



# welcome back to the 'new' Wester Ross Fisheries Trust



The 'old' Wester Ross Fisheries Trust was set up in 1996 in response to the decline in wild salmon and collapse of sea trout fisheries including that of Loch Maree, formerly one of the most productive sea trout fisheries in North West Europe.

With support and encouragement from a dedicated membership, anglers, wildlife enthusiasts, scientists and volunteers of all ages and abilities, the Trust has been able to carry out much work to learn more about the pressures facing wild fish populations and what can be done to address them. The Trust works in partnership with the Wester Ross Area Salmon Fishery Board and many others.



*We depend upon many volunteers and other helpers to carry out fish surveys . . .*



**Wester Ross** remains an international stronghold for **wild Atlantic salmon** and **wild Brown trout** and for other freshwater wildlife including Freshwater pearl mussel, Otter and Black throated diver.



*Wild brown trout*



*Black-throated diver*

The Little Gruinard River was designated by the European Union as a Special Area of Conservation [SAC] for the Atlantic salmon (*Salmo salar*) in 2005. It is not the largest nor the most productive wild salmon river within Wester Ross but it does contain some of the most remarkable habitat for juvenile salmon production.



*Juvenile salmon survey team*



*Mayfly*

After entering the river from the sea and swimming upstream against strong currents through a series of rocky cascades, wild salmon must negotiate challenging waterfalls around huge boulders to continue their remarkable journey home.



*photo by Ben Rushbrooke*



from Bing Maps

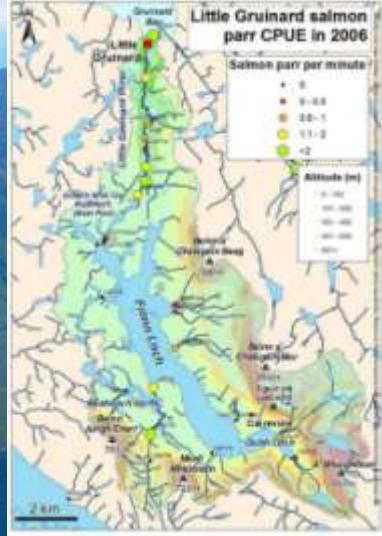


photo by Andy Jackson



Salmon eggs

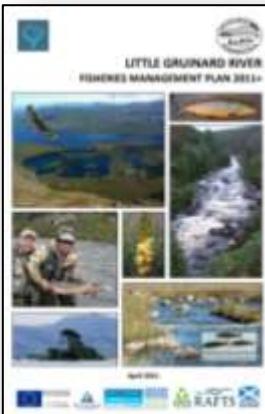
Wild salmon spawn where the streambed is composed of pebbles and small cobbles. In some parts of the Little Gruinard River adult female salmon have been the main movers of the stones for hundreds, perhaps for thousands of years. Ancestral salmon redds (old nests) can even be seen in satellite photographs.



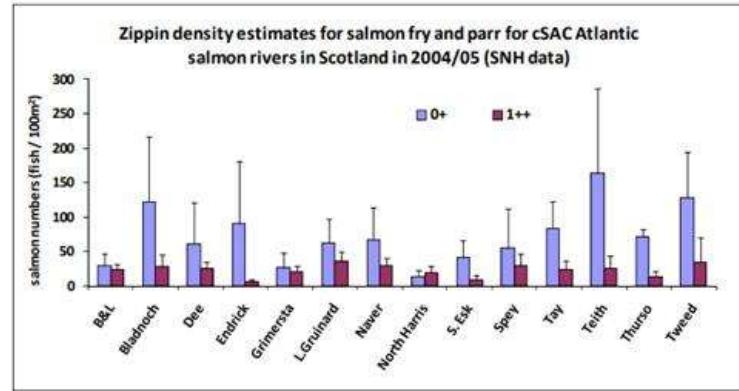
Some adult salmon go no further than the main river where there are deep pools and abundant areas of spawning and nursery habitat areas.

Other fish continue upstream as far as the Fionn Loch and beyond. Some headwater spawning streams within the SAC have not been surveyed for many years.



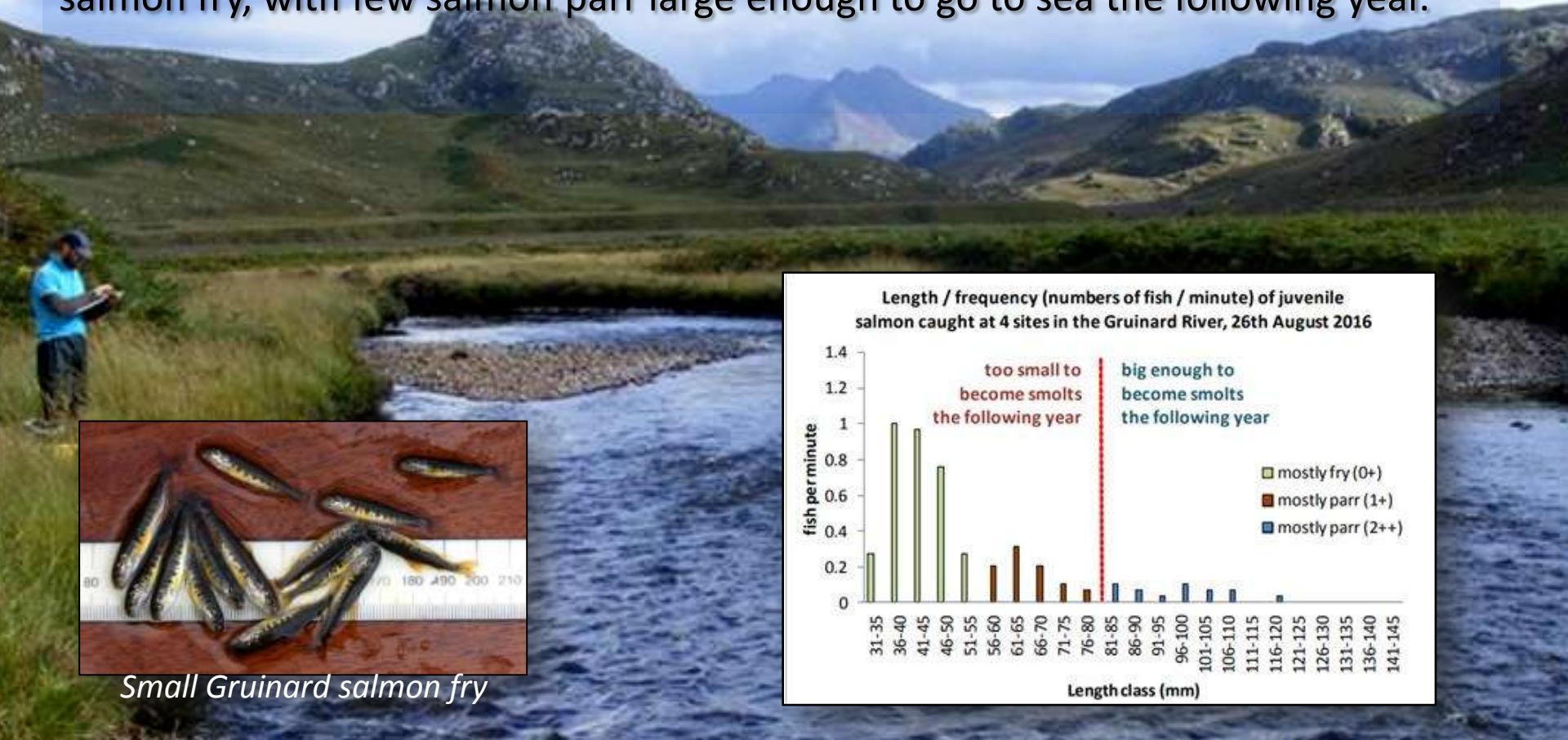


The WRFT electro-fishing team recorded some of the highest densities of salmon parr (age 1++) for any SAC salmon river in Scotland. However, for their age they included some of the smallest and slowest growing.



Four year classes of juvenile salmon from a Little Gruinard headwater

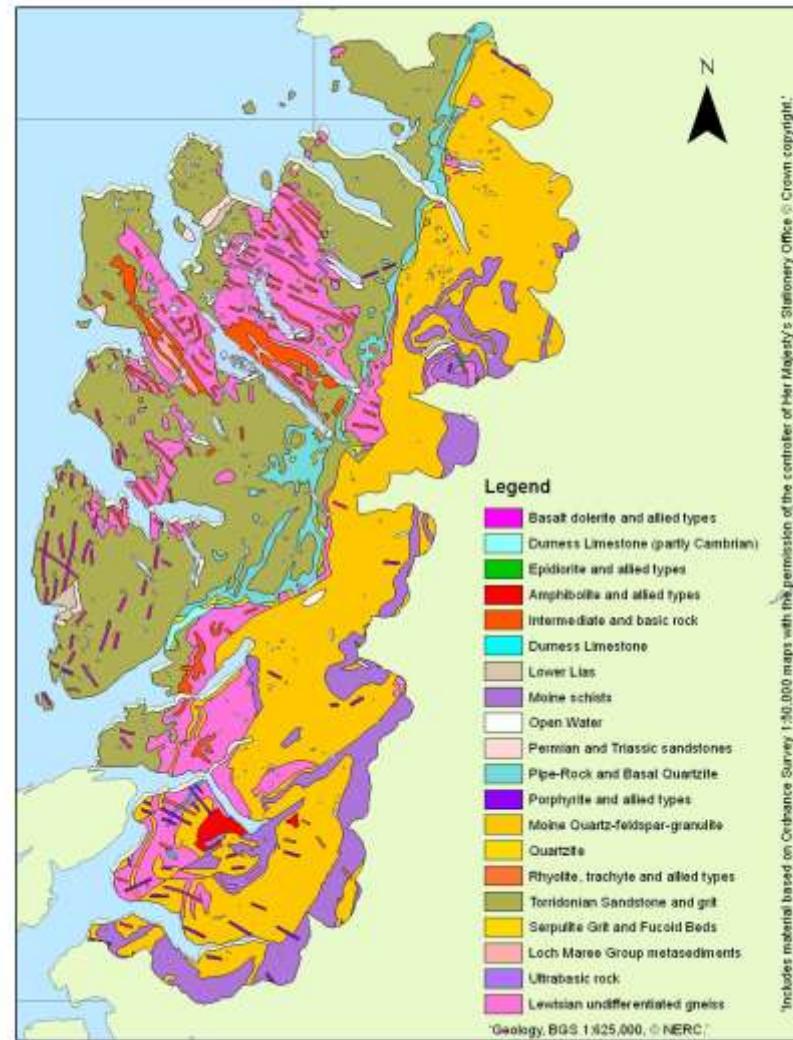
The neighbouring big Gruinard River is the most productive wild salmon river within the Wester Ross area. However, WRFT surveys recorded mostly small salmon fry, with few salmon parr large enough to go to sea the following year.



The bedrock beneath many river catchment areas in Wester Ross yields very little nutrient. Life on land and in freshwater depends upon the provision and circulation of life-limiting nutrients, especially phosphorus, through the ecosystem.

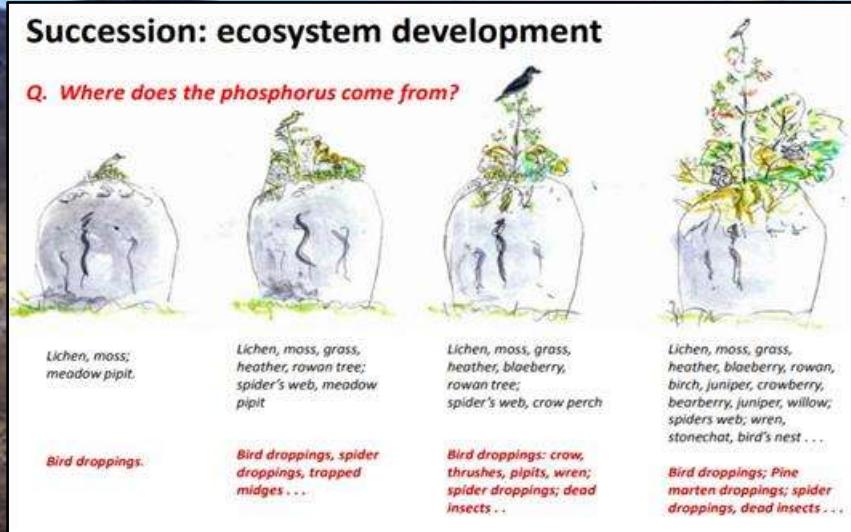


*Gneiss and sandstone boulders*

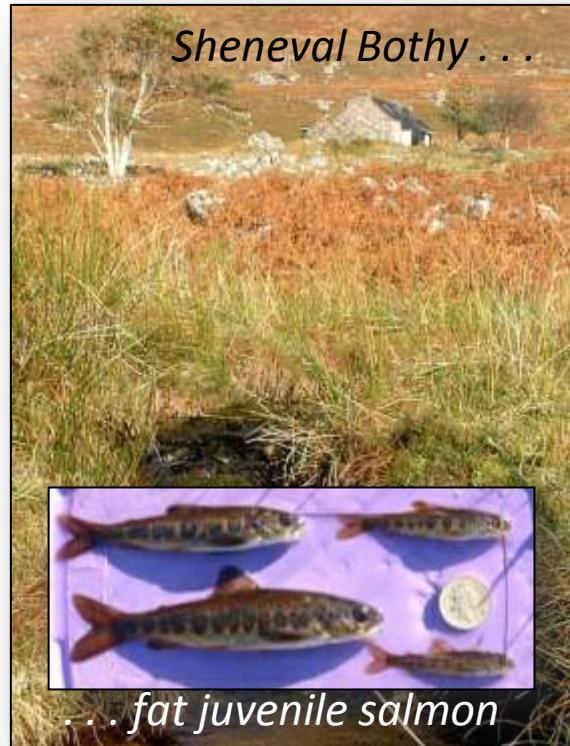
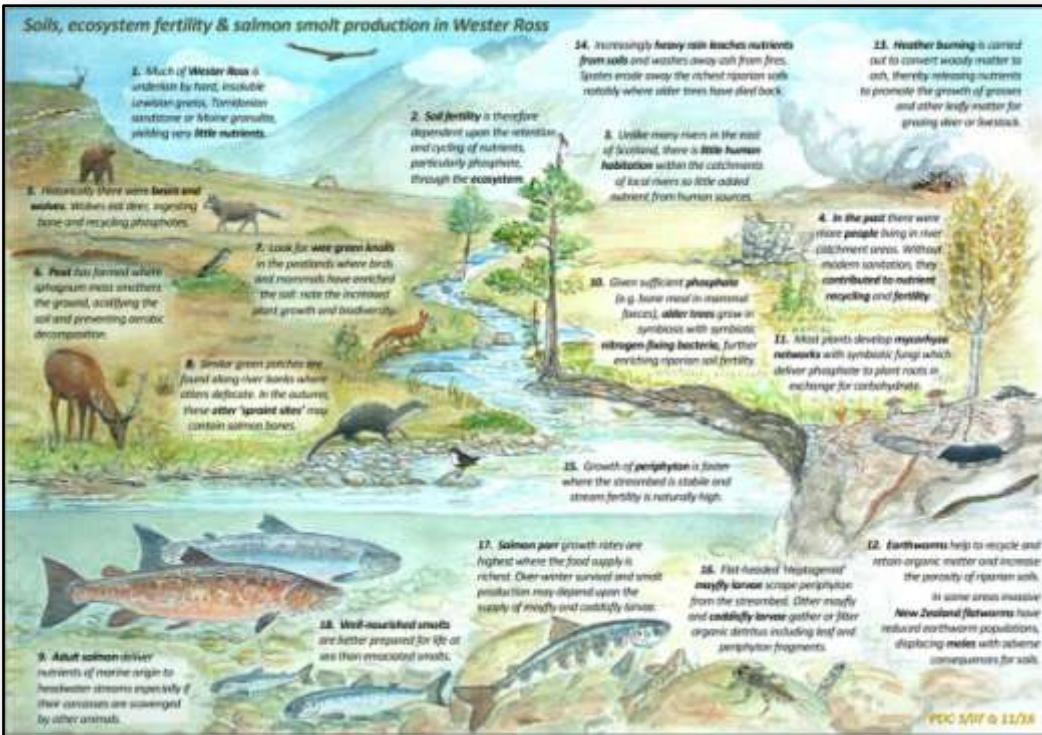


- Legend
- Basalt dolerite and allied types
  - Dumess Limestone (partly Cambrian)
  - Epidiorite and allied types
  - Amphibolite and allied types
  - Intermediate and basic rock
  - Dumess Limestone
  - Lower Lias
  - Morne schists
  - Open Water
  - Permian and Triassic sandstones
  - Pipe-Rock and Basal Quartzite
  - Porphyrite and allied types
  - Morne Quartz-feldspar-granule
  - Quartzite
  - Rhyolite, trachyte and allied types
  - Terrionian Sandstone and grit
  - Serpulite Grit and Fucoid Beds
  - Loch Maree Group metasediments
  - Ultrabasic rock
  - Lewisian undifferentiated gneiss

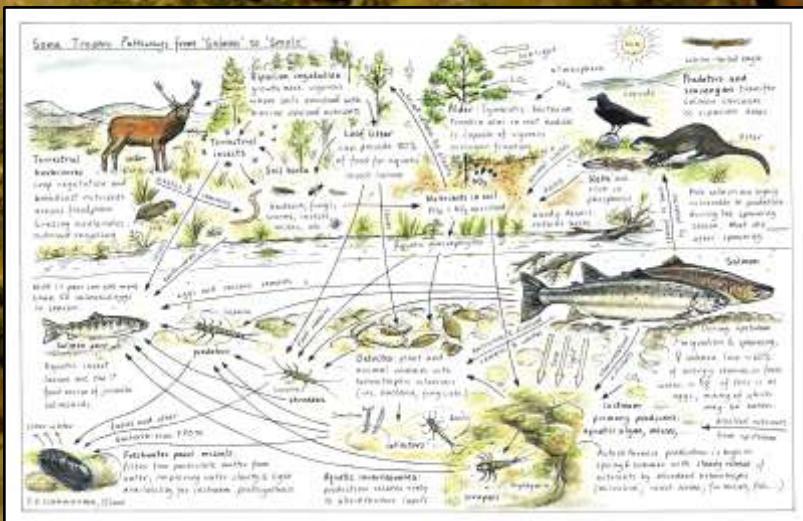
Wildlife production across large areas of Wester Ross is limited by a lack of food. This issue has been the subject of two WRFT workshops, [Ecosystem Fertility and Salmon Smolt Production in Wester Ross \(2007\)](#) and [Refertilising Wester Ross \(2016\)](#).



Historically there were more people living away from the coast and even wolves and bears in the more distant past. They all contributed to the fertility of the ecosystem, enriching nursery streams for production of juvenile salmon . . .



With fewer adult salmon returning to the rivers of Wester Ross in recent decades, there is less transfer of marine nutrients into river catchment areas. There is much interest in collaborative research to learn more about ways to restore nutrition to benefit many species including declining freshwater mussel populations.



Trophic pathways from salmon to smolt



Salmon jaw (left by an otter) on a mid-stream island . . .

We are also learning how high water temperatures can restrict the growth of juvenile salmon in some areas during summer months.

During periods of low flow in June and July, water temperatures can rise to critical levels (above 24C) where juvenile salmon become stressed and stop feeding.



## *Torridon River on a bright sunny day in early August*

Colleagues elsewhere in Scotland have also recognised the threat to wild salmon from climate change.

They have responded with ambitious riparian woodland restoration programmes to **provide shade** and to **improve habitat** and **nutrition** for juvenile salmon.

## TREES FOR FISH



Between June and September each year many thousands of adult salmon and sea trout return from the sea underneath the road bridge at Bothwell and up the River Ewe into Loch Mhor where the fishery for sea trout was once world famous. By October, many fish have completed their journey back towards their natal streams, some heading up the Kinlochewe and Alltshartie Rivers to Loch Doir and on into Loch Duin.

This stream, known locally as the 'Porpoise burn', is one of the most important spawning areas for sea trout, which lay their eggs in river gravel in late October or November. The eggs slowly develop during the cold winter months and little trout fry swim up from between the stones in April or early May in search of food.

To improve the habitat for fish, Colin Etts with support from the Forestry Commission through the Woodland Direct Scheme (WDS) have established 2 enclosures to restore riparian (stream-side) woodlands. This enclosure has been planted with alders, willow, birch, rowan and other species.



Native woodlands also provide habitat for many birds - including Shrike-shrike, warblers and other small song birds. Look for deeper grey and pink warblers which also feed on insects along the stream.



By restoring more varied habitat, production of insects, earthworms and other small animals will increase. Leaf litter is also a food source for some of the aquatic insect larvae that are also important food items for young fish.

Tree roots, especially those of willow, help to stabilise river banks preventing erosion. Roots also provide additional cover (protection) for small fish, which can hide from larger fish and other predators.



Stonefly (I)  
said and  
mayfly larvae (D)  
tots) are And  
the juvenile  
fish removed  
and salmons  
(below)



Coulin Estate is committed to the restoration of healthy and productive fisheries for wild sea trout, salmon and other special wildlife. If you meet the keeper, ask him about some of the other projects on the estate.

Walter Rose Fisheries Trust, 2004  
tel. 03445 712 899 • [info@wrrt.org.uk](mailto:info@wrrt.org.uk)



## *Fallen leaves*

*Main picture: riparian woodland enclosure  
(River Dee Trust)*

Salmon are not just found in the big rivers that support important fisheries, there are also many smaller rivers with wild salmon and sea trout.

Some of these could also be improved to benefit fish and other wildlife and for the enjoyment of people living nearby. Could you help?



*active landslip, Applecross River*

*main picture and far left:  
Allt Beith (Aultbea River)*

Wester Ross is also a **stronghold for wild brown trout (*Salmo trutta*)**.

There are thought to be over 300 lochs or lochans within the Wester Ross area which support wild brown trout. All are amazing places to visit on a warm summer day when there is just enough breeze or sunshine to keep the midges away.



*Sampling expeditions*



On an expedition into the hills you may find colourful dragonflies, damselflies, sedge flies and water beetles, and hear or see red deer, greenshank, red-throated diver or a golden eagle.

Take care not to disturb protected wildlife; please move on if you think special birds may be nesting nearby!



*Emerald damselfly*   *Golden-ringed dragonfly*

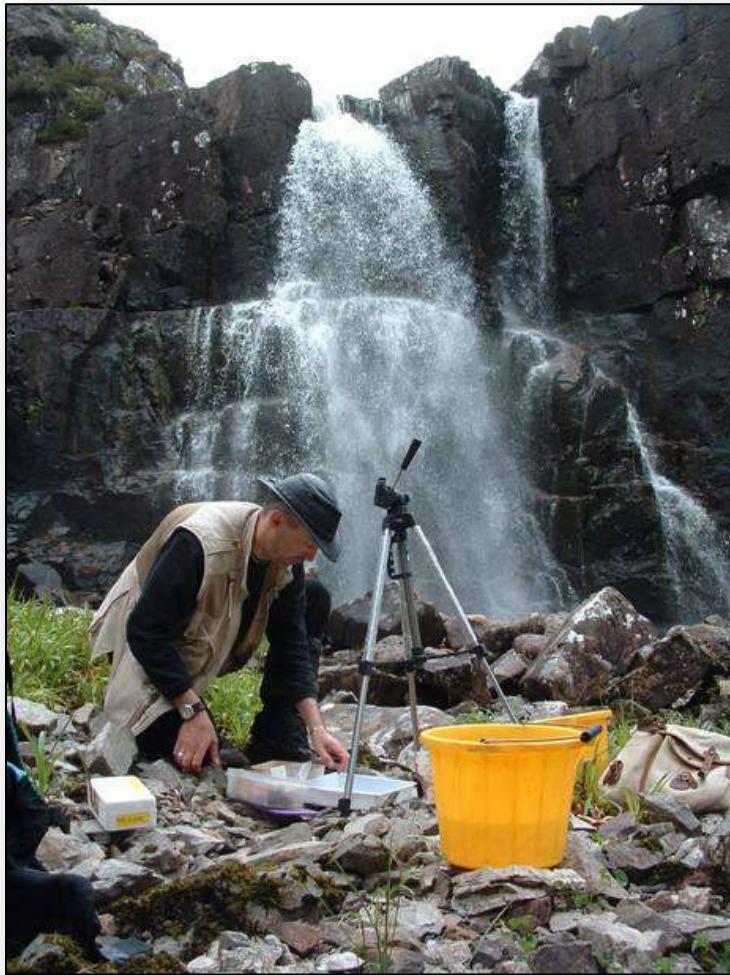


*Student projects*



Populations of the rarely seen Arctic charr (*Salvelinus alpinus*) have inhabited some lochs since the end of the last period of extensive glaciation around 10,000 years ago. The distribution of this mysterious fish has not been surveyed in recent years. How many charr populations survive in Wester Ross?

*Two kinds of  
charr from  
Loch Maree*



*Wild brown trout from above impassable falls*

Some lochs and streams have unique wild trout populations that have been isolated above impassable waterfalls for thousands of years.

Other waters are linked to the sea by rivers and support sea trout populations.

At the **Wester Ross Wild Trout workshop** in 2019, we learned much more about trout diversity in Wester Ross following collaborative research over many years including much work led by Dr Steve Kett from Middlesex University.

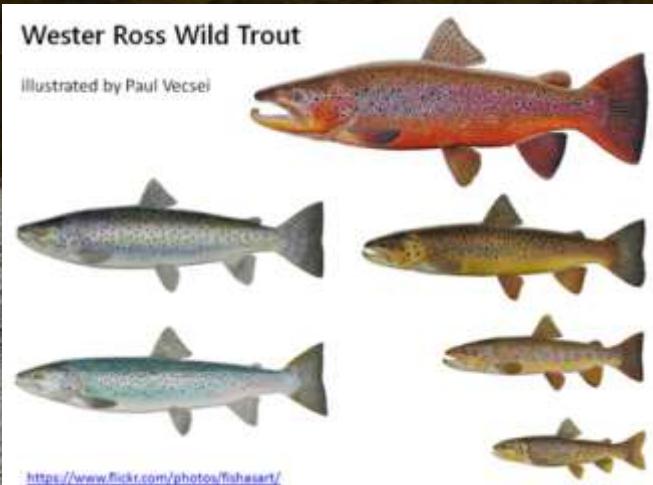


Middlesex University London  
Wester Ross Fisheries Trust  
Loch Maree Wild Trout Project

A first look at the population structure of Loch Maree wild trout

By Vu H. Dang – an MScles project  
Director: Dr. Steve Kett | Supervisor: Dr. Martijn Timmermans

SWRFT Trout workshop 2019



Loch Maree was the most famous and most productive sea trout fishery in the Wester Ross area. For most of the 20<sup>th</sup> Century, anglers from far away returned to the Loch Maree Hotel from where up to 12 boats each with a ghillie (fishing guide) set out each day from May until October in their quest for fabled sea trout.



In 1955 a British record rod caught sea trout of almost 20lb (9kg) was caught near Ash Island in Loch Maree. Many other sea trout of over 10lb were caught in Loch Maree during the 20<sup>th</sup> century; but so far, none since.

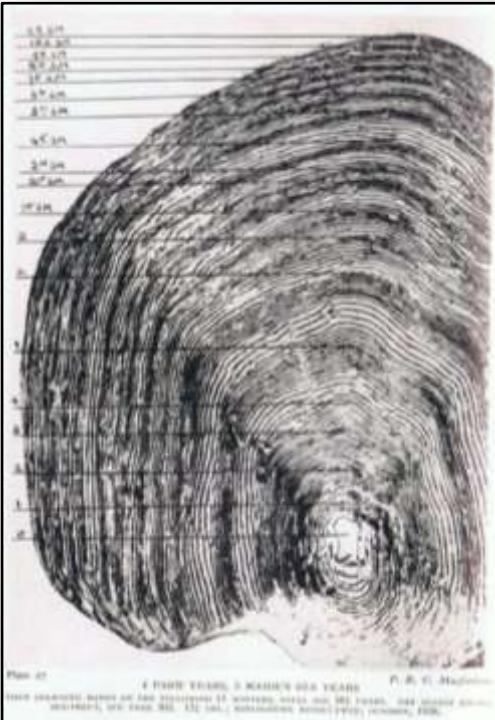
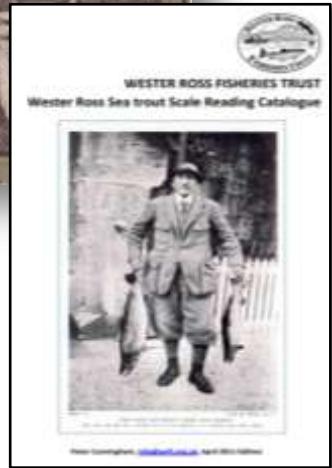
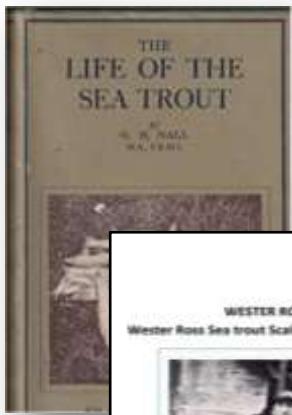


*Former British record sea trout*



The big sea trout grew slowly returning to the sea to feed many times before attaining their remarkable size.

A sea trout caught in the Kinlochewe River in 1928 aged by Herbert Nall (1930) at 18 years old may still be the oldest wild sea trout known in Europe.



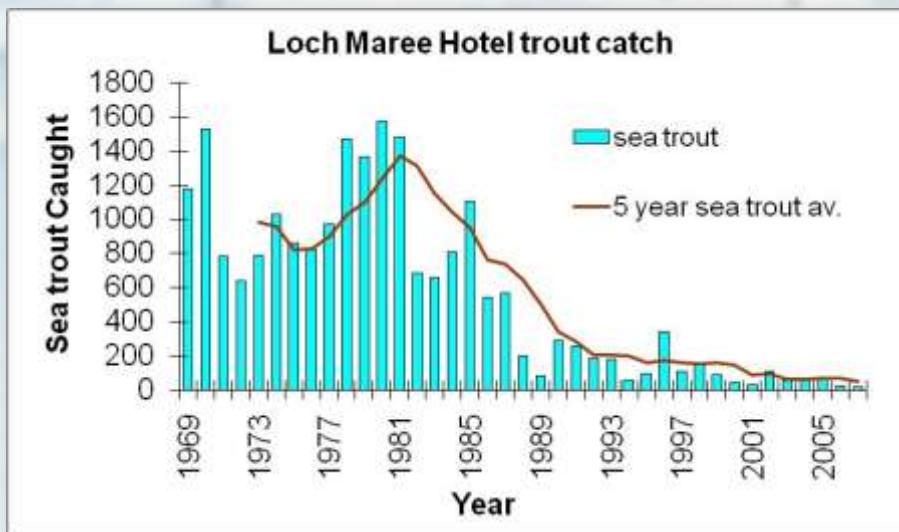
*The biggest sea trout sampled by WRFT to date was this fish of 59cm in length, Gairloch, 2010*



At the end of the 1980s and during the early 1990s the Loch Maree sea trout fishery collapsed. The big fish disappeared.

Anglers reported finding high numbers of parasitic sea lice on 'early returned' sea trout in the River Ewe.

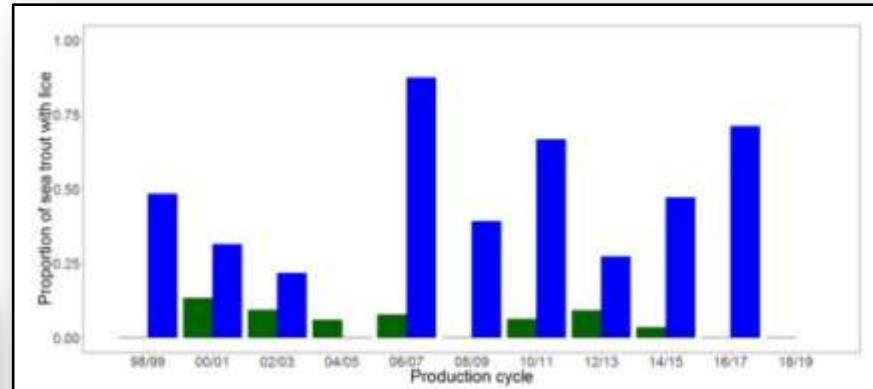
Then during the 1990s, anglers stopped coming and the fishery went into decline with the loss of many jobs and much unhappiness.



WRFT biologists together with colleagues elsewhere including Marine Scotland Science in nearby Loch Torridon have collected much data demonstrating links between sea lice infestation of sea trout, reduced growth and survival of sea trout, and proximity to open cage marine salmon farms.



*Sea lice on sea trout caught by WRFT in Loch Gairloch*

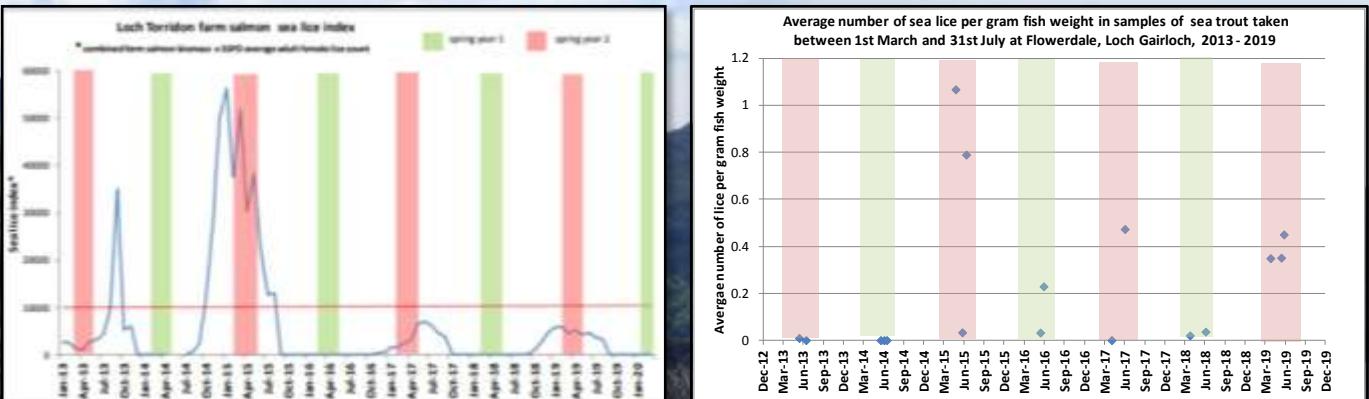


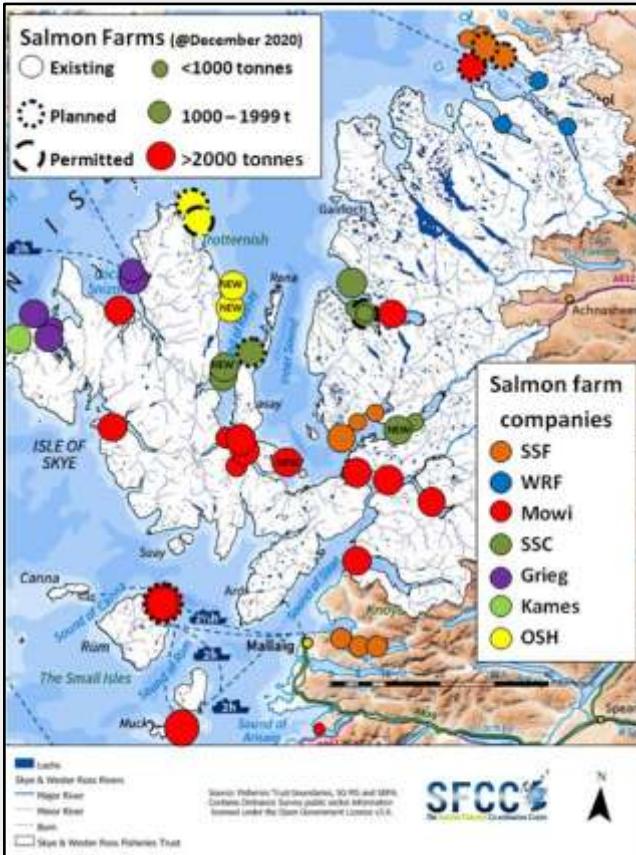
The proportion of trout sampled in the lower Shieldaig with lice in relation to fish farm production cycle. Green bars are those in the first year of production, blue are in the second year.

Please see: <https://www.gov.scot/publications/aquaculture-interactions-shieldaig-field-station/pages/lice-burdens-in-the-lower-reaches-of-the-river-shieldaig/>.

The sea lice problem typically manifests itself where nearby salmon farms are in the second year of the two year farm salmon production cycle.

Larval salmon lice are dispersed away from salmon farms and may remain infective for up to 15 days after being shed by the adult female lice on host fish.





For this reason, there is much concern about increasing farm salmon production in areas where existing farms have failed to control sea lice to safeguard wild fish.

Cumulative larval sea lice production on salmon farms around the Isle of Skye and Lochalsh poses a growing threat to wild fish in Wester Ross and as far away as west Sutherland.



There is already more than enough scientific evidence demonstrating the threat to wild salmon and sea trout for precautionary action to be taken.

**How much worse does the situation for our sea trout and wild salmon populations have to get before adequate regulation for sea lice on salmon farms?**

ICES Journal of  
Marine Science

ICES Journal of  
Marine Science  
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ISSN 0020-7903 (print)  
ISSN 1465-7610 (electronic)

Original Article

Changes in growth and migration patterns of sea trout before  
and after the introduction of Atlantic salmon farming

The image shows the front cover of the ICES Journal of Marine Science, Volume 69, Number 1, January 2012. The cover features a photograph of a salmon farm with numerous green buoys and cages in a body of water. The title 'ICES Journal of Marine Science' is prominently displayed at the top. Below the title, the journal's acronym 'ICES OEM' is shown next to a blue circular logo. The abstract area contains the following text:

**1443 Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout**

Eva B. Throndset  
Bengt Frostad

Original Article

**Salmon lice-induced mortality of Atlantic salmon during post-smolt migration in Norway**

Ingrid A. Johnsen<sup>1</sup>, Alison Harvey<sup>2</sup>, Pål Harvold Sørøi<sup>3</sup>, Anne D. Sarrebik<sup>2</sup>, Ola Ugleid<sup>2</sup>,  
Ragni Ådlandsvik<sup>2</sup>, Vidar Wimerekk<sup>2</sup>, Karen A. Gjørv<sup>2</sup>, and Øyvind Karlsen<sup>2</sup>

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Editorial: Ingrid A. Johnsen, Pål H. Sørøi, Ingvild B. Jørgensen, Øyvind Karlsen, and Gjertrud B. Tømmervik  
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The expansion of salmonid aquaculture has created environmental challenges, including salmon lice that may infect farmed and wild fish. Wild Atlantic salmon generally stay closer to shore than do farmed fish, the first phase of their journey in the coastal zone where salmonid diseases, in particular salmon lice, are most prevalent. During the spawning migration, the post-smolt migration, we have assessed the impact of salmon lice on wild Atlantic salmon by comparing the prevalence of lice infestation in wild salmon with those using a combination of areas of low, intermediate and high lice burdens. To estimate the historical prevalence of wild salmon lice throughout Norway, the infestation level on the ventral pre-smolt tail segment was observed on wild one-year-old genetically marked salmon from three areas of origin. The tail infestation prevalence increased with post-smolt age, reaching about 40% among 1-year-olds and 60–70% among 2-year-olds. The prevalence of wild salmon lice was higher in the central and southern parts of Norway (mean 50%) than in the northern part (mean 30%). The prevalence of salmon lice in farmed salmon was higher than in wild salmon in all areas, with the highest prevalence occurring in the central and southern parts of Norway (mean 40% for 1-year-olds and >50% for 2-year-olds). In 2008, increased mortality rates were together with other data an important predictor of salmon lice abundance in Norway. The relationship between salmon lice infestation, representing a genetic tail sample or smolted salmonids, management, mortality, fishing, rainfall, and fish density

**Keywords:** Atlantic salmon, pre-smolt, aquaculture, epizootiology, salmonid management, mortality, fishing, rainfall, fish density

The best salmon farmers are wild fish enthusiasts too! We have always strived to maintain friendly relations with local salmon farm staff.

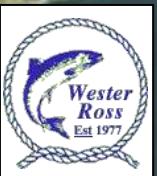
The old Wester Ross Fisheries Trust received much support for sea trout monitoring and other work from several salmon farming companies.



And there have been some big improvements in on-farm sea lice management, demonstrating that where there is the will, there is a way.

In recent years, Wester Ross Fisheries, a locally owned, locally managed company with marine salmon farms in Loch Kanaird, Loch Broom and Little Loch Broom has achieved and sustained very low on-farm salmon lice levels.

Since 2015, elevated on-farm sea lice levels have been prevented using only locally sourced cleaner fish (wrasse) and skilled hands-on husbandry.



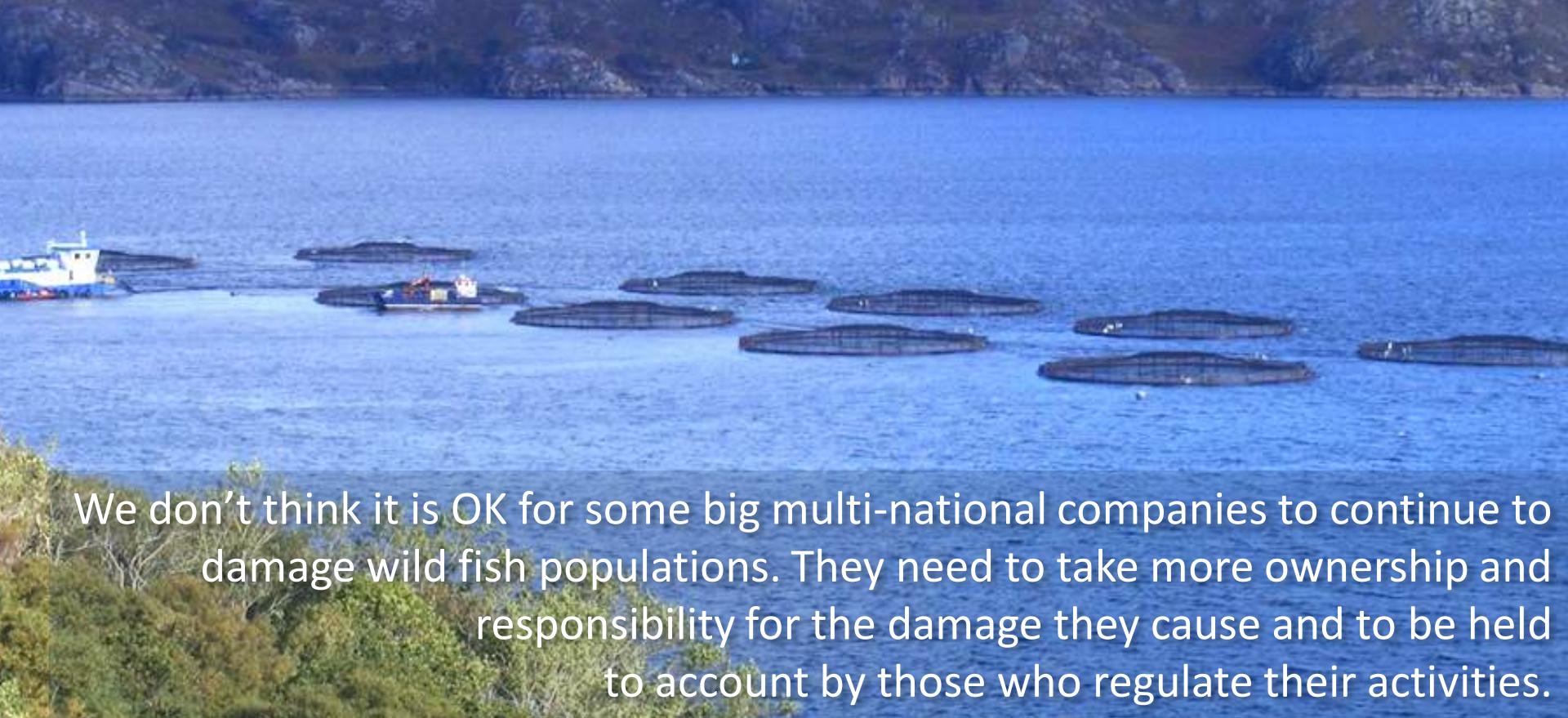
Ballan wrasse

We know that wild sea trout can recover where on-farm sea lice are properly controlled . . .



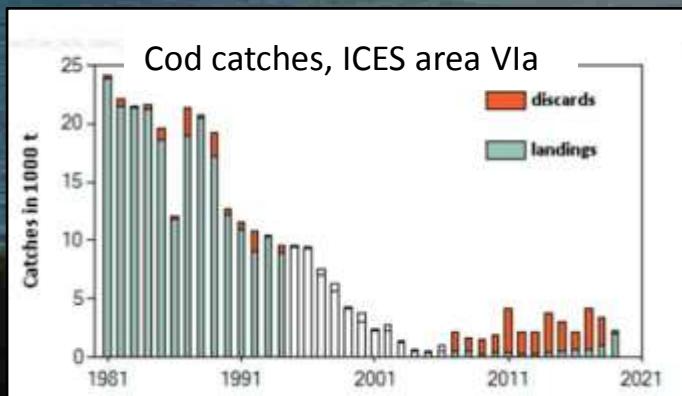
*Sea trout of about 450mm dropped by an osprey near the mouth of the River Kanaird, April 2017. Apart from claw marks, the fish was in good condition (photo by Ailsa Hayes)*

So why can't **all** fish farm companies control their on-farm sea lice down to near zero so that wild fish populations are able to recover?



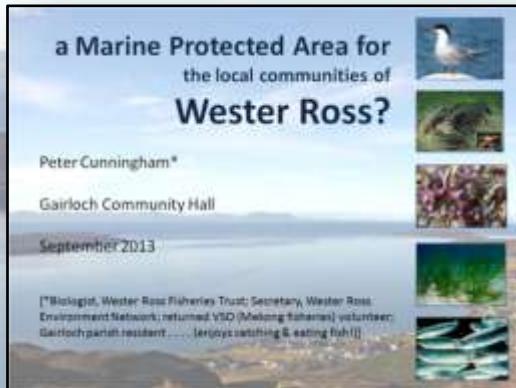
We don't think it is OK for some big multi-national companies to continue to damage wild fish populations. They need to take more ownership and responsibility for the damage they cause and to be held to account by those who regulate their activities.

For wild salmon and sea trout, problems in the sea are not just about sea lice. Many fisheries for other marine fin-fish species declined or collapsed in the 1990s and early 2000s following the removal of the three mile coastal limit by the Inshore Fisheries Act in 1984.

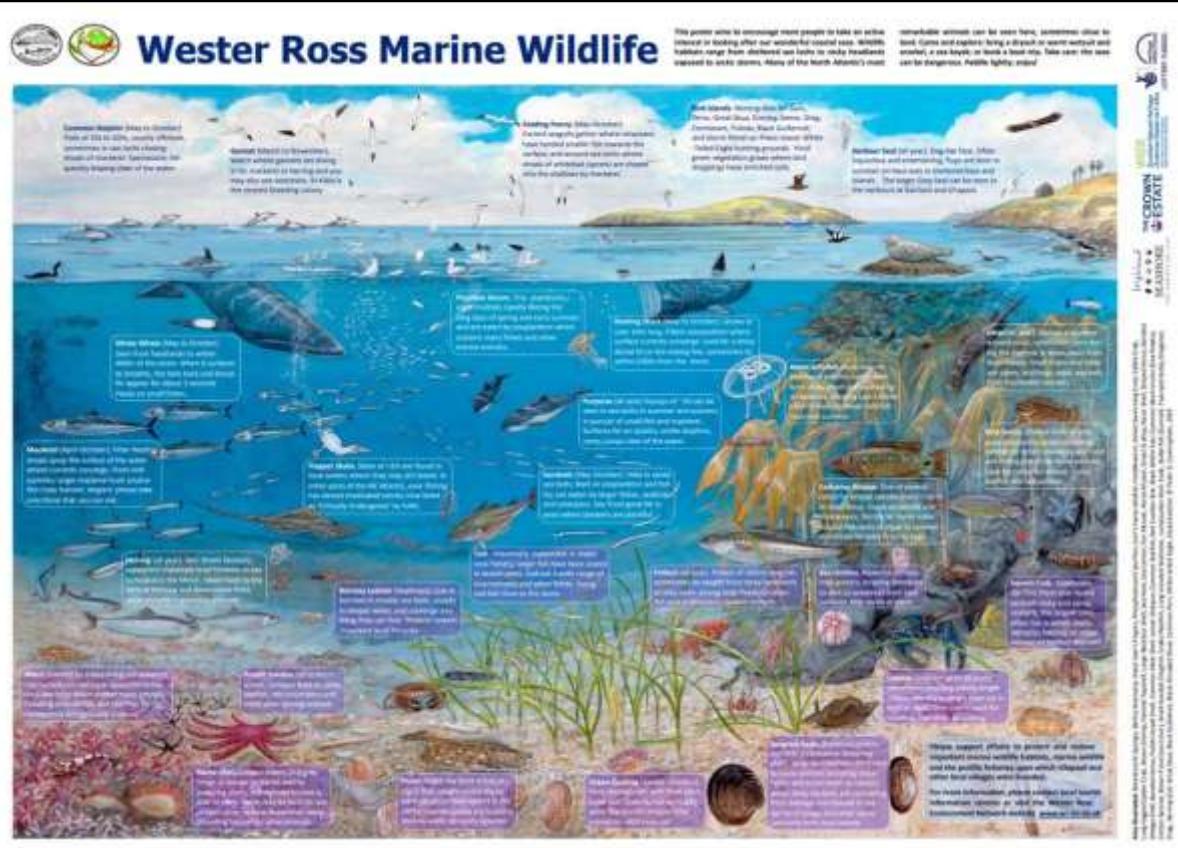


*Derelict seafood factory, Gairloch 2003*

The old WRFT recognised the need to take an ecosystem approach and to protect and restore coastal habitats of importance to marine fisheries and other wildlife. In 2012, a local community bid was submitted to the Scottish Government in support of a Marine Protected Area in local waters; subsequently the 'Wester Ross Marine Protected Area' was designated.



A Wester Ross marine wildlife poster was published by The Highland Seashore Project to highlight some of the habitats and spectacular wildlife in coastal waters.



Several other local marine community groups are now actively looking after coastal habitats with support from Nature Scot.



Sea trout habitat

In 2019, the Trust supported filming of herring spawning on the seabed to the west of Loch Gairloch by the late Andy Jackson. This generated much interest in reviving wild herring populations for the benefit of local people and other fishes.

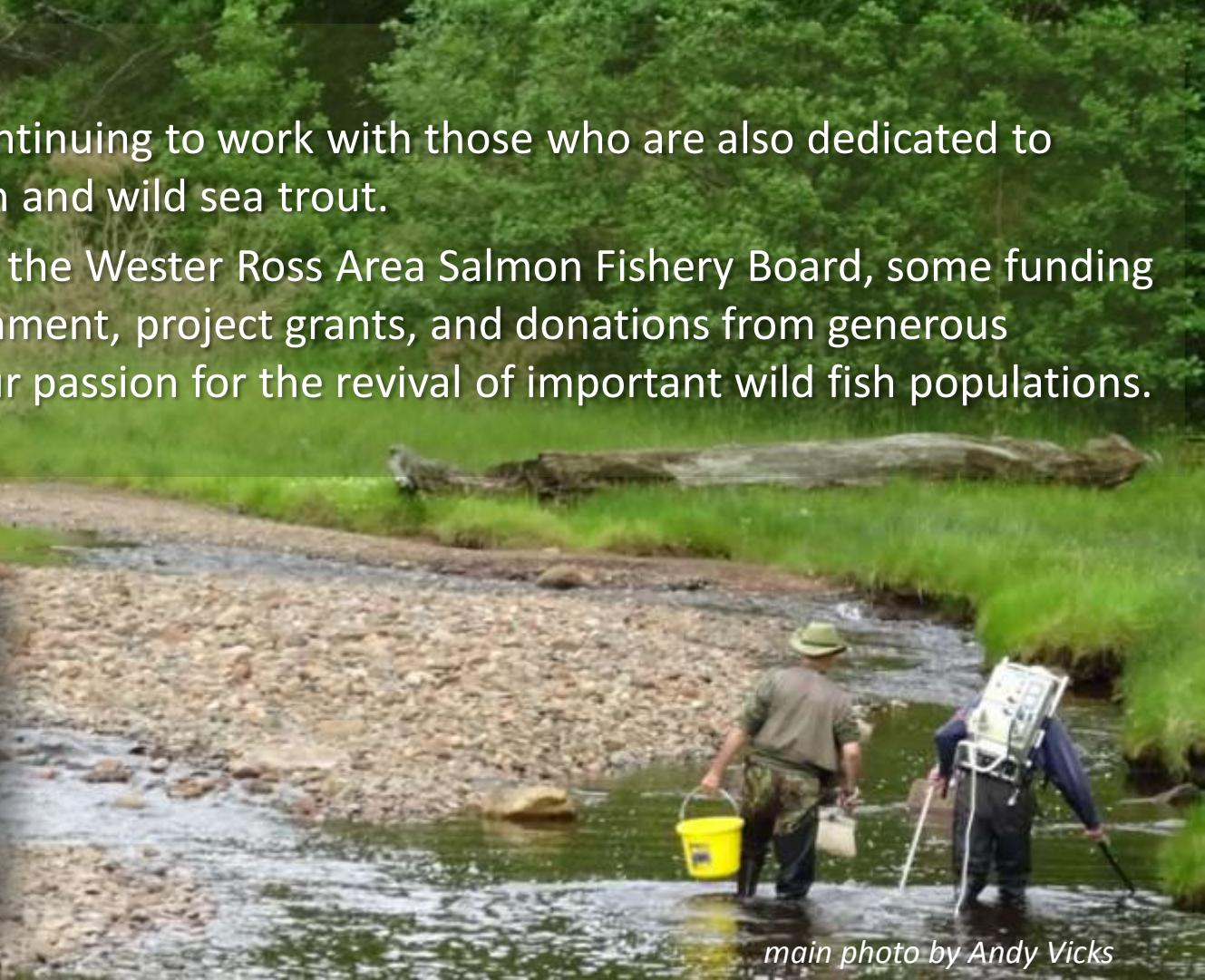


*Herring eggs on  
maerl gravel  
(by Andy Jackson)*

## So to the future?

Our focus remains on continuing to work with those who are also dedicated to looking after wild salmon and wild sea trout.

We rely on support from the Wester Ross Area Salmon Fishery Board, some funding from the Scottish Government, project grants, and donations from generous supporters who share our passion for the revival of important wild fish populations.



*main photo by Andy Vicks*

We'll continue to invest in education and raising awareness: our work is primarily for future generations, for those who follow.

With the continued support, financially and in kind, of those who share our dedication towards the revival of wild fish populations, much more will be achieved.



*Gairloch sweep netting teams*

And perhaps some of us will be lucky enough to see or perhaps even  
to catch a big sea trout in Loch Maree?



*photos by Peter Cunningham  
and Robin Ade*

If you would like to support our work, please contact [info@wrft.org.uk](mailto:info@wrft.org.uk). Thank you.

