A Fish Stock Survey Of Lough O'Flynn (2008)
And A Review Of The Current Ecological Status Of The Fishery

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Central Fisheries Board Report

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Central Fisheries Board

An Príomh-Bhord Iascaigh

About the Central Fisheries Board

The Central Fisheries Board is a statutory body with responsibility for inland fisheries and sea angling operating under the aegis of the Department of Communications, Energy and Natural Resources and was established under the Fisheries Act 1980.

The principal functions of the CFB are to advise the Minister for Communications, Energy and Natural Resources on policy relating to the conservation, protection, management, development and improvement of inland fisheries and sea angling, to support, coordinate and provide specialist support services to the Regional Fisheries Boards and to advise the Minister on the performance by the Regional Fisheries Boards of their functions.

The Boards mission is “to ensure that the valuable natural resources of inland fisheries and sea angling are conserved, managed, developed and promoted in their own right and to support sustainable economic activity, job creation and recreational amenity.”

Project Personnel

The survey was carried out by and the report subsequently written by C. Wogerbauer B.Sc., Dr Karen Delanty and Dr M. O'Grady.

Acknowledgements

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1. Introduction

Lough O'Flynn was surveyed for fish stocks from the 14th to the 16th of October 2008, four years since the most recent survey in 2004 and 33 years since the first fisheries survey. Lough O'Flynn is a small, mesotrophic lake of 121.4 ha. It has been stocked since the 1970's with Brown trout from Roscrea fish farm. The Clooncrim stream, flowing into L. O'Flynn, is the only trout spawning and nursery stream in this sub-catchment of the R. Suck. It is inadequate in terms of its ability to generate sufficient wild trout to fully stock L. O'Flynn.

2. Methods

Ten gangs of 192.5m gill-nets were set across the lake at random locations overnight. Each gang of nets contain seven panels of equal length, every half inch mesh size, from 2" to 5" inclusively. Net locations are illustrated in Fig. 1. Research has shown that this method of gill-netting can catch a random cross-section of the trout population of all trout ≥ 19.8cm (O'Grady 1981a, O'Grady 1981b). The survey nets will also retain all perch ≥14cms and pike ≥35cms. All fish caught were retained. They were subsequently measured, weighed, scaled for ageing, assessed for sexual maturity, and dissected to identify diet. Although this method of gill-netting is fatal for all fish, it is estimated that the entire sample of fish is likely to be less than 0.001% of the fish population of a lake (O'Grady 1981a).

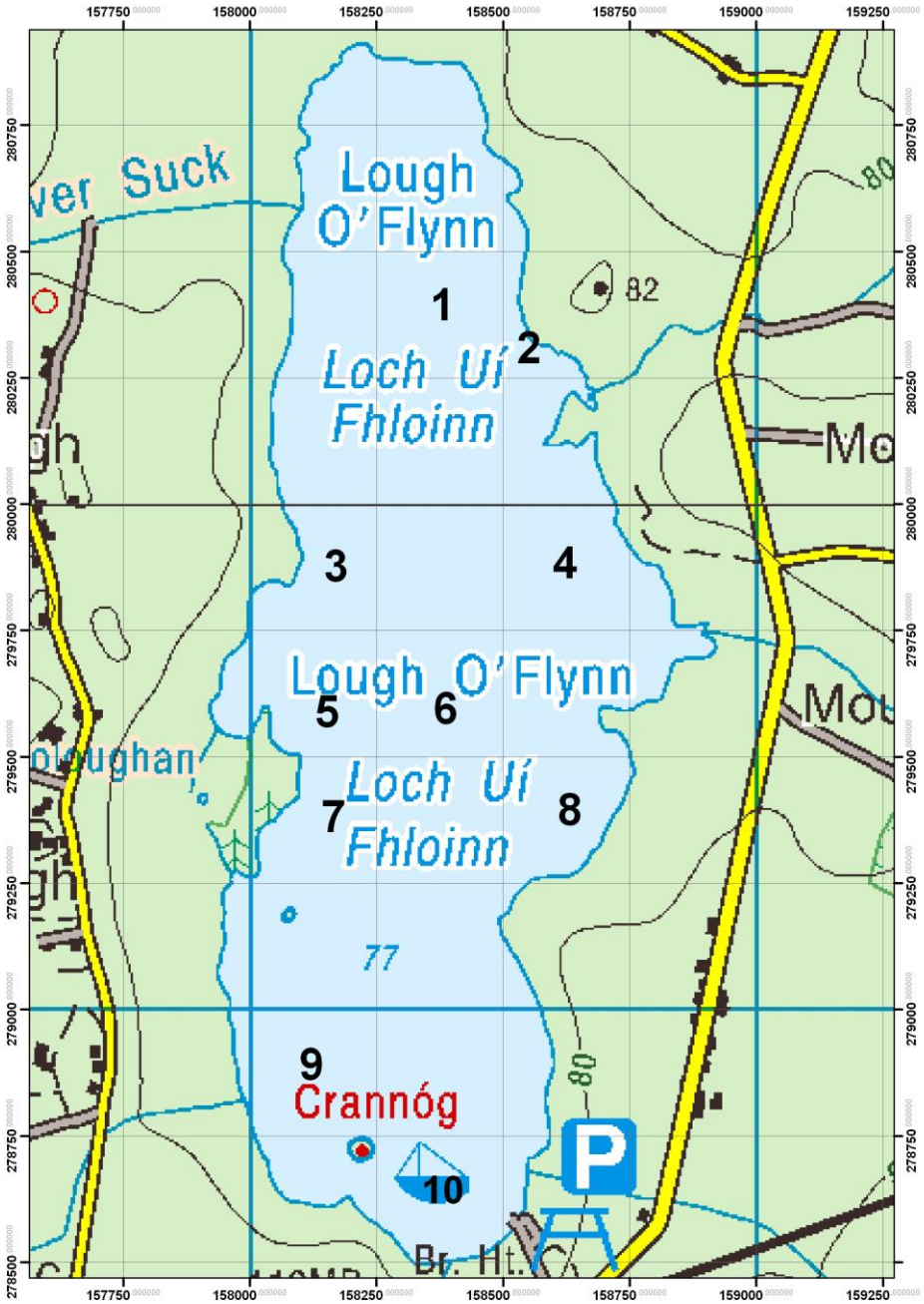

Fig. 1 Locations of gill-nets set in the Lough O'Flynn fish stock survey, 2008.

3. Results

Three species were encountered in this survey; Pike, Es*ox lucius*, Brown trout, *Salmo trutta* and Perch, *Perca fluviatilis*. In total 20 trout, 21 pike and 51 perch were encountered. The average trout weighed 0.51kg, the average pike weighed 2.5kg. Data on catches are presented as Catch Per Unit Effort values (CPUE) (Table 1). This allows one to compare the relative densities of different species in this survey and more importantly to look at the change in the relative densities of a particular species over many years. Wild brown trout figures have worsened since the 2004 survey, no wild trout were netted in 2008. Pike CPUE values have risen marginally, while Perch, which only entered the lake in the 1980's, have grown in numbers.

Table 1 CPUE results for L. O'Flynn since 1975

Survey Data	Pike	Perch	Brown Trout	Ratios of Wild to Stocked Trout
Oct-75	0.40	*	4.60	1:2
Oct-76	0.26	*	3.10	1:4.8
Oct-77	0.35	*	3.70	1:2.5
Oct-79	0.30	*	3.10	1:0.8
Oct-04	1.75	0.50	3.75	1:10
Oct-08	**2.00**	**3.70**	**2.00**	**no wild trout**

3.1 Brown Trout

A total of 20 stocked brown trout were caught in the gill nets. Of these, two were 3+ fish that had overwintered in the lake, the rest were 2+ year olds, stocked in 2008. The lengths of trout were within a narrow range of 30 – 40cm, consistent with farmed trout. The majority of trout stomachs were empty (80%). Of the remaining four fish, one had consumed invertebrates, one had consumed *Asellus* and two had consumed inedible plant material, similar in form to the pellets fed to stocked fish (Fig. 2). Only 15% of the brown trout were mature at the time of the survey.

* Perch were present in these surveys, but catch figures were not available for this report.

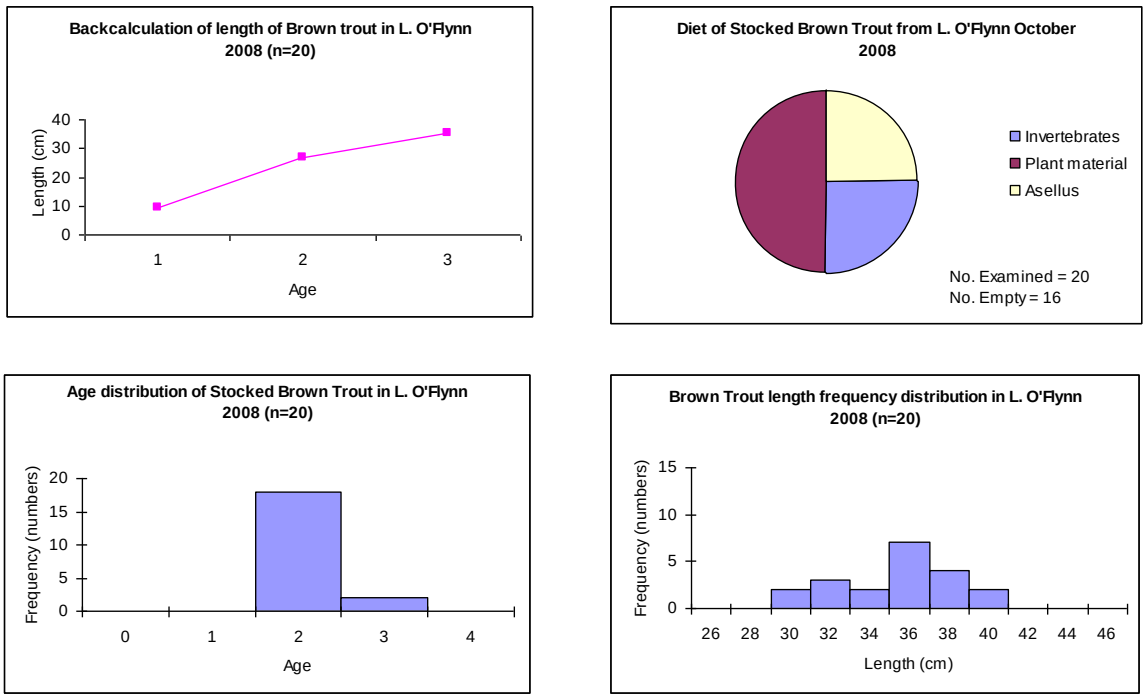

Fig. 2 Brown trout age, length, diet and growth patterns for L. O'Flynn, 2008.

3.2 Pike

Pike numbers have remained stable since 2004, although the population has grown since the 1970's. The pike stock has a high proportion of older fish, 38% of pike encountered were 5+ or older. A number of large individuals were encountered, with the majority of large pike being female – a feature of all pike populations. Food items found in pike stomachs ranged from invertebrates to crayfish to fish. Perch fry were the most common food item while it is worth noting that 2 out of the 3 largest pike were consuming crayfish, a high protein food source. Only one pike had consumed brown trout (Fig. 3).

It is clear from the length frequency distribution graph of Pike that the population has not been managed for a number of years as the distribution is approaching Normal. Previously, with pike control, pike stocks were limited to CPUE's as low as 0.26, but now have risen to 2.0.

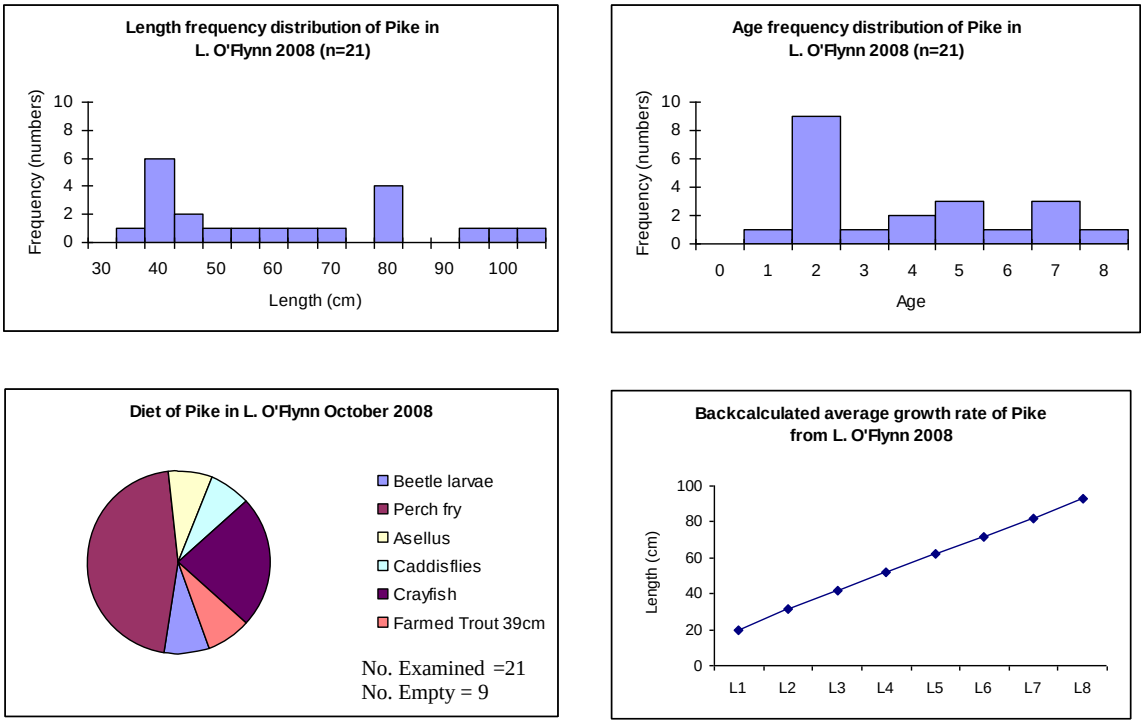

Fig. 3 Pike age, length, diet and growth patterns for L. O'Flynn, 2008.

Scales of pike encountered by the Shannon Regional Board staff during the 1980's and 1990's were made available to the Central Fisheries Board and provided invaluable data on the growth rates and size distribution of Pike in those years (Table 2 and Fig. 4). Lengths at various ages have remained remarkably stable between 1987 and 2008 considering pike are well known to have a high variability in growth rates. The boom in the pike population appears to have occurred in the 1990's as illustrated in Fig.'s 4 and 5. More older and longer pike were encountered in 1992 and 1996. However, the level of netting effort at this time is not known.

Table 2 Back-calculated lengths of Pike from selected years

Year	n	L1	L2	L3	L4	L5	L6	L7	L8	L9
1987	25	19.5	34	45.1	52.7	62.8	83	90	95.6	99.9
1988	11	19.2	34.5	45.9	55.9					
1992	28	20.1	34.8	47.8	60.0	68.1				
1996	31	19.1	33.7	45	56.6	70.3	80	85	91.9	100
2008	21	19.5	31.2	42	51.8	62.45	72	82	92.9	

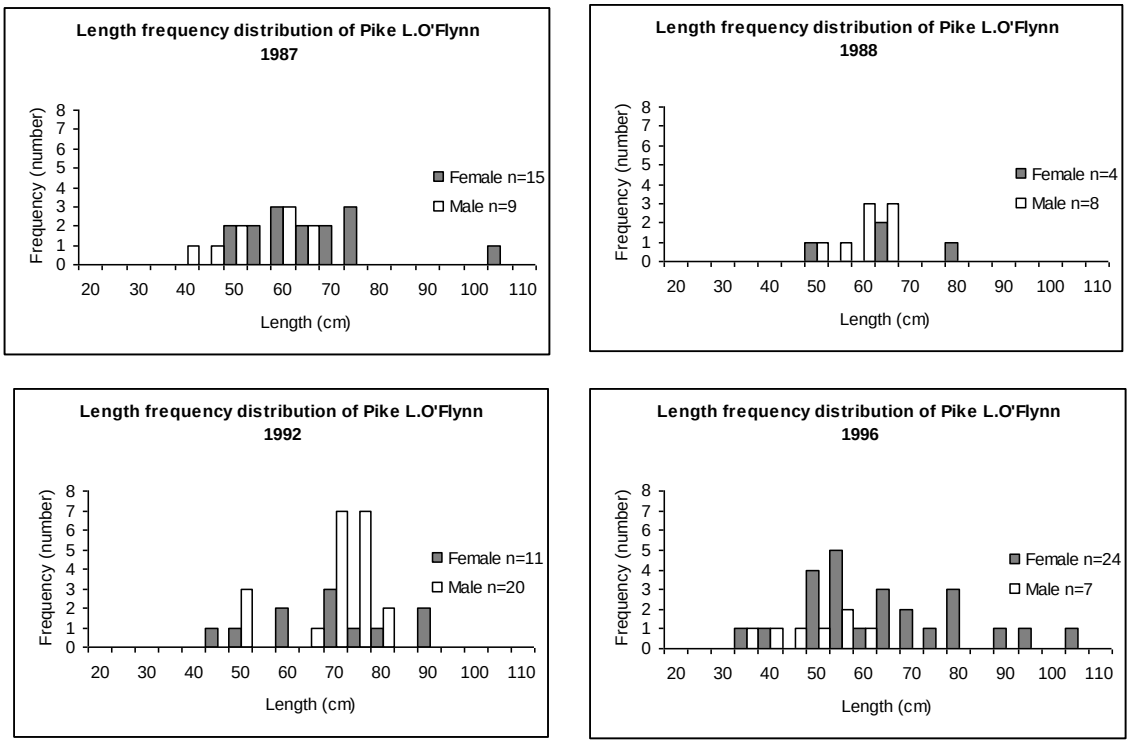

Fig. 4 Length frequency distribution of Pike encountered from 1987- 1996

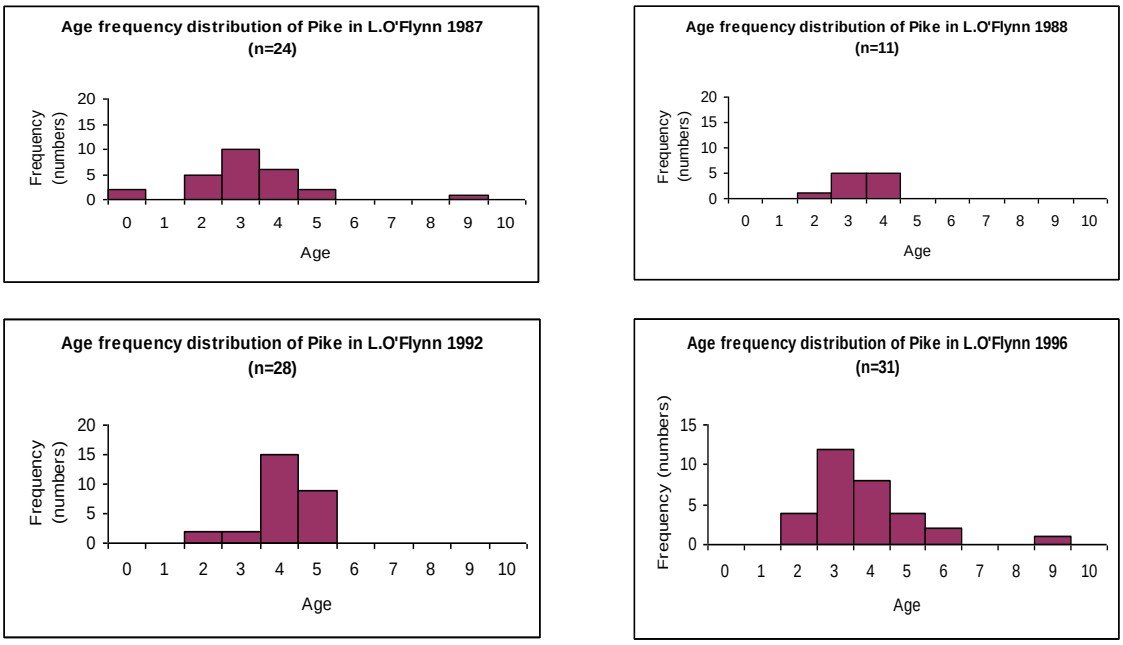

Fig. 5 Age frequency distribution of Pike encountered from 1987- 1996

3.3 Perch

The perch stock appears to be thriving and the length frequency distributions indicate a stable population, which has a Normal distribution.

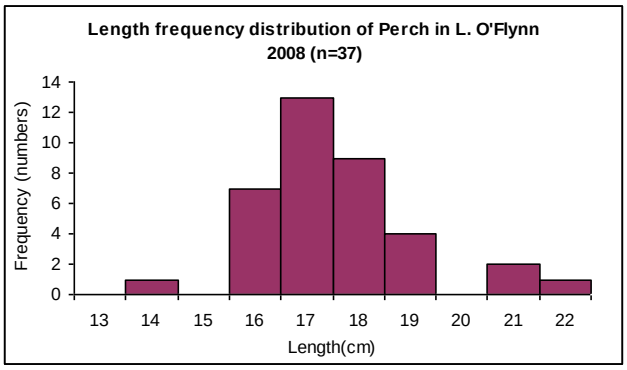

Fig. 6 Length frequency distribution of Perch from L. O'Flynn, 2008.

3.4 Roach

Roach were not caught in this survey, however as an intercalibration exercise, L. O'Flynn was surveyed simultaneously by the Water Framework Directive team. For the first time, roach were recorded from L. O'Flynn. 15 roach were encountered in benthic braided gill nets and the length frequency generated is displayed below (Fig. 7). The distribution of the population appears Normal. Roach are slow growing fish, so the largest fish in the lake may be between 5 and 7 years old. Roach can take advantage of resources in a lake not available to other fish, so their presence has probably increased the biomass of fodder fish to pike.

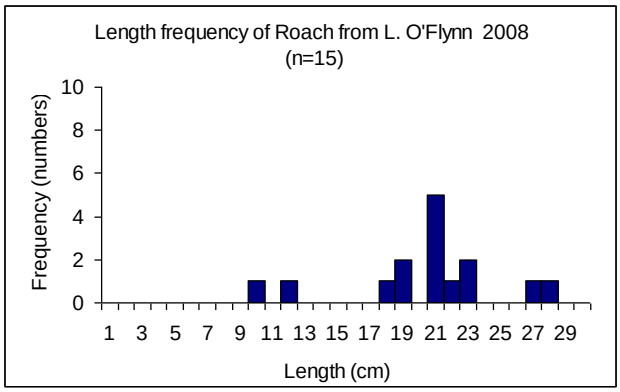

Fig. 7 Length frequency of Roach population in L. O'Flynn from the Water Framework Directive survey (October 2008)

3.5 Hydrochemistry

Table 3. Hydrochemical measurements of L. O'Flynn

Location	Date	Conductivity µS/cm	Alkalinity meq/L	Chlorophyll µg/L
L. O'Flynn South Shore	07-Dec-04	299	2.74	0.695
L. O'Flynn Close to Lake Outflow	07-Dec-04	264	2.37	0.695
L O' Flynn	30-Mar-07	n/a	n/a	5.246
L O' Flynn	15-Oct-08	266	2.45	3.074

The hydrochemistry of the lake appears stable, apart from elevated Chlorophyll values of unknown origin which may require investigation. Abundance of algae may indicate some nutrient input to the lake.

4. Conclusion and Management Recommendations

Since the previous survey, October 2004, the Pike population appears to have remained static, however the Perch population has grown and the CPUE of Brown Trout is down this year from 3.75 (2004) to 2.0 (2008) which is a significant drop. In 2004, the author suggested that the trout carrying capacity of the lake had remained stable from the 1970's to 2004 within a range of 3.1-4.6 trout per unit effort. Clearly the 2008 results indicate a marked decline in the trout stock of L. O'Flynn, both in terms of the wild brown trout stock and in terms of the farmed trout population.

The pike population has grown since the 1970's surveys due to the lack of pike-culling. The recent invasion of roach into the lake has also provided pike with a larger food base allowing the pike population to thrive. The reduction in trout stock is due to a combination of a lack of pike control, competition with roach and a necessity for enhancement of Clooncrim stream.

Lough O'Flynn is a mesotrophic lake. Water chemistry analysis indicates the lake's hydrochemistry was relatively stable between 2004 and 2008, although Chlorophyll levels appear elevated.

The authors suggest the condition of Clooncrim stream should be reviewed and an enhancement program be designed and implemented if necessary. Also, the pike-control program should be reinstated if the trout populations are to be given an opportunity to succeed.

5. References

O'Grady M.F. 1981a. A study of brown trout (*Salmo trutta L.*) populations in selected Irish lakes. Ph. D. Thesis, National University of Ireland.

O'Grady M.F. 1981b. Some direct gill-net selectivity tests for brown trout populations. *Irish Fisheries Investigation Series A* **22:** 1-9.

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