
Monitoring of the River Dee Fishery Season Extension 2008 - 2010

Final Report





The River Dee Trust

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MONITORING OF THE RIVER DEE FISHERY SEASON EXTENSION 2008 – 2010

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Executive Summary

The River Dee was granted a licence in 2008 to extend its rod and line fishing season from 30 September to 15 October for a trial period of three years, from 2008-2010. During these three years monitoring was carried out by the River Dee Trust and Dee District Salmon Fishery Board to assess any impact of this extension to the fishing season on the sustainability of Dee salmon stocks. This is the summary report following the conclusion of the three year monitoring programme.

After a pilot monitoring study in 2008, full monitoring of the impacts of the season extension to the salmon stock was undertaken in 2009 in the Lower Dee (downstream of Banchory) and in 2010 in the Middle Dee (between Aboyne and Banchory). The monitoring in each year included rod catch analysis, scale sampling, radio tracking of individual salmon and redd count surveys.

There was no evidence that, below Aboyne Bridge (Middle and Lower Dee sections), capture and handling of salmon in the October extension period had any significant impact on fish survival or ability to migrate for spawning, compared to the capture of fish in the last two weeks of September.

Spring, summer and autumn stocks comprise both the September and October fisheries. There was no evidence that these different stocks of fish were differentially targeted in the October fishery compared to the September fishery and there was no evidence that different stocks (particularly the spring salmon stock) were differentially impacted by being caught in the fishery. Therefore the overall conclusion is that extending the angling season below Aboyne Bridge to 15 October will cause no greater impact than continuing with the currently angling season which finishes on 30 September and thus will not impact on fish stock sustainability.

This report, together with an annual report for the third year of the monitoring trial, is presented to the Dee DSFB in March 2011 so that a decision on whether to apply for a permanent extension to the fishing season can be made.

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Background and Objectives

In 2007 the Dee DSFB applied to the Scottish Government to extend the angling season from 30 September until 15 October for a trial period of three years (2008-2010). Following a public consultation, the trial extension was granted from 2008. The October fishing extension would allow fishing beats to benefit from the increasing autumn runs of salmon that the Dee has been experiencing since the 1980s.

The October fishing extension was requested for a trial period only. During the three trial years, monitoring was undertaken to determine whether fishing in October is sustainable or whether it has any potential to harm the Dee salmon stock. During this period the Dee Conservation Code policy was maintained through the season extension period, and in particular, all salmon and sea trout caught were released.

The trial extension period encompassed the whole river but was restricted to downstream of Aboyne Bridge (i.e. the Middle and Lower Dee). This restriction was placed to minimise potential impact on spring salmon and early-spawning fish.

The objectives of the season extension monitoring were:

1. To assess whether fish caught by rod and line and released in the first two weeks of October have the same chance of successfully surviving to spawn as those caught in the last two weeks of September.
2. To determine if Aboyne Bridge is the correct upstream limit of the season extension.
3. To determine what stocks of salmon are caught in the first two weeks of October and whether there is an impact on the more vulnerable stocks of spring-running salmon.

The first two objectives were addressed through a radio tracking programme and redd count surveys. A salmon scale survey and rod catch analysis addressed the third objective. The pilot study conducted in 2008 was primarily to test the logistics of running a radio tracking programme (RDT 2009), following which, full monitoring was conducted in 2009 and 2010.

In the following section of the report, the results of this monitoring over the last three years are summarised. The third section of the report addresses the extent to which the objectives have been met and the conclusions as to whether the October fishery extension is sustainable to the Dee salmon stocks.

Summary Findings

Rod catch analysis

The number of salmon caught in the October extension period between 2008 and 2010 has averaged 847 salmon (11% of the annual rod catch) and 48 sea trout.

In all three years, significantly more fresh (silver) fish have been caught in the Lower Dee (downstream of Banchory) than the Middle Dee (between Aboyne and Banchory) in the October period. The October rod catch has included 'coloured' fish, comprising 58% (Lower Dee) and 82% (Middle Dee) of the rod catch and fresh/silver fish, comprising 29% (Lower Dee) and 10% (Middle Dee) of the rod catch.

Within both the Middle and Lower Dee, there has been a small (and sometimes statistically insignificant) increase in the proportion of coloured fish caught in October, compared to September of the same year. Such variability between years is likely to occur because of factors such as river flow levels, temperature and weather conditions prior to and during the fishing period. It is important to note that the colour of the fish does not reflect the approximate time until spawning, although it tends to reflect the length of time the fish has already spent in the river.

Scale Sampling

There was no evidence of a difference in the stock composition of the September and October fisheries, in either the Middle or Lower Dee. Firstly, the proportion of grilse to MSW salmon were consistent between September and October in all three years, with the autumn (September and October) fishery consisting of a majority of MSW salmon over grilse in 2008 and 2009, but a slight majority of grilse in 2010. This suggests that the impact of the grilse run at the end of the season is variable.

Secondly, there was no significant difference in the proportions of spring salmon compared to summer/autumn salmon comprising the September and October fisheries. The proportion of spring salmon sampled in the autumn fishery has varied over the three trial years; in the Lower Dee it has averaged 12% of the catch, with an additional 6% identified as either spring or early summer salmon. The scale sampling programme indicates that the Middle Dee has a greater proportion of spring salmon in its autumn fishery (24% spring or early summer salmon in 2010); although in two of the trial year's insufficient samples were taken from the Middle Dee autumn fishery to replicate this result.

It is clear from the RDT scale sampling programme that spring salmon comprise a relatively small but consistently-present component of the Dee's autumn fishery (September and October), throughout the river.

Radio Tracking

140 salmon were radio tagged between 2008 and 2010, of which 118 (84%) were tracked through their spawning period. In 2008, 20 salmon were tagged in the Lower Dee as a pilot study. In 2009 a further 60 salmon were tagged in the Lower Dee and in 2010 60 salmon were tagged in the Middle Dee.

Of the fish successfully tracked, 71% migrated upstream following tagging, whereas 17% migrated downstream and 12% showed no directional migration. There was no suggestion that downstream migration was related to failure to spawn, as evidenced from recaptured fish and through fish migrating downstream and subsequently into tributaries. It is therefore considered that downstream movement may be 'normal' behaviour for some fish at this time of year. In total, 14% of the tracked fish entered tributaries.

Of the fish tagged and tracked in the Lower Dee (n = 75), 15% subsequently moved into the Upper Dee at spawning time, 28% moved into the Middle Dee and 57% remained in the Lower Dee. Of the fish tagged and tracked in the Middle Dee, 53% entered the Upper Dee at spawning time and 47% remained in the Middle Dee. Therefore, just more than half of the fish tagged in either the Lower or Middle Dee fisheries in the autumn comprised stock from a different section of the catchment.

Salmon spawning occurs as early as the fourth week of October in the Upper Dee catchment. In all three years, the salmon tagged in September and October reached their final (spawning) destination in the second week of November, on average, although the date of reaching the spawning destination ranged between 4 October and 6 February. There was also evidence in two of the three years that salmon that entered the river in the autumn (i.e. fresh fish in the autumn fishery) reached their spawning grounds significantly later in the season (first and second week of December).

To determine whether salmon were negatively impacted by capture and handling in October, movements and behaviour of fish caught between 1 and 15 October were compared to fish caught between 16 and 30 September (2009 and 2010). October-tagged fish showed no significant difference to September-tagged fish in terms of (1) propensity to migrate upstream, downstream or show non-directional migration, (2) proportions of fish that entered the Upper, Middle and Lower Dee during the spawning period and (3) time at which the final (spawning) destination was reached.

Thus there was no evidence that fish captured and handled in October were negatively impacted (physically or behaviourally) more than fish captured and handled in September and no evidence that September and October fisheries were targeting different stock components (in terms of Lower, Middle or Upper Dee spawning stock). In addition, assessment of the fish when they were tagged showed that no fish were close to spawning.

The salmon that were radio tagged each year included spring, summer and autumn entrants to the river. Traditionally it was understood that spring salmon predominated in the Upper Dee

catchment (e.g. Girnock and Baddoch burn studies by Marine Scotland). However, during this study there was no evidence that spring salmon captured in the autumn fishery were predominantly Upper Dee stock, nor evidence that later-running (summer and autumn) stock components were predominantly components of the Lower Dee stock. For example, of the spring or early summer fish that were tagged in the Lower Dee, only 16% migrated into the Upper Dee and the majority (52%) remained in the Lower Dee at spawning time. In the Middle Dee, 54% of the spring or early summer fish that were tagged remained in the Middle Dee during the spawning period. Furthermore, of the summer and autumn salmon that were tagged in the Middle Dee, the majority migrated into the Upper Dee at spawning time.

In none of the years was there evidence of a relationship between the upstream distance to a fish's final (spawning) site and the time that the fish reached this location. Thus, fish that were destined for the Upper Dee reached their spawning grounds no earlier than fish that remained in the Middle Dee. During the three year trial, the fish that reached the Upper Dee did not reach their final (spawning) position until November, with the exception of one male that reached its spawning position in October. It therefore appears that the Upper Dee fish that are caught in the Middle and Lower Dee autumn fisheries are not the earliest spawners (i.e. October spawners) in the upper catchment.

As part of the RDT's remit to deliver education to schools in Deeside, the radio tracking project in 2010 involved three local primary schools. This education project was delivered through school visits and www.riverdeetracking.com.

Redd Count Surveys

The redd count surveys show that spawning occurs in late October in the Upper Dee, with no October spawning of salmon detected downstream of Aboyne. Further differentiation in the start of spawning along the length of the catchment was not identified, hence it appears that the upper half of the catchment (upstream of Aboyne) could be seen as 'earlier' spawning and the lower catchment (downstream of Aboyne) as 'later' spawning.

Although no cline was detectable for the start time of spawning through the catchment, surveys in 2009 found that the peak and duration of spawning show more of a cline within the catchment; with peak spawning occurring later and spawning duration being greater in the lower catchment.

There is some annual variability in the onset and peak of spawning (e.g. noted between 2009 and 2010), due to conditions such as weather, flows and temperatures. This is particularly likely to influence spawning in tributaries, as flows can affect access into tributaries and smaller water bodies are more rapidly influenced by changing temperatures. However, the earlier spawning found consistently in the Upper Dee may be in response to the lower water temperatures, which affects the development rate of spawned eggs and newly-hatched fish (Taranger et al 2003, Taranger & Hansen 2008).

Conclusions

Three objectives were set for the three year monitoring trial to assess whether there was any potential for the October fishery to impact on the sustainability of the Dee salmon stock. The October fishery was considered for the Dee downstream of Aboyne Bridge (i.e. the Middle and Lower Dee sections), to minimise any impact on early spawners or spring salmon (considered to be significant stocks in the Upper Dee, above Aboyne Bridge). These objectives are addressed below.

Objective 1. To assess whether fish caught by rod and line and released in the first two weeks of October have the same chance of successfully surviving to spawn as those caught in the last two weeks of September.

The radio tracking project found no significant difference in the movements and final destinations of salmon caught and tagged in either the Lower or Middle Dee in the last two weeks of September compared to the first two weeks of October. There was also no significant difference between fish caught and tagged in the last two weeks of September and in the first two weeks of October in the time that they reached their final (spawning) destination, providing no evidence that these two groups of fish had different spawning periods. This provides strong indication that, for the Dee downstream of Aboyne Bridge, extending the fishing season to 15 October will have no additional impact on the survival of salmon after capture and handling, nor on their propensity to migrate for spawning - and therefore on the sustainability of the salmon stock - than closing the fishing season after 30 September. In support of this conclusion, Booth et al (1995) have shown that after Atlantic salmon are fly fished and played to exhaustion when close to their spawning period, physiological recovery occurs within 12 hours and the stress response is minimal (possibly influenced by the low water temperatures in the autumn). They also found that egg survival from females was not affected by capture and handling close to spawning time.

Objective 2. To determine if Aboyne Bridge is the correct upstream limit of the season extension.

Redd count surveys indicate that commencement of salmon spawning in the Middle and Lower Dee is no earlier than November; hence there is a minimum of three weeks between the closure of an October fishery and the start of spawning in the Middle and Lower Dee. However, approximately half of the fish captured in the Middle Dee in the autumn (September and October) migrated into the Upper Dee, as did 15% of salmon caught in the Lower Dee during this period. Several of the sites surveyed in the Upper Dee recorded salmon spawning in the fourth week of October. However, the fish captured in the Middle and Lower Dee autumn fisheries that were destined for the Upper Dee reached their final (spawning) destination in the second week of November, on average, and only a single fish may have been at spawning grounds and ready to spawn in October. This suggests that the Upper Dee fish captured in the Middle/Lower Dee fisheries are not early (October) spawners.

As there was no evidence of a difference seen in the movements and behaviours of fish destined for the Upper Dee, compared to fish that remained in the Middle or Lower Dee, it appears that the

Middle/Lower Dee fisheries do not impact on any of the Lower, Middle or Upper Dee fish stocks they are comprised of.

Objective 3. To determine what stocks of salmon are being caught in the first two weeks of October and whether there is an impact on the more vulnerable stocks of spring-running salmon.

The radio tracking suggested that the October fishery in the Lower and Middle Dee will target not only Lower and Middle Dee stock but also Upper Dee stock. The majority of salmon caught in the Lower/Middle Dee in the autumn (September and October) were Multi Sea Winter (MSW) salmon, (with the remainder being grilse), with the exception that the Lower Dee fishery in 2010 was slightly dominated by grilse. It therefore appears that there is some variability in the contribution that grilse make to the Dee's autumn rod catch. Three quarters of the sampled October rod catch in the Middle Dee comprised summer/autumn salmon, as did 82% of the Lower Dee October catch. The remainder of the rod catch was classed as either spring salmon or 'spring or early summer' salmon (24% in the Middle Dee and 18% in the Lower Dee).

The radio tagged spring salmon and 'spring or early summer' salmon showed final (spawning) locations in the Upper, Middle and Lower River. These fish showed (statistically) similar movements (upstream/downstream/non-directional), migration distances and arrival time at spawning grounds to summer/autumn fish. Thus there was no evidence that capture, handling and tagging spring salmon in the first two weeks of October had any noticeable impact on these fish, relative to other stocks of fish or relative to fish caught in the September fishery. It is therefore concluded that the October fishing extension downstream of Aboyne Bridge has no impact on the sustainability of the spring salmon stock.

The final conclusions made from this three year monitoring trial and supported in this report are:

1. Salmon that are caught by rod and line and released in the first two weeks of October have the same chance of successfully surviving to spawn as those caught in the last two weeks of September on the River Dee downstream of Aboyne Bridge.
2. Fishing by rod and line in the first two weeks of October is sustainable for the main stem of the River Dee downstream of Aboyne Bridge.
3. Fishing in the first two weeks of October on the River Dee targets spring, summer and autumn stock components. The impact of fishing in the first two weeks of October does not differ between these stocks and is consistent with any impact of fishing in the last two weeks of September.

This final report, along with a full report of the third year of monitoring (2010), is provided to the Dee DSFB in March 2011. The Dee DSFB will make a decision on whether to apply for a permanent licence to extend the season in March 2011 based on the findings of the monitoring programme over all three years.

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