

Wester Ross Fisheries Trust

Biologist's Review, 2024-2025



Poolewe Village Hall, 24th April 2025

(revised to share, 30th April 2025)

Peter Cunningham, info@wrft.org.uk

- Sea trout sea lice monitoring
- Juvenile salmon surveys
- Tournaig trap project
- Bruachaig river headwaters survey
- Salmon stream nutrient restoration project
- Spawning herring search
- Scottish seagrass meadows project
- Thank you





Good ecological status?

Workshop on salmon and sea trout and their habitats

Loch Torridon Community Centre
23rd April 2024

<https://www.sea Lice.com/WRFT122>
www.wrft.org.uk



Report from 2024 WRFT spring meeting at Torridon can be found here:

<https://wrft.org.uk/news/newsitem.cfm?id=253>

Still too many sea lice in coastal waters? . . .

Peter Cunningham (WRFT Biologist)

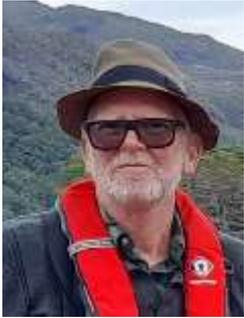
- What is a sea louse?
- What is a sea trout?
- Why are sea lice a problem for wild sea trout and salmon?
- Sea louse monitoring results for 2023
- Sea lice regulation to protect wild fish?
- Future prospects . . .



Adult female sea lice on a Gairloch sea trout (Gloch)



Wester Ross Fisheries Trust 2024 – 2025



Chairman
Dr Michael Aitchison



Administrator
Dr Sue Ward



Field assistant
Nic Butler



Field assistant
Chloe Hall



Field assistant
Ant Hall



Field assistant
Dr Ginevra House



Tournait trap
Ben Rushbrooke



Research scientist
Dr Steve Kett
(Trustee)



Field assistant
(Trustee)
Alasdair MacDonald



Biologist
Peter Cunningham

& lots of other helpers . . .

WRFT Biologist's Review, 2024-2025



Peter Jarosz retires as WRFT Administrator and WRASFB Clerk

On 11th June, several trustees and colleagues enjoyed a meal at the Myrtle Bank Hotel to mark Peter Jarosz's retirement after 18 years in support of wild fish populations and fisheries in Wester Ross. All at the Trust and the Board thank Peter for dedication far beyond official paid hours.

Much of Peter's work was behind the scenes. Following the covid pandemic, Peter was instrumental in setting up the 'new' Wester Ross Fisheries Trust, gaining support from diverse stakeholders and for coordinating fisheries management activity for both the Trust and the Board, including overseeing many projects. The defence of wild fish populations and fisheries from many pressures, including those associated with salmon farming (which can take a lot of time) can be a rather thankless grind. That Wester Ross retains some relatively healthy wild salmon populations is partly thanks to Peter's work.

We wish Peter a good recovery after a recent car accident and look forward to meeting up for a cup of tea from time to time, to find out about how the honey bees are doing . . .

(right) Peter Jarosz, Peter Cunningham (WRFT Biologist), and some bee-friendly plants outside the Myrtle Bank Hotel on 11th June 2024 (photo by Sue Ward)



(from WRFT Newsletter
September 2024

<https://www.wrft.org.uk/files/WRFT%20Newsletter%20September%2024v1.pdf>

Wild salmon have been important to people in Wester Ross for thousands of years.

(Pictish stone found by Gairloch, now in Gairloch Museum)

Gairloch

MUSEUM
Taigh-tasgaidh Gheàrrloch





Salmon are still a keystone species within freshwater ecosystems of Wester Ross

WRFT Loch Maree Wildlife Poster 2003
by Robin Ade.

Copies available from WRFT





Salmon are still a keystone species within freshwater ecosystems of Wester Ross

Sue Ward and Ginevra House with frozen remains of adult male salmon taken by otter, November 2024





Salmon are still important to the local economy . . .

. . . nearly all wild salmon are now returned . . .



A GUIDE TO BEST PRACTICE MARCH 2023

Catch & Release

Our choices make all the difference for fish survival



By taking a 'hands-off' approach, we give our precious wild Atlantic salmon the best chance of survival."

Paul Young



UK anglers are leaders in conservation.

In Scotland, anglers have set an example with an impressive release rate exceeding 95% for wild Atlantic salmon. Our salmon and sea trout angling practices stand out as some of the most responsible globally.

This success is not just a win for conservation—it helps rivers to have sustainable populations of wild fish to sustain angling and in turn supports the rural communities that rely on fishing tourism, contributing over £79 million to Scotland's economy each year.

Wild fish face unprecedented threats from climate change, pollution, and habitat destruction, with populations declining steadily over the past three decades. There's new evidence about the impacts of air exposure and river temperature on fish health and survival.

By adopting small changes to catch and release practices, we can achieve almost 100% survival rate of our caught fish and continue to play our part to protect populations for generations to come.

If we all follow catch and release guidance, a 100% survival rate of caught fish can be achieved.



Keep It Cool

Salmon struggle in warmer water. So, on cooler days or early mornings to reduce stress.



Keep Hands Off

Whenever possible, avoid handling fish directly to prevent infection. With the right tools, in most cases it's easy to unhook without touching the fish.



Keep It Under

Fish have a better chance of survival when they stay submerged throughout the release.



Keep It Clean

Always check, clean, and dry your gear to prevent spreading disease, parasites, and invasive species.

Scan to watch the "Contactless" film



Before you fish Plan Your Pool





Assess the conditions

Salmon are more vulnerable when water temperatures rise. When water reaches 18°C or higher, salmon become stressed. Avoid fishing above 20°C. Consider carrying a water thermometer.

Select a Spot

Think ahead about where you might hook a fish, play it and how you will release it. If you select an accessible spot, for example stable banks or areas with low embankments, you may find it easier to land and release fish gently.



Remember to check these places



After you fish Keep It Clean

While you're on the river, you can play a crucial role in safeguarding fish from the threats of **diseases, parasites, and invasive species**. Once these threats take hold, they become very difficult to eliminate.

How can I avoid accidental spreading?

CHECK

CLEAN

DRY

Check your equipment, boat, and clothing after leaving the water for mud, aquatic animals or plant material. Remove anything you find and leave it at the site.

Clean everything thoroughly as soon as you can, paying attention to areas that are damp or hard to access. Use hot water if possible.

Dry everything for as long as you can before using elsewhere as some invasive plants and animals can survive for over two weeks in damp conditions.

What should I do if I spot something?

Report any signs of disease, parasites, or invasive species using our app.



Scan the QR Code to learn more.



Salmon are still important to the local economy . . .

. . . nearly all wild salmon are now returned . . .

2007



Tackle Tips for Quick, Safe Release

Check that you have these in your tackle bag before setting out.

Where possible, use Barbless, Single Hooks

Why? Double and treble hooks can cause more injuries to fish. Opt instead for one barbless, single hook which is easier to remove for a quick release, minimising injury.

Best Choice: Use size 8 or smaller.
Pro Tip: If you don't have barbless hooks, flatten barbs with forceps.



Soft, Knotless Nets

Why? Preserves the fish's protective slime layer, scales, fins, and eyes from damage.

Best Choice: A rubber or mesh net with a shallow, wide bottom lets fish lie flat and stay protected.

Pro Tip: It's easy to re-purpose an older style net with a modern, fish friendly mesh.

Strong Leaders or Lines

Why? Shortens the fight, reducing fish stress.

Best Choice: As strong a leader or line as possible to land fish quickly and safely.

Pro Tip: Modern fluorocarbon line means you have greater strength to diameter. Consider using this material to achieve stronger breaking strain without sacrificing presentation.



Long-Nosed Forceps and Line Cutter

Why? Having these tools ready at hand ensures quick, safe unhooking.

Best Choice: A pocket clamp is an all-in-one solution for anglers, combining the functions of long-nosed forceps and line cutting scissors.

Pro Tip: If using a mobile phone neck lanyard to quickly snap a picture while the fish is still in the net.

Avoid Felt Soles

Why? Felt soles are difficult to clean and dry, making them a high-risk factor for spreading invasive species and pathogens between rivers.

Best Choice: Rubber or interchangeable soles are easier to dry and disinfect.

Pro Tip: Fish multiple locations? Ensure your wading boots are cleaned and smoothed to achieve good biosecurity between different rivers.



Water Thermometer

Why? Monitoring water temperature helps you decide when it's safe to fish, as higher temperatures can stress fish and reduce survival after release.

Best Choice: A pocket-sized digital thermometer is easy to carry and gives quick, accurate readings.

Pro Tip: Check the water temperature regularly—if it's above 18°C (64°F), consider stopping fishing to protect fish welfare.

Catch and release guidance 2025

Keep the fish in the water

DO NOT lift the fish, especially by the tail
NEVER drag the fish over stones, gravel, or onto the bank.



Recording Your Catch

Photography Tips

Taking photos can be a memorable part of the experience, but fish are best left in the water. If alone, take a photo of the submerged fish whilst holding the line, or in the net. With a companion, have them ready to snap a photo before you unhook.

Avoid Weighing

Measuring length is a safer way to record your catch and this can be used to provide a weight estimate. Use a tape measure or your rod's handle and refer to the weight estimation chart provided. This minimises handling and supports fish recovery. Several length-to-weight conversion guides exist, and length-to-weight can vary, depending on the condition and shape of the fish. Below is a sample guide.

Length (inches)	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Weight (lbs)	6	6.5	7.5	8.5	9.5	10.5	11.5	13	14	15.5	17	18.5	20	22	25.5	25.5
Length (inches)	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Weight (lbs)	27.5	29.5	32	34	36.5	39	42	44.5	47.5	50.5	53.5	57	60	64	68	72

Wild trout have also been important to people in Wester Ross for thousands of years.

all these trout, shown to scale, were caught and photographed during WRFT fieldwork, and illustrated by Paul Vecsei.

Wester Ross Wild Trout

illustrated by Paul Vecsei



<https://www.flickr.com/photos/fishasart/>



Wild trout diversity
Loch Maree,
31st August 2024

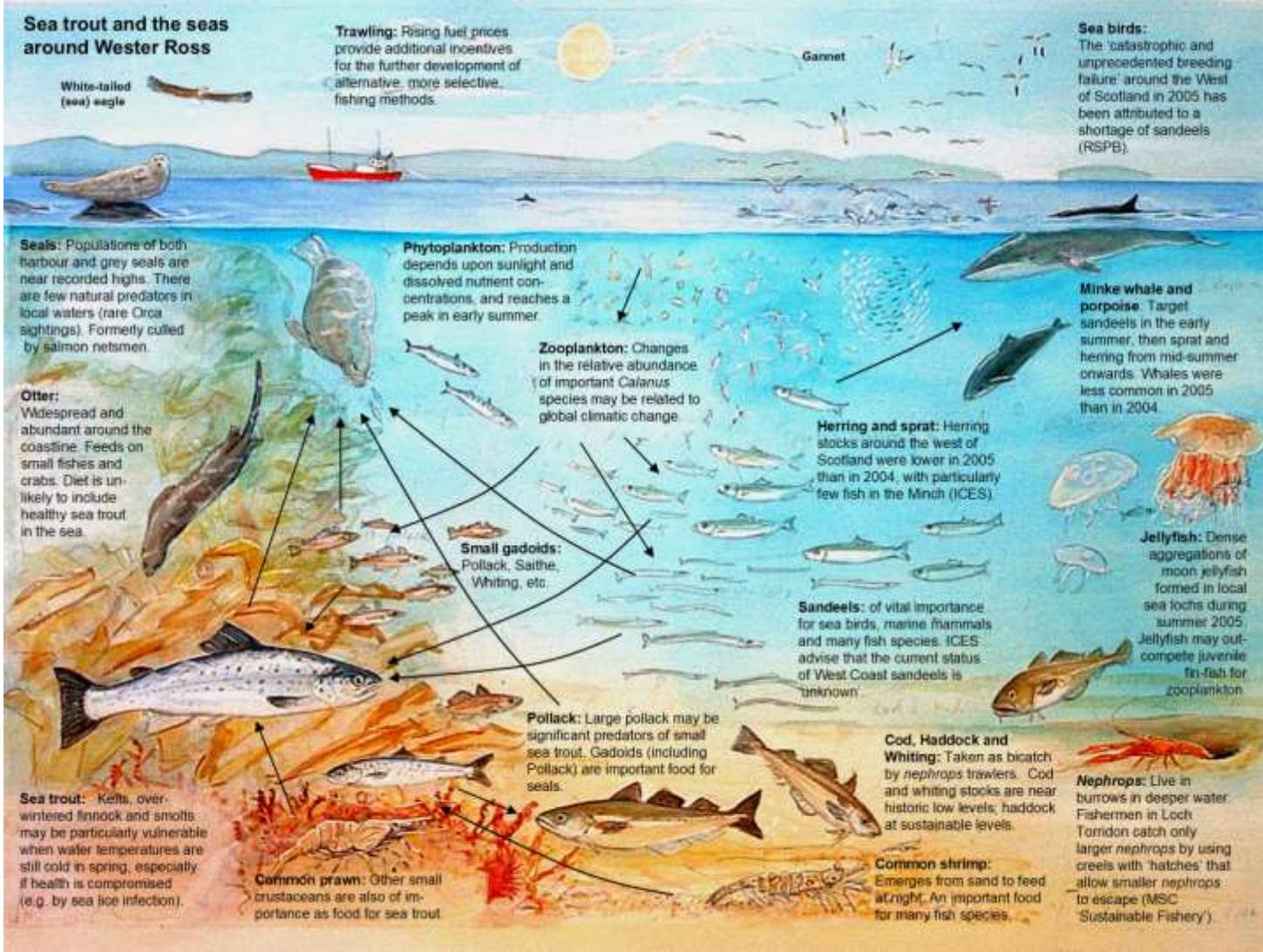


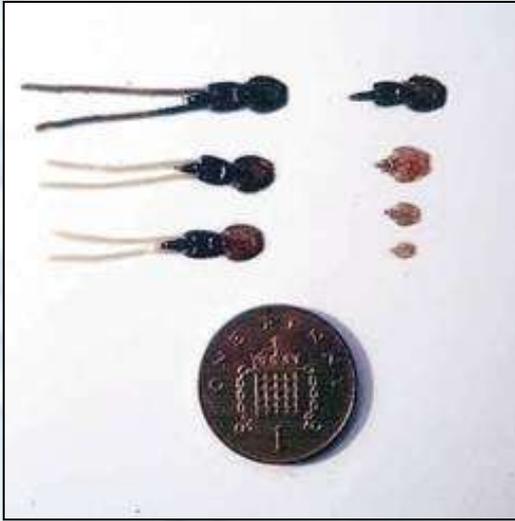
Wild trout have also been important to people in Wester Ross for thousands of years.

Sea trout are part of the coastal ecosystem.

Populations vary according to

- food availability
- predation
- parasites
- weather and climate





*Lepeophtheirus
salmonis*

(James Butler)

- Sea lice are naturally occurring parasites of fish.

- Larval *Lepeophtheirus salmonis* attach to salmon and sea trout and grow by eating the mucus, blood and skin of their host fish.

This slide is 20+ years old.

Alas, the sea lice problem has not gone away . . .

Sea trout and sea lice monitoring

Mixed results in 2024

Kanaird estuary
(near Ullapool)
high numbers of sea
lice recorded on sea
trout in May 2024



Thankyou to Kaenchullish
estate and local helpers for
support



Sea trout and sea lice monitoring

Kanaird estuary (near Ullapool) high numbers of lice on sea trout in May 2024

See online 'sea trout monitoring reports'

length (mm)	weight (g)	body condition factor (length vs. weight ...)	total	Copepodid & Chalmus (estimate)	Pre-adult & adult	Ov. female	Total L. salmonis sea lice	*estimated lice/g fish weight	Dorsal fin damage	<i>Cryptocotyle ligu</i> a spots per cm ² of caudal fin	Predator damage
156	35	0.92	0	95	0	0	95	2.714	0	0	N
167	41	0.88	0	86	0	0	86	2.098	0	0	N
285	239	1.03	0	5	1	0	6	0.025	0	0	N
171	51	1.02	0	120	0	0	120	2.353	0	1	N
185	59	0.93	0	64	0	0	64	1.085	0	0	N
135	20	0.81	0	0	0	0	0	0.000	0	0	N
150	33	0.98	0	8	0	0	8	0.242	0	2	N
164	42	0.95	0	50	0	0	50	1.190	0	1	N
135	24	0.98	0	0	0	0	0	0.000	0	0	N
157	42	1.09	0	45	0	0	45	1.071	0	0	N
273	214	1.05	0	156	0	0	156	0.729	0	0	N
137	23	0.89	0	3	1	0	4	0.174	0	0	N
162	41	0.96	0	44	0	0	44	1.073	0	0	N
s 175.15	66.46	0.96	0.00	52.00	0.15	0.00	52.15	0.98	0.00	0.33	

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<https://wrft.org.uk/downloads/files.cfm?id=50>

Sea trout and sea lice monitoring

Kanaird estuary (near Ullapool) high numbers of lice on sea trout in May 2024

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							



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'



Sea trout and sea lice monitoring

Gruinard Bay (new site)

May – October 2024



New site in 2024
Few lice on sea trout





Sea trout and sea lice monitoring 2024

Flowerdale (Gairloch)
April, June, **October 2024**



Finnock with high numbers of sea lice in October 2024 sweep



Sea trout and sea lice monitoring

Torridon, May – September 2024



New monitoring site;
useful samples obtained



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ESTABLISHED 1964
The Highland Council
Comhairle na Gàidhealtachd

 Scottish Government
Riaghaltas na h-Alba
gov.scot
marine scotland
science

 Fisheries
Management
Scotland

 the National Trust
for Scotland
a place for everyone

 **NatureScot**
NàdarAlba



Sea trout and parasitic sea lice monitoring

(all photos of fish are of lightly sedated fish)

Applecross 2024
May – September



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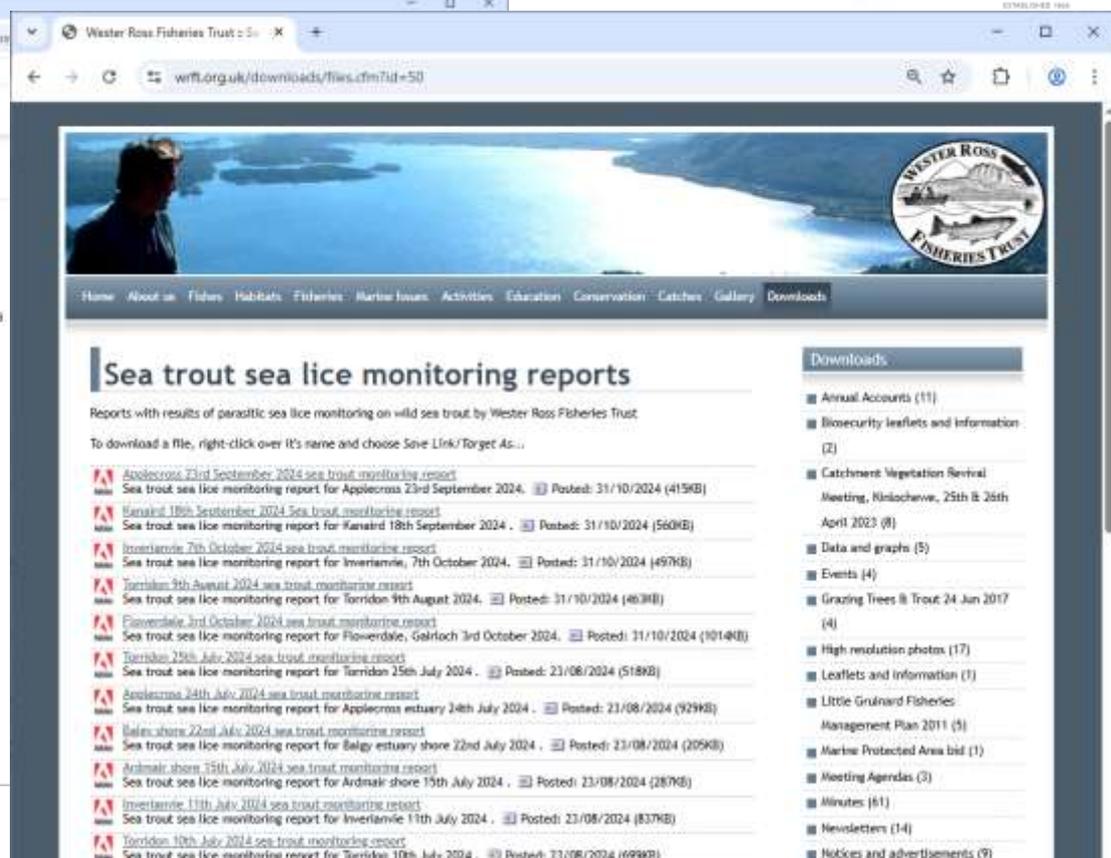
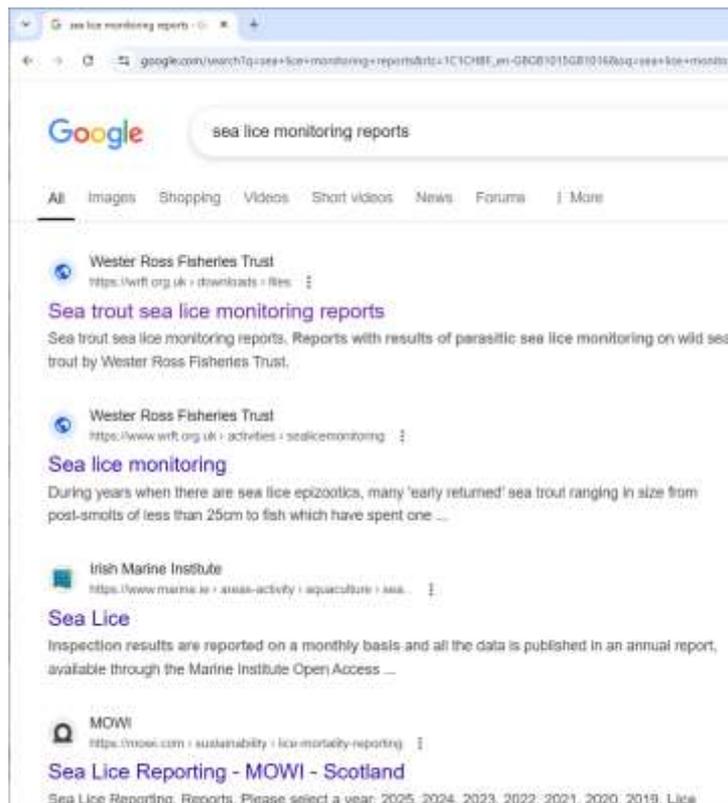


marine scotland
science

Thankyou to Applecross Trust
and local helpers for support



Sea trout and sea lice monitoring reports for 2024 are on WRFT website . . . <https://wrft.org.uk/downloads/files.cfm?id=50>





EMP wild fish monitoring reports (find them at <https://www.wrft.org.uk/downloads/files.cfm?id=11>)



**Applecross Sea trout and salmon monitoring report
2024**

to inform Loch Ainort, Caol Mor & Inner Sound EMP

for MOWI Scotland Ltd., Wester Ross Area District Salmon Fisheries Board, The Scottish Government (in place of the Skye District Salmon Fisheries Board) and The Highland Council



Peter Cunningham, December 2024 info@wrft.org.uk

Wester Ross Fisheries Trust (WRFT)
Harbour Centre, Gairloch, Ross-shire, IV21 2 BQ

www.wrft.org.uk

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**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



Peter Cunningham, December 2024 info@wrft.org.uk

Wester Ross Fisheries Trust (WRFT)
Harbour Centre, Gairloch, Ross-shire, IV21 2 BQ

www.wrft.org.uk

WRFT is a Registered Charity No. SC050755 and a Company Limited by Guarantee SC887827



Ardmair salmon farm EMP

Sea trout and salmon monitoring report for 2024

for MOWI Scotland Ltd., Wester Ross Area District Salmon Fisheries Board and The Highland Council



(Photo by Chase Hall)

Peter Cunningham, January 2025 info@wrft.org.uk

Wester Ross Fisheries Trust (WRFT)
Harbour Centre, Gairloch, Ross-shire, IV21 2 BQ



Sea trout and sea lice monitoring 2025

Flowerdale 11 April 2025 (now to inform Torridon EMP)



DRAFT Sea lice monitoring report for Flowerdale Burn estuary, Loch Gairloch sampling, 11Apr2025

Peter Cunningham, Biologist, WRFT. 14 Apr 2025 info@wrft.org.uk

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

Sea trout 345mm, 355g Flowerdale 11 Apr 25. Sea lice estimates: 260 copepodid and chalimus, 35 adult and preadult, 1 ovigerous female





Sea trout and sea lice monitoring

Flowerdale 11 April 2025 – a recaptured sea trout

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DRAFT Sea lice monitoring report for Flowerdale Burn estuary, Loch Gairloch sampling, 11Apr2025

Peter Cunningham, Biologist, WRFT. 14 Apr 2025 info@wrft.org.uk

Recaptured Sea trout 473mm, 935g, Flowerdale 11 April 2025 with 0 chalimus and copepodid, 13 preadult and adult lice, 2 ovigerous females

BAKKAFROST
ESTABLISHED 1966



Recaptured Sea trout 450mm, 968g, Flowerdale 3 October 2024 (same fish as above)





Sea trout and sea lice monitoring

Flowerdale 11 April 2025



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ESTABLISHED 1962


NatureScot
NàdarAlba

Thank you to
all the helpers!

WRFT Juvenile fish surveys 2023

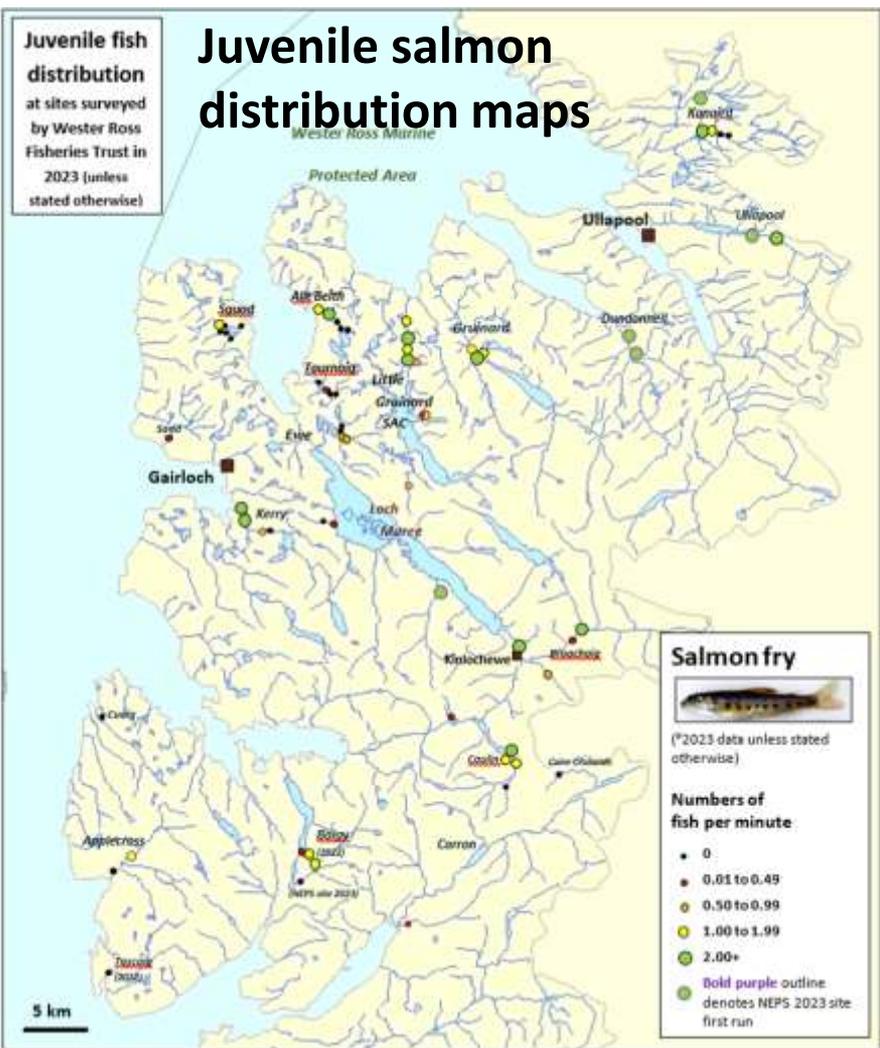


No Scottish Government funding for juvenile fish surveys in 2024 or 2025

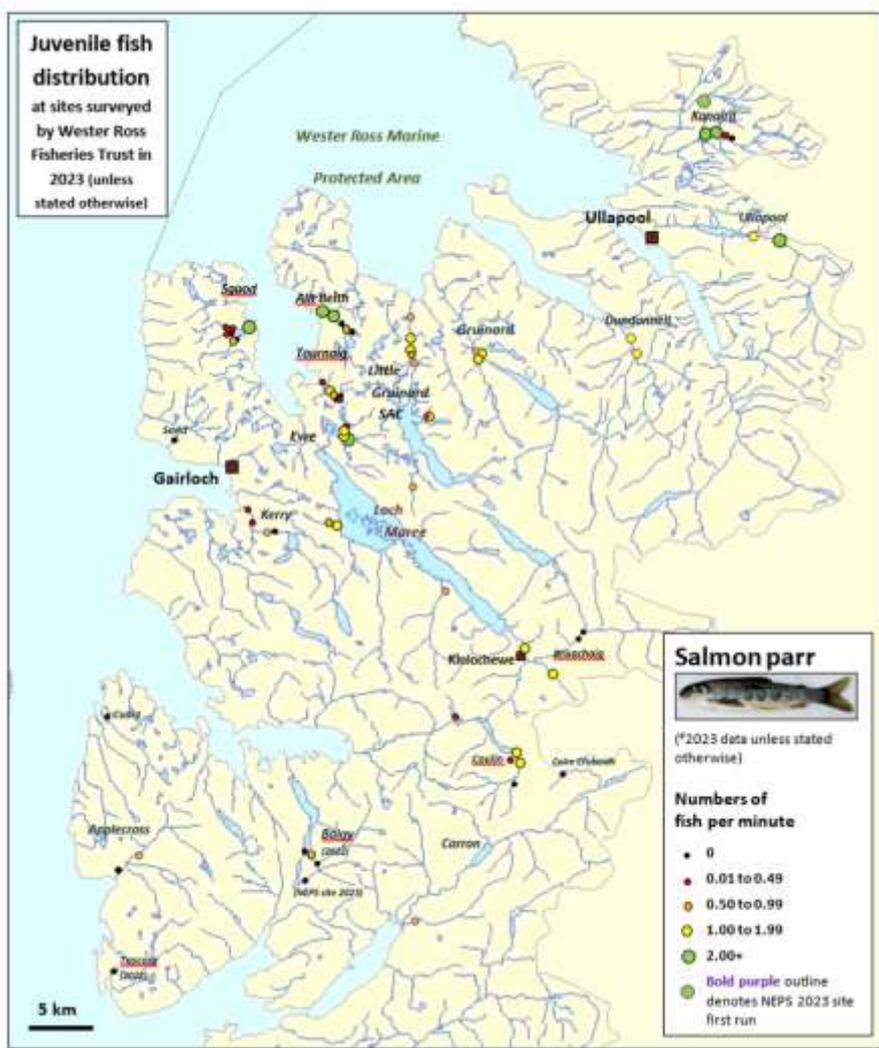


Juvenile fish distribution at sites surveyed by Wester Ross Fisheries Trust in 2023 (unless stated otherwise)

Juvenile salmon distribution maps



Juvenile fish distribution at sites surveyed by Wester Ross Fisheries Trust in 2023 (unless stated otherwise)





Juvenile fish surveys 2024

Gruinard River headwaters (for Ardmair EMP . . .)

Salmon fry and salmon parr found in November at top of system below top impassable waterfall . . . (above an occasionally passable fall)

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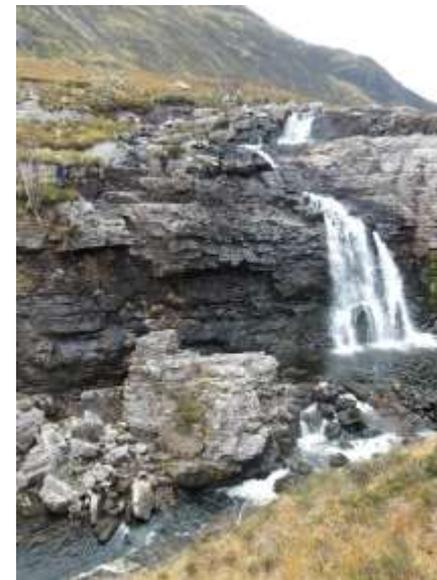
Supported by
Gruinard Estate



Small skinny parr where fish densities were high



Bigger chunky parr where fish densities were low (two fry in picture too)



Top impassable falls

Tournaig trap project 1999 – 2025



Ben Rushbrooke removing a grilse from the upstream trap (. . . a few years ago . . .)



Tournaig is just
along the road
from Poolewe . . .

Thank you to:

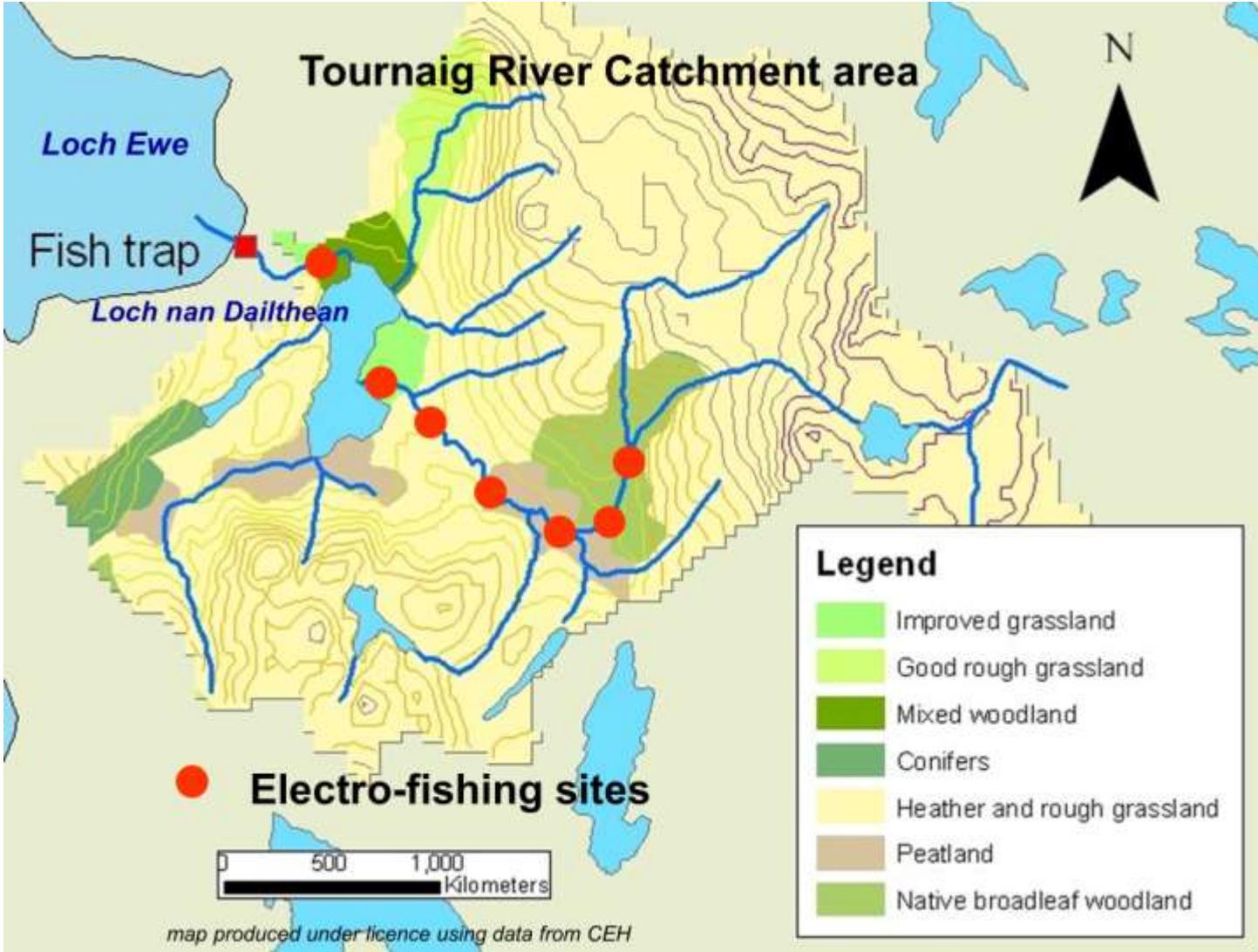
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Tournaig estate,



the National Trust
for Scotland

a place for everyone





Tournaig adult salmon catches have been dominated by grilse of typically 55cm to 60cm in length which entered in August and September . . .

(report available at info@wrft.org.uk on request)





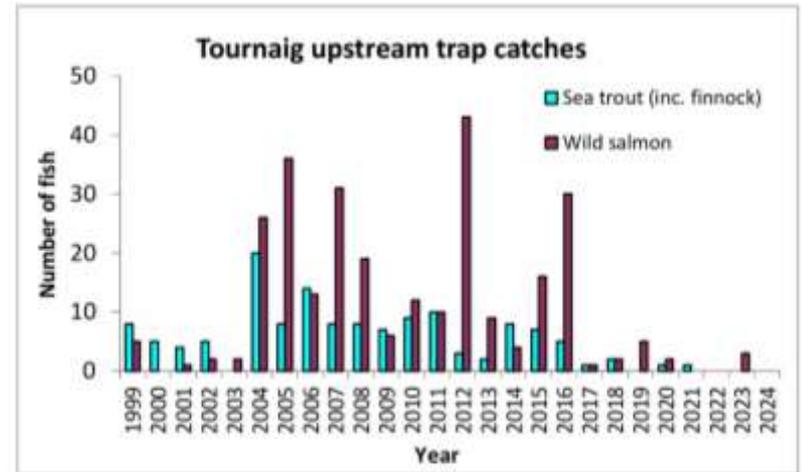
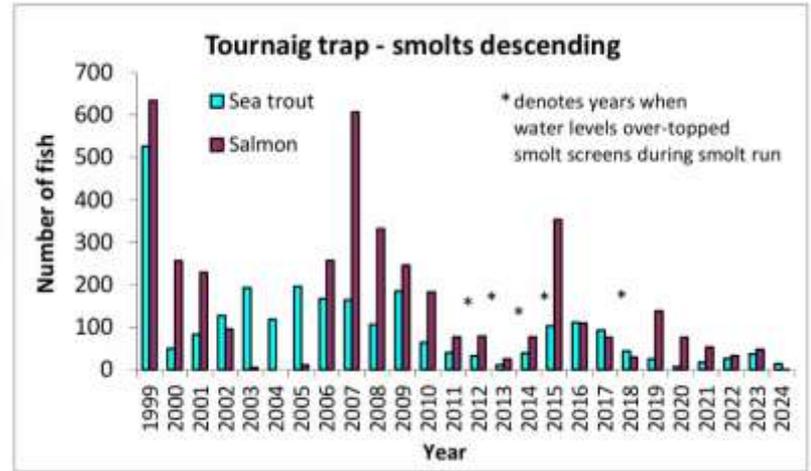
Ben Rushbrooke has photographed nearly all adult salmon and sea trout that have entered the upstream trap over the past 23 years . . .



Tournaig trap project (1999 to 2025)



- to monitor wild salmon in a small 'marginal' stream system by Loch Ewe



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 the National Trust
for Scotland
a place for everyone

- No adult salmon or sea trout recorded in upstream trap in 2024

Tournaig trap project

Juvenile fish survey 31 July 2024

(photos mostly by Ben Rushbrooke)



Top site (TNG12)



Bottom of woods (TNG13)



Top flats (TNG10)



Below 2nd falls (TNG8), salmon fry and trout fry from this site

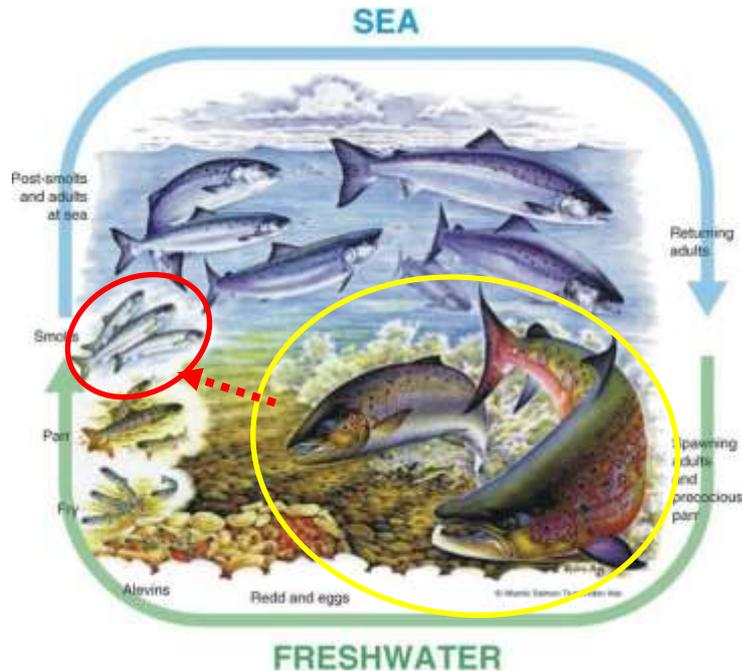


Sites TNG6, TNG5 and TNG4 on 31st July 2024



Tournaig trap project (1999 to 2025)

Is there a relationship between the number of adult salmon that enter the system and the number of smolts which go to sea three years later?

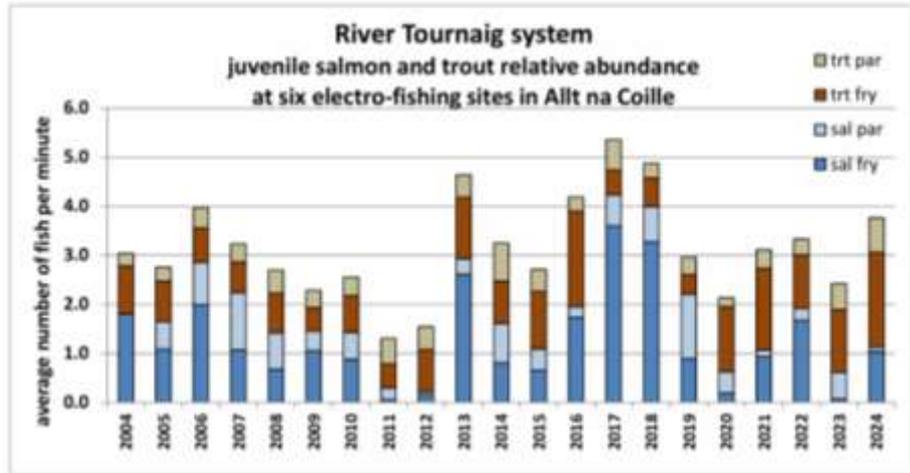
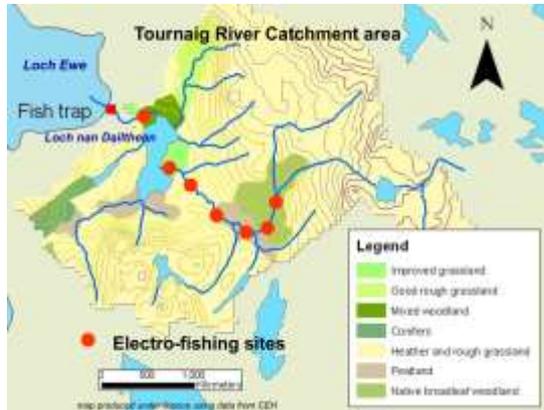
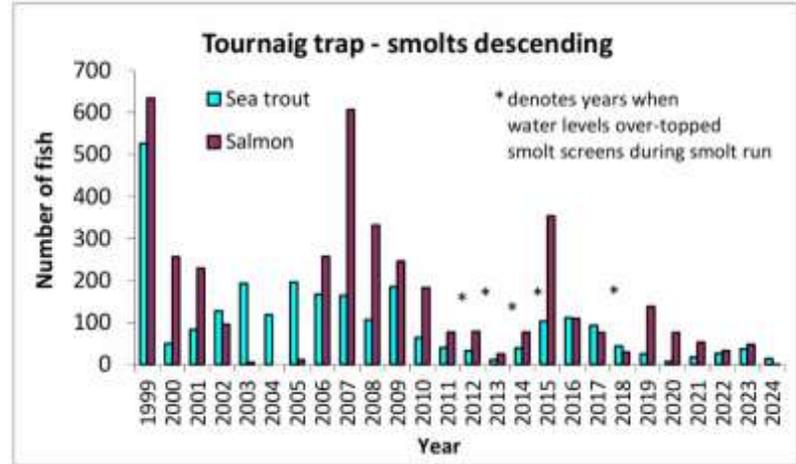
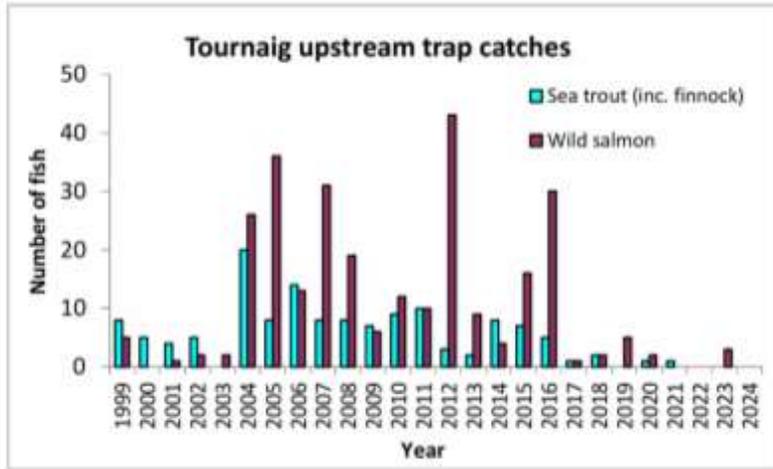


Year	Adult salmon recorded in upstream trap	Number of sites where salmon fry recorded	Salmon fry average number per minute	Number of sites where salmon parr recorded	Salmon parr average number per minute	Salmon smolts recorded in downstream trap
2003	2	0	0.00	0	0.00	0
2004	26	4	1.81	0	0.00	0
2005	36	6	1.09	6	0.55	11
2006	13	5	1.99	6	0.87	257
2007	31	6	1.07	6	1.17	607
2008	19	4	0.67	6	0.74	332
2009	6	5	1.05	5	0.41	246
2010	12	5	0.88	6	0.55	183
2011	10	2	0.06	5	0.24	77*
2012	43	2	0.14	4	0.08	78*
2013	9	5	2.61	3	0.32	25*
2014	4	2	0.81	6	0.81	77
2015	16	2	0.66	5	0.44	354
2016	30	5	1.73	2	0.22	110
2017	1 [#]	6	3.55	6	0.63	76
2018	2	6	3.00	6	0.81	44
2019	5	4	1.07	6	1.40	138
2020	2	2	0.20	6	0.44	76
2021	0	4	0.94	4	0.13	53*
2022	0	5	1.67	5	0.25	33
2023	3	1	0.07	5	0.55	48
2024	0	3	1.04	1	0.09	1

*some smolts missed when water level higher than screen

[#]hole in upstream trap found in 2018 & high water assume other salmon missed

Tournaig trap some graphs updated:



Pink salmon DNA was recorded in River Ewe system in 2023

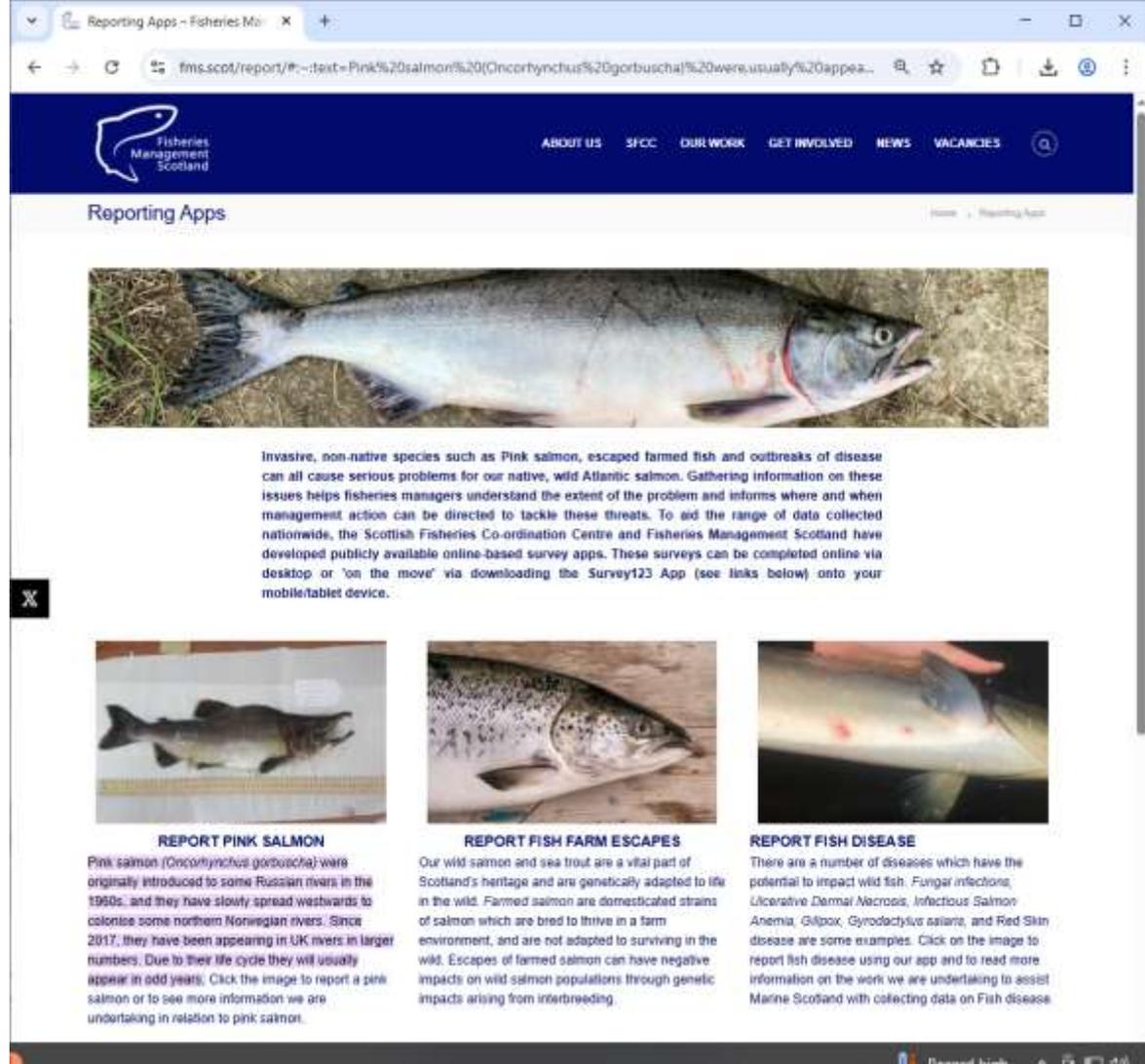
Please look out for and report **pink salmon, escaped farm salmon and diseased wild salmon** via FMS reporting apps.

Thankyou to colleagues at:

Fisheries Management Scotland

'conserving Scotland wild salmon and freshwater fish'

<https://fms.scot/>



The screenshot shows the Fisheries Management Scotland website. The header includes the logo and navigation links: ABOUT US, SFCC, OUR WORK, GET INVOLVED, NEWS, VACANCIES. The main heading is "Reporting Apps". Below this is a large image of a pink salmon. A text block explains that invasive, non-native species like pink salmon and escaped farmed fish can cause serious problems for native wild Atlantic salmon. It mentions that the Scottish Fisheries Co-ordination Centre and Fisheries Management Scotland have developed online-based survey apps (Survey123 App) for reporting. Below the text are three columns, each with an image and a heading: "REPORT PINK SALMON" (with an image of a pink salmon), "REPORT FISH FARM ESCAPES" (with an image of a farmed salmon), and "REPORT FISH DISEASE" (with an image of a diseased fish). Each column contains a short paragraph of text explaining the issue and providing information on how to report it.

Reporting Apps



Invasive, non-native species such as Pink salmon, escaped farmed fish and outbreaks of disease can all cause serious problems for our native, wild Atlantic salmon. Gathering information on these issues helps fisheries managers understand the extent of the problem and informs where and when management action can be directed to tackle these threats. To aid the range of data collected nationwide, the Scottish Fisheries Co-ordination Centre and Fisheries Management Scotland have developed publicly available online-based survey apps. These surveys can be completed online via desktop or 'on the move' via downloading the Survey123 App (see links below) onto your mobile/tablet device.



REPORT PINK SALMON

Pink salmon (*Oncorhynchus gorbuscha*) were originally introduced to some Russian rivers in the 1950s, and they have slowly spread westwards to colonise some northern Norwegian rivers. Since 2017, they have been appearing in UK rivers in larger numbers. Due to their life cycle they will usually appear in odd years. Click the image to report a pink salmon or to see more information we are undertaking in relation to pink salmon.



REPORT FISH FARM ESCAPES

Our wild salmon and sea trout are a vital part of Scotland's heritage and are genetically adapted to life in the wild. Farmed salmon are domesticated strains of salmon which are bred to thrive in a farm environment, and are not adapted to surviving in the wild. Escapes of farmed salmon can have negative impacts on wild salmon populations through genetic impacts arising from interbreeding.



REPORT FISH DISEASE

There are a number of diseases which have the potential to impact wild fish. Fungal infections, Ulcerative Dermal Necrosis, Infectious Salmon Anemia, Gillpox, Gyrodactylid infestations, and Red Skin disease are some examples. Click on the image to report fish disease using our app and to read more information on the work we are undertaking to assist Marine Scotland with collecting data on Fish disease



Juvenile fish surveys 2024 Bruachaig river (Ewe catchment)

Hydropower monitoring contract



Thank you to
Kinlochewe estate



Salmon fry and salmon parr found upstream from Bruachaig falls.

Therefore, upstream fish pass working OK . . .

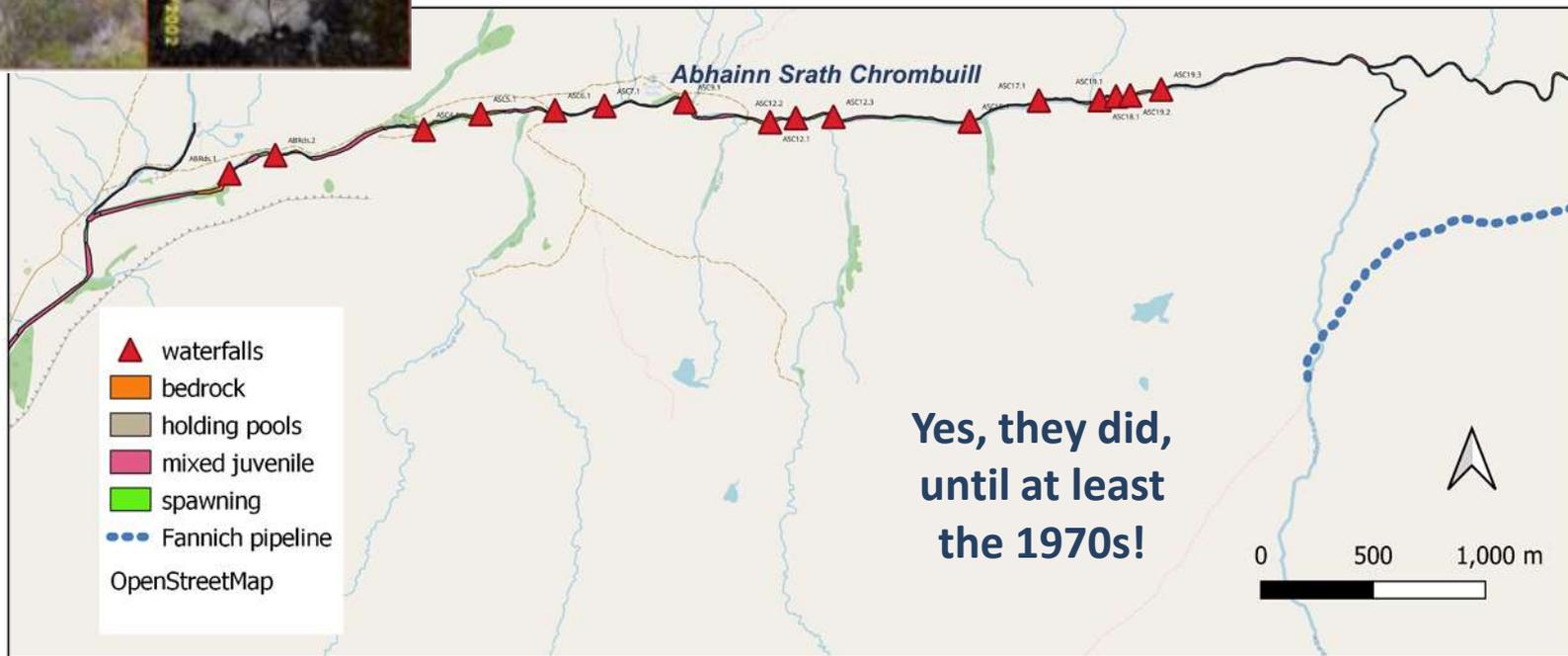


(Very midgy!)



Bruachaig River habitat survey, summer 2024

many **waterfalls** . . . did wild salmon ever get upstream to headwaters?





Bruachaig River habitat survey, summer 2024



to learn about the extent and quality of habitat in Srath Chrombuill to support a wild salmon population

DRAFT Towards the restoration of a wild salmon population in the Bruachaig River (River Ewe system) headwaters:

Habitat survey of the upper Abhainn Srath Chrombuill



DRAFT Report prepared for Ben Taylor, Scottish Woodlands

Neil Cunningham, Biologist, Wester Ross Fisheries Trust

DRAFT 20 August 2024

ben@wrt.nhs.uk





Bruachaig River habitat survey, summer 2024



Water is abstracted and diverted from headwater stream into Loch Fannich via a 1950s concrete pipeline and many associated intakes.



(below) Flow of abstracted water from Bruachaig river [River Ewe] catchment at end of pipe, August 2024





Bruachaig River habitat survey, summer 2024



Potential adult salmon holding pools, suitable salmon spawning habitat and nursery areas for salmon fry and salmon parr were recorded.

There is potential to for production of 2500+ wild salmon smolts/year.

Examples of larger weedy "holding pools" in Srath Chrombull: (top left) Trout Corner, NH 15354 64493; (top right) Ratty Pool NH 14520 64387; and (bottom left and right) Otter Pool at NH 13644 64266 approx. and at stepping stones, NH 13443 64322 (all photos taken on 16th May 2018)



Streambed of pools with Flote grass (*Glyceria fluitans*), *Myriophyllum* sp., ?Bulbous rush (*Juncus bulbosus* var. *fluitans*), and ?*Potamogeton* sp. . GoPro video screenshots from 14th August 2024.

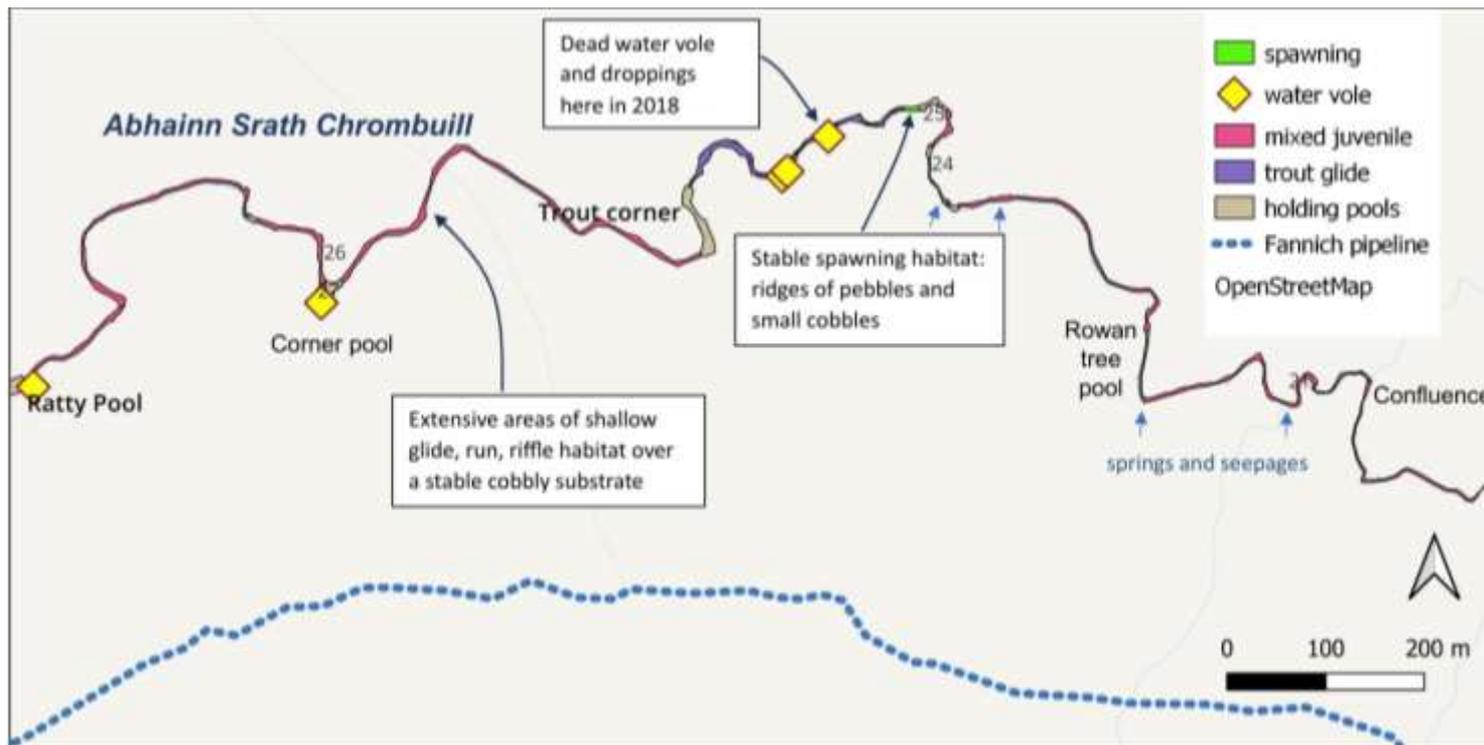


Figure 6 shows the locations of larger pools in upper Srath Chrombull.





Bruachaig River habitat survey, summer 2024





Bruachaig River habitat survey, summer 2024



Former salmon spawning areas?

*Banks of gravel in the stream bed which looked like former spawning redds, location 5 (on Figure 4)
NH 15570 64624*



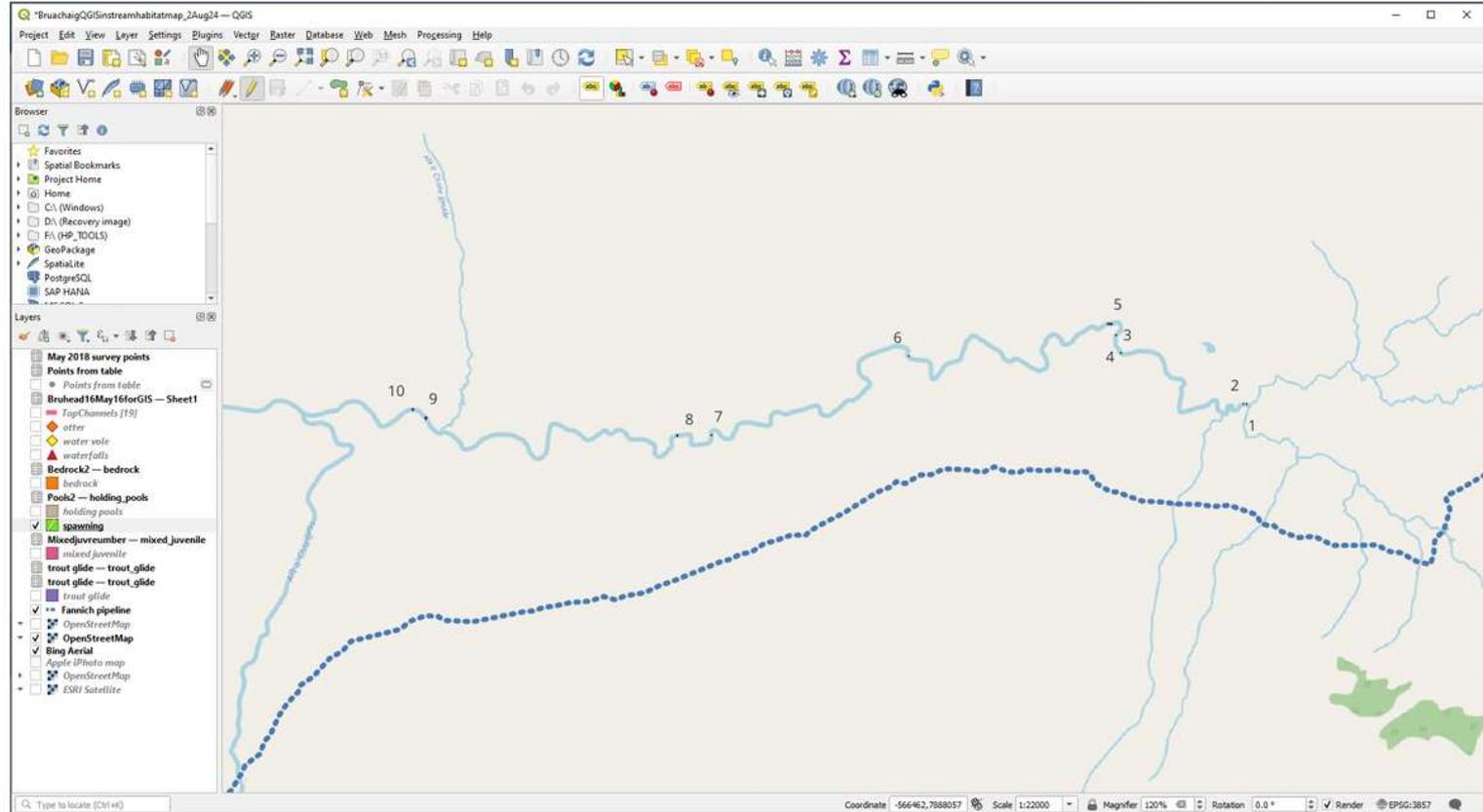
Spawning habitat like this may be used by both brown trout and salmon. The size of some of the features is consistent with salmon spawning in previous year.



Bruachaig River habitat survey, summer 2024



Figure 4 QGIS screenshot to show some locations of 'spawning habitat' recorded in upper Srath Chrombull on 16th May 2018. Several other locations of good spawning habitat areas were noted on 14th August 2024, mostly in the upper section of the stream . . .





Bruachaig River habitat survey, summer 2024



Large wetted area of good habitat to support a wild salmon population, contributing to the River Ewe system salmon population and fishery.

Contract habitat survey report available on request to:

info@wrft.org.uk

5. Some recommendations

5.1 Restore riparian woodland

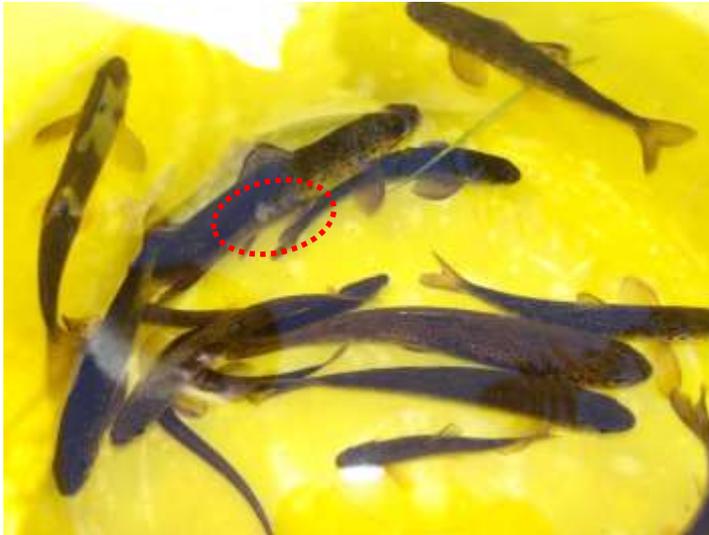
For the past 100+ years, the upper Srath has been managed as pasture for sheep and for red deer; there has been no regeneration of riparian trees. The only riparian trees noted by the upper Abhainn Srath Chrombhuill were two rowans at NH 15784 64332 (*below left*). Much further downstream at NH 11196 64354, there is a stand of large aspen, with some small aspen suckers nearby (*below right*).



Saprolegnia

Saprolegnia is a genus of water moulds often called cotton moulds because of the characteristic white or grey fibrous patches they form. Saprolegnia can affect the health of both adult and juvenile salmon and trout. Large salmon parr are often found with Saprolegnia lesions in late summer.

Applecross River 5th September 2024



Local sample collection for research project at Aberdeen University, led by Vasileios Kyparissis; see [FMS Annual Review 2024](#) page 23 for further information.

For sample collection for research project, thank you to:

Ray Dingwall (Inveran estate)

Alasdair Macdonald (Dundonnell estate)

Inverkerry fish farm (Hendrix Genetics)

In many streams in Wester Ross, growth and production of juvenile salmon depends upon food availability.



Stonefly and Mayfly larvae





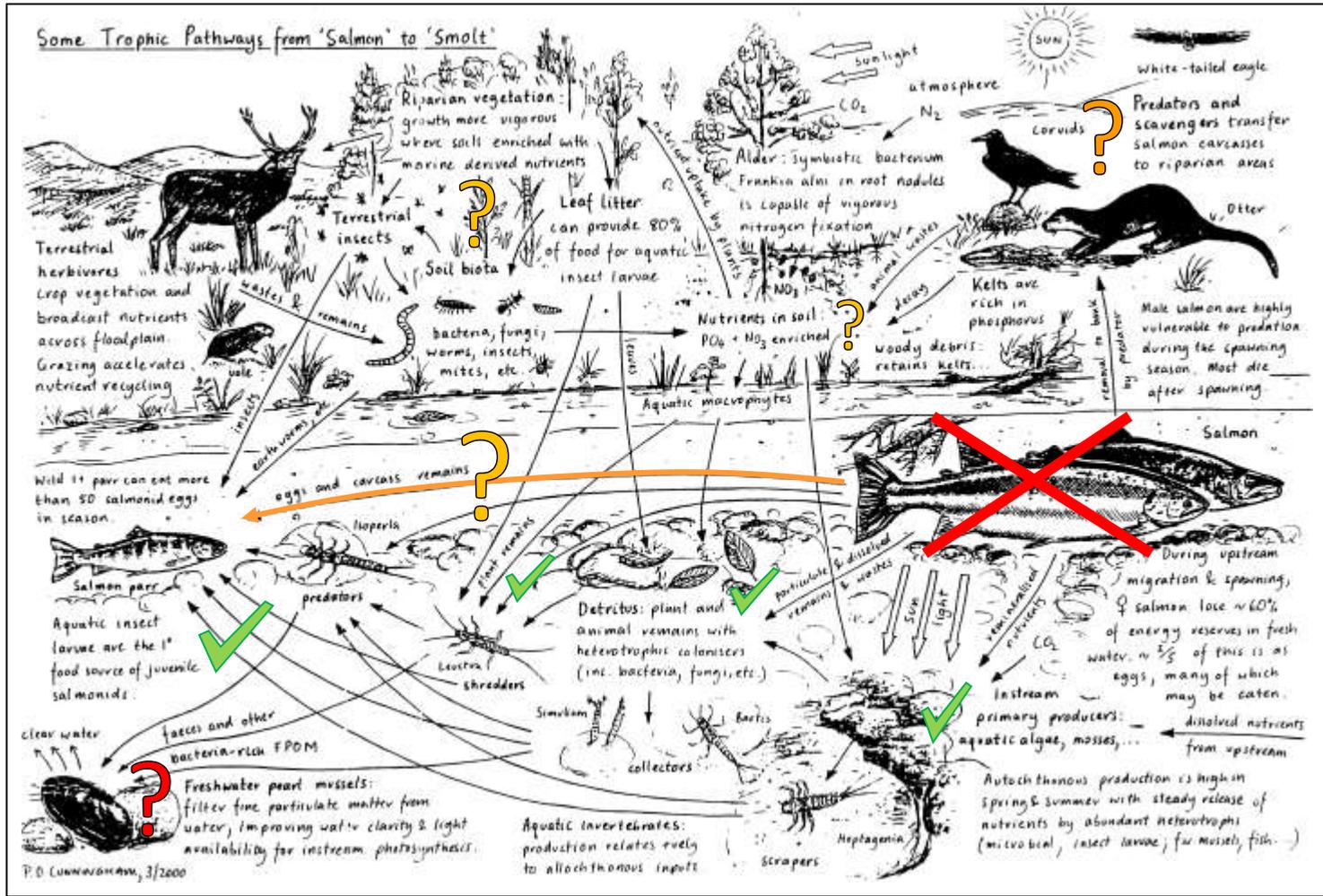
Food availability varies according to catchment fertility.



Well-fed one year old salmon and trout from the upper Balgy

Salmon stream nutrient restoration project

to restore missing nutrients from adult salmon that supported juvenile salmon production



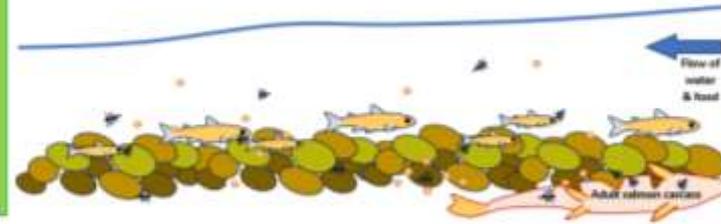
Salmon stream nutrient restoration project

to restore missing nutrients from adult salmon that supported juvenile salmon production

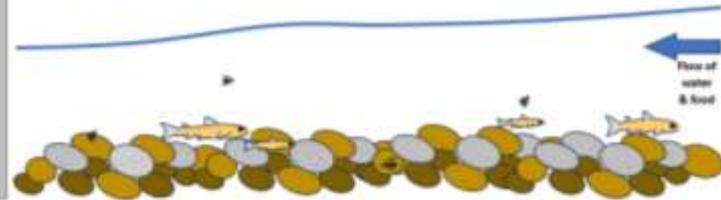


Diagram to illustrate project concept

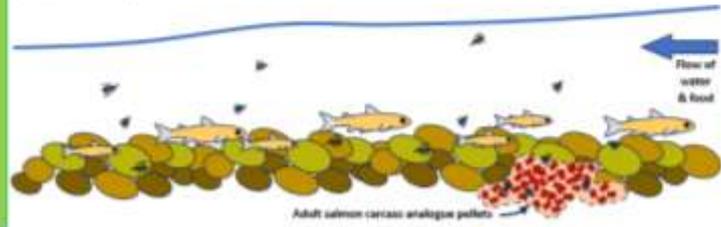
Past: stream ecosystem nourished each autumn and winter with marine derived nutrients from decomposing adult salmon carcasses and surplus salmon eggs which provide direct and indirect sources of food (including insect larvae) for juvenile salmon. Juvenile salmon grow longer and fatter (higher condition factor); smolts are large and well nourished.



Present: nutrition for juvenile salmon greatly reduced due to big reductions in decomposing adult salmon carcasses and surplus salmon eggs available. So juvenile salmon have less food, and there are times in the year when there is inadequate food to sustain growth; there are many malnourished, thin salmon fry and thin parr; fewer well-fed smolts to migrate to sea.



Proposed: salmon carcass analogue pellets [SCAP] are applied to provide supplementary nutrition for the stream ecosystem, resulting in more food for juvenile salmon; restoring production and quality (body condition) of salmon smolts, so more adult salmon return to the river in subsequent years.



In the past there were many more adult salmon carcasses and surplus eggs to provide nutrition for juvenile salmon.

With much less 'marine derived' nutrition in Wester Ross rivers in recent years, there is less food for juvenile salmon so more small skinny salmon parr.

This pilot project is exploring ways of providing supplementary nutrition to replace the missing adult salmon carcasses and surplus eggs.

Salmon stream nutrient restoration project

to restore missing
nutrients from adult
salmon that
supported juvenile
salmon production



Effects of Upland Stream Nutrient Restoration on Atlantic Salmon Populations

Fionn Robert Bernthal
MRes, BSc (Hons)



Submitted in fulfilment of the requirements for the Degree of Doctor
of Philosophy

School of Biodiversity, One Health & Veterinary Medicine

College of Medical, Veterinary & Life Sciences

The project is based on methods developed nearby in the River Conon system by research scientists including Fionn Bernthal.

Fionn's PhD thesis can be found here:

<https://theses.gla.ac.uk/84058/2/2023BernthalPhD.pdf>



Salmon stream nutrient restoration project



baseline juvenile fish survey, autumn 2024

Torridon River and Coulin River (Ewe headwaters)



mostly small
skinny parr . . .





Salmon stream nutrient restoration project

baseline invertebrate survey October & November 2024





Salmon stream nutrient restoration project

Salmon carcass analogue* nutrient application to two sites in three streams.
*high fishmeal content organic farm salmon feed in hessian bags buried in streambed



Contains fish meal, cannot be fed to ruminants. NOT FOR HUMAN CONSUMPTION. Certified by NO-GMO-01

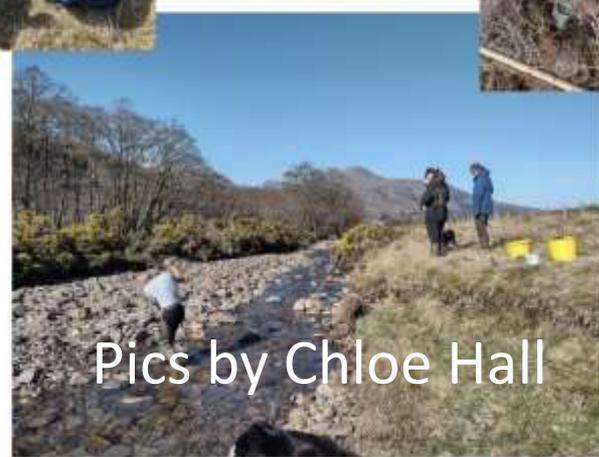
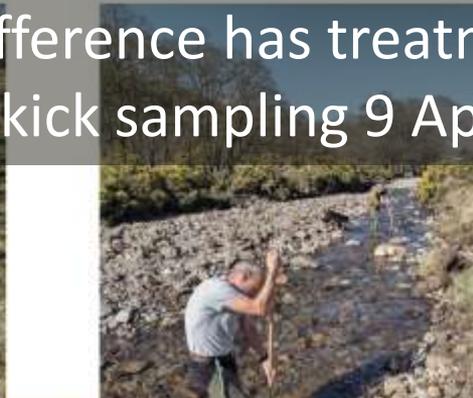
Analytical constituents	Address	
Crude protein:	55 %	3b103 Iron - Fe (Ironsulphate): 43.5 mg
Crude fat:	16 %	3b202 Iodine - I (calcium iodate): 2 mg
Ash:	14.8 %	3b405 Copper - Cu (Coppersulphate): 8 mg
Crude Fibre:	0.4 %	3b503 Mangan - Mn (mangan sulphate 36 mg)
Calcium:	2.9 %	3b605 Zinc - Zn (zinc sulphate): 130 mg
Sodium:	1.7 %	3a672a Vitamin A: 83
Phosphorus:	1.8 %	3a671 Vitamin D3: 2250 IU
		3b607 Zinc - Zn (glycinate): 0 mg
		3b107 Iron - Fe (protein chelate): mg
		3b407 Copper - Cu (protein chelate): mg

Composition: FISH MEAL, ORGANIC WHEAT, FISH OIL, MINERALS, YEAST EXTRACT



What difference has treatments made?

- kick sampling 9 April 2025



Pics by Chloe Hall

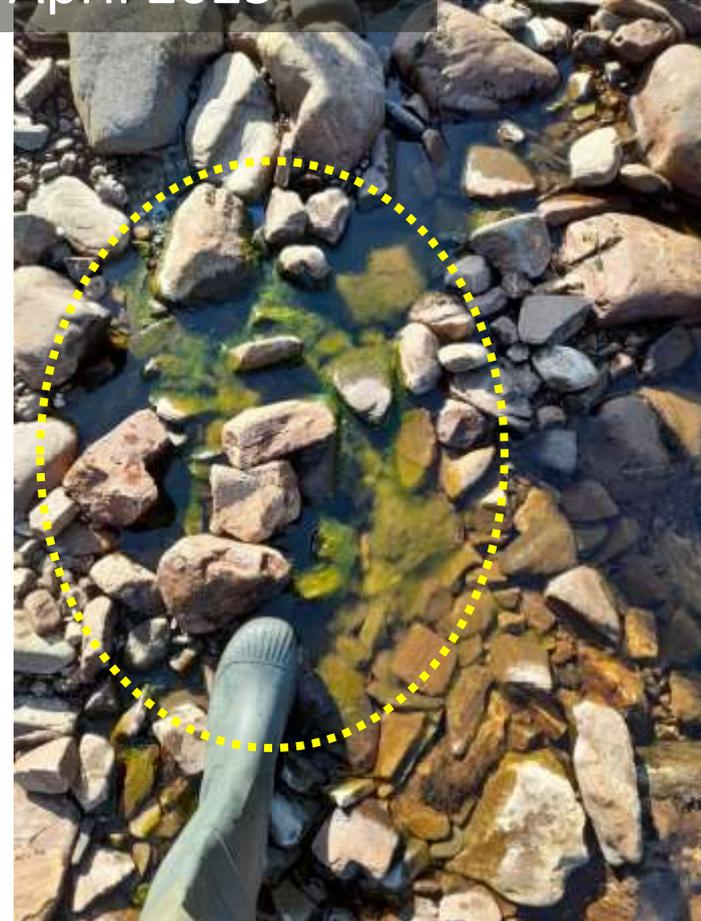
Salmon stream nutrient restoration project

to restore missing
nutrients that
support juvenile
salmon
production



What difference has treatments made?

- kick sampling 9 April 2025



Salmon stream nutrient restoration project

Thank you to
Beinn Eighe NNR
and volunteers



What difference has treatments made?

- sorting samples 9 April 2025



Salmon stream nutrient restoration project

Thank you to
Beinn Eighe NNR
and volunteers



What difference has treatments made?

- sorting samples 9 April 2025



Salmon stream nutrient restoration project

Thank you to
Beinn Eighe NNR
and volunteers



What difference has treatments made . . . ?

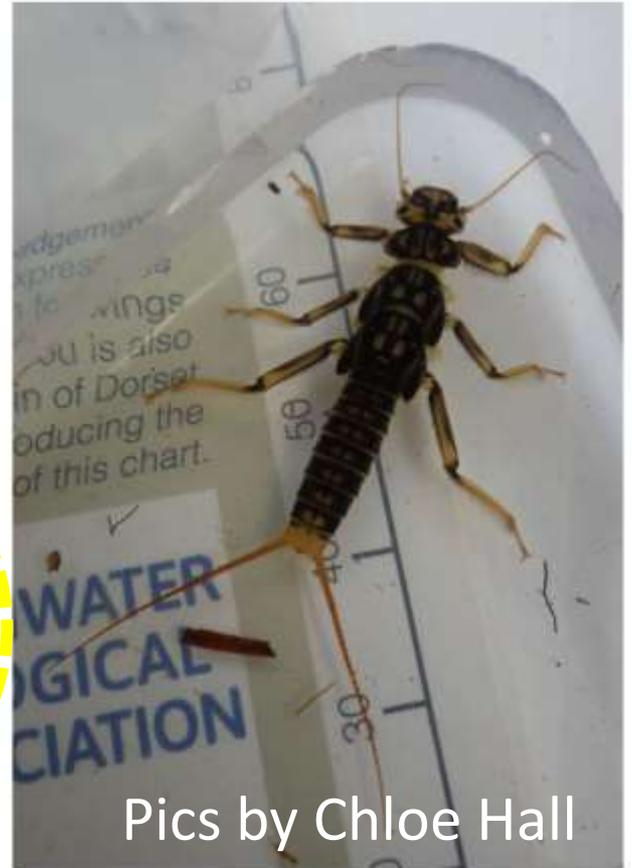
- sorting samples 9 April 2025



Invertebrate Sampling 9-4-2025



... more flat-headed
mayfly larvae?



Pics by Chloe Hall

Please ask Chloe Hall or Katie Grant (Highlife Highland Countryside Ranger) about monitoring river flies in the Allt Beith [Aultbea River] . . .

Aultbea Guardians of Our Rivers



First cast, River Balgy, 12th February 2025



Thank you to River Balgy fishing proprietors, Alasdair Macdonald, Jim Raffell, Richard and Claire Munday, Maree Todd MSP, piper Sandy Boyd and everyone else who came along . . .

Fisheries Management Scotland Annual Meeting, 20th March 2025.

FMS CEO Alan Wells presented poster about spring-spawning herring by Wester Ross to First Minister of Scotland, John Swinney



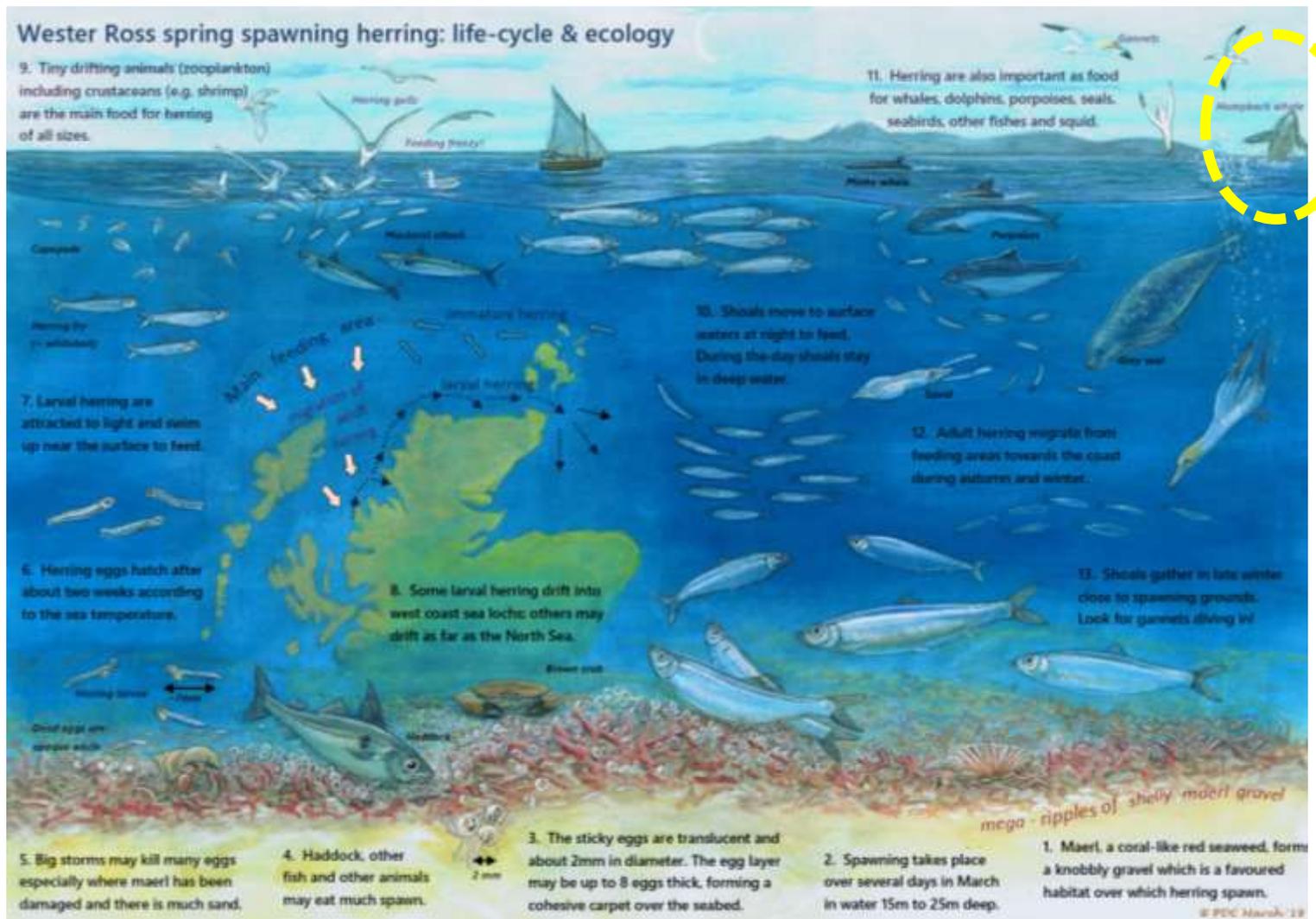
www.fms.scot

 A poster titled "Monitoring Spring-Spawning Herring" from the Wester Ross Fisheries Trust. It features a circular logo at the top left with a fish and the text "WESTER ROSS FISHERIES TRUST". The poster contains several text blocks and images:

- Monitoring Spring-Spawning Herring**: Main title.
- Herring**: Herring were once vital to Scotland's coastal economy and marine ecosystems. They spawn on the seabed, with eggs hatching into larvae after about three weeks.
- However**: much remains unknown about spring-spawning herring and their ecological importance. How crucial is an abundance of herring fry to the survival of post-smolt salmon as they migrate through coastal waters?
- In March 2024**, when an unusual patch of turquoise water appeared northwest of Gairloch, it signaled possible herring spawning activity. To confirm this, a team of local herring enthusiasts set off on Tuesday, 12th March. Using underwater cameras, including an ROV (Remote Operating Vehicle), they explored the seabed and discovered layers of herring eggs on moor gravel ridges across a 3km stretch.
- The summer of 2024** also saw regular sightings of humpback and fin whales in the loch. Some humpbacks were observed feeding on krill – but were they also preying on juvenile and adult herring?
- As spawning time approaches**, it will be interesting to see if these humpback whales follow the herring shoals, as they do in Norway.
- Learn more about spring-spawning herring lifecycle and ecology**: Includes a QR code.
- February 2024**: At least 120 germs were seen together with unusually large pods of juvenile 200 L, a pod of mixed size-class whales.
- February 2024**: Signs of spawning herring shoals were seen to the northwest of Gairloch.
- 12 March 2024**: The ROV captured other signs to the seabed in the form of Autographs, with herring eggs sticking to it.
- 12 March 2024**: Herring eggs were recorded in water about 10m from the shore in water about 22m deep.
- 12 March 2024**: To confirm that spawning had been going, three other cameras were deployed.
- Partnership Working**: The discovery of herring spawning northwest of Loch Gairloch in March 2024 was made possible through collaboration between local enthusiasts, marine biologists, and conservationists.
- Key contributors** included the Wester Ross Fisheries Trust, West of Scotland Herring Hunt, and Little Loch Broom Marine Life, with support from Dry Island Safaris, Open Seas, and community wildlife networks – highlighting the power of partnership in marine conservation.

Herring have also been important to people in Wester Ross for thousands of years.

Herring are a keystone species in coastal ecosystems.



Herring have also been important to people in Wester Ross for thousands of years.

Herring are a keystone species in coastal ecosystems.

... and then a summer of many large whales

In July and August, wildlife tour boats from Gairloch and Ullapool, and passengers on the Ullapool - Stornoway ferry enjoyed record numbers of encounters with Humpback whales and Fin whales in the Minch. We were very happy to support Steve Truluck of Hebridean Whale Cruises with efforts to learn more about whale diet through sampling of Humpback whale faeces.

Observations of feeding whales and from sampling (. . . it was bright red and floated) indicated that Northern krill was a major food source attracting these whales, perhaps rather more so than pelagic fin-fish including herring.



Pelagic food-webs are complex. Krill are also eaten by herring and juvenile salmon. Fish-finders indicated that there were also large shoals of fish not so far from where the large whales were feeding, sometimes in the outer parts of Wester Ross Marine Protected Area.

What determines the size of krill populations in the seas around Wester Ross?

(above) Humpback whale feeding on krill in the outer Wester Ross Marine Protected area. Look out for more of Steve's remarkable pictures and videos at <https://www.facebook.com/SteveTruluckAtSea/> and on the BBC website.

Herring shoals move inshore, March 2025



‘one of Scotland’s biggest wildlife spectacles!’ [in terms of biomass]:
humpback whale, 3 minke whale,
40+ common dolphins, 30+ porpoises,
50+ grey seals, 120 gannets,
300 gulls (several spp.) . . .

Search for herring eggs from North Erradale to Aultgrishan, 20th March 2025

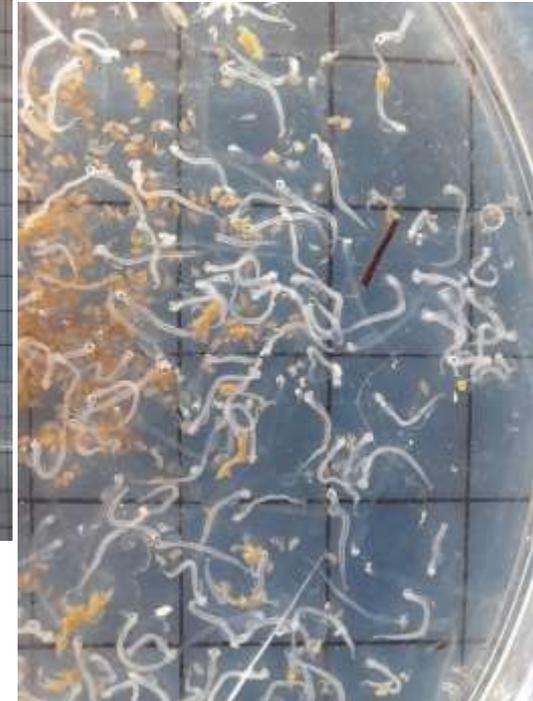


unsuccessful (?some videos still to review)



Search for herring eggs to west of Opinan, 3rd April 2025

Successful, plus many newly hatched herring larvae



**Herring eggs filmed and collected from seabed on 4th April 2025
by Sara Nason and Rob McKean with support from James Cameron**



Seagrass in Wester Ross



Zostera marina (Seagrass)

- Sound of Longa (Loch Gairloch). NW Scotland's largest seagrass bed?
- Feeding area for record Plaice?
- Sea trout feeding habitat.
- Sea horse habitat.

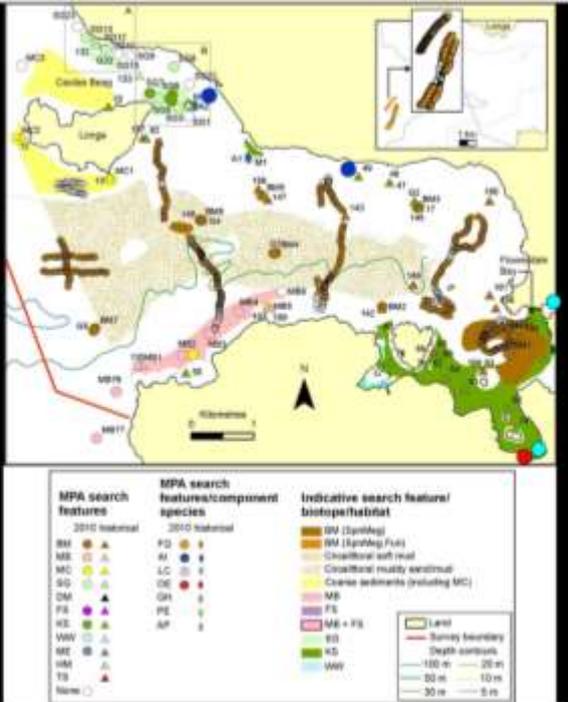
(picture from Tayside Biodiversity webpage)

Seagrass in Wester Ross

Seagrass beds were a search feature in the [2010 SNH Ullapool Approaches Survey](#)

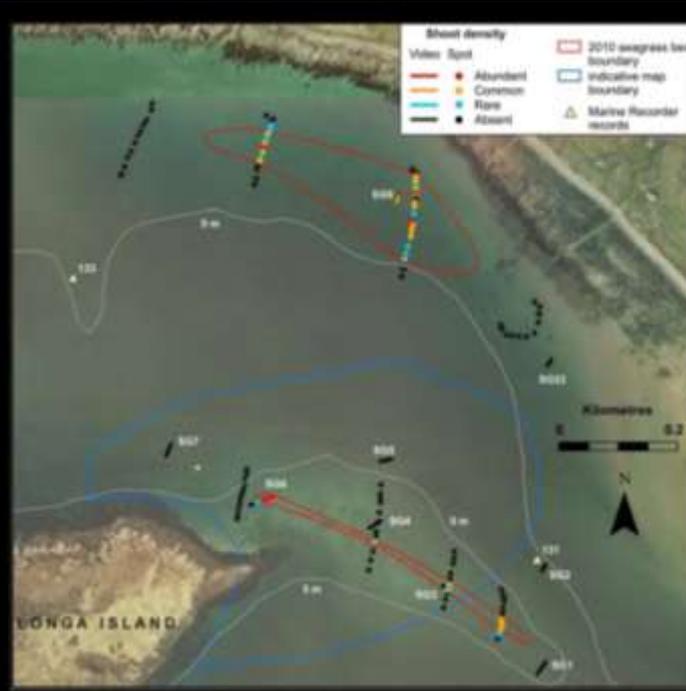
The 2010 SNH survey confirmed the existence of extensive sea grass [SG] beds, maerl beds [MB] and burrowed mud [BM] habitats within Loch Gairloch.

(Mobile fishing gear is excluded from Loch Gairloch as part of 1984 Inshore Fisheries act.)



Based upon Ordnance Survey material with the permission of the Controller of HMSO © Crown copyright (2011) Licence no. 100017908

Seagrass beds in Sound of Longa

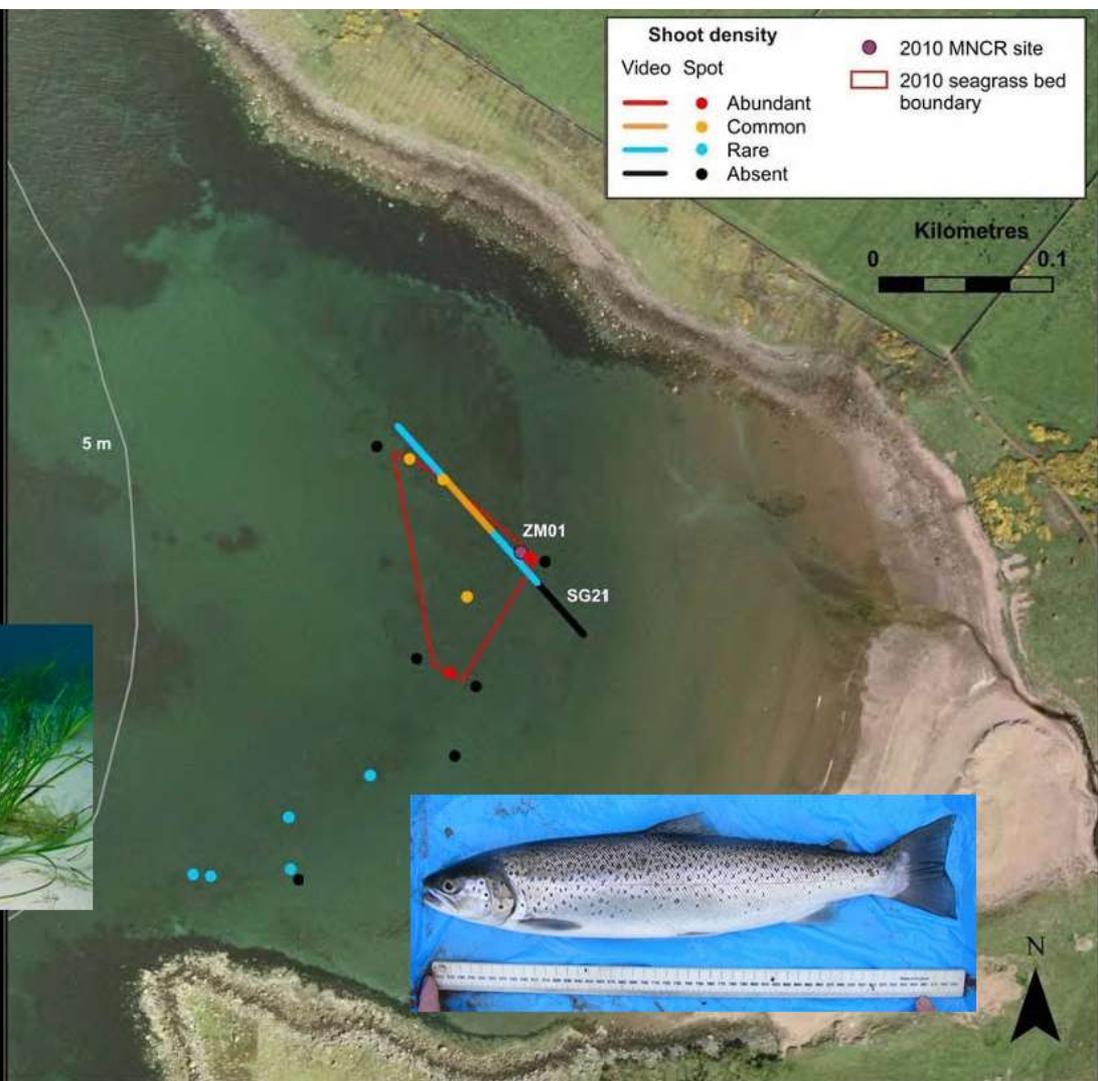


From SNH Ullapool Approaches Report, 2011. Based upon Ordnance Survey material with the permission of the Controller of HMSO © Crown copyright (2011) Licence no. 100017908

Seagrass in Wester Ross

Seagrass beds are habitat for sea trout and other fish . . .

The sea trout caught on 15th June 2011 were in the eel grass bed here.



Seagrass in Wester Ross

... so, it
makes sense
to protect
seagrass beds

a Marine Protected Area for the local community of Gairloch?

Peter Cunningham*

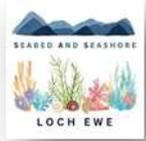
Gairloch Community Hall

7th May 2012

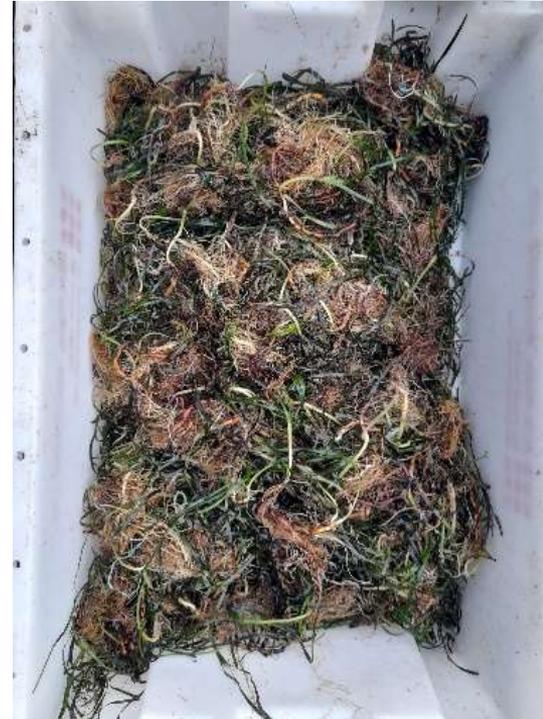
[*Biologist, Wester Ross Fisheries Trust; Secretary, Wester Ross Environment Network; returned VSO (Mekong fisheries) volunteer; Gairloch parish resident . . . (enjoys catching & eating fish!)]



Restoring seagrass in Wester Ross



Over 1000 seagrass fragments with rhizomes and roots were recovered from beaches around Gairloch on 20th – 22nd December 2024, following a WNW storm



Restoring seagrass in Wester Ross

Christmas time 2024: sorting seagrass
January 2025: making a holding pond



Thank you to Nic and Nicky Butler, Duncan and Kate Donald, and Janaka Balasuriya



Wester Ross Seagrass Restoration Project is now part of

SMEEF Seagrass Meadows Scotland



Katherine Knight (SMEEF Grants Officer) and others, Inverasdale February 2025



(left) Sue Ward and Diorbhail Wentworth at the introductory project meeting, Inverness, April 2025



(right) learning about methods of restoring seagrass & prototype seagrass seed planter.

Some of the seagrass fragments are sprouting in our seagrass pond!

Photos taken
on Easter Day,
21 April 2025



Thankyou very
much to Duncan
and Kate Donald
and Nic and
Nicky Butler!



Interpretation panels **DRAFTS** for viewpoint on A832 (NC500) overlooking Gruinard Bay Wester Ross Marine Protected Area

Supported by



The best sea fisheries in Europe?

The sea in front of you once supported prolific fisheries for herring, mackerel, haddock, wild salmon and other species.

Herring
Shoals feed on plankton near the surface of the sea by night.

Traditional herring drift net fishing boat

Priest Island (RSPB Nature Reserve)

Minke whale

Gannet
Look for gannets diving in! They may be following shoals of herrings or mackerel.

Creel fishing for crabs, lobster and nephrops prawn

Local people made a living and caught their supper from the sea.

Visit Ullapool for award winning local seafood!

Plankton
As the sun rises higher and shines for longer in spring, plankton blooms, supporting much other marine life.

Mackerel
Factory ships from eastern Europe exploited shoals in 1970s and 1980s.

Scottish record rod-caught haddock, mackerel, and skate were caught near here.

Whiting

Haddock

Cod

Skate
Huge skate may still breed near here.

Skate egg-case

Plaice

Nephrops prawn (Langoustine)

Lives in burrows where the seabed is muddy.

Can we learn to look after our seas?

Once there were big fish . . .

In the 1960s, the British skate fishing championships were held in Ullapool, and in 1965, the European sea angling championships.

But all is not lost!

Juvenile cod, haddock, whiting, plaice, skate and many other species still live here.

Many fisheries collapsed due to overfishing, ecosystem breakdown, seabed damage and inadequate fisheries management.

Contacts and supporters:



Interpretation panels **DRAFTS** for viewpoint on A832 (NC500) overlooking Gruinard Bay Wester Ross Marine Protected Area

Supported by



A marine protected area for Wester Ross

The **Wester Ross MPA** aims to protect and restore important seabed habitats that support much other marine wildlife.



Protected habitats include **kelp forest** (home to colourful wrasses and pollack), **burrowed mud** (where nephrops and skate live) and **maerl beds**.



Maerl is a coral-like pink seaweed that forms reef-like habitats that provide safe homes for many animals including juvenile scallop, lobster and cod.

Maerl beds take hundreds of years to grow. They can be easily damaged by dredging and by effluents from open-cage salmon farms.



As the seabed recovers, many fishes, birds and other animals benefit.

Look for:

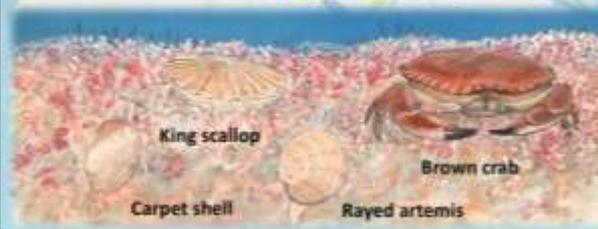
Minke whale



Common dolphin

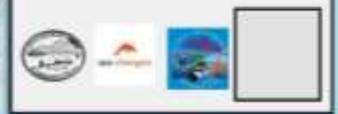


Porpoise



Local citizen-science groups aim to learn more and to help look after our wonderful seas.

Contacts and supporters:



The Wester Ross
MPA may be a be a
breeding area for
the Flapper Skate.

This one was found
on the shore nearby
yesterday (23 April
2025)

Photo by Roger
McLachlan



Interpretation panels **DRAFTS** for viewpoint on A832 (NC500) overlooking Gruinard Bay Wester Ross Marine Protected Area

Supported by



Can you spot a seal posing like a banana?

After feeding, seals like to haul out onto a big rock where they hold their heads and flippers in the air.

They do this to dry out when they feel safe and content. **Please do not disturb.**

Seals eat mostly small fish including sandeels, juvenile cod, pollack, coalfish, wrasse, flatfish, herring, sprat, mackerel, sea trout, salmon, and squid.

Quinag

Gruinard Island

Beinn Mor Coigach



Pollack live in kelp forest and feed on small fish, crustaceans and worms.

Kelp forest
Grows in shallow water where the seabed is rocky.

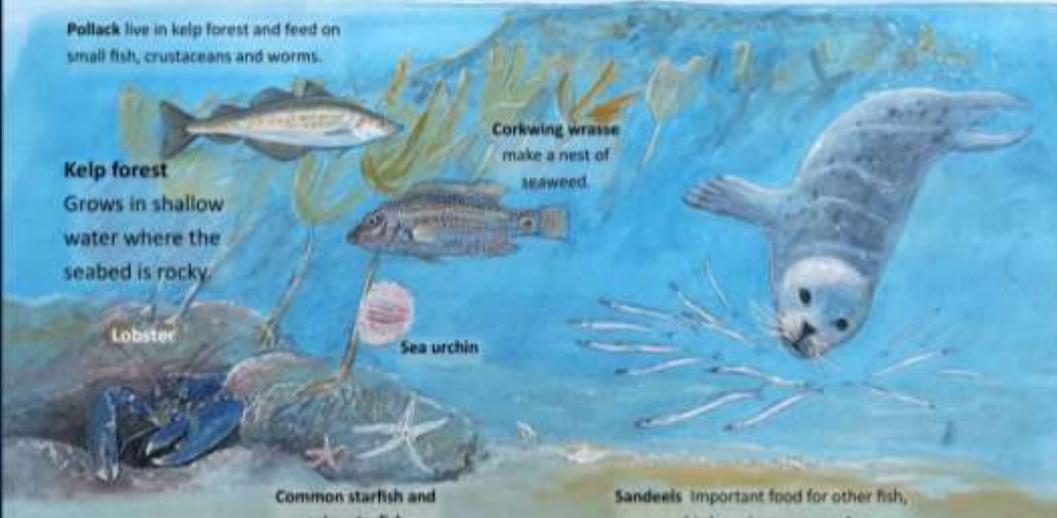
Corkwing wrasse make a nest of seaweed.

Lobster

Sea urchin

Common starfish and spiny starfish

Sandeels important food for other fish, seabirds and sea mammals.



Divers (loons)

Gruinard Bay is a great place to see divers. Look for:



Great-northern diver
October-May

Black-throated diver
All year

Red-throated diver
All year

Seals

Atlantic grey seal
Less common here; found in harbours!



Harbour seal
Dog-like face, more often seen from here.



Seals are protected around Scotland.

From very low numbers, the harbour seal population increased around Wester Ross in the 1990s and 2000s. Numbers have since fallen in some areas.

Seals are eaten by Orca. Divers and seal pups may be taken by White-tailed eagle.

Contacts and supporters:



Interpretation panels **DRAFTS** for viewpoint on A832 (NC500) overlooking Gruinard Bay Wester Ross Marine Protected Area

Supported by



A last stronghold for wild Atlantic salmon?

The wonderful Atlantic salmon is an icon for Wester Ross.

For thousands of years, adult salmon have returned from arctic seas to untamed rivers near here to complete their life-cycle.

Salmon grow quickly at sea by feeding on small fishes and krill.

Most salmon return to freshwater after one winter at sea; others swim as far as Greenland before returning to their home river after two or three years at sea.

Once there were so many salmon that they were often seen jumping as they gathered in summer awaiting rainfall.

Otter

Often seen along the shore; also in rivers and lochs.

Sea trout

Sea-going brown trout, remain in coastal waters after migrating to sea. Parasitic sea lice have been a problem.



White-tailed eagle

Feeds on fishes, seabirds and mammals; often taking carrion.

Salmon



Salmon spawn in November. Female salmon bury their eggs among stones.



Tiny salmon fry emerge from amongst stones in the streambed in April and feed on aquatic insect larvae.

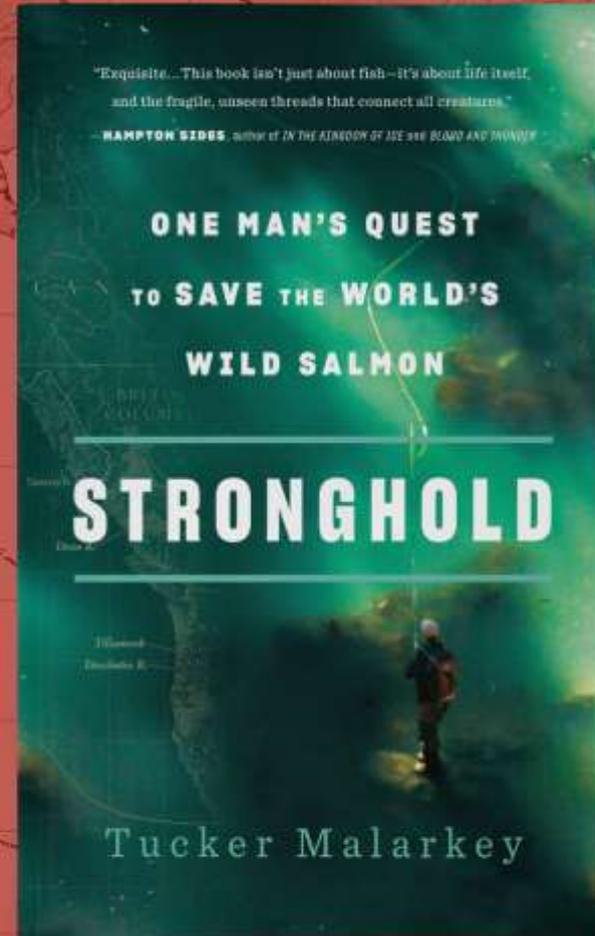
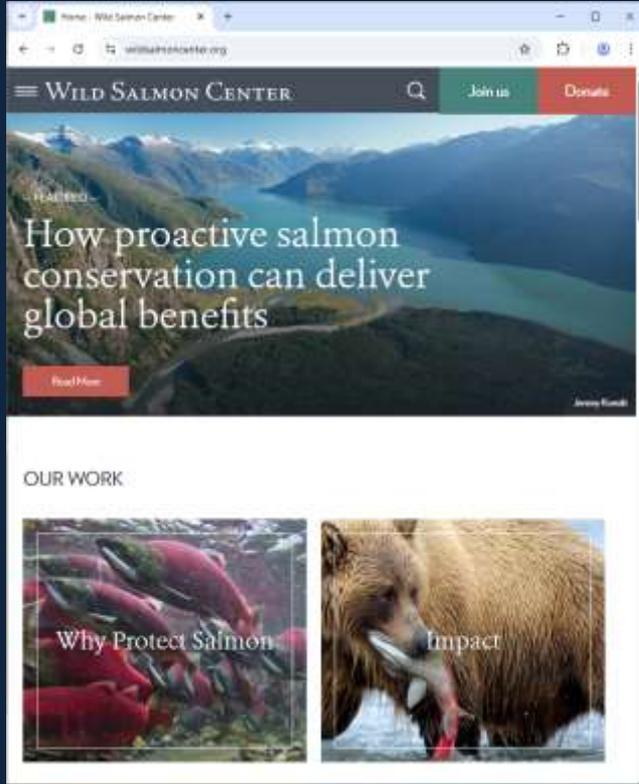


After two or three years in freshwater, the little salmon become silver and go to sea, migrating in April and May.

Contacts and supporters:



A stronghold for wild salmon?



about Guido Rahr (Wild Salmon Centre President and CEO)

Thank you to:



marine scotland
science



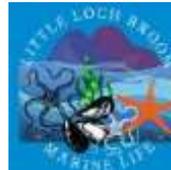
SFCC
The Scottish Fisheries Conservation Centre



MQWI



THE CROWN ESTATE



and to many helpers, volunteers, estates, keepers, anglers, wildlife enthusiasts and others for much support in 2024 and 2025



