

River Roy Electric Fishing Survey 2019

File note

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Waterside Ecology

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1 Methods

1.1 Survey

Fish populations on the River Roy catchment in Lochaber were surveyed by electric fishing during August 2019. Survey sites were selected mainly from a spreadsheet of previous survey events provided by Jon Gibb, manager of the River Lochy. Many of the grid references of past sites were recorded to the nearest 100 m, so current sites may not have been located in precisely the same locations as during past surveys. Furthermore, site dimensions were not available from all sites previously surveyed, so area covered is also likely to have changed. However, the hope was that by placing sites in the same general locations some useful comparisons with past surveys may be possible. Such comparisons are beyond the scope of this report.

Sites are listed in Table 1. Further site details are given in Appendix 4.1 along with details of survey events such as water level and voltages used.

Table 1 Survey sites, River Roy catchment 2019

Date	Site	Watercourse	NGR	Area surveyed (m ²)	Previous site code
14/08/2019	35	River Roy	NN 31384 89313	125.4	35
14/08/2019	New A	River Roy	NN 32336 90119	68.6	None
14/08/2019	36a	River Roy	NN 33296 91020	217.0	36a
13/08/2019	37	River Roy	NN 35409 92376	125.0	37
13/08/2019	38	River Roy	NN 37882 92511	154.9	38
13/08/2019	40a	River Roy	NN 39070 93295	156.2	40a
13/08/2019	40	Allt Chonnal	NN 39625 93654	95.0	40
13/08/2019	41	River Turret	NN 33876 91918	106.2	41

All sites were surveyed using the semi-quantitative method described by SFCC (2014). Fish were captured mainly in a large hand-held dip net (diameter 60 cm). The anode operator carried a smaller dip net for use in river margins or areas of low current speed where the large net was less effective.

Captured fish were placed in clean water in covered holding bins. They were anaesthetised, identified to species and measured to the nearest mm. Scales were taken from some salmon for age determination. Fish were allowed to recover fully in clean water before being released back into the sample site.

Habitat data were collected for all sites based on the SFCC (2014) protocol.

1.2 Data analyses and presentation

All fish densities are expressed as fish per 100 square metres of wetted stream area (fish.100m⁻²). Salmonid densities are presented separately for fish aged 0+ years old i.e. young of the year and for fish aged 1 year or older. Throughout this file note 0+ salmonids are referred to as fry and older juveniles as parr.

The relative classification for West Region provided by Godfrey (2006) is used to describe fish abundance in a regional context. The classification is based on data sets held by Scottish Fisheries Co-ordination Centre (SFCC). The quintile ranges of salmon and trout densities (Appendix 4.2) allow for comparison of fishery performance against nationally and regionally based reference points. The classification system is based on semi-quantitative fishing i.e. on the number of fish captured during a single electric fishing run through an undisturbed site. The classification for rivers greater than 9 m in width is used throughout this file note.

2 Results

2.1 Salmon

Salmon fry densities were highly variable, ranging from very poor to excellent (Table 2). The very poor classification was at site 38, a little over 2 km upstream of Falls of Roy. Habitat at this site was sub-optimal for fry (see Appendix 4.3 for details of habitat) but nevertheless appeared of sufficiently high quality to support a higher fry density than was found during the survey. Relatively low densities were also recorded at 36a (just downstream of Braeroy Lodge) and 40a (0.9 km downstream of Allt Chonnal confluence), both of which appeared to provide good quality salmon fry habitat. These results may suggest that egg deposition during the winter of 2018-2019 was insufficient to fully populate available habitat. Alternatively, it may be that these sites are distant from suitable spawning locations and that fry had not yet migrated into them. Fish habitat maps have previously been prepared for the River Roy by Lochaber Fisheries Trust. These are not currently available to Waterside Ecology may help interpret data from the current survey.

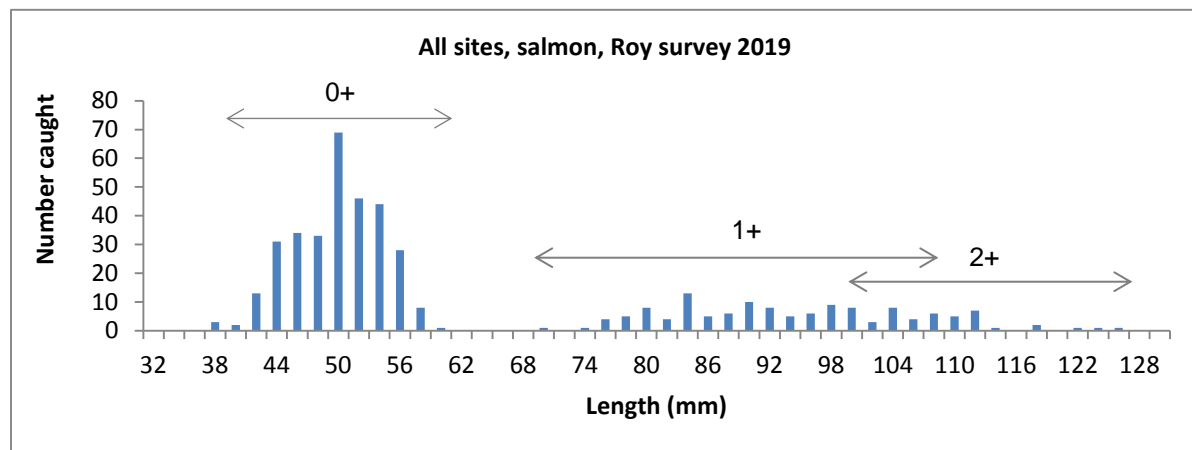
Table 2 Electric fishing results, salmon

Site	Watercourse	Number caught		Density (fish.100m ⁻²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
35	River Roy	53	17	42.3	13.6	Good	Excellent
New A	River Roy	34	25	49.5	36.4	Excellent	Excellent
36a	River Roy	34	24	15.7	11.1	Fair	Excellent
37	River Roy	53	22	42.4	17.6	Good	Excellent
38	River Roy	3	6	1.9	3.9	Very poor	Fair
40a	River Roy	32	13	20.5	8.3	Good	Excellent
40	Allt Chonnal	53	7	55.8	7.4	Excellent	Excellent
41	River Turret	50	19	47.1	17.9	Excellent	Excellent
All sites average				34.4	14.5	Good	Excellent

Salmon parr densities were classified as excellent at seven of the eight sites. The lowest density was at site 38, where density was classified as fair. As with fry, parr habitat at site 38 was sub-optimal but was judged capable of sustaining a higher density than was seen or captured.

Three age classes of salmon were present at most survey sites, 0+ (fry), 1+ and 2+. These fish would have hatched in 2019, 2018 and 2017 respectively. Too few scales were taken to establish numbers of 1+ and 2+ parr at some sites and there is likely to have been some overlap in the lengths of the two age classes (Figure 1). Scale readings are provided as Appendix 4.4.

Figure 1. Salmon lengths River Roy catchment 2019



2.2 Trout

Survey results for trout are presented in Table 3. Trout were absent at four of the eight survey sites. No more than two trout were captured at any of the sites surveyed and the average densities of fry and parr would both be classified as very poor.

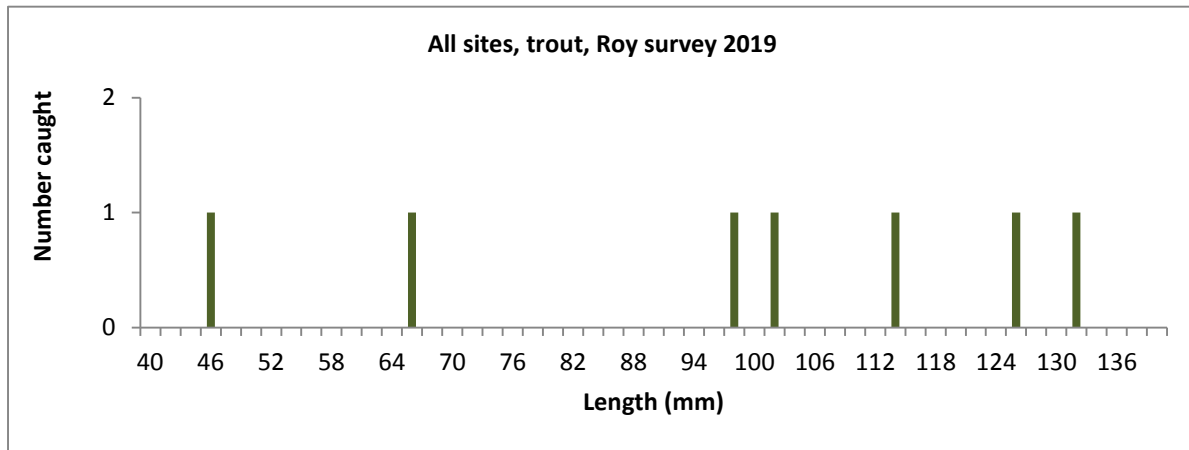
Trout parr density at site 40 was classified as excellent, despite only two being caught. This is clearly counter-intuitive. It should be noted that the data held by SFCC on which density classifications are based post-date sea trout stock declines during the 1980s and 1990s. The classifications may therefore be unduly conservative in relation to expected trout densities.

Table 3 Electric fishing results, trout

Site	Watercourse	Number caught		Density (fish.100m ⁻²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
35	River Roy	1	1	0.8	0.8	Very poor	Poor
New A	River Roy	1	1	1.5	1.5	Poor	Fair
36a	River Roy	0	1	0.0	0.5	Absent	Very poor
37	River Roy	0	0	0.0	0.0	Absent	Absent
38	River Roy	0	0	0.0	0.0	Absent	Absent
40a	River Roy	0	0	0.0	0.0	Absent	Absent
40	Allt Chonnal	0	2	0.0	2.1	Absent	Excellent
41	River Turret	0	0	0.0	0.0	Absent	Absent
All sites average				0.3	0.6	Very poor	Very poor

Three age classes of trout, 0+, 1+ and 2+ were captured ranging in length from 46 mm to 132 mm (Figure 2).

Figure 2. Trout lengths River Roy catchment 2019



2.3 Other fish species

The only non-salmonid fish species recorded were eels. A single eel of 44 cm was captured at site 41 in the River Turret. No eels or other fish species were captured at any of the other sites. The lack of eels may suggest that access over rapids and waterfalls further downstream, for instance in the Spean Gorge and middle River Roy, is difficult.

3 References

Godfrey, J. D. 2006. Site condition monitoring of Atlantic salmon cSACs. Commissioned report to Scottish Natural Heritage, December 2006. Scottish Fisheries Co-ordination Centre, Pitlochry.

SFCC. 2014. Scottish Fisheries Co-ordination Centre Training Manual: Team Leader Electrofishing. Inverness/Barony College. April 2014.

4 Appendices

4.1 Electric fishing site and event details

Site	NGR	Location	Length (m)	Width (m)	Voltage	Conductivity ($\mu\text{S}\cdot\text{cm}^{-1}$)	Temp ($^{\circ}\text{C}$)	Level
35	NN 31384 89313	100 m upstream of bend. Homogenous reach - identify on NGR.	6.6	19	390	22	14	Low-mod
New A	NN 32336 90119	50 m up from 'gorge'. Top of site is 2 m wide whale back rock near left bank.	10.1	17	390	22	14	Low-mod
36a	NN 33296 91020	Downstream end is in line with pyramid rock left of midstream.	10	21.7	390	22	13	Low-mod
37	NN 35409 92376	Left side of braid. Top of site is mid-way between two big rocks that are 5 m off left bank.	13.3	9.4	390	22	14	Moderate
38	NN 37882 92511	Start at the two big rock by the right side of channel.	9.5	16.3	390	19	17	Moderate
40a	NN 39070 93295	Start 40 m up from top of corner pool.	12.3	12.7	390	21	17	Moderate
40	NN 39625 93654	Top of site is 5 m downstream of the ford. Right side of bar only fished.	10	9.5	390	21	15	Moderate
41	NN 33876 91918	Opposite lone birch that is 40 m off right bank. Start 1 m up from the big oblong rock in the left bank face.	9.4	11.3	390	30	15	Moderate
35	NN 31384 89313	100 m upstream of bend. Homogenous reach - identify on NGR.	6.6	19	390	22	14	Low-mod

4.2 Salmonid density classification system for West Region (Godfrey 2006)

Quintile ranges for juvenile salmonid density are given below. The classification is based on data sets held by SFCC. Quintile densities allow for comparison of fishery performance against regionally based reference points.

	Absolute classification (all streams)	Stream width class (relative classification)			
		<4m	4-6m	6-9m	>9m
Salmon 0+					
0 th percentile	0.6	1.3	1.6	0.8	0.6
20 th percentile	2.4	2.4	3.5	1.6	2.7
40 th percentile	6.1	5.3	6.0	10.4	8.1
60 th percentile	14.6	10.7	14.0	14.0	15.9
80 th percentile	26.6	17.2	35.5	21.1	45.1
100 th percentile	172.4	92.8	55.1	172.4	83.9
% zero density	45.4	60.0	27.3	44.7	29.4
Salmon 1++					
0 th percentile	0.5	1.4	0.8	0.5	0.5
20 th percentile	1.9	2.3	2.0	1.9	1.7
40 th percentile	3.6	3.3	5.0	4.4	3.2
60 th percentile	5.8	6.9	6.6	5.9	4.2
80 th percentile	11.3	12.2	10.8	10.9	6.6
100 th percentile	40.5	30.9	40.5	22.0	24.0
% zero density	33.0	48.8	24.2	26.3	11.8
Trout 0+					
0 th percentile	0.2	1.4	0.7	0.5	0.2
20 th percentile	2.0	9.9	3.0	1.1	0.8
40 th percentile	5.5	28.5	5.0	1.8	1.5
60 th percentile	17.3	44.7	12.4	2.7	2.6
80 th percentile	50.4	74.4	19.0	5.3	4.0
100 th percentile	181.3	181.3	103.5	94.6	9.8
% zero density	15.7	5.0	12.1	18.4	41.2
Trout 1++					
0 th percentile	0.5	0.9	0.9	0.8	0.5
20 th percentile	1.6	3.9	2.3	1.5	0.7
40 th percentile	3.1	5.6	3.3	2.1	0.9
60 th percentile	5.3	7.6	5.4	3.2	1.5
80 th percentile	8.4	12.1	8.4	4.9	1.8
100 th percentile	66.7	66.7	30.3	10.8	6.0
% zero density	16.8	13.8	12.1	18.4	26.5

NB: All densities are based on single-run, semi quantitative survey.

Descriptive categories used in text

Density in regional classification	Description (category) used in text
Min to 20 th percentile	Very poor
20 th to 40 th percentile	Poor
40 th to 60 th percentile	Fair
60 th to 80 th percentile	Good
80 th to 100 th percentile	Excellent

4.3 Habitat at electric fishing survey sites

Instream variables

Site	Depth in cm (% of wetted area)						Substrate (% of wetted area)									Flow types (% of wetted area)							
	<10	11-20	21-30	31-40	41-50	>50	HO	SI	SA	GR	PE	CO	BO	BE	OB	SM	DP	SP	DG	SG	RU	RI	TO
35	5	5	30	50	10	0	0	0	0	0	10	40	50	0	0	10	0	0	0	0	70	20	0
New A	5	15	20	40	20	0	0	0	0	3	5	35	57	0	0	0	0	5	0	0	65	30	0
36a	5	20	65	10	0	0	0	0	1	3	10	45	41	0	0	0	0	5	0	0	55	40	0
37	0	25	55	20	0	0	0	0	0	0	5	70	25	0	0	0	0	0	0	0	80	20	0
38	10	20	60	10	0	0	0	0	5	5	10	50	30	0	0	5	0	0	5	0	80	10	0
40a	5	45	50	0	0	0	0	0	0	0	10	60	30	0	0	0	0	0	0	0	70	30	0
40	15	55	25	5	0	0	0	0	0	0	10	70	20	0	0	0	0	0	0	10	60	30	0
41	15	35	25	20	5	0	0	0	0	5	10	50	35	0	0	0	5	5	0	0	75	15	0

Substrates: HO = high organic (peat); SI = silt; SA = sand; GR = gravel; PE = pebble; CO = cobble; BO = boulder; BE = bedrock; OB = obscured.
Flow types: SM = shallow marginal; DP = deep pool; SP = shallow pool; DG = deep glide; SG = shallow glide; RU = run; RI = riffle; TO = torrent

Bankside overhead cover and cover on streambed

Site	Cover for fish at left at bank (% of bank length)				Cover for fish at right bank (% of bank length)				Cover on streambed
	Undercut	Draped	Bare	Marginal	Undercut	Draped	Bare	Marginal	
35	0	0	100	0	0	0	100	0	Good
New A	0	0	100	0	0	0	100	0	Excellent
36a	0	0	100	0	0	0	100	0	Excellent
37	20	0	80	0	na	na	na	na	Good
38	70	0	30	0	50	0	50	0	Good
40a	30	0	70	0	0	0	100	0	Excellent
40	5	0	95	0	50	10	50	0	Good
41	0	0	100	0	5	5	95	0	Excellent

4.4 Scale readings

Site	Species	Fish length (mm)	Age	Comment
40	Salmon	93	1+	Clear
40	Salmon	96	1+	Clear
40	Salmon	110	2+	Clear
40	Salmon	117	2+	Clear
40	Salmon	122	2+	Clear
40a	Salmon	103	2+	Clear
40a	Salmon	109	2+	Clear
38	Salmon	104	2+	Clear
38	Salmon	96	1+	Clear
36a	Salmon	100	1+?	Few readable scales.
36a	Salmon	105	2+	Clear
36a	Salmon	113	2+	Clear
New A	Salmon	111	?	Uncertain
41	Salmon	99	2+?	Uncertain. Few readable scales. Possible 2+
41	Salmon	111	2+	Clear