

Lough Gur



Sampling Fish for the Water Framework Directive - Lakes 2009



The Central and Regional
Fisheries Boards

ACKNOWLEDGEMENTS

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1.1 Introduction

Lough Gur (Plate 1.1, Fig. 1.1) is located within the River Maigue catchment approximately 20km south-east of Limerick city, north of Bruff in Co. Limerick. 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 CaCO₃). The lake catchment is relatively small and limited to surface run-off from surrounding hills. It is described as a eutrophic lake with consistently high levels of phosphorus (King and O' Grady, 1994; Lough Gur EMS, 2009). 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. (*Ceratophyllum* 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The lake was previously surveyed by the Inland Fisheries Trust in March 1978 (IFT, unpublished data) and by the Central Fisheries Board between December 1988 and October 1989 (King and O' Grady, 1994).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.



Plate 1.1. Lough Gur

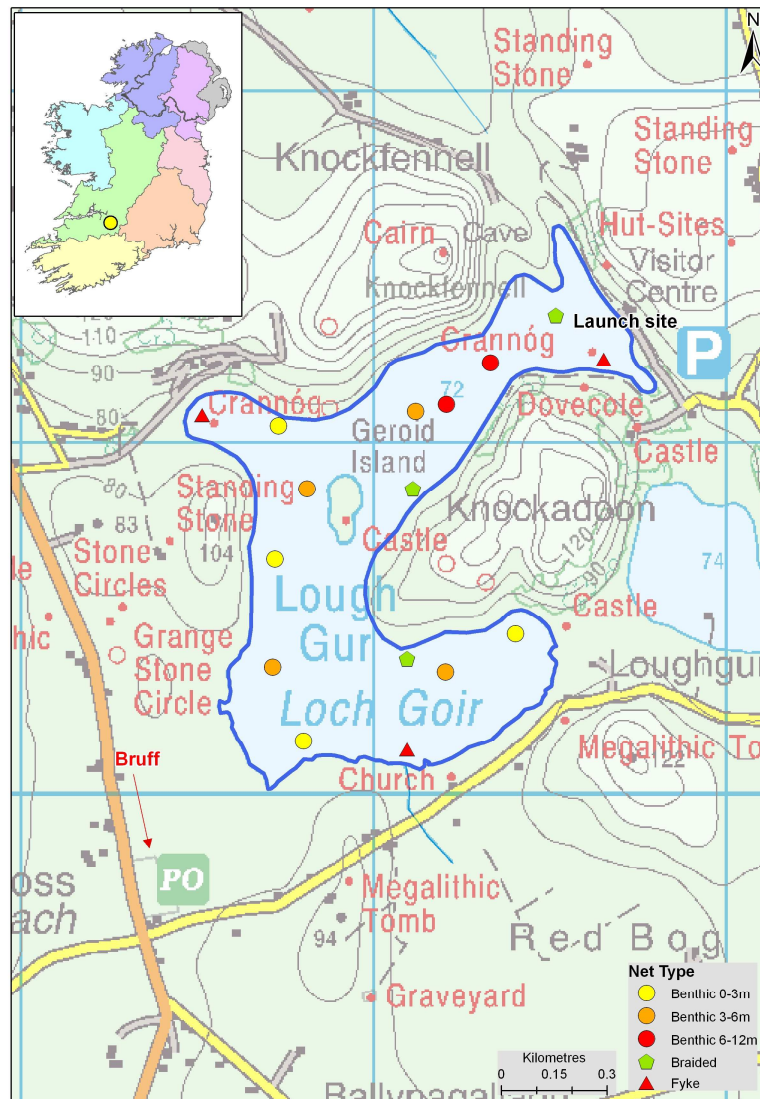


Fig. 1.1. Location map of Lough Gur showing locations and depths of each net

1.2 Methods

Lough Gur was surveyed over two nights between the 14th and the 16th of September 2009. A total of three sets of Dutch fyke nets and ten benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m and 2 @ 6-11.9m) were deployed randomly in the lake (13 sites). The netting effort was supplemented using three benthic braided survey gill nets (62.5mm mesh knot to knot) at three additional sites. Survey locations were randomly selected within each depth zone using a grid placed over a map of the lake. 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 rudd 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 returned to the laboratory for further analysis.

1.3 Results

1.3.1 Species Richness

A total of three fish species were recorded on Lough Gur in September 2009, with 146 fish being captured (Table 1.1). Rudd was the most abundant fish species recorded. Small numbers of pike were also recorded. Eels were captured in fyke nets only.

Table 1.1. List of fish species recorded (including numbers captured) during the survey on Lough Gur, September 2009

| Scientific name | Common name | Number of fish captured | | | |
|------------------------------------|--------------|-------------------------------------|------------------------------|-----------|-------|
| | | Benthic mono multimesh gill nets | Benthic braided gill nets | Fyke nets | Total |
| <i>Scardinius erythrophthalmus</i> | Rudd | 93 | 32 | 0 | 125 |
| <i>Esox lucius</i> | Pike | 8 | 0 | 5 | 13 |
| <i>Anguilla anguilla</i> | European eel | 0 | 0 | 8 | 8 |

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 are summarised in Table 1.2.

The differences in the mean rudd CPUE between Lough Gur and four other similar lakes were assessed and found to be statistically significant (Kruskal-Wallis, $P < 0.001$) (Fig. 1.2). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Gur had a significantly higher mean rudd CPUE than Inchicronan Lough ($z = -4.144$, $P < 0.001$), Lough Bunny ($z = -3.803$, $P < 0.001$), Dromore Lough ($z = -3.801$, $P < 0.001$) and Lough Cullaun ($z = -4.153$, $P < 0.001$).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Gur, September 2009

| Scientific name | Common name | |
|------------------------------------|--------------|------------------|
| | | Mean CPUE |
| <i>Scardinius erythrophthalmus</i> | Rudd | 0.268 (0.045) |
| <i>Esox lucius</i> | Pike | 0.022 (0.007) |
| <i>Anguilla anguilla</i> | European eel | 0.044 (0.011) |
| | | Mean BPUE |
| <i>Scardinius erythrophthalmus</i> | Rudd | 135.714 (25.684) |
| <i>Esox lucius</i> | Pike | 3.056 (1.213) |
| <i>Anguilla anguilla</i> | European eel | 24.756 (8.183) |

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species. Standard error is displayed in brackets.

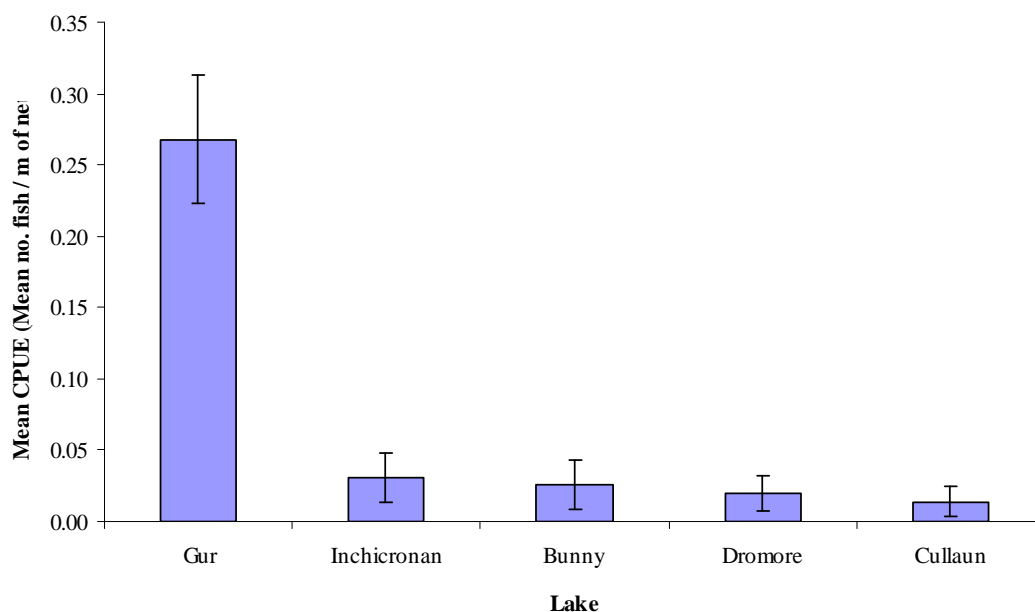


Fig. 1.2. Mean (\pm S.E.) rudd CPUE in five lakes surveyed during 2009

1.3.3 Length frequency distributions

Rudd ranged in length from 6.0cm to 37.5cm (mean = 27.5cm) (Fig. 1.3). Pike ranged in length from 15.2cm to 39.1cm (mean = 22.5cm) (Fig.1.4). Eels ranged in length from 52.0cm to 75.0cm.

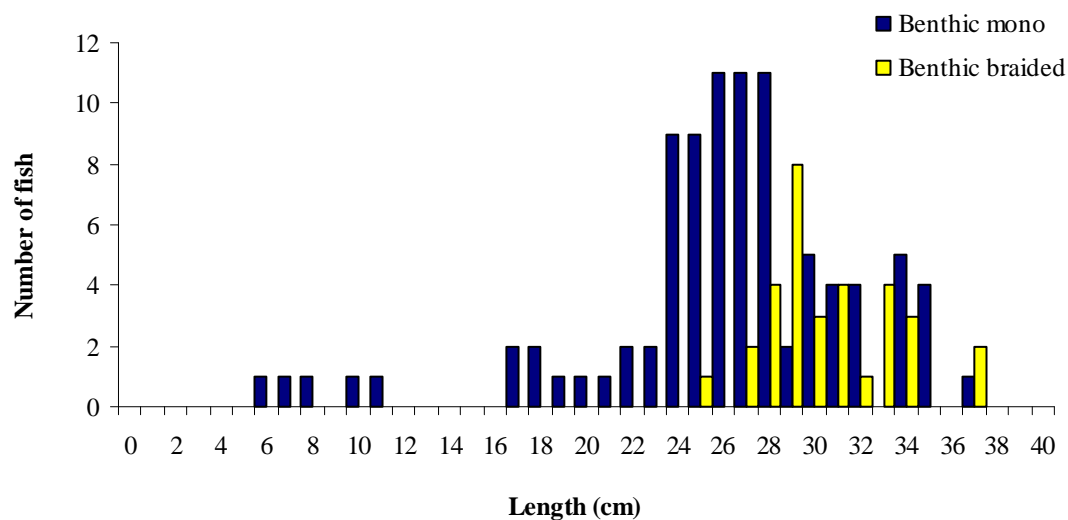


Fig. 1.3. Length frequency of rudd (n=124) captured on Lough Gur, September 2009

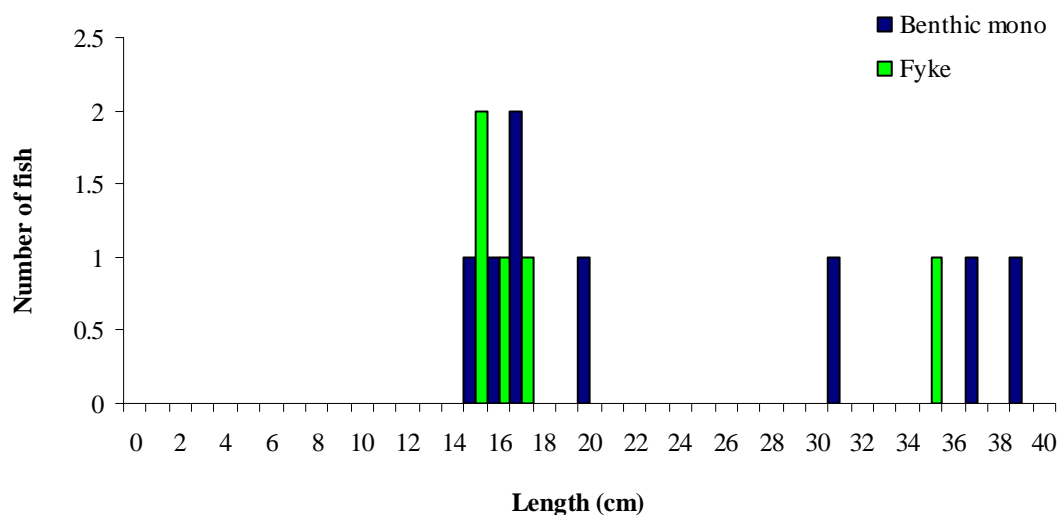


Fig. 1.4. Length frequency of pike (n=13) captured on Lough Gur, September 2009

1.3.4 Fish age and growth

Fourteen age classes of rudd were present, ranging from 1+ to 16+, with a mean L1 of 3.6cm (Table 1.3). Pike ranged in age from 0+ to 1+.

Table 1.3. Mean (\pm SE) rudd length at age for Lough Gur, September 2009

| | L ₁ | L ₂ | L ₃ | L ₄ | L ₅ | L ₆ | L ₇ | L ₈ | L ₉ | L ₁₀ | L ₁₁ | L ₁₂ | L ₁₃ | L ₁₄ | L ₁₅ | L ₁₆ |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Mean | 3.6 (0.1) | 8.2 (0.2) | 14.1 (0.3) | 20.3 (0.4) | 23.6 (0.5) | 24.8 (0.7) | 25.7 (0.7) | 27.7 (0.7) | 29.1 (0.7) | 30.4 (0.7) | 30.9 (0.7) | 31.3 (0.7) | 32.2 (0.6) | 32.5 (0.2) | 33.7 | 34.5 |
| N | 87 | 85 | 81 | 75 | 39 | 22 | 17 | 17 | 16 | 15 | 12 | 9 | 6 | 3 | 1 | 1 |
| Range | 2.2- 5.9 | 5.2- 11.9 | 8.6- 18.7 | 12.0- 25.1 | 16.5- 28.8 | 18.8- 30.3 | 21.4- 31.0 | 23.9- 32.6 | 25.1- 34.1 | 26.1- 35.7 | 27.2- 35.4 | 28.4- 33.6 | 30.5- 34.2 | 32.1- 32.8 | 33.7- 33.7 | 34.5- 34.5 |

1.4 Summary

Rudd was the dominant species in terms of both abundance (CPUE) and biomass (BPUE).

The mean rudd CPUE in Lough Gur was significantly higher than the mean rudd CPUE from the four other lakes included in the comparison. Rudd ranged in age from 1+ to 16+, indicating reproductive success in each of the previous number of years.

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 by 2015 if Ireland is not to incur penalties.

A WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 17) using CFB and Agri-Food and Biosciences Northern Ireland (AFBINI) data generated during the

NSSSHARE Fish in Lakes project (Kelly *et al.*, 2008). Using this tool, Lough Gur has been assigned an ecological status classification of Moderate based on the fish populations present.

The EPA has assigned an overall status of Moderate to Lough Gur in an interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates, macrophytes and fish.

1.5 References

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

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, NSSSHARE project.

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