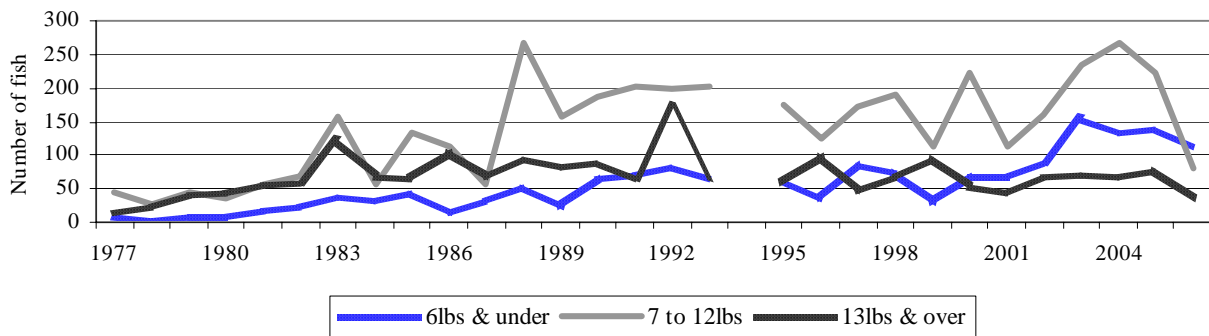


There having been considerable interest in the numbers of small grilse caught during the 2006 season, an investigation was carried out by the Tweed Foundation. The first question to answer was whether the numbers of small fish caught in 2006 were a “one-off” phenomenon or part of a longer trend. To answer this, by kind permission of the proprietors, the Foundation’s copies of the catch records of two major fisheries, one in the lower river and the other in the middle river were brought up to date for analysis.

1: Lower Tweed :

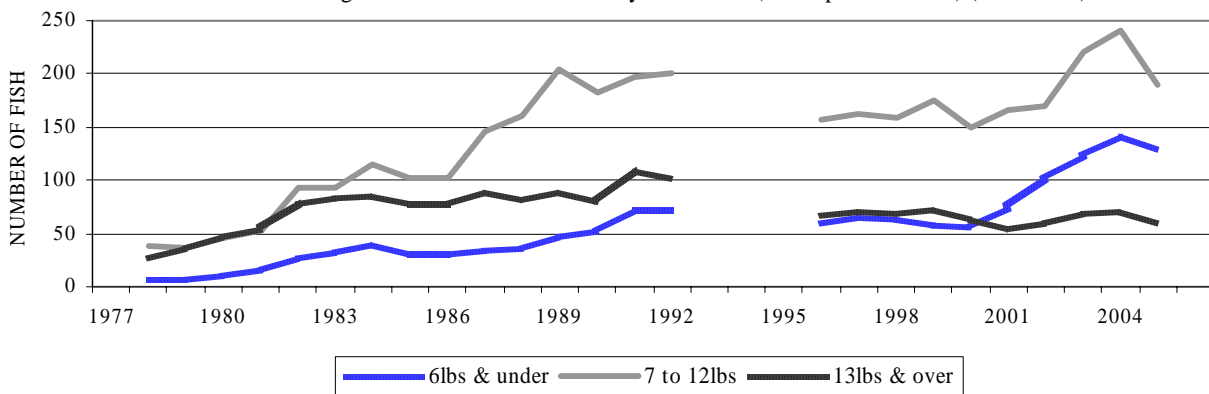
The raw annual catch figures for this beat show a general increase in the total number of fish being caught in the last three months of the season (September, October and November) but different trends within this increase for broad size categories (6lbs & under, 7 to 12lbs and 13lbs & over) – numbers in the first category have been increasing while those in the last have been declining.

Sizes of Salmon caught at a Lower Tweed fishery 1977-2006 (1st Sept>30th Nov)



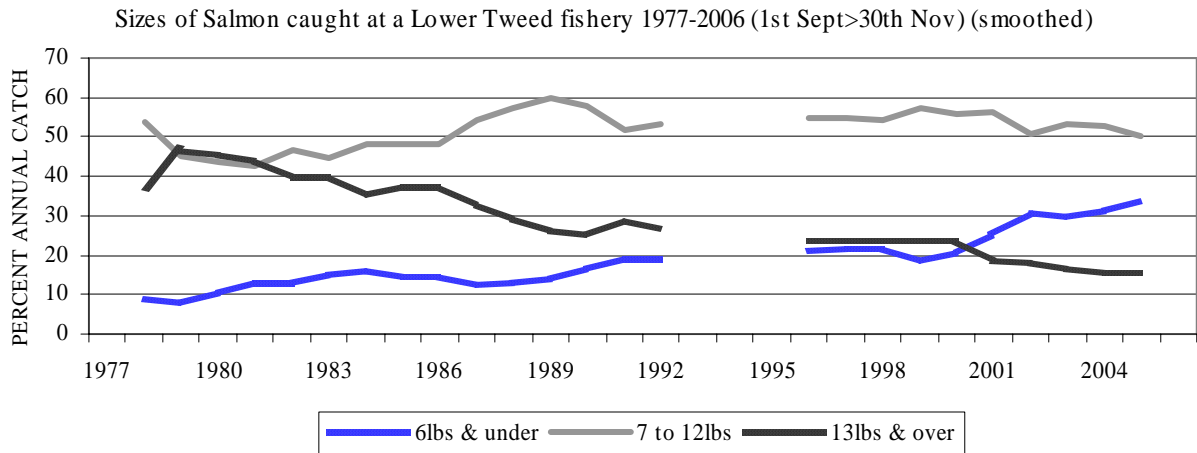
There is considerable year to year variation which can be “smoothed” out by averaging the catch total for a year with those of the years before and after : i.e. for the year 2000 the catch total used is the average of the catches of 1999, 2000 & 2001; for the year 2001 the catch total used is the average of the catches of 2000, 2001 and 2002 and so on. If this is done, then the underlying trends become much clearer :

Sizes of Salmon caught at a Lower Tweed fishery 1977-2006 (1st Sept>30th Nov) (smoothed)



While total numbers caught increase over the period, numbers of those of 13lbs & over decline gently from around 75 to 100 a year in the 1980’s and early 1990’s to around 50 to 75 a year from the mid-1990’s onwards. The rising numbers of fish of 6lbs and under first match the numbers of

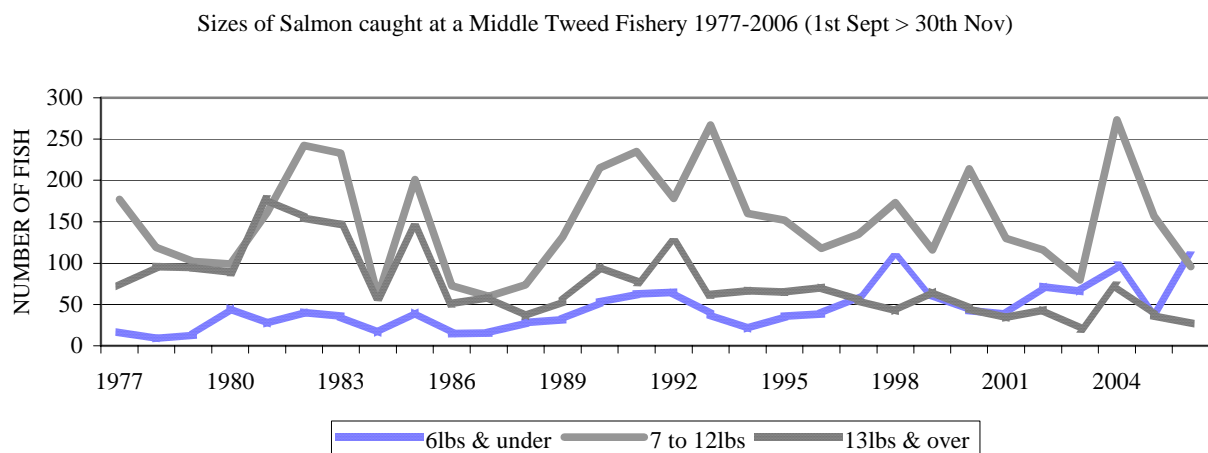
larger fish in the mid-1990's and then overtake them around the year 2000. If the percentages that the three size categories make up of the annual catch totals are smoothed in the same way, the trends become clearer still :



From this it can be seen that the decline in the proportion of the annual catches produced by fish of 13lbs and over has been in constant decline since the late 1970's, falling below the proportion produced by fish of 7 to 12lbs around 1980 and then below the proportion produced by fish of 6lbs & less around the year 2000. The proportion of the annual catch made up of fish of 7 to 12lbs has been stable since the early 1980's at around 50% - it is the make up of the other 50% that has changed, from being largely fish of 13lbs & over to being largely fish of 6lbs and less.

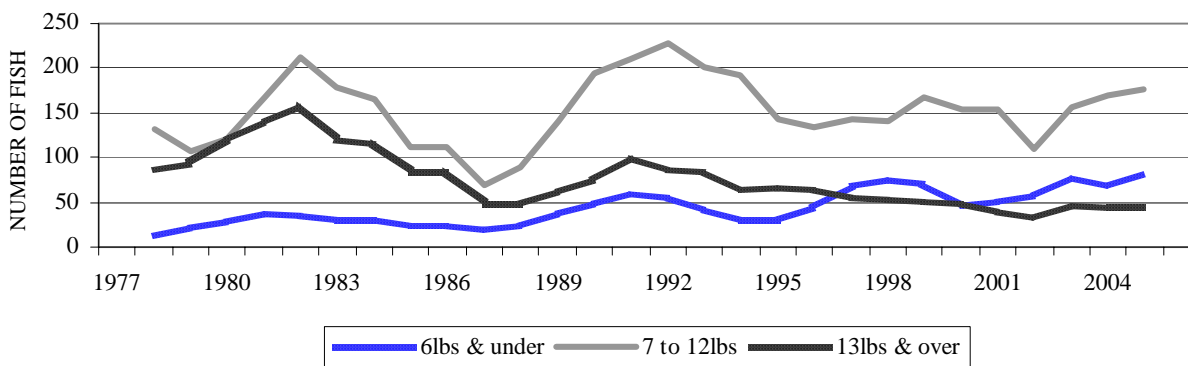
2: Middle Tweed

The increase in total numbers caught is less obvious here, but the trends for the different size categories are broadly similar, with the largest size class of fish becoming less numerous than the smallest over the years :



The smoothed data brings out the underlying trends :

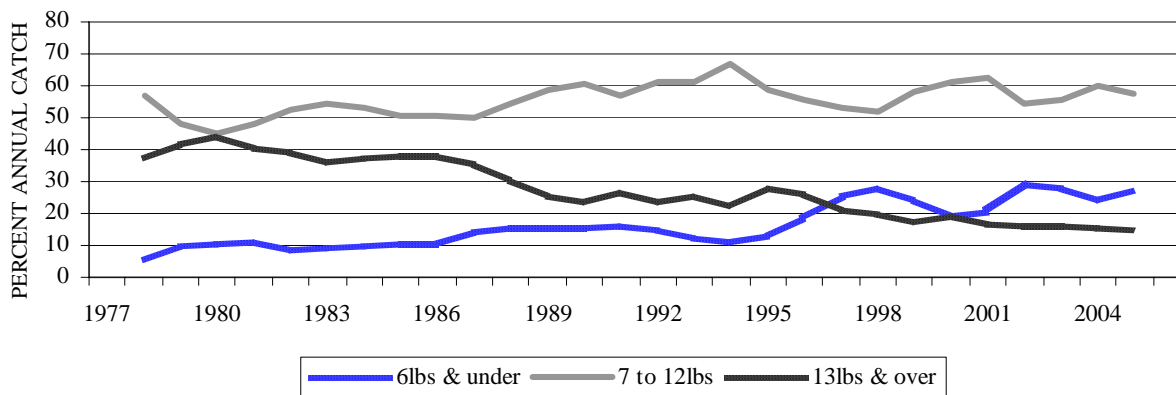
Sizes of Salmon caught at a Middle Tweed Fishery 1977-2006 (1st Sept > 30th Nov) (smoothed)



The fall in the numbers of fish of 13lbs and over is actually more pronounced here in the Middle Tweed, falling from around 100-150 a year in the early 1980's to 50 or under a year in the late 1990's which may be a reflection of the fact that this beat does not catch Teviot fish like the Lower Tweed beat. The increase in numbers of small fish is much the same however.

The smoothed percentages of each category give the overall picture.

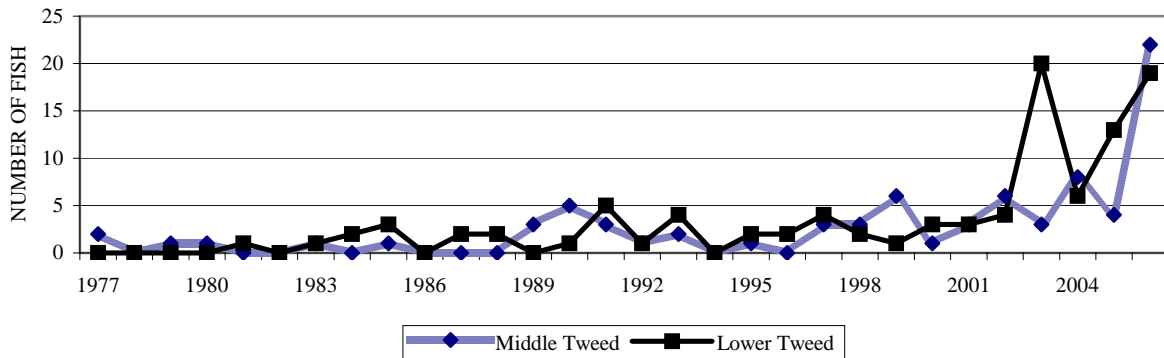
Sizes of Salmon caught at a Middle Tweed Fishery 1977-2006 (1st Sept > 30th Nov)(smoothed)



The data from both these beats show that the numbers of smaller fish have been increasing over the last 30 years and that they now outnumber the fish of 13lbs and over and also that the numbers of larger fish have been decreasing. The overall composition of the catches at present is therefore different from what it was 30 years ago, with fish of 6lbs and under now making up the second most numerous category now instead of fish of 13lbs and over as in the past. The most numerous category has over the whole period has, however, remained the fish of 7 to 12lbs.

That this increase in smaller fish is, in part, a reflection of increases in very small fish (3lbs and under) is shown in the graph below of the numbers of these caught at the two beats. There has been a relatively large increase in their numbers since 2002 but a general upward trend seems to date back to the early 1990's.

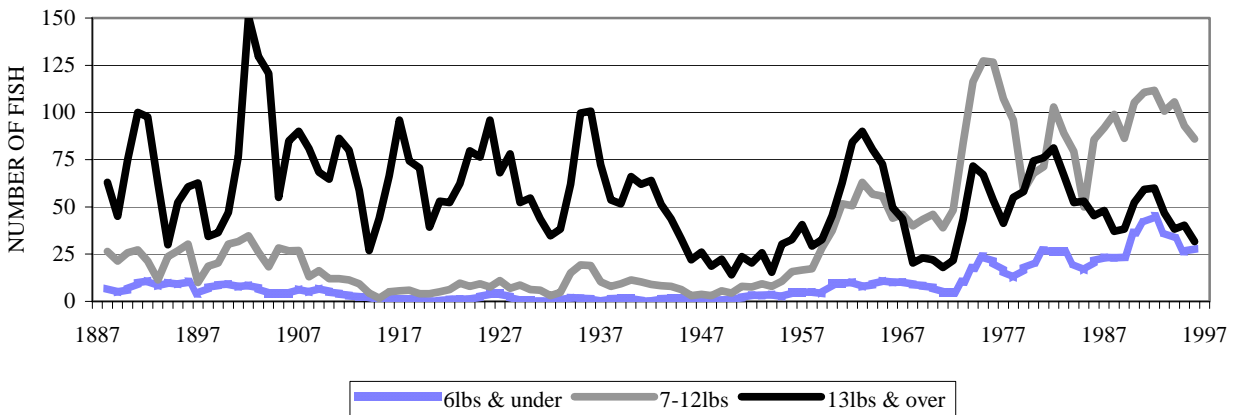
Numbers of Salmon of 3lbs & under 1977-2006 (1st Sept -30th Nov)



3: Longer-term trends :

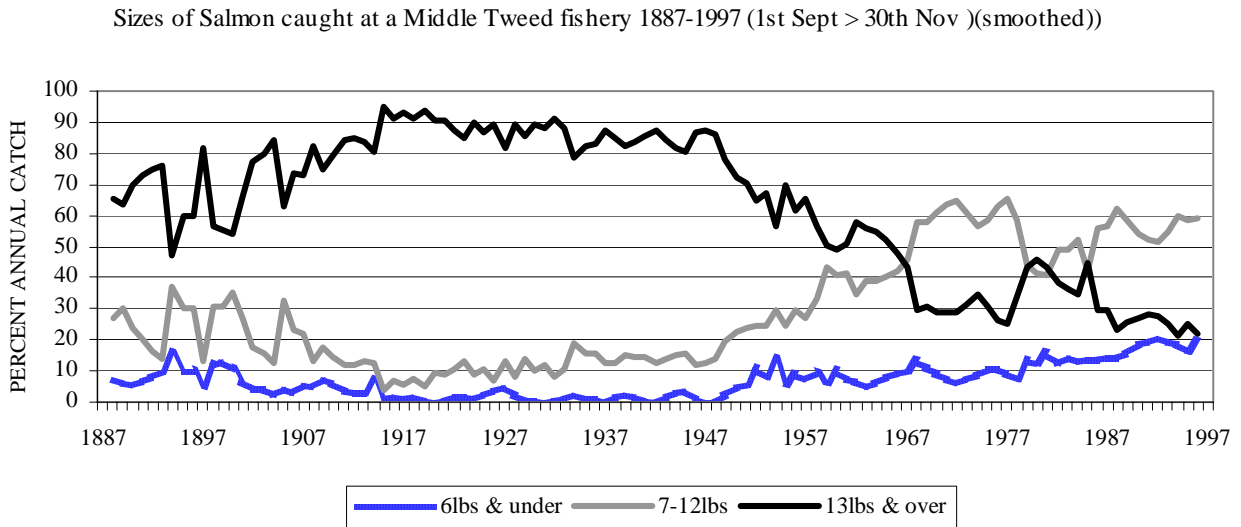
Using the catch records for a different Middle Tweed beat that stretch from 1887 to 1997 (when the records were copied – they have not been updated since) a number of long term trends can be identified :

Sizes of Salmon caught at a Middle Tweed fishery 1887-1997 (1st Sept > 30th Nov) (smoothed)



From the 1880's to the mid-1960's the most numerous category of fish caught in Autumn was that of 13lbs and over, with the two smaller classes being generally scarce until the mid 1950's when their numbers started to increase. However, it can also be seen that before the change from Autumn to Spring run domination, which happened around 1915, these smaller classes were somewhat more frequent. It was during the Spring Run dominant phase (c.1915 to c.1965) that these smaller fish, especially those of 6lbs & under, all but disappeared from the Autumn catches – during Spring phases, there are very few Autumn Grilse, though Autumn Salmon can be very large. The change back to Autumn domination in the mid-1960's was accompanied not only by increasing catches of smaller fish as the Grilse “returned” but by a decline in larger fish. This

present Autumn phase differs from the last in that it is dominated by fish in the 7-12lbs class rather than by fish of 13lbs and over as in the last, pre-1915, Autumn phase. In fact, fish of 6lbs and under became more numerous than fish of 13lbs & over in the 1990's, a very different situation from the pre-1915 period. The overall picture is made even clearer when the percentages of each size category in the annual catches are shown :



As the categories of smaller fish diminished at the beginning of the 20th century as the system began to switch over to Spring Salmon, fish of 13lbs and over came to completely dominate Autumn catches. When the change back to Autumn domination started in the 1950's, these larger fish went into a steep decline in importance as the smaller fish recovered in numbers with the “return” of Autumn Grilse. As the series ends in 1997, fish of 6lbs and less are about to overtake those of 13lbs or more in their contribution to annual catches.

It is clear therefore that the trend towards smaller fish in the Autumn is a very long term one, as is the decline in larger fish – however, the latter may be more pronounced in the middle Tweed than the lower as said above, possibly due to a difference between beats that catch Teviot fish and those that do not.

There were also a number of reports of thin fish, underweight for their length in the 2006 season. Whether this is related to the increased numbers of small fish or is a separate phenomenon is uncertain. The trend towards smaller fish is very long established as shown above and has not, as yet, been accompanied by a similar increase in thin fish suggesting that the two are not directly related and that the poor condition of some fish was due to some particular problem in 2006. In the RTC's Annual Report for 1976, Dr. D. H. Mills published an account of the small and thin fish Autumn fish caught in 1976 and suggested that they were the usual small fish that normally come upriver in the early Summer but were delayed by the severe drought that year and only caught when the drought broke in Autumn, having lost condition during the delay. A feature of 1976 that was repeated in 2006 was small fish caught far upriver with sea-lice, which in 1976 was attributed to the delayed little fish moving fast upriver once the water came. As 2006 was also a hot and dry summer, there are some similarities between the two seasons.

If the upward trend in the numbers of small and very small Autumn fish continues, and numbers of thin fish also start to increase in line with them, then some link can be suspected but this will only become apparent over time.