Sea lice monitoring report for Applecross River estuary sampling, 24 Jul 2024.

Peter Cunningham, Biologist, WRFT. 25 June 2024 info@wrft.org.uk

Sea trout data

									Caligus	*Lepeophtheirus salmonis*									
No.	Location	Date	Method	Riv/Est/Beach	Fish	length (mm)	weight (g)	condition factor	total	Copepodid & Chalimus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice	*estimated lice/g fish weight	Dorsal fin damage	*Cryptocotyle ligua* spots per cm2 of caudal fin	Predator damage	Photo	scale sample?	Comments
1	Applecross	24-Jul-24	Sweep Net	est	Sea trout	360	591	1.27	0	50	4	0	**54**	0.091	2.0	0	Y	Y	y	split tail
2	Applecross	24-Jul-24	Sweep Net	est	Sea trout	171	59	1.18	0	0	0	0	**0**	0.000	0.0	2	N	Y	y	thin
3	Applecross	24-Jul-24	Sweep Net	est	Sea trout	263	198	1.09	0	16	7	0	**23**	0.116	2.0	1	Y	Y	y	photos of dorsal fin; old damage
4	Applecross	24-Jul-24	Sweep Net	est	Sea trout	220	108	1.01	0	60	2	4	**66**	0.611	2.0	1	N	Y	y	photos of lice
5	Applecross	24-Jul-24	Sweep Net	est	Sea trout	291	294	1.19	0	0	1	0	**1**	0.003	0.2	1	N	Y	y	darker
6	Applecross	24-Jul-24	Sweep Net	est	Sea trout	222	100	0.91	0	0	0	0	**0**	0.000	2.0	2	N	Y	y	lice off
7	Applecross	24-Jul-24	Sweep Net	est	Sea trout	372	540	1.05	0	0	3	0	**3**	0.006	1.5	0	Y	Y	y	lice off, photo of pred damage right flank
8	Applecross	24-Jul-24	Sweep Net	est	Sea trout	215	103	1.04	0	12	5	2	**19**	0.184	2.0	1	N	Y	y	photo of dorsal fin
9	Applecross	24-Jul-24	Sweep Net	est	Sea trout	240	135	0.98	0	0	0	0	**0**	0.000	1.0	2	N	Y	y	lice off
10	Applecross	24-Jul-24	Sweep Net	est	Sea trout	250	150	0.96	0	15	2	3	**20**	0.133	2.0	4	N	Y	y	stock fish photo of tail fin
11	Applecross	24-Jul-24	Sweep Net	est	Sea trout	204	89	1.05	0	8	7	0	**15**	0.169	1.0	3	N	Y	y	thin
12	Applecross	24-Jul-24	Sweep Net	est	Sea trout	247	170	1.13	0	20	12	3	**35**	0.206	1.0	2	N	Y	y	old predator damage
13	Applecross	24-Jul-24	Sweep Net	est	Sea trout	260	210	1.19	0	4	8	1	**13**	0.062	2.0	1	Y	Y	y	split tail
14	Applecross	24-Jul-24	Sweep Net	est	Sea trout	201	74	0.91	0	0	0	0	**0**	0.000	0.5	0	N	Y	y	thin, lice off, pink dorsal fin
15	Applecross	24-Jul-24	Sweep Net	est	Sea trout	216	108	1.07	0	0	1	0	**1**	0.009	0.5	3	N	Y	y	lice off
16	Applecross	24-Jul-24	Sweep Net	est	Sea trout	247	180	1.19	0	60	30	3	**93**	0.517	2.0	5	N	Y	y	photos of lice on operculum etc
17	Applecross	24-Jul-24	Sweep Net	est	Sea trout	220	114	1.07	0	8	21	5	**34**	0.298	2.0	2	N	Y	y	thin extensive lice damage
18	Applecross	24-Jul-24	Sweep Net	est	Sea trout	165	44	0.98	0	0	0	1	**1**	0.023	0.0	0	N	Y	y	thin
19	Applecross	24-Jul-24	Sweep Net	est	Sea trout	220	100	0.94	0	0	0	0	**0**	0.000	1.0	2	N	Y	y	lice off thin
20	Applecross	24-Jul-24	Sweep Net	est	Sea trout	170	52	1.06	0	0	1	0	**1**	0.019	0.0	0	N	Y	y	
21	Applecross	24-Jul-24	Sweep Net	est	Sea trout	223	112	1.01	0	18	8	1	**27**	0.241	1.0	4	N	Y	y	
22	Applecross	24-Jul-24	Sweep Net	est	Sea trout	217	102	1.00	0	19	3	2	**24**	0.235	2.0	1	N	Y	y	
23	Applecross	24-Jul-24	Sweep Net	est	BT	168	54	1.14	0	0	1	0	**1**	0.019	0.0	0	N	Y	y	
24	Applecross	24-Jul-24	Sweep Net	est	Sea trout	244	165	1.14	0	7	18	0	**25**	0.152	1.0	2	Y	Y	y	old predator damage
25	Applecross	24-Jul-24	Sweep Net	est	BT	175	61	1.14	0	0	0	0	**0**	0.000	0.0	0	N	Y	y	
26	Applecross	24-Jul-24	Sweep Net	est	Sea trout	240	154	1.11	0	6	7	1	**14**	0.091	1.0	2	N	Y	y	
27	Applecross	24-Jul-24	Sweep Net	est	Sea trout	239	152	1.11	0	17	12	2	**31**	0.204	1.5	2	y	Y	y	split fin
28	Applecross	24-Jul-24	Sweep Net	est	Sea trout	180	51	0.87	0	0	0	0	**0**	0.000	0.0	0	Y	Y	y	old predator damage. Very thin
29	Applecross	24-Jul-24	Sweep Net	est	Sea trout	233	137	1.08	0	25	3	1	**29**	0.212	1.5	1	N	Y	y	lice off
30	Applecross	24-Jul-24	Sweep Net	est	Sea trout	224	117	1.04	0	2	1	0	**3**	0.026	0.5	1	N	Y	y	lice off
31	Applecross	24-Jul-24	Sweep Net	est	Sea trout	240	168	1.22	0	35	3	0	**38**	0.226	2.0	1	N	Y	y	deformed dorsal fin ?stockie
					Averages	**254**	**239**	**1.14**	**0**	**32**	**3**	**1**	**35.75**	**0.20**	**1.5**	**1**				

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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) Risk assessment of the environmental impact of Norwegian Atlantic salmon farming (researchgate.net)]

total lice	571
number of sea trout	29
number infested	24
prevalence	83%
total lice	571
abundance	19.69
intensity	23.79
fish with >0.3 lice / g	2
fish with >0.3 lice / g	8%

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 of fish in sample %
1	Yes	0.091	>0.3	100%	2	31	6.45	6.45	
2	No	0.000	0.2-0.3	50%	7		22.58	11.29	
3	Yes	0.116	0.1-0.2	20%	5		16.13	3.23	
4	Yes	0.611	<0.1	0%	17		54.84	0.00	**20.97**
5	No	0.003							
6	No	0.000							
7	No	0.006							
8	Yes	0.184							
9	No	0.000							
10	Yes	0.133							
11	Yes	0.169							
12	Yes	0.206							
13	Yes	0.062							
14	No	0.000							
15	No	0.009							
16	Yes	0.517							
17	Yes	0.298							
18	No	0.023							
19	No	0.000							
20	No	0.019							
21	Yes	0.241							
22	Yes	0.235							
23	No	0.019							
24	Yes	0.152							
25	No	0.000							
26	Yes	0.091							
27	Yes	0.204							
28	No	0.000							
29	Yes	0.212							
30	No	0.026							
31	Yes	0.226							

Acknowledgements

Sampling carried out as part of the Caol Mor Salmon Farms EMP wild fish monitoring programme supported by MOWI to inform the WRASFB, The Highland Council and The Scottish Government

Thank you to the Applecross Trust for permission and assistance

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 estmated 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.

https://www.researchgate.net/publication/266672998_Risk_assessment_of_the_environmental_impact_of_Norwegian_Atlantic_salmon_farming

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

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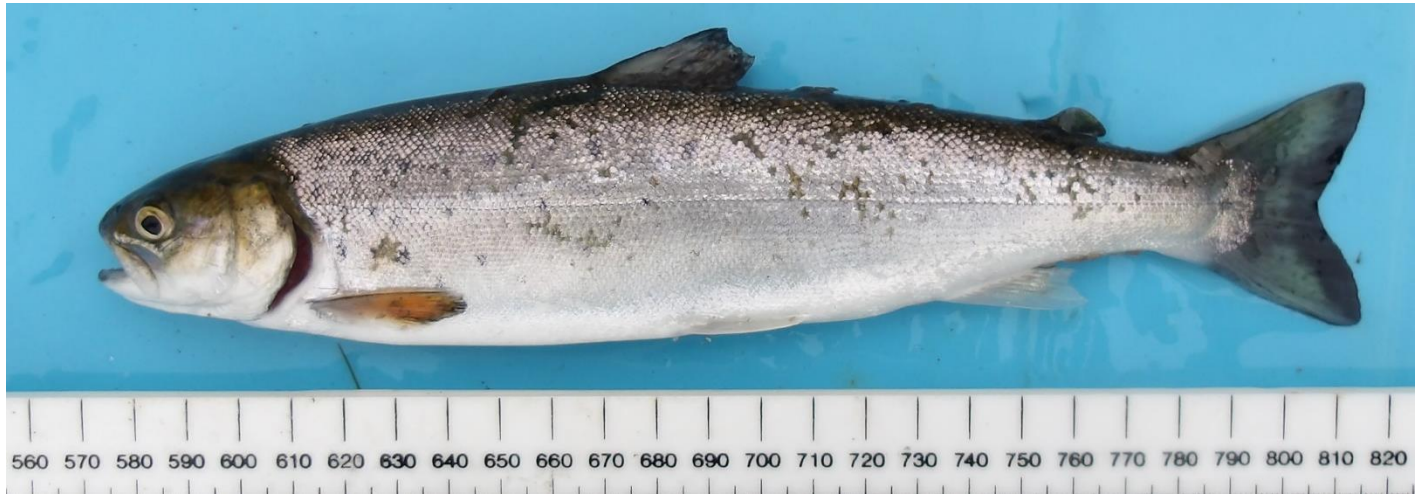
Sea trout 247mm Applecross 24 Jul 2024 – and pics of some of the lice on this fish



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Assorted lice on sea trout of 220mm – total count 66 lice.

Dorsal fin of sea trout 215mm

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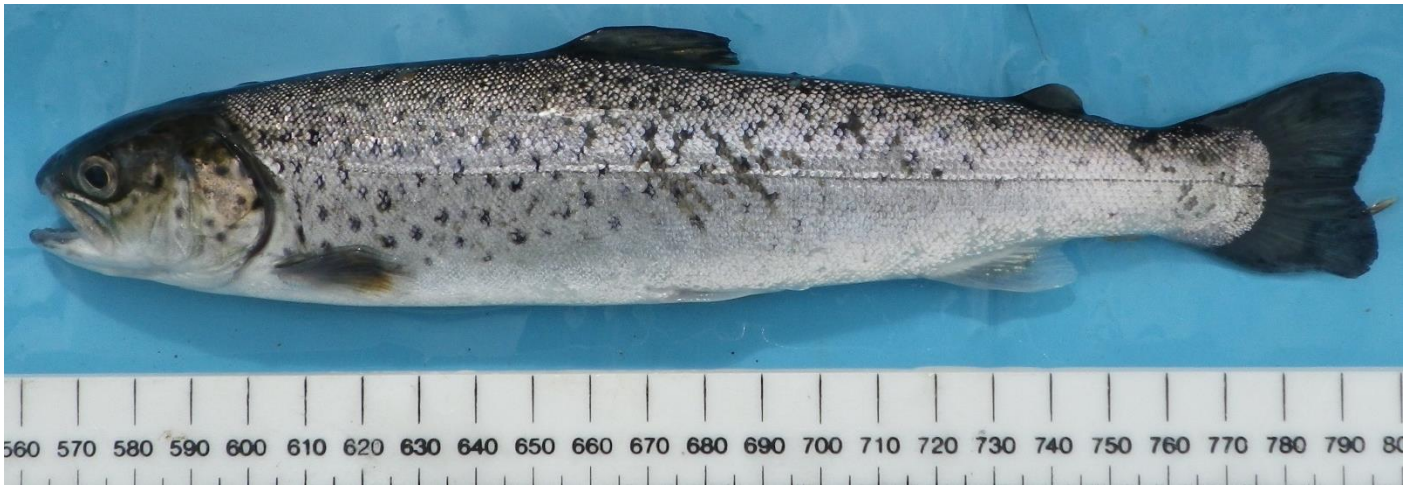
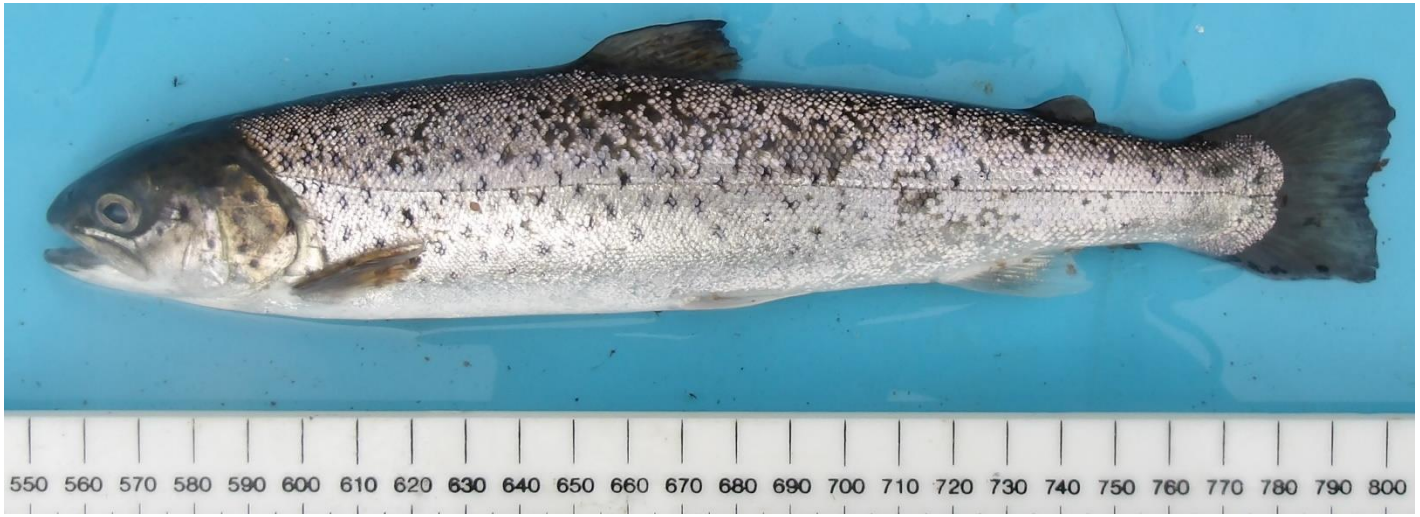
Recaptured sea trout (recognised by deformed dorsal fin, eroded caudal fin & spot pattern)

Sea trout 250mm 25 June 2024 – 4 copepodid and chalimus lice, 5 preadult and adult lice



Sea trout 240mm 24 July 2024 – 35 copepodid lice chalimus lice, 3 preadult and adult lice.



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ST 372mm, Applecross 24 Jul 2024 - predator damage to right flank