



Atlantic Salmon Trust

2024

Putting #WildSalmonFirst



Wild Atlantic salmon are essential for our ecosystems, for communities and for our shared natural and cultural heritage. Our work aims to secure a long-term future for the species.

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Company registered in England: Reg No. 904293
Registered Charity No. England 252742 & Scotland SCO 37902

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Chairman's Introduction

Cold, clean water delivers stronger, fitter wild salmon smolts



Wild Atlantic salmon in Great Britain are now endangered and 2023 saw the lowest numbers of returning salmon ever recorded across the UK. Whilst there were glimmers of hope in 2024, and despite great efforts over recent decades, it is clear that there is still much work to be done on understanding the species and what is driving this decline.

The key question I ask myself is: what is going wrong and what can we do about it? While our team works tirelessly to understand exactly what is going wrong and what precisely the impacts of various pressures are having on wild salmon across the whole of their lifecycle, we can look at this question from another angle – what do we already know that works?

We know that **cold, clean water** in our river catchments results in stronger, fitter wild salmon smolts going to sea, that fitter smolts survive better at sea, and that more of these fish will return home as adults to spawn. This also applies to our coastal zone where we must give wild salmon clean water which is free from disease and parasites during the early part of their marine migration. This year's update therefore sets out how we are delivering the research required to define and quantify the causes of salmon decline, but also how we are taking

immediate action on the ground with partners to develop a growing network of catchment-scale restoration programmes delivering cold, clean water for stronger, fitter wild salmon and sea trout.

Our work takes place on land, in freshwater and at sea, and looks to identify positive solutions across the entire salmon lifecycle.

This work is not carried out in isolation. For wild salmon to stand a chance it is critical that organisations work together. As a member of the Missing Salmon Alliance our combined abilities cover research, restoration, community representation, advocacy, campaigning and the law. Together we are working to deliver a major international conference in January 2025 to align the sector and develop the finance streams needed to ensure that we are collectively delivering catchment scale restoration so wild salmon can thrive in cold, clean water.

The Atlantic Salmon Trust itself is now entering the second year of a five year programme defined by our '5 in 5' goals. This update outlines our progress towards those goals, designed to put us on the path to achieving our long-term vision.

Peter Landale, Chairman

Mission & Vision

Our Mission: To restore wild Atlantic salmon and their environment.

Our Vision: By 2050 the decline in wild Atlantic salmon has been halted across its range and numbers are increasing in over 50% of the catchments it calls home.

5 goals for the next 5 years

1

Define why salmon are declining and continue to fill knowledge gaps.



2

Identify and prioritise the manageable pressures influencing that decline, and publish up-to-date reports on the efficacy of interventions, such as stocking.



3

Design and conduct a catchment audit and roll out a suite of restoration solutions on each of our Core Rivers, using salmon restoration as the driver to achieve wider biodiversity and climate goals.



4

Demonstrate that our strategy is working, through proven short-term successes on the Core Rivers and create a predictive model to demonstrate the potential long term restoration success.



5

Create catchment partnerships to share successful solutions, supporting others to implement them in their own river watersheds.



Everything we do involves working in partnership with others, whether that's with the wider Missing Salmon Alliance, our international research partners, fishery boards and trusts, Government and its agencies, universities, industry, landowners, or local communities. When it comes to restoring wildlife, partnership working is not only desirable, it is absolutely essential. **Mark Bilsby, CEO**



The Big Picture

Why today's wild salmon restoration efforts must have a long-term vision

In December 2023 the International Union for the Conservation of Nature (IUCN) classified wild Atlantic salmon in much of Great Britain as 'Endangered', a downgrading from the previous classification of 'Least Concern', skipping past the two categories of 'Near Threatened' and 'Vulnerable' in the process. The new classification is based on a 30-50% decline in British populations since 2006 and 50-80% projected decline between 2010-2025, with a population trend categorised as 'Decreasing'. The global population of wild Atlantic salmon was also downgraded from 'Least Concern' to 'Near Threatened' as a result of global population declines of 23% since 2006, again with a 'Decreasing' population trend.

To put the status of British salmon in context, they now share their classification with the tiger, African wild dog, red panda, and Ganges river dolphin

To put the status of British salmon in context, they now share their classification with the tiger, African wild dog, red panda, and Ganges river dolphin amongst many others. Across the planet, over 45,300 species are listed as 'Endangered' or 'Critically Endangered' and are therefore threatened with extinction. This includes 41% of amphibians, 26% of mammals, 37% of sharks and rays, and 36% of reef corals. In 2024, the World Wildlife Fund (WWF) produced its most recent 'Living Planet Report' which found that global wildlife populations had plummeted by 73% on average since 1970. Freshwater biodiversity was found to have suffered the most, with monitored

freshwater populations having declined by an average of 85% in this period – more than any other species group. Habitat loss and barriers to migration accounted for around half the threats to these populations. In the same period since 1970 the number of dams has increased by 293%, CO₂ emissions by 146% and deforested land by 40%. Closer to home, the 2023 State of Nature Report concluded that Scotland, the UK's wild salmon stronghold, is one of the most nature depleted countries in the world.

The purpose of stating these figures in this update is to highlight the fact that the wild Atlantic salmon decline does not exist in a vacuum. For restoration efforts to be successful, it is vital that the species is not managed in isolation with quick fixes and sticking plasters, but instead that action is taken to tackle the root causes of the decline, viewing the recovery of the species far more holistically and within the context of the global twin crisis of climate change and biodiversity loss. The world is a vastly different place compared to 1970 and restoration efforts and management strategies must adapt to the challenges of this new world.

While there are undoubtedly actions which can be taken in the immediate term to help the species which may give a quick boost to individual wild salmon populations, such as reducing pollution, removing barriers to migration and eliminating the impact of harmful industries, our 2050 Vision for long-term recovery and sustainable populations of wild salmon will be delivered by working at a significantly larger scale than has been carried out in the past. This vision will give wild salmon the habitats and environmental conditions they need to adapt, survive and thrive in a changed world.

Resilience and adaptation in the face of climate change

Wild Atlantic salmon are under pressure from climate change because they need **cold, clean water**. This is the mantra of the Missing Salmon Alliance, of which the Atlantic Salmon Trust is one of six partners, and was first used at the 2021 United Nations Climate Change Conference (more commonly referred to as COP26) in Glasgow. This phrase represents, in the simplest form, what must be delivered by wild Atlantic salmon restoration efforts in today’s world to build resilience into our river catchments and their surrounding landscapes to allow time for the species to adapt to rising temperatures, new weather patterns and changing ocean conditions.

By delivering cold, clean water to send stronger, fitter wild salmon smolts out to sea in greater numbers, we will achieve far-reaching benefits for the wider environment, wildlife and communities.

The scale of this work will require cooperation and partnership with governments, industries, communities and access to significant public and private nature-positive finance sources.

By delivering cold, clean water for wild Atlantic salmon we will achieve far-reaching benefits for the wider environment, wildlife and communities

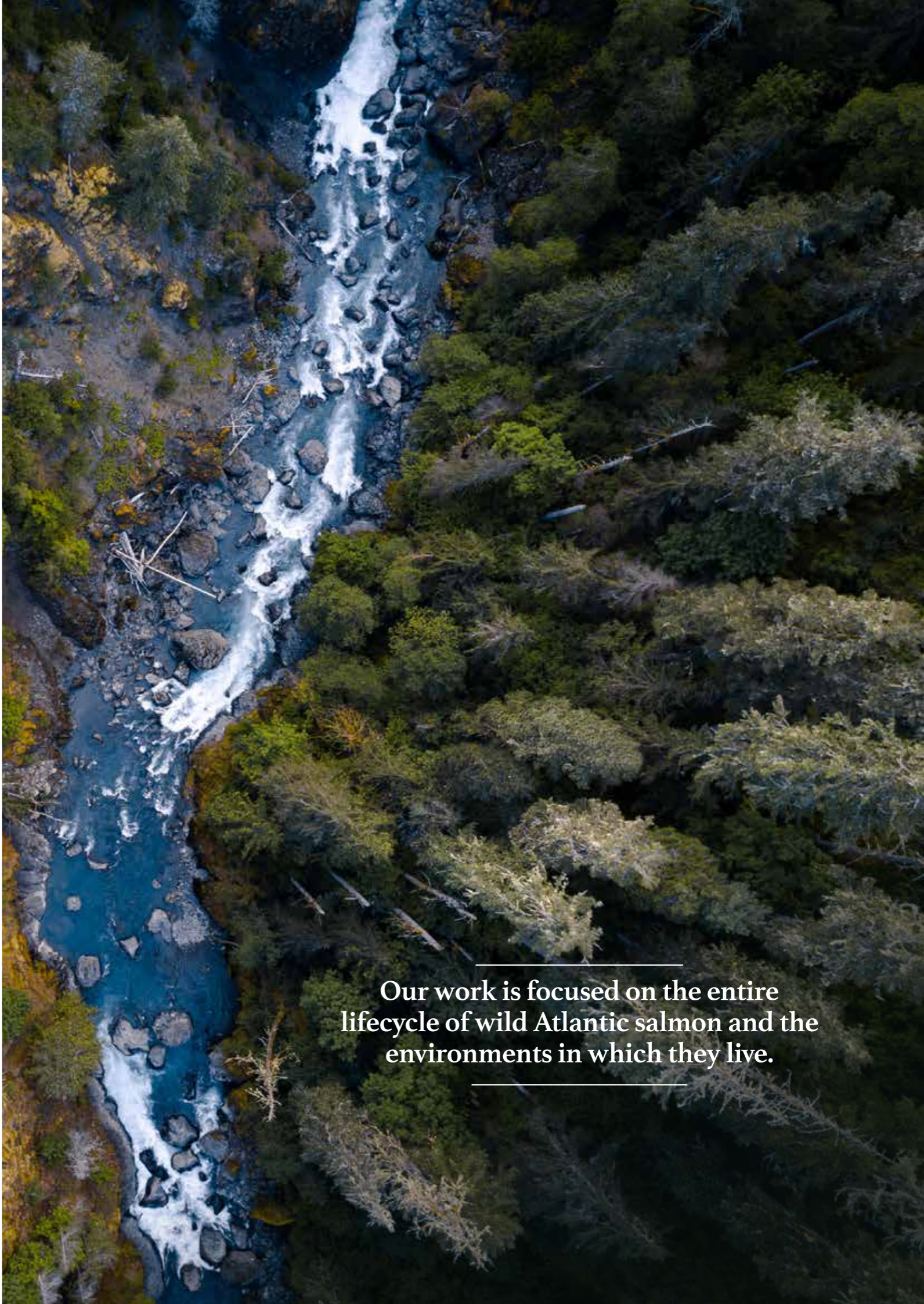
Wild Atlantic salmon are both a keystone and indicator species – critical to the overall structure and functioning of their ecosystem and reporting back to us about the health and condition of the environment. With their incredible lifecycle, in which they begin life in freshwater, migrate out to the ocean to reach adulthood, and then return to their home rivers to spawn (often dying



afterwards), their bodies are a unique transportation vessel for marine-derived nutrients to be delivered far up into our freshwater catchments. They play a key role in supporting wider species biodiversity, including through symbiotic relationships in which wild Atlantic salmon are essential to the survival of other species, for example some populations of freshwater pearl mussel, whose larvae can only survive by clinging to the gills of juvenile wild Atlantic salmon. Without salmon, the pearl mussels die, and the loss of these two species together has a knock-on impact on the rest of the ecosystem and the species which rely on them as prey.

Therefore an ecosystem-wide approach, including the coastal and marine zones, which combines catchment-scale restoration activity with sophisticated monitoring, is how the Atlantic Salmon Trust and our partners are now working to achieve the long-term recovery of the species. Our work is focused on the entire lifecycle of wild Atlantic salmon and the environments in which they live.

It is our firm belief that the successful long-term recovery of wild Atlantic salmon is possible, as is the realisation of our 2050 vision, if we take action now at scale and at pace. Our 5 in 5 goals represent the first stage of work, which will allow us to begin the journey on the long-term path ahead to securing a thriving future for the species.



Our work is focused on the entire lifecycle of wild Atlantic salmon and the environments in which they live.

How We Work

Our wild salmon restoration stream – the route to long-term recovery



To secure a long-term future for wild Atlantic salmon in biodiverse and climate resilient river catchments, our workflow is focused on demonstrating successful evidence-led restoration at a catchment scale and supporting others to take action.

1 Likely Suspects Framework

Delivered on behalf of the Missing Salmon Alliance, the Likely Suspects Framework is key to our evidence-led approach. It models complex data, collating all the knowledge we have about the influences on wild Atlantic salmon survival at each lifestage. It then transforms this knowledge into a practical, functional management tool (known as the Decision Support Tool or DST) for salmon managers to help identify which lifestages should be targeted with restoration action in their own river catchments to best achieve wild salmon recovery.

3 Watershed Connections

Our Watershed Connections programme is how we take restoration techniques and solutions, and deliver them through partnership, supporting local groups to lead their own catchment-scale restoration programmes. This element comprises project design, delivery, governance, management, fundraising and communications support. It aims to connect and align wild salmon restoration efforts at a regional, national, and ultimately international level to achieve widespread species recovery across the North Atlantic.

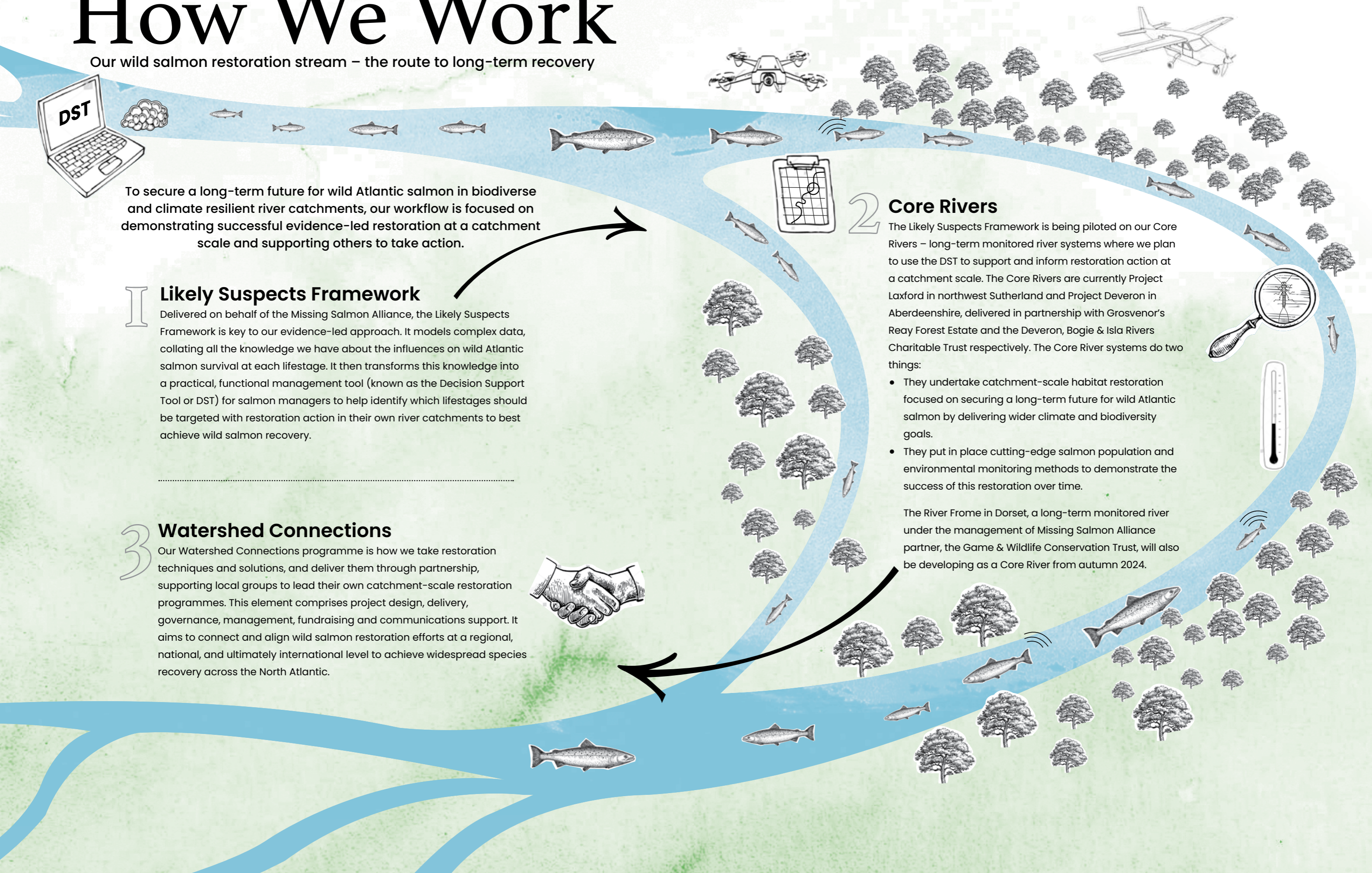


2 Core Rivers

The Likely Suspects Framework is being piloted on our Core Rivers – long-term monitored river systems where we plan to use the DST to support and inform restoration action at a catchment scale. The Core Rivers are currently Project Laxford in northwest Sutherland and Project Deveron in Aberdeenshire, delivered in partnership with Grosvenor's Reay Forest Estate and the Deveron, Bogie & Isla Rivers Charitable Trust respectively. The Core River systems do two things:

- They undertake catchment-scale habitat restoration focused on securing a long-term future for wild Atlantic salmon by delivering wider climate and biodiversity goals.
- They put in place cutting-edge salmon population and environmental monitoring methods to demonstrate the success of this restoration over time.

The River Frome in Dorset, a long-term monitored river under the management of Missing Salmon Alliance partner, the Game & Wildlife Conservation Trust, will also be developing as a Core River from autumn 2024.



Understanding where and
why salmon are declining.

The Lifecycle View

The Likely Suspects Framework

Understanding why wild salmon are declining and what we can do about it

What it is

The Likely Suspects Framework comprises several workstreams, but at its heart is a data model. The team developing this model on behalf of the Missing Salmon Alliance is bringing together everything we know about wild Atlantic salmon, from our own research and the work of others, to quantify what influences salmon survival success at each individual stage of their lifecycle – egg, fry, parr, smolt, salmon at sea, and returning adults. This is key to understanding why salmon are declining and prioritising the causes.

Highlighting where restoration action can help

A practical software support tool, known as the Decision Support Tool (DST), is being developed from this model. It is a work in progress but aims to help salmon managers make the best decisions in their own river catchments, ensuring the right salmon lifestages are being targeted with restoration action. This will also more precisely highlight and quantify the impact of damaging activities. The tool looks to support decision making in freshwater, estuaries, the coastal zone and the ocean, as well as helping to identify where there are knowledge gaps that need to be filled.

How it works to support wild salmon restoration

As an example of how the tool might be used in practice, let us consider a situation where a river manager has identified that they have high mortality in the egg lifestage due to redd (salmon nest) washout from winter flooding events, as well as high mortality in the fry/parr lifestage due to high temperatures in the summer. The manager therefore wants to know what the effect will be if action is taken to increase survival in these lifestages.

By doing the necessary groundwork to understand and quantify salmon mortality and growth relationships in their own unique river catchment, the manager can set up the DST platform with this locally gathered knowledge. The DST model can then work with these numbers to generate a range of scenarios which may arise from action carried out to achieve improved survival of their target lifestages.

For this example, work may include activities such as carrying out wetland restoration to slow the flow of water off the landscape and native riverside woodland restoration to provide shade and thermal protection. If the outcome results in an increase in returning salmon numbers, the manager can move ahead with confidence that they are taking the correct lifestage-targeted decisions on the landscape. The predicted effect can be compared against other lifestage targeting options to see where efforts and resources are best focused for the ➤

› long-term benefit of their salmon population. They can also create a 'do nothing' scenario and, using future temperature predictions for example, show what would happen to their salmon population in the future if no restoration action is taken and environmental conditions continue to degrade. Not only is it envisaged that the tool will help support decision making in individual river catchments or subcatchments, but due to its incorporation of coastal and marine lifestages, it also has the potential to help focus coastal and marine management actions and advocacy strategies at a much larger regional, national or international level. It is anticipated that the ability to test scenarios, and predict the outcome of various lifestage survival interactions, could be applied to all sorts of activities to facilitate long-term species recovery for example: in-river barrier removal, improving flow rates, improving water quality, reducing thermal stress, riverside woodland restoration, reducing sea lice infestation in the coastal zone, reducing marine bycatch, the impact of predation management, reducing the exploitation of returning adult fish, and a whole range of other possible decisions.

The DST programme is being developed with practical support from governmental agencies and partners across the Atlantic and the Pacific. A prototype version is being piloted by the Missing Salmon Alliance on the Frome in Dorset, led by the Game & Wildlife Conservation Trust, and on the Atlantic Salmon Trust's Laxford and Deveron Core Rivers in Scotland, testing its capabilities in practice to focus restoration efforts.

Progress Timeline

2020

Work begins.

2021

Development of SalHub data library.

2022

Data model created.

2023

Decision Support Tool successfully passes proof-of-concept stage following engagement with river boards & trusts, and government agencies via a series of workshops.

2024

The tool is now being piloted on the rivers Frome, Laxford and Deveron to inform restoration action on the ground.

Atlantic & Pacific Support

The team working on the programme is in regular contact with international counterparts who directly inform fisheries policy through the International Council for the Exploration of the Sea (ICES) Working Group on North Atlantic Salmon (WGNAS) - the group which advises the North Atlantic Salmon Conservation Organization (NASCO).

New Research Published Through the Likely Suspects Framework

Research Paper: *Patterns of declining zooplankton energy in the northeast Atlantic as an indicator for marine survival of Atlantic salmon, ICES Journal of Marine Science* Emma Tyldesley, Neil S Banas, Graeme Diack, Richard Kennedy, Jonathan Gillson, David G Johns, Colin Bull

Whilst wild Atlantic salmon face many pressures in freshwater and in the coastal zone, recent declines have also been driven by a dramatic reduction in survival during the marine phase of the lifecycle over at least the last 50 years.

In 2024 the Missing Salmon Alliance team published a paper, led by Dr Emma Tyldesley, which links this drop in marine survival to declining zooplankton energy through the juvenile salmon food chain. Zooplankton is essential prey for the larvae of fish such as sandeel and blue whiting which young salmon 'post-smolts' (fish which

have entered the marine environment) rely on for feeding during their marine life phase.

The study found that 'zooplankton prey energy has significantly and dramatically declined over much of the northeast Atlantic, and specifically within key salmon migration domains, over the past 60 years.' The analysis included wild Atlantic salmon data from rivers around the British Isles and northern France, including the Bush in Northern Ireland, Corrib and Burrishoole in The Republic of Ireland, Tamar and Frome in England, Dee in Wales, North Esk in Scotland, and Bresle and Scorff in France, to build a regional picture.

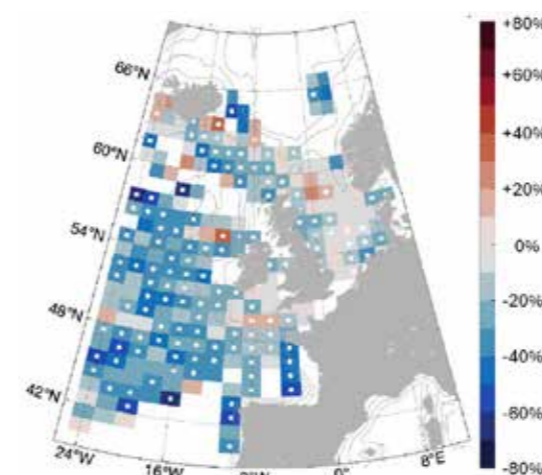
This work is now feeding into and refining the marine lifestage components of the Likely Suspects Framework data model and Decision Support Tool.

Scan the QR code to read this paper in full and our associated summary article, or visit atlanticsalmontrust.org



Scan the QR code to read this paper in full.

Percentage change in zooplankton energy per decade between 1958–2019



The study found that 'zooplankton prey energy has significantly and dramatically declined over much of the northeast Atlantic, and specifically within key salmon migration domains, over the past 60 years.'

Spotlight on Bycatch

French salmon smolts identified in Icelandic fish processing plant

By gathering and organising PIT (Passive Integrated Transponder) tagging data from salmon rivers across Europe and North America, in 2023 the Likely Suspects Framework data team was able to identify two salmon smolts from the river Scorff and Bresle in northern France whose tags were registered by a PIT detector in an Icelandic fish processing plant. While this finding represents just two individual fish, it raises an important question about the true scale of bycatch of wild salmon post-smolts at sea – an important research area which the Missing Salmon Alliance is now progressing.

What is a PIT tag?

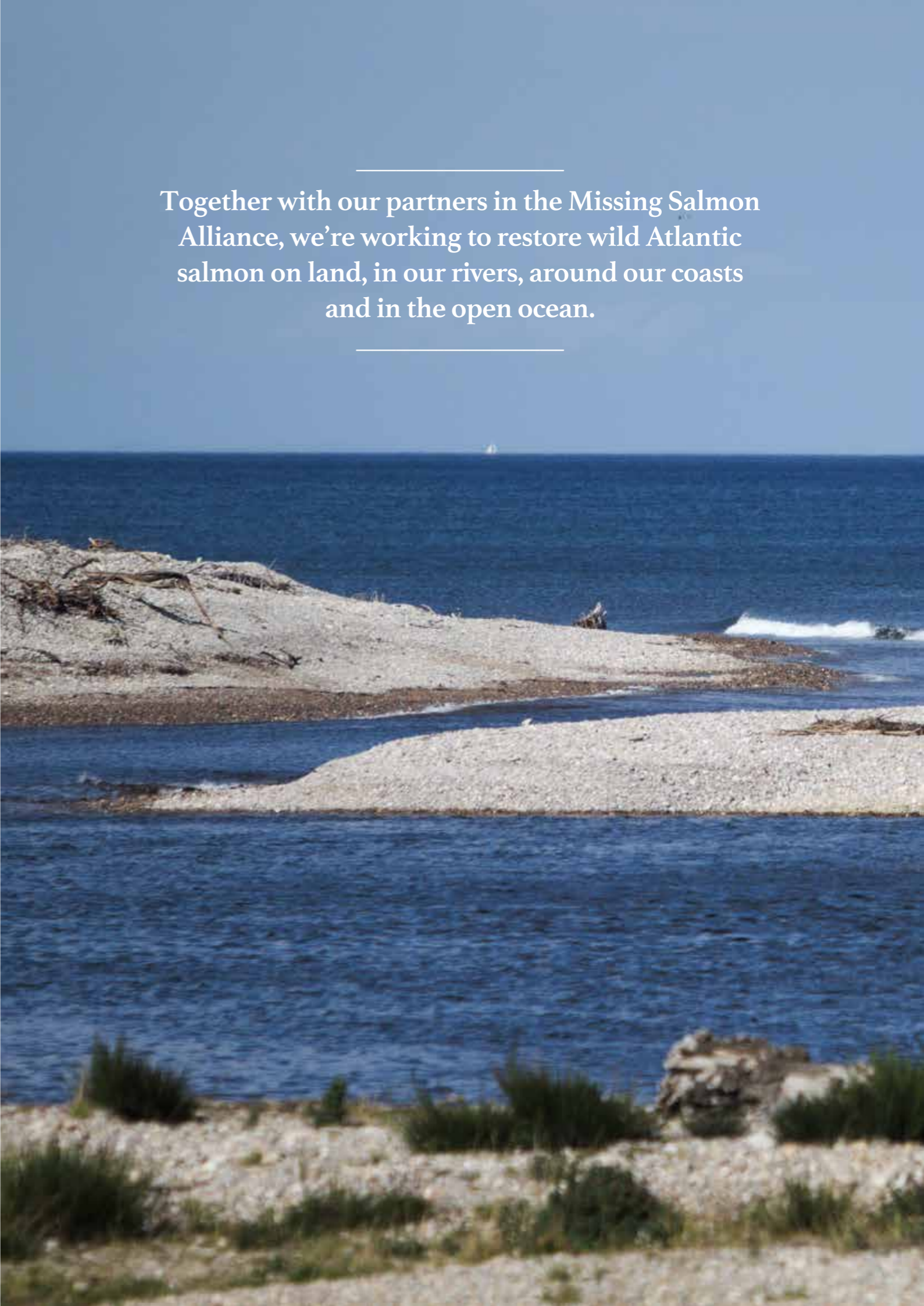
PIT (Passive Integrated Transponder) tags are small microchip tags (about the size of a grain of rice) which can be implanted into fish and don't rely on battery power to work. This means fish can be tracked over several years across their lifecycle from parr to returning adult whenever they come into range of PIT detection equipment.




Bycatch – an important research area which the Missing Salmon Alliance is progressing.



Together with our partners in the Missing Salmon Alliance, we're working to restore wild Atlantic salmon on land, in our rivers, around our coasts and in the open ocean.



An underwater photograph showing a large school of fish swimming in the middle ground. The foreground is filled with dense, dark green seaweed. The water is clear and blue, with sunlight filtering down from the surface.

Eyes on the Ocean

The most comprehensive study of the diet of wild salmon post-smolts found that sandeel was the most important prey item around the British Isles. In late 2023 we wrote to the UK Government to support the closure of the commercial sandeel fishery in English and Scottish North Sea waters.

Evidence For Impact

Understanding how to improve smolt and post-smolt survival

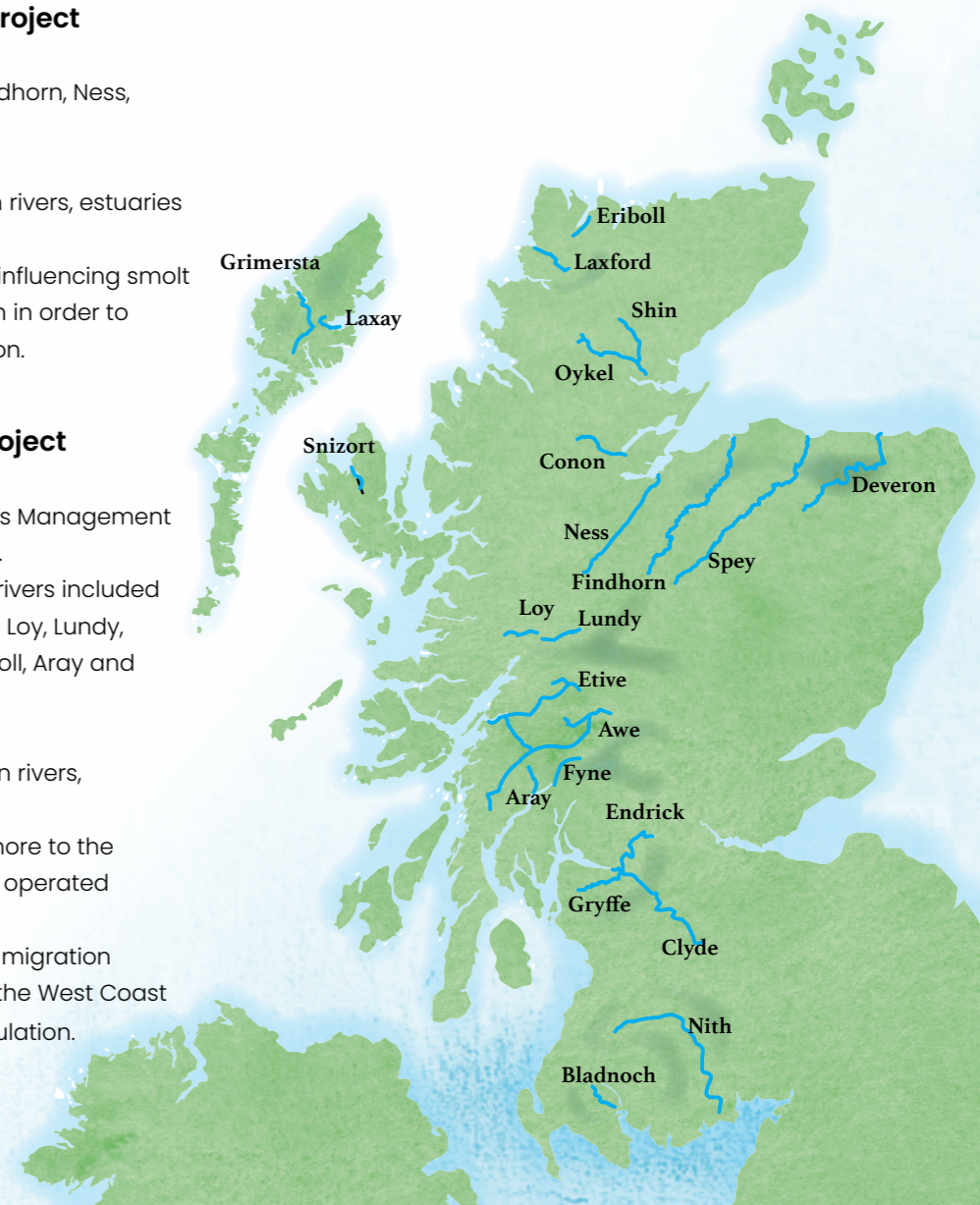
The acoustic smolt tracking work carried out via the Moray Firth Tracking Project and West Coast Tracking Project is now informing the Likely Suspects Framework data model, having studied the migratory behaviour of wild salmon smolts in-river, through freshwater lochs, sea lochs and in the coastal zone. In these projects, migrating smolts were implanted with battery-powered acoustic tags which emit a regular 'ping' which can be registered when the fish comes into range of acoustic receiver listening equipment. Having completed the fieldwork for those projects in 2022 and 2023 respectively, and then undergoing detailed analysis of the data obtained, the team is producing research outputs to inform both our data model and wider policy, management and restoration efforts.

Moray Firth Tracking Project

- 3 year study.
- 7 rivers included – Deveron, Spey, Findhorn, Ness, Conon, Oykel and Shin.
- 1,960 smolts tagged.
- 761 acoustic receiver deployments in rivers, estuaries and at sea.
- Designed to understand the factors influencing smolt migration success rates in the region in order to support management and restoration.

West Coast Tracking Project

- 3 year study.
- Delivered in partnership with Fisheries Management Scotland and the Marine Directorate.
- 15 West Coast and Outer Hebridean rivers included – Nith, Bladnoch, Clyde, Endrick, Etive, Loy, Lundy, Awe, Laxford, Laxay, Fyne, Snizort, Eriboll, Aray and Grimersta.
- 3,349 smolts tagged.
- 862 acoustic receiver deployments in rivers, estuaries, sea lochs and at sea.
- Furthest smolt tracked – 300km offshore to the northwest of Scotland by a remotely operated submersible vehicle.
- Designed to understand the coastal migration behaviour of wild salmon smolts on the West Coast of Scotland to inform policy and regulation.



Findings so far

Moray Firth Tracking Project

The Moray Firth Tracking Project was a three-year project which began in 2019 with data collection completing in 2024. The overall aim of the project was to investigate the early phase of the migration of juvenile salmon, as they journey downstream and out to sea for the first time. Specifically, investigating where smolts go missing in freshwater and their movement pathways in the Moray Firth. A remarkable amount of information was successfully obtained and is currently being analysed in detail. The thorough analysis of data is a labour-intensive process but an important one, ensuring that the outputs from this project have impact and can support practical management solutions to protect wild Atlantic salmon. Whilst this analysis is ongoing, the findings to date are:

- On average 40–90% of smolts do not make it to sea. There was great variability between rivers in the percentage of smolts detected as making it to sea in the same year (from 9% to 65% for example in 2019), as well as great variability for individual rivers across the years (for example on one river which ranged from 6% in 2022 to 74% in 2021). We are presently working to understand what is causing this variation.
- So far, we have ruled out poor tag detection or tag burden as having a significant impact on the number of fish detected making it to sea.
- Flow is critical to smolt survival – in high flow conditions more smolts survive and the opposite happens in low flows. This is an increasing problem with climate change.
- The loss of fish increases with distance of migration downriver. This may have greater impacts on smolts from spring salmon parentage, as they typically spawn in the upper reaches of a catchment.
- Predation has been highlighted as a concern during downstream migration of smolts, whether through the activity of predatory birds, fish such as trout and pike, or mammals. Research was commissioned to supplement the tagging data to understand

the behaviour (pike and trout) and diet (birds and mammals) of these predators.

- Where there are more barriers to fish migration more smolts die. We are currently bringing together the detailed tracking information and the research on predator diets to evidence the extent to which barriers exacerbate the opportunity for predation.
- The bigger a smolt or the better its physical condition, the greater the chance that it will survive.

Implications:

- As snowmelt becomes scarcer in the headwaters of the Moray Firth rivers and the spring months typically warmer and drier, catchment restoration should focus on maintaining water levels through peatland/wetland restoration and increasing habitat diversity.
- Artificial barriers to downstream passage of smolts should be removed, wherever possible, to best protect wild Atlantic salmon.
- Where flows are controlled through impoundments, consideration should be given to providing sufficient flows downriver to promote good smolt escapement. Historically, the focus has typically been on upstream migration.
- Bigger smolts, or those in better condition, survive better. Our focus should be on encouraging the conditions required to grow better wild fish without prompting them to go to sea earlier.

What next?

The team is now beginning to publish peer reviewed scientific papers to enable us to mobilise the evidence gathered and use it to positively influence management, policy and regulation to aid the long-term restoration of wild Atlantic salmon. This work will look to encourage catchment managers and policymakers to think about flows, barrier removal and land use to achieve greater smolt survival. Our publications will also look to better understand the impact of in-river predation.



Research Paper: Determinants of riverine migration success by Atlantic salmon (*Salmo salar*) smolts from rivers across the UK and Ireland. *Rodger, J.R, Guthrie, J, Honkanen, H.M, Lothian, A.J, Lilly, J, Walters, M, Miller, R, Hawkins, L, Reeve, A, Ribbens, J, Henderson, J, Parke, D, Green, A, Shields, B.A, Ramsden, P, Fletcher, M, Kettlewhite, A, Shaw, B, Burns, S, Laughton, R, Conroy, C, Daphne, C, Williams, K, Robertson, S, Bean, C.W, del Villar, D, Waters, C, Rosell, R, Cotter, D, Smith, M, Ó Maoiléidigh, N, Kennedy, R. & Adams, C.E., 2024.*

This paper investigated the environmental determinants of riverine migration success of salmon smolts – essentially, how river and surrounding land use affected and influenced smolts’ ability to successfully migrate down rivers and out to sea. This paper drew acoustic telemetry data together from both the Moray Firth Tracking Project and West Coast Tracking Project, as well as from partner organisations across the United Kingdom and Republic of Ireland. In total, 4,120 salmon smolts tagged across 22 rivers between 2019 – 2022 were included in this study. The study found that, at a population level, a number of landscape use and habitat type variables were found to predict migration success. These variables were the proportion of wetland and woodland in a catchment, which positively predicted migration success, and the proportion of grassland and peatland in the catchment which negatively predicted migration success. While it is important to note that in this study the state

of landscape variables (i.e. healthy or degraded) or the composition of landscape variables (i.e. for woodland ancient oak forest versus commercial conifer plantations) was not investigated in high resolution, this paper represents a significant first step toward identifying a link between landscape habitat types and in-river smolt migration success. Further work will look at this more closely, ultimately to support targeted landscape-level habitat restoration at scale.

Scan the QR code to read this paper in full and to view other outputs from the Moray Firth Tracking Project.



The Moray Firth Tracking Project was a significant undertaking involving partnership working with river boards, trusts and hundreds of volunteer hours. It is now beginning to demonstrate the potential

impact its work can have for wild Atlantic salmon. Links between pinch points, land use, habitat type and smolt migration success will now be looked at more closely, with the aim of supporting catchment-scale restoration action on the ground for long-term species recovery.

Professor Melanie Smith, Research Director

West Coast Tracking Project

Working together for better regulatory protection
of wild fish on Scotland's West Coast.

The West Coast Tracking Project is a partnership between the Atlantic Salmon Trust, Fisheries Management Scotland and the Marine Directorate (formerly Marine Scotland), with scientific support from the University of Glasgow. The aim of the project is to investigate the behaviour and dispersion of juvenile wild Atlantic salmon smolts as they migrate through sea lochs, nearshore coastal waters and into the open sea on the West Coast of Scotland. This work will help to inform regulation and management of risks faced by wild salmon in coastal waters.



We know that wild Atlantic salmon smolts on the West Coast of Scotland are at risk of infection by sea lice emanating from the salmon farming industry, as well as potential risks associated with other marine developments. By gathering evidence on the migration behaviour of wild smolts through sea lochs and marine waters and publishing these findings we can contribute to informing policy and regulation.

Dr Jessica Rodger, Theme Leader for Biodiversity & Fish Communities

The Project began in 2021 with the final year of data collection in 2023. A total of 3,349 salmon smolts were tagged over three years and across 15 West Coast rivers, including on the Isle of Skye and Isle of Lewis. These rivers were the Bladnoch, Nith, Endrick, Gryffe, Fyne, Aray, Orchy, Etive, Loy, Lundy, Snizort, Laxford, Eriboll, Laxay and Grimersta. Hundreds of acoustic receivers were strategically deployed within sea lochs and wider coastal waters to record the passage of tagged fish to allow us to examine the migration and dispersal of smolts in this region.

A number of acoustic telemetry projects were conducted in the waters to the west of Scotland

at the same time as the West Coast Tracking Project. Consequently, the team collaborated with organisations across the UK and Ireland, increasing the data available to the project. These projects included; SeaMonitor – led by the Loughs Agency in Ireland, COMPASS – an EU-funded partnership between the Agri-Food and Biosciences Institute, Marine Institute, Inland Fisheries Ireland, Scottish Association for Marine Science UHI and the Marine Directorate, and MEFS MPA – a flapper skate tracking project led by St Andrews University. We are currently analysing the data collected over the three fieldwork years of the project, but some of the main findings to date are outlined below.

- Great variability was found in the approximate migration pathways of juvenile salmon, as opposed to well-defined migration corridors, with variation seen among salmon originating from different regions and rivers, as well as between individuals originating from the same river.
- Some smolts moved rapidly through sea lochs, whereas others exhibited 'milling' behaviour, whereby they paused for some time before continuing their outward migration. Such behaviours have been observed around the Isle of Mull and also in other studies of inshore smolt dispersal. The third study year focused on smolt movement speeds through sea lochs to better understand this milling behaviour. Information arising from the study will contribute to the models used to underpin regulation of sea lice.

The research team will be working closely with regulators to assure that the smolt dispersion data can be rapidly integrated into the models underpinning marine management. The team has also published initial data with Glasgow University and aims to integrate this into the Likely Suspects Framework model to contribute to the better understanding of drivers of salmon mortality at different lifestages.



Our View

Supporting Better Aquaculture Regulation

The Atlantic Salmon Trust is wholly opposed to unsustainable open pen aquaculture. It is our view that wild salmon must be protected from the risks associated with sea lice from salmon farms in all sea lochs, sounds and coastal waters, and that regulation must be implemented with urgency and at a wide scale across the region. This argument was made clearly in our official response to the Scottish Environment Protection Agency's (SEPA) consultation on 'Detailed proposals for a risk-based, spatial framework for managing interaction between sea lice from marine finfish farm developments and wild salmonids in Scotland' in September 2023.

In response to proposals put forward in that consultation, we expressed our view that proposed 'Wild Salmon Protection Zones' must protect wild salmonids year-round,

set sea lice threshold levels in-line with the highest international standards and that sea lice regulation should be brought in immediately for all existing farms, not just 'new or expanding' farms.

The Missing Salmon Alliance has undertaken diligent and detailed advocacy work with government, regulators and industry. This has helped start a new chapter – one in which the regulatory system is designed, for the first time, to protect wild salmon and sea trout from sea lice originating on salmon farms in Scotland. Members of the Alliance will play a key role in the independent monitoring of sea lice on farmed and wild fish within this new framework. Led by our partners at Fisheries Management Scotland, the Alliance wants to see regulations which are implemented transparently and are robustly enforced.

Research Paper: *Inshore and offshore marine migration pathways of Atlantic salmon post-smolts from multiple rivers in Scotland, England, Northern Ireland, and Ireland. Journal of Fish Biology.* Rodger, J.R., Lilly, J., Honkanen, H.M., Del Villar, D., Kennedy, R., Maoiléidigh, N.Ó., Boylan, P., Rosell, R., Morris, D.J., O'Neill, R. and Waters, C., 2024

This paper was a collaborative study, working with multiple partners across the UK and Ireland, and describes the approximate migration pathways of juvenile salmon smolts migrating from 25 rivers which drain into the sea to the west of Great Britain. This study provides valuable empirical information on the migratory pathways of smolts from four different countries, each with separate species protection legislation and contrasting management policies. The paper found that there is no one single 'major' migration route being used by salmon smolts through inshore and offshore marine waters, with salmon from different regions and rivers having been recorded using different migration pathways, as well as individuals from the same river also using different migration pathways.



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Research Paper: *Migration patterns and navigation cues of Atlantic salmon post-smolts migrating from 12 rivers through the coastal zones around the Irish Sea. Journal of Fish Biology,* 104(1), pp.265–283. Lilly, J., Honkanen, H.H., Rodger, J.R., Del Villar, D., Boylan, P., Green, A., Pereiro, D., Wilkie, L., Kennedy, R., Barkley, A. and Rosell, R., 2024.

This was another collaborative study which included smolts tagged on the River Bladnoch, Nith, Endrick and Gryffe. The study investigated whether water temperature and water currents were affecting the movement of smolts through the Irish Sea. The paper found that smolts were not simply being carried along by water currents, but were instead actively swimming through the Irish Sea. Follow up work will look at which other cues smolts may be using to orientate during their migration through the Irish Sea. The resulting information will be used to advocate for better protection of migrating wild salmon in this area.



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code to read this
paper in full.





Over the three study years of the West Coast Tracking Project, 862 acoustic receiver deployments took place in rivers, estuaries, sea lochs and at sea.

Solutions & Action

Core Rivers – Demonstrating long-term wild salmon restoration at a catchment scale

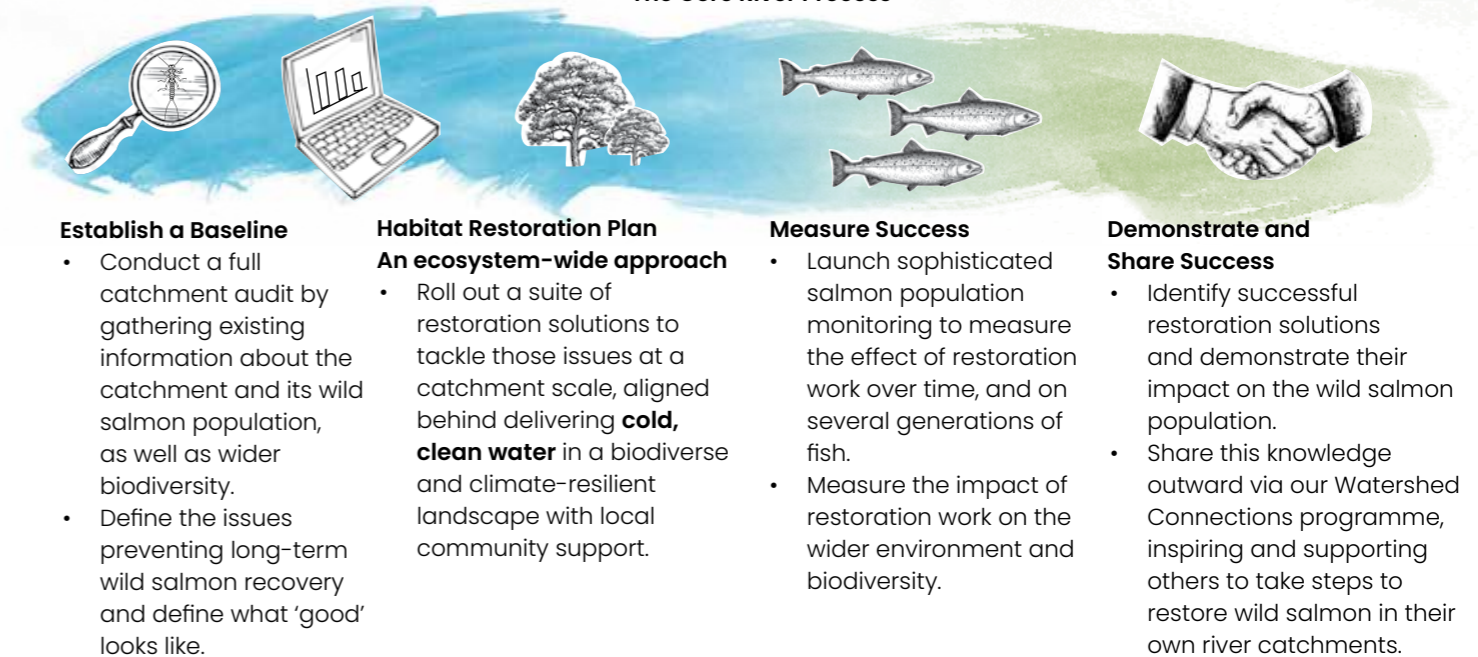
Working at a catchment scale to restore wild Atlantic salmon is essential in order to build climate resilience, and to halt and reverse biodiversity loss. The Core Rivers programme of long-term monitored river catchments is setting out to evidence how restoration at scale can achieve improvements in returning salmon populations over defined time periods. This demonstration can then be scaled up across entire watersheds. This scaling up is crucial for long-term salmon recovery.

Through restoration action to deliver **cold, clean water**, Core Rivers aim to provide the best possible freshwater and estuarine environments for juvenile wild salmon, ensuring that we produce as many fit and healthy wild smolts as possible. Our evidence gathering work has shown that the better their condition when they exit our rivers, the better they survive at sea. This is the driving philosophy behind the Core Rivers – maximising the

number of fit and healthy wild salmon smolts heading safely out to sea.

Currently the Core Rivers are Project Laxford in northwest Sutherland, in partnership with Grosvenor's Reay Forest Estate, and Project Deveron in Aberdeenshire, in partnership with the Deveron, Bogie & Isla Rivers Charitable Trust. These two river systems have distinctly different environments – one is a classic Highland system, sparsely populated and defined by rugged peatland and moorland. The other is a more expansive system with a higher density of built environment, and containing agricultural and forestry land. By working in both environments, we aim to identify the long-term restoration solutions which can lead to success in these different regions. Future work is set to define a range of 'Wild Atlantic Salmon Bioregions', within which Core Rivers will be representative.

How it Works The Core River Process



A Core River At Work

Project Laxford is a partnership between the Atlantic Salmon Trust and Grosvenor's Reay Forest Estate in northwest Sutherland, supported by the Marine Directorate and West Sutherland Fisheries Trust. As a Core River, the aim of Project Laxford is to put evidence-led restoration solutions into practice in the catchment to aid long-term wild salmon recovery, and then demonstrate their success over time through sophisticated salmon population and environmental monitoring. As a Core River for the West Coast of Scotland, the lessons learned and successes recorded here will be shared with other river catchments in the region and beyond for wider impact.



People at the heart of the project

Project Laxford is a powerful example of organisations and the local community coming together to realise a shared long-term vision for the catchment, its wild salmon, wider biodiversity and people. In the early stages of the scheme, Grosvenor's Reay Forest Estate hosted engagement and information events to inform its local communities and partner organisations about the project. Although it may be decades before the restoration work in the catchment demonstrates its full potential, the team on Grosvenor's Reay Forest Estate, including land managers, foresters, ghillies and deer stalkers, have embraced a vision for the future of the catchment, where traditional ways of life are able to adapt sustainably to the challenges of a new world and individual skills and knowledge can be harnessed to transform the landscape into one with greater resilience and biodiversity for future generations.

In partnership with **GROSVENOR**

Establishing a baseline

Project Laxford completed its catchment audit in 2023, establishing a baseline against which objectives can be set to develop restoration plans – a key first step in the Core Rivers process. The general health of the catchment's landscape and ecosystem, and its ability to adapt to a changing climate, was identified as the overriding factor preventing an increase in wild salmon numbers and threatening the population in the future. Its habitat restoration plan is therefore focussed on increasing biodiversity and building resilience to climate change.



Photo: Chris Conroy

Habitat restoration & management plan

Under the management of Grosvenor's Reay Forest Estate, key planned activities include the targeted restoration of native riverside woodland through large-scale replanting efforts, establishing protected fenced enclosures to allow for natural tree regeneration, and an ongoing, managed reduction of deer grazing pressure. The restoration of native woodland will bring a host of benefits in the future, notably shading to keep the water cool, root structure to prevent erosion and siltation, and creating a more complex riverside zone to slow the flow of water off the land, reducing redd (salmon nest) washout in high-flow events. There will likely be more immediate benefits too however, with young trees able to provide a boost to insect numbers.

In addition to the catchment-scale reduction in grazing pressure, four completely deer-free enclosures will be created around priority areas of the catchment. These areas of almost 27km² were identified through the catchment audit process and include important salmon spawning and nursery areas. Work on the first of the four enclosures was completed in spring 2024 when a 1km² area around an important spawning burn was replanted with a mix of 72,000 native trees, grown and sourced from local nurseries in Scotland. The fencing will facilitate natural regeneration over a wider zone in this area totalling 1.3km². Planning is also well advanced for the delivery of the next two enclosures which the team hopes

to see completed in 2025. The largest of these will extend to approximately 7.7km², taking in both banks of a 4km stretch of the lower River Laxford itself.



Monitoring

Demonstrating the link between restoration action, the wild salmon population and wider biodiversity

Monitoring is an essential part of the Core River process, ensuring that the impact of the habitat restoration and management plan upon the wild salmon population can be recorded over time to demonstrate long-term success. Project Laxford is employing a range of monitoring methods to achieve this goal.



PIT Tagging – Understanding wild salmon marine survival

A key metric to monitor is the marine survival rate of the catchment's wild salmon and how this changes in response to restoration efforts over the long term. To understand this dynamic, beginning in 2021 the team on Project Laxford has been implanting a sample of juvenile salmon parr in the autumn with Passive Integrated Transponder (PIT) tags – 158 in 2021 for our pilot year, then 2,000 in 2022, 2023 and 2024. This has allowed us to start building an important picture of marine return rates over time and how this will be influenced by restoration action. In 2023 and 2024 we were able to monitor the passage of many of these tagged fish as they migrated downstream to sea as smolts. This year we also began to see tagged fish returning to the river as adult salmon.

How does PIT tagging work?

PIT (Passive Integrated Transponder) tags are small microchip tags which don't rely on battery power to work. This means we can track fish over several years at each part of their lifecycle from parr to returning adult whenever they swim over a PIT detection array located in the river, giving us a vital picture of marine survival rates and population size in response to restoration efforts over the long term.

Counting Smolts

As well as measuring marine return rates, the Project is also looking to quantify the total number of salmon smolts exiting the river and migrating out to sea. This is known as 'smolt escapement' and is an important metric when it comes to understanding the catchment's smolt productivity – something which is linked to the health of the freshwater environment and is directly linked to the number of returning adults.

To count smolts leaving the river, a rotary screw trap was deployed in the lower reaches of the River Laxford in 2024 where the team employed 'mark-recapture' sampling methods. A total of 6,917 salmon smolts were recorded in the trap, with the mark recapture exercise suggesting a trap efficiency of 17.6%. This provided an estimated total salmon smolt escapement of 39,196 fish. Once again, this metric will be monitored over time to identify how it is influenced by restoration activity in the catchment.



Counting Returning Adult Salmon

In addition to the monitoring of marine return rates and smolt output, the team has also installed a high-resolution ARIS (Adaptive Resolution Imaging Sonar)

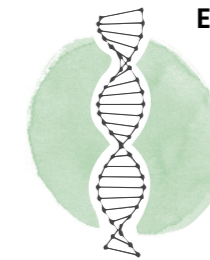
multibeam sonar fish counter in the lower reaches of the river to allow estimation of the total number of returning adult salmon. This system functions by emitting small acoustic beams and converting the returning echoes into high quality digital images of individual passing fish.

We now have a full year of data for the Laxford, with initial counts from the ARIS suggesting that approximately 1,104 adult salmon entered the system between April and the end of September 2023. The number of returning adults can be monitored over the long term and analysed in relation to restoration activity.

Invertebrate Sampling



In 2024 the team also delivered an ambitious, catchment-wide sampling programme to monitor aquatic invertebrates such as stonefly, mayfly, caddisfly and other species. This will allow us to monitor changes in the abundance and species distribution of invertebrates over time and in response to our restoration efforts. The health of invertebrate populations is key to good juvenile salmon feeding and growth, and therefore the size and condition of smolts heading out to sea.



Environmental DNA

Environmental DNA (eDNA) analysis is being used to identify species present from DNA fragments extracted from water samples taken from the river.

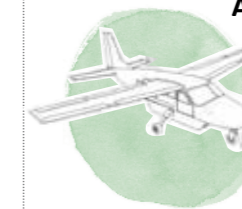
As part of Project Laxford, the Atlantic Salmon Trust is working with the UHI

Institute for Biodiversity & Freshwater

Conservation to map the species present and their distribution in the catchment, including both fish and terrestrial animals. The project is currently concentrating on three key tributaries of the Laxford which will allow us to monitor the change in biological communities over time and in response to management actions.

Water Temperature Monitoring

The Project also employs a network of 14 strategically positioned temperature loggers which record in-river water temperatures in the Laxford every 15 minutes. As water temperature has a significant impact on the health of freshwater ecosystems, this is a vital metric to monitor.



Aerial Habitat Survey

In 2024, an aerial survey of the entire Laxford watershed was carried out with an aircraft using multiple ultra-high-resolution camera and laser imaging, detection and ranging (LiDAR) systems. This will allow the mapping of terrestrial habitats by providing an estimation of the biomass of different tree and vegetation species, as well as the availability of instream habitat for fish. This aims to add a larger, more strategic view to the catchment's restoration plans and another baseline against which to measure restoration success over time.

The Future

With restoration activity now well underway, and our monitoring generating important data on the salmon population and biodiversity more widely, the coming years will see the link between the two becoming clearer. With this level of resolution, we hope to be able to share our successes outward to energise wild salmon restoration efforts far beyond the Laxford catchment itself.



Photo: Nick Kelley

The Catchment Scale Approach

Project Deveron – a second Core River now up and running

Project Deveron, a second Core River, was formally launched in late 2023 following a pilot year in 2022 and is a partnership with the Deveron, Bogie & Isla Rivers Charitable Trust with support from the William Grant Foundation and the Marine Directorate. As a Core River, efforts are focused on understanding how the wild salmon population and wider biodiversity respond to catchment-scale restoration over time to secure long-term species recovery. Like Project Laxford, Project Deveron employs a similar set of monitoring methods, including PIT tagging 2,000 autumn salmon parr each year, an ARIS sonar counter to record returning adult numbers, as well as wider environmental monitoring. Work on Project Deveron's initial baseline catchment audit is ongoing, although anthropogenic pressures have already been identified, including acidification in

headwaters, rising water temperatures, diffuse pollution and sedimentation from intensive agriculture, a lack of riverside woodland cover, the dredging of gravels, deepening of watercourses and water abstraction. An ecosystem approach to restoration, both in and around the river and on the surrounding landscape, will look to address these issues for long-term recovery.

Early Goals – Reconnecting wild salmon spawning territory and native woodland restoration

A key early aim for the project is the removal of the decrepit King Edward weir located on the King Edward burn, a tributary of the River Deveron. This barrier is currently impacting the migration of wild Atlantic salmon, both as adults migrating upstream and juveniles migrating downstream. Funding for the removal of the

weir was secured in August 2024 from the Open Rivers Programme and removal is scheduled for spring 2025. This action will open over 11km of habitat upstream for the first time in over 150 years, reconnecting the burn to the wider river ecosystem.

Planning is also underway to begin native woodland and wetland restoration in key upper catchment areas and tributaries to build climate resilience and biodiversity by restoring and rehabilitating river and floodplain functionality.

Achieving the River Deveron's first ever accurate returning adult salmon count

An ARIS sonar imaging fish counter was deployed in the river Deveron towards the lower end of the river in 2023, with weather and river conditions enabling it to operate from 24th February to 19th October 2023.

Between these dates, 5,775 fish over 55cm length (which was the threshold set to differentiate between salmon and trout) were counted moving upstream and 1,101 fish were counted moving downstream, equating to a net count of 4,674 adult salmon migrating upstream past the counter. This is considered a minimum count as some fish will have been missed during a 25-day period where only partial footage was recorded and three additional days with power-related issues.

To compensate for these inoperable periods, a model has been developed to estimate the number of salmon that would have been expected to have been counted on those days when the counter was offline or was only partially effective. This increased the total estimated count to 5,600 returning adult salmon, with a range of 5,464 – 5,753.

The Project Deveron partnership is delighted with this early technical success in the programme. The ARIS



counter deployment in 2023 has allowed the first ever accurate returning salmon count for the River Deveron to be achieved, providing a key baseline against which the restoration programme can measure its impact and success over time. As we look ahead, the team is confident that the technical and power issues have been rectified for the 2024 season, where the counter has been operating consistently since 5th March.

Community Support

Both the Atlantic Salmon Trust and Deveron, Bogie & Isla Rivers Charitable Trust have been actively involved in consultation events, talking with local community groups, landowners and businesses. It is a reflection of the importance felt for wild Atlantic salmon that there is such local support for Project Deveron and the need for a resilient river catchment.

The partnership has also ensured that it is collaborating with other initiatives and organisations in the northeast of Scotland to maximise the scale and impact of restoration in the region, including the Spey Catchment Initiative, Findhorn Watershed Initiative, Highlands Rewilding, Sylvestris Land Managers, Cairngorms National Park Authority, North East Scotland Climate Action Network, Moray Climate Action Network, Woodland Trust and Game & Wildlife Conservation Trust.



Core Rivers combine catchment-scale habitat restoration with sophisticated monitoring of the wild Atlantic salmon population and wider environment to demonstrate success over time.





The Power of Partnership

Watershed Connections – Empowering local communities and organisations to achieve wild Atlantic salmon restoration at a catchment scale

Our new Watershed Connections programme, launched in 2024, is designed to take the restoration techniques and successful solutions developed on the Core Rivers and through our research programmes, and deliver these to other river catchments across the UK. It aims to provide the knowledge and tools required to enable others to conduct a high-level audit of whole river catchments to establish their restoration potential, aiding decision making and leading to action on the ground.

Working with partners across the UK we will create a resource hub with an interactive platform of spatial information linked to other relevant resources, including Geographic Information System (GIS) mapping, to help support initial discussions on the ground with landowners, other stakeholders, funders and regulators. Critically this will be able to articulate the basic type, quality and quantity of habitats which currently exist in a river catchment, the relationships these have with each other, and where restoration should be targeted. This includes land cover and existing land use, for example native woodland cover and types of existing river morphology. Using modelling tools, the platform will then be able to provide a view of a river catchment's restoration potential, focused on wild Atlantic salmon but with applicability for wider biodiversity recovery. It will also integrate with the Likely Suspects Framework and associated Decision

Support Tool being developed on behalf of the Missing Salmon Alliance.

Supporting the technical outputs, the hub will also act as an advisory centre for management, finances, governance and regulation, leading to shovel-ready projects.

We are pleased to have brought two programmes of work into Watershed Connections in 2024 – Save the Spring on the River Dee, and a new programme just beginning on the Laxay on the Isle of Lewis, both of which are being delivered in partnership with landowners and managers, local river boards and trusts, as well as local communities.



No single organisation can secure a long-term future for wild Atlantic salmon alone, but we must do more to share relevant information, successful restoration solutions, and energise and inspire others

to take action at a catchment scale – the scale that will make a difference. This is what Watershed Connections aims to achieve.

Alison Baker, Restoration Director

Preserving the Wild



A two-pronged strategy to support wild spawning and restore the Dee's spring-run salmon



Photo: Sam Poulthney

January 2024 saw the launch of our first Watershed Connections partnership with the Save the Spring programme on the River Dee in Aberdeenshire. This programme is a partnership between the River Dee Trust, Dee District Salmon Fishery Board and Atlantic Salmon Trust, supported by the University of Stirling and UHI Inverness. It comprises a planned 20-year programme of work to restore and futureproof the upper River Dee catchment – heartland of its spring salmon. Aligned with our other work programmes and Core Rivers, the focus is on delivering **cold, clean water** in biodiverse landscapes which are resilient and adaptive to the impacts of climate change.

As is the case with Atlantic salmon rivers across the North Atlantic, climate change is severely impacting wild Atlantic salmon populations in the River Dee, particularly the river's iconic spring-run salmon which have declined by 80% in recent decades. Rising water temperatures and altered flow patterns are creating significant challenges for long-term salmon survival and reproduction success. Winters are becoming wetter, leading to more frequent and severe flooding events which can wash away salmon eggs and young fish, risking the loss of entire generations. The loss of riverbed stability due to frequent winter floods has also impacted salmon spawning areas, invertebrate populations, and other species such as freshwater pearl mussel. A study carried out on the River Dee near Banchory found that only 10% of the catchment's substrate was in a stable condition in 2023, down from 50% in 2010. Conversely, the spring and summer months are becoming drier with snowpack on the Cairngorms decreasing, resulting in periods of low water flow and higher temperatures. Recent studies have shown that water temperatures in the River Dee have increased by an average of 1.5°C over the past three decades. This change can have profound impacts on the river ecosystem, particularly for cold-water species like Atlantic salmon. Higher water temperatures lead to reduced oxygen

levels, increased stress on fish, poorer juvenile growth rates, and altered timing of important lifecycle events such as spawning and migration. Upper tributaries, key to spring salmon spawning and juvenile production, are now frequently exposed to high water temperatures and low flows. 60% of monitoring sites in the upper Dee in 2023 for example exceeded temperatures that cause thermal stress to salmon.

Save the Spring is now taking action to restore natural processes in the landscape to protect against these climate impacts and allow wild Atlantic salmon and other wildlife to recover. At the same time, as some salmon populations are now critically low, a careful helping hand is being given to the wild salmon population to help it on this recovery, maintaining the catchment's unique wild salmon genetic diversity to enable them to adapt to the challenges of the present and future.

The programme therefore employs a two-pronged strategy, combining landscape-scale habitat restoration with wild fish repopulation to enable increased wild spawning.

Habitat Restoration – *Building resilience, adaptability and biodiversity*



The habitat restoration element of the strategy aims to, among a number of goals, slow the flow of water off the landscape. This will ultimately reduce the power of flood events and over time improve the river's stability. Key to slowing the flow is a complex riverside zone involving restored native woodland, as well as peatland and wetland restoration in the wider catchment.

The programme is prioritising tributaries upstream of Aboyne, comprising approximately 1000km² in area and 900km of stream length, 300km of which is already highlighted as at risk of thermal stress.

Programme partners identified five priority tributaries for the first phase in 2024. Of these, the River Muick has been

the focus for the wild fish repopulation pilot. The Muick was identified as a key initial focus area, based on its critically low salmon population status, its good geographic catchment access and existing working partnerships in place, an absence of impassable barriers, and improving habitat quality and water quality due to restoration work and recovery from historic acid rain impact. Other tributaries the partnership will work on in the next five years are the Clunie, Feardar, Gairn and Girnock.

Wild Fish Repopulation – Supporting wild spawning

Genetic diversity has enabled wild Atlantic salmon to be adaptable to change, a feature of the species which is especially important to preserve in the face of the rapid climate and environmental change of today's world. Preserving this diversity is key to the second half of Save the Spring – wild fish repopulation.

Unlike a stocking programme, which is typically defined as the artificial augmentation of natural salmon production by the addition of artificially-extracted eggs or young fish bred in captivity, this programme's approach to wild fish repopulation does not propose to use fish as broodstock, extract salmon eggs from fish, hatch fish in captivity or stock artificially hatched fish into the wild. Instead, the approach is one of 'conservation translocation' – the movement of individuals of a species from one place to another for conservation benefit. In this case, wild fish will be captured and moved into captivity, reared to maturity, and then released back into the wild, at the same location from which they were captured, in order to spawn in the wild – an approach focused on wild spawning adults and wild hatched offspring.

Evidence demonstrates that hatchery-raised stocked salmon survive poorer over the course of their lifecycle when compared to wild hatched fish, and exhibit natural selection towards the domestic environment over several generations – i.e they become adapted to the hatchery and not to the wild. In the long-term, the programme's ambition is to have secured the Dee's unique populations of spring salmon in order to step back and leave behind a self-sustaining wild population, not run a continual artificial stocking programme which puts the long-term genetic integrity of these populations at risk and reduces their natural ability to adapt to a changing climate.



Photo: Chris Conroy

The main method of wild fish repopulation being trialed is smolt to adult supplementation and release (known as 'S2A'), through which the programme partners are working with both the Scottish Government's Marine Directorate and NatureScot to develop a detailed plan to ensure best practice. The S2A work is being carried out in partnership with the University of Stirling's Institute of Aquaculture, with genetic information being analysed by UHI Inverness. In April 2024, 87 wild smolts from the River Muick priority area were successfully transferred into the programme. As of the time of publication there have been minimal losses in this group and the fish are currently being cared for in the University of Stirling Institute of Aquaculture on-shore marine facilities on the West Coast of Scotland. A 'soft transfer' process was undertaken when the smolts arrived, gradually increasing water salinity over the course of a few days, before achieving a 100% saltwater environment for optimal feeding and growth. All Muick smolts captured have been genetically sampled and this will allow us to understand the genetic structure of this subpopulation in order to maximise restoration efforts. This will provide a baseline to monitor their future spawning success, and the survival of their offspring.

It has been highly encouraging to see how these now 'post-smolts' are feeding and growing in captivity. If all goes well, we hope to be releasing mature adult salmon back into the Muick to spawn in late 2025, creating wild hatched juveniles which can inhabit areas where native woodland restoration, peatland and wetland restoration has also occurred.

Demonstrating Success – It's in the genes

Demonstrating success in the Save the Spring programme will come down to effective monitoring and reporting. Key to this will be genetic monitoring which can map the parental lineages of juveniles caught in the wild to match them up with fish from the rearing programme. For example, if we electro-fish an area where S2A has previously taken place, we will be able to tell from genetics which wild fry and parr were hatched from the wild fish we previously interacted with. Sampling migrating smolts caught in traps will then allow us to calculate the overall juvenile production resulting from our repopulation efforts. Over time the partnership hopes to demonstrate the successful link between its habitat restoration and wild fish repopulation efforts, resulting in a recovering spring salmon population with its genetic integrity preserved and able to adapt to a changing world.



It is exciting to be working with the Atlantic Salmon Trust to develop innovative approaches to restore wild salmon. By working with our partners we aim to develop these approaches into best practice tools to help salmon across Scotland. Bringing together knowledge from our stakeholders and the local community is also central to this programme.

Dr Lorraine Hawkins – Director, River Dee



The River Dee



Photo: Richard Davies

Taking Action for the Future

The strategic planting of native riverside woodland on the River Muick, in addition to other key upper Dee tributaries, is being carried out in combination with significant peatland and wetland restoration, as well as the installation of hundreds of large woody structures. This work is focused on creating a more biodiverse and resilient ecosystem for the future.



Working with Watersheds

Upcoming Partnerships Linking the Lochs – River Laxay, Isle of Lewis

We are delighted to announce the commencement of a new Watershed Connections partnership based around the Laxay river catchment on the Isle of Lewis.

With preliminary scoping work which began in July 2024, the team is working in partnership with the Soval Estate to develop a catchment-scale restoration programme to aid the recovery of wild Atlantic salmon in the system, guided by building resilience to climate change and increasing biodiversity.

The Soval Estate covers an area of around 35,000 acres and the majority of the Laxay catchment, providing an excellent opportunity to work at the scale required to achieve long-term restoration. As well as the essential support from the Estate itself, the initiative has also received funding from the Scottish Government's Nature Restoration Fund managed by NatureScot, and the Fishmongers' Company Charitable Trust. Engaging with the community is vital to the success of



the project, and summer 2024 saw the team connecting with local people at the Lochs Agricultural Show which was attended by over 1,500 people where the project concept was enthusiastically received. We will be looking to engage as many local people and businesses as possible during the project, the first phase of which is set to include drone surveys, soil sampling, grazing reports, woodland consultancy, baselining of invertebrates, mammals, birds and fish populations, and Geographic Information System (GIS) mapping. We look forward to providing a progress update in next year's publication.




The Linking the Lochs project represents a new Watershed Connections partnership and the first in the Outer Hebrides. It offers a unique chance to develop restoration solutions in this

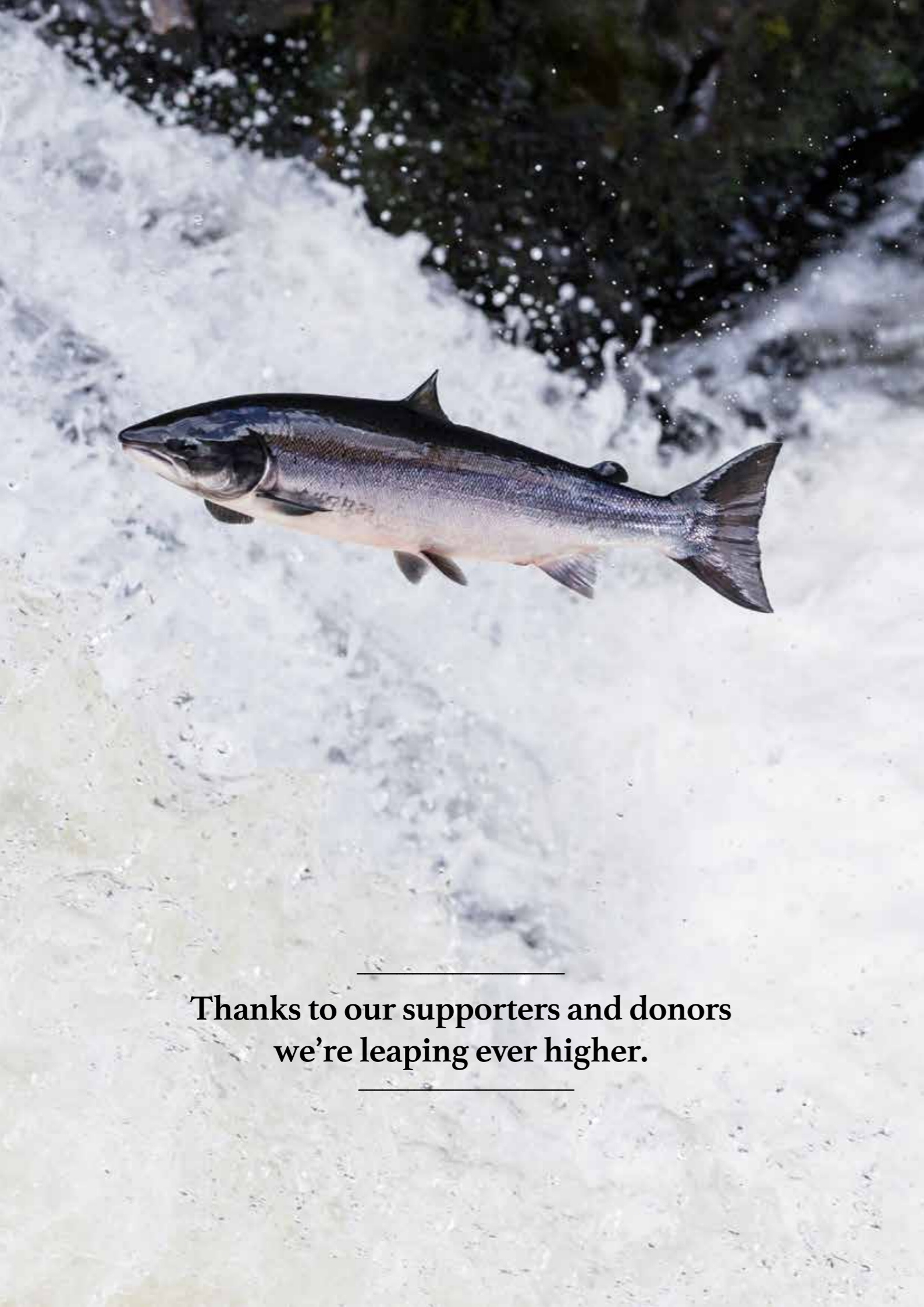
important, and often overlooked, wild salmon region.

John Chantry, Watershed Connections Programme Coordinator





Wild Atlantic salmon and sea trout in estuarine waters wait to run a river on the Isle of Lewis. Working here will enable us to develop restoration solutions to benefit the wider region.



Thanks to our supporters and donors
we're leaping ever higher.



Atlantic Salmon Trust 2024 Auction

OCTOBER 12TH - NOVEMBER 24TH

RAISING FUNDS FOR THE RESTORATION OF
WILD ATLANTIC SALMON AND THEIR ENVIRONMENT



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the Atlantic Salmon Trust at
atlanticsalmontrust.org



It was another wonderful year for the Trust as we took our message to some fantastic fundraising events across the country from Wiltshire to the Scottish Borders, all of which were immensely well-attended by keen and passionate wild salmon supporters.

Charity Golf Day – SCHLOSS Roxburghe Golf Club

Our inaugural Charity Golf Day on May 10th at the SCHLOSS Roxburghe Golf Club in the Scottish Borders was an outstanding success. We'd like to give an enormous thank you to Sladen Estates for sponsoring the event, and to everyone who came along and brought a team. Our ten teams of golfers helped us raise an incredible £40,000. This will play a huge role in helping to drive our work forward.



Charity Clay Shoot – Purdey at the Royal Berkshire Shooting School

Once again our Charity Clay Shoot was a roaring success and the 2024 event on May 31st saw eighty individuals making up twenty-one teams of guns come along to Purdey at The Royal Berkshire Shooting School. This was the third year that the Trust has organised the event and it is now a firm fixture in the calendars of those who are passionate about doing their bit to contribute to wild Atlantic salmon restoration efforts. The event, which was generously sponsored by INEOS Grenadier and BaxterStorey, and supported by YETI, raised over £45,000 to help us continue our mission to restore wild Atlantic salmon and their environment.

Fonthill Estate Garden Open Day

Thanks to the generosity of Lord Margadale and the Fonthill Estate in Wiltshire, we were delighted to have been the chosen charity for the Fonthill Estate Garden Open Day on June 9th. Not only did this wonderful event enable our team to connect with new audiences to explain the importance of wild Atlantic salmon restoration, but visitors also donated over £10,000 to the Trust.

Curzon Cinema with the Missing Salmon Alliance

In late 2023 we opened up our regular Curzon Cinema event in London to the wider Missing Salmon Alliance, ensuring that our partners in the Game & Wildlife Conservation Trust, Rivers Trust, Angling Trust, Fish Legal and Fisheries Management Scotland could join us to demonstrate how the Alliance is working collaboratively toward wild salmon restoration. The evening event featured a range of speakers and short films on the big screen, as well as raising thousands of pounds for the Alliance in a prize raffle. Our sincere thanks go to Lycetts for sponsoring the event. We were delighted that actors Jim Murray (an Atlantic Salmon Trust ambassador) and Dominic West could join us to help raise the profile of wild salmon conservation.



The support we received at this year's events, both from our supporters and event sponsors, has been incredible – thank you! These events are high points in our calendar and make a huge contribution to funding our work. To join us at our events in 2025, please get in touch at events@atlanticsalmontrust.org. Not only do we promise to give you a wonderful day out, but you'll also be doing your bit for our wild salmon.

Tiggy Pettifer, Fundraising & Events





This year's Charity Clay Shoot at Purdey at the Royal Berkshire Shooting School raised over £45,000 to help us continue our mission to restore wild Atlantic salmon and their environment.

Our Corporate Partners Making a Difference

A cause to be proud of

As well as the individual supporters who make our work possible, the support provided by our corporate partners is vital in enabling our work to continue. Our corporate partners are joining us on our mission by taking action to save an iconic species – a species which is also an indicator for the wider health of the environment. What better way to focus your corporate philanthropic funding or ESG strategy? Our work to restore wild salmon is interlinked with tackling the wider effects of the twin crises of climate change and biodiversity loss, and a return of salmon abundance will bring far reaching benefits for other wildlife, communities and businesses.

We'd like to thank all of our existing corporate partners for their valued support and welcome prospective partners getting in touch with us to start their journey.



A growing number of companies and organisations are stepping up to the environmental challenges of the 21st Century and are seeing a noble cause to get behind – restoring wild Atlantic salmon. That's a cause to be proud of. Help support us on this journey by getting in touch.

mark.cockburn@atlanticsalmontrust.org
Mark Cockburn, Corporate Ambassador



Leave a Legacy

Including the Atlantic Salmon Trust in your will is a significant and lasting way to support our work to restore wild Atlantic salmon and their environment.

The world is constantly evolving, and so too are the pressures affecting wild salmon. With your legacy we can be ready to meet those future challenges head-on. Your legacy will help us to:

- Continue to design, develop and deliver the most ambitious and innovative salmon research projects in the UK, filling the knowledge gaps that still exist.
- Expand our network of Watershed Connections partnerships to inspire salmon restoration at a catchment scale.
- Communicate our message and spread awareness of the salmon crisis to wider audiences through media and events.
- Continue to engage at a high level with governments, regulators and international bodies.
- Bring together the greatest salmon minds in the world through conferences, workshops and meetings.

- How to remember us in your will**
- There are several ways to leave a gift in your will. These could include:
- A share of your estate.
 - A fixed sum.
 - A particular item for sale in our fundraising auction.

For more information about remembering the Atlantic Salmon Trust in your will, please contact info@atlanticsalmontrust.org



A Legacy in Action – The Giles Wilson Fellowship

It was with great sadness that we learned of the passing of Giles Wilson in early 2023. Giles was one of the Atlantic Salmon Trust’s greatest stalwarts and an integral part of the organisation’s growth over recent years. As a Trustee from 2016–2023 he continually pushed us forward in the fight to stop the decline of his beloved wild salmon and, as a member of the President’s Club, helped to secure funds to ensure our work continued with vigour.

Giles left a substantial sum to the Trust in his will and, in recognition of his immense contribution over the years and through discussions with his family, it was decided that these funds would be used to create the Giles Wilson Fellowship to support early career stage professional development. This gift from Giles will have enormous impact in helping to usher in the next generation of wild salmon conservationists.

From all of us here at the Atlantic Salmon Trust – Giles, thank you.



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Dr Jessica Rodger – Theme Leader for Biodiversity & Fish Communities
Callum Ellard – Research Assistant

Likely Suspects Framework Team

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Dr Emma Tyledesly – Marine Data Modelling Specialist
Dr Neil Banas – Ecological Modeller

A member of
**THE MISSING
SALMON ALLIANCE**



Thank You

TO OUR PRESIDENT'S CLUB MEMBERS

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And Those Who Wish
To Remain Anonymous

And Finally To **You**
For Putting Wild Salmon First

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YETI

TO OUR 2024 AUCTION AND CURZON EVENT SPONSOR

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TO OUR MISSING SALMON ALLIANCE PARTNERS

ANGLING TRUST
GAME AND WILDLIFE CONSERVATION TRUST
FISHERIES MANAGEMENT SCOTLAND
THE RIVERS TRUST
FISH LEGAL

TO OUR PROJECT DELIVERY PARTNERS

Grosvenor's Reay Forest Estate
Deveron, Bogie & Isla Rivers Charitable Trust
Dee District Salmon Fishery Board
& River Dee Trust
Soval Estate

WITH SPECIAL THANKS TO

John Miller, Dylan Williams
Purdey at the Royal Berkshire
Shooting School,
SCHLOSS Roxburghe, FishPal,
Richard Davies
our cover image photographer,
Miranda Cloy booklet design

TO OUR AMBASSADORS

Sir Gareth Edwards
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Jim Murray
Robson Green
Craig Somerville
Marina Gibson
Will and Al Peake
James Stokoe
Matt Harris
John Olav Oldren
Richard Davies
Lara Stroh

How you can help Ways to support the Atlantic Salmon Trust

We can't continue our work with you – our supporters. There are a range of ways to support our work and we are grateful for any support you may give us, whether that's a one-off donation or becoming a more regular member of our family through our monthly Salmon Club membership programme, or by joining the President's Club to play an even more significant role in fundraising for the Trust.

Don't forget our annual fundraising auction either – this is live in October and November each year, featuring a range of wonderful auction lots to bid on from fishing and sporting experiences to holiday accommodation, tickets for unique events, spectacular art, and delicious food & drink – there's truly something for everyone.

SEND
US A DONATION



BID
IN OUR ANNUAL
FUNDRAISING
AUCTION



JOIN
The
**Salmon
Club**

JOIN
The
**PRESIDENT'S
CLUB**

We've seen our Salmon Club monthly membership grow this year which is fantastic to see. Salmon Club members make a regular monthly donation to the Trust and form our core supporter base, being the first to hear about news and exclusive events.
To join our family, please get in touch.

salmonclub@atlanticsalmontrust.org



Putting #WildSalmonFirst