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Preliminary Observations in Relation to an Adult Fish Stock Survey of L. Corrib completed in February/March, 2012

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1. Introduction

An adult fish stock survey of Lough Corrib was carried out by Inland Fisheries Ireland over the period February 27th to March 15th. This is the second such survey on the Lough, the only other complete survey having been carried out previously in 1996. The primary objective of the exercise was to update IFI's knowledge in relation to the status of fish stocks in this water in the knowledge that there have been a number of major ecological changes in this water since the previous survey was undertaken in 1996 – Roach have now had a thirty year period to integrate with other stocks in the lake, a population of Zebra Mussels has become established in this water since the early 2000's and, more recently, a South African aquatic plant (*Lagarosiphon major*) has been growing vigorously in parts of the lake. A management programme is in place to control the latter species.

The results of 1996 survey suggested that Arctic Char, a native fish species in L. Corrib, appeared to have become extinct in the 1990's. It was hoped that the recent survey (2012) would update the status of this fish species

In 2007 and 2008 a micro-satellite DNA study of the trout stocks were carried out in the Corrib Catchment. This allowed IFI to genetically identify the individual stocks from the major stream catchments and, subsequently, to determine the contribution of each of these to the mixed adult stock in the lake. The present survey provides the opportunity to repeat this exercise at reasonable cost because the original genetic patterns for each tributary sub catchment will still be valid and therefore only the adult sample from the lake needs to be examined genetically. This exercise will answer two questions;-

a) Has the contribution of trout from individual sub catchments to the adult stock in the lake changed since 2008?
b) The fact that a GPS reading is available for every trout captured in the 2012 survey means that, for the first time, the distribution of fish from the individual tributaries throughout the lake itself can be determined.

The reader should note that comment on the status of stocks in this document is provisional. Detailed analysis of the data is required before more definitive comment can be provided.

2. Methodologies

A lake fish stock sampling programme, developed and in use since the 1970's on all Irish trout loughs, was employed. This involves using special survey gill nets to capture a representative cross section of the adult fish stocks present. The catch effort employed allows for the comparison of the numbers and size range of fish captured in this exercise to previous surveys on this and other

waters. The survey methodology employed in the 2012 survey was exactly the same as that used in the previous survey of 1996. Both surveys (1996 and 2012) involved sampling a total of 250 randomly chosen locations in the lake at the same time of year over a three week period (late February/early March). The same locations were sampled in both surveys (Figure 1).

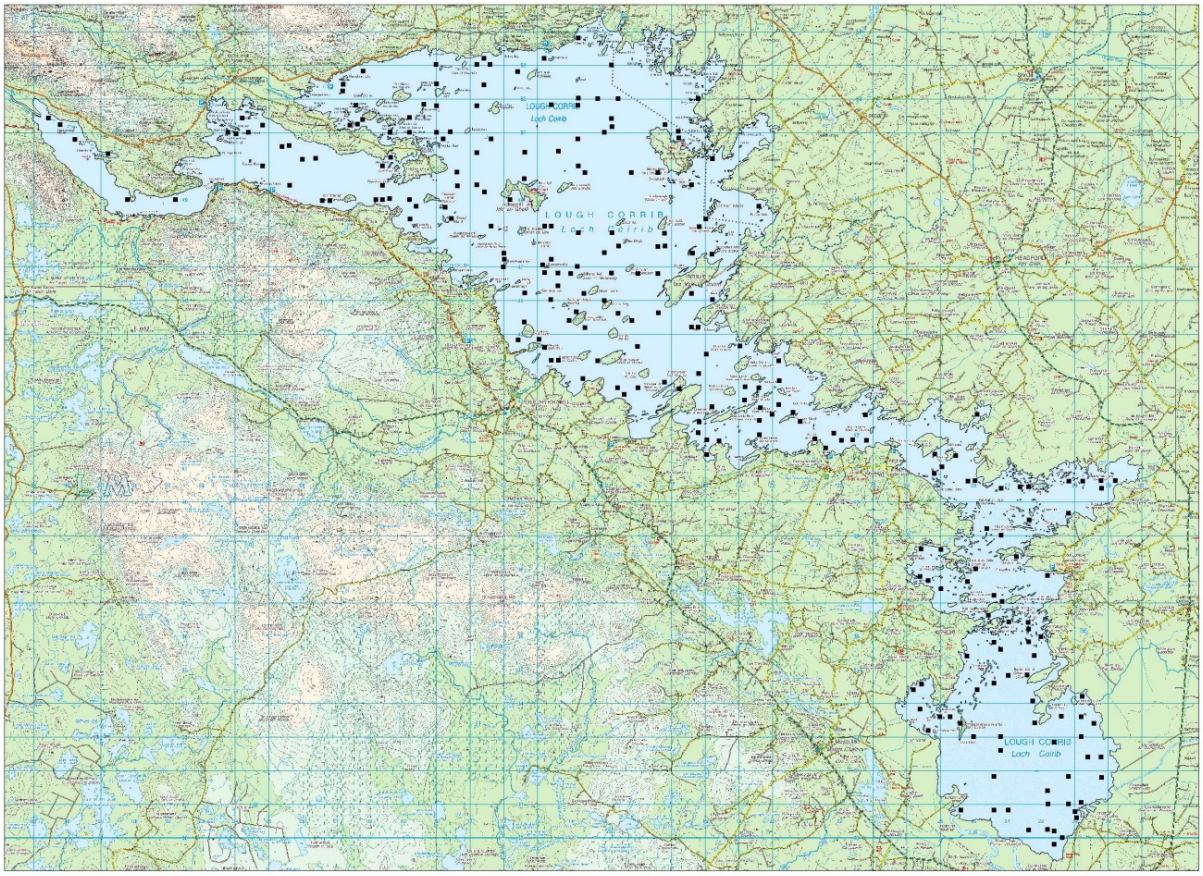

Figure 1. The location of the fish stock sampling sites on L. Corrib in both the 1996 and 2012 surveys.

3. Results

The results presented within this section are preliminary. A detailed and comprehensive report and review of the status of the Lough Corrib brown trout fishery will be made available and published later in 2012.

The total numbers of fish captured in both (1996 and 2012) surveys are outlined in Table 1.

Table 1. L. Corrib Survey Catches

	1996			2012		
Fish Species	Released	Retained	Total	Released	Retained	Total
Brown Trout	358	130	488	259	125	384
Pike	0	461	461	13	231	248
Perch	0	21	21	0	687	687
Roach	0	1240	1240	0	1409	1409
Rudd	0	5	5	0	1	1
Bream	0	0	0	0	33	33
Roach/Bream Hybrids	0	63	63	0	642	642
Rudd/Bream Hybrids	0	1	1	0	0	0
Salmon Kelts	0	1	1	4	1	5
Salmon Smolts	0	0	0	0	1	1
Char	0	0	0	0	0	0
Adult Lamprey	0	0	0	0	1	1

Data indicate a number of significant changes in the relative abundance of different fishes in the stock in 2012 compared to 1996(Table 1). The most significant changes can be summarised as follows;-

1. There has been a marked decline in trout numbers – from 488 fish in 1996 to 384 fish in 2012.
2. A very significant reduction in the adult pike population is evident – from 461 fish in 1996 to 248 individuals in 2012.
3. A major recovery in perch stocks is evident with the catch increasing from 21 in the 1996 survey to 687 fish in 2012.
4. The adult Roach population recorded in both years is similar – 1240 fish in 1996 and 1409 individuals in 2012.

5. There has been an expansion of the Bream stock. No Bream were captured in the1996 survey while 33 were noted in the 2012 exercise.
6. A very substantial increase in the Roach/Bream hybrid population is evident in 2012 (642 fish) compared to 1996 (63 fish).
7. Regrettably no Char were captured in either the 1996 or 2012 surveys suggesting that this species, in L Corrib, is probably extinct.

3.1. Observations on Stock Changes in relation to Individual Species

3.1.1. Brown Trout

The status of the brown trout stock in L. Corrib in 2012 is quite different to that observed in 1996 (Figure 2).

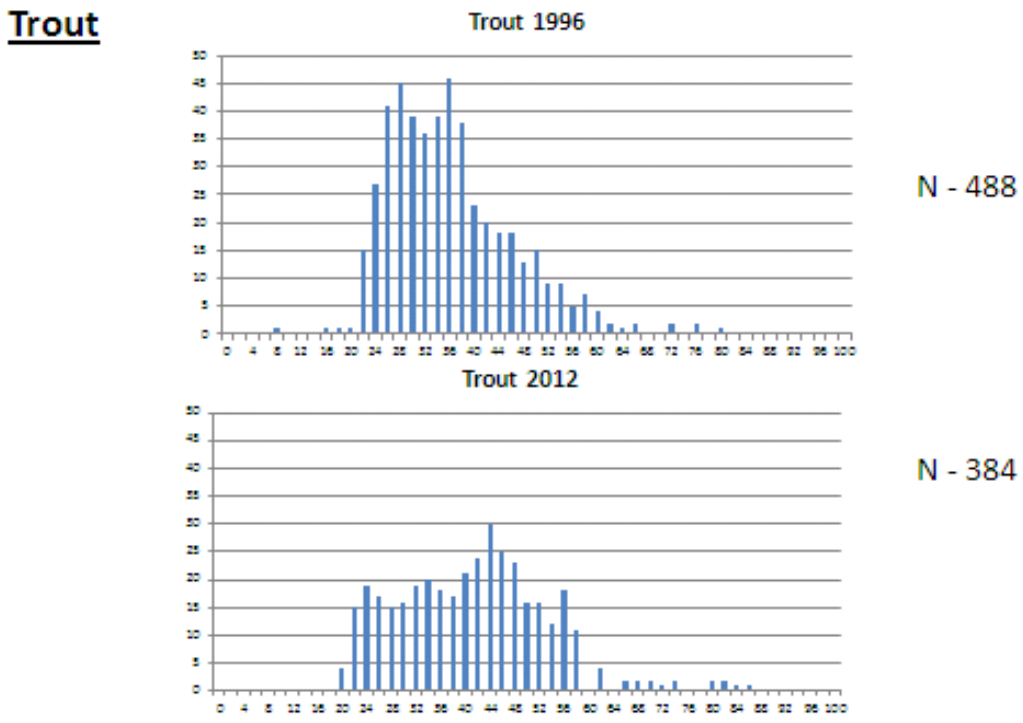

Figure 2. Percentage length frequency distribution and N values for brown trout in the 1996 and 2012 surveys.

The size and stock structure of the trout population, as measured in the 1996 survey, represents the ideal in fishery management terms – substantial numbers of young adult fish (< 40cm) many of whom will be large enough to be cropped by anglers in the 1996 and 1997 angling seasons. The numbers of older larger fish (≥ 40cm) will ensure a good spawning population in the following year. The angling catches in both 1996 and 1997 were considered to be good (M. Butler, pers com.).

In contrast the 2012 survey data differs markedly from the 1996 data in two respects;-

1. The C.P.U.E. value has fallen from 1.95 in 1996 to 1.54 in 2012.
2. A significant change in stock structure is evident in 2012 with the younger component of the stock being less well represented in the population than they were in 1996.

These changes are likely to have the following short term impacts;-

a. Trout angling catches may fall somewhat in 2012 compared to previous years in overall numerical terms, while the average size of fish caught is likely to increase. The long-term IFI data base for lake trout C.P.U.E. values suggests that the current value of 1.54 for L. Corrib is adequate to provide good angling returns during favourable angling conditions.
b. The current stock of adult trout should be adequate to fully spawn the catchment next winter (2012/13).
c. The current relatively poor stock of younger fish (< 40cm) is of greater concern. This will inevitably result in relatively poor angling returns in the 2013 season and a reduction in the trout spawning effort in both the winters of 2013/14 and 2014/15.

The stomach contents of all trout retained were examined and recorded at the processing stage. While these require further analysis initial observation suggests that the trout's dietary habits, at the time of the survey, were exactly what would be expected in springtime in an Irish limestone lough – largely Asellus, Gammarus and Gastropod's with fish in a few areas starting to feed on Chironomid pupae (Duck fly).No new invasive species of macroinvertebrate was observed among the dietary items.

3.1.2. Perch

There has been a remarkable change in the perch stock in L. Corrib in 2012 compared to 1996 (Figure3).

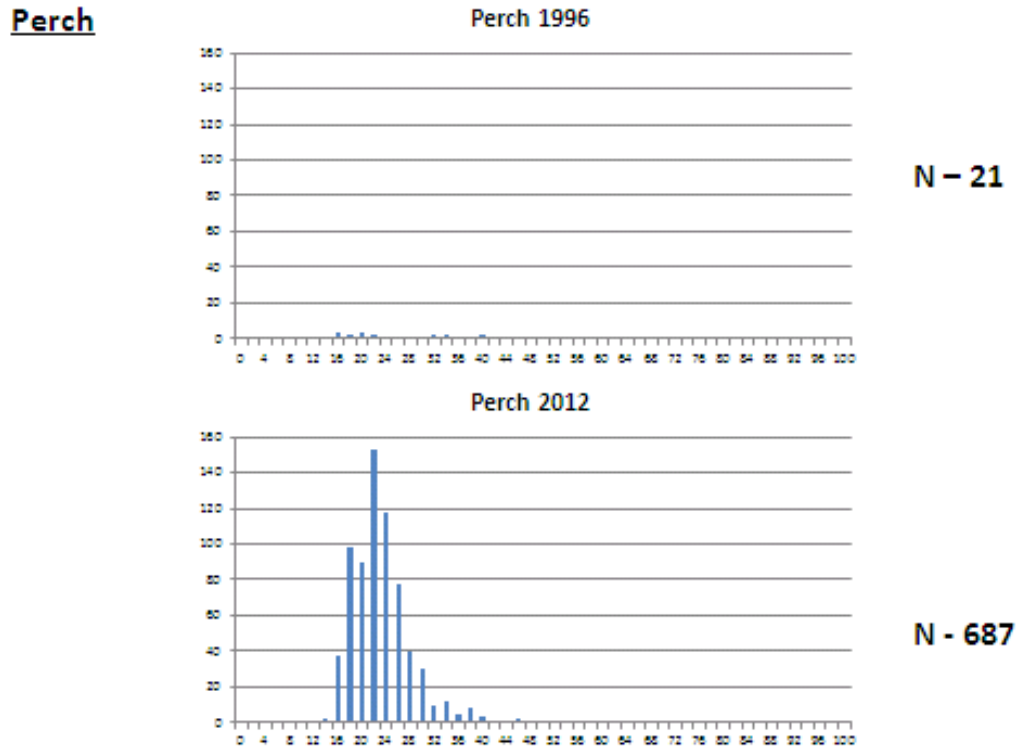

Figure 3. Percentage length frequency distribution and N values for Perch in the 1996 and 2012 surveys.

There has been a recovery in the perch stock in L. Corrib over the period 1996 to date (2012).This population was close to extinction in 1996. The 2012 data indicates the recovery of this stock to what would be called a “normal” adult perch stock in a productive Irish lake in terms of stock structure. The C.P.U.E. value for perch in the Corrib 2012 survey (2.75) would be regarded as “moderate” relative to values recorded previously for other Irish lakes.

3.1.3. Roach

The structure and size of the Roach stock recorded in L. Corrib in both 1996 and 2012 are remarkably similar (Figure 4).

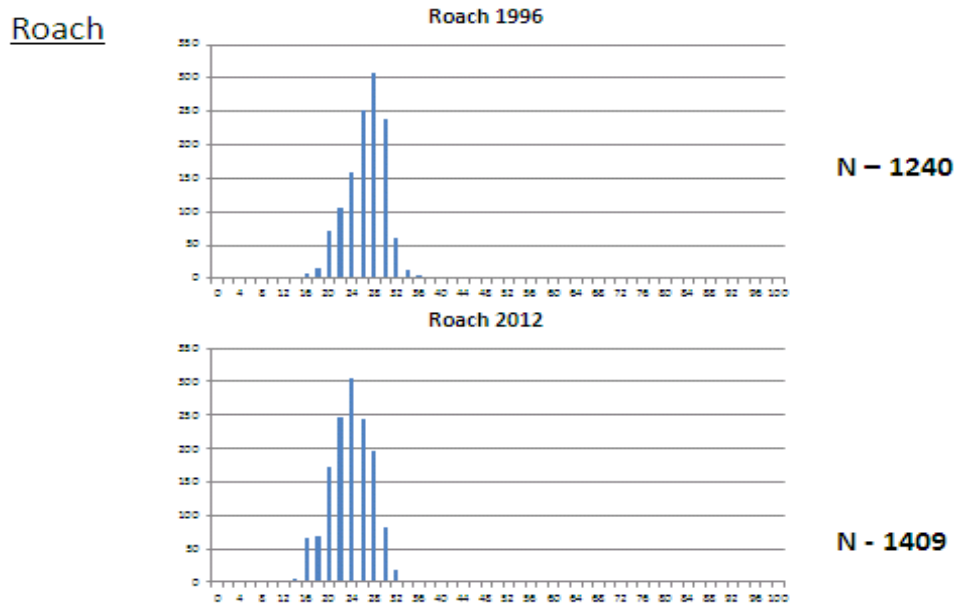

Figure 4. Percentage length frequency distributions and N values for Roach in the 1996 and 2012 surveys of L. Corrib.

These indicate the presence of a large stable roach population in the lake on both occasions. The C.P.U.E. values for Roach recorded in both surveys are very similar (5.0 and 5.6 respectively). Data from previous lake surveys on other waters would rate these C.P.U.E. values as moderate compared to Roach standing crops recorded on highly eutrophic Irish waters in the past.

In two of the midland trout lakes (L. Derravaragh and L. Sheelin), following the establishment of a zebra mussel populations, very large roach populations collapsed and have remained since at a "low background level". A comparison of the Roach data from the 1996 and 2012 L. Corrib surveys indicate that the zebra mussel stock in L.Corrib has not had the same impact on roach stocks in this water.

3.1.4. Bream

No bream were captured in the 1996 survey although this species was known to be present in small numbers in L.Corrib at that time. A total of 33 bream were captured in the 2012 survey indicating an expansion of this fish stock in the lake since 1996.

3.1.5. Roach/Bream Hybrids

Major changes are evident in the stock of this species in L. Corrib in 2012 compared to 1996 (Figure 5).

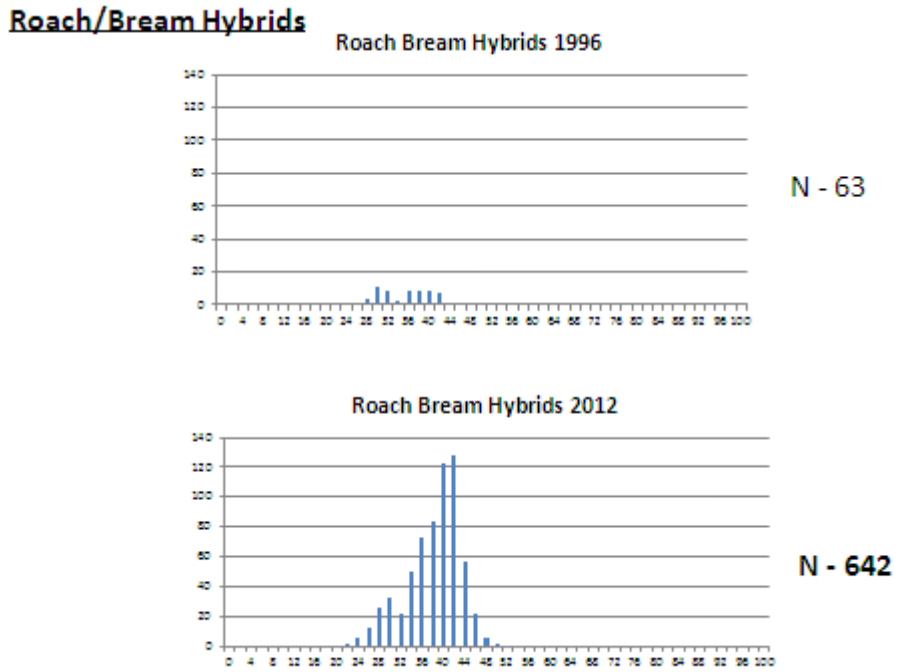

Figure 5. Percentage length frequency distribution and N values for the Roach /Bream hybrid stocks in the 1996 and 2012 surveys of L. Corrib.

A very small population of this species was recorded in the 1996 survey. In contrast a substantial stock of very big roach/bream hybrids were captured in the 2012 survey – comparable C.P.U.E. values for the two surveys were 0.25 and 2.6 respectively. The stock of this species in L. Corrib in 2012 is very unbalanced, being dominated by a number of year classes of older fish. This is one of the largest stocks of big roach/bream hybrids that the author has encountered since this type of fish stock survey was first employed in 1976.

3.1.6. Pike

Data indicate significant changes in the pike stock in L. Corrib in 2012 compared to 1996 (Figure 6).

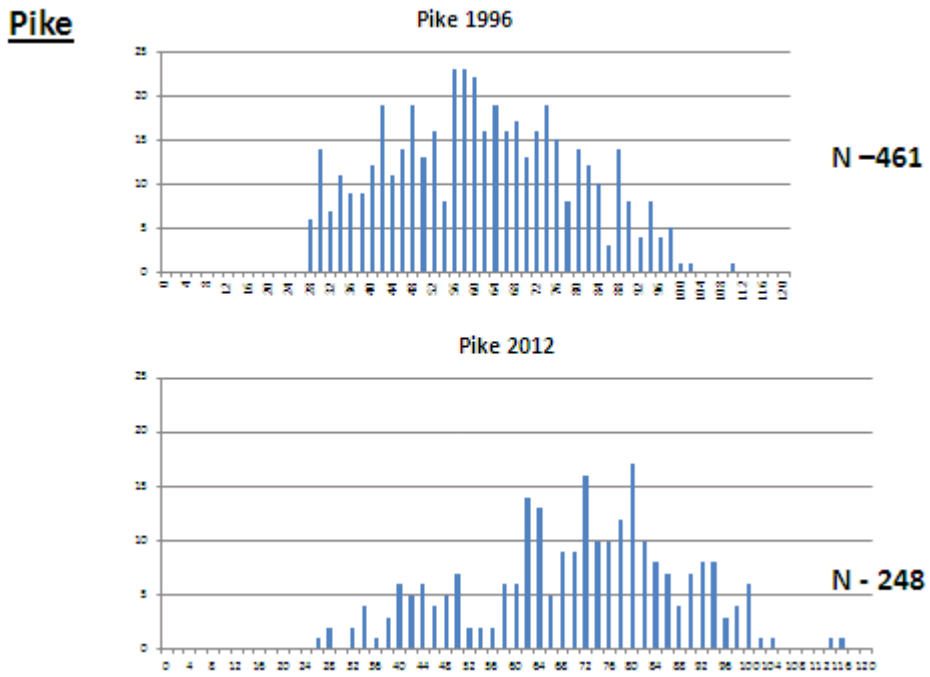

Figure 6. Percentage length frequency histograms and N values for the pike samples in the 1996 and 2012 surveys.

There are three significant differences between the pike data sets from 1996 and 2012;-

1. There has been a significant overall reduction in the numerical size of the pike population in 2012 compared to 1996 with the C.P.U.E. value falling from 1.84 in 1996 to 0.99 in 2012.
2. The numbers of large adult pike (≥ 60 cm.) have declined.
3. There has been a very significant decline in the recruitment rate of young adult pike (35cm – 60cm) to the L. Corrib stock in the last few years. This is the first time in over thirty five years of survey programmes on Irish trout loughs that the author has observed this phenomenon.

The current status of the pike stock in L. Corrib suggests the following;-

a- The on-going adult pike management programme is proving successful.
b- The lake electro fishing programme, designed to limit recruitment of juvenile pike to the adult stock, is proving effective.

4. Summary Comment

The reader should note that the following comment is provisional. More detailed analysis of the data and a review of records from the Galway Office are required before definitive comment can be provided.

- Currently (2012) there is a reduction in the standing crop of trout in L. Corrib compared to 1996. Recruitment, and/ or survival, of 2+ and 3+ year-old trout to the lake have been relatively poor.
- The trout stock in L. Corrib presently should be adequate to provide good angling returns in the current angling season with some reduction in the average catch, per rod, per day but an increase in the average weight of fish caught.
- Trout angling returns may decline in the 2013 and 2014 seasons due to the relatively poor status of the current 2+ and 3+ year old trout year classes.
- In the authors opinion the relatively poor young adult trout year classes are most likely due to a reduced survival of young fish after they migrate to the lake as opposed to a reduction in the recruitment rate of young fish.

There is no information available to suggest that recruitment rates of trout to L. Corrib in recent years would have declined because of a reduced capacity of the streams to produce fish. On the contrary reduced pollution levels, a decline in the sheep overgrazing problem and on-going stream enhancement programmes in recent years would favour increased trout production in these rivers. Extreme lengthy summer drought conditions can also result in reduced trout production. However, such conditions have not occurred in this area in recent years.

The 2012 survey data point to a significant decline in adult pike stocks compared to 1996, a time when trout stocks in the lake were higher. In these circumstances predation by pike on trout cannot be held responsible for the reduced trout stock.

If excessive angling catches were responsible for reducing trout stocks in recent years then a significant reduction should be seen in the numbers of larger older fish in the 2012 survey – this is not the case. It is the smaller fish, not the larger individuals, which are poorly represented in the stock (Figure 2).

In the next few years there will be a major decline in the roach/bream stock in L. Corrib. Currently this population in L. Corrib is completely dominated by larger older fish (see Figure 5). This may benefit trout standing crops in the longer term.

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