

**A Review Of Fish Stocks In Lough Ennell, Co. Westmeath, (1983-2004)
And Recommendations For The Future Management Of This Resource**



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An Príomh-Bhord Iascaigh

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Introduction

Fish stock surveys have been carried out on Lough Ennell on seven occasions from 1983 to-date (2004). This report reviews the trends observe over this period and presents recommendations for the future management of this fishery.

Methodologies

A standard gill netting survey procedure designed originally by O’Grady (1981) has been used to carry out all of these surveys. The survey dates have been consistent on each occasion – i.e. all surveys were carried out in spring time. This is an important point – it means that the data sets are directly comparable. The level of activity of our fishes, being cold-blooded animals, is primarily controlled by temperature. Consequently, for comparative purposes, it is essential that surveys be carried out in the same seasonal period each year.

Year on year the relative density of any fish species is compared in C.P.U.E. terms (Catch per unit of Effort) – the total number of fish caught is divided by the number of net gangs fished to arrive at a C.P.U.E. value.

- [the C.P.U.E. data for all fish species captured in all surveys is presented in Table 1].

Results and Trends

Over the period 1983 to 2004 a total of eight fish species have been recorded in the surveys – brown trout, pike, perch, roach, rudd, rudd/bream hybrids, rudd/roach hybrids and tench. Stocked fish from brown trout were also present in the fishery in the 1980’s.

Brown Trout

Fluctuations in the standing crop of wild brown trout in Lough Ennell over the period 1983 to 2004 are illustrated in C.P.U.E. terms (Fig. 1). Survey data over the

period 1983 to 1999 recorded trout C.P.U.E. values ranging from 1.5 to 2.6. These are moderate value by Irish standards. Since 2002 there has been a very significant improvement in C.P.U.E. values – 4.0 in 2002 and 3.5 in 2004. Given the large average size of trout in Lough Ennell (Fig. 2), C.P.U.E. values in the range 3.5 to 4.0 reflect the presence of an excellent stock – among the best ever recorded in any Irish water.

In the author's opinion the substantial increase (260%) in the wild brown trout stock in Lough Ennell in recent years compared to the 1980's is due to the success of the T.A.M. stream enhancement programme carried out by the Sh.R.F.B. in the late 1990's. O'Grady *et al* (2002) showed that a majority of the adult trout in Lough Ennell over the period 1983 to 1992 had emigrated to the lake as 1+ year-old fish. This was despite the fact that the ratio of fry (0+) to parr (1+) in the streams, at that time, was 22.3 to 1. Fry were the dominant group in the streams, at that time, because the streams were artificially wide and shallow, lacked pool areas and, in many reaches, had no bank cover. The objective of the stream enhancement programme was to restore the natural physical form of the streams thereby greatly increasing their capacity to support 1+ year-old trout. Monitoring programmes show that there was almost a 900% increase in numbers of 1+ year-old trout in the stream post-enhancement (O'Grady *et al*, 2002). This change is responsible for the major increase in the stock density of adult trout in the lake in recent years.

An estimate of the trout standing crop in all of the Ennell stream sub-catchments, post-enhancement indicates the presence of 56,055 fry and 48,517 parr – these can be regarded as minimum values because they do not take account of fish numbers in areas which were not enhanced – i.e. headwaters and very low gradient reaches of some individual channels. In the authors opinion this level of juvenile stock is adequate to maintain optimum numbers of adult trout in the lake. In future years it is likely that factors, other than the recruitment of juvenile fish, will determine the size of the trout stock in the lake.

Trout in Lough Ennell over the entire survey period (1983-2004) have always been relatively fast growing short lived individuals (Fig. 2). The adult stock is dominated by three age groups – 3+, 4+ and 5+ year-old fish with few fish being

beyond their sixth year. This is the norm for an Irish limestone lake brown trout population in recent decades where ferox trout are absent. In future years one may see a slight change in stock structure with some fish living longer and reaching an even larger size than heretofore. Research has shown that some trout in Lough Sheelin stock in the 1930's lived longer and reached a larger size than trout in some lakes in the 1970's. These bigger older fish had generally spent two to three years in a stream before migrating to the lake. Their initial slower growth (because they were stream dwellers) probably meant that they matured first as older fish but lived longer and eventually reached a larger average size. Now that some fish have the option of remaining in the Lough Ennell and Sheelin stream catchments until 2+ or even 3+ years of age we may see some longer lived older trout in the adult stock in both lakes in future years.

The Pike Population

Over the survey period (1983 to 2004) the pike stock has been relatively small and dominated by young adult fish (Fig. 3) – this is as one would expect in a fishery where the adult pike stocks was being managed. Pike netting operations ceased on Lough Ennell in April, 2003 (D. Broughan, pers comm.).

Perch Stocks

The netting surveys on Lough Ennell excludes a sampling programme in the very deep central trough of this water. Experimental netting programmes, prior to 1983, had shown that trout were not present in significant numbers in this area in springtime. In contrast the entire perch stock in Lough Ennell hibernate in this deep trough from November through to late March. Consequently when the netting surveys are being carried out in March a majority of the perch stock may still be overwintering in the deep area – i.e. they will not be available for capture in the survey nets. Consequently perch C.P.U.E. values in the survey data are erratic ranging from 0 to a maximum value of 2. These data do not necessarily reflect the status of the perch stock in this water. Consequently meaningful comment on the fluctuation in the perch stock from 1983 to date is not possible.

Roach Stocks and Other Cyprinids

In most Irish brown trout lakes roach, once introduced have prospered. While individual year-classes have fluctuated in terms of size there tends to be at least moderate recruitment of juvenile fish from year to year. This has not been the case in Lough Ennell.

Roach were first recorded in Lough Ennell in 1979 when a few adult fish (7) were caught during perch trawling operations. Subsequently in the annual gill-netting surveys in 1983, '84 and '85 no roach were recorded. One roach was caught in the 1992 survey. The first substantial numbers of roach caught in an annual gill-netting survey was in 1999. Very large numbers were subsequently caught in the 2002 and a small number in the 2004 survey (Fig. 4). An examination of the roach samples captured in the 1999, 2002 and 2004 surveys indicate that this is not a balanced roach population with young fish recruiting into the stock annual (Fig. 5). The survey gill nets used are capable of capturing roach in significant numbers once they are ≥ 16 cms in length. The factor or factors which are severely limiting the reproduction of roach in L. Ennell are unknown.

Small numbers of roach/bream and roach/rudd hybrids were also captured in the 1999, '02 and '04 surveys. None were present in significant numbers.

Management Recommendations

1. Lough Ennell presently supports one of the finest stocks of wild brown trout ever noted in an Irish fishery. This fact should form the basis of a promotional campaign.
2. Great care should be taken to ensure that the work of the excellent stream enhancement programme is not undone by drainage maintenance programmes. The Lough Ennell streams are entrenched because of past drainage practices. This means that a lot of sediment, suspended during flood flows will not deposit out on the flood plain – it will deposit on point bars within the entrenched channel. Over time maintenance (lowering) of these point bars, in order to accommodate flood flows, may be necessary. Where this is necessary it is crucial that the narrow summer fishery channel within the broader drainage channel not be disturbed – i.e.

- point bars should only be lowered to a level which is *circa* 5cms higher than summer water level.
3. Two maintenance operations are necessary on an ongoing basis in the Lough Ennell stream catchment: -
 - a) It is imperative that spawning gravel deposits be tossed on a rota basis in all channels to alleviate the calcification process. This can be most efficiently carried out with a hydraulic machine.
 - b) All fences erected during the T.A.M. programme should be inspected annually and maintained where necessary.
 4. Another fish stock survey should be carried out in 2006 or 2007 with three particular objectives:-
 - a) To see if the cessation of the pike gill-netting programme has lead to a major change in either size or structure of the pike population.
 - b) To establish, whether or not, a larger pike population, if present at that time, is impacting negatively on the trout population.
 - c) To check the age-class structure of the trout population for the anticipated changes outlined in this report.
 5. The Shannon Regional Fisheries Board might consider installing a temporary upstream and downstream traps in one of the Lough Ennell streams to study both the seasonal movements of fish from the stream to the lake and *vice versa*.

