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Protection, Restoration and Enhancement of Salmon Habitat
Focus Area Report

Finland

Focus Area Report on Protection, Restoration and Enhancement of Salmon Habitat

EU - FINLAND

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1. Introdution

In addition to the several salmon rivers on the Baltic Sea basin, there are two river systems in Finland supporting Atlantic salmon stocks that are running to the Atlantic Ocean, the Rivers Teno and Näätämöjoki. Both rivers are in the subarctic area, located between 68ºN and 70ºN, and they are border rivers with Norway with their lowest sections belonging to Norway only (Fig. 1). The River Teno (Tana in Norwegian) is a large salmon river with a drainage area of 16 386 km^2 and a mean discharge of 170 m^3/s. Two thirds of its drainage area belongs to Norway, including the large headwater tributaries, Rivers Iesjoki and Karasjoki (Fig. 1). In contrast, more than 80% of the River Näätämöjoki system (Neidenelva in Norwegian, drainage area 3160 km^2) is located in Finland (Fig 1).

All salmon production is natural, and no releases of salmon are allowed in these river systems. The only tools in salmon stock management are the fishery regulations, introduced and agreed by Finnish and Norwegian authorities for the river fisheries. A variety of both national and bilateral legislations regulate the nature conservation, land use and fishing activities in both rivers (Siirala & Huru 1990).

Atlantic salmon populations in these rivers are abundant, showing large fluctuation in the yearly abundance of salmon but no declining trend in general (Fig. 2). Concerns have been recently raised, however, on the status of certain sub-populations, especially multi-se-winter stock components in some headwater tributaries (Johansen et al. 2008).The variety of natural salmon life histories in the River Teno is probably the widest among all Atlantic salmon rivers, with smolt ages varying between 1 and 8 years (mostly 3-5), and sea ages between 1-5 years, and a variety of previous spawner groups adding to the diversity of 96 different life history combinations (Niemelä et al. 2006).The River Teno system supports one of the most abundant, if not the largest, wild Atlantic salmon population in the world; the yearly river catch of salmon mostly varying between 100 and 200 metric tonnes. Furthermore, the River Näätämöjoki typically belongs to the top ten of the Norwegian salmon rivers in terms of yearly catch .

2. Current status of salmon habitat in Atlantic salmon rivers in Finland

It has been estimated that the Teno river system contains some 47.2 million square meters (habitat units) of production area for salmon, and the corresponding figure for the River Näätämöjoki is 2.1 million m^2 (Niemelä et al. 1999; Erkinaro et al. 2000; Hindar et al. 2007). Given the northern subarctic nature and little or no human influence on the water quality or other physical environment (Sivonen

2006), large proportions of the drainage areas of the rivers Teno and Näätämöjoki are virtually pristine. No major recent changes have occurred and no major future threats for the environmental status of these river systems are expected. An overview of the Atlantic salmon habitat issues has earlier been presented to NASCO (Erkinaro 2003).

3. Identifying and designating priority habitat areas

The Finnish- Norwegian Transboundary Water Commission, and intergovernmental body managing the transboundary watersheds (see below), although on a relatively small scale, has identified two main causes of present or potential habitat problems in the River Teno valley: road construction with regards to ecological connectivity in small tributaries, and river bank erosion.

3.1. Road construction causing migration obstacles for juvenile salmon

In addition to c. 30 tributaries with distinct spawning sub stocks of salmon in the River Teno system (Moen 1991, Elo et al. 1994, Vähä et al. 2007) there are at least 100+ small tributaries where adult salmon do not spawn but where juvenile salmon enter from the main stem of the river (Erkinaro 1995, Erkinaro et al. 1997, Johansen et al. 2005). Most of these streams also support brown trout (*Salmo trutta*), either resident or migratory or both, and arctic charr (*Salvelinus alpinus*). Similar tributaries have been identified in the River Näätämöjoki system as well (Erkinaro et al. 2000)

Many of these tributary brooks are draining into the main stem of the Teno or into the major tributaries of the river, the River Utsjoki, Inarijoki, Karasjoki and Iesjoki (Fig. 1), which all have roads following most parts of the river (with the exception of the R. Karasjoki). Most of the road crossings with the tributaries used to be equipped with culverts. In 1980's many of the culverts of the largest tributary brooks were displaced by bridges, which substantially improved the migration routes in these cases. However, in late 1980's several culverts were still identified as obstructions for juvenile salmon (Erkinaro 1988), and a later inventory carried out by the Finnish and Norwegian environment authorities in early 2000s further revealed at least half a dozen tributaries, where road culverts were blocking the migratory route for juvenile salmon and brown trout, and where restoration activities could lead to a substantial increase of salmonid habitat (Lundvall et al. 2001). In some cases, the vertical drop in the culverts during the summer water level was as high as one meter, which obviously prevents upstream migration of any salmonid fish.

In some cases, road and bridge construction has caused erosion and deteriorated the migration routes of also adult salmon in larger tributaries. A typical result of such erosion is the filling of the tributary outlets and formation of a shallow delta-like, multi-channel outlet. This problem has been substantial in at least seven tributaries of the River Teno (Lundvall et al. 2001). During the 1990's, the road and environment authorities have tried to improve these river mouths by restoring the old, single-channel river mouth. Success and especially the permanence of such improvements have varied from river to river. In some cases, a sufficient solution has required strong lining with large boulders to centralize the river flow into a single-channel outlet.

3.2. River bank erosion

In a recent cooperative project between Finnish and Norwegian environment authorities an inventory of erosion banks revealed more than 80 unstable river banks were detected in the River Teno valley (Fergus & Rönkä 2001). In most of the cases (63%), the reason for erosion was natural, mainly due to steep banks with fine post-glacial, stratified soils. In certain areas, however removal of bank vegetation in connection with agriculture activities and road construction has caused erosion.

4. Activities and approaches used to share and exchange information on habitat issues, and best management practices, between relevant bodies within the jurisdiction

To co-ordinate the management of transboundary watersheds, the Governments of Finland and Norway concluded an agreement in 1980 establishing the Finnish- Norwegian Transboundary Water Commission. The Commission aims to preserve the transboundary watercourses and their unique natural conditions, while also safeguarding the environmental interests of both states and residents of the border region. The Commission has three representatives from Finland and three from Norway, as well as deputy members appointed by each country. The Commission is chaired by the regional authorities, and its secretariats are the Lapland Regional Environment Centre in Finland, and the County Governor of Finnmark in Norway.

The Commission has issued recommendations on how to preserve unique natural and landscape values, how to prevent the deterioration of water quality, and how to safeguard the multiple use of rivers. The Commission also monitors water quality and any activities affecting the state of the transboundary waters.

According to the EU Water Framework Directive, river basins reaching into more than one Member State must be assigned to international river basin districts. Norway is not a Member State but as an EEA country WFD concerns it as well. Appropriate coordination between EU and Russia may also be done to achieve the objectives of the WFD across the transboundary watersheds. A recently established international river basin district covers the watershed areas of the Rivers Teno (Tana in Norwegian), Näätämöjoki (Neidenelva), Uutuanjoki (Munkelva) and Paatsjoki (Pasvikelva). Competent authorities in the district in Finland and Norway are Lapland Regional Environment Centre in Finland and the County Governor of Finnmark in Norway.

In 2008, environmental authorities responsible for river restorations from Sweden, Norway and Finland have established an informal "Northern Calotte River Restoration Group". The aim of the group is to exchange information and knowledge, and to promote river restoration activities in the Northern Calotte area.

5. Description of plans, ongoing work and work undertaken

5.1. General

Several bi- and trilateral plans have been completed and salmon habitat related projects realized in the transbowatersheds. Main aim of the work has been to preserve the good ecological quality of the rivers and the sustainable use of natural resources.

During the years 1999 and 2000, the Lapland Regional Environment Centre, the Norwegian Water Resources and Energy Directorate (NVE) and the County Governor's Office of Finnmark carried out a project *Erosion of the River Tenojoki Preservation of the River Tenojoki as a salmon river in its natural state.* The project was partly financed by the Interreg II North Calotte programme. The main aim of the project was to map erosion and identify barriers to salmon migration. Another aim was to create a common understanding between the managing authorities in Norway and Finland of the processes in the river in order to ensure more integrated and sustainable management of the river.

In September 2002, the Lapland Regional Environment Centre and the NVE started a project named *Preserving the natural state of the river Tenojoki – environmental work, ecological state and monitoring*. The aim of the project was to preserve the river as a salmon river in its natural condition and to develop recreational use of the river in accordance with the principles of sustainable development. The studies of the river basin, guidance for people visiting the area and improvement of the fish migration conditions all aim at securing the natural state and sustainable use of what is a very sensitive area. The project was financed by the EU/Interreg III A North, the Finnish Ministry of Labour/Employment and Economic Development Centre, the Ministry of the Environment/Lapland Regional Environment Centre, the Municipalities of Utsjoki, Inari, Tana and Karasjok, and the State of Norway.

A draft River Basin Management Plan for Teno-Näätämöjoki-Paatsjoki river basin district (Finnish area) was published for public hearing in 31 Oct 2008. Several measures and policy instruments are suggested that also play a role in preserving natural salmon populations in the area. During 2009 the Management plans for 2010-2015 will be finalized and accepted. Finland and Norway will formulate common suggestion of measures relevant on the whole river basin district.

5.2 Culvert restoration

During a pilot phase in 2000-2001, fish migration routes in five tributaries were improved by lowering the culverts deeper into the ground. In addition, transverse structures that slow the flow velocity were constructed in the culverts. Started in 2002, the later project continued the culvert improvement activities and started a biological controlled before-after study to monitor and demonstrate the improvement in fish migration in these tributaries. Seven additional road crossings in brooks on both Norwegian and Finnish side were restored in 2002-2004. As a consequence, migration routes were opened and fish expanded their territories upstream the road crossings in most cases (Erkinaro & Erkinaro 2006).

5.3 Erosion protection

During the past two decades both Norwegian and Finnish authorities have introduced river bank protection plans and carried out bank lining projects. In Finland, 12 sections (total 9 km) of banks have been strengthened and lined using large boulders. On the Norwegian side nine such sections have been protected comprising seven kilometres of river banks (Fergus & Rönkä 2001). A report on these activities provided also recommendations in handling and priorization the future protection and restoration activities with regards to the river bank erosion (Fergus & Rönkä 2001).

5.4 Landscaping of erosion barriers along the river

In the project 2002-2006, the aims included recreating the natural riparian environment and vegetation on the embankments of erosion-protected river stretches and thereby increase biological diversity and improve the landscape and scenery. The main focus was to replace the top layer of the riprap construction, i.e., large stones, with materials of finer structure (grain size). The new layer retains moisture better and keeps it in for a longer period of time, thus providing water to the plants. It is also important that the roots cling to the sand as well as to the small stones. Vegetation was introduced by planting willow bushes (*Salix*) species. These were planted in the substratum in four rows and plant cuttings of the same species were added to a net pattern. In some areas, complete clusters of Salix and herb vegetation were removed near the embankment and brought down to the riprap structure. The vegetation (bushes) was collected from areas near the river with abundant natural willow vegetation.

A total of six areas along the banks of the rivers Anarjohka and Karasjohka were rehabilitated on the Norwegian side (c. 2.2 km) and four areas on the Finnish side (c. 1 km).

5.2. Future plans

Identification and quantification of salmon habitat in the river systems was strongly emphasized in the recent report of the Norwegian-Finnish Group working on salmon monitoring and research (Johansen et al. 2008). Improvinig the knowledge beyond the existing habitat information was also identified to be essential in developing the applicability of the recently established spawning targets for the salmon populations in these rivers (Hindar et al. 2007). Practical implementation of this work will be among the first topics in the agenda of the standing Norwegian-Finnish Expert Group which will be established in near future.

No major activities affecting the salmon habitat that can include questions on burden of proof, socio-economic aspects etc. are currently foreseen in the Teno and Näätämöjoki systems.

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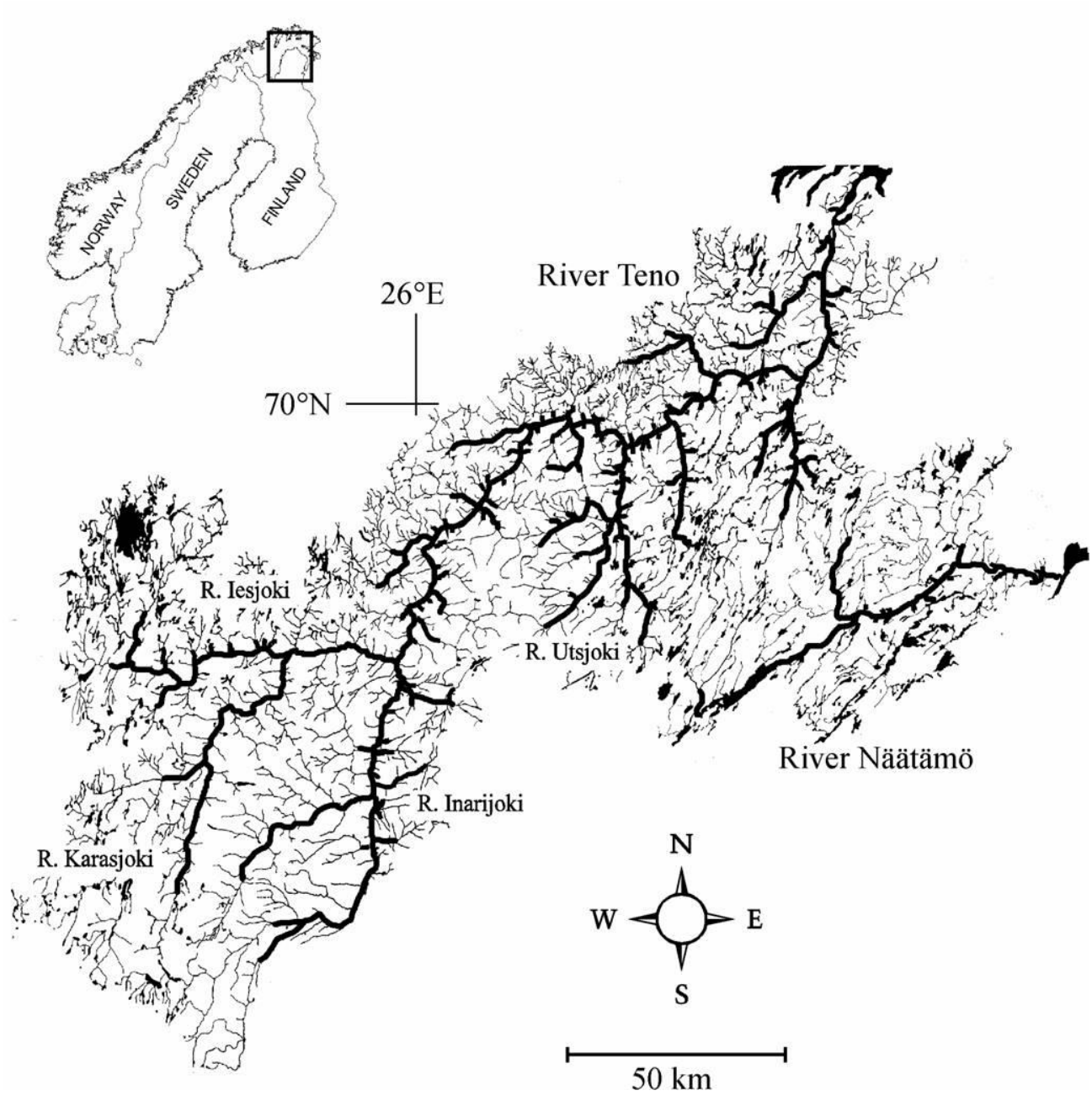

Fig. 1. The Rivers Teno and Näätämöjoki and the distribution of Atlantic salmon in the river systems (thick lines).