

The Ghillies Seminar
Friday 15th April 2011
(Part-funding courtesy of the North & West District Salmon Fishery Board)

Speakers and their topics

Dr Shona Marshall (WSFT)	Introduction and area update; Biosecurity
Dr Iain Simes (SNH)	Freshwater pearl mussels – culture, crime and conservation.
Dr Ronald Campbell (TF)	The secret history of salmon
Dr Keith Williams (N&BFT)	Damage to salmon smolts
Mr Gunnar Scholtz (RAFTS)	The Highland Mink Project

Dr Shona Marshall (WSFT):

All were welcomed to the seminar and a short report on local issues given. It was suggested that information be shared within the area to assist in any restoration projects. Some of the work mentioned included:

Loch Innis are involved in a large restoration project; Reay Forest are undertaking a large scale genetic project to look at hatchery efficiency; a fish pass has been installed in Bhadaidh Daraich to help with sea trout restocking; hatcheries are used in the Laxford, Inver and Osgaig. It was suggested that these three (Robert, Geordie, Keith, Scott, Henry and Ian) get together and produce a 'Best Practice' document for the area.

Biosecurity continues to be an issue and all were asked to report any sightings of non-native species. The Trust will get involved in eradication and are already removing some plants from the area. All were once again reminded about the importance of *Gyrodactylus* and the need to disinfect tackle between water courses.

The request was made that the Trust would be happy to read any scales collected. Also please inform us of anything unusual in the catches, for example any rainbows caught. It was also noted that the Board would be interested in photographic evidence of any predator marks.

Dr Iain Simes (SNH):

Iain introduced the freshwater pearl mussel and explained their life history. It was noted that individuals can live for more than 100 years, taking 10 – 15 years to reach sexual maturity. FWPM's have males and females and the larvae are released over a two day period in July/August. The larvae are passively taken over the gills of small salmonids, where they close and form a small cyst. They live there, not harming the fish, for 1 year before dropping off, hopefully onto fine gravel or coarse sand with some stability. There is 99.99% mortality at each stage so they are extremely sensitive to interference. It is also believed that the mussels can be selective to fish species and therefore vulnerable to changes in the composition of the fish population.

Scotland has half of the known populations within Europe and Sutherland has half of the Scottish populations. Sutherland is therefore very important to mussel conservation. In addition, each river has a genetically unique population. This usually splits on geographical patterns, but in one case a main river population was significantly different to that in one of its tributaries. Breeding populations are a sign of good water quality.

He then went through references to pearl mussels in history and literature before noting that the first documented evidence of overfishing was in the 18th Century. Since it can be necessary to kill hundreds if not thousands of mussels to get one pearl this demonstrates the vulnerability of the species.

Mussels are also vulnerable to pollution and land use changes; in-river works, particularly diggers within the river crushing or digging them up; hydro schemes resulting in changing flow regimes and silting; over abstraction causing death by exposure; declining salmon and trout populations.

A survey of 145 known mussel sites found that 1/3 were extinct, 1/3 declining (no juveniles) and 1/3 healthy. Of these, 99% were affected by fishing, 23% by pollution and 16% by hydro management. Mussel kills continue to happen – fishing, salmon poaching, instream works, pollution, etc. Three quarters of the sites samples recently have shown signs of fishing.

This is a priority for wildlife crime and all present were asked to assist in its detection and to display posters detailing the things to look out for and to display posters detailing the things to look out for. In addition, Iain brought literature giving guidance for instream works.

Iain noted that otters will take mussels but that they are not major predators. Any piles of mussels will be the result of fishing.

Questions and discussion

Where is the trade for pearls? There is no obvious market and as such that is unknown.

How does the pearl form? There are two theories: a piece of grit in the shell which irritates and causes a build up of excretion to ease the issue or a virus. As you get 'good' and 'bad' pearl rivers the infection is the most likely cause.

What is the effect of road salt? Increases in salinity are not good. In addition, pollutants from the road are also bad for the mussels but this is not the main issue.

Dr Ronald Campbell (TF):

Ronald started by stating that all studies into salmon populations began in 1952 with the introduction of statutory recording. However, as salmon have been around for much longer than this it is dangerous to restrict our views to this period. While this talk was about changes in the Tweed catches, it is probable that similar differences would be found in other systems, although timings may be different. It is therefore important to look at the patterns in our own catchments.

On the Tweed they have been lucky enough to be able to computerize all of the old records, including catches from the netting stations, particularly the Berwick Salmon Company, 1840 – 1882. This has enables long term trends to be analysed.

A big collapse was noted on the Tweed in the 1850's, with things increasing through the 1960's to the 1980's/90's where catches reached numbers not seen in 150 years. Why did this collapse happen? It is unlikely to be drainage as most of this happened in the 1820's and 30's. Similarly, the building of caulds and weirs happened in the 1840's, but was not enough to explain the full decline. Pollution issues also became more relevant after the decline, in the 1870's/80's. One possible reason was over netting in this period.

In addition to changes in catch, the fish also changed at this time from grilse to salmon.

The collapse in the spring salmon catches since 1952 was preceded by a big rise from the 1920's.

When spring catches are up, autumn catches tend to be down. A similar pattern was observed in the nets – spring salmon were dominant in the 1740/50's and again 1917 – 1958. In between there were more grilse than salmon. This coincided with high numbers in the nets, indicating that an autumn grilse population = lots of fish.

The autumn fish have also changed. There have been big changes in the size since the 1880's, with small fish becoming more common. There has therefore been a switch from salmon to grilse. This happened before, in the early 1800's.

Within the Tweed you also see different patterns of catches between the upper and lower Tweed.

Smolt age can also change. In 30 years, the Tweed went from S2 to S3. In another 30 year period it went back to S2, with more S1. This is possibly related to winter temperatures. It will affect the juvenile populations via competition – three generations rather than 2 therefore more adults.

Sea trout have also shown long term changes. Over 160 years, sea trout have been getting earlier.

It is hoped to do similar work on the Tay and Aberdeenshire Dee in order to get a comparison in the trends.

Questions and discussion

Do similar records exist for the rivers in this area? It was felt that they would be somewhere, although no one present knew where. It was noted that a similar study had been attempted in Anne, Duchess of Westminster's time but that the records were very patchy as a result of signature theft.

Dr Keith Williams (N&BFT)

Keith noted that what happens to smolts in freshwater can have an effect on marine survival i.e. acidification causes marine mortality from damaged gills and subsequent reduction in tolerance to salt.

A mixture of predators will affect descending smolts – avian, mammal and fish. Damage rates of 7.93 – 10.78% were noted during the study period.

Keith has categorised the damage:

1. Scales removed, including 'rake' marks (equidistant parallel lines).
2. Scales removed, including converging lines or v-shaped marks.
3. A single puncture (open wound).
4. A single large puncture.
5. Multiple small punctures.
6. Multiple punctures, including one or more large punctures.
7. General scale loss or miscellaneous damage.

Rates of damage varied with conditions. A cold, harsh spring gave the greatest rate of recorded damage. In that year larger smolts were more likely to be damaged, possibly as they were more likely to escape. More damage is recorded later in the smolt run, possibly because early smolts tend to run at night. There is a negative relationship between the number of fish in the trap and the amount of damage.

Sources of damage can be split: heron will cause parallel scale loss; cormorants create a deep triangular wound on one side of the fish. There is little information on the damage caused by sawbills, fish or other predators. However, scale loss close to the tail with puncture wounds is possibly sawbills or other fish.

Some will survive but their marine survival is compromised. All efforts to reduce damage should be made.

Questions and discussion:

Will estuary netting have a negative effect on the population and should it stop? Keith witnessed the netting and felt that the fish were handled carefully with no damage caused. It is similar to angler catches where care has to be taken not to over handle or damage the fish.

Mr Gunnar Scholtz (RAFTS)

Gunnar introduced the north Highland mink project, which is due to run until August 2013. However he noted that the eradication of mink will be a slow process and will require effort beyond this time. It was also noted that it is important to think on a larger scale basis rather than one river.

Mink can travel for over 100 km from their nest site, with 50 km travelled in one day by a radio-tagged mink.

Volunteers will be required to monitor the traps and rafts and also dispatch and collect any mink. Even if you can't help with the traps and rafts it is important to report any sightings, both within this area and also extended into Caithness.

RAFTS will be building a central store of equipment – rafts, traps, etc. – and also training, for use within the project. Lure is, however, not available at the moment.

Mink are most likely to be moving around at 2 times of the year – spring and autumn. Traps should be used at these times rather than rafts.

Signs of mink activity include the lining up of carcasses – can poultry keepers watch out?

Rafts should be checked every 2 weeks or so. If tracks are mink then traps should be put into the raft. Mink prints are about the size of a 50p piece.

The maximum altitude for breeding is 400 m, but mink will live anywhere accessible to water.

Anybody willing to volunteer to monitor rafts or traps should contact Shona, who will pass on their details. Any sightings should also be reported to Shona.