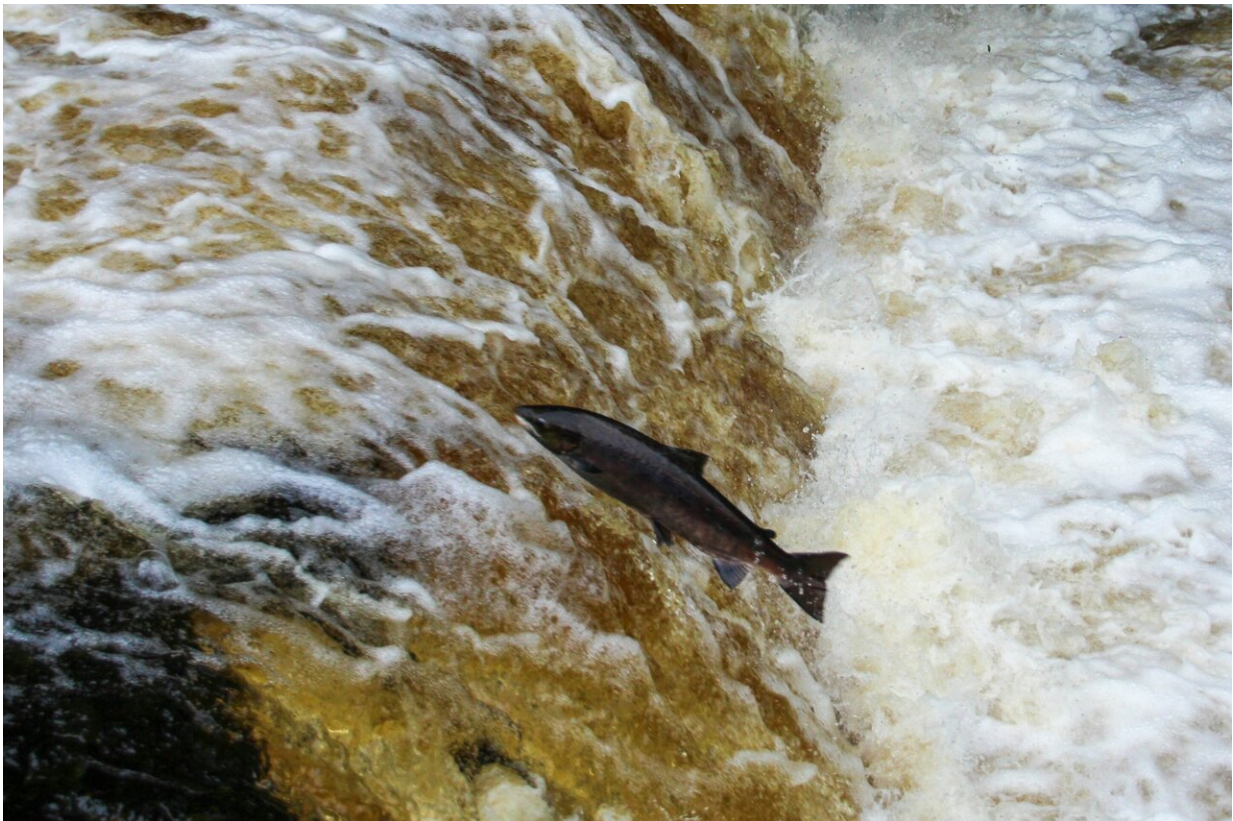


River restoration is encouraging Atlantic salmon to return to heart of the UK

April 10 2024, by Josh Davis



Credit: Unsplash/CC0 Public Domain

For the first time in 100 years, Atlantic salmon are once again spawning in the upper waters of the River Derwent.

The return of spawning salmon to the rivers of Derbyshire is a real conservation success story. After centuries of intensive river management by the county's burgeoning factories, the fish were driven extinct in many of its waterways.

Since then, the health of some of the rivers have improved to an extent that salmon can once again spawn. But the routes for the fish to return are still blocked by the remnants of the industrial boom, with numerous dams and weirs still blocking the migratory route of salmon attempting to swim upstream.

Dr. Tim Jacklin is a Conservation Officer for the Wild Trout Trust who has worked on river restoration projects that encourage and helps the migration of fish such as the Atlantic salmon. He was involved with the removal of a weir at Snake Lane, Derbyshire, which allowed the salmon to recolonize the headwaters of the River Derwent.

The catalyst for this work was seeing salmon making it all the way up the River Derwent, but then being stopped from exploring the upper reaches where the river becomes the Ecclesbourne.

"We'd started to see large salmon turning up in the Derwent in winter," explains Tim. "They became sort of local celebrities really. People were going out with their head torches at night and looking into the river, because it's not a particularly large watercourse and these fish were quite literally as long as your arm, without it being an angler's tale."

"So they attracted quite a lot of attention. But it also highlighted the fact that Snake Lane Weir, which was a [concrete structure](#) that had been built in the 1970s to replace an old mill, was a complete barrier to fish getting upstream."

This prompted the work to remove the Snake Lane Weir and replace it

with a boulder rapid that the fish would, once again, navigate over and continue on their journey.

"It's very rewarding," says Tim. "We opened up a good ten kilometers of spawning habitat upstream, so that translates into hundreds more juvenile salmon that make their way downstream and hopefully to come back and spawn."

The removal of the weir at Snake Lane has allowed salmon to pass through for the first time in over a century.

Return of the salmon run

Salmon are extraordinary fish. The Atlantic salmon is one of seven species that we think of as salmon, although the larger group Salmonidae actually contains around 200 species that includes other related fish such as trout, char and grayling.

As the name suggests, Atlantic salmon are typically found swimming around the waters of the northern Atlantic. Most populations of the fish are anadromous, meaning that they start life in freshwater but then migrate to sea where they reach adulthood. This means that the fish will have traveled thousands of kilometers over their lifetime, from river, out to sea, and then back to the river from which they were born

All Atlantic salmon start life hatching from eggs as far up the rivers as the adults could get.

"Salmon begin life in an egg that typically hatches in January or February," explains James Maclaine, the Curator of Fish at the Natural History Museum. At this stage the tiny fish are known as an alevins, before they "then develop into these little stripy fish called parr, which usually spend one or two years in the upper reaches of the river."

After a couple of years, they then start to move down the river, losing their stripes and becoming silvery. This is thought to be an adaptation to living out at sea, as while stripes may be good for hiding among aquatic vegetation, a silvery sheen is better when in the open ocean.

At this point they are called smolts. "Often by the time they're at that stage, the smolts will be hanging around in the estuary before they head out to sea," says James.

"Most of them will swim way off to the northeast Atlantic area around Greenland where they feed and grow for a few years." Often they are feeding on prey such as prawns, which is what gives their flesh its distinctive pinkish hue, and usually growing to around five kilograms in weight.

"Some of the fish will then return to spawn after just one year, and these are called grilse," says James. "But the ones that go away for two years or more before returning to spawn are what are technically called salmon."

How the fish manage to find the river in which they hatched is still not entirely understood. It is probable the fish use smell, although the method is clearly not perfect.

"When I was tagging salmon in Scotland, you could see there was obviously a little bit of trial and error," explains James. "We were radio tracking them so we could see where they were going. And we'd see the fish going up some tributaries and then dropping back out, before going up others."

"So I think there was a little bit of fine tuning going on." This can help to explain how salmon can return to rivers from which they were eradicated, despite not having hatched in them.

When the fish reach freshwater, they stop eating altogether and rely solely on their fat reserves. Their entire purpose is then directed towards swimming up the river, getting as far into the upper reaches of the tributaries as possible to find the ideal place to breed.

This means riverbeds with fine gravel and gentle flow so that the females can excavate a little nest, known as a redd. In these, she will then deposit her eggs as the males fight for opportunity to fertilize them. While many North American salmon will then die, some Atlantic fish will manage to make it back out to sea and live to spawn again.

But over the past few hundred years, these fish have been finding it increasingly difficult to navigate back to their home rivers, and their young are struggling to survive in them.

The health of UK rivers

Broadly speaking there are three major issues affecting the UK's rivers. The first of these relates to how clean our river systems are.

"The news over the last 12 months or so has been dominated by the scandal of sewage and storm overflows discharging into rivers when they shouldn't be," says Tim. "This is introducing bacteria and toxins directly to the environment."

Not only is this extremely concerning for people who use the rivers for recreation and drinking, but an excess of nutrients can also cause significant environmental harm. For example, too much nitrogen from raw sewage and agricultural runoff can cause major algal blooms that cause the amount of oxygen in the water to crash, and as a result lead to the mass die off of fish and invertebrates.

The second issue is water quantity. The UK may have a reputation as

being a pretty damp nation, but in many regions we have been putting an increasing pressure on the amount of water being extracted from lakes and rivers. For example, roughly 80% of London's drinking water comes from rivers and yet the capital receives less rainfall per year than Rome.

The increase in demand on water—coupled with growing issues such as the climate crisis—means that in parts of the south-east of the UK, rivers have been literally running dry during summer months.

"And then the third issue is the physical habitat side of things," explains Tim. "These are things like the shape and the depth profiles of rivers, the gravel quantities and the vegetation along the side of rivers. The physical elements that make up the habitat quality that the wildlife can use, and the rivers require."

The straightening, dredging and damming of rivers might have been good for industry, providing power and quick draining of the land, but it has often been devastating for wildlife.

Putting the river bends back in

A little further upstream on the Ecclesbourne River, the Derbyshire Wildlife Trust is working to continue the work started at Snake Lane. At the edge of a farmer's field a deep, straight channel rushes along under the trees. This was created by diverting the river to increase its flow to power a mill using a weir. This has formed yet another barrier for the migrating salmon.

But not even 20 meters away the ghost of the river's original route perseveres. Nothing more than a shallow, muddy ditch with a few scraggly trees overgrowing it, the bends and curves of the river's natural path can still be seen forming the boundary of a field.

The wildlife charity is now trying to undo the centuries of harm that bypassing the river's natural route has done, with the hope that the salmon will travel even further up into the headwaters and spawn once more in the gravel of the restored river.

By rediverting the river at Turnditch so that it follows its original, natural path, the team at the Derbyshire Wildlife Trust hope that salmon will once again spawn on this section of the river.

"A lot of our rivers across the whole country have been straightened," explains Jenny Kril from the Derbyshire Wildlife Trust. "Unfortunately, what that does is remove any sort of natural habitat that we would expect to see in a healthy river."

"What we're doing is re-wiggling or re-meandering the Ecclesbourne, which is essentially just putting the bends back into it. What that does is change the speed and flow of the water. It creates nice beaches and different habitats for a whole host of different species and just making the river more natural."

It is hoped that this work will create a greater variety of habitats, which in turn will encourage a greater variety of plants and invertebrates, and so boosting the overall biodiversity seen in this section of the river. But the cherry on the cake would be if the salmon start nesting.

"Over the next few years, we're going to see this whole area just continue to develop naturally," says Jenny. "We'll get some sediment being deposited on some of the beaches creating more habitats, and we're going to do tree planting to further increase the biodiversity of the area."

"We're just going to hopefully watch it become the brand-new river and as it should be again."

There is a long way to go to safeguard the future of the UK's rivers, but the work on the Ecclesbourne is showing that with the resources and right interventions change can happen and improvements made.

"I think we've got some huge challenges ahead of us, but you know, they're not making rivers anymore," says Tim. "So we've got to look after the ones that we've got."

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