 1+ and 11+. All intervening age classes except 10+ were represented in the sample aged (Table 3.3). The largest age cohort was 3+ (10cm to 19cm) (Figure 3.1 and Table 3.3). Fish aged 1+ to 5+ accounted for *c*. 85% of all fish aged. Relatively few older (i.e. >6+) or larger (i.e. >25cm) fish were captured in 2024.

Rudd abundance (CPUE) has fluctuated across all surveys of the lake and was higher in 2024 than in the earlier surveys. Rudd biomass (BPUE) has also fluctuated since surveys began and was higher in 2024 than all years with the exception of 2009 (Figure 3.2).

Large rudd, captured on Lough Gur, September 2024

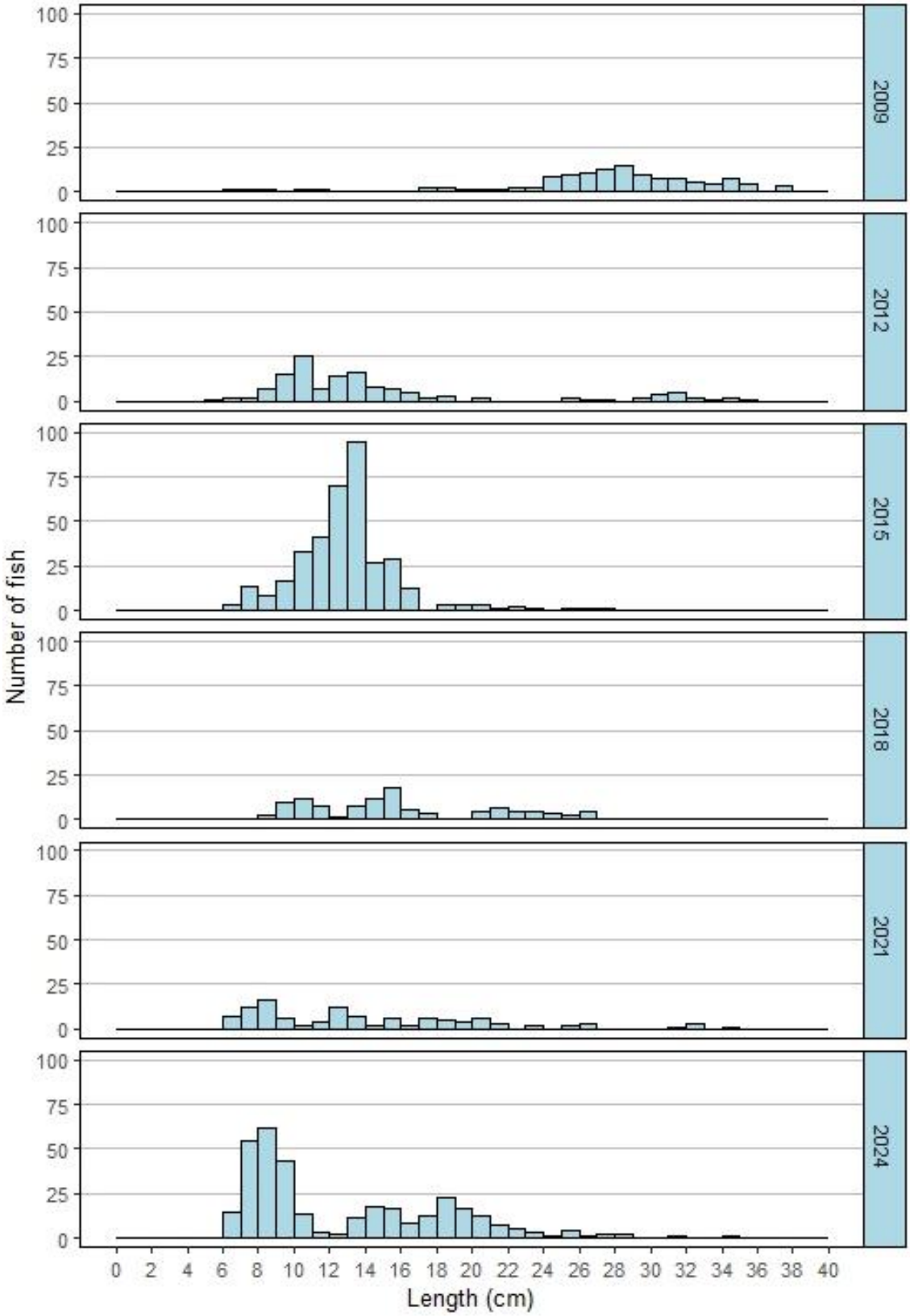

Figure 3.1. Length frequency of rudd captured on Lough Gur between 2009 and 2024.

Table 3.3. Summary age data from rudd captured on Lough Gur, September 2024. Number of fish and length ranges of all fish aged in the sample is presented.

Length (cm)	Age class											
	0+	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+
N	-	13	9	20	10	15	6	3	1	1	-	1
Mean	-	7.6	9.4	13.9	17.1	19.9	24.0	26.9	28.6	31.8	-	34.0
Min	-	6.4	8.3	10.4	14.2	16.1	21.7	26.5	28.6	31.8	-	34.0
Max	-	9.3	11.0	19.7	20.5	22.7	25.5	27.2	28.6	31.8	-	34.0

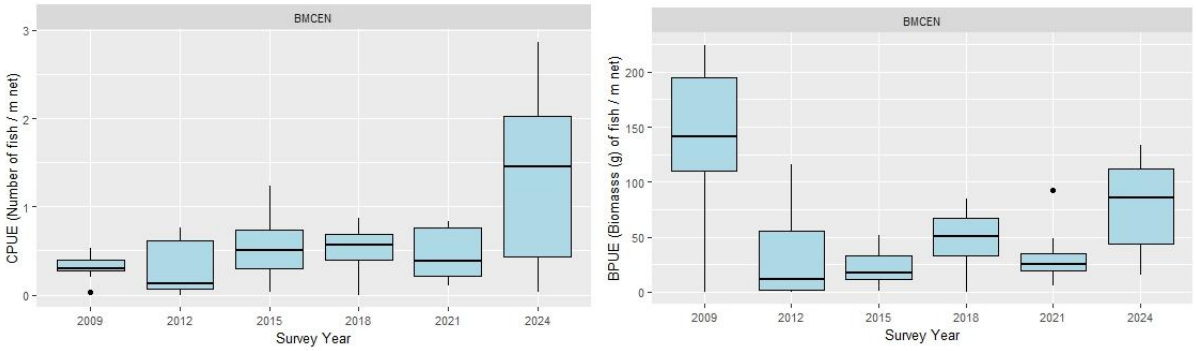

Figure 3.2. CPUE and BPUE of rudd captured during surveys of Lough Gur between 2009 and 2024. Figures are expressed as numbers of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

Perch

Perch captured during the 2024 survey ranged in length from 4.3cm to 23.4cm (mean = 11.9cm) (Figure 3.3). Perch were aged between 0+ and 7+ and all intervening age classes were represented in the sample aged. No one year class dominated the population. 2+ perch (9cm-16cm) was the most abundant cohort (Figure 3.3). Few fish greater than 20cm were captured and the two oldest cohorts (5+ and 6+) were each represented by just one individual fish. Mean L1 (i.e. length at the end of the 1st year) was 5.5cm (Table 3.3).

The rapid expansion in perch abundance (CPUE) and biomass (BPUE) evident between 2012 and 2015 has since stabilised (Figure 3.4)

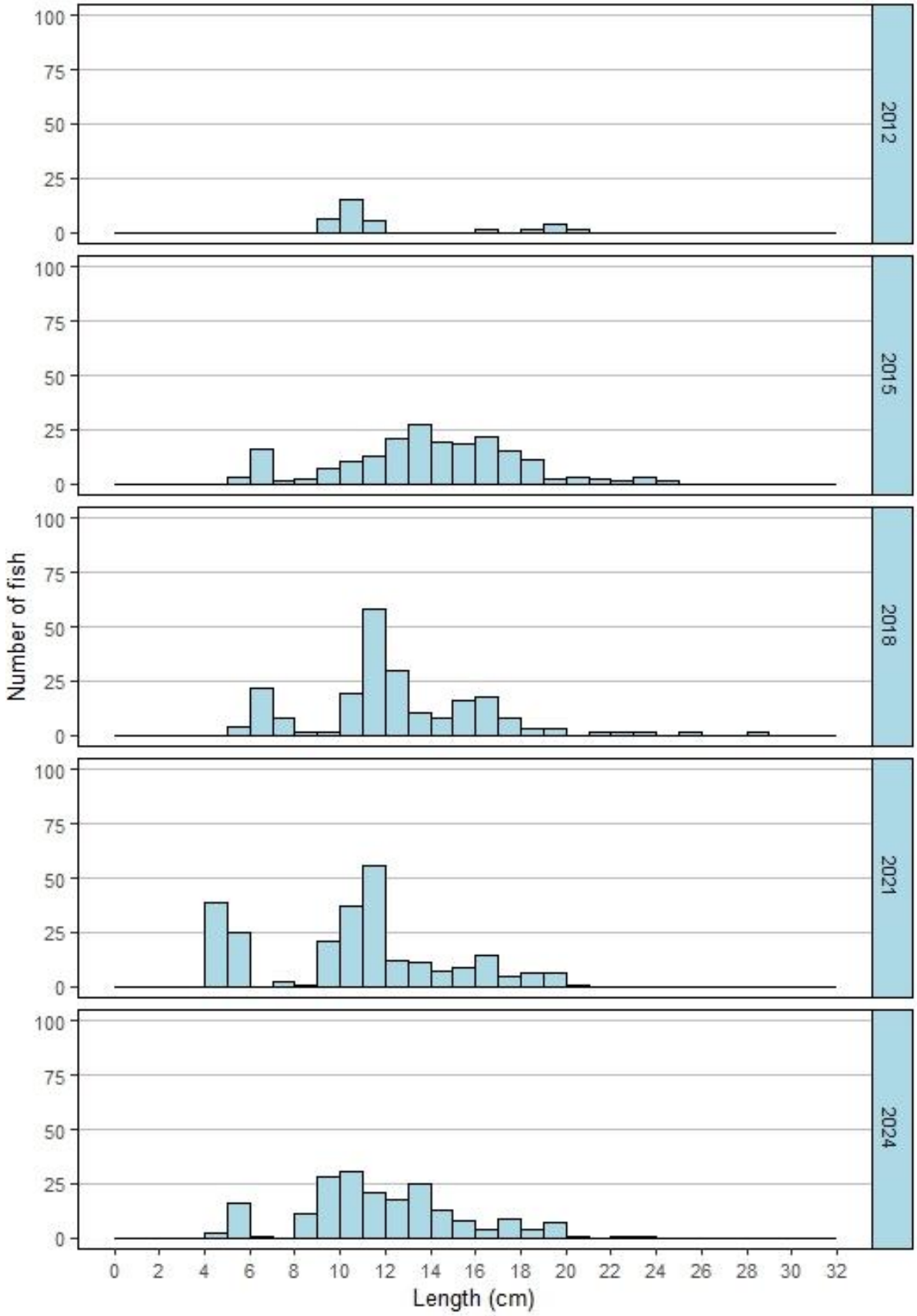

Figure 3.3. Length frequency of perch captured on Lough Gur between 2009 and 2024. No perch were captured in 2009.

Table 3.3. Mean (±S.E.) perch length (cm) at age Lough Gur, September 2024.

	L_1	L_2	L_3	L_4	L_5	L_6	L_7
Mean (±S.E.)	5.5 (±0.11)	9.6 (±0.2)	12.5 (±0.31)	15.1 (±0.44)	16.3 (±0.44)	17 (±1.25)	16.5
N	59	47	30	17	9	2	1
Range	3.5–7.4	5.7–12.1	8.3–15.7	12.7–19.2	14.9–18.5	15.8–18.3	16.5–16.5

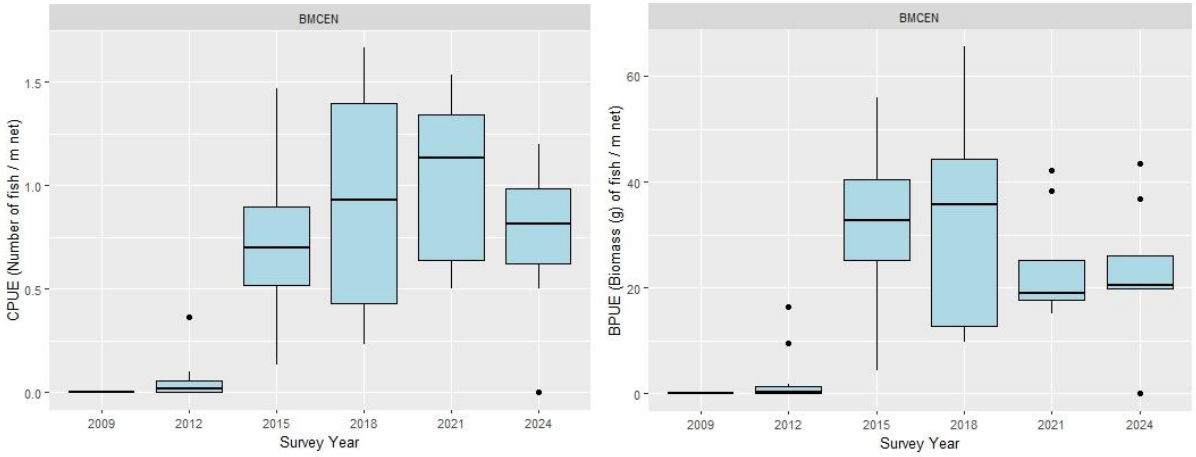

Figure 3.4. CPUE and BPUE of perch captured during surveys of Lough Gur between 2009 and 2024. Figures are expressed as numbers of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

Other Species

Five pike captured in 2024 ranged in length from 21.1cm to 72.0cm (mean = 33.5cm). Three pike were aged 1+. Individual pike aged 2+ and 4+ were also captured.

Two European eel captured in 2024 measured 49.2cm and 49.5cm respectively. Eel abundance and biomass were highest in the first surveys of the lake conducted in 2009 and 2012 (Figure 3.5).

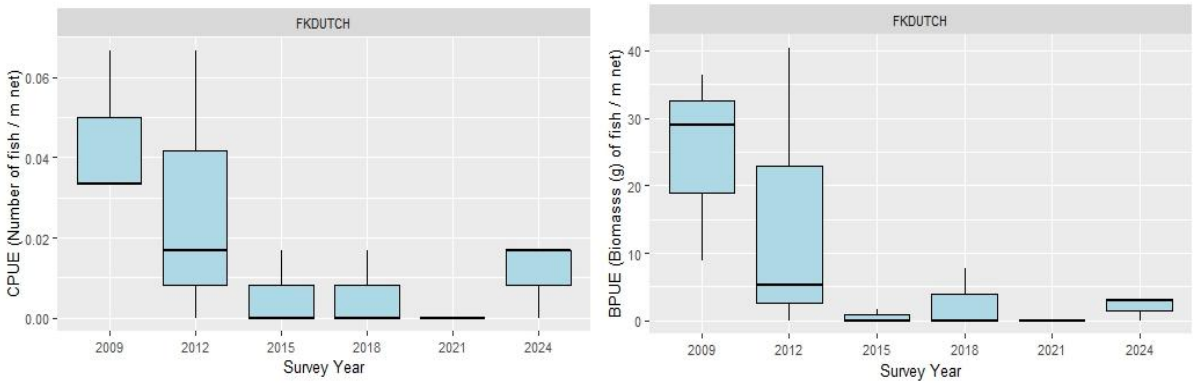

Figure 3.5. CPUE and BPUE of European eel captured during surveys of Lough Gur between 2009 and 2024. Figures are expressed as numbers of fish captured per linear meter of net deployed. The horizontal bars represent the median value of the sample, while the 75th and 25th percentiles are marked by the upper and lower boundary of each box. The vertical 'whiskers' show the data range. Outliers are marked by dots.

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 73 perch stomachs were examined. Thirty stomachs contained food (41%). Fish was the sole prey type recorded in 22 (36%) perch stomachs. Zooplankton was the sole prey type recorded in 13 (44%) stomachs and was found together with invertebrates in four (13%) stomachs. Invertebrates were the sole prey type recorded in ten (33%) perch stomachs. Fish was the sole prey type recorded in three (10%) perch stomachs (Figure 3.6).

Pike

Four pike stomachs were available for analysis. Three stomachs contained food. Perch was recorded in the stomach of one pike which measured 21.9cm. Invertebrates were recorded in two pike measuring 21.1cm and 22.8cm.

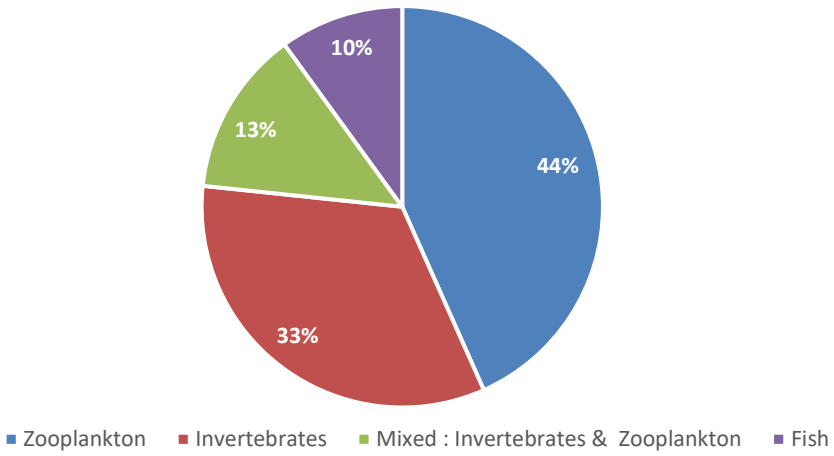

Figure 3.6. Diet of perch (N= 30) captured on Lough Gur, 2024 (% FO).

4. Summary and fish ecological status

A total of four fish species (perch, rudd, pike and eel) were recorded on Lough Gur in September 2024. Rudd were the dominant species with respect to both abundance (CPUE) and biomass (BPUE).

Both rudd and perch exhibit regular recruitment patterns in the lake. Perch were first recorded in the 2012 survey. The initial increase in perch CPUE and BPUE evident between 2012 and 2015 would appear to have stabilised.

Smaller rudd (i.e. < 10cm) were more prominent in 2024 survey compared to earlier surveys of the lake. There is also evidence of some larger and longer-lived fish persisting in the rudd population. European eel were recorded in the 2024 survey, having not been recorded in 2021.

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) 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, Lough Gur has been assigned an ecological status of Poor for 2024 based on the fish populations present. The fish ecological status of Lough Gur has fluctuated following previous stock assessments on the lake (Figure 4.1).

In the 2016 to 2021 surveillance monitoring reporting period, the EPA assigned Lough Gur an overall ecological status of Moderate, based on all monitored physio-chemical and biological elements, including fish (EPA, 2021).

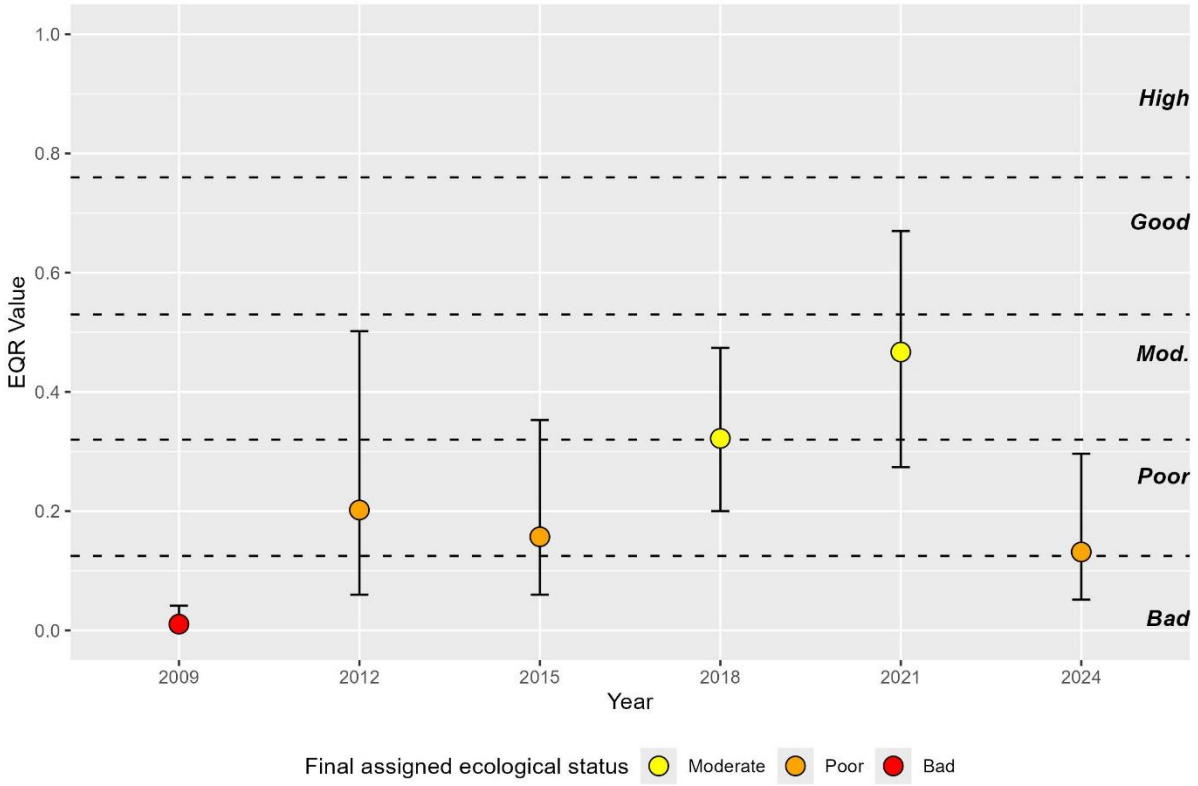

Figure 4.1. Fish ecological status, Lough Gur, between 2009 and 2024 (dashed line indicates EQR status boundaries).

5. References

Amundsen, P.A., Gabler H.M. and Staldvik F.J. (1996) A new approach to graphical analysis of feeding strategy from stomach contents data—modification of the Costello (1990) method. *Journal of Fish Biology,* **48,** 607–614.

Caffrey, J. (2010) *IFI Biosecurity Protocol for Field Survey Work*. Inland Fisheries Ireland.

Connor, L., Matson R. and Kelly F.L. (2017) Length-weight relationships for common freshwater fish species in Irish lakes and rivers. *Biology and Environment: Proceedings of the Royal Irish Academy*, **117 (2)**, 65-75.

Connor, L., Morrissey, E., Coyne, J., Corcoran, W., Cierpial, D., Gavin A., Brett A., McLoone, P., Delanty, K., Rocks, K., Gordon, P., O' Briain, R., Matson, R., McCarthy E. and Kelly, F.L. (2018) Fish *Stock Survey of Lough Gur, September 2018*. National Research Survey Programme, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

EPA (2021) https://gis.epa.ie/EPAMaps/ Data - Catchments.ie - Catchments.ie. Accessed in May 2025.

Kelly, F.L., Harrison, A., Connor, L., Allen, M., Rosell, R. and Champ, T. (2008) *FISH IN LAKES Task 6.9: Classification tool for Fish in Lakes. FINAL REPORT*. Central Fisheries Board, NS Share project.

Kelly, F., Harrisson, A., Connor, L., Wightman, G., Matson, R., Morrissey, E., O'Callaghan, R., Feeney, R., Hanna, G., Wogerbauer, C., Rocks, K., Stafford, T. and Hayden, B. (2010) *Sampling Fish for the Water Framework Directive – Summary Report 2009*. The Central and Regional Fisheries Boards.

Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.

Kelly, F.L., Connor, L., Morrissey, E., Wogerbauer, C., Matson, R., Feeney, R. and Rocks, K. (2013) *Water Framework Directive Fish Stock Survey of Lough Gur, August 2012*. Inland Fisheries Ireland.

Kelly, F.L., Connor, L., Delanty, K., McLoone, P., Coyne, J., Morrissey, E., Corcoran, W., Cierpial, D., Matson, R., Gordon, P., O' Briain, R., Rocks, K., Walsh, L., O' Reilly, S., O' Callaghan, R., Cooney, R. and Timbs, D. (2016) *Fish Stock Survey of Lough Gur, October 2015*. National Research Survey Programme, Inland Fisheries Ireland.

King, J.J. and O' Grady, M.F. (1994) Aspects of the Limnology of Lough Gur, Co. Limerick. *Irish Fisheries Investigations, Series A (Freshwater)*, **No. 37**, 13pp.

Lough Gur EMS (2009). *Lough Gur Environmental Management Study. Final Report.*

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 Lough Gur, August 2021. National Research Survey Programme, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

Walsh, N. (2017) *Using lake sediment records to examine recent productivity in Lough Gur, Co. Limerick.* Thesis Submitted to Mary Immaculate College for the degree Master of Arts in Geography. Mary Immaculate College.

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