

The River Simojoki – Back to Nature



Restoration and Protection of the River Simojoki
Simojoki-Life
2002 - 2007

EU LIFE-Nature project

SIMOJOKI-LIFE
Restoration and Protection of the River Simojoki
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**LAPIN
YMPÄRISTÖKESKUS**



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The River Simojoki – part of the Natura network

The objective of the Natura 2000 nature conservation programme is to halt the decline of biodiversity and the reduction and loss of species in the member states of the European Union. The habitat types considered important by the Community are those occurring in its territory that are in danger of disappearing, have a small natural range, or are premier examples of distinctive features of a particular natural geographic area. The Habitats Directive defines a habitat type as a terrestrial or aquatic area distinguished by geographic, abiotic and biotic features. The function of the Natura network is to promote the maintenance or restoration of habitats and species at a favourable conservation status. Finnish Lapland is home to 46 Natura habitats.

The Simojoki represents the Natura 2000 habitat type “Fennoscandian natural rivers”. The type includes rivers or parts of rivers in a natural or near natural state; their waters are low in nutrients, their seasonal water level varies greatly and they freeze in the winter. The rivers vary in character: they may feature waterfalls and rapids, as well as stretches of still water and the small lakes that go with them. The other rivers in Lapland representing the same habitat type as the Simojoki are the Tornion-Muoniojoki river system and the River Ounasjoki.



(Photo: Aarno Torvinen)

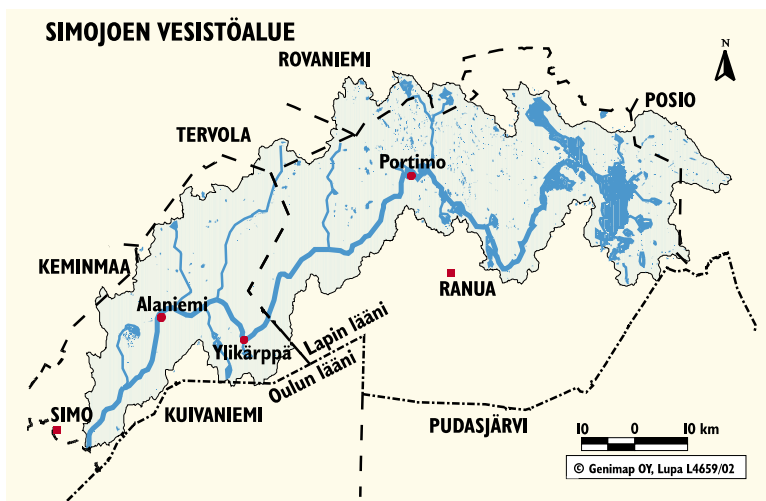
The Simojoki Basin

The Simojoki basin is located in the southern part of the province of Lapland, primarily in the municipalities of Ranua and Simo. The River Simojoki runs 193 kilometres from the wilderness of Lake Simojärvi to the Bothnian Bay, dropping 176 metres on its course to the sea. The river boasts a wealth of rapids, most along its middle and lower courses, where one also finds the most important natural salmon habitats.

The Simojoki is one of Finland's last undammed mid-sized river systems. Along with the Torniojoki, it is one of only two Finnish rivers flowing into the Baltic that has a native salmon population. The Simojoki river system is protected from power plant construction by the Rapids Protection Act.

The survival of the Simojoki river system as a salmon river was threatened, particularly in the 1940s and 1950s, when the river was cleared to facilitate log floating. Wing deflectors were built to direct the flow of water to the middle of the main channel. The channel was deepened by blowing up rocks and moving the debris to the banks and the deflectors. Moreover, during log-floating season, dams were used at Lake Simojoki and on the tributaries to regulate the river's flow. Another development that has a considerable impact on the natural state of the river system is the drainage of peatlands and bogs, carried out to serve the needs of forestry and peat extraction.

On the upper reaches of the Simojoki, the water is poor in nutrients and contains a slight amount of humus naturally. The lower course of the river is richer in nutrients and the water is slightly eutrophic. One source of environmental loading is the scattered settlement along the river; others, particularly on the central and lower reaches, include agriculture, forestry and peat extraction, the last two being located along the river's tributaries.



The Simojoki-Life Project

The River Simojoki Restoration and Protection project began in May of 2002. The total budget of the five-year (2002-2007) project was 1.14 million euro, of which the EU LIFE Nature Fund contributed 0.5 million euro. The national co-financing was provided by the project coordinator, the Lapland Regional Environment Centre, as well as the municipalities of Ranua and Simo, the Lapland Employment and Economic Development Centre, Vapo Oy, Simon Turvejaloste Oy, Metsähallitus and Forest Centre Lapland.

The goal of the Simojoki Life project was to ensure the favourable conservation status of the River Simojoki, part of the Natura 2000 network, through ecological restoration and enhanced water protection measures in the catchment area. Another central objective of the project was to improve the educational and recreational use of the river area and develop opportunities for the tourism sector there.

The River Simojoki Restoration and Protection project implemented a number of subprojects, e.g., measures to reduce environmental loading, a mapping of the ecological state of the river, and the ecological restoration of the main channel. This brochure provides a succinct presentation of the objectives of these subprojects, the measures they involved and the results they achieved.

Reducing Environmental Loading

The effectiveness of wastewater treatment for individual households is often poor and insufficient. This is especially the case with older properties, which generally have only a one- or two-part septic tank, after which the wastewater ends up with no post-treatment in the nearest ditch or body of water. A government decree came into force at the beginning of 2004 that sets out the minimum standards for household wastewater treatment on individual properties. The requirements apply to all properties that are not connected to the sewerage system of a water supply and sewerage facility. If a property has a wet toilet, the treatment of its household wastewater must always be more effective than that provided by a mere septic tank.

A survey was conducted of wastewater treatment in sparsely populated areas of the Simojoki basin in order to ascertain how households not connected to public sewerage treated their wastewater. There are some 1100 such households in the area. The survey consisted of interviews with a sample of approximately one half of the households in the basin. The owners of the properties were asked about water supply and sewerage for their residential buildings. In addition, dairy farmers were asked to report how the water used to wash the milk rooms was treated. The survey revealed the problematic areas requiring enhanced wastewater treatment measures.

According to the study, over 90 per cent of the households in the Simojoki basin have a pre-treatment method for wastewater, typically consisting of a two-part septic tank. A post-treatment method using absorption ditches or an absorption field is generally found only on newer properties, that is, ones built in the late 1980s or in the 1990s. Over 30 per cent of the households surveyed had no wastewater post-treatment at all and nearly 10 per cent had no knowledge of the post-treatment method for wastewater on their property. Nevertheless, a vast majority of the households taking part in the study were interested in changing how they treated wastewater provided the costs could be shared, for example, through joint projects and subsidies. The survey carried out by the project furnishes a solid foundation for the implementation in the Simojoki basin of the government decree on the treatment of household wastewater.



(Photo: Aarno Torvinen)

Where forestry was concerned, the principal aim of the project was to gain a comprehensive picture of the extent to which water protection measures have been carried out in the Simojoki catchment area. The water protection measures carried out in connection with forestry procedures and the implementation of these measures were assessed on a number of selected sites, mainly restoration drainage areas, and the results were compared to the revised forest management recommendations for Northern Finland issued in 2001.

The study demonstrated above all just how important it is to have a water protection plan for the measures to be taken. If the measures are specified in sufficient detail in the plan, they will also be carried out. On the other hand, field inventories showed that a focus on training and monitoring is also reflected as concrete outcomes on the practical level. The water protection measures undertaken at the sites studied were carried out with reasonable success, although room for improvement was noted where surface drainage fields, for example, were concerned.

The results of the field inventories led to the formulation of three central objectives, which were recorded in the report: 1) to provide training in water protection for actors in the forestry sector, 2) to improve the quality of water protection measures by seeing to it in the planning stage that each project implements the measures that have been found most effective, and 3) to improve the flow and updating of information and ensure that recommendations and guidelines are kept up to date.

In Lapland, industrial peat production on the same bog lasts some 20 years. When production has ceased, what is left on cutaway bog is pure humus, which can be used in many ways. Environmental loading declines when active measures can be carried out on areas as soon as they are released from peat production.



(Photo: Aarno Torvinen)



(Photo: Aarno Torvinen)

The project drew up after-care and after-use plans for sector 1 of The Lumiaapa mire and for Iso-Tuohiaapa mire, where peat extraction has ended. Field measurements, the soil fraction composition of mineral soils, and nutrient analyses of soil samples for both areas have suggested three alternatives for after-use: what are known as multiple-use alternatives and restoration. The most common forms of after-use are reforestation, agriculture, rewetting of the deepest parts of the bog, and bog regeneration.

Agriculture is a firmly established livelihood along the River Simojoki, with some 260 active farms in the municipalities of Ranua and Simo combined. The farms have almost 6500 hectares of arable land, of which 2400 are located along the river. The number of active farms along the river is 70. In order to reduce the diffuse loading caused by agriculture, the Simojoki-Life project set itself the goal of creating protective belts in the areas of the river most heavily impacted.



(Photo: Aarno Torvinen)

Five farms in total were interested in planning farm-specific protective belts and plans were drawn up for each. It is hoped that the project will increase interest in setting up protective belts among riverside farmers and motivate them to take advantage of the various different sources of funding available.



(Photo: Aarno Torvinen)

Mapping the Ecological State of the Simojoki

The purpose of the mapping was to assess the ecological state of the river and to ascertain the factors that have an impact on it. The mapping of the main channel also helped reveal the state of the rapids prior to restoration. These results can be used in evaluating the outcome of the restoration work.

Twenty six observation points in the catchment area were chosen for the study, eleven in the main channel of the river, fifteen in its tributaries. Ecological state was assessed by studying the vegetation, fish population, benthic fauna, benthic algae, water quality and environmental loading, as well as by mapping the river's hydromorphological state. For example, benthic fauna and benthic algae are indicators of the ecological state of and water quality in their habitat, providing information on factors such as flow conditions, the quality and quantity of organic material coming from the catchment area, and the nutrient content, turbidity and variation in acidity of the water. The composition and relative abundance of species indicates where the state of the environment and water quality change and where the largest sources of environmental loading occur.

All of the studies comprising the subproject were designed with implementation of the EU Water Framework Directive (WFD) in mind. The research also evaluated the applicability of the methods used for describing the ecological state of northern rivers. The goal was to be able to use the results of the mapping in the classification of ecological state required by the WFD.

Benthic algae reflected the barren or slightly eutrophic and clear-watered conditions to be found in the Simojoki. Judging from the diatom communities, the level of eutrophication on the main course of the river increased when going from upstream to downstream. The composition of diatom communities varies in rivers that differ in terms of environmental loading and even relatively small differences in water quality come to light when such communities are analysed. The mapping revealed that the ecological state of the river was good for all the points studied. The study demonstrated that the diatom method is well suited to assessing the ecological state of rivers in the north.



(Photos: Annukka Puro-Tahvanainen, Aarno Torvinen)



(Photos: Aarno Torvinen)

The vegetation mapping indicated that the pressures caused by human activity were poorly reflected in the structure of aquatic and littoral vegetation. Water mosses are often the dominant plant group in northern rivers. Mosses are relatively sensitive to changes in the characteristics of the river channel and water flow, and a greater emphasis should be placed on their use in assessing the state of the environment by developing research methods and indicators.

The benthic fauna sites on the main course and tributaries of the River Simojoki proved to be in rather good condition in terms of species richness and communities. That sensitive species occurred at all sampling points reflected the high water quality in the river system and the local nature of environmental loading caused by human activity in the catchment area. The mapping showed that the lower reach of the main channel is in somewhat poorer condition than the headwaters. The ecological state at the observation points farthest up river was excellent: they were close to being in a natural state.



(Photos: Aarno Torvinen)

An inventory of the fish population was carried out using electric fishing in rapids along the main channel and the tributaries. The study focused to the composition of fish species and in particular the extent of natural fry production in the case of particularly sensitive species, such salmonids. The results of the mapping furnish excellent background material when assessing the impacts of restoration projects.



(Photos: Aarno Torvinen)

All in all, the mapping of the ecological state of the River Simojoki showed that the main course and the tributaries of the river are for the most part in good condition and that detrimental impacts of human activities are local. However, it was noted that the methods and indicators used will require further development if they are to adequately reflect the changes caused by the clearing of rapids.

Ecological Restoration of the Main Channel

The need for an ecological restoration of the Simojoki stems from, among other things, its use as a log-floating channel in the recent past. Rapids were cleared many times to expedite floating, the such operation taking place at the end of the 1960s. In the following decade, the log-floating regulations were repealed and efforts began to restore the rapids on the river. Most of this work was done in 1976 and 1977 but several additional restoration operations were carried out later. The restoration carried out on the 1970s had to take into account the possible need for log floating in a time of crisis, meaning that the work was not as extensive as it should have been nor it could be done across the entire width of the river. Restoration nevertheless succeeded in increasing the number of salmon fry production area to some extent, but the clearing of the rapids and narrowing of the main channel still had a severe impact on flow conditions and habitat structure.



(Photo: Aarno Torvinen)

The ecological restoration of the main channel of the river, carried out between 2002 and 2006, sought to return the river as nearly as possible to the state it was in before the rapids were cleared. In practice, this meant the dismantling of the remaining wing deflectors, broadening of shallow fry production areas, restoring the naturally diverse flow conditions and the building of gravel spawning grounds. Rapids have been restored by constructing ledges, rock groups, and trenches and by directing the water flow. The aim of restoration has been to not only increase the production of valuable fish species but also enhance the biodiversity of the entire ecosystem. Not only fish but also other species typical of natural rapids areas—from benthic fauna to the vegetation – benefit from restoration.

During the project, some 155 hectares of rapids other stretches of flowing water – covering 24.5 kilometres of the river - were restored mechanically. Restoration along the middle and lower courses of the main channel (below Portimojärvi) adhered to the requirements of salmon habitats. Farther upriver the work was primarily geared to meeting the habitat needs of trout.



(Photos: Aarno Torvinen, Eero Hiltunen)

Restoration significantly increased the number of gravel spawning grounds as well as rapids areas conducive to fry production – for salmon on the lower course, for trout on the upper. Spawning grounds were restored using gravel found in the rapids areas and brought in from elsewhere. Along the lower course, the spawning grounds were generally built at a depth of 20-60 cm at the head of the rapids, making protective habitats available for hatching fry in the rapids just below the spawning area. Farther upriver, the spawning grounds were small, patches of undulating gravel some 2 m² in size. Restoration is estimated to have increased the total size of the potential salmon fry production areas by at least 20 hectares. Preliminary monitoring of the fish population has yielded promising results, with increases seen in the production of natural salmon fry and fry being observed over a larger area than before.

Improved Recreational Use and Increased Tourism

The Simojoki is well known among rod-and-reel fishers as one of the best recreational sites in the country. Rapids as well as flat-water stretches of the river offer a wealth of superb fishing. There is plenty of room and plenty of good fishing for lure and fly-fishers alike.

The ecological restoration of the main channel of the Simojoki primarily sought to ensure biodiversity and to improve the habitats of the river's natural salmon population. The principal challenges to be met in projects of this type are reconciling the interests involved in the multiple use of river systems with biological objectives. During the project, fishers and paddlers alike provided valuable feedback, and every effort was made to take advantage of this input when implementing restoration solutions.

Fishing tourism has increased clearly with the revival of the river's salmon population. The Simojoki seems to have established a solid reputation as a worthwhile destination among fly-fishers in particular. The pressures from fishing are concentrated on the rapids in the middle course of the river, the location of the best spawning and fry production areas. Indeed, on stretches of the river where recreational fishing is particularly popular and salmon fry production has picked up, restoration of the rapids was a collaborative effort involving fishers and tourism entrepreneurs.



(Photos: Suvi Nenonen, Aarno Torvinen)

The Simojoki's increased popularity among fishers is being matched by its appeal to paddlers. The river—a run of rushing rapids and tranquil stretches of flat water from Lake Simojärvi to the Bothnian Bay—offers unparalleled opportunities for canoe and kayak treks. With the river's naturally shallow rapids, boating tends to remain a local activity. Paddlers, however, may run the entire length of the river and every effort was made to accommodate their needs when carrying out restoration. The difficulty of a river for paddlers normally increases after restoration, because at low water one cannot run a rapid restored to near its natural state in the same way as one can a rapid that has been drastically cleared for log floating. The restoration team tested how its solutions worked for paddlers by running the restored rapids in a canoe.



(Photo: Miikka Halonen)

Project Communications

The Simojoki-Life project, its goals and related measures were featured extensively and prominently in local and regional print media as well as on regional radio. In addition, information sessions and other public occasions were held to present the project to people living along the river. Other forums centring on the project and its aims included various meetings and exhibitions for officials, experts, people in the tourism sector, students, school pupils, fishers and paddlers. The communication sought to increase officials' and local residents' awareness of the ecological state of the Simojoki as a Natura 2000 site and of how various activities contribute to improving the conservation status of the river and water quality. The reasoning here is that increased information on and awareness of nature will dispel the negative preconceptions observed in the Simojoki area towards the Natura 2000 programme and conservation in general. The aim of Natura 2000 – along the Simojoki and elsewhere – is to improve local well-being by ensuring the present and future conditions and opportunities for different forms of local culture, for a subsistence economy, for local nature tourism and for nature experiences.

The project produced a diverse range of presentation and educational material, a project brochure, two guides and reports on the subprojects completed. The project's web pages can be found at the address of the Finnish Environmental Administration: www.ymparisto.fi> Lappi > Luonnonsuojelu > Natura 2000 network > Simojoki-Life.

In connection with its aim of reducing diffuse loading by agriculture, the project compiled a booklet in Finnish entitled “[Suojavyöhykkeet vesiensuojelussa – opas Simojokivarren viljelijöille](#)”. The publication was distributed to farmers along the Simojoki and in other part of the river basin as well.

The publication “[Simojoen jokiretkeilyopas \[Recreational Guide to the River Simojoki\]](#)” describes the nature, conservation areas, cultural heritage and recreational opportunities in the Simojoki basin. The Paddler's Guide section of the publication provides updated classifications for each of the rapids on the river and directions on how to best run them. It is our hope that the guide will find as wide a readership as possible, making the area better known, bringing the Simojoki basin to the attention of travellers and guiding traveller to use the region's services and explore its sites of natural and cultural interest.

The summary report “[Simojoen tila ja kunnostus](#)” contains reports dealing with the wastewater treatment situation of rural areas in the river basin, the implementation of water protection measures in the forestry sector, and the studies mapping the ecological state of the river, and the ecological restoration of the river.

The following organisations have done their part to ensure the favourable conservation status of the Simojoki:

Municipalities of
Ranua and Simo

Vapo Oy

Metsähallitus

Lapland Employment and
Economic Development Centre

Simon Turvejaloste Oy

Forest Centre Lapland



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