



Loch Torridon Sea trout and salmon monitoring report 2024

to inform the Loch Torridon Environment Management Plan
for MOWI Scotland Ltd, Bakkafrost Scotland Ltd, Wester Ross Area District
Salmon Fisheries Board, The Scottish Government and The Highland Council



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Loch Torridon sea trout and wild salmon monitoring report 2024

Peter Cunningham, 2st December 2024

Summary

This document presents the results of wild fish monitoring activities around Loch Torridon during the spring and summer of 2024 to inform the Loch Torridon Environment Management Plan [EMP].

Seine netting teams were assembled to sample sea trout in the mouth of the Torridon River and River Balgy almost monthly between May and September 2024. Netting was mostly unsuccessful by the mouth of the River Balgy, just one sea trout was caught. However, 32 sea trout were caught in the sea pools of the Torridon River, mostly in July and August. Samples were a mix of post-smolt sea trout and larger trout of up to 460mm in length.

Lice counts were low on sea trout. Sea trout were mostly in good condition, some with condition factor scores of over 1.2.

The low counts of sea lice on sea trout sampled at Torridon in July and August correlate with low numbers of sea lice reported from nearby salmon farms, two (of three active farms) of which were in operation during June and July.

Primarily to learn more about wild salmon populations, juvenile fish were surveyed in the Torridon River and in the River Balgy. Estimated densities of salmon fry and parr were moderate to high at the best sites. However, in both rivers there were gaps in the distribution of juvenile salmon, with missing year classes (fry, parr or both) at some sites. Results concur with the Scottish Government's 'category 3' conservation grading for both the Torridon River and the River Balgy, indicative of inadequate numbers of adult salmon spawning within river systems to maintain optimal levels of juvenile salmon production within the areas of habitat accessible to wild salmon.

With regard future wild fish monitoring in Loch Torridon, there are several things to consider. From early autumn 2024, reported lice levels on salmon farms in Loch Torridon rose (see Scotland's Aquaculture website). The Sgeir Dughall salmon farm was stocked in autumn 2024; all three farms reported adult female sea lice counts in excess of 0.5 lice per fish in week 41 (2024).

Given the large size of these farms and potential numbers of fish stocked, sea lice infection pressure may peak early in 2025. To learn of potential sea lice infection pressures to sea trout within Loch Torridon and prior to migration of post-smolt salmon in April and May 2025, sea trout monitoring should start in early spring 2025.

Instead of monitoring by the mouth of the River Balgy where sampling effort has been largely unsuccessful, the Flowerdale site (Loch Gairloch) could be included in the Loch Torridon EMP wild fish monitoring programme. The Sgeir Dughall farm is the nearest salmon farm to the Flowerdale sea trout sampling site; fluctuations in sea lice abundance on sea trout sampled in the spring at Flowerdale have correlated with the production cycle at Sgeir Dughall since 2014. Given continuing uncertainty regarding sea lice models (e.g. Gillibrand, 2023) it seems reasonable to regard the Sgeir Dughall salmon farm as a potential source of sea lice contributing to sea lice infection pressure for wild fish in the Loch Gairloch area.

For future monitoring of salmon populations, it would be useful to understand the genetic make up of juvenile salmon especially within the River Balgy system. Juvenile salmon were exceptionally large for their age in the River Balgy below Loch Damh; are these fish mostly descended from escaped farm salmon contributing to rapid growth rates? In contrast, does the Abhainn Dearg above Loch

Damh retain a wild salmon population with 'native' genetic characteristics? And what is the genetic makeup of the salmon population in the Torridon River?

1. Introduction and background

1.1 Location, some background information and rationale

This document presents the results of wild fish monitoring activities around Loch Torridon during the spring and summer of 2024 to inform the Loch Torridon Environment Management Plan [EMP].

Loch Torridon has long been recognised as an area of much biodiversity interest. [Priority Marine Features \[PMFs\]](#) present in the loch include seabed habitats e.g. Maerl beds and Seagrass beds, both included in subset of the [11 most vulnerable PMFs](#) in Scotland, as well as marine mammals and fish species including the Herring, the Atlantic salmon and Sea trout. The Torridon River, Balgy River system and several smaller river systems support populations of salmon and sea trout and fisheries formerly of local economic and cultural importance. However, rod catches for wild salmon and sea trout in the Torridon River and River Balgy have steadily fallen. Concern has been expressed particularly for the future of native wild salmon populations in the area (Cunningham, 2022b).

Open cage salmon farming in Loch Torridon started before 1990. As elsewhere, the scale of salmon farming increased in Loch Torridon from a series of smaller farms to, most recently, three large farms all with SEPA approved biomass consents of over 2000 tonnes, operated by Bakkafrost (Aird, Sgeir Dughall) and MOWI (Loch Torridon).

Since 1999, the Scottish Government's Marine Scotland Science, formerly the Fisheries Research Service has investigated relationships between open cage salmon farming, sea lice abundance and dispersal, and wild sea trout and wild salmon within Loch Torridon, based until 2024, at a Field Station by Shildaig. Long-term monitoring has documented relationships between lice levels in the water column nearby, lice levels on sea trout and rates of return of sea trout to a fish trap. Some earlier results can be found [here](#).

Previous work by Wester Ross Fisheries Trust includes a study of wild trout in the Loch Torridon area in response to high levels of sea lice on sea trout recorded nearby in 2015 ([Cunningham, 2016](#)).

To provide greater protection for wild fish from impacts associated with salmon farming, particularly from sea lice infestation, an Environment Management Plan [EMP] was developed by The Highland Council, fish farm companies, following discussions with Wester Ross Area Salmon Fishery Board.

EMPs aim to develop locally appropriate 'adaptive management' approaches to sea lice control on salmon farms, informed by the results of wild fish monitoring in nearby waters.

This report provides a summary of the results of wild fish monitoring in and around Loch Torridon in 2024, primarily for the purposes of informing an EMP approach to on-farm sea lice control.

In spring and summer 2024, there were two stocked salmon farms within the Loch Torridon area, Aird and Torridon; their locations, and that of a third active farm, Sgeir Dughall (stocked in autumn 2024), are shown in Figure 1, together with the sea trout monitoring locations referred to in this report.

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Figure 1. Locations of active salmon farms in Loch Torridon (blue, Bakkafrost; red, MOWI), and sea trout sampling sites (orange circles) in 2024. Base map OpenStreetMap thank you.



1.2 Monitoring wild salmonids for the Loch Torridon EMP

In 2024, Wester Ross Fisheries Trust [WRFT] was jointly commissioned by MOWI and Bakkafrost to monitor sea trout and juvenile salmon around Loch Torridon to fulfil EMP obligations. Previously, in 2022 and 2023, sea trout and juvenile salmon were monitored by APEM Ltd.

In both 2022 and 2023, APEM undertook netting for sea trout at the head of Loch Torridon, and carried out an electro fishing survey of sites in the River Torridon and River Balgy (APEM, 2022; APEM 2023).

In 2024, the WRFT sea trout monitoring team carried out sampling for sea trout at the head of Loch Torridon and investigated possibilities for netting sea trout around the mouth of the River Balgy.

The WRFT electro-fishing team carried out an electrofishing survey of sites in the River Torridon and in the River Balgy system, including sites below and above Loch Damp.

Part 2 of this report provides a summary of the findings of sea trout monitoring in Loch Torridon in 2024; Part 3, a summary of the results from the juvenile fish survey of the Torridon River and River Balgy in 2024.

Part 2. Monitoring sea lice on sea trout

2.1 Previous wild fish monitoring at Torridon

WRFT previously netted small numbers of sea trout in the estuary of the Torridon River in 2015 (see Cunningham, 2016). The APEM team netted sea trout at the head of Loch Torridon in 2022 and 2023. In May 2022, twenty-seven sea trout were caught (post-smolt sea trout 153mm to 177 in length; older sea trout 265mm); none of these fish carried sea lice (APEM Ltd, 2022). In 2023, just one post-smolt sea trout of 200mm was caught, carrying no lice (APEM Ltd, 2024).

2.2 Monitoring of sea trout in Loch Torridon in 2024

The WRFT sea trout sampling team organised five visits to Torridon in 2024, in June, July (2 visits), August, and September; and four visits to the River Balgy estuary, one in May, one in June, one in July and one in September.

Each visit to Torridon focussed on using a seine net with a sampling team which included experienced snorkellers to man-handle the lead line of the seine net over the riverbed of the sea pool. There were many stones that snagged the net and would otherwise have made netting ineffective.

The net used was approx. 47m x 3m of mesh size 14mm knot to knot was used with floats on top and lead weighted line on bottom.

On each occasion the minimum team size was five people (usually 6 or more), comprising two or more from WRFT (setting off in the morning from Gairloch) and remaining team members from the Torridon area NTS staff.

At the Balgy, a new sweep netting site, a boat was initially used to set the net by the river mouth at high tide on 27th May and 24th June. The boat was operated by Jim Raffell and Owen Kilbride of Marine Scotland Science, netting was assisted by the WRFT biologist. This approach was unsuccessful.

Subsequently, the WRFT sweep netting team explored opportunities for netting sea trout at this location at low tide, using snorkellers. One sea trout was caught (on 22nd July), however there were too many boulders and too much seaweed to make seine netting as successful as at Torridon.

The August sweep was cancelled due to poor weather. We returned in September at low tide to the location where the sea trout was caught in July, but had no success.

Sampling days are listed in Tables 2a and 2b.

Table 2a: Sea trout monitoring days at Torridon in 2024

Visit	Date	Methods used	Number of trout processed
#1	13 th June 2024	Seine net sea pool of river	1
#2	10 th July 2024	Seine net sea pool of river	10
#3	25 th July 2024	Seine net sea pool of river	8
#4	9 th August 2024	Seine net sea pool of river	13
#5	25 th September 2024	Seine net sea pool of river	1

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Table 2b: Sea trout monitoring days at Balgy in 2024

Visit	Date	Methods used	Number of trout processed
#1	27 th May 2024	Seine net set from boat	0
#2	24 th June 2024	Seine net set from boat	0
#3	22 nd July 2024	Seine net shore	1
#4	25 th September 2024	Seine net shore	0

All fish caught were transferred to a tub. Fish were lightly sedated using anaesthetic (eugenol). The length (in mm), weight (to nearest 5g) and records of the following were noted: numbers of sea lice (three categories of *Lepeophtheirus salmonis*; check for adult *Caligus elongatus*), dorsal fin damage score (0 [no damage] – 3 [over 2/3 of dorsal fin eroded away]), predator damage, and ‘black spots’ (*Cryptocotyle lingua*) spots per cm² of caudal fin. Scale samples and photos were taken. All fish were returned to the water following recovery.

2.3 Sea lice monitoring results

Results are presented in Tables 3a-3e.

Altogether 34 trout were processed, all of which were caught in the Torridon River estuary except for one Balgy fish.

The most useful samples were as follows:

- On 10th July 2024 (Table 3b), ten sea trout were caught, from 203mm to 385mm in length. Only one of these fish carried more than 5 lice; the biggest fish of 385mm carried 20 sea lice and had a dorsal fin damage score of 2 (over 2/3 of dorsal fin damaged, though damage described as ‘old’). These fish were in good ‘plump’ condition, many with condition factor scores of over 1.2
- On 25th July (Table 3c), eight sea trout were caught, from 155mm to 315mm in length. Sea lice levels were again low; and condition factor scores mostly indicative of reasonable growth.
- On 9th August (Table 3d), 13 sea trout were caught, from 134 to 250mm in length. Sea lice levels were again low, except for two smaller fish which had lice loadings in excess of 0.1 lice per gram fish weight.

The one Balgy sea trout, a fish of 460mm in length taken on 22nd July 2024 (the largest sea trout in the sample) carried just four lice (Table 4).

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Table 3a Data recorded for sea trout sampled at Torrison in 2024. All fish taken in the Torrison River estuary using a seine net by WRFT team.

Details of lice stages, dorsal fin damage, predator damage and *Cryptocotyle lingua* spots on caudal fin on sea trout sampled at Applecross in summer 2024. Including calculation for projected mortality based on method described by Taranger *et al* 2014 and adopted by Fisheries Management Scotland for analyses of Scottish Government funded sweep netting within the West of Scotland in 2022. Legend and further explanation of colour scheme can be found below.

Sample #1: 13th June 2024.

Fish	length (mm)	weight (g)	condition factor	Caligus		Lepeophtheirus salmonis			*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle lingua spots per cm ² of caudal fin	Predator damage	Photo	scale sample ?	Comments	≥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 %
				total	Copepodid & Chalimus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice																
Sea trout	141	28	1.00	0	0	0	0	0	0.000	0	0	N	Y	y	estuarine colouring	No	0.000	>0.3	100%	0	1	0.00	0.00	
																		0.2-0.3	50%	0		0.00	0.00	
																		0.1-0.2	20%	0		0.00	0.00	
																		<0.1	0%	1		100.00	0.00	0.00

Explanation (for Tables 3a – 3e and Table 4):

Dorsal fin damage score: '1' is for up to 1/3 of fin damaged; '2' is for >1/3 an <2/3 of fin damaged; '3' is for over 2/3 of dorsal fin damaged

Estimation of projected mortality or early return to freshwater from Taranger *et al* 2014:

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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Table 3b Data recorded for sea trout sampled at Torricon in 2024. All fish taken in the Torricon River estuary using a seine net by WRFT team.

Sample #2: 10th July 2024

Fish	length (mm)	weight (g)	condition factor	Caligus		Lepeophtheirus salmonis				*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample?	Comments	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 %	
				total	Copepodid & Chalimus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice																			
1	310	354	1.19	0	1	2	0	3	0.008	0	5	N	Y	y	silvery nice fish	1	No	0.008	>0.3	100%	0	10	0.00	0.00			
2	350	485	1.13	0	0	1	0	1	0.002	0.5	1	N	Y	y	male nice fish	2	No	0.002	0.2-0.3	50%	0		0.00	0.00			
3	385	630	1.10	0	3	9	8	20	0.032	2	0	N	Y	y	pic of dorsal fin	3	Yes	0.032	0.1-0.2	20%	0		0.00	0.00			
4	320	385	1.17	0	0	1	1	2	0.005	0.2	1	old	Y	y		4	No	0.005	<0.1	0%	10		100.00	0.00	0.00	0.00	
5	353	465	1.06	0	0	3	0	3	0.006	0.2	0	N	Y	y		5	No	0.006									
6	340	485	1.23	0	0	1	0	1	0.002	0.2	0	N	Y	y	fat male	6	No	0.002									
7	320	404	1.23	0	0	0	0	0	0.000	0	0	N	Y	y		7	No	0.000									
8	350	486	1.13	0	2	2	1	5	0.010	0.5	1	N	Y	y		8	No	0.010									
9	240	148	1.07	0	0	1	0	1	0.007	0	2	old	Y	y		9	No	0.007									
10	203	95	1.14	0	1	0	0	1	0.011	0	1	N	Y	y	thin	10	No	0.011									
Averages	317.10	393.70	1.15	0.00	1.00	3.25	2.25	6.50	0.01	0.68	1.75																

Table 3c Data recorded for sea trout sampled at Torricon 2024. All fish taken in the Torricon River estuary using a seine net by WRFT team.

Sample #3: 25th July 2024

Fish no.	length (mm)	weight (g)	condition factor	Caligus		Lepeophtheirus salmonis				*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample?	Comments	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 %	
				total	Copepodid & Chalimus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice																			
1	315	362	1.16	0	9	5	3	17	0.047	1	8	N	Y	y	plump, dorsal fin photo	1	Yes	0.047	>0.3	100%	0	8	0.00	0.00			
2	198	78	1.00	0	2	1	0	3	0.038	0	2	N	Y	y	estuarine, ?recapture	2	No	0.038	0.2-0.3	50%	0		0.00	0.00			
3	170	47	0.96	0	0	0	0	0	0.000	0	0	N	Y	y		3	No	0.000	0.1-0.2	20%	0		0.00	0.00			
4	186	70	1.09	0	0	0	0	0	0.000	0	1	N	Y	y		4	No	0.000	<0.1	0%	8		100.00	0.00	0.00	0.00	
5	170	54	1.10	0	0	0	0	0	0.000	0	0	N	Y	y	parr bars visible on fish	5	No	0.000									
6	163	36	0.83	0	0	1	0	1	0.028	0	0	N	Y	y		6	No	0.028									
7	210	100	1.08	0	7	0	0	7	0.070	0	2	Y	Y	y	fat fish; old tail damage	7	No	0.070									
8	155	36	0.97	0	0	0	0	0	0.000	0	0	N	Y	y		8	No	0.000									
Averages	195.88	97.88	1.05	0.00	2.75	1.50	0.75	5.00	0.02	0.25	2.75																

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Table 3d Data recorded for sea trout sampled at Torricon in 2024. All fish taken in the Torricon River estuary using a seine net by WRFT team.

Sample #4: 9th August 2024

Fish no.	length (mm)	weight (g)	condition factor	Caligus	Lepeophtheirus salmonis				*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample?	Comments	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 %	
				total	Copepodid & Chalmus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice																		
1	200	90	1.13	0	0	0	0	0	0.000	0	2	0	Y	y	lice scars	1	No	0.000	>0.3	100%	0	13	0.00	0.00		
2	210	95	1.03	0	1	0	0	1	0.011	0	0.5	0	Y	y		2	No	0.011	0.2-0.3	50%	0		0.00	0.00		
3	250	175	1.12	0	1	0	0	1	0.006	0.5	0	0	Y	y	lice scars	3	No	0.006	0.1-0.2	20%	2		15.38	3.08		
4	220	105	0.99	0	0	0	0	0	0.000	0.5	3	0	Y	y	caudal fin base missing	4	No	0.000	<0.1	0%	11		84.62	0.00	3.08	
5	225	122	1.07	0	5	0	0	5	0.041	1.5	2	0	Y	y		5	No	0.041								
6	171	54	1.08	0	0	0	0	0	0.000	0	0	0	Y	y	recapture; estuarine	6	No	0.000								
7	182	74	1.23	0	0	0	0	0	0.000	0	0	0	Y	y		7	No	0.000								
8	193	75	1.04	0	0	0	0	0	0.000	0.2	5	0	Y	y		8	No	0.000								
9	190	68	0.99	0	5	4	2	11	0.162	1	2	0	Y	y		9	No	0.162								
10	231	145	1.18	0	4	2	1	7	0.048	1	1	0	Y	y		10	No	0.048								
11	180	54	0.93	0	6	0	0	6	0.111	0.2	4	0	Y	y		11	No	0.111								
12	134	30	1.25	0	0	0	0	0	0.000	0	0	0	Y	y		12	No	0.000								
13	185	50	0.79	0	0	0	0	0	0.000	0	0.5	0	Y	y		13	No	0.000								
Averages	197.77	87.46	1.06	0.00	0.50	0.00	0.00	0.50	0.00	0.25	1.38															

Table 3e Data recorded for sea trout sampled at Torricon in 2024. All fish taken in the Torricon River estuary using a seine net by WRFT team.

Sample #4: 23rd September 2024

Fish	length (mm)	weight (g)	condition factor	total	Copepodid & Chalmus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice	*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample?	Comments	≥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 %
Bm trout	120	NR	#VALUE!	0	0	0	0	0	#VALUE!	0	0	N	N	N	wee brown trout	No	#VALUE!	>0.3	100%	0	0	#DIV/0!	#DIV/0!	
																		0.2-0.3	50%	0		#DIV/0!	#DIV/0!	
																		0.1-0.2	20%	0		#DIV/0!	#DIV/0!	
Averages	120.00	#DIV/0!	#VALUE!	0.00	0.00	0.00	0.00	0.00	#VALUE!	0.00	0.00							<0.1	0%	0		#DIV/0!	#DIV/0!	#DIV/0!

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Table 4 Data recorded for sea trout sampled at Balgy shore 2024. The only fish taken using a seine net by WRFT team on 22nd July 2024.

Fish	length (mm)	weight (g)	condition factor	Caligus		Lepeophtheirus salmonis			*estimated lice/g fish weight	Dorsal fin damage	Cryptocotyle ligua spots per cm ² of caudal fin	Predator damage	Photo	scale sample ?	Comments	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 %
				total	Copepodid & Chalimus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice																	
Sea trout	460	1095	1.12	0	0	2	2	4	0.004	1	30	N	Y	y	fat hen fish	1	No	0.004	>0.3	100%	0	1	0.00	0.00	
																			0.2-0.3	50%	0		0.00	0.00	
																			0.1-0.2	20%	0		0.00	0.00	
																			<0.1	0%	1		100.00	0.00	0.00

2.4 Sea lice monitoring discussion

Useful samples of sea trout were taken at Torrison for the purposes of informing the Loch Torrison EMP, with a total of 32 sea trout (and 1 'brown trout') taken here over the 5 visits. The fish were taken in the river estuary as the tide receded; using a team with snorkellers. Now that we know how to catch useful samples of sea trout here, it is worthwhile monitoring here in 2025.

Despite much effort and exploring around the mouth of the River Balgy, only one sea trout was taken in the sweep net. This fish was 50m away from the main channel in the estuary; we were unable to find a location where the seabed where the river flows into the sea was suitable to be able to seine net. The shore close to the main river channel is bouldery, with much seaweed growing on stones, so not suitable for sweep netting at any point in the tide.

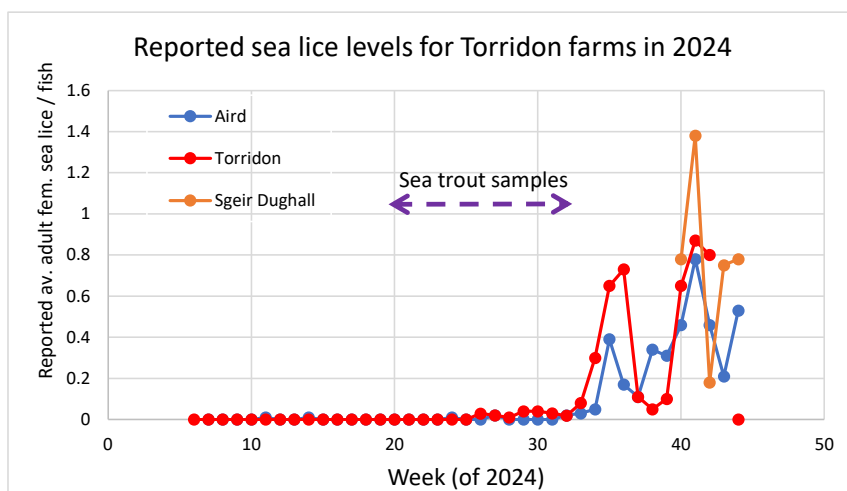
Other options for catching sea trout at the mouth of the River Balgy include fyke netting, or as demonstrated by anglers, catching samples of finnock using rod and line during the summer months. Rod and line was used here in 2015 to obtain sea trout for sea lice monitoring (see Cunningham, 2016). 22 finnock were caught by anglers in the sea pool of the River Balgy August 2024.

The sea trout taken in July and August 2024 at Torrison including many fish of over 30cm in length, which were generally in good condition (condition factors of over 1.2) having been feeding well. Lice levels were low; the fish appeared to be in good health. The biggest fish in the sample was the fish taken at the mouth of the Balgy on 22nd July; it was also in good condition (condition factor of 1.12) and carried only 4 lice.

Thus, sea trout sampling suggests that sea lice infestation pressure was low in upper Loch Torrison during the Spring and Summer of 2024.

Data from Scotland's Aquaculture Website shows that lice levels remained low on farms in Loch Torrison during the period when sea trout were caught at Torrison, with the last successful sample taken on 9th August in week 32 when reported on farm sea lice counts for the two stocked farms in the area (Aird and Torrison) were still very low; this can be seen on Figure 2. However subsequently, reported lice levels rose sharply; Sgeir Dughall farm was also stocked from week 40.

Figure 2. Reported average adult female lice counts on salmon farms in Loch Torrison in 2024 (data from Scotland's Aquaculture website)



2.5. Conclusions and recommendations from sea lice monitoring

The WRFT sea trout sampling team was successful in obtaining a useful sample of 32 sea trout at Torrison during the summer of 2024, but only one sea trout at the Balgy sampling site.

Burdens of sea lice were low, and most sea trout taken in July and August were in good condition having been feeding well.

The low lice numbers seen on sampled sea trout correlate with low numbers of sea lice reported on nearby salmon farms during the spring and summer of 2024.

Given increases in reported sea lice numbers on salmon farms in the Loch Torrison area following the wild fish monitoring programme in 2024, it is recommended to start sea trout monitoring trout in Loch Torrison in Spring 2025 to assess sea trout health prior to the post-smolt salmon migration period.

Instead of monitoring by the mouth of the River Balgy where sampling effort has been largely unsuccessful, the Flowerdale site (Loch Gairloch) could be included in the Loch Torrison EMP wild fish monitoring programme. The Sgeir Dughall farm is the nearest salmon farm to the Flowerdale sea trout sampling site (about 26km as the fish swims or sea lice drift). Fluctuations in sea lice abundance on sea trout sampled in the spring at Flowerdale have correlated with the production cycle at Sgeir Dughall since 2014. Given continuing uncertainty regarding sea lice models (e.g. Gillibrand, 2023) it seems reasonable to regard the Sgeir Dughall salmon farm as a potential source of sea lice contributing to sea lice infection pressure for wild fish in the Loch Gairloch area.

Given the potentially high numbers of farmed fish within the Loch Torrison area, adult female sea lice levels per farmed fish may need to be very low (below CoGP values) to protect post-smolt salmon and sea trout in April and May 2025.

It is beyond the scope of this report to provide an assessment of potential % mortality for post-smolt salmon migrating through Loch Torrison. However, note that rod catches of wild salmon have been very low on nearby rivers in recent years (Figure 3).

Research in Norway¹ (Vollset *et al*, 2017) has clarified relationships between lice levels on sea trout and on post-smolt salmon migrating nearby. With information from the Scottish Government's Marine Directorate and SEPA, and by following Vollset *et al* (2017), it may be possible to develop the most appropriate adaptive management strategies for Loch Torrison to protect wild salmon.

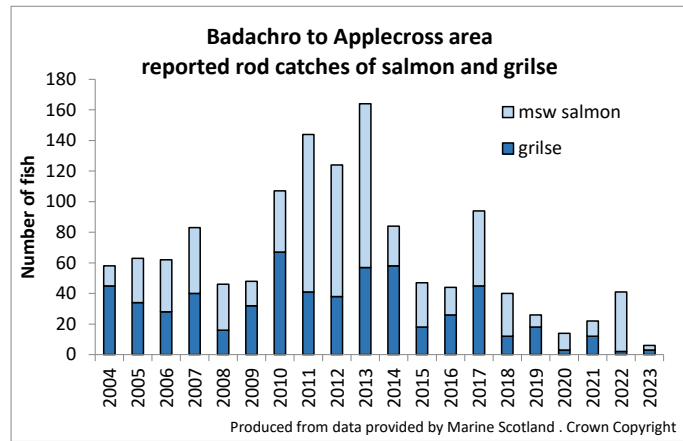
Since 2018, low grilse catch years have alternated with low MSW salmon catch years in nearby rivers (Figure 3), a pattern also observed for the River Carron reported catches in earlier years and discussed in the [SWRFT Review 2018](#) and [Applecross sea trout monitoring report 2023](#).

One possible explanation for is that in odd years, emigrating salmon smolts have experienced higher mortality than in even years, correlating with high lice counts on sea trout recorded by WRFT at Flowerdale, and reported from nearby salmon farms including the Sgeir Dughall salmon farm and some of the east of Skye farms.

¹ Vollset *et al* (2017) Salmon lice infestation on sea trout predicts infestation on migrating salmon post-smolts <https://academic.oup.com/icesjms/article/74/9/2354/3860036>

Torrifon sea trout and salmon monitoring report for 2024

Figure 3. Reported rod catch graphs for the Rivers in the Badachro – Applecross area.



Part 3. Juvenile fish survey of the Torridon River and River Balgy

3.1 Introduction to juvenile fish survey

This part of the report presents the results of an electro-fishing survey of sites in the Torridon River and the River Balgy to inform the Loch Torridon EMP.

The survey focussed primarily on finding out about the distribution and abundance of juvenile salmon (*Salmo salar*) within the Torridon River system and the River Balgy system; trout (*Salmo trutta*), eel (*Anguilla anguilla*) and minnow (*Phoxinus phoxinus*) were also recorded. For the Torridon River, the distribution of sites was similar to that of surveys by APEM teams in 2022 and 2023 (see APEM, 2022; APEM, 2024); differences in some locations were so that data collected in 2024 can be more easily compared with previous WRFT survey data for juvenile salmon in the Torridon River.

For the River Balgy, sites above Loch Damh were included for the first time for EMP wild fish monitoring purposes. This was for two reasons. Firstly, genetic studies have indicated that juvenile salmon in the River Balgy can have high levels of likely genetic introgression with escaped farm fish (Gilbey et al, 2021). However, this study also suggested that there were still some wild salmon with 'native' genetic characteristic in the River Balgy system; these fish are considered most likely to inhabit the Abhainn Dearg above Loch Damh, hence the rationale for surveying two sites there. Secondly, WRFT has surveyed juvenile salmon within the catchment over many years, and again, by revisiting sites surveyed by WRFT e-fishing teams in previous years, some comparisons can be made. This is further discussed in part 3.4

3.2 Locations and methods

Six sites were surveyed in the Torridon River system on 2nd September 2024; five sites along the main Torridon River and one in the River Thrail (a tributary of the Torridon River), see Figure 4a and 4b.

In the River Balgy five sites were surveyed on 10th September 2024; just one site was fished in the main river below Loch Damh and four sites in tributary streams above Loch Damh.

At each site, the survey team fished for a minimum of 10 minutes in a standardised way, usually covering a wetted area of 100m² or more (one site was subsequently estimated at just 80m²). A one-run, semi-quantitative methodology, following Scottish Fisheries Coordination Centre [SFCC] protocol and NEPS Single Run protocol, was used to produce Catch Per Unit Effort [CPUE] data and minimum density estimates for juvenile salmon and trout.

Surveys were led by WRFT Biologist Peter Cunningham with assistance from Nic Butler, both with SFCC electrofishing qualifications. An Electrocatch backpack discharging 350-400 volts was used.

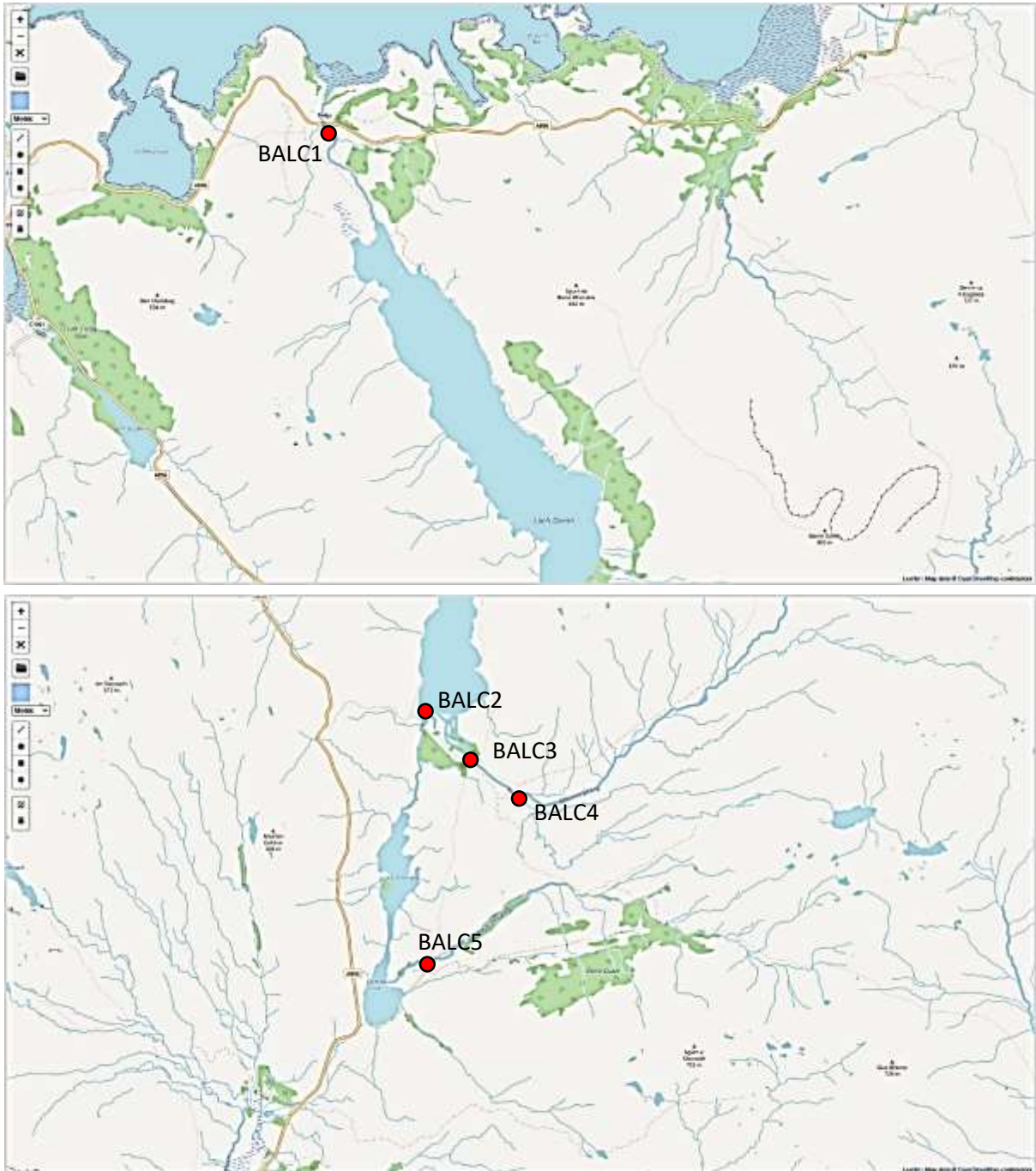
All fish were lightly sedated (in eugenol, c. clove oil) and measured to the nearest mm (fork length) and returned to the water following recovery.

Torrifon sea trout and salmon monitoring report for 2024

Figure 4a. Locations of electrofishing sites in the Torrifon River surveyed on 2nd September 2024. Base map OpenStreetMap thank you.



Figure 4b. Locations of electrofishing sites in the River Balgy surveyed on 10th September 2024. Base map OpenStreetMap thank you.



3.3 Results

A summary of results can be found in Table 5, together with some data from previous recent surveys. Results are presented as numbers of fish caught per minute; minimum fish density estimates (in numbers of fish per m²) were also obtained for most sites.

3.3.1 Torridon River (Table 5a)

The river was low on 2nd September 2024 and fishing was very effective in so far as most of the juvenile trout and juvenile salmon that were seen were caught.

Salmon

Salmon fry were recorded at all sites. Numbers (Catch Per Unit Effort [CPUE] and estimated minimum densities) were highest at the sites towards the upper part of the river (TORC4 and TORC5) with high CPUE for salmon fry recorded at these sites. However very few salmon fry were recorded at the two main river sites further downstream (TORC2 and TORC3).

Salmon fry were small, mostly from 41mm to 55mm in length at TORC4 and TORC5 they were most numerous; larger at the Thrail site (TORC1) 53mm-67mm; and large (over 65mm) at the other sites TORC2 and TORC3 where very few juvenile salmon were recorded.

Salmon parr (assumed to be mostly 1 year old fish) were recorded at all sites except TORC3, between the pinewoods in the lower part of the river. Numbers (Catch Per Unit Effort [CPUE] and estimated minimum densities) were low at all sites except the top site, TORC6 above the road near the Beinn Eighe NNR car park.

Parr were relatively small at the top site (TORC6), 67mm to 103mm in length, where densities were highest. Parr were larger at other sites; from 138mm to 141mm in length at the middle site TORC3.

Juvenile salmon from TORC6 on 2nd July 2024



Trout

Small numbers of brown trout were recorded at all sites, at low CPUE and estimated densities. The highest numbers of fry were found around the mouth of a small tributary burn at site TORC2.

Eels

Small numbers of eels were caught; others were seen.

Torriddon sea trout and salmon monitoring report for 2024

Table 5a. Juvenile fish survey results for Torriddon River. Sites surveyed in 2024 for EMP monitoring purposes circled with dashed red line and shown with results for surveys in previous years, including the two lower sites fished in 2022 and 2023 by APEM team.

Colour coding relates to Wester Ross scales of relative abundance or minimum density estimates for fish: green is for over 2 fish per minute or over 0.200 fish per m²; yellow, for 1.00 to 1.99 fish per minute or 0.100 to 0.199 fish per m²; orange for 0.50 to 0.99 fish per minute or 0.050 to 0.099 fish per m²; and red for 0.01 to 0.49 fish per minute or 0.001 to 0.049 fish per m². Further explanation of this colour scheme can be found in Cunningham (2022b)

<https://www.wrft.org.uk/files/Status%20of%20Wild%20Salmon%20in%20Wester%20Ross%20Report%20for%202021v1Feb22.pdf>.

Date	Code	Site	Easting	Northing	conductivity μS	temp °C	time (mins.)	wet area (approx) m ²	sal fry number	sal par number	trt fry number	older trout number	sal fry per minute	sal par per minute	trt fry per minute	old trt per minute	sal fry per m ²	sal par per m ²	trt fry per m ²	older trout per m ²	eels	Comments
02/09/2021	TDNT19	Allt Coire an Anmoich from roadbridge	195873	856845	34	17	10	125	16	16	1	3	1.60	1.60	0.10	0.30	0.13	0.13	0.01	0.02	2	
02/09/2021	TDNT24	main river ~100m above burn mouth	194621	856542	40	18.6	11	120	12	22	2	0	1.09	2.00	0.18	0.00	0.10	0.18	0.02	0.00	2	
02/09/2021	TDNT13	roadside burn, around corner	194572	856671	39	17.4	10	90	0	6	9	4	0.00	0.60	0.90	0.40	0.00	0.07	0.10	0.04	3	
02/09/2021	TDN11	main river above Glen Cottage	193417	856428	42	16.5	9	100	25	7	5	0	2.78	0.78	0.56	0.00	0.25	0.07	0.05	0.00		
02/09/2021	TDNT7	main river by pine tree island burn mouth	191460	855370	34	14.3	16	180	0	4	13	1	0.00	0.25	0.81	0.06	0.00	0.02	0.07	0.01	4	
02/09/2021	TDN5	Thrail by house site	190695	855090	36	14.7	10	75	21	7	0	0	2.10	0.70	0.00	0.00	0.28	0.09	0.00	0.00	6	
23/08/2022	APEM_M	Torriddon River	195074	856612			6		0	3	0	1	0.00	0.50	0.00	0.17					0	
23/08/2022	APEM_L	Torriddon River	194189	856601			6		1	2	0	0	0.17	0.33	0.00	0.00					2	
23/08/2022	APEM_K	Torriddon River	192317	855892			6		0	6	0	0	0.00	1.00	0.00	0.00					2	
23/08/2022	APEM_J	Torriddon River	191377	855372			6		0	2	0	1	0.00	0.33	0.00	0.17					0	
23/08/2022	APEM_F	Torriddon River	190421	855041			6		2	1	0	1	0.33	0.17	0.00	0.17					1	
31/08/2023	APEM_M	Torriddon River	195074	856612			6		6	3	1	3	1.00	0.50	0.17	0.50						
31/08/2023	APEM_L	Torriddon River	194189	856601			6		4	8	1	0	0.67	1.33	0.17	0.00						
31/08/2023	APEM_K	Torriddon River	192317	855892			6		0	1	1	1	0.00	0.17	0.17	0.17						
31/08/2023	APEM_J	Torriddon River	191377	855372			6		0	0	7	0	0.00	0.00	1.17	0.00						
31/08/2023	APEM_F	Torriddon River	190421	855041			6		0	1	2	0	0.00	0.17	0.33	0.00						
02/09/2024	TORC6 (TDNT19)	just above roadbridge	195874	856848	26	12.4	10	150	5	21	1	4	0.50	2.10	0.10	0.40	0.03	0.14	0.01	0.03	seen	sal fry 41mm-56mm; sal par 67mm-103mm
02/09/2024	TORC5 (TDNT24)	100m upstream from burn mouth	194652	856565			12	150	29	1	0	2	2.42	0.08	0.00	0.17	0.19	0.01	0.00	0.01		sal fry 42mm-55mm
02/09/2024	TORC4 (TDN11)	above Glen Cottage	193413	856433	27	12.8	11.5	120	29	4	1	1	2.52	0.35	0.09	0.09	0.24	0.03	0.01	0.01	1	sal fry 47mm-64mm
02/09/2024	TORC3	between pine woods and Glen Cottage	192176	855746	31	13	10	120	1	3	3	2	0.10	0.30	0.30	0.20	0.01	0.03	0.03	0.02	1	sal fry 71mm; sal par 138m -141mm
02/09/2024	TORC2 (TDNT7)	Between pine woods	191461	855362	33	14	10	85	2	0	8	0	0.20	0.00	0.80	0.00	0.02	0.00	0.09	0.00		sal fry 67mm, 69mm
02/09/2024	TORC1 (TDN5)	Thrail below house pool	190701	855093	22	14	10	125	16	6	0	1	1.60	0.60	0.00	0.10	0.13	0.05	0.00	0.01	2	sal fry 53mm-67mm

	over 2 fish per minute or over 0.200 fish per m ²
	1.00 to 1.99 fish per minute or 0.100 to 0.199 fish per m ²
	0.50 to 0.99 fish per minute or 0.050 to 0.099 fish per m ²
	0.01 to 0.49 fish per minute or 0.001 to 0.049 fish per m ² .

3.3.2 River Balgy system (Table 5b)

On the 9th of September, water levels were a bit too high at three of the five sites surveyed to be able to fish main channels; so fishing was restricted to shallow areas along the sides of main channels.

Salmon fry were recorded at the site below Loch Damh (BALC1) and at two sites above Loch Damh in the Abhainn Dearg (BALC3) and in the Allt Eisg, a tributary of Abhainn Dearg (BALC4). No salmon fry were recorded in the Loch Coultrie River (BALC2) or higher tributary, Allt a' Ghuibhais (BALC5)

Salmon fry were exceptionally large at the lowest site (BALC1) from 67mm-98mm in length; much smaller in the Abhainn Dearg (BALC3) and Allt Eisg (BALC4) from 50mm – 57mm in length at the latter site.

Small numbers of salmon parr were recorded at four of the five sites. At the lowest site (BALC1), three very large parr were caught (141mm to 151mm in length); in the Abhainn Dearg and Allt Eisg (BALC3 and BALC4), the six parr caught were from 68mm to 102mm in length; and the mouth of the Loch Coultrie River (BALC2), three parr caught were 101mm to 145mm.

Trout

Brown trout were recorded at all sites. The highest numbers of fry were found in the Loch Coultrie Burn (BALC2) and Allt a' Ghuibhais (BALC5).

Small numbers of eels and minnows were caught (see Table 5b)

Torrifon sea trout and salmon monitoring report for 2024

Table 5b. Juvenile fish survey results for River Balgy. Sites surveyed in 2024 for EMP monitoring purposes are shown with dashed red line and shown with results for surveys in previous years, including the two lower sites fished by APEM team in 2022 and 2023. See text for further comments.

Colour coding relates to Wester Ross scales of relative abundance or minimum density estimates for fish: green is for over 2 fish per minute or over 0.200 fish per m²; yellow, for 1.00 to 1.99 fish per minute or 0.100 to 0.199 fish per m²; orange for 0.50 to 0.99 fish per minute or 0.050 to 0.099 fish per m²; and red for 0.01 to 0.49 fish per minute or 0.001 to 0.049 fish per m². Further explanation of this colour scheme can be found in Cunningham (2022b)

<https://www.wrft.org.uk/files/Status%20of%20Wild%20Salmon%20in%20Wester%20Ross%20Report%20for%202021v1Feb22.pdf>.

Date	Code	Site	Easting	Northing	conductivity µS	temp °C	time (mins.)	wet area (approx) m ²	sal fry number	sal par number	trt fry number	older trout number	sal fry per minute	sal par per minute	trt fry per minute	old trt per minute	sal fry per m ²	sal par per m ²	trt fry per m ²	older trout per m ²	eels	minnow	comments
16/08/2018	BGY3	Abhainn Dearg	186295	847314	21	13.9	26		present	21	present	present		0.81									salmon parr sampled for genetic study
16/08/2018	NEPS4694	Loch Coultrie burn	185884	847170	74	15.2	30	500	0	0	11	7	0.00	0.00	0.37	0.23	0.00	0.00	0.02	0.01	7	21	river in spate
16/08/2018	MS FW2	Loch Coltrie Burn by bridges	185947	847538	79	14.9	27		1	4	5	14	0.04	0.15	0.19	0.52					2	7	genetic samples
16/08/2018	MS FW1	River Balgy by road bridge	184663	854357	46	15	22	167	102	30	2	0	4.64	1.36	0.09	0.00	0.61	0.18	0.01	0.00			genetic samples
22/07/2022	BGYT25	Allt a' Ghiubhais, at bridge	185888	845231	133	17.7	6	68	0	0	22	13	0.00	0.00	3.67	2.17	0.00	0.00	0.32	0.19	1		trout of est. 35cm & eel of est. 50cm seen in pool under bridge
22/07/2022	BGYT22	Alltan Eisg, from 20m from confluence upstream	186814	846791	43	15.3	11	144	18	0	16	15	1.64	0.00	1.45	1.36	0.13	0.00	0.11	0.10			above new power house
22/07/2022	BGY3	Abhainn Dearg	186340	847274	38	16.6	26	386	34	13	33	16	1.31	0.50	1.27	0.62	0.09	0.03	0.09	0.04	2	2	genetic samples from parr for MSS. Parr 100mm to 143mm
22/07/2022	BGY2	Abhainn Dubh, below and above bridge	185968	847537	107	18.4	18	200	1	0	41	7	0.06	0.00	2.28	0.35	0.06	0.00	0.21	0.04	4	36	Deep pools not fished. Polly T played bagpipes!
23/08/2022	APEM_B	River Balgy above bridge	184757	854221			6		23	0	1	0	3.83	0.00	0.17	0.00					1		reinterpreted juvenile salmon ages from APEM - very large fry
23/08/2022	APEM_A	River Balgy below bridge	184657	854370			6		18	0	0	0	3.00	0.00	0.00	0.00							reinterpreted juvenile salmon ages from APEM - very large fry
31/08/2023	APEM_B	River Balgy above bridge	184757	854221			6		31	2	1	1	5.17	0.33	0.17	0.17							reinterpreted juvenile salmon ages from APEM - very large fry
31/08/2023	APEM_A	River Balgy below bridge	184657	854370			6		30	1	3	3	5.00	0.17	0.50	0.50							reinterpreted juvenile salmon ages from APEM - very large fry
10/09/2024	BALC5 [c. BGYT25]	Glasnock burn (Allt a' Ghiubhais) below bridge	185863	854225	72	11.4	12	100	0	0	11	2	0.00	0.00	0.92	0.17	0.00	0.00	0.11	0.02			river high - fished shallow areas
10/09/2024	BALC4 [BGYT22]	Abhainn Dearg, Allt Eisg	186816	846787	21	11	12	100	10	3	2	1	0.83	0.25	0.17	0.08	0.10	0.03	0.02	0.01			high and fast water, difficult fishing
10/09/2024	BALC3 [BGY3]	Abhainn Dearg by Lodge	186348	847219	21	10.8	10	100	2	2	5	1	0.20	0.20	0.50	0.10	0.02	0.02	0.05	0.01	1	4	river high - fished edges; area fished estimated
10/09/2024	BALC2 [MSFW2]	Loch Coultrie burn below road bridge	185954	847353	71	12.7	10	80	0	2	10	0	0.00	0.20	1.00	0.00	0.00	0.03	0.13	0.00			river high - fished edges; area fished estimated
10/09/2024	BALC1 [MSFW1]	just above road bridge	184690	854293	46	11.6	10	100	15	3	2	0	1.50	0.30	0.20	0.00	0.15	0.03	0.02	0.00	2	1	difficult fishing; sal fry 67mm-98mm; sal par 141mm-151mm

	over 2 fish per minute or over 0.200 fish per m ²
	1.00 to 1.99 fish per minute or 0.100 to 0.199 fish per m ²
	0.50 to 0.99 fish per minute or 0.050 to 0.099 fish per m ²
	0.01 to 0.49 fish per minute or 0.001 to 0.049 fish per m ² .

3.4 Discussion of juvenile fish survey

Salmon fry and salmon parr were recorded in both the Torridon River and in the River Balgy. However, juvenile salmon distributions and estimated densities (from CPUE) were patchy in both river systems, with year classes missing at many sites (fry, parr or both).

In the Torridon River, estimated densities of salmon fry were moderate or high only at sites in the upper part of the river. Estimated densities of both salmon fry and salmon parr were very low in the lower part of the main river (TORC4 and TORC3) where habitat is good for juvenile salmon. The juvenile salmon that were caught were large for their age and had grown quickly compared to those of same age at higher sites indicative of low levels of competition for the available food.

In some previous years (especially 2014 & 2016) parr numbers have been slightly higher in the lower part of the river near TORC3 where habitat appears to be good for salmon parr, but never as high as one might expect based on the quality of habitat during the past 20 years.

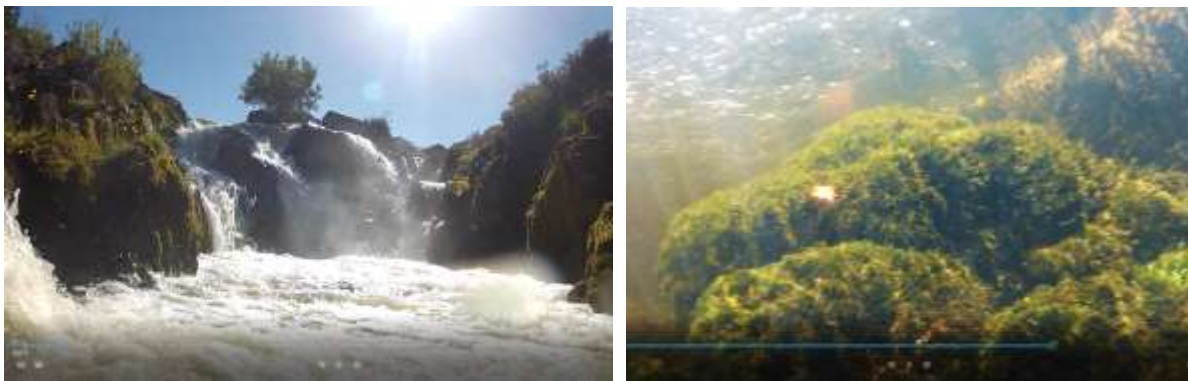
Our results concur with Scottish Government's category 3 grading for the Torridon River. Some adult salmon have been entering the river and spawning in the river in 2022 and 2023, enough to support a juvenile salmon population in core areas, but not enough to repopulate the whole system. Egg deposition and distribution has not been adequate especially in the lower part of the river system for overall juvenile salmon densities to be anywhere near carrying capacity for the habitat accessible to wild salmon

For the River Balgy, the situation is more complex and even more fragile so far as maintaining a juvenile salmon of likely native origin. In contrast to surveys in 2022 and 2023, the 2024 survey, included sites above Loch Damh as well as a site in the River Balgy below Loch Damh.

Juvenile salmon grow unusually fast in the River Balgy below Loch Damh in contrast to those in the Abhainn Dearg, a more typical oligotrophic river, above Loch Damh. The rapid growth of juvenile salmon in the River Balgy may be partly due to genetic origins of these fish and partly due to the apparently nutrient enriched and very productive riverine habitat.

Loch Damh has two active open cage salmon smolt farms located there in; these have added nutrients to the loch water over many years. The River Balgy has become an unusually productive river; it was snorkelled and filmed with GoPro camera in 2023: the river bed was like a shaggy rug of moss and filamentous algae. Water quality data has been requested from SEPA.

Figure 5. River Balgy 5th September 2023; GoPro video stills; the picture on the right is an example of the highly mossy streambed; an indication of high nutrient status.



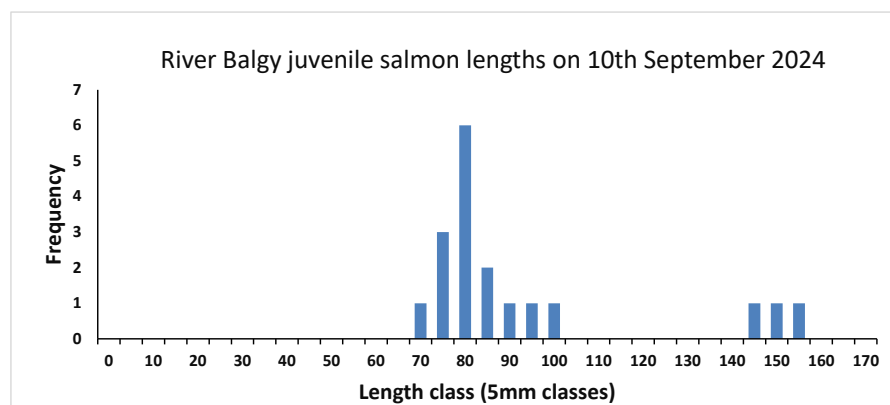
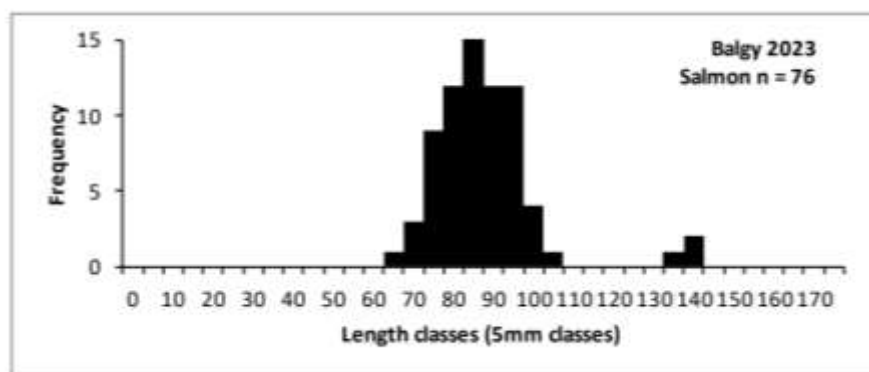
Estimated densities of salmon fry were high in the River Balgy below the road. Salmon fry were unusually large, as big as one-year old salmon parr for a more typical Wester Ross river system. The salmon parr recorded in the 2024 survey (by WRFT team) were very large (141mm to 151mm), assumed to be one year old parr that had grown fast (scale samples taken for checking).

Juvenile salmon grow unusually fast here because of the high nutrient status of the River Balgy below Loch Damh; the river bed supports a lush carpet of moss and algae, supporting high productivity of insect larvae upon which juvenile salmon feed. Our juvenile fish bucket contained large numbers of *Baetis* spp. mayfly nymphs following the electro-fishing survey.

However genetic samples from previous years for this part of the river suggest that many of the juvenile salmon below Loch Damh are descended, at least in part, from escaped farm salmon (Gilby et al. 2021). Is the rapid growth of juvenile salmon in this part of the system also partly also related to genetic origins of the fish? Some further genetic sampling would be useful to be able to understand any long-term changes in the ‘wild’ salmon population in this part of the River Balgy system.

In 2022 and 2023, the APEM team focussed electro-fishing surveys on the River Balgy (below Loch Damh), and also recorded very large salmon fry. Some were initially interpreted as ‘parr’ based on information for ‘normal’ salmon fry in Wester Ross area. The graph for 2024 shows a same distribution of juvenile salmon sizes as for 2023 (Figure 6). The rate of growth of juvenile salmon in the River Balgy appears to be such that many of them would be big enough to smoltify at the end of just one year in freshwater.

Figure 6. Length – frequency graphs of juvenile salmon in the River Balgy below Loch Damh. (top) 2023, APEM survey (4 sites); (bottom) September 2024, WRFT survey (site BALC1). Mostly large fry in both years (65mm – 100mm); just few very large parr (130mm-155mm).



Above Loch Damh, the Abhainn Dearg provides the main area of riverine habitat to support juvenile salmon. This is considered likely to be the important salmon nursery stream for a wild native salmon population within the system. On the day of survey (9th September 2024) the main river was high so results for densities of parr and fry may underestimate actual values.

The most useful and encouraging data recorded was of reasonable densities of salmon fry in the Allt Eisg, just above the confluence with the Abhainn Dearg, demonstrating salmon spawning in 2023 in this part of the system.

E-fish samples from the Loch Coultrie burn; and upper tributary have been very much trout dominated in recent years. Juvenile salmon were recorded in the Allt a' Ghubhais in 1999; 2005 and 2007 usually at low CPUE; they were always greatly outnumbered by juvenile trout.

There are many brown trout in Loch Damh, Loch Coultrie and Loch an Loin. The resident trout population is likely to have increased as a result of salmon farming within the system and elevated food availability. The lack of juvenile salmon within Loch Coultrie river and higher tributaries may be partly due to competition with juvenile trout and predation of juvenile salmon by large trout.

4. Conclusions and recommendations (for discussion)

- The WRFT seine netting team gained useful experience in sampling sea trout at Torridon.
- Useful samples of sea trout were obtained to be able to assess sea lice levels and the condition of sea trout at the Torridon sampling site.
- Given reports of higher numbers of on-farm sea lice during autumn 2024, sea trout monitoring in 2025 should start at Torridon in March 2025, ahead of the salmon and sea trout smolt runs.
- Using a seine net to sample sea trout by the mouth of the River Balgy was largely unsuccessful. Small supplementary samples of sea trout can sometimes be obtained using rod and line; this is a future option for this site.
- Sweep netting at Flowerdale (Loch Gairloch), 26km from the Sgeir Dughall salmon farm, has provided reliable samples of sea trout over many years.
- Since 2014 lice levels on sea trout sampled at Flowerdale (Loch Gairloch) have correlated with the two-year production cycle at salmon farms in Loch Torridon.
- Given continued uncertainty regarding sea lice dispersal models, it is recommended that the Flowerdale site be included within the monitoring programme for informing the Loch Torridon EMP from 2025.
- Other opportunities for sea lice data collection include rod and line sampling in the River Balgy sea pool; and early-returned e-fishing sampling at Shieldaig River; the Marine Scotland monitoring programme is a useful one; can it be continued?
- Juvenile salmon were recorded in both the Torridon River and River Balgy. However, year classes (fry, parr or both) were missing at survey sites in both river systems.
- The River Balgy 'native' salmon population may be particularly fragile. Genetic analyses of samples would provide further valuable information.

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Appendix 1. Sampling at Applecross further notes and some photos

Please note that all fish in photos were lightly sedated before being returned after recovering from anaesthetic

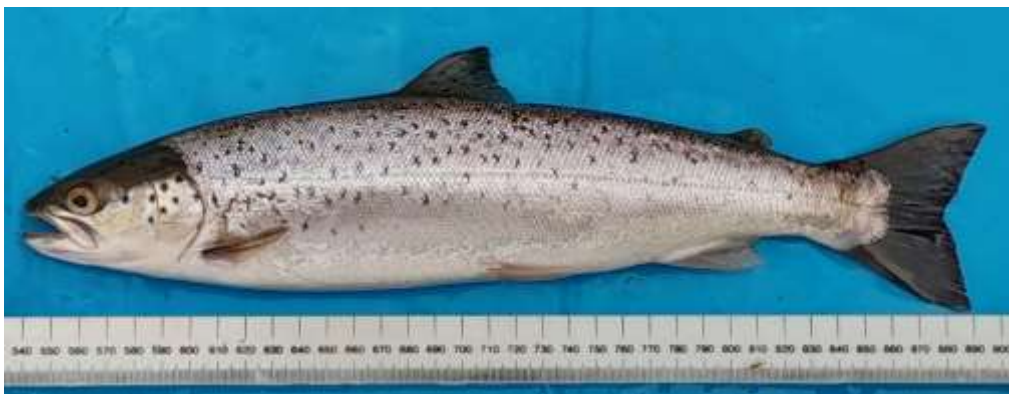
Sea trout sampling visit #3: 10Jul 24



ST340mm 10Jul 24



ST350mm Torridon 10 Jul 24



Torridon sea trout and salmon monitoring report for 2024

ST 385mm Torridon 10 Jul 24



Dorsal fin and adult lice ST 385mm Torridon 10 Jul 24



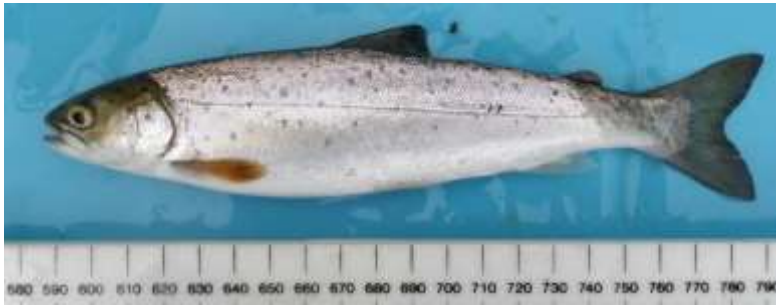
Torrifon sea trout and salmon monitoring report for 2024

Sea trout sampling visit #4 25 Jul 24

Waiting for the tide



ST210mm 25 Jul 24



ST315mm 25 Jul 24



ST315mm dorsal fin

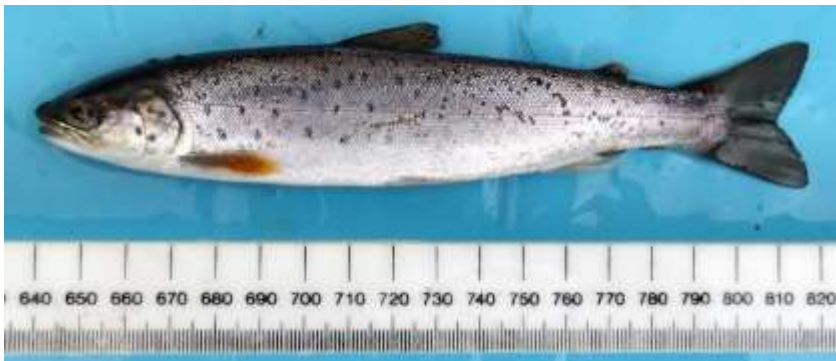


Torridon sea trout and salmon monitoring report for 2024

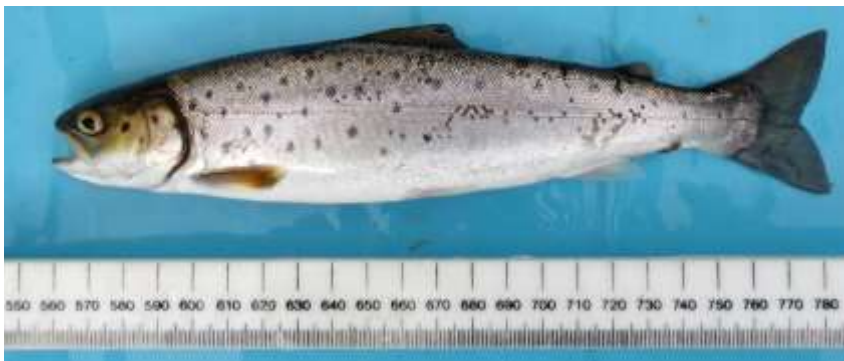
Sea trout netting team 9th August 2024



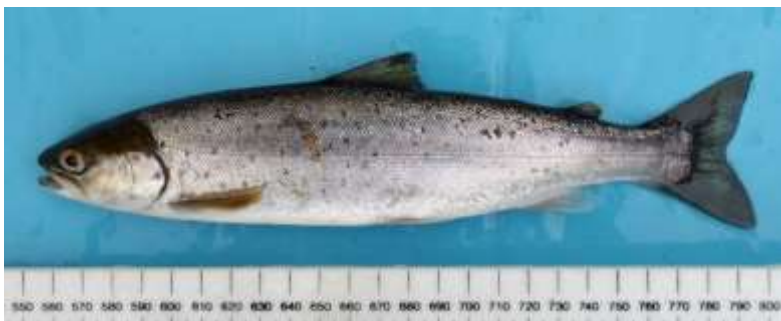
ST190mm 9 Aug 2024



ST231mm 9Aug24



ST250mm 9 Aug24



Torridon sea trout and salmon monitoring report for 2024

Visit #6 25 Sept 24 No sea trout caught



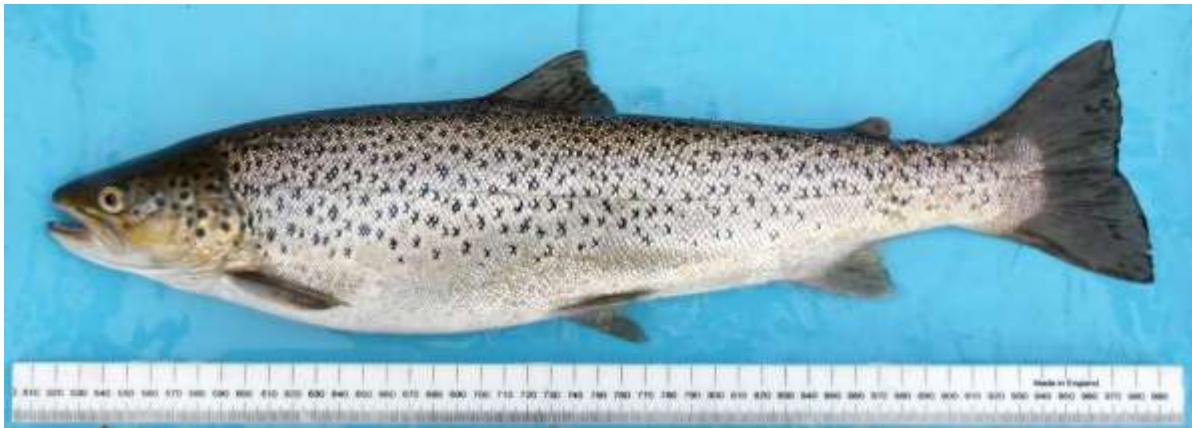
Torrifon sea trout and salmon monitoring report for 2024

Balgy sweep netting photos

22nd July 2024



ST 460 mm, 1095g



Torrifon sea trout and salmon monitoring report for 2024

Team 4th September 2024



Torrison sea trout and salmon monitoring report for 2024

Juvenile fish survey Torrison River 2nd Sep 2024 September 2024 site photos and some fish

Please note that all fish in photos were lightly sedated before being returned after recovering from anaesthetic

(left) TORC6



(Left) TORC5



(left) TORC4



Torridon sea trout and salmon monitoring report for 2024

(Left) TORC3



(left) TORC2



(left) TORC1- River Thrail



Torridon sea trout and salmon monitoring report for 2024

River Balgy e-fish survey 9th September 2024

(left) BALC1 River Balgy just above road bridge. Exceptionally large salmon fry and salmon parr



(left) BALC2 -Loch Coultrie River – below bridge. No salmon fry recorded



BALC3 Abhainn Dearg.9th September 2024. River too high to fish easily, salmon fry and parr recorded; numbers underestimate densities.



Torridon sea trout and salmon monitoring report for 2024

(left) BALC4 Allt Eisg. Right – top of site – mostly unfished . . .



Torrison sea trout and salmon monitoring report for 2024

BALC5Alt a' Ghuibhais, 9th Sep 2024. Just trout here.

