

News release – 12.00, Wednesday 7 February 2024

Innovative techniques used to detect the presence of invasive non-native Pink salmon in Scotland

We are delighted to announce the summary findings from a national surveillance programme, funded by the Scottish Government and delivered by a partnership of organisations last year, that will help us understand better the presence and distribution of invasive, non-native Pink salmon (*Oncorhynchus gorbuscha*) in rivers across Scotland. Pink salmon are native to the Pacific Ocean but are now appearing in Scotland's rivers in increasing numbers. They represent a threat to the country's unique aquatic biodiversity and freshwater fisheries.

The study uses an innovative approach of examining environmental DNA (eDNA), genetic material left behind by fish and collected in riverine water samples, to infer presence of Pink salmon in the studied rivers. In the laboratory, Pink salmon eDNA can be detected and distinguished from other fish species without the need to directly observe or capture fish, offering a powerful and non-damaging tool for biodiversity monitoring.

One phase of the monitoring programme was funded by the Scottish Governments' Marine Fund Scotland while the other phase was resourced and delivered in parallel by the Scottish Environment Protection Agency (SEPA) and Marine Directorate of the Scottish Government (MD). The sampling was co-ordinated by partners of the Pink Salmon Task Group which comprises Fisheries Management Scotland, MD, NatureScot, SEPA and the Dee and Ness District Salmon Fishery Boards. The Task Group was established to monitor the extent of the Pink salmon invasion and prioritise and facilitate appropriate management actions. At a local level, these management measures can include targeted netting, trapping and electrofishing to remove Pink salmon before they spawn.

Water samples were collected from 32 Scottish rivers in late summer 2023 in two separate surveys. In the laboratory, using Pink salmon species-specific molecular tools, the presence of Pink salmon eDNA was identified and this enabled the project to predict where Pink salmon occurred in rivers. This approach adopts a more systematic survey method than previous programmes that relied on reported data on catches and observations from anglers.

Pink salmon eDNA was consistently detected in 10 out of 32 studied rivers, demonstrating presence of these fish in these rivers. On a further five rivers, the presence of Pink salmon was suspected with various levels of confidence, inferred from the consistency of detecting eDNA in repeated water samples. Pink salmon eDNA was detected in rivers located on the east, west and north coasts of Scotland. The full findings of the programme will be published in due course.

The Marine Fund Scotland also supported the installation and operational costs of a bespoke trap which was installed in the River Thurso with a view to preventing any Pink salmon which entered the river, continuing upstream to spawn. The trap was designed to allow native Atlantic salmon to be safely released to continue their natural migration.

Brian Davidson of Fisheries Management Scotland, commented, " *Fisheries Management Scotland is working closely with our partners to mitigate the risk of this invasive non-native species to our freshwater fish populations. Working with partners in the Marine Directorate, NatureScot and SEPA, we are delighted to be able to utilise the funding awarded by the Marine Fund Scotland to help us better understand the extent of Pink salmon in Scotland and inform future management actions.*"

Prof Colin Bean of NatureScot said, *“Collating data on the distribution on non-native species is notoriously difficult, and this is especially so for aquatic species because they can be hard to see and also because capture can be biased towards areas of highest angling pressure. The development of surveillance programmes that eliminate this bias and can increase the probability of detection of non-native species, is essential if we are to identify those rivers which are at highest risk. This new approach, which includes data collected from anglers and public, as well as the deployment of a state-of-the art environmental DNA strategy, has already provided us with some useful insights as to the true extent of the Pink salmon invasion in 2023. It also demonstrates how Government agencies, District Salmon Fishery Boards and Fishery Trust biologists can work together to deal with this emerging Pink salmon issue.”*

SEPA's Fish and Biodiversity team leader, Dr Scot Mathieson, said: *“SEPA is pleased to have contributed to this innovative monitoring project, using the emerging potential of environmental DNA to gain a clearer picture of where Pink Salmon are arriving in Scottish rivers. The project was only possible through close collaboration with partners, and we will continue to work with them to develop appropriate responses to this invasive non-native species.”*

Dr. Iveta Matejusova of Marine Directorate said: *This eDNA-based monitoring has contributed to a more robust understanding on presence and distribution of Pink salmon in Scottish rivers, especially from rivers less visited by anglers and where instances of Pink salmon might be underestimated. As water collection does not require any specialized equipment, a wide range of personnel including citizen scientists could be involved in future, enabling to expand such monitoring to additional rivers and maximizing the opportunities this approach offers.*

Notes for editors

In 2017, unprecedented numbers of non-native pacific Pink Salmon were captured across Scotland. A similar situation occurred elsewhere in the UK, Norway, Finland, Iceland, Denmark and Germany. 2019, 2021 and 2023 saw further invasions of these into Scotland's rivers. This invasive, non-native species is likely to have strayed from some of the rivers in northern Russia.

These fish were originally introduced to some Russian rivers in the 1960s, have slowly spread westwards and have now colonized some northern Norwegian rivers. They have a very different life history to Atlantic salmon, having a fixed, two-year lifecycle and generally spawning in summer. Due to their two-year lifecycle, Pink salmon are derived from distinct 'odd' or 'even' years, with the Russian/Norwegian fish being odd-year stocks. It was therefore likely that they would occur again in Scottish rivers in 2023. The reasons behind the unusually large numbers since 2017 remain unclear, but climate change is considered to be a factor.

In 2021, the River Thurso saw the largest incursion of Pink salmon of all Scottish Rivers, and therefore was chosen as the site to deploy and test a bespoke trap.

The number of native wild Atlantic salmon returning to their spawning grounds in the UK has fallen dramatically since the 1970s and wild Atlantic salmon could be lost from many of our rivers within our lifetime if we do not act now. The 'wild salmon crisis' is now widely recognised and concerted efforts are now underway to prioritise action to address these declines.

Over 2,000 plants and animals have been introduced to GB from all over the world by people. These are known as **non-native species**. Most are harmless, indeed the majority of our agricultural species (wheat, barley, sheep etc) are not native to GB, but around 10-15% become **invasive non-native species** which spread and have a harmful impact.

Invasive non-native species are one of the top five drivers of global biodiversity loss. They threaten the survival of native wildlife, damage our natural ecosystems, cost the Scottish economy nearly £500 million a year, and can even harm our health and interfere with activities we enjoy. Find out more <https://www.nonnativespecies.org/>

Pink salmon

For more information on Pink Salmon, visit:

Fisheries Management Scotland website: <http://fms.scot/Pink-salmon-in-scotland/>
[Scottish Government website](#) An [app](#) to report Pink salmon can be downloaded for free on Android and iOS devices. To locate and report a sighting of Pink salmon and other non-native species, open the app and follow the simple instructions.

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