



Electric-fishing Survey of River Wester (2016)

Summary Report

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The Flow Country Rivers Trust



The Burn of Lyth at Quintfall looking west

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Caithness District Salmon Fishery Board

Introduction

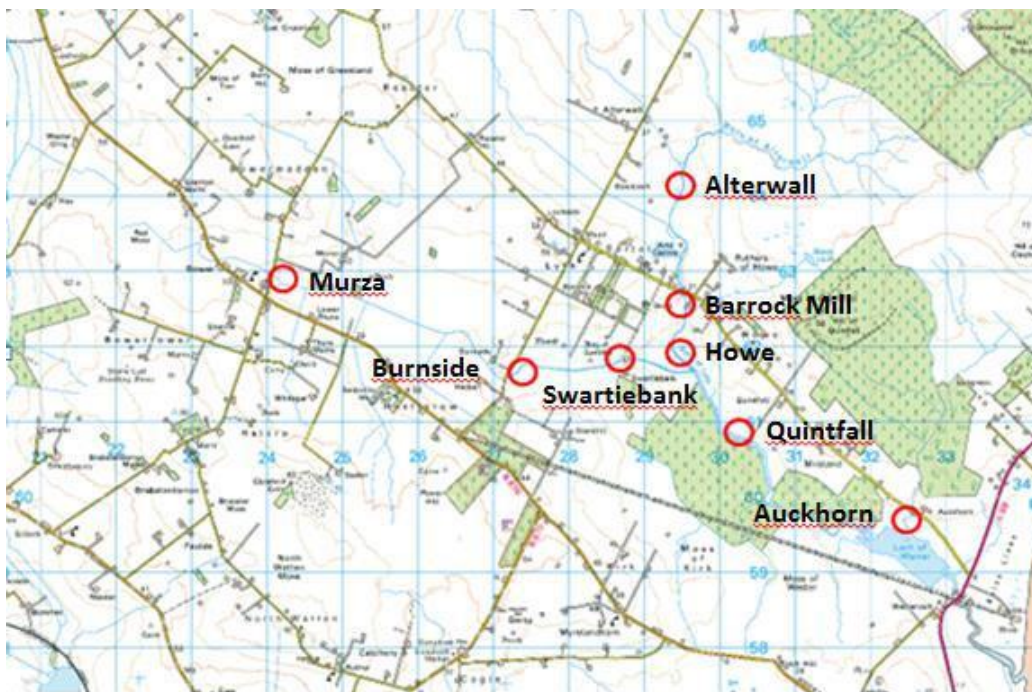
When the Caithness District Salmon Fishery Board set up its annual series of electric-fishing surveys of the Caithness rivers in 2013, a single site at Barrock Mill in the Wester catchment was included. The results of four annual surveys (2013–16) of the site have been disappointing. In 2016 the Flow Country Rivers Trust carried out a more extensive survey of the Wester catchment to investigate the status of the juvenile trout and salmon population in the wider catchment.

In September/ October, 2016, eight sites in the River Wester catchment were electric-fished in the standard way by three-pass fishing using stop nets and a generator.

This paper is intended to give an overview of the detailed scientific report which contains the full narrative, survey results, maps, diagrams and tables. The full report will be posted on the FCRT website - <http://fcrt.org/>

The Wester contains a mixed population of trout and salmon which is unusual in the Caithness context. The trout component and particularly the sea-trout component is of greater management priority than the salmon population because the sea-trout fishery is considered dominant. In this respect, the Wester fishery is a unique and valuable local asset particularly if current levels of productivity can be sustainably enhanced. The present project has shown that there is likely to be scope for fishery improvement because, in 2016, the number of 1+ fish produced was estimated to be 30 – 50% of what could reasonably be expected. The management actions appropriate for improvement of the fishery have been provisionally identified and they could be carried out sustainably and at relatively low cost.

Map of the Catchment and Electro-Fishing Sites



The Wester Catchment

The River Wester runs from Loch Wester, a shallow freshwater loch of about 0.5 km² lying at an altitude of only 3m. The river flows eastwards for about 2km before entering the sea in Sinclair Bay. The loch is fed by three streams: the Bower Burn, the Burn of Lyth and the Kirk Burn. Finally, the Burn of Auckhorn enters the loch on its northern edge. The periphery of the Wester catchment lies at an altitude of about 30m but the last segment of the stream network falls only 4m over the final 4 km of its course.

The Wester catchment has a complex history and is highly impacted by agriculture and forestry activity. In particular, long stretches of the various streams have been deepened and straightened to

hasten run-off and improve drainage of the surrounding land. Due to channel modification, the Scottish Environmental Protection Agency regards the Bower Burn and the Burn of Lyth as being of “bad” overall status and the Kirk Burn as being only “moderate”. Almost all the stream network in the upper part of the Wester catchment (i.e. west of Mireland) appears to have been dredged and re-aligned. By consulting old maps, we have timed these extensive works to the 1860s.

The Wester fishery was very popular with anglers up until the early 1980’s and we have identified the following events around this time which may have adversely affected the fishery.

- a) Drainage and dredging works in the river above the loch.
- b) Extensive afforestation of the catchment.

As a result of the above, Loch Wester has silted up and many of the popular angling areas have reduced in depth from approximately 1 metre to 0.5 metres. More investigative work is required.

- c) The Ackergill and Keiss net fishings operated at a much-reduced capacity after 1983. Prior to this the netsmen used to stock the catchment and the stocking would have ceased after this date.

Site	Density						Biomass density
	Trout		Salmon		Trout + salmon		Trout + salmon
	0+	1+	0+	1+	0+	1+	All ages
Alterwall	12.1	7.8	2.6	2.6	14.7	10.4	4.7
Barrock Mill	8.7			5.2	8.7	5.2	2.4
Howe	27.8	0.8	55.5	18.0	83.3	18.8	7.9
Murza	19.9				19.9		1.9
Burnside 2	65.6	14.7	2.7	6.7	68.3	21.4	14.4
Swartiebank	32.8	4.1	3.3	0.8	36.1	4.9	4.7
Quintfall	42.0	1.3	47.1	1.3	89.1	2.6	4.4
Auckhorn	21.8	1.0			21.8	1.0	2.2

Key to colour code

absent	
poor	
fair	
adequate	
good	
excellent	

Electro-Fishing Results

The values for density (the number of fish per 100 square meters) and biomass density (grams of fish per 1 square meter) are given for each site in the Table above. The values are informally colour-coded for ease of reference from dark red (absent) through to blue (excellent) according to the key given below.

Density

Overall, the best results for 0+ combined trout and salmon are the blue sites (Howe, Burnside 2 & Quintfall) followed by Swartiebank (yellow). Results for 1+ fish are best at Burnside 2 and Howe. Burnside 2 and Quintfall are best for trout and Howe and Quintfall for salmon.

Trout are very uncommon at all the sites on the other Caithness rivers that are routinely electric-fished by CDSFB. However, average values for salmon density at the Caithness sites are around 80 per 100 m² for 0+ fish and 20 per 100 m² for 1+ fish. On this basis, the density of 0+ fish (combined trout and salmon) reached average Caithness values only at Howe, Quintfall and perhaps Burnside 2. The combined values for 1+ fish reached average Caithness values only at Burnside 2 and perhaps Howe. All the other Wester sites fell far short of average Caithness values.

The density of fish is relatively low at most, but not all, of the Wester sites. It seems likely that radical changes to the streambed caused by drainage works about 150 years ago have resulted in patchy patterns of spawning that impede the initial supply of young fish to some areas. Later on in the life-cycle, these sites support fewer juveniles than expected.

Biomass Density

Biomass density (the weight of fish per m² of stream) is shown in the right-hand column of the Table above. Values ranged from 1.9 grams per m² at Murza to 14.4 grams per m² at Burnside 2. The range of values is broadly in line with values for sites elsewhere in Caithness.

At the point where competition for food begins to limit the growth of fish and therefore a site's capacity to produce biomass, the site will still be capable of supporting greater numbers of fish. If the numbers of fish are greater and the biomass density remains unchanged, the fish will be smaller. It can be judged whether any of the Wester sites is near its productive limit by scrutinising the body sizes of the fish present at each site. Most of the sites do not contain sufficient fish to justify robust comparisons. However, 0+ trout and salmon at Howe and Quintfall were small relative to fish at other sites so they might be around their maximum capacity to produce fish biomass.

The biomass of fish supported by each site was used to gauge the number of juvenile fish that would be expected to result if the input of very young fish was not a limiting factor. For 2016 it is estimated that, on average, the Wester survey sites produced around 30 – 50% of their maximum potential density of juvenile salmonids.

Further data requirements

1. The Wester data is for a single year, so a repeat of the full Wester survey in 2017 would test the validity of the conclusions drawn based on the survey of 2016. In particular, the variation in (a) the distribution of age classes and (b) levels of biomass production at certain sites should be checked again.
2. Assessment of the mixed trout/ salmon population of Wester is hampered by the lack of suitable reference data on the structure of trout populations elsewhere. A survey of the fish population of the Gill Burn at nearby Freswick would be likely to provide a suitable reference comparison for the performance and production of Wester trout.
3. Streambed habitat in Wester is profoundly affected by historical river works. Information on habitat is currently restricted to informal assessment of the survey sites themselves and these differ

greatly in character. More generally, the stream network is probably a mosaic of altered habitats that have been affected by channel modification in different ways. A full-scale habitat survey of the stream network would clarify the picture and provide greater detail on the likely scope for improvement in certain areas.

4. The production of the Wester is estimated to be 30 – 50% of its potential (see above). This value assumes that average levels of potential biomass production at the Wester sites are similar to the values achieved in 2016 at Quintfall and Howe. Saturation stocking could be used to provide specific values for the natural limits on biomass production at sites on the catchment periphery like Murza, Auckhorn and Alterwall. The more productive sites at key locations like Howe, Quintfall and Burnside 2 should not be stocked, in order to avoid disturbing their natural fish populations. More generally, trout should not be used for stocking, in order to conserve the Wester trout population. Salmon for stocking would have to be sourced outside the Wester, perhaps from the Wick River which lies 8km to the south. This would probably be considered legitimate given the long history of intense stocking reportedly carried out by local salmon netsmen some years ago.

Management options

1. If stream maintenance is proposed for the Wester catchment, particularly for main spawning areas near Howe or Quintfall, the works should be timed to avoid the period when eggs or alevins are present in streambed gravels (November to May) to prevent the destruction of young stock.

2. If stream works are proposed, it will be feasible and practicable to remove fish from the targeted area by electric-fishing and to re-locate them to areas elsewhere in the Wester catchment that are not already saturated with fish. If required, the FCRT will advise.

3. The 2016 survey suggests that Wester is producing 1+ fish at 30-50% of its potential due to shortfalls in the availability of young fish. It is likely that this is mostly due to the uneven distribution of spawning gravels which appear to be overly concentrated in the area around Howe. This imbalance might be circumvented by redistributing eggs/ alevins away from Howe to other parts of the catchment via a hatchery. However, the more sustainable alternative is to create or restore spawning habitat in areas where it is lacking to make hatching fish more freely available to all the potentially productive areas of the catchment.

“The loch of Wester, communicating with the sea, produces plenty of excellent salmon-trout, some of them two feet in length, remarkable for flavour, delicacy and richness”.

First Statistical Account of Scotland (1791-1799).

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