

Sea lice monitoring report for Flowerdale Burn estuary, Loch Gairloch sampling, 26 April 2024

Peter Cunningham, Biologist, WRFT. 12 Jun 2024 info@wrft.org.uk

Sea trout data (see page 3 for other fish)

Location:		Flowerdale Estuary																						
Date:	26-Apr-24	Time:	net in about 13.10; low tide 15:30 (0.9m)																					
*Counts:	Peter Cunningham																							
Team:	9 assistants plus Jim Raffell from Marine Directorate																							
Weather:	cool, light northerly breeze, sunny spells																							
Other notes:	Jim Raffell took DNA samples for MD sea trout genetics study																							
										Caligus		Lepeophtheirus salmonis												
Fish No.	Location	Date	Method	Riv/Est/Beach	Fish	length (mm)	weight (g)	body condition factor	total	Copepodid & Chalimus (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	26-Apr-24	Sweep Net	est	Sea trout	282	200	0.89	0	1	0	0	1	0.005	0.5	1	N	Y	Y					
2	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	293	180	0.72	0	3	1	1	5	0.028	0	5	N	Y	Y					
3	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	272	162	0.81	0	5	1	0	6	0.037	0	1	N	Y	Y					
4	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	253	116	0.72	0	1	0	0	1	0.009	0	1	N	Y	Y	very thin				
5	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	263	148	0.81	0	4	2	0	6	0.041	0	0	N	Y	Y	Acanthocephalus				
6	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	230	90	0.74	0	2	0	0	2	0.022	0	0	N	Y	Y	Paragnathia				
7	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	250	115	0.74	0	9	0	0	9	0.078	0.2	0	N	Y	Y					
8	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	281	190	0.86	0	0	2	1	3	0.016	2	3	N	Y	Y	old fin damage				
9	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	235	114	0.88	0	5	0	0	5	0.044	0.5	0	N	Y	Y					
10	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	148	31	0.96	0	0	2	0	2	0.065	0	1	N	Y	Y					
11	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	287	202	0.85	0	2	2	0	4	0.020	1	0	Y	Y	Y	Old / net damage				
12	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	290	210	0.86	0	4	4	0	8	0.038	0.5	0	N	Y	Y					
13	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	263	164	0.90	0	2	1	0	3	0.018	0	1	Y	Y	Y	healed bird beak damage				
14	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	363	390	0.82	1	3	4	1	8	0.021	2	0	Y	Y	Y	Extensive bird beak damage				
15	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	324	300	0.88	1	2	3	1	6	0.020	0.5	12	N	Y	Y					
16	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	333	292	0.79	0	2	10	1	13	0.045	1	5	N	Y	Y					
17	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	230	98	0.81	0	1	1	0	2	0.020	0	0	Y	Y	Y	bird beak				
18	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	315	296	0.95	0	3	1	1	5	0.017	0.5	1	N	Y	Y					
19	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	325	318	0.93	0	0	0	2	2	0.006	0.5	3	N	Y	Y					
20	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	316	290	0.92	0	3	5	0	8	0.028	0.5	2	N	Y	Y					
21	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	263	155	0.85	0	3	1	0	4	0.026	0.2	1	Y	Y	Y	old damage				
22	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	380	465	0.85	0	11	5	2	18	0.039	1	15	Y	Y	Y	broken gill arch				
23	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	304	275	0.98	2	0	4	2	6	0.022	1	10	N	Y	Y					
24	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	385	675	1.18	0	9	6	4	19	0.028	2	8	N	Y	Y					
25	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	403	537	0.82	1	3	3	0	6	0.011	2	8	Y	Y	Y	old				
26	Flowerdale	26-Apr-24	Sweep Net	est	Sea trout	203	70	0.84	0	0	1	0	1	0.014	0	1	N	Y	Y					
						Averages	288.115	234	0.859	0.192	3.000	2.269	0.615	5.885	0.028	0.612	3.038							
													total lice	153										
													number of fish	26										
													number infested	26										
													prevalence	100%										
													total lice	153										
													abundance	5.88										
													intensity	5.88										
													fish with >0.3 lice / g	0										
													fish with >0.3 lice / g	0%										

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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	0.005	>0.3	100%	0	26	0	0	
2	No	0.028	0.2-0.3	50%	0		0	0	
3	No	0.037	0.1-0.2	20%	0		0	0	
4	No	0.009	<0.1	0%	26		100	0	0
5	No	0.041							
6	No	0.022							
7	No	0.078							
8	No	0.016							
9	No	0.044							
10	No	0.065							
11	No	0.020							
12	No	0.038							
13	No	0.018							
14	No	0.021							
15	No	0.020							
16	Yes	0.045							
17	No	0.020							
18	No	0.017							
19	No	0.006							
20	No	0.028							
21	No	0.026							
22	Yes	0.039							
23	No	0.022							
24	Yes	0.028							
25	No	0.011							
26	No	0.014							

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.	
	colour code
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.	100% sea lice related mortality or early return to freshwater
	>50% to 99% sea lice related mortality or early return to freshwater
	>20% to 50% sea lice related mortality or early return to freshwater
	<20% sea lice related mortality or early return to freshwater
https://www.researchgate.net/publication/266672998 Risk assessment of the environmental impact of Norwegian Atlantic salmon farming	

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Other fish in sample:

Abbreviations. 15spstbk: 15-spined stickleback; seascpn sp. sea scorpion species indef.

Fish No.	Location	Date	Method	Riv/Est/ Beach	Fish	length (mm)
27	Flowerdale	26-Apr-24	Sweep Net	est	15spstbk	140
28	Flowerdale	26-Apr-24	Sweep Net	est	15spstbk	138
29	Flowerdale	26-Apr-24	Sweep Net	est	seascpn sp	155
30	Flowerdale	26-Apr-24	Sweep Net	est	seascpn sp	65
31	Flowerdale	26-Apr-24	Sweep Net	est	seascpn sp	60
32	Flowerdale	26-Apr-24	Sweep Net	est	flounder	255
33	Flowerdale	26-Apr-24	Sweep Net	est	flounder	260
34	Flowerdale	26-Apr-24	Sweep Net	est	flounder	145
35	Flowerdale	26-Apr-24	Sweep Net	est	flounder	95
36	Flowerdale	26-Apr-24	Sweep Net	est	flounder	80
37	Flowerdale	26-Apr-24	Sweep Net	est	flounder	100
38	Flowerdale	26-Apr-24	Sweep Net	est	goby sp.	63



Acknowledgements

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Thank you to Gairloch Estate for permission

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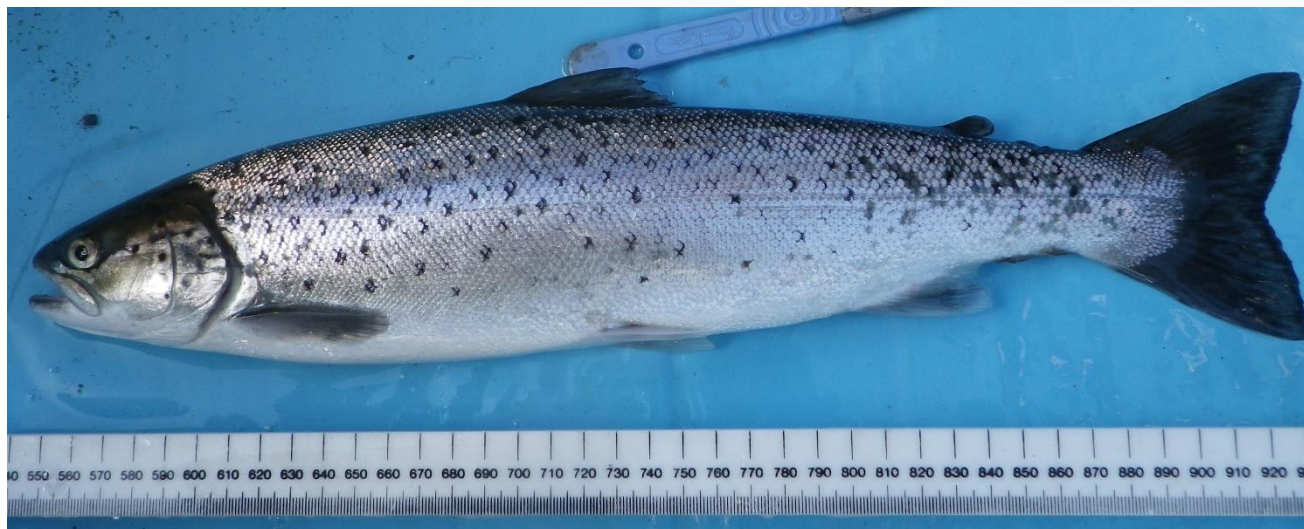
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Photos: all ©WRFT unless otherwise indicated. All fish in photos were lightly sedated for inspection then returned to the sea after recovery.

Sea trout 403mm, 537g Flowerdale 26 April 24



Sea trout 385mm, 675g Flowerdale 26Apr 24



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(left) Sea trout 365mm, 390g Flowerdale 26 Apr 24 Lice eating bird damaged area behind ventral fin; (right) *Lepeophtheirus salmonis* and *Caligus ?elongatus* lice on sea trout, Flowerdale 26 April 24 (photo by Roger McLachlan)



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(left) Sea scorpion Flowerdale 26th April 24; *(right)* 15-spine Stickleback and Goby sp., Flowerdale 26th April 24



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Flounders, Flowerdale 26th April 24

