Sea lice monitoring report for River Kanaird estuary sampling, 24 May 2024.

Peter Cunningham, Biologist, WRFT. 28 May 2024 info@wrft.org.uk

Sea trout data (fish number 1 was a stickleback see page 3)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location:** | | **Kanaird estuary** | | | | | | | | | | | | | | | | | |
| **Date:** | | 24-May-24 | | **Time:** | 13:00 | | | | | | | | | | | | | | |
| ***Counts:** | | Peter Cunningham | | | | | | | | | | | | | | | | | |
| **Team:** | | 6 helpers including 2 from WRF Ardmair salmon farm | | | | | | | | | | | | | | | | | |
| **Weather:** | | light winds, overcast | | | | | | | | | | | | | | | | | |
| **Other notes:** | | 1 sweep by dry sea pinks island; angling guests fishing estuary so decided best not to disturb other pools | | | | | | | | | | | | | | | | | |
| | | light wind - weights to within 2g | | | | | | | | | | | | | | | | | |
| | | post-smolt sea trout with very small copepodid and chalimus stage lice | | | | | | | | | | | | | | | | | |
| | | most trout with dark patches along back indicative of previous lice attachment | | | | | | | | | | | | | | | | | |
| | | note 3-spined stickleback with attached chalimus sea lice | | | | | | | | | | | | | | | | | |
| | | thankyou to Keanchulish estate for loan of vehicle to carry net to shore; | | | | | | | | | | | | | | | | | |
| | | | | | | | | | ***Caligus*** | ***Lepeophtheirus salmonis*** | | | | | | | | | |
| **No.** | **Location** | **Date** | **Method** | **Riv/Est/Beach** | **Fish** | **length (mm)** | **weight (g)** | **body condition factor** (length vs. weight . . . ) | **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** |
| 2 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 156 | 35 | 0.92 | 0 | 95 | 0 | 0 | **95** | 2.714 | 0 | 0 | N | Y | y | small early stage lice |
| 3 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 167 | 41 | 0.88 | 0 | 86 | 0 | 0 | **86** | 2.098 | 0 | 0 | N | Y | y | |
| 4 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 285 | 239 | 1.03 | 0 | 5 | 1 | 0 | **6** | 0.025 | 0 | 0 | N | Y | y | lice off, lice scarring along back |
| 5 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 171 | 51 | 1.02 | 0 | 120 | 0 | 0 | **120** | 2.353 | 0 | 1 | N | Y | y | |
| 6 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 185 | 59 | 0.93 | 0 | 64 | 0 | 0 | **64** | 1.085 | 0 | 0 | N | Y | y | |
| 7 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 135 | 20 | 0.81 | 0 | 0 | 0 | 0 | **0** | 0.000 | 0 | 0 | N | Y | y | |
| 8 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 150 | 33 | 0.98 | 0 | 8 | 0 | 0 | **8** | 0.242 | 0 | 2 | N | Y | y | some lice off |
| 9 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 164 | 42 | 0.95 | 0 | 50 | 0 | 0 | **50** | 1.190 | 0 | 1 | N | Y | y | |
| 10 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 135 | 24 | 0.98 | 0 | 0 | 0 | 0 | **0** | 0.000 | 0 | 0 | N | Y | y | |
| 11 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 157 | 42 | 1.09 | 0 | 45 | 0 | 0 | **45** | 1.071 | 0 | 0 | N | Y | y | quite fat |
| 12 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 273 | 214 | 1.05 | 0 | 156 | 0 | 0 | **156** | 0.729 | 0 | 0 | N | Y | y | intestine parasite |
| 13 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 137 | 23 | 0.89 | 0 | 3 | 1 | 0 | **4** | 0.174 | 0 | 0 | N | Y | y | |
| 14 | Kanaird | 24-May-24 | Sweep Net | est | Sea trout | 162 | 41 | 0.96 | 0 | 44 | 0 | 0 | **44** | 1.073 | 0 | 0 | N | Y | y | |
| | | | | | **Averages** | **175.15** | **66.46** | **0.96** | **0.00** | **52.00** | **0.15** | **0.00** | **52.15** | **0.98** | **0.00** | **0.33** | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | total lice | | 678 | | | | | | | |
| | | | | | | | | | | | number of fish | | 13 | | | | | | | |
| | | | | | | | | | | | number infested | | 11 | | | | | | | |
| | | | | | | | | | | | prevalence | | 85% | | | | | | | |
| | | | | | | | | | | | total lice | | 678 | | | | | | | |
| | | | | | | | | | | | abundance | | 52.15 | | | | | | | |
| | | | | | | | | | | | intensity | | 61.64 | | | | | | | |
| | | | | | | | | | | | fish with >0.3 lice / g | | 8 | | | | | | | |
| | | | | | | | | | | | fish with >0.3 lice / g | | 62% | | | | | | | |

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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)]

| Sea trout 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 % |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Yes | 2.714 | >0.3 | 100% | 8 | 13 | 61.54 | 61.54 | |
| 3 | Yes | 2.098 | 0.2-0.3 | 50% | 1 | | 7.69 | 3.85 | |
| 4 | No | 0.025 | 0.1-0.2 | 20% | 1 | | 7.69 | 1.54 | |
| 5 | Yes | 2.353 | <0.1 | 0% | 3 | | 23.08 | 0.00 | **66.92** |
| 6 | Yes | 1.085 | | | | | | | |
| 7 | No | 0.000 | | | | | | | |
| 8 | No | 0.242 | | | | | | | |
| 9 | Yes | 1.190 | | | | | | | |
| 10 | No | 0.000 | | | | | | | |
| 11 | Yes | 1.071 | | | | | | | |
| 12 | Yes | 0.729 | | | | | | | |
| 13 | No | 0.174 | | | | | | | |
| 14 | Yes | 1.073 | | | | | | | |

**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.**

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; 3spstbk: 3-spined stickleback

| **Other fish in sample** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No | | | | | | mm | | | | | | | | |
| 1 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 130 | | | | | | | | |
| 15 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 39 | | | | | | | | |
| 16 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 125 | | | | | | | | |
| 17 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 120 | | | | | | | | |
| 18 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 127 | | | | | | | | |
| 19 | Kanaird | 24-May-24 | Sweep Net | est | 15spstbk | 125 | | | | | | | | |
| 20 | Kanaird | 24-May-24 | Sweep Net | est | 5 bearded rockling | 155 | | | | | | | | |
| 21 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 85 | | | | | | | | |
| 22 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 90 | | | | | | | | |
| 23 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 85 | | | | | | | | |
| 24 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 86 | | | | | | | | |
| 25 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 82 | | | | | | | | |
| 26 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 75 | | | | | | | | |
| 27 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 90 | | | | | | | | |
| 28 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 80 | | | | | | | | |
| 29 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 93 | | | | | | | | |
| 30 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 86 | | | | | | | | |
| 31 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 78 | | | | | | | | |
| 32 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 77 | | | | | | | | |
| 33 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 87 | | | | | | | | |
| 34 | Kanaird | 24-May-24 | Sweep Net | est | ?15spstbk | 105 | | | | | | | | |
| 35 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 87 | | | | | | | | |
| 36 | Kanaird | 24-May-24 | Sweep Net | est | 3spstbk | 75 | | | | | | | | |
| **37** | **Kanaird** | **24-May-24** | **Sweep Net** | **est** | **3spstbk** | **87** | | | | **16 chalimus lice** | | **photos taken** | | |
| 38 | Kanaird | 25-May-24 | Sweep Net | est | 15spstbk | 117 | | | | | | | | |

Acknowledgements

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(all photos by James Spence)

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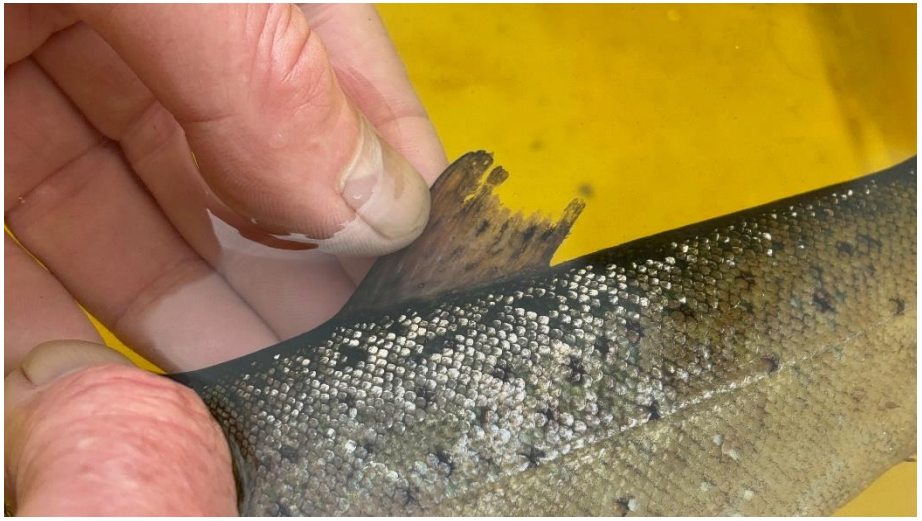
Sea trout 273mm (fish no 12), approx. 156 chalimus lice



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(left) Sea trout 171mm (fish no.5) , with approx. 120 lice (right) post smolt sea trout in tub showing dark marks on back where lice have been attached.

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3-spined stickleback with sea lice