

Sea lice monitoring report for Flowerdale Burn estuary, Loch Gairloch sampling, 3rd October 2024

Peter Cunningham, Biologist, WRFT. 9th October info@wrft.org.uk

Sea trout data

Location:		Flowerdale Estuary																			
Date:		03-Oct-24		Time:		net in about 12:30															
*Counts:		Peter Cunningham																			
Team:		5 assistants																			
Weather:		bright and sunny, light sw breeze																			
Other notes:		used new lighter weight net																			
		one sweep of usual area																			
		fish processed in estuary. All fish caught were photographed and measured; first 29 sea trout plus the salmon were examined for lice, doresal fin damage and black spots																			
		fish no (= fish number on data sheet -1)																			
		many of finnock were heavily liced with raw dorsal fin																			
									Caligus	Lepeophtheirus salmonis											
Fish No.	Location	Date	Method	Riv/Est/Beach	Fish	length (mm)	weight (g)	body condition factor	total	Copepodid & Chalmus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice	*estimated lice/g fish weight	Dorsal fin damage score	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample?	Comments	
1	Flowerdale	03-Oct-24	Sweep Net	est	Salmon	555	1602	0.94	0	0	2	0	2	0.001	1	0	N	Y	Y	female with lice scars	
2	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	415	762	1.07	0	3	8	1	12	0.016	2	15	N	Y	Y	male	
3	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	450	936	1.03	0	4	14	1	19	0.020	2	8	N	Y	Y	female	
4	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	415	726	1.02	0	0	18	1	19	0.026	2	1	old	Y	Y	female	
5	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	400	651	1.02	0	60	40	3	103	0.158	2	1	N	Y	Y	male	
6	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	372	528	1.03	0	7	15	1	23	0.044	2	1	N	Y	Y	female	
7	Flowerdale	03-Oct-24	Sweep Net	est	Salmon	220	95	0.89	0	0	0	0	0	0.000			N	Y	Y	escaped farm salmon smolt	
8	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	380	550	1.00	0	1	6	0	7	0.013	0.5	6	N	Y	Y		
9	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	302	284	1.03	0	6	10	2	18	0.063	2	2	N	Y	Y	finnock silvery	
10	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	360	488	1.05	0	1	8	0	9	0.018	1	0	N	Y	Y	male	
11	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	390	550	0.93	0	20	16	1	37	0.067	1	10	N	Y	Y	female	
12	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	274	203	0.99	0	100	35	0	135	0.665	3	1	N	Y	Y	tatty finnock photos on CH	
13	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	270	203	1.03	0	80	16	7	103	0.507	2	4	N	Y	Y	finnock very licy	
14	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	290	236	0.97	0	15	6	4	25	0.106	2	8	N	Y	Y	silvery finnock	
15	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	375	510	0.97	0	30	25	0	55	0.108	2	0	N	Y	Y	Fem	
16	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	445	945	1.07	0	15	25	4	44	0.047	1	0	N	Y	Y	Male good condition	
17	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	393	628	1.03	0	5	6	3	14	0.022	0.5	15	N	Y	Y	Fem	
18	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	372	508	0.99	0	2	8	1	11	0.022	0.5	0	N	Y	Y	Fem	
19	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	400	695	1.09	0	0	12	2	14	0.020	0.2	2	N	Y	Y	Male	
20	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	403	710	1.08	0	3	8	0	11	0.015	1	1	N	Y	Y	Fem	
21	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	317	336	1.05	0	25	10	0	35	0.104	1.5	4	N	Y	Y	silvery immature finnock F?	
22	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	285	247	1.07	1	65	18	4	87	0.352	2	4	N	Y	Y	silvery finnock chloes pics	
23	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	262	188	1.05	0	0	8	0	8	0.043	0	1	N	Y	Y	filvery finnock fem mature?	
24	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	234	120	0.94	0	30	4	0	34	0.283	0.5	1	N	Y	Y	finnock	
25	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	218	98	0.95	0	20	1	1	22	0.224	0.5	1	N	Y	Y		
26	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	365	495	1.02	0	6	18	0	24	0.048	1	6	N	Y	Y	fem pictured with male #27	
27	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	388	600	1.03	0	0	25	1	26	0.043	0.2	4	N	Y	Y	male picture on own	
28	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	400	700	1.09	0	5	12	0	17	0.024	1	12	N	Y	Y	female	
29	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	283	230	1.01	0	10	3	1	14	0.061	0.5	8	N	Y	Y	silvery finnock jaw damage	
30	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	263	190	1.04	0	70	10	0	80	0.421	2.5	3	N	Y	Y	pics on CH. raw fins	
Averages						350	500	1.015	0.033	19.433	12.900	1.267	33.600	0.118	1.290	4.103					

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Mortality / early returned estimates for sea trout in sample based on method from Taranger et al 2015, Risk assessment for the environmental impact of Norwegian salmon farming ([PDF](https://www.researchgate.net/publication/266672998)) [Risk assessment of the environmental impact of Norwegian Atlantic salmon farming \(researchgate.net\)](https://www.researchgate.net/publication/266672998)

Fish No.	≥13 lice/fish?	Lice/g fish weight	Range	Mortality category	Number of fish in category	Total number of fish in sample	% of sample in category	projected mortality for category %	Projected mortality %
1	No	0.001	>0.3	100%	4	34	11.76471	11.764706	
2	No	0.016	0.2-0.3	50%	2		5.882353	2.9411765	
3	Yes	0.020	0.1-0.2	20%	4		11.76471	2.3529412	
4	Yes	0.026	<0.1	0%	24		70.58824	0	17.058824
5	Yes	0.158							
6	Yes	0.044							
7	No	0.000							
8	No	0.013							
9	Yes	0.063							
10	No	0.018							
11	Yes	0.067							
12	Yes	0.665							
13	Yes	0.507							
14	Yes	0.106							
15	Yes	0.108							
16	Yes	0.047							
17	Yes	0.022							
18	No	0.022							
19	Yes	0.020							
20	No	0.015							
21	Yes	0.104							
22	Yes	0.352							
23	No	0.043							
24	Yes	0.283							
25	Yes	0.224							
26	Yes	0.048							
27	Yes	0.043							
28	Yes	0.024							
29	Yes	0.061							
30	Yes	0.422							

total lice	1006
number of trout	28
number infested	28
prevalence	100%
total lice	1006
abundance	35.93
intensity	35.93
fish with >0.3 lice / g	4
fish with >0.3 lice / g	0%

Notes:
based on the assumption that small salmonid post-smolts (<150g body weight) will suffer 100% lice-related marine mortality, or return prematurely to freshwater for sea trout in the wild if the are infected with >0.3 lice per g of fish weight. Furthermore, the lice related marine mortality is estimated to 50%, if the infection is between 0.2 and 0.3 lice per g fish weight, 20% if the infection rate is between 0.1 and 0.2 lice per g fish weight, and finally 0% if the salmon lice infection is <0.1 g fish weight.
0.05 and 0.1 lice per g fish weight, 20% for lice infections between 0.05 and 0.01 lice per g fish weight, and finally 0% if the salmon lice infection is <0.01 lice g fish weight.
<div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="font-size: 8px;">colour code</div> <div style="margin-left: 10px;">100% sea lice related mortality or early return to freshwater</div> </div> <div style="display: flex; align-items: center; margin-top: 2px;"> <div style="width: 20px; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="font-size: 8px;">colour code</div> <div style="margin-left: 10px;">>50% to 99% sea lice related mortality or early return to freshwater</div> </div> <div style="display: flex; align-items: center; margin-top: 2px;"> <div style="width: 20px; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="font-size: 8px;">colour code</div> <div style="margin-left: 10px;">>20% to 50% sea lice related mortality or early return to freshwater</div> </div> <div style="display: flex; align-items: center; margin-top: 2px;"> <div style="width: 20px; height: 10px; background-color: lightgreen; margin-right: 5px;"></div> <div style="font-size: 8px;">colour code</div> <div style="margin-left: 10px;"><20% sea lice related mortality or early return to freshwater</div> </div>
<p>Taranger, G. L., Karlsen, Ø., Bannister, R. J., Glover, K. A., Husa, V., Karlsbakk, E., Kvamme, B. O., Boxaspen, K. K., Bjørn, P. A., Finstad, B., Madhun, A. S., Morton, H. C., and Sva'sand, T. (2014) Risk assessment of the environmental impact of Norwegian Atlantic salmon farming. –ICES Journal of Marine Science, doi: 10.1093/icesjms/fsu132.</p> <p>https://www.researchgate.net/publication/266672998 Risk assessment of the environmental impact of Norwegian Atlantic salmon farming</p>

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Other fish in sample (measured and weighed and photo'ed)

Fish No.	Location	Date	Method	Riv/Est/Beach	Fish	length (mm)														
31	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	305	320	1.13					0	0.000			N	Y	Y	silvery lice pics
32	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	413	755	1.07					0	0.000			N	Y	Y	female
33	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	510	1370	1.03					0	0.000			N	Y	Y	female
34	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	450	968	1.06					0	0.000			N	Y	Y	female
35	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	460	1000	1.03					0	0.000			N	Y	Y	male
36	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	295	274	1.07	100				0	0.000	3		N	Y	Y	immature finnock very licey
37	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	375	555	1.05					0	0.000			N	Y	Y	male
38	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	440	924	1.08					0	0.000	2		N	Y	Y	male raw dorsal fin
39	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	465	984	0.98					0	0.000			N	Y	Y	female
40	Flowerdale	03-Oct-24	Sweep Net	est	Sea trout	555	1550	0.91					0	0.000		tail	N	Y	Y	female [recapture from 2023]

Acknowledgements

Supported by the Wester Ross Area Salmon Fishery Board and Scottish Government via Fisheries Management Scotland.

Thank you to Gairloch Estate for permission

Team, Flowerdale 3 October 24

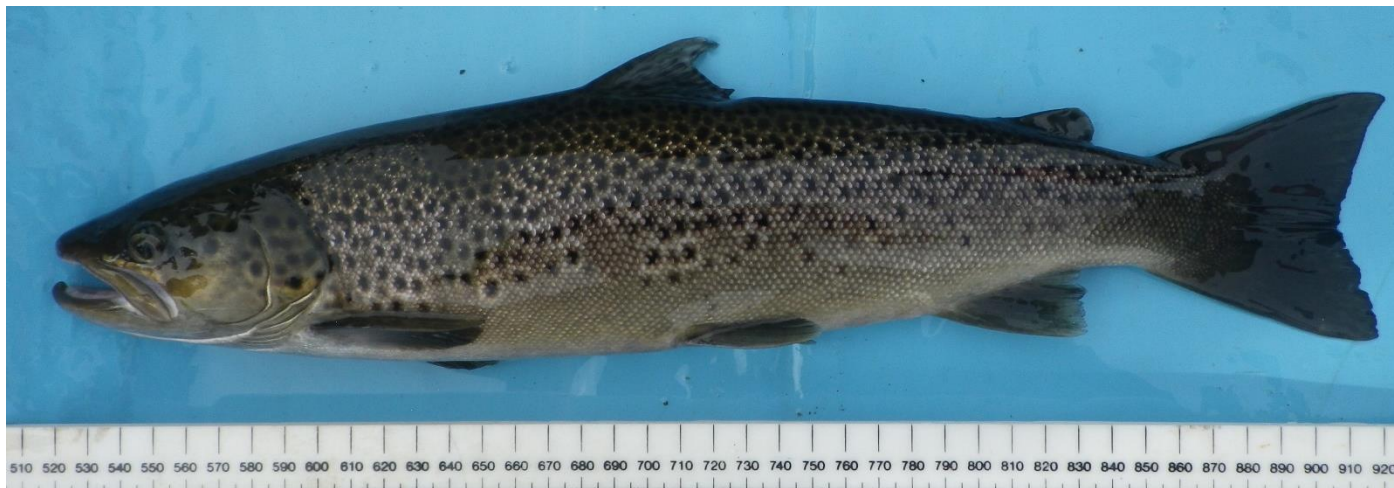


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Photos: all ©WRFT unless otherwise indicated. All fish in photos were lightly sedated for inspection then returned to the sea after recovery.

Fish A Sea trout 400mm, 705g, Flowerdale 15th September 2023



Recaptured Sea trout 460mm, 1000g, Flowerdale 3rd October 2024: slow growing male



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Fish B Sea trout 420mm, 728g, with 'bird beak' damage, Flowerdale 15th September 2023



Recaptured Sea trout 555mm, 1550g, Flowerdale 3rd October 2024: fast growing female (despite bird beak damage!)



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Sea trout 274mm, 3rd October 2024 with pics of dorsal fin (red raw) and sea lice on pelvic fins (photos WRFT & CH)

