



PER GUNNARSSON

Go with the flow

Rivers are the lifeblood of Swedish Lapland. We caught up with Henrik Persson, Rewilding Sweden team leader, to discuss how rewilding is restoring these vital waterways – and their catchments – to health.

Extending across the top of Sweden and bisected by the Arctic Circle, Swedish Lapland is defined as much by its myriad rivers and lakes as it is by its huge swathes of forest. While many of these rivers have been harnessed for hydroelectricity, those that remain undammed are home to a range of wild fish species, including salmon, sea trout, lamprey, whitefish, ide, and grayling. Yet even these waterways and their catchment areas have suffered from the long-term

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In 2023–2024, five km of river is being rewilded by the Rewilding Sweden team.

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impacts of the forestry industry, which means they – and the landscapes of which they are part – could be healthier and far more natural.

Can you tell us about the rivers in the Swedish Lapland rewilding landscape?

The landscapes in which Rewilding Sweden operate are very large – far larger than Rewilding Europe’s other rewilding landscapes. Bear in mind that greater Lapland, if we take this to include the two northernmost Swedish counties of Norrbotten and Västerbotten, is almost four times the size of the Netherlands. Within this expanse, we are trying to focus our rewilding efforts on specific priority areas. By that we mean a chosen set of catchments, or sub-catchments,

in which the main rivers are either unaffected by hydropower, or where hydropower is about to be removed, and where the surrounding landscapes have rewilding potential.

Rewilding is currently being carried out in three main catchments – the Vindel River catchment, the Råne River catchment, and parts of the enormous Torne River catchment. There are also neighbouring catchments where rewilding may take place – such as the Rickleå catchment (bordering the Vindel), the Vitå catchment (bordering the Råne), and parts of the Kalix river catchment (bordering the Torne) – because a corridor, nature reserve, or another area with rewilding potential in which we work may cross the borders of one catchment into another.

Can you explain the relationship between a river and its catchment?

A catchment is an area of land where water collects when it rains, often bounded by hills. As the water trickles through the landscape it finds its way



- **Country**
 Sweden
- **Focal landscape**
 Swedish Lapland
- **Size of Landscape**
 1,200,000 ha
- **Work started in**
 2015
- **Larger landscape**
 The greater Nordic landscape between Norway and Sweden.
- **Main habitats**
 Taiga forest, high tundra and alpine grasslands, free-flowing rivers, lakes, and peat marshes.
- **Focal species**
 Reindeer, beaver, sea trout, grayling, salmon, lamprey, whitefish, freshwater pearl mussel, deciduous tree species (e.g. birch, willow, aspen).
- **Team Leader**
 Henrik Persson

down into the soils and into streams, which eventually feed rivers. When you are restoring rivers, this means you have to consider the entire riverscape, because the health of any surface water is governed by the area that drains into it. In fact, the rewilding of rivers often starts with actions on land.

Despite the large size of some rewilding sites, our riverscape approach to river restoration, with its focus on hydrological pathways as opposed to just waterways themselves, ties together processes and functions in a coherent way.



Why do the rivers in the rewilding landscape need restoring?

Despite the absence of hydropower stations, these main rivers and their many tributaries have been and continue to be heavily impacted by forestry. Historical logging and timber floating activities saw coarse river sediment extensively cleared from riverbeds – which was done to enable timber to float freely – meaning that many hundreds of kilometres of northern Swedish rivers ended up effectively becoming straightened canals, with walls of boulders and blocks lining their sides. This significantly reduced the diversity of in-stream habitats, natural erosion and sedimentation processes, and severed all ecological, biogeochemical, and hydrological connections between land and water.

Additionally, thousands of small wooden dams were constructed in small tributaries, many to facilitate timber floating. Together with road culverts, these now impede the movement of aquatic species and natural processes.

After the logging came intensive landscape draining. This saw a huge number of ditches dug in the forest to make it drier, in order to maximise the growth of commercial plantations. However, this has resulted in a drained landscape incapable of storing water



PETER CAIRNS / WILD WONDERS OF EUROPE

after precipitation. It also changes the hydrological regime of the entire downstream river system, because greater quantities of water run through the system over shorter timescales. Peatlands were also ditched to enhance tree growth, which drastically decreased their carbon storage capacity.

And today we have monoculture forestry, with the widespread practice of clear-cutting and expansion of forest road networks. In many of our catchments, the main problem relates to turbidity (the cloudiness of the water), as clay particles from clear-cut forest areas and forest roads enter the water column and clog stream beds.

What measures does your river restoration involve?

Today, sections of many rivers in Swedish Lapland have already undergone restoration to reverse the impact of activities associated with the timber floating activities – these stretches typically have rocky beds, with turbulent water flow and a long association with salmonid species. We see great potential in focusing our efforts on slow-flowing, “forgotten” stretches of river in northern Sweden that run over finer sediment, because this is where nature’s own processes, if kickstarted, can reshape landscapes if we let them. Pure rewilding, in other words.



◀ Swedish Lapland has many wild and free-flowing rivers that are important for migratory fish.

▶ A healthy, meandering river flows over sandy soil in Swedish Lapland.

Can you tell us more about the dams and dam removal?

While past initiatives have already focused on the removal of non-hydro-power-related barriers in local rivers here, there are still hundreds remaining. A quick scan of the catchment of the Vindel River – one of the most restored in northern Sweden – shows 210 artificial barriers, of which at least 57 (many related to logging) are considered to be preventing the free passage of fish, invertebrates, seeds, sediments, nutrients, and so on. Large landscapes are connected by intact hydrology, which means a rewilding approach must include the removal of as many of these unnatural obstacles as possible.

What measures are being taken to scale up barrier removal?

In 2023 we will start looking into the ownership, cultural and ecological aspects of these 57 dams, plus 19 in another catchment (many are ownerless). This often requires some true detective work!

In 2024, we aim to move into the next phase and hopefully get some of these dams physically removed. We will also start identifying barriers in another catchment where we are active.

How will river restoration in Swedish Lapland benefit people?

In the past, river restoration here has typically been aimed at improving sport fishing. But I think this is the wrong approach, because it means restoration efforts have focused solely on sections with enough elevation to create riffles (shallow landforms in a stream or river which are important for fish feeding and spawning). But in many cases it will take a long time for fish

In addition to restoring these sandy stretches, removing barriers and plugging ditches, a significant part of Rewilding Sweden's river restoration work is forest-related.

Commercial forestry means there is a lack of deciduous trees such as birch, willow and aspen in the landscape, which has a huge impact on rivers. The leaves of deciduous trees constitute the main energy source for riverine ecosystems in boreal landscapes, where algal production (the only other basal energy source for aquatic ecosystems) is limited due to low temperatures and a lack of sunlight. These leaves are fed on by bacteria and fungi, which in turn get eaten by insect larvae, which are then fed on by fish – there is a direct link between leaf abundance and trout biomass. So landscapes with more deciduous trees are better for healthy fish populations.

In their natural state, sections of rivers flowing across finer soils in Swedish Lapland should be meandering and braided, with floodplains, swamp forests, and thriving riparian areas. One way of restoring this state is to support and enhance beaver populations, which means we need to work with local communities to increase their acceptance of beavers and their dams.

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What measures were taken to restore rivers in 2022 and what are your plans going forward?

In 2022 and early 2023 we laid down many of the plans and much of the strategy for our road ahead. We now have a significant amount of restoration work lined up – not only within rivers, but also in drained wetland and peatland areas adjacent to these river systems, as well as in riverside forests. This means there will be significant synergy between our rewilding efforts as these interventions are strongly related.

In addition to a two-year initiative to restore a canalised river in the Råne River catchment, we are also looking to remove 76 small dams across two of our catchment areas and to restore forests to improve reindeer winter migration.

populations to return, if they return at all, because they may be locally extinct. There is nothing wrong with sport fishing, but such a narrow focus generally ignores the vital connection between rivers and the surrounding landscape, which can play a critical role in the health of riverine fish populations.

Rewilding, which represents a far more holistic approach to river restoration, results in more attractive, well-connected and ecologically functional riverscapes, which provide a far more comprehensive array of benefits to both nature and people. Healthier, more biodiverse rivers, embedded in naturally forested landscapes, can support thriving nature-based economies, through activities such as recreation and tourism, provide cleaner water, and help to reduce downstream flooding. Although rivers themselves are often natural carbon emitters, more ecologically functional catchments have higher water saturation and are therefore better at absorbing and locking up atmospheric carbon. Natural river catchments are also more climate resilient than impacted ones, enabling the species they host to adapt to changing conditions more easily.

Last but not least, an important restoration goal for the rivers we are rewilding is to enable them to start functioning as reindeer migration corridors. The semi-wild reindeers that roam the landscape here are an important keystone species because of their natural grazing. Intensive monoculture forestry makes it hard for the reindeer to feed and migrate, which means the landscape loses their beneficial impact. Our approach to river restoration will help Sweden's indigenous Sámi people continue practicing their traditional way of living.



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What are the implications of the EU Nature Restoration Law on your river restoration efforts?

In June 2022, the European Commission tabled a new Nature Restoration Law, which for the first time introduces legally-binding targets for EU Member States to restore degraded land and reverse biodiversity loss, including the restoration of 25,000 kilometres of EU rivers. At the moment it's hard to say whether the law will help to speed up Swedish river restoration or not, because there has been ambition to carry out such restoration here for decades. Yet an overeagerness and impatience to reverse degradation has seen many res-

toration efforts leave rivers in an even worse condition, and some initiatives have not been underpinned by sound ecological science. If the restoration law means Swedish forestry companies afford greater respect to riverside forests (and forests in general) this will have a positive impact on river restoration outcomes.

These days I am happy that rewilding – as a holistic, landscape-scale approach to river restoration – is being considered far more at a practical level. For example, both hydrological (how water circulates through the landscape) and geomorphological processes (which relate to soil and landforms) are now being discussed in restoration initiatives, as is the restoration of land as a precursor to river restoration. So, the rewilding philosophy that is going to be applied to meet the obligations of the Restoration Law looks like it is finally mature and ready to do some real good, both in Swedish Lapland and further afield.

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The Rewilding Sweden team is working towards the removal of 76 dams.

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