The River Dee Trust

Scale Sampling Report, Summer/Autumn 2010

Summary

- Scale samples from adult salmon and trout captured on the River Dee were obtained by ghillies and angling club representatives between 1st June and 15th October 2010 and analysed by the River Dee Trust. Scales were collected from a total of 400 salmon, 50 sea trout and one brown trout.

- Of the 400 salmon sampled 85 (21%) were Spring fish (i.e. salmon that had entered the river before resuming growth at sea in 2010). The majority of these Spring salmon (63%) were caught in June. Between 2008 and 2010, an average of 22% of the summer/autumn rod catch (Jun – Oct) has comprised Spring salmon; these Spring salmon occur more in the month of June and in the Upper Dee.

- Of the summer/autumn entrants in 2010, 144 (48%) were 2 Sea Winter (2 SW) salmon (fish that had spent two winters at sea) and 156 (51%) were grilse (1 SW fish). Three salmon (1%) had spawned previously. Over the last three years, the summer/autumn salmon rod catch has averaged 53% grilse and 46% 2 SW salmon, with previous spawners comprising only 1%.

- Grilse ranged in size from 17 – 32" in length and 2 – 12 lb in weight (on average, 24" and 5 lb). 2SW salmon were significantly larger and ranged in size from 23 – 39" and 4.5 – 21 lb (average of 30" and 11 lb).

- The majority (80%) of the summer/autumn salmon had spent 2 years in freshwater before migrating to sea as smolts, with the remainder having spent 3 years (18%) or 1 year (2%) in the river prior to smolting. Significantly more of the Upper Dee rod catch comprised salmon that had been 3 year old smolts than the Middle and Lower Dee catches. These trends were also found in 2008 and 2009.

- Of the sea trout sampled this summer/autumn, most (88%) were 1 SW fish, 8% were 2 SW and 4% (two fish) were previous spawners.

- The brown trout sampled was 1.25 lb, 15" in length and six years old.

Introduction

This report presents findings of scale sampling conducted within the Dee rod fishery between 1st June and 15th October 2010 (summer/autumn period). This is part of a River Dee Trust (RDT) scale programme started in 2008; previous reports on scale sample findings can be found on our website.

The aim of this study is to determine the age composition of salmon and sea trout in the Dee's rod fishery. In addition, scales have provided insight into the frequency with which salmon and sea trout repeat spawn and also highlight growth patterns of fish whilst at sea. The scale sampling provides an unbiased sample of the rod fishery, achieved by ghillies sampling fish strategically (every 2nd – every 6th fish landed, or the subsequent fish landed at which the ghillie was present). Above all, this avoided any 'choice' in which fish to sample. The participating beats are spread along the length of the Dee.

In terms of ageing fish by 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). Spring fish have always spent at least two winters at sea (2 SW). '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 entering the river (2+ SW). It is possible that Summer salmon may appear in the fishery before 31st May and fresh Spring fish may enter the river after 31st May. Grilse are salmon that have spent only one winter at sea and always show 'summer' growth after the winter period (1+ SW).

2010 is the third year of the scale sampling programme on the Dee. The data collected between 2008 and 2010 is used to describe the composition of the Dee salmon rod catch in recent years. A total of 1749 salmon scale samples have been collected and analysed in the last three years, along with 201 sea trout and 259 salmon kelt samples. The scale sampling programme will continue in 2011 and beyond, with the aim of monitoring rod catch composition to detect if any changes to the Dee salmon stock occur.

This scale sampling programme will link to the genetics project started by the RDT in 2009. In the genetics programme, juvenile salmon throughout the catchment are being sampled by the RDT to determine where discrete spawning populations of salmon occur. In 2010 and 2011, adult salmon caught in the rod catch are being sampled by ghillies on the river throughout the fishing season. Once results from the juvenile samples are available, the samples of adult fish will be analysed to determine to what spawning population/part of the catchment these rod-caught fish belong. This will allow us to build up a fuller picture of the Dee's rod catch composition and to look for any failings in part of the rod catch/Dee salmon stock. Fisheries management can then be directed to restore and protect any failing stock components.

The remainder of this report is in two sections. The first section summarises the information collected from all beats along the river and compares age structures of fish caught at the different locations. The second section provides detailed information of individual fish captured at the ghillie's beat(s).

SECTION 1

Location

The scale sampling was carried out in eight locations (Fig. 1):

1. Upper Dee, above Gairn tributary (Crathie, Lower Invercauld)
2. Upper Dee, below Gairn tributary (Monaltrie, Aboyne Castle, Deecastle)
3. Middle Dee (Upper & Lower Dess, Kincardine, Borrowstone, Ballogie & Carlogie)
4. Middle Dee above Feugh tributary (Middle Blackhall, Little Blackhall & Inchmarlo)
5. Lower Dee, below Feugh (Invery, Crathes Castle, Lower Crathes & West Durris)
6. Lower Dee (Park, Upper Drum & Lower Durris, Middle Drum, Tilbouries, Altries)
7. Dee entrance (Aberdeen & District Angling Association)
8. Feugh tributary

In the following text, the Upper river includes locations 1 and 2 (i.e. above Aboyne Bridge), the Middle river includes locations 3 and 4 (i.e. between Aboyne Bridge and Banchory Bridge) and the Lower river includes locations 5 and 6 (below Banchory bridge).

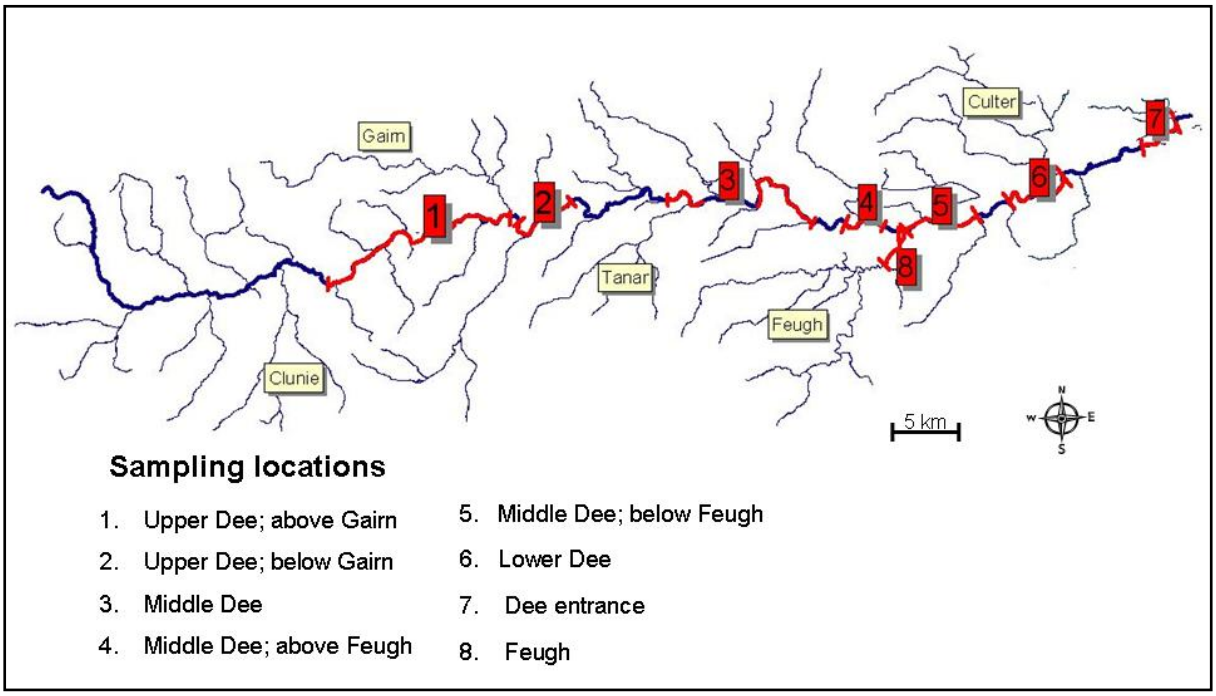

Figure 1. Locations of scale sampling on the Dee, highlighted in red.

Spring Fish in the Summer/Autumn Sample

85 of the 400 salmon (21%) sampled in the summer/autumn fishery were Spring fish (i.e. fish that entered the river before undergoing fast 'summer' sea growth in 2010). The majority (66%) of these Spring salmon were caught in the Upper Dee, 22% were caught in the Middle Dee and the remainder (12%) were caught in the Lower Dee. As a result, Spring salmon accounted for significantly more of the Upper Dee's summer/autumn rod catch (36%) than the Middle (19%) or Lower (8%) Dee (Fig. 2 and shown with statistical analysis).

The majority of the Spring salmon caught in the summer/autumn rod catch were caught in June – Spring salmon comprised 65% of the Dee's June rod catch. Spring salmon also comprised 16% of July's rod catch and between 5 and 8% of the rod catches for the months of August to October.

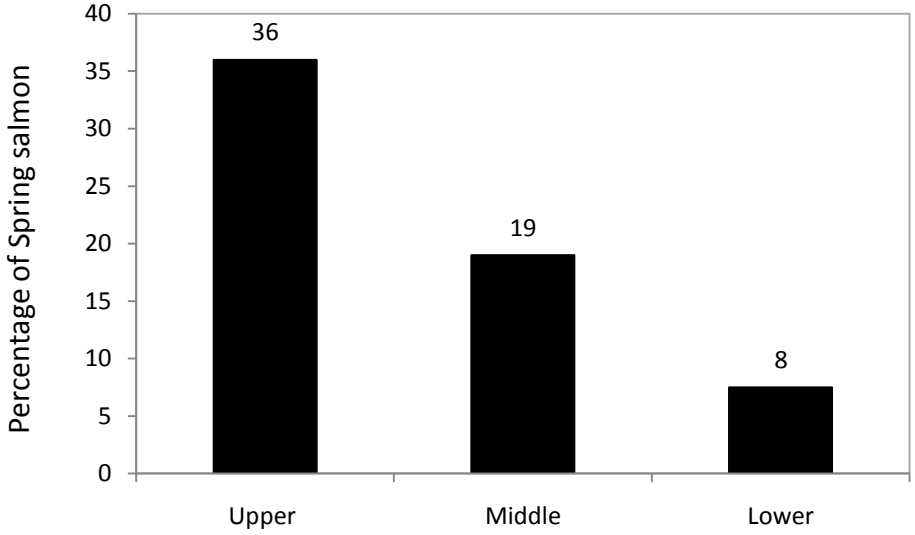

Figure 2. Percentage of the Upper, Middle and Lower Dee's rod catch, between 1st June and 15th October 2010, that were Spring salmon.

Scales from 12 salmon (3% of the total sampled) could not be aged. This was due to severe scale erosion. Scale erosion occurs once the fish has stopped feeding; hence scale erosion tends to be more severe the longer the fish has been in the river, and is therefore more common in the autumn rod catch. All 12 samples were taken from fish caught in September and October.

2008-2010 Conclusion:

1. 22% of the Dee's rod catch between 1st June and 15th October comprises Spring salmon. For the month of June, Spring salmon comprise an average of 55% of the rod catch.

2. Spring salmon comprise a minimum of one third of the Upper Dee's summer/autumn rod catch and this area accounts for 60% of all Spring salmon caught in the summer/autumn period.

Summer/Autumn Entrants

The remainder of the analyses excludes the Spring salmon and the 12 samples that could not be aged and focuses on the 303 fish that entered the river in summer/autumn 2010.

156 (51%) of the summer/autumn entrants were grilse and 144 (48%) were 2+ SW ('Summer') salmon. There was a significant difference in the proportion of grilse versus Summer salmon caught in the Lower and Middle Dee sections, with the Lower Dee having a predominance of grilse (Fig. 3 and shown by statistical analysis). Over the last three years, the abundance of grilse relative to Summer salmon in the rod catch of the Upper, Middle and Lower river has shown large variability, with grilse comprising either a majority or minority. For the whole river, on average, grilse have comprised 53% of the summer/autumn salmon sampled in 2008 - 2010, but this has varied from 44 – 68% of the rod catch.

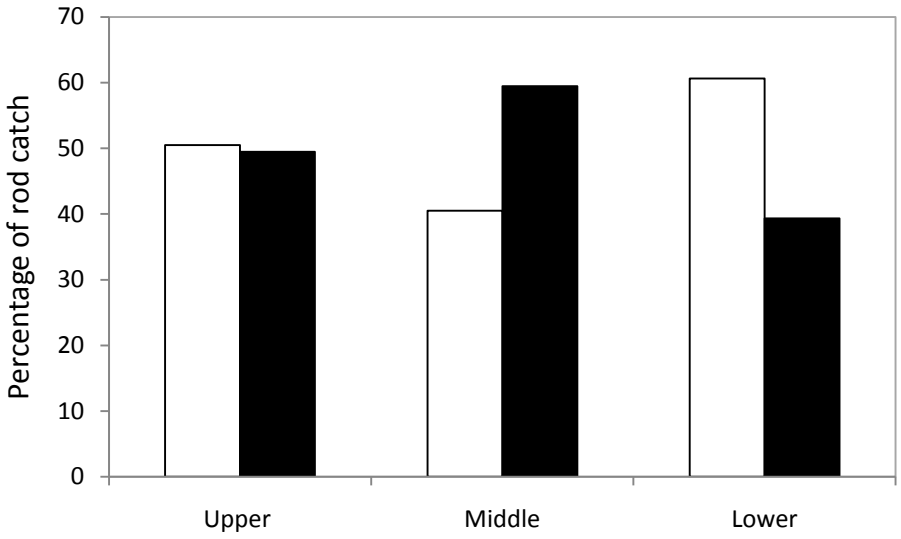

Figure 3. Percentage of 1+ SW (grilse; □) and 2+ SW (■) salmon in the Upper, Middle and Lower Dee

Month of Capture

The proportion of grilse sampled in the rod catch increased throughout the summer and then declined from September (Fig. 4). The run of grilse was not underway in June (only five grilse sampled in June). In August and September grilse outnumbered 2+ SW salmon in the sample but by October, 2+ SW salmon slightly outnumbered grilse.

Over the last three years, the months of greatest grilse abundance have had rod catches comprised of 68% (August) and 67% (September) grilse.

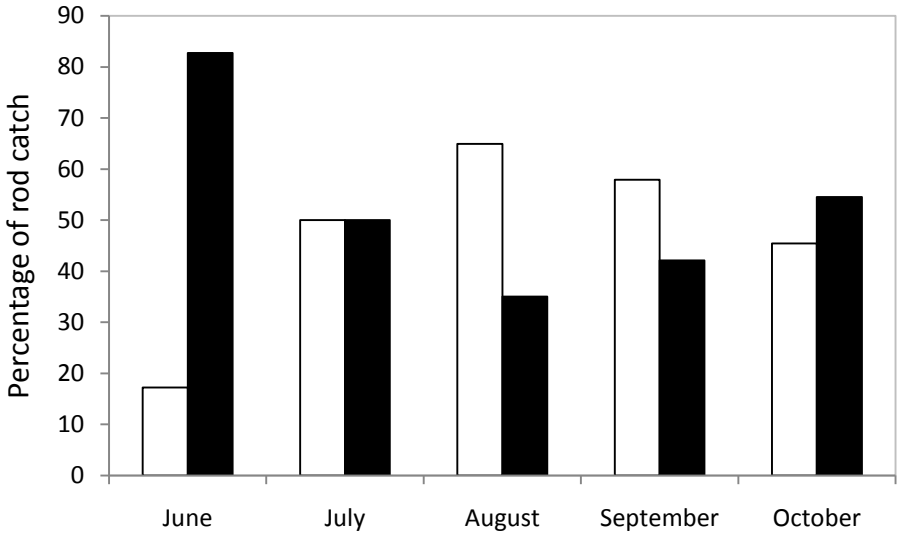

Figure 4. Percentage of 1+ SW (grilse; □) and 2+ SW (■) salmon in summer and autumn months.

2008-2010 Conclusion:

3. The abundance of grilse relative to 2+ SW ('Summer') salmon has varied in the summer/autumn periods but has averaged at nearly equal proportions.

4. Grilse dominate the rod catch in the months of August and September, comprising approximately two thirds of these months' rod catches.

Smolts

The majority (80%) of the salmon sampled had entered the sea as 2 year old smolts (a similar proportion to that found in 2008). 18% of the sample had been 3 year old smolts and 2% (six fish) had been 1 year old smolts. The Upper river had a significantly greater proportion of 3 year old smolts (26%) than the Middle (16%) or Lower (10%) river (Fig. 5).

Between 2008 and 2010, there has been a highly significant trend of a greater proportion of 3 year old smolts in the Upper river than the other river sections (for Spring periods 2008, 2009, 2010 and summer/autumn periods 2008 and 2010); on average, 52% of the Upper river samples in the spring and 25% in the summer/autumn comprise 3 year old smolts. This may be due to a colder climate and lack of nutrients in the Upper Dee causing slower juvenile salmon growth; hence fish can take an extra year to reach smolt stage.

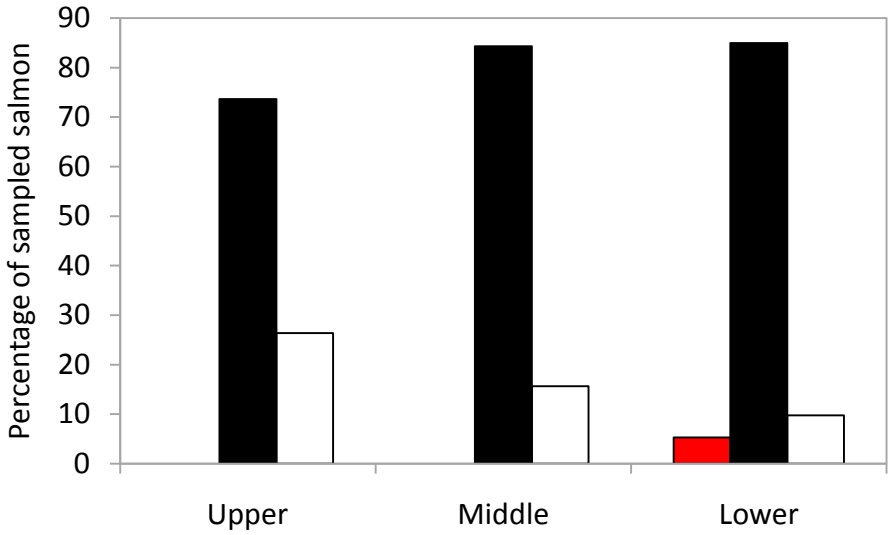

Figure 5. The percentage of sampled salmon that had smolted after one (1 FW; ■), two (2 FW; ■) or three (3 FW; □) years in freshwater, in the Upper, Middle and Lower Dee.

2008-2010 Conclusion:

5. Three quarters of the Dee's rod caught salmon smolt after spending two years in the river, while the remainder smolt at 3 years old (24%) and 1 years old (1%).

6. The Upper Dee rod catch comprises significantly more 3 year old smolts than the Middle and Lower Dee sections, suggesting slower growth of juveniles in the upper catchment.

Fish Sizes

Grilse ranged in length from 17" (43 cm) to 32" (80 cm) and in weight from 2 lb to 12 lb and were on average 23.6" (±0.6) and 5.0 lb (±0.2). 2 SW salmon ranged in length from 23" (58 cm) to 39" (98 cm) and in weight from 4.5 lb to 21 lb and were on average 29.7" (±0.4) and 10.6 lb (±0.4). Hence there was some overlap in size distribution between grilse and 2+ SW salmon (Fig. 6).

The size of grilse has been similar over the last three years (i.e. statistical tests have found no significant difference). The length and weight of 2+SW salmon was similar in 2008/09 but significantly smaller in 2010.

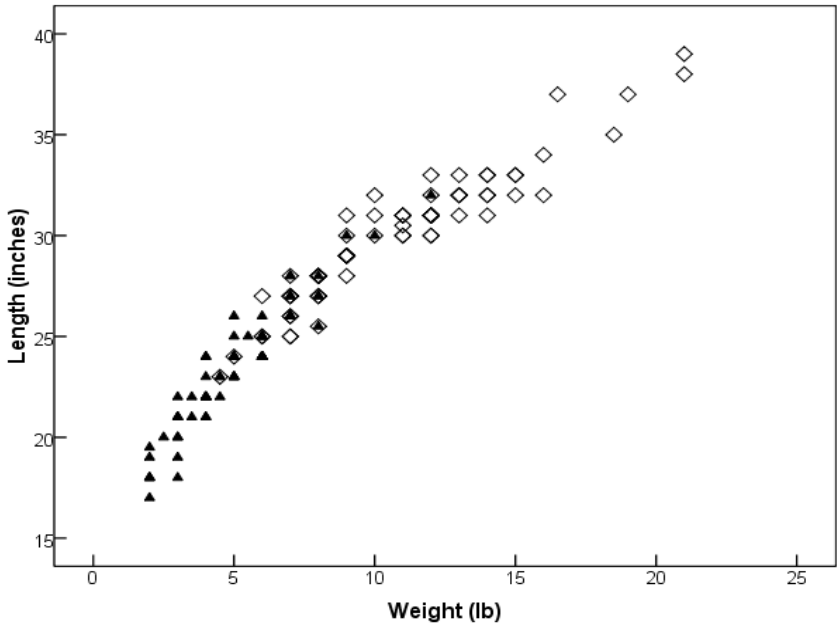

Figure 6. Length and weight of 1 SW (grilse; ▲) and 2+ SW salmon (◇) in summer/autumn samples, for individuals with both length and weight reported.

It would be expected that size of salmon and grilse would increase through the summer and autumn months, as later-entry fish would have spent longer feeding at sea. Indeed, the largest grilse (12 lb) was caught in October, whilst the smallest 2+ SW salmon (4.5 lb) was caught in June. Statistically, grilse caught in August – October had greater weights than grilse caught in June and July, and weights of 2+ salmon also increased significantly through the period (Fig. 7). No increase was seen in lengths of fish through the season.

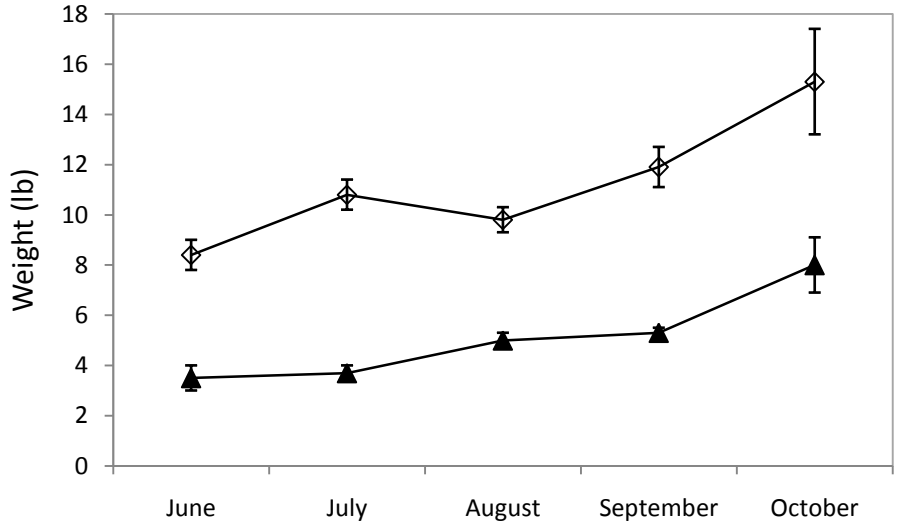

Figure 7. Average weight of grilse (▲) and 2+ SW salmon (◇) sampled in each month. Vertical bars on each data point represent variation in sizes per month.

This trend of increasing size through the summer/autumn season was also seen in 2008, for both length and weight of the fish, but was a weak trend only (for grilse) in 2009. This variability may be partly due to rod catches/scale samples per month including not just new entrants to the river but also fish that have been in the river some time.

2008-2010 Conclusion:
7. Grilse have averaged 5 lb and 2+ SW salmon have typically averaged 10 – 12 lb in weight. There is a trend for the size of both grilse and 2+ SW salmon increasing in size through the summer/autumn months.

Previous Spawners

There were three salmon sampled that had spawned previously. All three fish had entered the river previously and spawned in 2009, and were all grilse when they entered the river in 2009. These three fish ranged in weight from 3 lb 9oz (captured in the Feugh tributary) to 8 lb.

2008-2010 Conclusion:
8. A total of 1.3% of salmon sampled in 2008-2010 had spawned previously, with the proportion of previous spawners being greater in Spring salmon (2.4%) than Summer/Autumn salmon (0.6%).

Sea Trout

Of the 50 sea trout sampled (including 15 from the Feugh tributary), 88% were 1+ SW fish, 8% were 2+ SW fish and 4% were previous spawners. The previous spawners had all spawned once, as 1+SW fish, in 2009. Size of sea trout averaged 17.8" (±0.3) and 2.2 lb (±0.1).

The proportion of previous spawners was 10 – 12% in 2008 and 2009. The proportion of previous spawners found in 2010 was not significantly lower than 2008/09 (shown by statistical tests).

72% of the sea trout had left the river as 2 year old smolts and 28% as 3 year old smolts.

2008-2010 Conclusion:
9. The majority of Dee sea trout are 1+ SW fish. A small proportion, 4 – 12%, comprises previous spawners.

Brown Trout

The single brown trout sampled, from Aboyne Castle, was 1.25 lb, 15" in length and six years old.

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- Willie Banks (Tilbouries)
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- Keith Cromar (Park)
- Colin Espie (Deecastle)
- Robert Fettes (Lower Crathes & West Durris)
- Kevin Fleming (Altries & Lower Drum)
- Stuart Fleming (Aberdeen & District Angling Association)
- David Gibbon (Middle Blackhall)
- Robert Harper (Lower Crathes & West Durris)
- Archie Hay (Crathie)
- Martin Hayward (Little Blackhall & Inchmarlo)
- Martin Holroyd (Ballater Angling Association)
- Mike Maughan (Feugh)
- John McGinley (Kincardine)
- Ian Murray (Monaltrie & Lower Invercauld)
- David Murray (Monaltrie & Lower Invercauld)
- Bill Palmer (Borrowstone)
- Jim Paton (Upper Drum & Lower Durris)
- Terry Paton (Little Blackhall & Inchmarlo)
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