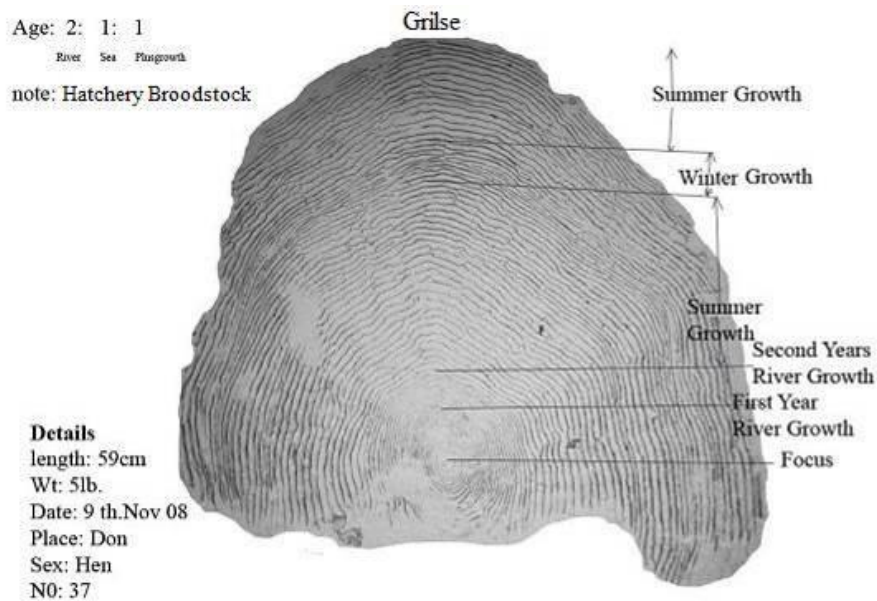




Scale Sampling Report 2010



A scale sample from a Don Grilse caught whilst collecting broodstock for the Hatchery with the rings and phases of growth indicated.

Background

This report by the River Don Trust presents findings of scale sampling conducted within the River Don's rod fishery during the 2010 angling season for Salmon and Trout. The report is in its interim phase and more details will be released as available, especially relating to the hatchery broodstock collection process and the juvenile salmonid EF sampling summer 2010 alongside historic hatchery broodstock samples. The report forms one of the River Don Trust's objectives within the Fishery Management Plan and will complement other data collection objectives such as the electro fishing programme and catch returns.

The aim of this study is to determine the age composition of salmon, sea trout and brown trout in the Don's fishery in the widest manner and provide a permanent historical baseline of information for further years analysis. In addition, scales provide an insight into the life history strategies of fish, when they smolt, growth rates in river, the frequency with which salmon and trout repeat spawn and also highlight growth patterns whilst at sea.

The anglers scale sampling programme will contribute to a wider scale monitoring programme within the catchment targeting other stock components such as; the monitoring of the scales collected during hatchery broodstock collection process which enables appropriate (although forced) matings to occur and enables a selective approach used to determine broodstock 'Run Type' prior to crossing; the juvenile salmonid EF sampling during the summer of 2010 (and subsequent summers).

Collated the information from these programmes will enable suitable management of vulnerable stocks, ensure that the current conservation measures in place are adequate, allow for periodic health checks of stock components and study long term changes in stock composition.

Introduction

By collecting and reading scales from fish we can learn a great deal about their life history to that point in time. Information such as their; age, smolting age for migratory fish, their age at maturity if they have spawned previously and how many times and with more detailed analysis we can even calculate their growth rates. All this information can be used to infer appropriate management practices for a fishery, be it salmon, brown or sea trout.

The intention of the programme is to, engage with anglers, have them collect scales, the Trust to read and interpret information and feedback to anglers, and finally provide this information to the statutory bodies to allow them to apply appropriate management practices where required.

During the 2010 season the number of fish sampled by anglers and angling club representatives was 50 salmon and 25 trout. The samples have been sporadic both temporally and geographically; however it is the intention that this scale study will expand its coverage of the catchment and season, and continue to provide a monitoring capacity and indicator of change in subsequent years.

This scale sampling programme would ideally be designed to provide an unbiased sample, with this in mind anglers were requested to sample all fish caught in this first season rather than selecting any fish preferentially, this would also allow us to gather as large a sample size as possible. Above all, this avoided any 'choice' in which fish to sample. We were aware that angling pressure would be varied throughout the catchment at different locations and times of the season depending upon the target species. The angler's samples represent a number of areas across the river particularly the Lower River with limited sampling from the Middle and Upper River.

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Due to the nature of the Don's Rod fishery it would be very difficult to accurately conclude that the scale sampling programme would provide a representative sample of the structure and composition of the actual stock that is potentially available for capture during the fishing season. This is due to a number of factors as identified by previous research, these are as follows; Some stock components are more vulnerable to capture by anglers than others; Different methods of angling selectively exploit other different stock components and different fishing rules and regulations determine where, when and how anglers may fish within a river.

For the purpose of analysing fish age from their scales, spring salmon are fish that have entered the river before any faster ('summer') growth occurs in the sea after their final sea winter (SW). A spring fish is generally considered to be one that has entered the system before the 31st of May in any year. Spring fish have spent at least two winters at sea. 'summer salmon' are fish that have spent at least two winters at sea and have resumed summer growth at sea in their final year before re-entering the river. 'Grilse' have spent only one winter at sea and have resumed summer growth at sea before re-entering the river.

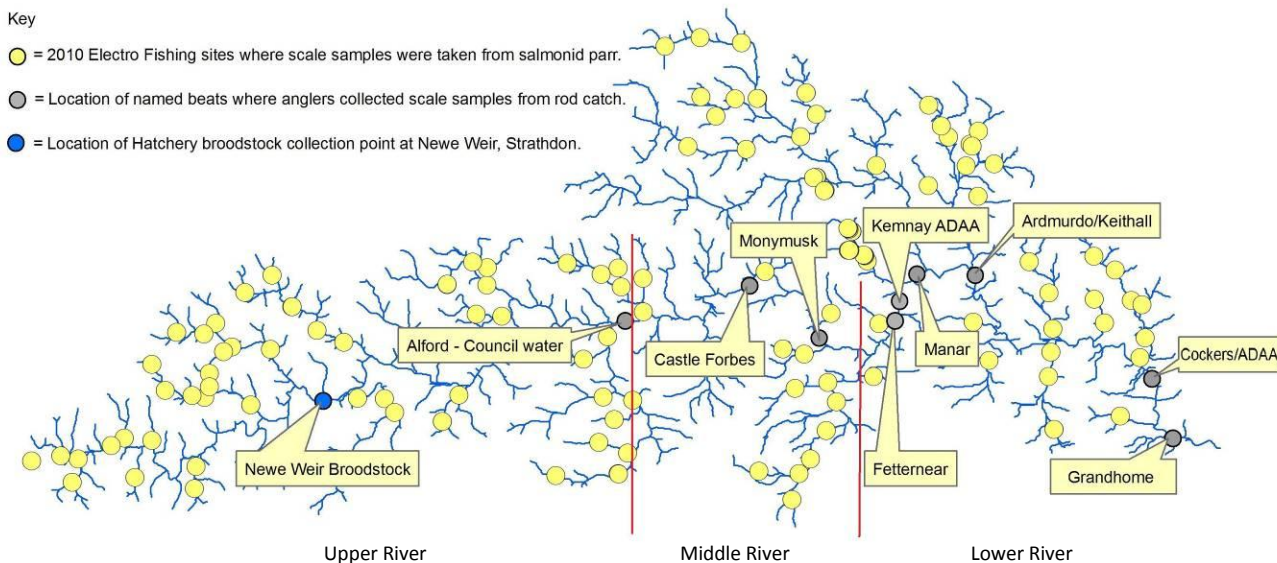
Sea Trout are aged using similar criteria but with different acronyms. Finnock are sea trout that had entered the sea in the early summer and returned to the river in the same year having spent no winters at sea, one sea winter sea trout are the equivalent of grilse and two sea winter sea trout are equivalent to summer or spring multi sea winter fish spending having spent two winters at sea.

Brown trout are aged in individual years with 'Plus growth' indicated as a (+) on incomplete year's growth. Age at first maturation of brown trout is also important information which can be gleaned from the scale reading.

Any fish that had spawning marks (should they be present) were identified by areas of erosion in scale growth concurrent with the expenditure of energy and re-absorption of the calcium in the scale during this spawning period.

Sampling locations

The sampling of the rod fishery was carried out over ten beats in the river as illustrated below. Although the hatchery and juvenile scale samples have not been included in this interim report they have been included in this figure for perspective. The Hatchery broodstock sampling took place from one single location, the Newe Weir and fish trap at Strathdon. Juvenile salmonid Electro Fishing samples were taken across the whole catchment; each is illustrated in Figure 1.



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Figure 1. Illustrates the distribution of sampling locations within the catchment, across the lower, middle and upper river for the different scale sampling programmes.

The propensity of scale samples from the Lower River is as a consequence of the angling effort in this area. Not only is there more club waters to fish but it's thought that migratory fish are less prevalent in the upper reaches of the system until later in the season, where less scales were collected as a result.

Results

The results of the scale sampling analysis have been split into three sections, Salmon, Sea Trout and Brown Trout, with key findings highlighted in each case.

Salmon

Adult salmon are often categorised into the three main components or run types, as previously outlined in the introduction. For the purposes of this report they will continue to be identified with the same acronyms.

A total of 51 samples for Salmon were collected by anglers on the River Don. Of the 51 salmon sampled 22% (11 fish) were spring those fish caught before the 31st May. The majority of these spring fish were caught in the lower reaches of the Don (82%), and 18% being caught in the Upper River with no samples collected for spring fish from the Middle of the River. This illustrates more the fishing pressure and timings of scale collections than a wholly accurate distribution of spring fish within the catchment. The samples from the Upper River were the latest collected scale samples of spring fish suggesting that the fish took some time to get to the upper river. The 2010 season started with very cold temperatures and as a result of this and the number of historical physical barriers present in the Lower River as a result of industry, fish entering the system would have restricted passage until the temperature rose and they were able to ascend these combined temperature and physical barriers.

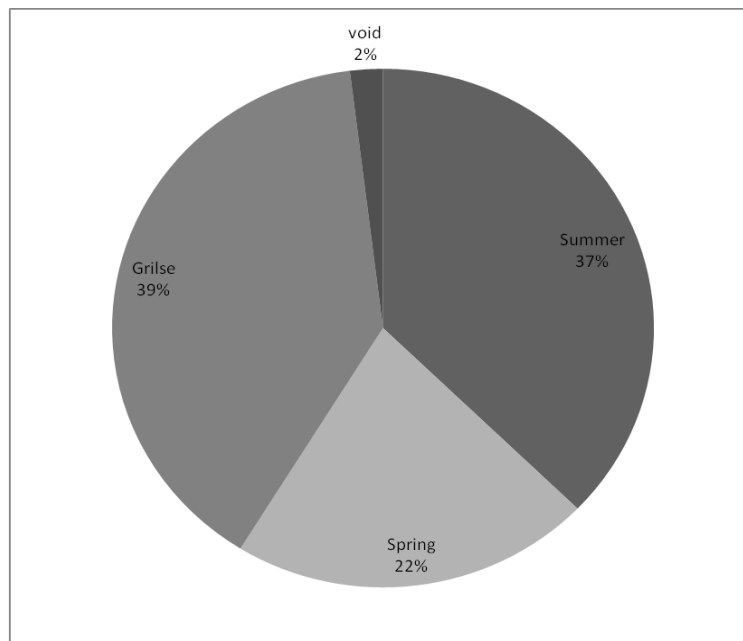


Figure 2. Illustrates the proportion of attributed run types of salmon from the 2010 scale sampling programme as identified using standard scale reading methods. Segments have name of run type displayed apart from scales where no information could be interpreted, in this chart they are marked as void. (n= 51)

Figure illustrates that the proportion of scales collected have been attributed fairly evenly across the run types. Angling effort on the River Don has not been measured and as a result it would be difficult to make any accurate assumptions about the overall catches relating to these proportions. Angling effort for example could have been far more intensive during the longer summer/autumn months, where a larger number of fish would be expected to be encountered.

The seasonal occurrence of the run type is revealed in the name for some i.e. spring and summer salmon, but this only relates to when the fish enter the river. They typically spend long periods of time in the freshwater until they are ready to spawn at the end of the fishing season and during this period can still be caught by anglers.

When analysing this information we must also consider how catchable each run type is and how this may affect the proportions of scales collected. Previous research has illustrated that spring salmon have a much higher rate of capture than grilse or summer salmon and can be caught several times. It is therefore important to consider the typical exploitation rates when analysing the information.

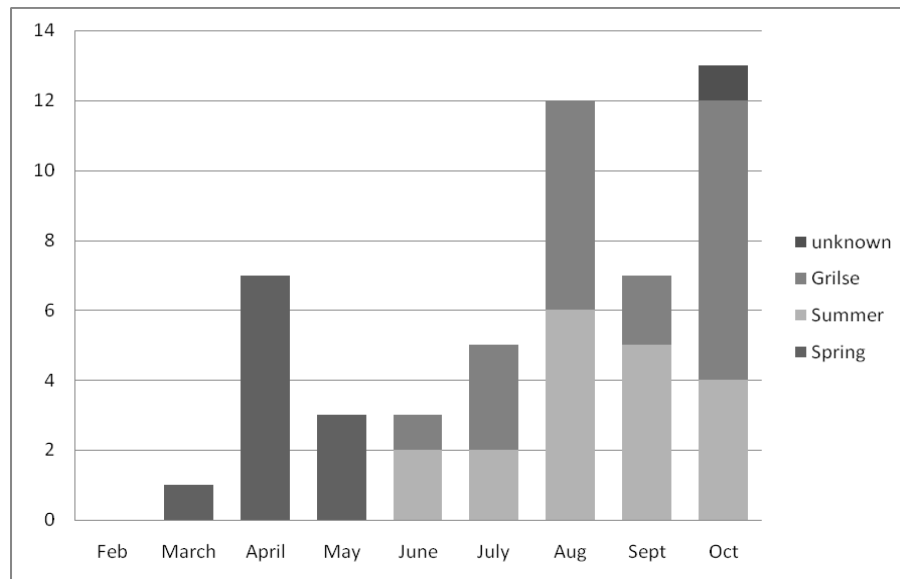


Figure 3. Illustrates the seasonal occurrence of each run type in the scale samples from the River Don rod catch. (n=51)

From Figure 3. It is quite clear that there were no spring fish caught after the month of May and that April was by far the best month for spring fish. This may well be due to water heights and conditions for anglers leading to greater angling pressure and success. It may also be that following the month of May fish entering the system display some growth at sea on their scales, therefore resulting in them no longer being spring fish which are characterised by having entered the river during the winter/spring months without this growth from feeding at sea being present. The most likely reason for this is that the spring stock component is much smaller than the other runs types and this is represented in the rod catch. We suspect that these fish will have moved further up the river by the early summer months, where there is an even lower fishing effort and their numbers will also be overwhelmed by the larger runs of grilse and summer fish entering the system.

The River Don has a reasonable standard of water chemistry as Scottish rivers go and coupled with its predominately agricultural land use, areas of high nutrient value can be found. As a result the Don has a diverse and healthy invertebrate community which in turn supports abundant salmonids along side other freshwater fishes. These salmonids utilise the prey items available and in the case of the migratory fish salmon and sea trout feed rapidly to attain a sufficient size for smolting.

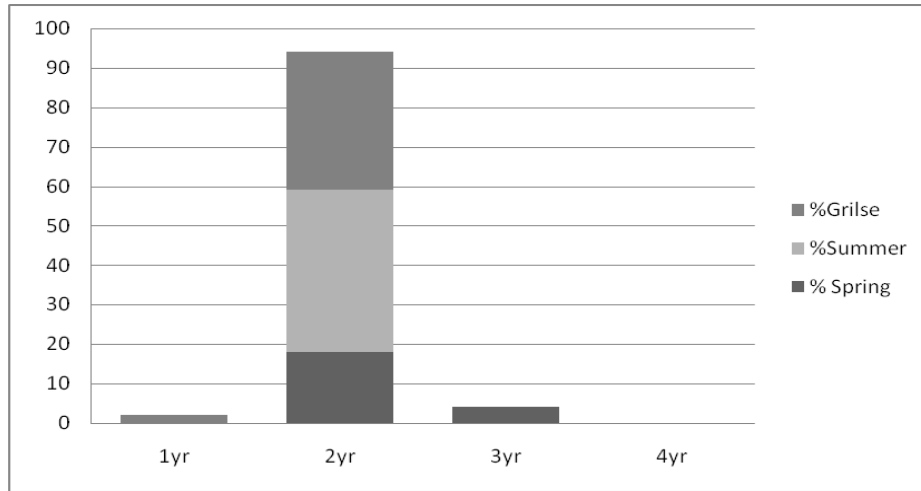


Figure 4. Depicts the percentage of Salmon smolts from the River Don for each run type and also for each smolting year. (N=51)

From Figure 4 it is apparent that 94% of all salmon smolted at 2 years of age with 2% and 4% or 1 and 3 year old smolts respectively completing the picture. No four year old smolts were found. It is also evident that all the three year old smolts returned as spring fish. We had anticipated that all the fish attributed the spring run type were that of three year old smolts but this was not the case. A reason for this may be due to the good nutrient status of parts of the catchment and the fast growth of the juvenile salmon in these areas.

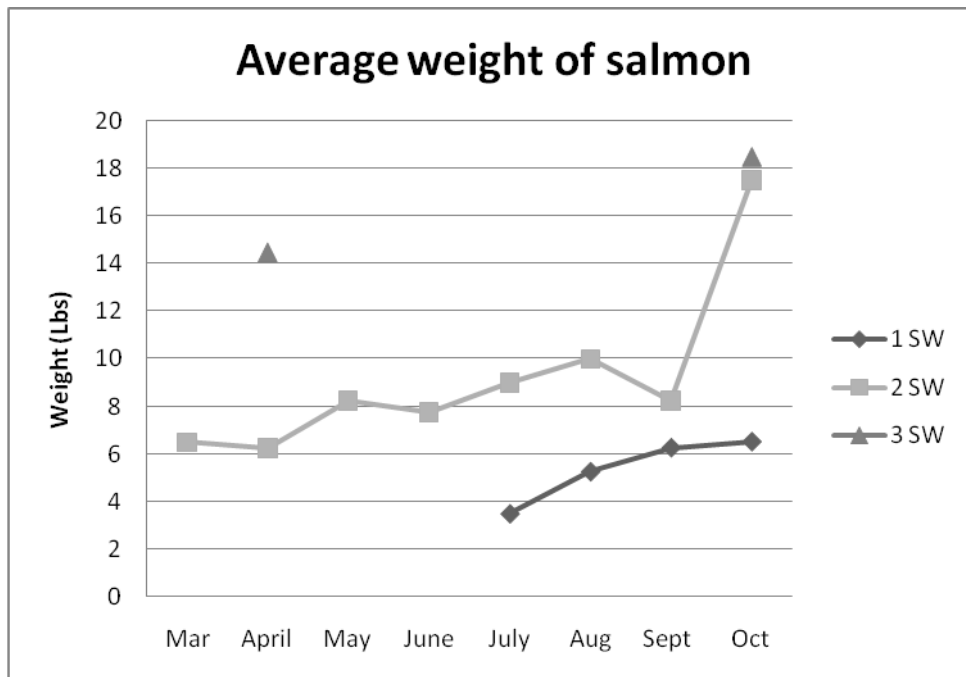


Figure 5. illustrates the average weight of salmon sampled in the anglers scale programme throughout the season.

Figure 5 clearly illustrates the differences in average weight between 1 SW (grilse) and 2 or 3SW (Spring or Summer) fish. The smallest fish sampled was 3.5lb and the largest 24lb. It is to be expected that there is often some overlap in sizes but given that standard error bars are not illustrated here it is not apparent. Spring fish are of a similar average size if slightly smaller than Summer fish. Which is what is to be expected given that these Summer fish will have had the ability to feed out at sea for whilst the Spring fish have entered the freshwater and stopped feeding. The propensity for a larger average size of fish as the season extend also confirms this senario as seen in both the Summer and Grilse run types.

Sea Trout

A total of 13 samples for Sea Trout were collected by anglers on the River Don. Of the 13 Sea trout sampled 84% (11 fish) were one sea winter fish, 8% (1 fish) was a two sea winter fish and the final 8% (1 fish) was a Kelt. No finnock were caught during this year’s scale sampling programme. Of these 13 fish 16% (2 fish) were previous spawners, the Kelt and the two sea winter fish, both had spawned on a single occasion.

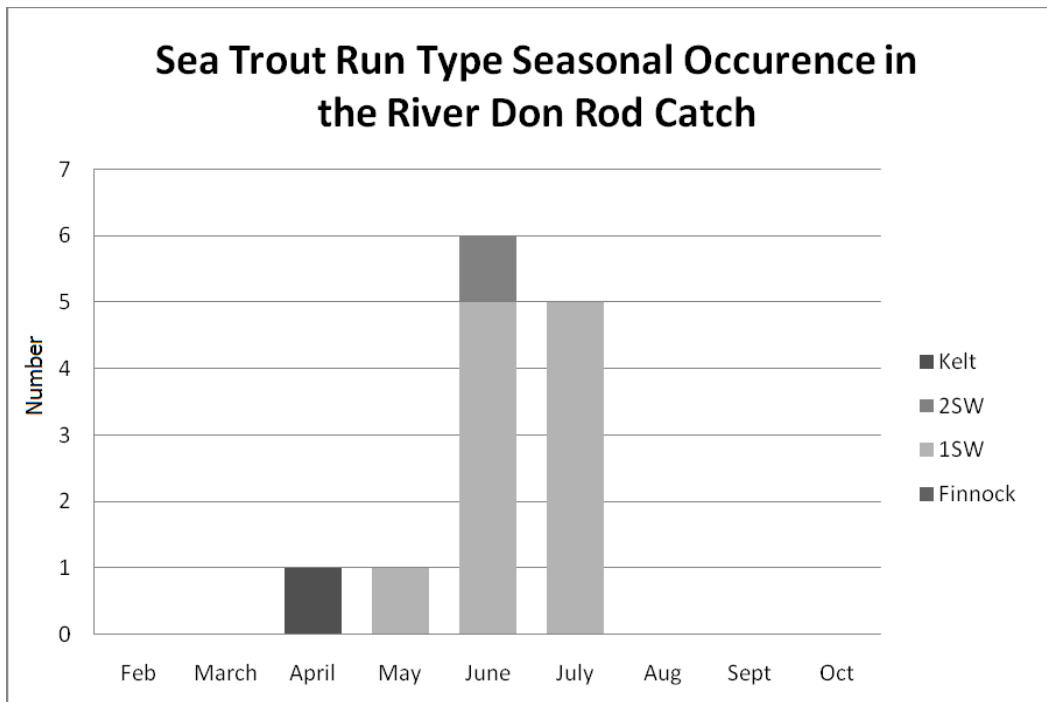


Figure 6. illustrates the seasonal occurrence of Sea Trout in the River Don Rod Fishery and their assigned ages.

Even from these figures it is quite evident that there is a much smaller window during the season when Sea Trout are caught. This again may be due to angling effort but nevertheless its apparent that there seems to be an abundance of fresh fish from May to July which are able to be exploited by the angler.

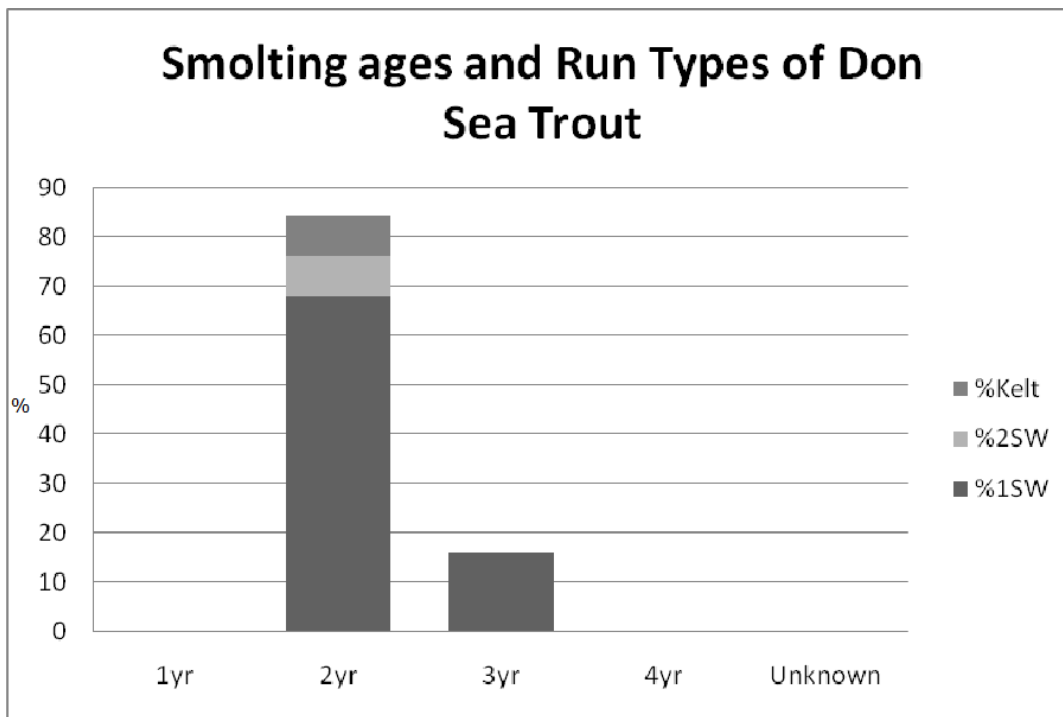


Figure 7. Depicts the percentage of Sea Trout smolts from the River Don for each run type and also for each smolting year. (N=13)

The previous figure illustrates that the majority (84%) of Sea trout smolt after two years in the Don. A smaller portion (16%) smolt at three years. It was expected that we would have a greater number of three year old smolts owing to the fact that sea trout often smolt at larger sizes than typically witnessed for salmon. In order to attain this size its expected that they would have to stay longer in the river.

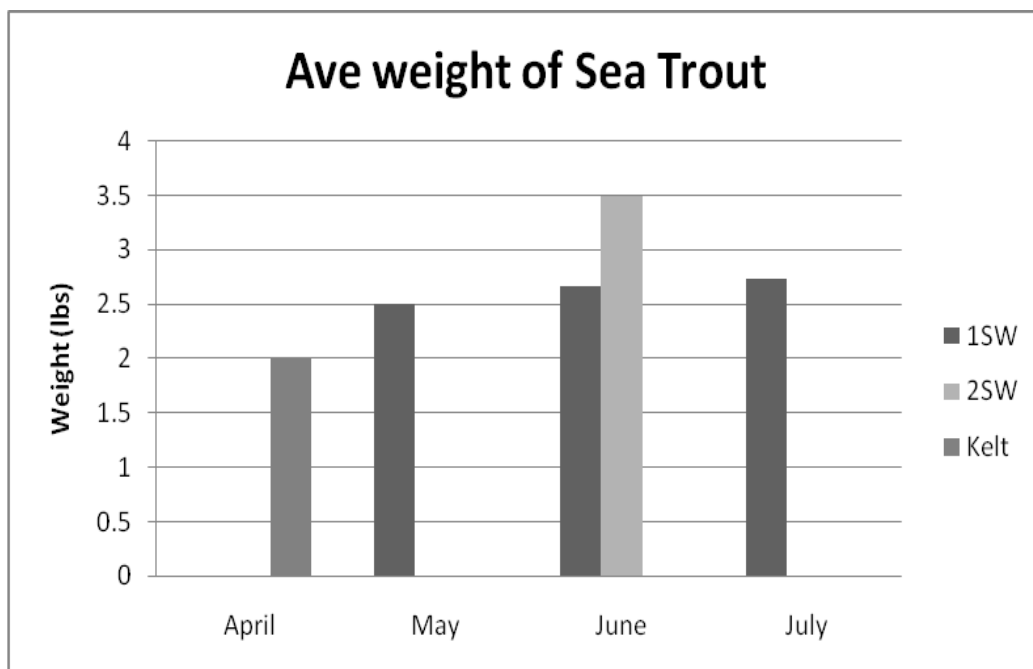


Figure 8. illustrates the average weight of Sea Trout sampled in the anglers scale programme throughout the portion of the season where Sea Trout were present in the rod catch.

Sea trout in the River Don are of a typical size for an East coast River, very seldom are there fish caught in the double figures range with the majority being from 2-4lb, with a few in the 4-6lb class. The graph shows that there is a trend to larger fish later in the season, which is to be expected given that these fish will have spent longer feeding at sea before their return to the less fertile rivers.

Two previous spawners were collected in the sample one spawning for the first time (the previous year 2009) and was caught as a Kelt early in the 2010 season and the other in June returned to spawn for its second time. It is known that the repeat spawning incidences is much higher in trout than in salmon and

We have seen a resurgence in the overall abundance over the past few years, a very welcome sight. As a result of the sample size we can only make very restricted conclusions from the data collected. Further information from future samples will allow us to investigate each run type in more detail to ascertain if there are any problems which we can resolve or mitigate against here within the river

Brown Trout

The scale sampling programme enabled 12 Brown Trout scales to be collected by anglers. The information from these scales has been interpreted and some of the results have been displayed in Figure 9 below.

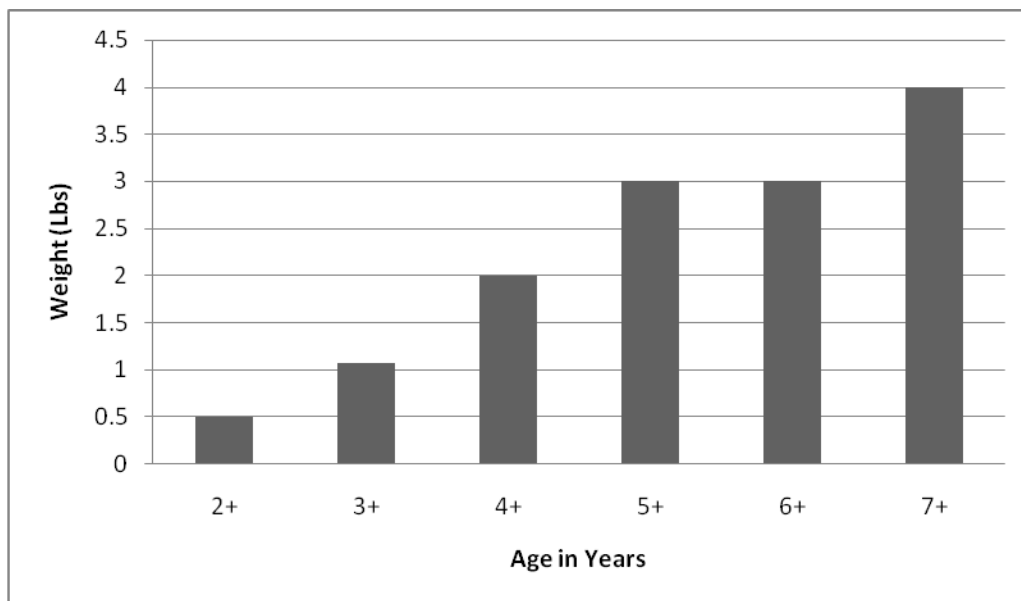


Figure 9. Illustrates the relationship between weight (lbs) and age of Brown Trout from the River Don.

The graph clearly shows a positively correlated trend with age and weight as would be expected for any healthy Brown Trout population.

It will be interesting to see if further scale sample in future years will follow this trend.

Of the 12 Brown Trout sampled, 11 were assigned ages and one lacked any readable information on the scale, which is often the case if the fish has been damaged and the missing scale replaced.

The weight of the Brown Trout ranged from 1/2lb to 4lb with an average of 1lb 12oz. For those fish that were assigned a sex by the angler a total of 4 out of the 12, 3 were females and 1 was a male. Samples of Trout were collected over a five month period within the season from April to Oct. All but one of these samples was collected between the months of April to June.

The scale readings also identified two previous spawners, which were two of the larger fish. One fish weighing 4lbs was aged as 7+ years old with clear spawning marks at years 3 and 4 years. The other previous spawner weighed 3lbs was aged 6 + and had spawned on 4 previous occasions at years 3,4,5 and 6.

Discussion

The volume of scales collected in the pilot programme has been small. We are aware that the figure collected is insignificant in relation to the volume of fish caught during the whole season (approx 2500 not including trout). Although given its infancy we would expect slower acceptance of the programme by anglers until they became more familiar with it and more anglers were trained to collect scales. The River Don also lacks of permanent ghillies to assist in collecting the scales and relies solely on anglers. We were however pleased by the number of repeat samples given by individual anglers, one with 18 different samples.

Overall the results of the programme illustrate that the condition of the River Don Salmonid stock is healthy with salmon and sea trout typically smolting at two years old and clear distinctions between run components as illustrated in the timings and sizes. Further information will only serve to expand upon these findings by comparisons between years and also between greater samples sizes of each species and run type. Whilst few brown trout scales were collected it is apparent even from those that were that the Don fishery supports a healthy and fast growing brown trout population across the catchment.

Comparisons with the data gathered from the Hatchery Broodstock programme and the Juvenile scale sample from the Electro Fishing surveys is ongoing and will be reported upon in due course.

Further details can be provided upon request but due to the sensitive nature of some of the locations and their catches the River Don Trust has not included these in this report.

Acknowledgements

We would like to thank all those who participated in the programme as anglers, beats and distribution outlets, in particular the following people and organisations;

| | |
|----------------|-----------------------|
| Alan Youngson | Paul Hans |
| Ben Dixon | Ralph Green |
| Cleve Cowie | Richard Tong |
| Iain Morrison | Sam Martin |
| Ian (Monymusk) | Grandhome Estate |
| Martin Webster | Bain's Fishing Tackle |
| Matthew Oliver | Somers Fishing Tackle |
| Mick Townend | Sloans of Inverurie |
| Mike Dunn | |
| Mike Thornton | |

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