River Carron Tracking Project

2019 Report

Introduction

Electro-fishing surveys undertaken by Kyle of Sutherland District Salmon Fishery Board (KSDSFB) on behalf of SSE have highlighted the presence of juvenile salmon/hybrid salmon and trout upstream of the weir at Gleann Beag, River Carron. These surveys were initiated in response to anecdotal reports from Alladale Estate workers which suggested adult salmon had been seen jumping upstream of the structure. Adult salmon should be excluded from the area upstream of the structure as the intake which transfers water to the Conon system is unscreened. This would mean that any offspring of adult salmon migrating to the sea as smolts would be extremely unlikely to reach the marine environment.

Discussions have taken place between SSE, KSDSFB and SEPA in an attempt to ascertain how adult salmon are accessing the area upstream of Gleann Beag weir. Presently it is believed that there are two ways in which ingress to the area is being achieved:

1. Fish are able to jump over the weir during periods of high flow.
2. Fish are able to swim through the scour gate when it is opened to allow the winter flow plate to be inserted into the compensation orifice.

It is also possible that a combination of these two scenarios are vectors for migration.

It has been agreed that an adult salmon radio tracking study would inform discussions surrounding potential remedial actions aimed at preventing access for adult salmon and subsequent losses. In particular, it is important to understand at what times of year and by what mechanism successful migration is being achieved. It was agreed that salmon captured on rod and line would form the basis of the study with netting also potentially an option to increase numbers of tagged fish should the need arise. In order to increase the likelihood of tagging salmon which were destined to migrate to the upper reaches of the barrier, salmon captured at Amat and Glencalvie fishing beats were tagged. Glencalvie Falls is understood to be a major obstacle to fish migration, with successful passage dependent on water temperature and flow conditions.

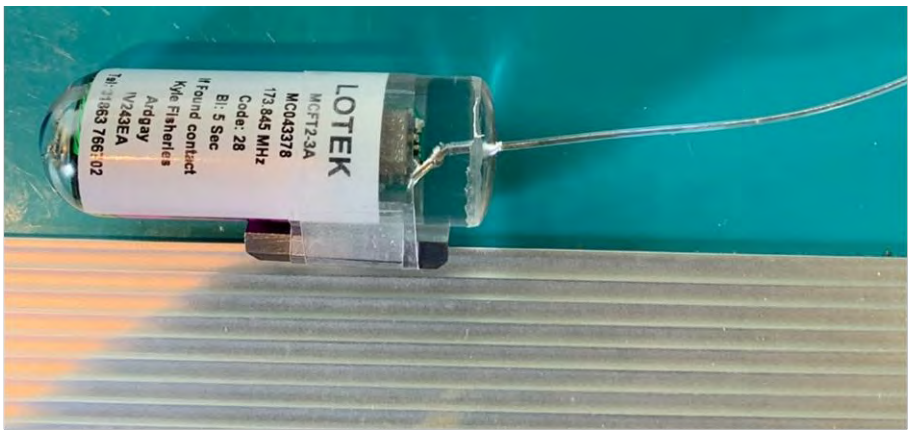
Methodology

Salmon captured on rod and line were retained in a keep net until the arrival of a tagging team. Netting of salmon was not utilised due to the presence of an unknown disease which affected salmon on the Carron and elsewhere in the North of Scotland during the early part of the season. Salmon were anaesthetised using MS222 dissolved in water. Fork-length of the fish was recorded. Tags were implanted into the stomach of the salmon via the oesophagus. Tags were manufactured by Lotek, Canada, see Plate 1. Each tag has a unique code which is detected by the radio receiver. Salmon were allowed to fully recover before being returned to the water. Salmon were tracked using hand-held receivers with the tag code and location

noted. Visits to obtain the location of fish were made at least weekly until the spawning period. Automatic listening stations were not deployed due to the low number of fish available for the study.

In addition to the telemetry data, river height data during the study period is potentially available from the SEPA monitoring station at Sgodachail. Additionally, water temperature data is available from the network maintain by the Kyle of Sutherland Fisheries Trust.

Plate 1 Radio tag. Tags are approximately 4.5cm in length.



Results

Seven salmon were tagged during the study period. Details of the individual salmon can be found in Table 1 below.

Table 1 Details of tagged fish.

Tag No.	Date Tagged	Length (mm)	Location
27	17.5.19	695	Falls Pool
11	23.5.19	755	Bridge Pool
12	23.5.19	740	Bridge Pool
14	17.5.19	705	Falls Pool
15	17.5.19	835	Falls Pool
16	21.6.19	671	Bridge Pool
17	07.8.19	700	Bridge Pool

Salmon undergoing tagging procedures often display a quiescent period immediately after release, including dropping back downstream prior to resuming upstream migration. This type of behaviour was displayed by a number of fish in the present study. However, the presence of Glencalvie Falls appears to have significantly hindered fish migration in this study and truncated upstream movement. Of the fish tagged, five showed distinct upstream movement post a quiescent period. The first fish tagged (tag number 27) dropped downstream after tagging and appeared to leave the Carron system, although regurgitation of the tag with the tag subsequently being washed downstream cannot be discounted. Tag

failure is also a possibility. No upstream movement was detected from the fish with tag number 14 although given it was tagged at Glencalvie Falls this of itself does not preclude the possibility that the fish remained alive until the spawning period. Again, it would also be possible that the tag was regurgitated.

No salmon were detected upstream of Glencalvie Falls at any point during the study period. This is despite the fact that a number of fish tagged in the Bridge Pool approximately 450m downstream of the falls were subsequently detected in the immediate vicinity of the falls on a number of occasions. Anecdotally it would appear that some untagged salmon did successfully negotiate the falls in 2019 as they were seen jumping in known resting pools at Alladale, however confirmation will not be available until electro-fishing surveys are undertaken in the summer of 2020. It is suggested that the wet conditions prevalent in the late spring and summer of 2019 restricted opportunities for successful passage at the Falls.

Plate 2 Salmon being released back to the River Carron after tagging.

The fish with tag number 12 displayed the greatest degree of movement in this study. The fish was captured on the 23rd May in the Bridge Pool at Glencalvie. The fish was detected very close to Glencalvie Falls further upstream on a number of occasions. On the 12th August the fish was detected downsteam of the Lady's Grave Pool at Amat and had dropped further downstream to the Sgodachail area by the 21st August. On the 29th August it was again detected in that area. The fish was not detected again until wider searches of the Kyle of Sutherland were undertaken closer to the spawning period. In early October the fish was detected in the lower reaches of the River Shin where it remained until the spawning period.

As in similar studies, movement of individuals typically increased as the spawning period (late October/November) was approached. Some individuals displayed downstream movements, presumably to locate suitable spawning areas. The last fish tagged, number 17, for example migrated upstream to Glencalvie Falls after being tagged in the Bridge Pool further downstream but closer to the spawning period the area in the vicinity of Lady's Grave pool was favoured.

Recommendations

It is suggested that fish entering the Carron earlier in the year should be tagged rather than relying on the capture of fish in a limited geographical area later in the year. This would maximise the chances of fish being able to take advantage of any 'migration window' available to successfully migrate upstream of Glencalvie Falls. This approach would also likely increase the absolute numbers of fish available for study.

Automatic listening stations should be judiciously placed in order to obtain better and more detailed movement on migration. In particular, a 'gate' system using listening stations in the lower reaches of the Carron would likely detect salmon exiting the Carron system as occurred in the 2019 study.

Consideration should still be given to obtaining fish via netting if insufficient fish are donated by anglers. Potential netting sites upstream of Glencalvie Falls should be identified if possible.

Acknowledgements

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