

River Lochy Electric Fishing Survey 2019

File note

October 2019

Waterside Ecology

Druimindarroch
Arisaig
Inverness-shire
PH39 4NR
T: 01687 450298
M: 07788 717605
jon@watersideecology.co.uk



www.watersideecology.co.uk

1 Methods

1.1 Survey

Fish populations were surveyed by electric fishing during July and August 2019. Sites were assigned by Jon Gibb, River Lochy Association. Sites are listed in Table 1, which includes information on stocking history that may have affected fish densities. Further site details are given in Appendix 3.1. The survey repeated that conducted during 2018¹.

Table 1 Survey sites, 2018

Date	Site	Watercourse	NGR	Stocking 2018 - 2019
07/07/2019	1	River Lochy	NN 17629 83834	None
08/07/2019	2	River Lochy	NN 17029 83486	None
08/07/2019	3	River Lochy	NN 16811 82657	None
07/07/2019	4	River Lochy	NN 15465 81673	None
07/07/2019	5	River Lochy	NN 14813 80871	None
07/07/2019	6	River Lochy	NN 14192 80284	None
07/07/2019	7	River Lochy	NN 12789 77990	Fed fry 2018
07/07/2019	8	River Lochy	NN 12179 77255	Fed fry 2018
07/07/2019	9	River Lochy	NN 12567 76784	Fed fry 2018*
09/07/2019	1	River Loy	NN 14888 81792	Eyed ova Feb. 2019
09/07/2019	3	River Loy	NN 12451 83108	Eyed ova Feb. 2019
08/07/2019	4	River Loy	NN 10685 84345	Eyed ova Feb. 2019
13/07/2019	L3	River Lundy	NN 12893 76492	Eyed ova Feb. 2019
13/07/2019	L2	River Lundy	NN 14578 77108	Eyed ova Feb. 2019
13/07/2019	L1	A. Achaid na Dalaich	NN 13953 77590	Eyed ova Feb. 2019
14/08/2019	S1	River Spean	NN 26538 80577	None

* fed fry stocked also immediately downstream during 2019

Sites on the River Lochy were surveyed using a timed/area method. Each site was surveyed for approximately 10 minutes, working methodically in an upstream direction. At the end of the sampling period the area fished was measured, allowing calculation of a minimum fish density. Sites were fished though only once and without using stop nets. This technique was also used at S1 on the River Spean.

On the smaller tributaries all surveys were conducted using semi-quantitative methods as described by Scottish Fisheries Co-ordination Centre². This method is based on a single electric fishing run through each survey site. Again, no stop nets were used. These surveys covered the full width of each stream.

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 classification for West Region provided by Godfrey (2006³) is used to describe fish abundance in a regional context. The classification is based on data sets held by Scottish Fisheries Co-ordination

¹ Waterside Ecology. 2018. River Lochy Electric Fishing Survey 2018.

² SFCC. 2014. Electric Fishing Team leader manual. Scottish Fisheries Co-ordination Centre, April 2014.

³ 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.

Centre (SFCC). The quintile ranges of salmon and trout densities (Appendix 3.2) allow for comparison of fishery performance against nationally and regionally based reference points. The classification system is based on semi-quantitative fishing i.e. density based on number of fish captured during a single electric fishing run through an undisturbed site. The relative classifications, which take river width into account, were used throughout.

2 Results

2.1 Salmon

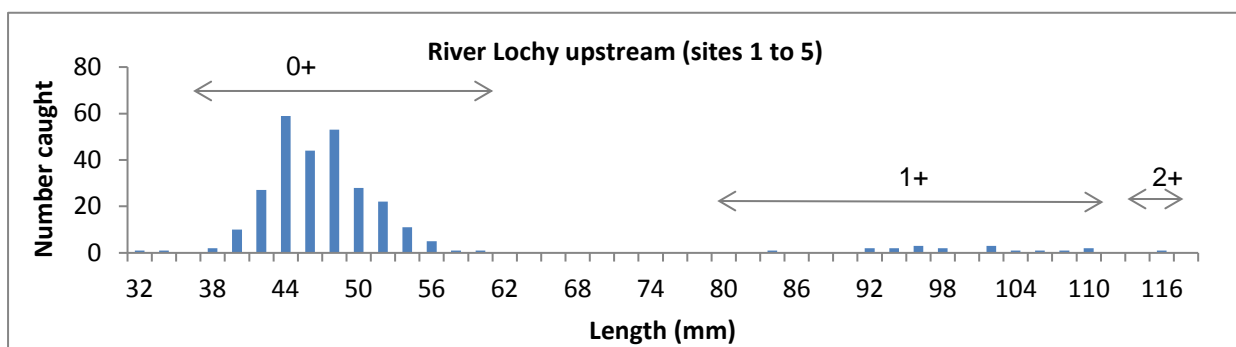
Salmon fry densities in the River Lochy were good or excellent at all sites (Table 2). The higher densities tended to be found from Camisky upstream (sites 1 to 6). A similar trend was identified during 2018, but was much more marked (see Appendix 3.4). The average density of salmon fry at sites 1 to 9 during 2019 was 49.2 ($\sigma = 28.4$), which would be classified as excellent.

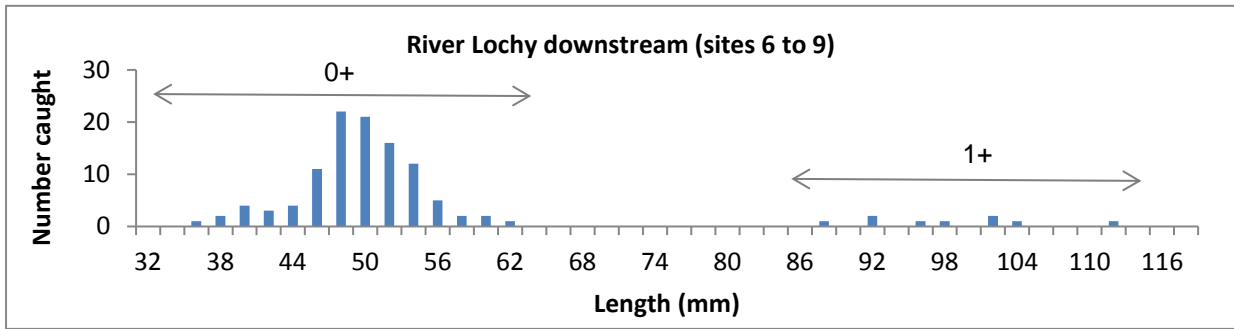
Table 2 Electric fishing results, salmon

Site	Watercourse	Number caught (N)		Density (fish.100m ²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
1	River Lochy	68	3	89.1	3.9	Excellent	Fair
2	River Lochy	15	3	21.9	4.4	Good	Good
3	River Lochy	73	0	77.2	0.0	Excellent	Absent
4	River Lochy	38	9	53.2	12.6	Excellent	Excellent
5	River Lochy	70	5	80.9	5.8	Excellent	Good
6	River Lochy	39	3	54.2	4.2	Excellent	Good
7	River Lochy	18	3	19.8	3.3	Good	Fair
8	River Lochy	28	3	26.6	2.8	Good	Poor
9	River Lochy	21	0	19.5	0.0	Good	Absent
1	River Loy	50	27	29.6	16.0	Good	Excellent
3	River Loy	130	19	100.5	14.7	Excellent	Excellent
4	River Loy	29	14	17.0	8.2	Good	Good
L3	River Lundy	16	6	20.1	7.5	Good	Excellent
L2	River Lundy	11	1	16.4	1.5	Good	Very poor
L1	A. Achaid na Dalaich	1	0	1.6	0.0	Very poor	Absent
S1	River Spean	37	3	67.8	5.5	Excellent	Good

Salmon parr densities in the River Lochy were highly variable, ranging from zero to 12.6 per 100 m². Only one site was classified as having an excellent parr density while a further three were classified as good. Parr were absent from two of the mainstem sites. These data contrast strongly with the 2018 survey results (Appendix 3.4) when 7 sites were classified as having excellent parr densities and parr were present at all sites. Scale readings (Appendix 3.3) and length-frequencies (Figure 1) indicated that the great majority of parr were aged 1+, with a small number of 2+ parr.

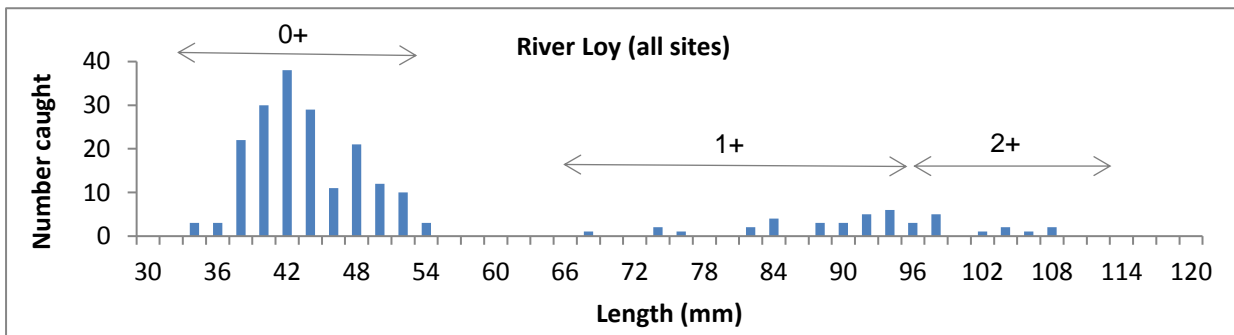
Figure 1. Salmon lengths River Lochy





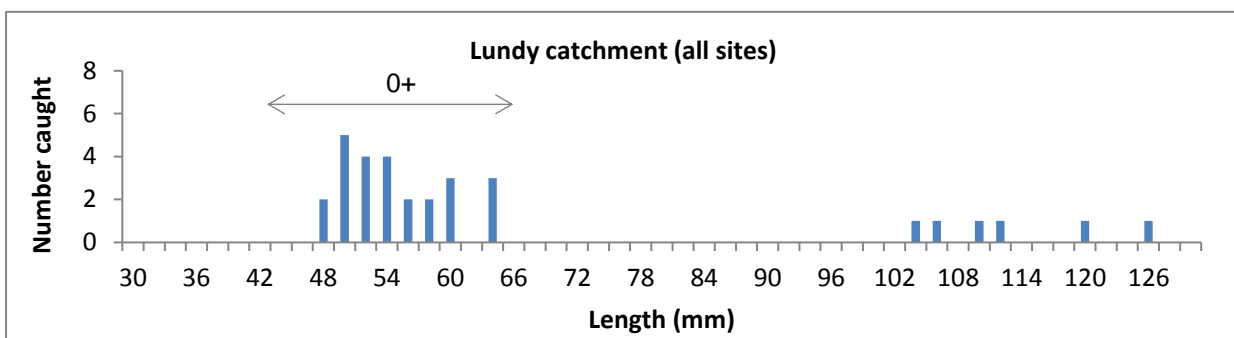
Salmon fry and parr densities at the three sites on the River Loy were all classified as good or excellent (Table 2). Fry densities at all sites increased compared with 2018. In contrast, parr densities decreased substantially at all sites, perhaps reflecting the relatively low fry density during 2018. Two age classes of salmon parr were present at sites on the River Loy and fish aged 2+ made up a relatively high proportion of the catch of parr (Figure 2).

Figure 2. Salmon lengths River Loy



Salmon fry densities on the River Lundy were good at both sites (Table 2) and showed a substantial increase when compared to 2018. Small numbers of fry were also present at L1 on the Allt Achaidh na Dalaich, where none were present in 2018. Parr densities at L1 and L2 both decreased substantially compared with 2018 and the density at L2 was classified as very poor, despite the presence of good quality habitat. No scales were taken from parr on the River Lundy but the length-frequency data suggest that many of the parr may have been aged 2+ (Figure 3). This cohort was very strong in 2018, when aged 1+ year.

Figure 3. Salmon lengths Lundy catchment (L1, L2 and L3)



2.2 Trout

Results for trout are presented in Table 3. Trout were absent at five of the nine sites on the River Lochy and where present densities were low. Overall, trout fry density appeared to be lower than in 2018 (see Appendix 3.4 for 2018 data).

Trout densities at site Loy 1, the most downstream site on the River Loy, were excellent and good for fry and parr respectively. Densities at this site increased compared with 2018. Densities of trout at the other sites on the River Loy were mainly rather low.

Table 3 Electric fishing results, trout

Site	Watercourse	Number caught (N)		Density (fish.100m ⁻²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
1	River Lochy	3	0	3.9	0.0	Good	Absent
2	River Lochy	0	0	0.0	0.0	Absent	Absent
3	River Lochy	0	0	0.0	0.0	Absent	Absent
4	River Lochy	1	0	1.4	0.0	Poor	Absent
5	River Lochy	0	0	0.0	0.0	Absent	Absent
6	River Lochy	2	0	2.8	0.0	Good	Absent
7	River Lochy	0	0	0.0	0.0	Absent	Absent
8	River Lochy	4	0	3.8	0.0	Good	Absent
9	River Lochy	0	0	0.0	0.0	Absent	Absent
1	River Loy	14	3	8.3	1.8	Excellent	Good
3	River Loy	1	1	0.8	0.8	Very poor	Very poor
4	River Loy	3	0	1.8	0.0	Poor	Absent
L3	River Lundy	3	0	3.8	0.0	Good	Absent
L2	River Lundy	1	0	1.5	0.0	Poor	Absent
L1	A. Achaid na Dalaich	3	0	4.8	0.0	Poor	Absent
S1	River Spean	0	0	0.0	0.0	Absent	Absent

2.3 Other fish species

Results for non-salmonid species are presented in Table 4. All species seen or captured are listed.

Table 4 Electric fishing results, other fish species

Site	Watercourse			
		Eels	Stone loach	Minnow
1	River Lochy	1	0	1
2	River Lochy	0	0	0
3	River Lochy	4	1	0
4	River Lochy	1	0	1
5	River Lochy	0	2	0
6	River Lochy	1	1	0
7	River Lochy	23	0	0
8	River Lochy	3	3	1
9	River Lochy	5	0	present
1	River Loy	6	2	0
3	River Loy	0	0	0
4	River Loy	0	0	0
L3	River Lundy	0	0	0
L2	River Lundy	1	0	0
L1	A. Achaid na Dalaich	0	0	0
S1	River Spean	0	0	0

3 Appendices

3.1 Electric fishing site details

Code	NGR	Bank fished	Location	Length (m)	Width (m)
1	NN 17629 83834	Left	Midway between iron railings and rock armour on right bank (NB - site itself is on left bank).	10.6	7.2
2	NN 17029 83486	Left	Riffles just upstream of top of island. Site covered middle to top of riffle by left bank.	8.8	7.8
3	NN 16811 82657	Left side of right channel	Braided section immediately upstream of left bank tributary and 3-trunked alder on right bank.	10.5	9
4	NN 15465 81673	Left	Riffle by cobble/boulder bar below fishing hut and end of high sandy bank.	9.4	7.6
5	NN 14813 80871	Left	Riffle below cobble bar/backwater on right bank.	10.3	8.4
6	NN 14192 80284	Left	Riffle opposite gauge upstream of Camisky fishing hut.	9	8
7	NN 12789 77990	Left	Start approximately 20 m upstream of the rock armour on opposite bank.	16.8	5.4
8	NN 12179 77255	Left	Dalvenie. Small riffle above main riffle. 20 m upstream of concrete culvert/outfall structure.	6.8	15.5
9	NN 12567 76784	Left	70 m upstream of Big Rock. Right side of channel.	11	9.8
1	NN 14888 81792	Full width	Between road and canal bridge. Start 16 m upstream of canal bridge.	14.2	11.9
3	NN 12451 83108	Full width	Start at constriction with bedrock spur right bank. Fish up to mossy mid-stream rock in line with upstream edge of tributary.	14.7	8.8
4	NN 10685 84345	Full width	Start at 2nd alder upstream of braided reach. Fish up to leaning alder on left bank.	24.3	7
L3	NN 12893 76492	Full width	25 m downstream of bridge. Fish up to stepping stones.	9.5	8.4
L2	NN 14578 77108	Full width	Start at mossy rock approx. 15 m downstream of bridge. Fish up to break at tail of glide.	11.5	5.85
L1	NN 13953 77590	Full width	Start at the constriction in line with big willow on right bank.	12.5	5
S1	NN 26538 80577	Right	50 m up from pool. Start in line with gnarly ash tree on left bank. Did not fish to edge (started 4 m out into channel).	8.4	6.5

3.2 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

3.3 *Salmon scale readings*

Site	Fish length (mm)	Age	Comment
Lochy 4	102	1+	Clear
Lochy 4	109	1+	Few readable scales. Not clear.
Lochy 4	115	2+	Clear
Lochy 5	98	1+	Clear
Lochy 5	110	1+	Clear
Lochy 7	103	1+	Clear
Lochy 8	102	1+	Clear
Lochy 8	112	1+	Clear
Loy 1	105	2+	
Loy 3	91	1+	Clear
Loy 3	101	2+	
Loy 3	104	2+	
Loy 4	83	1+	
Loy 4	87	unknown	Not readable
Loy 4	97	2+	

3.4 Fish densities 2018

SALMON

Site	Watercourse	Number caught (N)		Density (fish.100m ⁻²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
1	River Lochy	27	10	28.4	10.5	Good	Excellent
2	River Lochy	24	3	27.8	3.5	Good	Fair
3	River Lochy	82	6	93.2	6.8	Excellent	Excellent
4	River Lochy	28	14	42.1	21.0	Good	Excellent
5	River Lochy	15	16	13.9	14.8	Fair	Excellent
6	River Lochy	4	26	6.0	38.8	Poor	Excellent
7	River Lochy	2	26	2.3	29.5	Very poor	Excellent
8	River Lochy	5	31	4.9	30.5	Poor	Excellent
9	River Lochy	9	5	7.9	4.4	Poor	Good
1	River Loy	30	58	17.8	34.3	Good	Excellent
3	River Loy	57	49	44.1	37.9	Excellent	Excellent
4	River Loy	13	51	7.6	30.0	Poor	Excellent
L3	River Lundy	2	29	1.2	16.9	Very poor	Excellent
L2	River Lundy	1	55	0.8	43.3	Very poor	Excellent
L1	A. Achaid na Dalaich	0	35	0.0	23.9	Absent	Excellent
S1	River Spean	30	28	40.3	37.6	Good	Excellent

TROUT

Site	Watercourse	Number caught (N)		Density (fish.100m ⁻²)		Classification	
		Fry	Parr	Fry	Parr	Fry	Parr
1	River Lochy	11	0	11.6	0.0	Excellent	Absent
2	River Lochy	5	0	5.8	0.0	Excellent	Absent
3	River Lochy	0	0	0.0	0.0	Absent	Absent
4	River Lochy	2	0	3.0	0.0	Good	Absent
5	River Lochy	12	0	11.1	0.0	Excellent	Absent
6	River Lochy	1	0	1.5	0.0	Poor	Absent
7	River Lochy	2	0	2.3	0.0	Fair	Absent
8	River Lochy	0	0	0.0	0.0	Absent	Absent
9	River Lochy	0	0	0.0	0.0	Absent	Absent
1	River Loy	4	2	2.4	1.2	Fair	Poor
3	River Loy	4	1	3.1	0.8	Good	Very poor
4	River Loy	0	2	0.0	1.2	Absent	Poor
L3	River Lundy	4	6	2.3	3.5	Fair	Excellent
L2	River Lundy	10	1	7.9	0.8	Excellent	Very poor
L1	A. Achaid na Dalaich	4	1	2.7	0.7	Very poor	Very poor
S1	River Spean	0	0	0.0	0.0	Absent	Absent