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Salmon and Sea Trout Populations and Rivers in Finland

HELCOM assessment of salmon (*Salmo salar*) and sea trout (*Salmo trutta*) populations and habitats in rivers flowing to the Baltic Sea.

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HELCOM has the sole responsibility for this report and the European Commission is not responsible for any use that may be made of the information contained therein.

Contents

1. Introduction

This Report gives a description of Finnish salmon and sea trout populations and rivers that empty into the Baltic Sea. The Report is based on the HELCOM SALAR Project that focused on the state of salmon (*Salmo salar*) and sea trout (*Salmo trutta*) populations in rivers flowing to the Baltic Sea.

The deliveries of the HELCOM SALAR Project include a General Report on Baltic salmon and sea trout populations and rivers (BSEP 126A) as well as reports with individual descriptions of populations and rivers separately for Denmark, Estonia, Finland, Latvia, Lithuania, Poland, Russia and Sweden (BSEP 126B). The project also prepared a GIS map of salmon rivers as well as a database compiling information on salmon and sea trout populations and rivers.

The overall ecological state of the Baltic rivers and their fish populations has deteriorated from their pristine state. This is a consequence of direct anthropogenic impacts caused by many activities in the drainage area, in the rivers and in the Baltic Sea. In the rivers, the most detrimental activities have been damming, dredging and channelizing rivers to serve for hydropower production, log driving and agricultural purposes. Also indirect impacts of human activities such as nutrient and sediment loads from agriculture, forestry and sewage sources have had negative consequences on the ecological state of the Baltic rivers.

The General Report of the HELCOM SALAR Project presents an overview, inventory and classification of Baltic rivers with salmon and/or sea trout populations. In order to improve the status of these populations, the Report recommends measures for the restoration of river habitats and waters, for the opening of passage as well as for fisheries management in rivers. Furthermore, a prioritization of Baltic salmon and sea trout populations in need of urgent actions for their recovery is included. The recommendations and prioritizations form a basis for the development of international and national programs for the planning, funding and systematic realization of these actions.

The HELCOM SALAR Project was funded through a co-financing agreement between the European Commission (DG MARE) and HELCOM. It implements fisheries actions in the strategic HELCOM Baltic Sea Action Plan to radically reduce pollution to the sea and to restore the good ecological status of the marine environment by 2021.

The Reports have been prepared in co-operation with nominated salmonid and river habitat experts of the Baltic Sea countries as mentioned on the second page. The texts concerning salmonid populations and rivers in each country have been produced by the nominated experts and edited by the project staff in the HELCOM secretariat.

The General Report, the Reports with river descriptions and the GIS map are available at www.helcom.fi and the databank as an excel file at the institutions of the nominated experts.

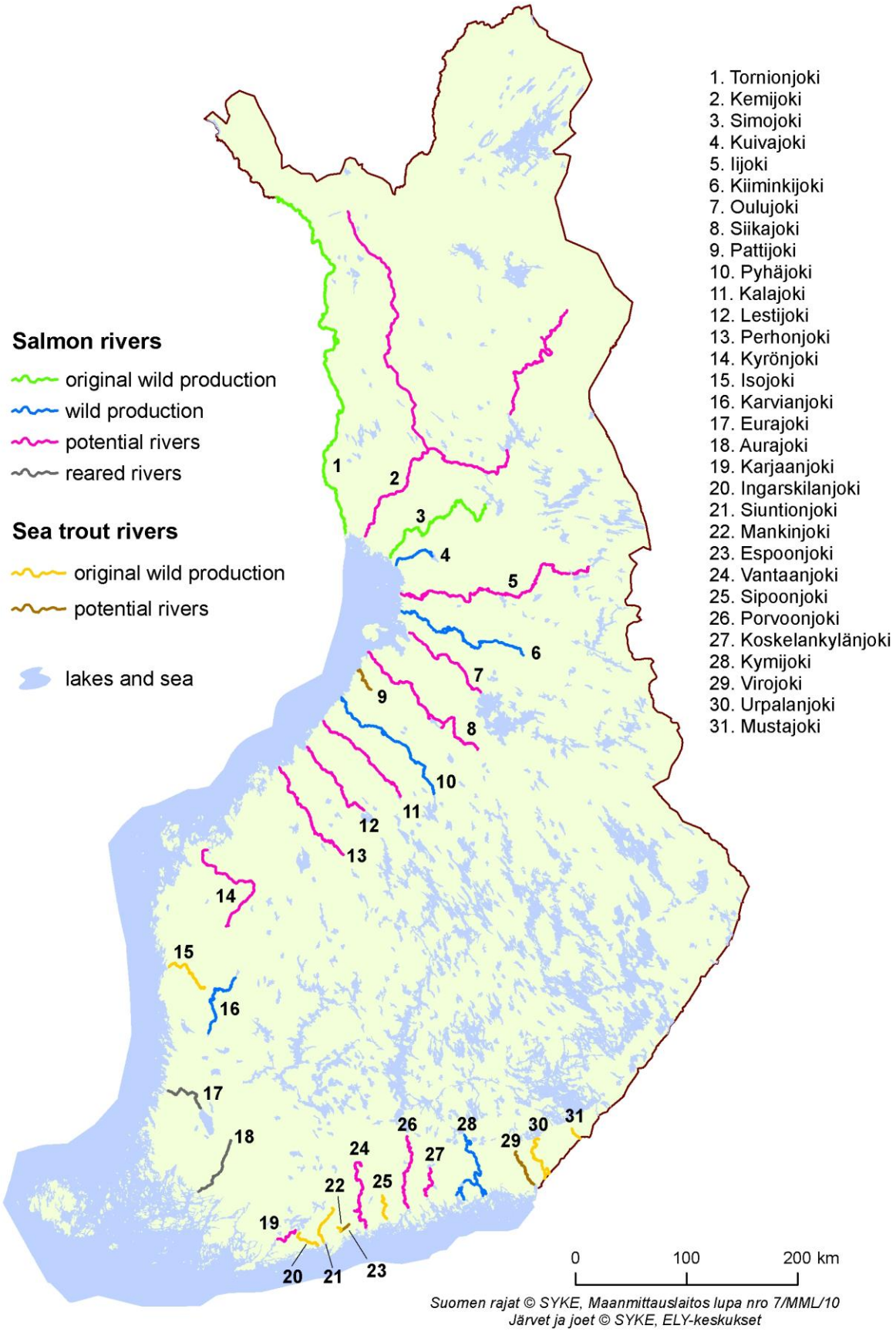

Figure 1. Map of the Finnish salmon and sea trout populations and rivers.

2. Salmon populations and rivers in Finland

The River Aurajoki

The River Aurajoki is a salmon and sea trout river flowing to the Archipelago Sea.

Basic hydrological facts

River length: 70 km of which 23 km accessible for salmonids
Size of catchment area: 874 km^2
Average flow: 7.2 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 4 (1 contains a fish way)

Habitat and water quality in River Aurajoki

The River Aurajoki starts from Oripää ridges and enters the Archipelago Sea at the city of Turku. Forests cover about a half of the catchment area of the watercourse, fields 35%, peatland10% and lakes only 0.3%. Abundance of clay soils and intensive agriculture are typical for this coastal area. The fields are commonly located on sloping river banks and are thus especially prone to erosion.

Due to the scarcity of lakes in the catchment area, the variation in the river discharge is large. The River Aurajoki is the main source of municipal water supply for the city of Turku, and in dry seasons almost all the river discharge is used for this purpose. During dry periods, some water is led into the river Aurajoki from the neighbouring rivers.

The water quality has been assessed as poor due to the high nutrient and sediment load and turbidity. Over two-thirds of the nutrient loading comes from agriculture, 10–20% from settlements and forestry and about 10% from natural leaching. In addition, mild winters may increase soil erosion and annual nutrient loading to the river.

Earlier there were several milldams in the river, and some of the rapids have been dredged. There are two dams closing the river: one in Halistenkoski about 6 km from the sea and another one in Nautelankoski about 23 km from the sea. The fish ladder over the Halistenkoski dam makes the ascent of fish possible except during the periods of low discharge. In addition, there are at least two low milldams left which may be partial migration obstacles during low flow periods.

In the river about 2 hectares of rapids are available for smolt production.

River Aurajoki according to the Water Framework Directive

The name of the water management district is the River Basin District of River Kokemäenjoki-Archipelago Sea-Bothnian Sea and the river type is a medium-sized river in regions with clay soils.

Ecological status: Poor
Biological status: No information
Physical & chemical status: Poor
Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment load and by preventing occasional periods of drought; removing migration obstacles and restoring reproduction areas including the tributaries and continuation of stocking of salmon and sea trout.

Natura 2000

A part of the river belongs to the Natura 2000 network.

The River Aurajoki salmon and sea trout stocks

There are some historical references from the 1550s of a Crown fishery located in the Halistenkoski rapids. This fishery was probably targeted at salmon and sea trout, but due to the size of the river, the occurrence of salmon is unsure. The Nautelankoski rapids have probably been a natural migration obstacle for ascending fish.

In 1995, a fish ladder was built over the Halistenkoski dam allowing fish ascent upstream until the Nautelankoski rapids. Releases of salmon and sea trout smolts near the river mouth have been annually carried out since the 1980s. Since the 1990s the river downstream of the Halistenkoski dam has been developed as a popular rod fishing resort for salmon and sea trout. Even though smolt production is limited, the river allows possibilities for rod fishing of salmon and sea trout in the middle of the city of Turku.

Some restoration work has also been carried out in the rapids. Stocking experiments have been done with eyed eggs, newly hatched fry and 1 year old parr of salmon and sea trout in the rapids. Despite the annual observations of ascending salmon and sea trout in the fish ladder, only a few natural 0+ sea trout parr have been found in some years in the Nautelankoski rapids in electro-fishing surveys.

Salmon and sea trout population facts

Population category: 7 (salmon), 6 (sea trout)
Reproduction area: 2 ha (salmon)
Production capacity: No information
Recent wild production estimate: No information

Fishing regulations in the River Aurajoki

The closed season is from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

Occurrence of periods of extreme low flow conditions should be prevented, for instance by altering the water supply of the city of Turku from the river Aurajoki to other water sources. Water quality should be improved by establishing an effective protection zone along agricultural lands by the river. The rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Eurajoki

The River Eurajoki is a potential salmon and sea trout river flowing to the Bothnian Sea.

Basic hydrological facts

River length: 52 km of which 10 km accessible for salmonids
Size of catchment area: 1,336 km^2
Average flow: 8.8 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 5 (3 contain a fish way)

Habitat and water quality in River Eurajoki

The River Eurajoki begins at the lake Pyhäjärvi, 50 m above the sea level. Lakes cover 13% of the catchment area. Lake Pyhäjärvi is the largest lake of the watercourse and Lake Köyliönjärvi the second largest. The main tributary of this river is the River Köyliönjoki.

There are five dams closing the main stem: Kauttua regulating dam near the outlet of lake Pyhäjärvi, Eurakoski and Paneliankoski (at 30 km) power plant dams, Saharinkoski regulating dam at 17 km, and the Pappilankoski power plant dam nearly 10 km from the sea. The Pappilankoski dam (built in 1928–1931) is the lowest dam of the river. The only dams to currently have fish ways are the Saharinkoski, Pappilankoski and Paneliankosk dams. In addition to the dams, there are some partial obstacles hindering the migration of fish. The rapids of the river have been dredged for timber floating and flood prevention, but their restoration between Pappilankoski and Paneliankoski will be performed in the near future.

The discharge in the river is notably reduced near the sea, because some water is drawn above the Pappilankoski dam to the use of the local industry and settlements. Water is also taken for irrigation purposes to vegetable fields and greenhouses by the riverside. On the other hand, additional water has since 2000 run from the neighbouring River Kokemäenjoki during dry seasons into the River Eurajoki.

The water quality has been rated as fair in the lower and uppermost reaches of the main stem, while in the middle reaches and in the largest tributary of Köyliönjoki it has been rated poor due to the high nutrient load from agriculture and settlements. The water quality is good in Lake Pyhäjärvi but poor in the Lake Köyliönjärvi and in the Köyliönjoki tributary. Especially during low discharge, the water quality may change quite much in the river due to the relatively high loading from the industry and settlements and due to diffuse loading from agriculture. For example, the pH values can be sensitive to such changes.

The potential for salmon and sea trout smolt production is low, but the production is expected to increase if the water quality is improved and if migration obstacles are removed. Also the reduced discharge downstream of the Pappilankoski dam may hinder fish from migrating into the river and reduce the potential of smolt production near the river mouth.

River Eurajoki according to the Water Framework Directive

The name of the water management district is the River Basin District of River Kokemäenjoki-Archipelago Sea-Bothnian Sea and the river type is a medium-sized river in regions with clay soils.

Ecological status: Fair
Biological status: No information
Physical & chemical status: Fair (the lowest part); Good (the upper part)
Hydrologic & morphological status: Poor

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading; to remove migration obstacles; to restore reproduction areas; and to reintroduce salmon and sea trout.

Natura 2000

A part of the river belongs to the Natura 2000 network.

The River Eurajoki salmon and sea trout stocks

The river Eurajoki lost its original salmon and sea trout stocks during the first half of the 20th century. This was probably caused by the construction of dams and impaired water quality due to the effluents from paper industry built near the outlet of Lake Pyhäjärvi. The few releases of salmon and sea trout smolts near the river mouth have not resulted in natural reproduction in the river. However, an introduced population of brown trout lives in the tributary of Pyhäjoki, flowing into Lake Pyhäjärvi.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 2.5 ha (salmon)
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Eurajoki

The closed season is from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

Occurrence of periods of poor water quality or extreme low flow conditions should be prevented. Water quality should be improved by effective protection zones along agricultural lands and by effective sewage treatment. The rapids should be restored. Water flow regulation in the dammed parts of the river should be minimized.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Fiskarsinjoki

The River Fiskarsinjoki is a salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 5 km of which 4 km accessible for salmonids
Size of catchment area: 131 km^2
Average flow: 1.2 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 3

Habitat and water quality in River Fiskarsinjoki

The main stem of the River Fiskarsinjoki begins at the Lake Degersjö, about 19 m above the sea level. The river is divided into two stretches. The upper stretch is about 2.3 km and extends from the lake Degersjö to a shallow and narrow lake of Borgbyträsk. The lower stretch is 1.2 km long and extends from the lake Borgbyträsk to the Bay of Pohjanpitäjänlahti in the Northern Gulf of Finland.

The catchment area of the watercourse consists of barren forests and fertile fields, and the proportion of lakes is extraordinary high, about 18%. There are two small brooks emptying into the river: Brunkomträskbäcken near the river mouth and Risslaån in the rapids area between the dams.

There are about 0.6 hectares of rapids in the main stem accessible for ascending migratory fish. All the rapids are situated in the upper stretch of the river near the outlet from the Lake Degersjö. In the rapids area there are a total of three dams close to each other. The dams have been built by the old iron factory area of Fiskars and date back to the 17th century. They are still in use. Fish can ascend the river until the Kopparhammarfors dam, located 4 km upstream from the sea. The water quality of the river Fiskarsinjoki is rated as good.

River Fiskarsinjoki according to the Water Framework Directive

The name of the water management district is Kymijoki- Gulf of Finland River Basin District.

Ecological status: Fair
Biological status: Fair
Physical & chemical status: Good
Hydrologic & morphological status: No information

The main measuresin the water management plan are to remove migration obstacles and to restore reproduction areas of sea trout.

Natura 2000

A part of the river belongs to the Natura 2000 network.

The River Fiskarsinjoki salmon and sea trout stocks

According to old references, some dozens of salmon were caught annually in the Fiskarsinjoki in the end of the 19th century. The last record was a male salmon weighing 10 kg which was caught in 1910. Due to the small size of the river it is probable that the salmon have strayed from the neighbouring, a much larger salmon river, River Mustionjoki. The River Mustionjoki flows to the sea side by side with Fiskarsinjoki.

Sedentary and migratory trout occur in the river and in the brooks draining into it. It is not known what proportion of the trout is migratory. Even though no parr or smolts have been released during the past decades, the stock may have been mixed with other stocks earlier. In any case, the trout stock is a self-sustaining population and differs genetically from other stocks. Trout reproduces very poorly in the rapids of the main stem and in the Brunkomträskbäcken brook.

In the recent years, catch and release fishing tourism has been developed in the river.

Salmon and sea trout population facts

Population category: 8 (salmon), 3 (sea trout)
Reproduction area: 0.6 ha
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Fiskarsinjoki

Fishing in the river is prohibited from September 11 – November 15. The minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The spawning and nursery areas should be carefully restored. The flow regulation should be optimized considering migration of fish and the productivity of the spawning and nursery areas.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Halikonjoki

The River Halikonjoki is ahistorical salmon river and a potential sea trout river flowing to the Archipelago Sea.

Basic hydrological facts

River length: 20 km of which 9 km accessible for salmonids
Size of catchment area: 307 km^2
Average flow: 3 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Halikonjoki

The main stem of the river Halikonjoki begins from the junction of two main tributaries, the Kuusjoki and Vaskionjoki. The headwaters are situated about60 m above the sea level. Forests cover more than half of the catchment area, fields 40%,peatland about 6% and lakes only 0.05%. Due to the scarcity of lakes in the catchment area the changes in the river discharge are large.

Agriculture is very intensive in the area, and as fields are in the coastal area mainly on clay slopes they are especially prone to erosion. Water quality has been assessed poor due to the high nutrient and sediment load and turbidity. More than half of the nutrient load comes from agriculture, but a part of it originates from settlements and forestry.

Earlier there have been several milldams and sawmill dams in the river. Some of them still remain and present obstacles for migrating fish. The lowest Häntälänkoski dam is situated about 9 km from the sea. Some dredging has been carried out in the rapids.

River Halikonjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a medium-sized river in regions with clay soils.

Ecological status: Poor
Biological status: Poor
Physical & chemical status: Poor
Hydrologic & morphological status: Good

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of drought, removing migration obstacles and restoring reproduction areas of sea trout.

Natura 2000

The river does not belong to the Natura 2000 network.

The River Halikonjoki salmon and sea trout stocks

There are some historical data on the salmon and sea trout fishing carried out in the lower reaches and near the mouth of the river Halikonjoki. The migratory fish stocks have disappeared during the 20th century probably due to the construction of dams and due to the degradation of water and habitat quality. However, in one of the upper tributaries a natural brown trout population still remains, and it differs genetically from the other brown trout stocks in this area.

Releases of hatchery-reared sea trout have sometimes been carried out near the river mouth. Due to the small size of the river, rehabilitation of only sea trout appears to be reasonable.

Salmon and sea trout population facts

Population category: 8 (salmon), 6 (sea trout)
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Halikonjoki

Fishing in the river is prohibited from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The spawning and nursery areas should be carefully restored. The flow regulation should be optimized considering migration of fish and the productivity of the spawning and nursery areas. Water quality should be improved by the establishment of effective protection zones along agricultural lands by the river and effective sewage treatment.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Iijoki

The River Iijoki is a potential salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 276 km of which 13.5 km accessible for salmonids
Size of the catchment area: 14,190 km²
Average flow: 171 m^3/ s
Daily lowest flow: 36.8 m^3/ s
Number of migration hindrances: 6

Habitat and water quality in River Iijoki

The River Iijoki is a large river flowing to the Bothnian Bay between the rivers Kiiminkijoki and Olhavanjoki. The tributaries of the main river are numerous, and the main tributaries are the rivers Siuruanjoki, Livojoki, Korpijoki, and Kostonjoki. Lakes cover only 5.7% of the catchment area and therefore the river flow varies a lot seasonally. The natural flow regime is modified by regulation for hydropower production, but the discharge is typically the lowest from December to May, when the river is frozen. In 1961–1990 the mean flow of the river was 174m^3/ s, and during the spring thaw, in May–June, the flow rate peaks to 600 m^3/ s.

In 1956, the first dam for hydropower production near the river mouth prevented all migration of fish into the river. Currently there are altogether five hydropower plants in the lower course of the river. Above these power plants there are about 600 hectares of rapids and riffles, which would be suitable for salmon or sea trout, given that fish migration would be enabled to pass the five lowermost dams. Currently the planning of fish ways for the dams is underway. The majority of the

riffles and rapids are located above the dams in the middle and upper part of the river. The main tributaries of the river were dredged for timber floating, but they have been restored to improve reproduction success of fish species utilising these habitats.

Only minor anthropogenic disturbances are evident in river water quality, which is predominantly good in the upper catchment. Despite the lowest and deteriorated catchment of the river Siuruanjoki, water quality would have little or no negative effects on salmon or sea trout reproduction. Forestry, agriculture and municipal waste are the main sources of nutrient and sediment load.

River Iijoki according to the Water Framework Directive

The name of the water management district is the Iijoki Basin District and the river type is a large peat land river.

Ecological status: Fair (lower, regulated part of river), Good–Excellent (reproduction areas)
Biological status: Good–Excellent (reproduction areas)
Physical & chemical status: Good–Excellent
Hydrologic & morphological status: Poor, heavily modified (lower, regulated part of river)

The main measures in the water management plan are to improve possibilities for fish migration (lower, regulated part of river) and to continue efficient treatment of municipal waste.

Natura 2000

Some areas of the River Iijoki are included in the Natura 2000 network.

River Iijoki salmon and sea trout stocks

The original salmon and sea trout stocks of the Iijoki are maintained in the fish hatchery of the Finnish Game and Fisheries research institute. Before the river was dammed, salmon used to spawn and parr occurred in the swiftly flowing sections of the main river, in the headwaters and in the major tributaries. Spawning areas of sea trout were concentrated on the smaller tributaries and higher up in the headwaters than those of salmon.

The original salmon and sea trout stocks of Iijoki have been stocked at the river mouth as a compensation for the lost wild reproduction. Annually the total amount of stocking is 300,000 reared salmon and 30,000 reared sea trout smolts. For restocking purposes, early life stages of salmon and trout have been lately stocked into the free-flowing part of the river. This activity is part of the regional plan to build up fish ways on the five lowermost dams and to re-establish natural reproduction of salmon and sea trout in the Iijoki.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 3.4 ha (salmon) (600 ha available with fish ways)
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Iijoki

Closed season is from September 11 – November 15, except in the terminal area. Minimum legal length for both salmon and sea trout is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kalajoki

The River Kalajoki is a large potential salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts (main river)

River length: 113 km of which 47 km accessible for salmonids
Size of catchment area: 4,247 km^2
Average flow: 29.5 m^3/ s
Daily lowest flow: 4.18 m^3/ s
Number of migration hindrances: 9 (1 contains a fish way)

Habitat and water quality in River Kalajoki

The River Kalajoki starts at the Hautaperä reservoir, 113 km from the coast and 99 m above the sea level. The largest tributary of the river is Vääräjoki. About 11 km before Vääräjoki joins the main river there is a bifurcation where the majority of the water drains along the Vääräjoki stem (mean discharge 7.7 m^3/s) and a part of it via the Siiponjoki stem (mean discharge 3.9 m^3/s) to the sea. The other tributaries, rivers Malisjoki, Settijoki and Kuonanjoki are small.

The catchment area of Kalajoki consists of agricultural land, forests and bogs. Agriculture in the Kalajoki river basin is more intensive than in the neighbouring river basins due to the abundance of clay and silt in the soil. Also, the soil of Kalajoki is not acid unlike in the neighbouring rivers. There are no large lakes along the main river. Lakes cover only 1.8% of the catchment area and therefore the river flow varies a lot seasonally and depending on the changes in precipitation. Typically the annual lowest flow occurs late in the winter but sometimes it may occur in the late summer.

There are altogether about 80 hectares of rapids in the river. The rapids were dredged for timber floating and flood prevention in the late 19th and early 20th century. The dredging and embankments were widespread especially in the 1950s and 1960s. In the 1990sand early 2000s the dredged rapids have been restored in order to improve the reproduction of salmon, sea trout and other fish species.

There are four hydropower plants in the river and none of them has a fish way. The lowest one is at Hamarinkoski, 43 km from the coast. There are also several former mill dams and working bottom dams constructed for water level regulation. Most of them are only partially blocking fish migration. One fish way has been built in the river, and it is located at the lowest migration obstacle at Vivunkumpu. Vivunkumpu is a regulating dam about 25 km from the coast. There are also two regulating dams in the Siiponjoki branch, which are at least partial migration obstacles. The lowest one is situated 21 km from the coast. There are practically no nursery areas left upstream from the Hamarinkoski dam.

Water quality is passable in the open lowest reach of the river. Agriculture and forestry are the main sources of nutrient and sediment load, but diffuse loading is coming also from settlements and peat mining.

River Kalajoki and its tributaries according to the Water Framework Directive

The name of the water management district is the Oulujoki-Iijoki River Basin District and the river type is a large peat land river.

Ecological status: Fair
Biological status: Fair
Physical & chemical status: Poor
Hydrologic & morphological status: Fair

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste, and restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

The estuary belongs to the Natura 2000 network.

The River Kalajoki salmon and sea trout stocks

In the past, there have been occurrences of salmon, sea trout, whitefish, grayling and river lamprey in the River Kalajoki. Salmon fishing in the River Kalajoki was stopped in the early 20th century, because large scale timber floating started at the large sawmills situated at the river mouth. The original salmon population disappeared in the late 1960s due to the extensive dredging carried out for preventing the commonly occurring floods. How far and to what extent the sea trout migrated and reproduced in the River Kalajoki is not documented very well, but it is known that it disappeared by the 1970s. There is, however, one or more original resident brown trout stocks left in the uppermost headwater brooks of the river system.

During the last three decades some salmon and sea trout parr and smolts have been stocked, but practically no natural reproduction has been found.

Salmon population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 42 ha (main river); 30 ha (Vääränjoki); 9 ha (Siiponjoki) (salmon)
Production capacity: 13,000 (salmon 2009)
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the river Kalajoki

Except for the general fishing rules, no special restrictions concerning salmon fishing exist in the river Kalajoki. Catching of salmon and sea trout is prohibited from September 11 – November 15 and the minimum legal length for both species is 50 cm. Using worm as bait is not allowed.

Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment load from agriculture, forestry and municipal waste. An effective protection zone should be established along agricultural lands by the river. The river flow should be adequate year round and the short time flow-regulation should be reduced. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment (draining for forestry, agriculture and peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

The River Karjaanjoki (Mustionjoki)

The River Karjaanjoki is a potential salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 20 km
Size of catchment area: 2,046 km^2
Average flow: 19.4 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 4 in the main stem below Lohjanjärvi

Habitat and water quality in River Karjaanjoki river system

The Karjaanjoki watercourse is one of the largest watercourses in the northern coast of the Gulf of Finland.The majority of the catchment area is covered by forests, about 30% is under cultivation, and lakes cover 12.2% of the area. The headwater streams of the Karjaanjoki watercourse are situated near the ridge of Salpausselkä, over 120 m above the sea level.

There are three tributaries in the upper part of the catchment area. The largest river of the system is the river Karjaanjoki beginning from the lake Pyhäjärvi, about 73 m above the sea level and emptying into the central lakes of Hiidenvesi and Lohjanjärvi. The name of the lowermost part of the river system is the River Mustionjoki which begins from the lake Lohjanjärvi, about 32 m above the sea level. The Mustionjoki main stem is regulated by four hydropower plant dams, the lowest of which is in Åminnefors, about 2 km from the sea. In the 1700s, there were 12 ha rapids in this river section.

Nowadays there are only 3.5 hectares of rapids left in the main stem of the Mustionjoki. Due to the dams and flow regulation they have no smolt production. Altogether nine brooks empty into the river Mustionjoki, but brown trout parr have been found in only one of them in the 2000s.The water quality is commonly good, but during large discharge periods the water is clouded by clay.

River Karjaanjoki according to the Water Framework Directive

The name of the water management district is the Kymijoki-Gulf of Finland River Basin District and the river type is a large river in regions with clay soils.

Ecological status: Fair
Biological status: Fair–Good
Physical & chemical status: Good
Hydrologic & morphological status: Fair

Main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading; removing migration obstacles and restoring reproduction areas of salmon and sea trout; flow regulation should be reconciled with tolerable conditions to fish and other river fauna.

Natura 2000

Parts of the river belong to the Natura 2000 network.

The River Karjaanjoki salmon and sea trout stocks

The river Mustionjoki had original salmon and sea trout stocks before the building of power plants. The construction of the Åminnefors dam in 1912 reduced the stocks considerably. Until 1933, however, a proportion of water was allowed to flow past the dam, still permitting the maintenance of the natural salmon and sea trout stocks in the river. The final extinction of the stocks was caused by the renewal of the Åminnefors dam in 1956, after which the natural stocks disappeared. 35,000 salmon eggs were stocked in the rapids of the Mustionjoki in the spring of 2010.

A large population of thick shelled river mussel (*Unio crassus*) inhabits the Mustionjoki river. This species is mentioned in the Annexes II and IV of the Habitats Directive. In the rapids of the lower reaches there are also a few freshwater pearl mussels (*Margaritifera margaritifera*), which belong to endangered species in Finland. Pearl mussels are very old, and they cannot breed anymore, because their reproduction requires the existence of salmonid parr.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 3.5 ha
Production capacity: 10,000 smolts (salmon)
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Karjaanjoki/ Mustionjoki

Fishing in the river is prohibited from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The water quality should be improved by reducing nutrient and sediment load from agriculture by the establishment of an effective protection zone and by effective sewage treatment. The remaining rapids in the main stem and the brooks draining into it should be restored suitable for sea trout reproduction.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Karvianjoki

The River Karvianjoki is a salmon and sea trout river flowing to the Bothnian Sea.

Basic hydrological facts

River length: over 110 km of which 10–27 km accessible for salmonids in different river branches
Size of catchment area: 3,438 km^2
Average flow: 10.7 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 4

Habitat and water quality in River Karvianjoki

The uppermost tributaries of the river Karvianjoki begin from sources at about 160 m above the sea level. The name of the main stem in the uppermost parts is River Karvianjoki, which is also the name of the entire watercourse. The catchment area is mostly comprised of forests and bogs. 12% of the area is fields and 4.5% lakes. The headwater streams and tributaries first flow directly and partially via the River Karvianjoki into two central lakes (Inhottujärvi and Isojärvi) discharging later through a trifurcation into the Bothnian Sea.

The main outlet branches of the River Karvianjoki are the rivers Eteläjoki, Pohjajoki and Merikarvianjoki. There are more than ten dams constructed for hydroelectric power production and for lake regulation in the watercourse, four of them directly hindering ascent of anadromous fish. Only a few dams have fish ways or are occasionally passable for fish. The lowest total migration barrier is situated in the river Eteläjoki about 10 km from the sea.

The length of the southernmost branch Eteläjoki is 45 km. There are two hydroelectric dams in the lower reaches: one at Sahankoski at 10 km from the sea, and the other one at Makkarakoski at 23 km from the sea. The lower dam is passable for fish only during very high flows whereas the upper dam is a definite migration obstacle. There are also dams in the upper reaches of the river that are definite migration obstacles. The Eteläjoki branch was very heavily dredged for drainage and flood prevention in the 1940s and 1960s. The water quality is assessed to be moderate.

The length of the central branch, River Pohjajoki, is about 30 km. It begins from the Lake Isojärvi, 35 m above the sea level. Lake Isojärvi discharges via two outlets. There is a fish way at the regulating dam in the southern outlet, the outlet of Salmusoja, and it is the only dam in the river branch. However, the fish way does not function very well. The river was heavily dredged in the 1940s and 1960s but restored later in 1995. The water quality is assessed to be good.

The northernmost river branch is called Merikarvianjoki. It is 27 km long and it also begins from the lake Isojärvi. The water flow of Merikarvianjoki is effectively regulated by the dam of Kurikanniska, the northern outlet of the lake Isojärvi. This dam is passable for migratory fish only when the dam is fully open. There is a hydropower plant in Lankoski at 22 km from the sea, but a fish way has been opened over it in the late 1990s. Also this branch has been heavily dredged in the 1940s and 1960s. The total area of rapids within the river is about 8 hectares. Most of the rapids have been restored in 1996. The water quality has been assessed to be moderate.

The nutrient and sediment load into the watercourse comes mostly from agriculture. Forestry and settlements, as well as peat mining in the upper part of the watercourse, are also sources of nutrient and sediment load.

River Karvianjoki and its tributaries according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the River types are as follows:
Karvianjoki - a large peatland river (the lower and the middle part), a medium-sized peat land river (the upper part); Merikarvianjoki - a large peat land river; Pohjajoki - a medium-sized peat land river; Eteläjoki - a large peat land river

Ecological status: Karvianjoki - Fair; Merikarvianjoki - Good; Pohjajoki - Good; Eteläjoki - Fair

Biological status: No information
Physical & chemical status: Karvianjoki - Poor; Merikarvianjoki - Fair; Pohjajoki - Good; Eteläjoki - Fair
Hydrologic & morphological status: Karvianjoki - Fair; Merikarvianjoki - Fair; Pohjajoki - Fair; Eteläjoki - Fair

The main measures in the water management plan are improvement of water quality and reducing of water flow regulation; removing migration obstacles and restoring reproduction areas of salmon and sea trout and safeguarding of the remaining sedentary brown trout populations.

Natura 2000

The middle part of the upper section of the river Karvianjoki and a part of the estuary of the river Eteläjoki belong to the Natura 2000 network.

The River Karvianjoki salmon and sea trout stocks

The Karvianjoki river system lost its original salmon and sea trout stocks in the early 20th century. At least in the Merikarvianjoki the dredging made for flood prevention and log floating have been very thorough. Also, building of hydropower dams and flow regulation in the lakes and rivers, carried out mainly for agriculture and electricity production, have connived the extinction of the original stocks.

In addition to habitat alterations, abnormally rapid changes in flow and occasional flooding and drought due to flow regulation cause damages to the migratory fish stocks. There are, however local sedentary populations of brown trout left in many headwater brooks draining into the river Karvianjoki. In 2009, brown trout parr were moved from the brooks into a hatchery for building of a brood stock for stocking purposes in the upper tributaries and brooks.

From the three outlet branches to the sea, the Merikarvianjoki is almost the only branch where salmon and sea trout are regularly stocked and where river fishing is common and popular. The stocking of salmon smolts is partially based on the compensatory stocking made for the lost Kokemäenjoki smolt production and partially for sea ranching supporting the professional salmon fishing in the Bothnian Sea.

As there are practically no rapids left in the Kokemäenjoki, stocking of salmon in the Merikarvianjoki has been justified by the remaining rapid area in this river. Earlier only Neva salmon stock was used in the stocking, but in the 2000s the releases have been done using Tornionjoki and Simojoki salmon stocks. Releases of sea trout have been done with the neighbouring Isojoki stock, mostly with smolts but also with parr and eyed eggs. Recreational fishing and fishing tourism are popular in the Merikarvianjoki, and the top-rated catch species are salmon and sea trout. Rod fishing is, however, mainly targeted at rainbow trout which is regularly stocked in the river. However, also grayling and whitefish are occasionally caught since they have been stocked in the river.

In the electro-fishing carried out in the Merikarvianjoki in the 2000s, some natural reproduction of salmon and sea trout have been observed annually. However, the numbers of natural 0+ parr have been very low, usually <1 parr/ 100 m^2. 0+ parr of sea trout have annually been found in the Pohjajoki, but in some years also 0+ salmon parr. The numbers of ascending spawners are low due to the high fishing pressure at sea, but also the heavy flow regulation, the inadequate restoring of rapids and the rather poor water quality reduce the enhancement potential of salmon and sea trout in all the river branches.

Salmon and sea trout population facts

Population category: 5 (Karvianjoki, Merikarvianjoki, Pohjanjoki), 8 (Eteläjoki) (salmon and sea trout)
Reproduction area: 5 ha (Merikarvianjoki); 3.35 ha (Pohjanjoki); 7 ha (Eteläjoki)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Karvianjoki

Rod fishing of salmon and sea trout is allowed year round by a special permission of The Ministry of Agriculture and Forestry. Minimum legal length is 50 cm for sea trout and 60 cm for salmon. Using worm as bait is prohibited. There is a bag limit of two fish per day. Catch and release fishing is commonly used.

Specific actions for the development of the salmonid populations

Water quality should be improved by the establishment of effective protection zones along agricultural lands by the river and by effective sewage treatment. Rapids should be restored. Water flow regulation should be minimized in the dammed parts of the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kemijoki

The River Kemijoki is a potential salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts (main river)

River length: 597 km of which 50 km accessible for salmonids
Size of catchment area: 51,127 km^2
Average flow: 563 m^3/ s
Daily lowest flow: 127 m^3/ s
Number of migration hindrances: 8 (1 contains a fish way)

Habitat and water quality in River Kemijoki

The River Kemijoki is the largest Baltic river in Finland. It enters the Bothnian Bay next to the River Tornionjoki. The catchment area covers a sparsely populated terrain on the boreal zone up to 300–400 meters above the sea level. The headwater sources form four main rivers (Ounasjoki, Kitinen, Luiro and Kemihaara), which join together and form one main river about 120 km from the coast. The tributaries of the main rivers are numerous. Lakes cover only 4.3% of the catchment area and therefore river flow varies a lot seasonally. The natural flow regime is somewhat modified by the regulation for hydropower production, but the discharge is typically the lowest from December to May, when the river is frozen. During the spring thaw in May-June the discharge rate peaks at 2,000–3,000 m^3 /s.

The first hydropower dam was built in Kemijoki in 1948. The dam is located near the river mouth and it prevented all migration of fish into the river. Currently there are altogether 17 hydropower plants in the watercourse, eight of which are located on the lower and middle course of the main river. The five lowermost are located on the 120 km long lower reach, downstream of the areas suitable for salmonid reproduction.

In the river system there are about 2,000 hectares of rapids and riffles, which would be accessible for salmon or sea trout, given that fish migration was made possible through the five lowermost dams. Currently there is a fish way only at the lowermost dam. The majority of the riffles and rapids are in the River Ounasjoki. Ounasjoki and almost all the smaller rivers were dredged for timber floating, but they have been restored to improve reproduction success of fish species.

The water quality is mainly excellent in the rivers of the upper catchment, but slightly deteriorates downstream. Water quality would have little or no negative effects on salmon or sea trout reproduction. Forestry, agriculture and municipal waste are the main sources of nutrient and sediment load. Only minor anthropogenic disturbances are evident in the river.

River Kemijoki and its tributaries according to the Water Framework Directive

The name of the water management district is Kemijoki River Basin District and the river type is a very large/ large peat land river.

Ecological status: Fair (lower, regulated part of river), Good–Excellent (reproduction areas)

Biological status: Good–Excellent (reproduction areas)
Physical & chemical status: Good–Excellent
Hydrologic & morphological status: Poor, heavily modified (lower, regulated part of river)

The main measures in the water management plan are to improve possibilities for fish migration (lower, regulated part of river) and to continue efficient treatment of municipal waste.

Natura 2000

The river does not belong to the Natura 2000 network.

The Kemijoki salmon and sea trout stocks

The original salmon and sea trout stocks of the Kemijoki have been lost. Before the damming, salmon used to spawn and parr used to occur in the swiftly flowing sections of the main stream, in the headwaters and in the major tributaries. Most of the sea trout spawning areas were found at the smaller tributaries and higher up in the headwaters than those of salmon.

Since the early 1980s 615,000 reared salmon and 90,000 reared sea trout smolts have been annually stocked at the river mouth as a compensation for the lost wild reproduction. Mainly the strains of Iijoki and Tornionjoki have been used. Lately early life stages of Tornionjoki salmon have been introduced into Ounasjoki and its tributaries. This activity belongs to the regional plan of building fish ways at the five lowermost dams and of re-establishing natural reproduction of salmon and sea trout in the River Kemijoki.

By building fish ways at each dam location, the salmonid reproduction area would increase by 2,278 hectares in Ounasjoki and in the smaller tributaries.

Salmon population facts

Population category: 6
Reproduction area: 0 ha
Production capacity: No information
Recent wild smolt production estimate: No wild production

Fishing regulations in the river Kemijoki

A specific terminal fishing area is established in the river mouth where fishing for salmon is allowed from June 11. This is earlier than in the sea area outside the river and is designed to allow for utilisation of the large stocking of reared salmon.

Except for the general fishing rules, no special restrictions concerning salmon fishing exist in the river Kemijoki. Catching of salmon and sea trout is prohibited from September 11 – November 15 and the minimum legal length for both species is 50 cm.

Specific actions for the development of the salmonid populations

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kiiminkijoki

The River Kiiminkijoki is a large salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts (main river)

River length: 171 km totally accessible for salmonids
Size of catchment area: 3,814 km^2
Average flow: 41 m^3/ s
Daily lowest flow: 6.2 m^3/ s
Number of migration hindrances: 0

Habitat and water quality in River Kiiminkijoki

The main river starts at the Lake Kivarinjärvi, 151 m above the sea. There are no large lakes along the river, and the river Nuorittajoki is the main tributary. The catchment area consists of agricultural land, peat land and forest. Lakes cover 3.4% of the catchment area. Therefore the river flow varies seasonally and depending on the changes in precipitation. Typically, the lowest flow season is late winter but sometimes the lowest flow may occur late in the summer.

There are altogether about 110 hectares of rapids and riffles in the river. Riffles and rapids were dredged for timber floating and flood protection in the 1940s and 1950s, but they have been recently restored to improve reproduction success of fish species that utilize the habitats. Due to the absence of power plants, the entire river is totally accessible for migratory fish.

Water quality is good in the main river and satisfactory in the river Nuorittajoki. Agriculture, peat mining and forestry are the main sources of nutrient and sediment load, and the value can be low.

River Kiiminkijoki and its tributaries according to the Water Framework Directive

The name of the water management district is Oulujoki - Iijoki River Basin District and the river type is a large peat land river.

Ecological status: Good below the river Nuorittajoki and excellent above it
Biological status: Good
Physical & chemical status: Fair–Good
Hydrologic & morphological status: Good

The main measures in the water management plan are continued and strengthened actions to reduce nutrient load from agriculture, forestry and municipal waste, restricting the decrease in pH in the river and restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

The main river belongs to the Natura 2000 network.

The Kiiminkijoki salmon stock

The original Kiiminkijoki salmon stock has been lost and the status of the introduced salmon stock is weak. Since the 1990sthere have been attempts to restore the stock by substantial stocking of hatchery-reared parr and smolts. Despite the poor results of the stocking programme the river Kiiminkijoki is important as a restocking habitat for the salmon stock of the neighbouring River Iijoki, which lost its natural spawning grounds about 50 years ago. It seems that many factors together prevent successful restoring of a self-sustaining salmon stock in the river. The main factors are probably the poor water quality for salmon spawning, too low flows for ascending salmon and too high fishing mortality. It is highly probable that salmon will vanish from the river as soon as stocking is ceased. A self-sustaining population is therefore difficult to achieve without additional measures.

Salmon and sea trout population facts

Population category: 5 (main river); 6 (tributary) (salmon and sea trout)
Reproduction area: 110 ha (main river); 18 ha (tributary)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the river Kiiminkijoki

Salmon and sea trout fishing is prohibited from September 11 – November 15, and the minimum legal length for both species is 50 cm.

Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment loads from agriculture, forestry and peat mining. An effective protection zone should be established along agricultural lands by the river. The flow of the river should be adequate all year, and the occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kiskonjoki

The River Kiskonjoki is a sea trout river and historical salmon river flowing to the Archipelago Sea.

Basic hydrological facts

River length: 22 km of which 20 km accessible for salmonids
Size of catchment area: 1,047 km^2
Average flow: 4.6 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Kiskonjoki

The main stem of the River Kiskonjoki begins from the lake Kirkkojärvi. The northern main tributaries are the rivers Kurkelanjoki and Aneriojoki, the headwaters of which are situated about85 m above the sea level. The greatest tributary, the river Perniönjoki, joins the main stem from east at about 6 km from the sea.

Forest covers 63%, fields 24%, peat land about 6%, and lakes about 7%of the catchment area. Agriculture is very intensive in the catchment area of the river Perniönjoki, and the water quality is poor due to the high nutrient load and turbidity. The water quality in the lower reaches of the main stem of the river Kiskonjoki has been assessed as poor and fair in the upper reaches of the river basin. More than half of the nutrient load comes from agriculture, and some from settlements and forestry.

Earlier there were several milldams and saw milldams in the river, as well as dams regulating the water level of the lakes. Some of the dams still prevail and are migration obstacles for salmonids. The lowestdam, the Koskenkoski power plant, is situated in the main stem about 20 km from the sea. Dredging has been carried out in the rapids, especially in the river Perniönjoki. The Latokartanonkoski rapids, that are located about 8 km from the sea, have been restored and the old dam closing the river has been removed.

River Kiskonjoki according to the Water Framework Directive

The name of the water management district is The River Basin District of River Kokemäenjoki - Archipelago Sea - Bothnian Sea and the river type is “a large river in regions with mineral soils”.

Ecological status: Poor (the lowest part); Fair (the rest of the river)

- Biological status: Fair
- Physical & chemical status: Poor (the lowest part), Fair (upper reaches)
- Hydrologic & morphological status: Good (the lowest part); Poor (the rest of the river)

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of drought, removing migration obstacles and restoring reproduction areas of sea trout.

Natura 2000

The whole river belongs to the Natura 2000 network.

The River Kiskonjoki salmon and sea trout stocks

It is known that earlier a sea trout population has existed in the lower reaches of the rivers Kiskonjoki and Perniönjoki, and the species has been observed in the sea near the river mouth. Large sea trout spawners have also been observed at least in one brook. The occurrence of salmon is unsure.

The migratory fish stocks disappeared during the 20th century probably due to the dams and degradation of water quality and habitats. However, in some brooks draining into the lower part of the Perniönjoki, some natural and genetically differentiated populations of brown trout still remain.

Releases of hatchery-reared sea trout and salmon have been carried out near the river mouth. In the 2000s, natural sea trout parr have been regularly observed in the Latokartanonkoski rapids after the restoration. In 2009, also some 1+ parr of salmon were found in these rapids. As the present rapid area accessible from the sea only covers about one hectare in the main stem, the occurrence of natural salmon parr is probably based on strayed spawners.

River spawning migratory whitefish, vimba and river lamprey ascend and spawn annually in the lowest rapids of the river Kiskonjoki. A mussel species *Unio crassus* exists in this river system.

Salmon and sea trout population facts

Population category: 8 (salmon), 3 (sea trout)
Reproduction area: 0.9 ha
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Kiskonjoki

Fishing is prohibited from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing an effective protection zone along agricultural lands by the river and by effective sewage treatment. Rapids should be restored. Water flow regulation should be minimized in the dammed parts of the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kokemäenjoki

The River Kokemäenjoki is a salmon river and a potential sea trout river flowing to the Bothnian Sea.

Basic hydrological facts

River length: 121 km of which 40 km accessible for salmonids
Size of catchment area: 27,046 km^2
Average flow: 218 m^3/ s
Daily lowest flow: 32 m^3/ s
Number of migration hindrances: 4 (in the main stem)

Habitat and water quality in River Kokemäenjoki

The river Kokemäenjoki watercourse is the largest river of the eastern coast of the Bothnian Sea. The river starts from the Lake Liekovesi in the town of Sastamala about 150 km from the sea and about 58 m above the sea level. The River Loimijoki, whichis the largest tributary of the River Kokemäenjoki, begins from Lake Pyhäjärvi in the municipality of Tammela. The catchment area of the watercourse consists of agricultural land, forest and peat land. Lakes cover 11% of the catchment area. The lower part of the watercourse, including the main stem of the river

Kokemäenjoki, has been totally harnessed for hydropower production. The main stem of the River Kokemäenjoki and the tributary of Loimijoki have been assessed as highly modified watersheds.

There are four hydropower plants closing the river, the lowest situating 40 km from the sea, but there are no nursery areas above this dam in the main stem. In the tributary of Harjupäänjoki, however, there are a total of 5 – 10 ha of rapids left in the river that form potential sea trout reproduction areas. Harjupäänjoki is a tributary below the lowest dam with a free entrance from the sea. There are several power plants and other dams located further up in the watercourse.

The water quality is fair downstream of the lowest dam. Industry, municipalities, agriculture and forestry are the main sources of nutrient and sediment loading.

River Kokemäenjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a very large river in regions with mineral soils.

Ecological status: Fair

Biological status: No information
Physical & chemical status: Fair (the lowest and the middle part); Good (the upper part)
Hydrologic & morphological status: The main stem and the Loimijoki tributary are rated as highly modified

The main measures in the water management plan are to decrease daily and weekly flow regulation; continue and strengthen actions to reduce diffuse nutrient load from agriculture and forestry and municipal effluents; and restoration of the dredged rapids in the main river downstream the lowest dam and in the tributary of Harjunpäänjoki, which drains to the river below the Harjavalta dam.

Natura 2000

A part of the lowest and the middle section of the river Kokemäenjoki belong to the Natura 2000 network.

The River Kokemäenjoki salmon and sea trout stocks

The river Kokemäenjoki has earlier been the largest and the most important salmon river on the Finnish coast of the Bothnian Sea. Catches of whitefish and sea trout have also been considerable and important for local fishermen. However, the catches of migratory fish in the upper reaches of the river declined in the early 20th century due to the effluents from the pulp and paper industry. In the 1930s the original stocks went extinct due to the closing of the river by dams for electricity production. The lowest hydropower dam in Harjavalta was built in 1939. The compensatory measures later imposed by the water law did not include fish ways but instead a financial commitment which is mainly used for stocking of salmon and sea trout smolts annually near the river mouth.

The existence of salmon and sea trout in the river is practically based on releases of hatchery-reared smolts. Due to the releases, ascending salmonids may spawn in the few existing rapids of the lowermost river, but smolt production based on natural spawning is negligible. About 100,000 salmon smolts have been released annually during the recent years. Salmon would vanish from the river if stocking ceased. Also sea trout smolts have been released in the river.

Salmon and sea trout population facts

Population category: 7 (salmon), 6 (sea trout)
Reproduction area: 12 ha
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Kokemäenjoki

Fishing of salmon and sea trout is prohibited from September 11 – November 15. The minimum legal length for salmon is 60 cm and for sea trout 50 cm.

Specific actions for the development of the salmonid populations

Strong daily and weekly variations in discharge should be diminished. The water quality should be improved by decreasing nutrient and sediment load from agriculture by establishing effective protection zones and forestry as well as by effective sewage treatment from municipalities and industry. Reproduction areas should firstly be restored in the tributary of Harjunpäänjoki. Discharge variations should be reduced in the main river, after which reproduction areas also in this part of the river below the lowest dam should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Koskenkylänjoki

The River Koskenkylänjoki is a potential salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 38 km
Size of catchment area: 895 km^2
Average flow: 8.2 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Koskenkylänjoki

The River Koskenkylänjoki starts from the lake Pyhäjärvi, about 40 m above the sea level. Lakes cover 4.4% of the catchment area. The largest tributary of this river is the River Myrskylänjoki. The ecological status of the lake Pyhäjärvi is good. Agricultural activity in the river basin downstream of the lake Pyhäjärvi is rather high causing nutrient and sediment load in the river. During large flows the river water is clouded by clay. Nutrient loading is also caused by municipal waste waters that are led into the river.
Many rapids of the river have been dredged for timber floating and for flood prevention, and several dams close the river. The oldest dam was built at the Forsby iron factory in the 1680s. Until 1993, ascending sea trout stopped at the Forsby dam, 2 km from the river mouth. In 1993, the dam was demolished and a migration route was opened to the next dam in the Kuuskoski rapids. Most rapids in the main stem have been restored in the 2000s.In 2008, a fish way was also built over the Kuuskoski dam.

River Koskenkylänjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is amedium-sized river in regions with clay soils.

Ecological status: Fair
Biological status: Fair-Good
Physical & chemical status: Fair
Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading, and restoration of reproduction areas in the brooks.

Natura 2000

The Bay of Pernajanlahti belongs to the Natura 2000 network.

River Koskenkylänjoki salmon and sea trout stocks

The river Koskenkylänjoki has probably had salmon and sea trout stocks in the past. The migration stopped centuries ago at the Forsby dam and the stocks have been weak for a long time, finally disappearing. Sea trout is known to be a common species, but the existence of salmon in the river is unsure. There is still some natural production of brown trout in the upper reaches of the river.

In recent years, some stocking experiments have been done in the river with salmon and sea trout parr. However, the stocking of sea trout has mostly been done with eggs. After building the fish ways, no major reproduction of sea trout has been observed. Natural reproduction of salmon has not been observed either.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 3.6 ha
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Koskenkylänjoki

The minimum legal size for salmon is 60 cm and for sea trout 50 cm. Fishing is prohibited during September 11 – November 15.

Specific actions for the development of the salmonid populations

The water quality in the river should be improved by reducing nutrient and sediment loads from agriculture and forestry by establishing effective protection zones along agricultural lands by the river and by effective sewage treatment. The rapids in the brooks should be restored suitable for sea trout reproduction.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kuivajoki

The River Kuivajoki is a mid-sized potential salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 50 km totally accessible for salmonids
Size of catchment area: 1,356 km^2
Average flow: 17.3 m^3/ s
Daily lowest flow: 2.44 m^3/ s
Number of migration hindrances: 2 (1 in the natural river channel)

Habitat and water quality in River Kuivajoki

The river starts from the Lake Oijärvi, 89 m above the sea level and 43 km from the coast. There are no lakes along the main river and the tributaries connected to it are small. The catchment area consists of large swamps and forests. Lakes cover only 2.7% of the catchment area and therefore the river flow varies a lot seasonally and depending on changes in precipitation. The river is regulated by a dam in the Lake Oijärvi which also affects the water flow. Typically the annually lowest flow season is late winter but sometimes late summer.

There are a total of 58 hectares of rapids and riffles in the river. Riffles and rapids were dredged for timber floating, but they have been restored in the early 2000s to improve reproduction success of fish species utilising the habitats.

There are no natural or man-made migration obstacles in the river despite the dams at the two outlets (a natural river channel and another, a man-made channel) from the Lake Oijärvi. The dams do not cause problems to migratory fish because the river area upstream dams is not suitable for salmon or sea trout. The area above the lake Oijärvi is rich in bogs. A river called Kivijoki brings humus rich water to the lake and to Kuivajoki, which affects the water quality.

Despite the abundance of bogs in the catchment area, the water quality of the river Kuivajoki is classified as good. Forestry, agriculture and peat mining are the main sources of nutrient and sediment load. Agriculture and forestry increase the nutrient load. This may negatively affect mid- and late summer conditions and salmon reproduction, and increase macro-vegetation growth especially during the seasons of low flow. Effluents from peat mining increases sedimentation of organic substances and may therefore decrease oxygen supply of salmon eggs and increase macro-vegetation growth. The effluents may also create a sudden decrease in pH, especially during the critical springtime when salmon eggs hatch.

River Kuivajoki according to the Water Framework Directive

The name of the water management district is Iijoki River Basin District and the river type is a mid-sized peat land river.

Ecological status: Good
Biological status: Good
Physical & chemical status: Good
Hydrologic & morphological status: Good

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste, to maintain and increase water pollution control in peat mining and restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

No information

The Kuivajoki salmon and sea trout stocks

The status of the Kuivajoki salmon stock is poor and it is believed to consist solely of Simojoki salmon. Salmon of the Simojoki strain have been introduced to the river Kuivajoki each year. The salmon stock has also been supplemented by voluminous stocking of hatchery-reared parr and smolts from the late 1990s. The stocking has since then been ceased.

Despite considerable stocking of parr and smolts, the salmon stock in the river Kuivajoki does not seem to be able to recover, and it is extremely unlikely that a self-sustaining stock can be created in the river. The main reasons are probably the poor water quality for salmon spawning, the regulation of the water flow and the small size of the river. The river is too small to sustain enough spawners at the present sea mortality level. The salmon population thereby is dependent on continuous stocking.

Sea trout has not been found in study surveys, and there have been no stocking of it in the river Kuivajoki. However, according to fishing inquiries some trout have been caught from Kuivajoki but their origin is not known.

Salmon population facts

Population category: 6
Reproduction area: 58 ha
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Kuivajoki

Except for the general fishing rules no special restrictions for salmon fishing exist in the river Kuivajoki. Fishing of salmon and sea trout is prohibited from September 11 – November 15 and the minimum legal length for both species is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment load from peat mining, forestry and agriculture. An effective protection zone should be established along agricultural lands by the river. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment. This could be done by filling old, unnecessary ditches and by strict permission policy for any digging of new ditches (draining for forestry, agriculture or peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kymijoki

The River Kymijoki is a salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 85–204 km of which 40 km accessible for salmonids
Size of catchment area: 37,159 km^2
Average flow: 317 m^3/ s
Daily lowest flow: 106 m^3/ s
Number of migration hindrances: No information

Habitat and water qualityin River Kymijoki

The Kymijoki watercourse is the largest river system on the Finnish coast of the Gulf of Finland. The size of the catchment area of the Kymijoki watercourse is about 11% of the area of Finland. The River Kymijoki begins from the outlet of the lake Päijänne, from the Kalkkistenkoski rapids, situating about 79 m above the sea level. The river flows through several lakes: such as the lakes Ruotsalainen, Konnivesi and Pyhäjärvi. Along the main stem, there are many smaller tributaries and watercourses, the largest of which are the watercourses of Mäntyharju and Valkeala.

The lower continuous river stretch of Kymijoki starts from the lake Pyhäjärvi, 85 km from the sea. Even though flowing at first as a single river, it is split near the coast into five branches each discharging separately into the sea. All these branches have been blocked by dams and two of the dams have been provided with fish ways. The fish ways do not function properly. Fish can pass them only during periods of great discharge, when they can reach the Anjalankoski dam at 40 km from the sea. There are a total of 14 hydroelectric power plants in the river between Lake Pyhäjärvi and the sea.

The river discharge is regulated by storing excess water in the lake Päijänne which is why flooding of the river is unusual. The discharge is regulated in the winter, and therefore some of the lowermost nursery areas suffer from water shortage. At the moment there are 15 hectares of nursery areas available below the dams and an additional 60–100 hectares downstream of the Anjalankoski dam. These areas can be reached only if the discharge is large enough for the functioning of the fish ways. Above the Anjalankoski dam the river has been dammed so effectively that the remaining nursery areas there are negligible.

The water quality is good and the river offers good living conditions for salmonid fishes. However, in many pools large amounts of dioxins are stored in the sediment due to the pulp and paper industry along the river, and therefore the layers should not be disturbed in the river bed.

River Kymijoki according to the Water Framework Directive

The name of the water management district is the Kymijoki-Gulf of Finland River Basin District and the river type is a very large river in regions with mineral soils.

Ecological status: Fair
Biological status: Fair
Physical & chemical status: Good
Hydrologic & morphological status: No information

The main measures in the water management plan are building/rebuilding of fish ways over the five hydro-electric power plant dams; rearranging discharge regulations by taking into account fish migration needs and salmon nursery areas; and restoration of the nursery areas after man-made changes due to timber floating and hydropower plant industry.

Natura 2000

Kalkkistenkoski rapids in Asikkala and Kymijoki downstream from the Anjalankoski dam, except Korkeakoskenhaara and Huumanhaara in Kotka, belong to the Natura 2000 network.

River Kymijoki salmon and sea trout stocks

The river Kymijoki has once probably been the most important salmon river of the Gulf of Finland and the largest one of the Finnish rivers in this area. It lost its original salmon and sea trout stocks by the 1950s due to heavy pollution from the paper mill industry and because of closing of the river by dams.

The hydro power plants were constructed in the river between 1900 and 1950. Fish ways were also included in the construction, but they worked incompletely. Also due to heavy pollution in the river, the living conditions of fish were unfavourable. When ascending salmon disappeared by the 1950s, also the fish ways became useless and were left to degrade.

In the 1980s the water quality began to improve due to the intensified waste water treatment. A salmon strain originating from the river Neva was imported and the first releases of hatchery-reared smolts were made in the early 1980s. Since then 100,000–200,000 salmon smolts have been released annually in the lower reaches of the river, and smaller amounts of parr in the nursery areas that are left above the lowest dams. Thanks to these releases, returning adult salmon spawn now in the rapid areas accessible from the sea.

The potential smolt production has been estimated to be 100,000–200,000 smolts per year below the Anjalankoski dam, if the fish ways would be available in dams lower in the river and if also the spawning and nursery areas would be improved. The smolt production of sea trout is at a very low level compared to salmon.

At the river mouth fishing is carried out by set nets and in the river almost exclusively by angling. Rod fishing of salmon and sea trout is very popular in the river, and catch-sized rainbow trout are released in the river in early summer for this purpose.

Salmon and sea trout population facts

Population category: 5 (salmon and sea trout)
Reproduction area: 151 ha
Production capacity: 100,000–200,000 smolts (salmon)
Recent wild smolt production estimate: 6,700–44,000 (salmon)

Fishing regulations in the River Kymijoki

Fishing is prohibited from September 11 – November 15. Minimum legal length for salmon is 60 cm and for sea trout 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The spawning and nursery areas should be restored. The nutrient and sediment load from agriculture and forestry should be decreased by establishing effective protection zones along agricultural lands by the river. Discharge regulation should be accommodated for the needs of salmonids, not only for the needs of the power industry. Waste water treatment of the industry and settlements should be improved.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Kyrönjoki

The River Kyrönjoki is a historical salmon river and a potential sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 200 km of which 60 km accessible for salmonids
Size of catchment area: 4,923 km^2
Average flow: 41 m^3/ s
Daily lowest flow: 4 m^3/ s
Number of migration hindrances: No information

Habitat and water quality in River Kyrönjoki

There are only some small lakes and ponds in the river Kyrönjoki catchment area. Some reservoirs have been constructed in the area for preventing floods, covering together 1.2% of the catchment area. Agriculture is extensive especially in the lower parts of the river basin. Acid soils are common in the coastal plain situating approximately 60 m above the sea level. These soils may occasionally result in very acid water in the river, especially after dry summers.

During the past decades, periods of low pH have caused fish kills in many years. Due to the abundance of fields and drained peat land in the catchment area, the lower reaches of the river are susceptible for flooding, which is why long reaches of the river have been dredged and embanked. There are about 10 hectares of rapids remaining in the open lowest reach of the river.

There are over 20 dams in the main stem and its tributaries. These dams have been constructed for power plants, mills, sawmills or water regulation. Most of them are impassable for fish. The first migration obstacle, the power plant of the Hiirikoski dam is situated about 30 km from the river mouth. A fish way over this dam is being built in 2010. The next dam in the main stem is 60 km from the sea. The upper part of the river upstream of the Malkakoski rapids, 77 km from the sea, is highly modified due to the flow regulation and high damming percentage.

The water quality has been assessed as poor in the lower and middle reaches due to the occasional acidity and high nutrient loading, but moderate or good in some of the uppermost tributaries. The middle reaches should reach a good status by 2021 and the lower reaches by 2027 if the measures provided by the Water Framework Directive are realized. The present state of the river for smolt production of salmon and sea trout is poor, but it would improve if the water quality can be improved and if migration obstacles are removed.

River Kyrönjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a large peat land river.

Ecological status: Poor (lower parts), Poor (middle part); Fair–Good (upper parts)
Biological status: No information
Physical & chemical status: Fair
Hydrologic & morphological status: Poor–Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of acid water with appropriate measures in agriculture and forestry; removing migration obstacles and restoring reproduction areas of salmon and sea trout; and safeguarding the remaining sedentary brown trout populations.

Natura 2000

The estuary area of the river belongs to the Natura 2000 network. Vassorfjärden at the river mouth belongs to the Natura 2000 Network.

River Kyrönjoki salmon and sea trout stocks

The river Kyrönjoki used to have original salmon and sea trout stocks, but they were lost during the first half of the 20th century. This was probably due to the construction of dams, impaired water quality and accidental occurrence of very low pH in the river. Stocking experiments with salmon and sea trout parr and smolts have been carried out in some years in the 1980s and 1990s, but they did not result in natural reproduction. In 2010 also eyed sea trout eggs have been stocked in some rapids of the middle reaches. There are, however, some sedentary brown trout populations left in the uppermost tributaries and brooks of the river.

Since the 1990s, some local sport fishermen have promoted river fishing by stocking catch-sized rainbow trout and sea trout in the rapids.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 10 ha
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Kyrönjoki

Fishing is prohibited September 11 – November 15. Minimum legal length for both species is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

Occurrence of acid flow should be prevented and water quality should be improved by the establishment of effective protection zones along agricultural lands by the river. Rapids should be restored. Water flow regulation in the dammed parts of the river should be minimized.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Lapuanjoki

The River Lapuanjoki is a historical salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 150 km of which 6 km accessible for salmonids
Size of catchment area: 4,122 km^2
Average flow: 34 m^3/ s
Daily lowest flow: 0.8 m^3/ s
Number of migration hindrances: 6

Habitat and water quality in River Lapuanjoki

The uppermost headwater brooks of the River Lapuanjoki are situated about 130 m above the sea level. Many tributaries drain into the river. The largest ones of them are the rivers Nurmonjoki and Kauhavanjoki. Lakes in the catchment area are commonly small and rare. The largest lake of the watercourse is Lake Kuortaneenjärvi. Two man-made reservoirs have been built in the area for preventing floods. About half of the catchment area consists of forests, and fields cover about 21% of it. There are over 50 peat mining bogs in the river basin. Lakes and reservoirs cover only 2.9% of the catchment area.

The extensive drainage of fields and peat land in the river basin has increased the susceptibility of the river for flooding. Some rapids were dredged for flood prevention already in the 1860s, but later very thoroughly between the 1950s and the 1970s, when also very extensive embankments and reservoirs were constructed against flooding.

There are six hydropower plants in the main river. The lowest power plant of Stadfors (built in 1927) is situated about 6 km from the sea. In addition, there are more than 20 mill and saw

milldams in the watercourse. Most of them nowadays more or less deteriorated. A chain of rapids still exist in Jeppo, over 20 km from the sea.

The water quality is satisfactory only in the upper reaches of the river and deteriorates downstream due to increased nutrient and sediment loading and is poor in the middle and lower reaches. Agriculture, settlements, fur farming, forestry and peat mining are the main sources of the nutrient and sediment load. Agriculture alone causes 40–50% of the phosphorus and nitrogen loading. The lowest part of the catchment area is located on acid sulphate soils and therefore very low pH values (< pH 5) are measured in the river almost annually.

River Lapuanjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a large peat land river.

Ecological status: Poor (Lowest reach from Uusikaarlepyy to Alahärmä, the middle part, and the tributary Nurmonjoki)

Biological status: Poor
Physical & chemical status: Poor
Hydrologic & morphological status: Poor (the middle part of the river from municipality of Alahärmä to Lapua town, and the tributary of Nurmonjoki)

The main measures in the water management plan are to prevent occurrence of accidental periods of very low pH; improve water quality by reducing nutrient and sediment loading by appropriate measures in agriculture, fur farming and forestry; construction of fish ways over the dams, starting from the Stadfors power plant in Uusikaarlepyy; restoration of rapids.

Natura 2000

The river does not belong to the Natura 2000 Network.

The River Lapuanjoki salmon and sea trout stocks

In the end of the 19th century salmon and sea trout still existed in the River Lapuanjoki, even though the numbers caught were rather low. Salmon fishing was mainly carried out in the village of Jeppo, over 10 km upstream of the river mouth. Also migratory whitefish and grayling were caught in the river at that time. However, the catches decreased, possibly due to the intensive fishing at the river mouth. The migratory fish stocks vanished for good after the construction of the lowest power plant in the end of the 1920s. Some local brown trout stocks have still survived in the uppermost brooks flowing into the Lake Kuortaneenjärvi.

Salmon and sea trout population facts

Population category: 8

Fishing regulations in the River Lapuanjoki

Fishing of salmon and brown trout is prohibited from September 11 – November 15, and the minimum legal size for both species is 50 cm.

Specific actions for the development of the salmonid populations

Occurrence of acid peaks and very low discharge should be prevented. Nutrient and sediment loads should be reduced by the establishment of effective protective zones along agriculture lands by the river. Rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Mynäjoki

The River Mynäjoki is ahistorical salmon river and a potential sea trout river flowing to The Archipelago Sea.

Basic hydrological facts

River length: 50 km
Size of catchment area: 288 km^2
Average flow: 1.8 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Mynäjoki

The River Mynäjoki begins from the Lake Mynäjärvi,67 m above the sea level. Forests cover about 60% of the catchment area, fields about a quarter, peat lands about 10% and lakes only 0.3%. The fields are mainly located on clay soils and if located on sloping river banks they are especially prone to erosion. The fields are commonly located on clay soils and on river slopes susceptible to erosion.

The water quality has been rated as moderate. About two-thirds of the nutrient loading comes from agriculture and the rest from settlements and forestry. The nutrient loading from the settlements is caused by diffuse loading from houses and villages along the riverside. Nutrient loading from forestry is chiefly caused by peat land drainage and clear cutting. Earlier there were several mills and dams in the river, and some dredging has been carried out in the rapids. Now there are still at least two dams which impede the ascent of migratory fish.

River Mynäjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a medium-sized river in regions with clay soils.

Ecological status: Fair
Biological status: No information
Physical & chemical status: Good
Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of drought; removing migration obstacles and restoring reproduction areas of sea trout; and reintroduction of sea trout.

Natura 2000

The estuary of the river Mynäjoki belongs to the Natura 2000 network.

The River Mynäjoki salmon and sea trout stocks

There are some historical references of a salmon fishery in the lower reaches of the river Mynäjoki from the 16th century. Based on the small size of the river it is more likely that these fish have been sea trout. The migratory fish stocks have disappeared over a century ago probably due to the dams and degradation of water quality and habitats. Lately some restoration works and releases of hatchery-reared sea trout have been carried out in the rapids, but they need to be supplemented.

Salmon and sea trout population facts

Population category: 8 (salmon), 6 (sea trout)

Fishing regulations in the River Mynäjoki

Fishing in the river is prohibited from September 11 – November 15. Minimum legal length for salmon is 60 cm and for sea trout is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing effective protective zones along agricultural lands by the river and by effective sewage treatment. Occurrence of periods of poor water quality or extreme low flow conditions should be prevented. All rapids should be restored for increasing the smolt production capacity of the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Oulujoki

The River Oulujoki is a salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 101 km of which 40 km accessible for salmonids
Size of the catchment area: 22,841 km²
Average flow: 262 m^3/ s
Daily lowest flow: 66.6 m^3/ s
Number of migration hindrances: 8

Habitat and water quality in River Oulujoki

The River Oulujoki is a large river flowing to the Bothnian Bay. Below the lake Oulujärvi, lakes cover 3.2% of the catchment area. The main tributaries are the rivers Sanginjoki, Muhosjoki, Utosjoki, and Kutujoki.

Compared to the annual discharge pattern of the rivers Kemijoki and Iijoki the natural spring flood has been smaller and later in the River Oulujoki with a large central lake. The regulation practice has changed the discharge pattern considerably, and especially in the River Oulujoki, where the lake is used for storing flood waters, the spring flood has practically disappeared. Since the river is used for hydro peaking, the daily discharge varies with minimum flows during the night and increasing flows towards the afternoons.

In 1948, the first dam for hydropower production near the river mouth prevented all migration of fish into the river. Currently there are altogether 7 hydropower plants in the lower course of the river below the Lake Oulujärvi. Planning of fish ways for the dams is underway. The majority of the riffles and rapids are located in four small tributaries of the main stem comprising ca. 50 ha of suitable producing areas for salmon. The three uppermost tributaries have been restored to improve reproduction success of salmonid species.

Forestry, agriculture and municipal waste are the main sources of nutrient and sediment load. However, in the main stem, water quality would have little or no negative effects on salmon or sea trout reproduction. Instead, in tributaries large scale forestry, agriculture and peat mining within the catchments have deteriorated water quality.

River Oulujoki according to the Water Framework Directive

The name of the water management district is Oulujoki Basin District and the river type is a very large peat land river.

Ecological status: Good (heavily modified main stem below Lake Oulujärvi), Fair (tributaries of the main stem)
Biological status: Good (main stem)
Physical & chemical status: Good (main stem)
Hydrologic & morphological status: Poor, heavily modified and regulated

The main measures in the water management plan are to improve possibilities for fish migration and to continue efficient treatment of municipal waste.

Natura 2000

The river does not belong to the Natura 2000 network.

River Oulujoki salmon and sea trout stocks

As a consequence of the dam construction in 1948, the natural salmon stocks disappeared in the River Oulujoki. Compensatory releases of salmon smolts are carried out using a hatchery stock comprising a mixture of genetic material from the Rivers Skellefteå, Iijoki and Oulujoki.

The annual obligation to release salmon smolts is 200,000 individuals for the River Oulujoki. One third of these smolts are released from the hatchery below the second dam (Montta hydroelectric plant, 36.5 km from the river mouth)and the rest are stocked in the estuary of the river.

For restocking purposes, early life stages of salmon and trout have been lately stocked into the tributaries. This activity is a part of the regional plan to build up fish ways on the dams below the Lake Oulujärvi and to re-establish natural reproduction of salmon and sea trout in the Oulujoki.

Salmon and sea trout population facts

Population category: 7 (salmon and sea trout)
Reproduction area: 30.3 ha (salmon); 1 ha (sea trout); (50 ha available with fish ways)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Oulujoki

Closed season is from September 11 – November 15. Minimum legal length for salmon is 60 cm and for sea trout 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Paimionjoki

The River Paimionjoki is a historical salmon river and a potential sea trout river flowing to the Archipelago Sea.

Basic hydrological facts

River length: 64 km
Size of catchment area: 1,088 km^2
Average flow: 7 m^3/ s
Daily lowest flow: No information
Number of migration hindrances: 5

Habitat and water quality in River Paimionjoki

The River Paimionjoki starts from the municipality of Somero, about80 m above the sea level. The river empties into the bay of Paimionlahti in the Archipelago Sea. The river has several small tributaries, the largest of which is the River Tarvasjoki.

Forests cover about half of the catchment area. Agriculture is very extensive and fields cover about 40% of the catchment area. As the fields are commonly located on clay soils and on river slopes susceptible to erosion, they result in plenty of nutrient and sediment loading and turbidity in the river. Over 2/3 of the nutrient loading comes as diffuse loading from agriculture, but some loading is caused also by settlements and forestry. The water quality is rated as poor in the river.

The river is closed by five electric hydropower plants. The biggest are the Juvankoski, Juntolankoski and Askalankoski dams. All of them were built during the first half of the 20th century. The Askalankoski power plant was built in 1936, and it is the lowest dam, located at12 km from the sea. There is short-term flow regulation in the river. Additionally there are several small old mill and sawmill dams, which are not in use but may hinder fish migration at least during low flow periods. The river has been assessed to be heavily modified.

During dry seasons, some water is drawn from the River Paimionjoki into the neighbouring River Aurajoki for supplementing the municipal water supply of the city of Turku.

River Paimionjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki – Archipelago Sea – Bothnian Sea River Basin District and the river types are: a large river in regions with clay soils (lowest part); a medium-sized river in regions with clay soils (the middle and upper section)

Ecological status: Poor
Biological status: No information
Physical & chemical status: Poor
Hydrologic & morphological status: Poor, heavily modified

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of drought; removing migration obstacles and restoring reproduction areas including the tributaries.

Natura 2000

The middle part of the lowest section of the river Paimionjoki belongs to the Natura 2000 network.

The River Paimionjoki salmon and sea trout stocks

Both salmon and sea trout used to ascend the river to spawn, but the original stocks were lost by the 1940s due to the construction of the lowest dams. Decreased water quality and increased sedimentation due to intensive farming may also have contributed to the extinction.

Since the 1980s, salmon smolts of the Neva strain have been released at the river mouth, and some caught salmon originated from these releases. At present, fishing continues in the Bay of Paimionlahti, and the gill net fishing in the river targeted at anadromous river spawning whitefish harvests also salmon and sea trout entering the river.

There are no nursery areas of salmon and sea trout left in the main river downstream of the lowest dam. However, several > 1 yr trout were found in the electro-fishing carried out in 2007 in the Vähäjoki brook, draining into the main stem downstream of the Askala dam. These trout may be

hybrids of local and stocked sea trout, but anyway the results show that there is some potential and maybe original genetic material left to the re-establishment of a sea trout stock in this brook or in the main river. Some restoration works have been carried out lately in this brook.

Salmon and sea trout population facts

Population category: 8 (salmon), 6 (sea trout)
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Paimionjoki

Fishing in the river is prohibited from September 11–November15. The minimum legal length for sea trout is 50 cm and for salmon 60 cm.

Specific actions for the development of the salmonid populations
Water quality should be improved by establishing effective protective zones along agricultural lands by the river and by effective sewage treatment. Short term flow regulation should be reduced.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Perhonjoki

The River Perhonjoki is a potential salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 150 km
Size of catchment area: 2,524 km^2
Average flow: 22 m^3/ s
Daily lowest flow: 2 m^3/ s
Number of migration hindrances: 2 (1 contains a fish way)

Habitat and water quality in River Perhonjoki

The uppermost headwater brooks of the River Perhonjoki begin from small ponds and lakes situating about 200 m above the sea level. The largest tributaries of the river are the Rivers Ullavanjoki, Köyhäjoki and Halsuanjoki. There are three man-made reservoirs in the area (Patana, Venetjoki, Vissavesi) and a chain of regulated lakes above the lowest hydropower plant in the watercourse.

About a half of the catchment area consists of forests. Large swamps cover about 40% and farmlands about 10% of the area. Lakes and reservoirs cover only 3.4% of the catchment area. Therefore the river flow varies a lot seasonally and depending on the changes in precipitation. Typically the annually lowest flow season is late winter but sometimes also late summer.

There are 10 hectares of rapids accessible for migratory fish in the main river and 5 hectares of rapids in the tributaries. Some rapids were dredged for timber floating and flood prevention already in the 1860s, and the rest of them between the 1930s and the 1970s. Most of the rapids have been restored in late 1990s and in the beginning of the 2000s. There are two hydropower plants in the main river and two in the tributaries. The lowest power plant of Kaitfors (built in 1983) is situated about 25 km from the sea, and a fish way has been built over it in 2006. In the early 20th century, there were altogether over 30 mills and sawmills in the river, and some of them are still left. Bottom dams were constructed later for water level regulation.

The water quality is satisfactory in the upper reaches of the river, but deteriorates downstream due to increased loading, being only fair in the lower reaches. Agriculture, settlements, fur farming, forestry and peat mining are the main sources of nutrient and sediment load. Agriculture alone causes about 40% of the phosphorus and nitrogen loading. The lowest part of the catchment area is located on acid sulphate soil and therefore the pH in the river may be very low (< pH 5) after dry seasons.

River Perhonjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a large peat land river.

Ecological status: Poor (the lowest part); Fair (the middle part and tributaries);
Poor (the upper part)
Biological status: Poor (the lowest part); Fair (the middle part); Poor (the upper part)
Physical & chemical status: Poor (the lowest part); Moderate (the middle part); Poor (the upper part)
Hydrologic & morphological status: Fair–Poor (the lower reaches), heavily modified or artificial (the upper part and the manmade lakes)

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and settlements; removing occurrence of very acid water in the river; restoration of dredged rapids, and stocking of parr and smolts.

Natura 2000

The sea area in front of the river belongs to the Natura 2000 network.

The River Perhonjoki salmon and sea trout stocks

The River Perhonjoki has once been a significant salmon and sea trout river, and the catches of whitefish and river lamprey have been important for the local fishermen. Original stocks of salmon and trout reproduced in the River Perhojoki until the 1950s. Dredging carried out for log floating and flood prevention finally destroyed both stocks in the late 1960s. During the past decades, sea trout became more common than salmon. Natural reproduction of brown trout still occurs in the River Penninkijoki in the uppermost reaches of the tributary of Halsuanjoki. It is not known whether this population is mixed or original.

After the restoration works, in the 2000s, salmon and sea trout smolts and parr have been released in the river. No natural reproduction has been observed so far. At the same time, accidental peaks of very acid water have occurred in some years.

Salmon and sea troutpopulation facts

Population category: 6 (salmon and sea trout)
Reproduction area: 10 ha(salmon); 10 ha (Perhonjoki); 4 ha (Halsuanjoki); 3 ha (Ullavanjoki); 1 ha (Köyhäjoki) (sea trout)
Production capacity: 4,000 smolts (salmon)
Recent wild smolt production estimate: 0 (salmon and sea trout)

Fishing regulations in the River Perhonjoki

Fishing of salmon and sea trout is prohibited from September 11 – November 15 and the minimum legal size for both species is 50 cm.

Specific actions for the development of the salmonid populations

Water quality should be improved by decreasing nutrient and sediment loads from agriculture, settlements, forestry and peat mining. Effective protection zones should be established along agricultural lands by the river. The occurrence of low pH and extreme low flow should be prevented.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Porvoonjoki

The River Porvoonjoki is a potential salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 143 km of which 63 km accessible for salmonids
Size of catchment area: 1,271 km^2
Average flow: 11.3 m^3/ s
Daily lowest flow: 2 m^3/ s
Number of migration hindrances: 8 (4 contain a fish way)

Habitat and water quality in River Porvoonjoki

The River Porvoonjoki begins from the Salpausselkä esker area 68 m above the sea level. There are only a few lakes and ponds in the river basin covering 1.4% of the catchment area. Three main tributaries and several brooks empty into the river. During large flows water in the river is heavily clouded by clay.

Many dams close the river, but three fish ways have been built over the lowest power plant dams. The dam of Tönnönkoski about 63 km from the sea is a total block for ascending fish. About 3.5 hectares of rapids are accessible for migratory fish in the main stem. No major restorations of rapids have been done in the main stem or in the tributaries.

The water quality is good only in the uppermost parts of the main stem in the Salpausselkä esker area. Because of the abundant clay soils and fields on slopes, clay originating from agricultural drains may occasionally cloud water in the lower reaches resulting also in abundant nutrient and sediment loading. Over 50,000 m^3 of refined municipal waste water is daily led into the River Porvoonjoki mainly from the cities of Lahti and Orimattila.

During high floods, the sediment loading due to erosion results in silting of rapids which reduces the quality of the spawning and nursery habitats of sea trout.

River Porvoonjoki according to the Water Framework Directive

The name of the water management district is the Kymijoki-Gulf of Finland River Basin District and the river type is a large riverin regions with clay soils.

Ecological status: Poor
Biological status: Poor-Fair
Physical & chemical status: Poor
Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading; removing migration obstacles and restoring reproduction areas of salmon and sea trout.

Natura 2000

The estuary of the river Porvoonjoki belongs to the Natura 2000 network.

The River Porvoonjoki salmon and sea trout stocks

The River Porvoonjoki has earlier had an original sea trout stock, but the occurrence of salmon is more or less unsure. The stocks have later disappeared probably due to the construction of power plant dams and deterioration of water quality and habitats. After building the lowest fish way at Strömsberg in 2000, some ascending sea trout have been caught there again in some years. Nowadays a weak sedentary brown trout population is left in one brook (Vähäjoki) flowing into the main stem downstream of the lowest dam. As the genetic status of this stock has not been studied, it may be either mixed or original. In the 2000s, stocking experiments with eggs of Ingarskila sea trout stock have been made in other headwater brooks, and trout parr have been observed in electro-fishing.

Smolts of the River Neva salmon stock have been released in the river, and some ascending spawners have been observed in the lowest fish way. In the river, no natural reproduction has been observed.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 3.5 ha
Production capacity: No information
Recent wild smolt production estimate: No wild smolt production

Fishing regulations in the River Porvoonjoki

The minimum legal size for salmon is 60 cm and for sea trout 50 cm. Fishing is prohibited from September 11 – November 15.

Specific actions for the development of the salmonid populations

Water quality should be improved by decreasing nutrient and sediment loads from agriculture, settlements and industry. Effective protection zones should be established along agricultural lands by the river. The rapids should be restored in the main stem and in the brooks.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Pyhäjoki

The River Pyhäjoki is a large salmon river and a potential sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 128 km of which 80.5 km accessible for salmonids
Size of catchment area: 3,712 km^2
Average flow: 29 m^3/ s
Daily lowest flow: 4.47 m^3/ s
Number of migration hindrances: 8 (2 contain a fish way)

Habitat and water quality in the River Pyhäjoki

The river starts from lake Pyhäjärvi (126 km^2) 140 m above the sea level and 162 km from the coast. The Kärsämäenjoki and Piipsanjoki rivers are the main tributaries of the river. The catchment area consists of agricultural lands, forests and wide-ranging peat lands. Lakes cover 5.2% of the catchment area. Therefore the river flow varies a lot seasonally and depends on the changes in precipitation. Typically the annually lowest flow occurs in the late winter but sometimes also in the late summer.

There are about 98 hectares of rapids and riffles in the river that were dredged for timber floating and flood prevention in the early 20^{th} century. Large dredging for field drainage and flood prevention was carried out especially in the 1960s. The rapids within about 80 km reach from the coast have been restored in the 1990s in order to improve reproduction success of salmon, sea trout and other fish species utilising these habitats.

Currently there are five working water-power plants and two mills in the river. Hourunkoski power plant is located about 3 km from the coast, and it has a fish way. About half of the discharge is flowing through another free river branch, both branches joining later together near the river mouth. There is a natural waterfall in Pyhänkoski, 21 km from the coast, and a fish way has been built over it to allow ascent of fish also during the low flow season. After Pyhänkoski, the next migration obstacle for upstream migrating fish is the power plant of Haapakoski, located 82 km from the coast. A fish way has been recently installed at Haapakoski.

Upstream of the Haapakoski, there are working mills and dams at Joutennivankoski and Myllykoski

rapids, but there are plans to build fish ways over both of them. Salmonid nursery areas extend upstream of these rapids, and restoration plans exist for these areas. The three furthest dams are located more than 129 km from the coast. Venetpalo, Kalliokoski and Vesikoski power plants have no fish ways and rapid areas have been lost.

Water quality is passable beneath the lowest dam. Agriculture and forestry are the main sources of nutrient and sediment load, but diffuse loading comes also from the settlements and peat mining. Water is very humic. Nutrient and sediment load may occasionally be high due to the abundance of clay and silt soil and peat land in the catchment area. There is also abundance of acid clay soil near the coast, and pH in the river water can therefore fall very low especially after dry summers or extensive ditching operations. The latest fish kill occurred in the river in autumn 2006.

Nowadays whitefish and river lamprey still reproduce in the lower reaches of the river Pyhäjoki, and fishing of these species is carried out near the river mouth. Earlier the catches of river crayfish in the river Pyhäjoki have been the largest of the Finnish rivers, but in the 1960s the stock almost disappeared due to the dredging made in the river.

River Pyhäjoki according to the Water Framework Directive

The name of the water management district is the Oulujoki - Iijoki River Basin District and the river type a large peat land river.

Ecological status: Passable
Biological status: Satisfactory
Physical & chemical status: Passable
Hydrologic & morphological status: Satisfactory

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient and sediment load from agriculture, forestry, settlements and peat mining; to restrict decreasing of pH in the river; restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

No information

The Pyhäjoki salmon and sea trout stocks

The River Pyhäjoki has previously been an important local migratory fish river. It has rather stable hydrologic conditions and good water quality, because its main water source is a large lake. However, in the early 20th century, the catches of salmon and sea trout diminished, because of the gradual degradation of the habitats and inferior water quality due to the dredging for timber floating and the field drainage. The stocks extirpated finally in the 1970s because of the very extensive dredging of the 1950s and 1960s for flood prevention. Also the increased fishing mortality at sea may have been partly responsible for the final extirpation.

There is very little natural reproduction of salmon in Pyhäjoki. Since the latter part of the 1990s there have been attempts to restore the stock by substantial reintroduction of hatchery-reared parr and smolts. The stocking was ceased a few years ago, because it is likely that many factors together prevent the restoring of a self-sustaining salmon stock in the river. The main reasons for the unsuccessful restoring are probably the poor water quality for salmon spawning, seasonal low flow for ascending salmon and high fishing mortality in the sea. Therefore salmon will likely disappear from the river soon after the stocking is ceased.

Salmon and sea trout population facts

Population category: 5 (salmon), 6 (sea trout)
Reproduction area: 98 ha (salmon)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Pyhäjoki

Fishing of salmon and sea trout in river Pyhäjoki is prohibited from September 11 – November 15. Net fishing is prohibited in the river since 1998. The minimum legal length for the species is 50 cm.
Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment load from agriculture, forestry and peat mining. An effective protection zone should be established along agricultural lands by the river. Flow of the river should be adequate all year and the short time flow-regulation should be reduced. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Siikajoki

The River Siikajoki is a large salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts (main river)

River length: 187 km of which 115 km accessible for salmonids
Size of catchment area: 4,318 km^2
Average flow: 39m^3/s
Daily lowest flow: 5.1 m^3/ s
Number of migration hindrances: 3 (2 contain a fish way)

Habitat and water quality in the River Siikajoki

River Siikajoki falls 190 m in altitude on its way to the Bothnian Bay. The catchment area is dominated by large swamps and forests, and covered by some farmland in the lowest part. Lakes cover 2.2% of the catchment area and therefore the river flow varies a lot seasonally and depending on changes in precipitation. There are no large lakes in the area, but one reservoir is located 113 km from the coast. The annual lowest flow occurs late in the winter or in the late summer.

There are about 50 ha of rapids and riffles within the river. Riffles and rapids were dredged for timber floating and flood protection in the 1950s and 1960s, but they have been partly restored to improve reproduction success of fish species that utilise the habitats.

There are three hydropower stations in the river. The first one is located 18 km from the coast and has two fish ways.

Water quality is satisfactory in the main river, but passable in the tributaries. Forestry, agriculture and peat mining are the main sources of nutrient and sediment load. The nutrient load may negatively affect mid- and late summer conditions of salmonid parr and spawners. Effluents from peat mining fields increase sedimentation of organic substances which may decrease oxygen supply of salmon eggs. The lowest part of the river runs through acid sulphate soil and the pH readings can be very low in these areas. In the autumn of 2006 fish mortality was last observed in the river.

River Siikajoki according to the Water Framework Directive

The name of the water management district is the Oulujoki-Iijoki River Basin District and the river type is a large peat land river.

Ecological status: Satisfactory
Biological status: Good
Physical & chemical status: Passable
Hydrologic & morphological status: Satisfactory

The main measures in the water management plan are to restrict decreasing of pH in the lowest part of the river that situates in the acid sulphate soil region, to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste; to maintain and increase water pollution control in peat mining; restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

The river does not belong to the Natura 2000 network.

River Siikajoki salmon and sea trout stocks

Salmon and sea trout fishing in the River Siikajoki was active until 1950s. Thereafter the stocks began to weaken and disappeared by the 1970s. The reasons were dredging and building of the Uljua reservoir.

Some salmon and sea trout were caught in the Siikajoki during 1980s and 1990s, but it is evident that the caught fish were reared. No natural reproduction has been observed in the river.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: 50 ha (salmon)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Siikajoki

Except for the general fishing rules, there are no special restrictions on salmon fishing in the River Siikajoki. Fishing of salmon and sea trout is prohibited from September 11 – November 15, and the minimum legal length for both species is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment load from peat mining, forestry and agriculture. An effective protection zone should be established along agricultural lands by the river. It is important to prevent low pH values. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment (draining for forestry, agriculture and peat mining). Flow of the river should be adequate all year.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Simojoki

The river Simojoki is a large salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 175 km totally accessible for salmonids
Size of catchment area: 3,160 km^2
Average flow: 45 m^3/ s
Daily lowest flow: 2.8 m^3/ s
Number of migration hindrances: 0

Habitat and water quality in the River Simojoki

The River Simojoki springs from the Lake Simojärvi, 176 m above the sea level and 175 km from the coast. At 120–150 km from the coast the river widens and forms a chain of several shallow, eutrophic lakes. There are no other lakes along the main river. The tributaries of the main river are small. The catchment area consists of large swamps and forests. Lakes cover 5.7% of the catchment area and the river flow varies a lot seasonally and depending on the changes in precipitation. Typically the annually lowest flow season is in late winter, but sometimes also in late summer.

There are altogether about 280 hectares of rapids and riffles in the river downstream of the Lake Simojärvi. Rapids were dredged for timber floating in the 1940s and 1950s, but they have been recently restored to improve reproduction success of fish species that breed in these areas. Due to restoration the rapid area needs new evaluation.

There are no natural or man-made migration obstacles in the river. Water quality is good or excellent on the upper section of the river, but deteriorates downstream where it may potentially negatively affect salmon reproduction especially during the seasons of low flow. Forestry, agriculture and peat mining are the main sources of nutrient and sediment load. Agriculture and forestry increase the nutrient load which may negatively affect mid- and late summer conditions of parr and spawners, and increase macro-vegetation growth. Effluents from peat mining fields increase sedimentation of organic substances and may therefore decrease oxygen supply of salmon eggs and increase macro-vegetation growth. The effluents may also create sudden decrease in pH, which is critical especially in the spring time when salmon eggs hatch.

River Simojoki according to the Water Framework Directive

The name of the water management district is the Kemijoki River Basin District and the river type is a large peat land river.

Ecological status: Excellent
Biological status: Excellent
Physical & chemical status: Excellent
Hydrologic & morphological status: Excellent

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste; to maintain and increase water pollution control in peat mining; and the restoration of riffles and rapids from dredging due to timber floating.

Natura 2000

The main river belongs to the Natura 2000 network.

The Simojoki salmon and sea trout stocks

River Simojoki is the only river with an original wild salmon stock that is located completely in Finnish territory. Currently there is no indication of a salmon sub-population structure within the Simojoki.

The salmon stock was supplemented by voluminous stocking of hatchery-reared parr and smolts from the mid-1980s to the mid-2000s.

During the second half of the last century the Simojoki salmon population declined and the years with the overall lowest abundance date back to 1980s. In the late 1980s the annual smolt run was only 1000–3000 wild smolts. Since then, the stock has recovered mainly by a sudden, sharp rise in the late 1990s. The abundance of wild smolts was on its highest level in the early 2000s, after which the abundance has somewhat decreased and is currently 30,000–40,000 smolts per year. The counts indicate that currently 1,000–1,500 spawners ascend the river annually.

Simojoki salmon reproduces only along the main river. The headwater river section upstream of the shallow lakes was without any observed salmon reproduction for a long period. However, in 2009 wild salmon parr were detected in electro-fishing at several rapids of this area. Thus, the distribution of salmon in the Simojoki has reverted to its historical range.

In the River Simojoki the spawning success per spawner is likely the lowest among the wild salmon stocks of the Gulf of Bothnia. This may indicate poorer-than-average river conditions for salmon reproduction, but also other factors may be responsible for the phenomenon. Whatever the reason, the low productivity of the stock implies a low resilience to fishing mortality. Improving the river habitat for salmon reproduction may increase the productivity through increased survival of eggs and juveniles.

The sea trout stock has always been very weak compared to salmon. Sea trout smolts have been found only occasionally in the surveys made by FGFRI. It is not known whether they are progeny of the sea migrating form or descendants of the lake Simojärvi area. Some sea trout are caught by rod, the draft estimation of the total annual catch is about 10–20 kg, but they are mainly fish stocked for compensatory purposes by peat mining companies. This can be seen from their worn fins. The number of stocked sea trout smolt is small, only some hundreds every year.

Salmon population facts

Population category: 3
Reproduction area: 254 ha
Production capacity: 45,000 smolts
Recent wild smolt production estimate: 31,000 (2009)

Fishing regulations in the River Simojoki

Closed season is from September 11 – November 15. Minimum legal length for both salmon and sea trout is 50 cm. Using worm as bait is prohibited.

Salmon fishery using all kinds of nets is prohibited in the River Simojoki from the river mouth to the lake Portimojärvi from May 1 until the end of November. There is a bag limit of one salmon per fisher per day. The weekly closure of fishing is between Sunday 18 pm and Monday 18 pm. Hooked kelts must be released.

Specific actions for the development of the salmonid populations

The water quality should be improved by decreasing nutrient and sediment load from peat mining, forestry and agriculture. An effective protection zone should be established along agricultural lands by the river. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment. This could be done by filling old, unnecessary ditches and by strict permission policy for any digging of new ditches (draining for forestry, agriculture or peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

The River Tornionjoki/Torneälven

The River Tornionjoki is a salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 522
Size of catchment area: 40,131 km²
Average flow: 383
Daily lowest flow: 76
Number of migration hindrances: 0

Habitat and water quality in River Tornionjoki

The Tornionjoki river system is the largest unregulated river system in the Western Europe, and it is connected to the adjacent River Kalixälven through a natural bifurcation. It is also one of the world's largest spawning rivers of Atlantic salmon and the largest producer of wild salmon in the Baltic Sea. The river Tornionjoki flows to the Bothnian Bay along the national border between Finland and Sweden. It starts and form the Swedish mountain lake Torneträsk from where it flows down to the national border and confluences with River Muonionjoki. The headwaters are located

near the Norwegian border in the Swedish and Finnish Lapland. The headwater sources form three main rivers: Torneälven, Lainioälven and Muonionjoki. After flowing 240 km as separate rivers, there is a confluence at about 200 km from the sea. River Tornionjoki has several tributaries.

The River Tornionjoki catchment area is the northernmost of the Baltic Sea catchment river basins. The catchment covers sparsely populated terrain ranging from the southern boreal zone in its lower reaches to the headwater subarctic zone 400 to 500 meters above the sea level. Lakes cover only 4.6% of the catchment area and therefore the river flow varies a lot seasonally. Discharge is the lowest from December to May, when the river is frozen. During the spring thaw in May-June the discharge rate peaks to 1,000–2,000 m^3/ s.

There are thousands of hectares (hundreds of km) of rapids and riffles in the river system. Most riffles and rapids of the tributaries in the lower and middle reaches have been dredged for timber floating in the 1940s and 1950s, but they have been restored to improve reproduction success of fish species utilising these habitats.

There is one small hydropower plant with a dam in the main river Torneälven (Sweden), but the power station blocks only a small side channel of an island and it does not impede fish migration. Two tributaries (one in Sweden, one in Finland) on the lower catchment are regulated by hydropower plants. Salmon or sea trout are not known to have occurred in these tributaries. There are no natural migration obstacles in the river system.

Only minor anthropogenic disturbances are evident in river water quality, which is predominantly excellent on the rivers of the upper catchment, but slightly deteriorates downstream. The water quality has hardly any negative effects on salmon reproduction, but it may affect sea trout reproduction in a few spawning tributaries with the highest anthropogenic disturbances. Forestry, agriculture and municipal waste are the main sources of nutrient and sediment load. Large mines are planned in the middle part of the catchment area. The poor control of effluents from the mines is a potential threat for the water quality in the future.

River Tornionjoki according to the Water Framework Directive

The name of the water management district is Torne River Basin District and the river type changes along the river. The main types are: a very large peat land river, a large mineral land river (most salmon spawning areas), and a medium-sized mineral/peat land river (most sea trout spawning areas).

Ecological status: Good–Excellent
- Biological status: Good–Excellent
- Physical & chemical status: Good–Excellent
- Hydrologic & morphological status: No information

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient and sediment load from agriculture, forestry and municipal waste.

Natura 2000

The main rivers and lakes belong to the Natura 2000 network.

The Tornionjoki/Torneälven salmon and sea trout stocks

River Tornionjoki supports original wild salmon and sea trout stocks. Salmon spawn and parr occur in the swiftly flowing sections of the main stream, in the headwaters and in the major tributaries from the lowermost riffles up to 400–500 km from the sea. Spawning areas of sea trout are concentrated on the small-medium sized tributaries of the middle reach, but some juvenile trout are also found elsewhere, e.g. in the main rivers.

There are clear indications of sub-population structure for sea trout, and each spawning tributary supposedly holds a distinct sea trout population. Genetic studies have found some indications of sub-population structure also for salmon. However, the within-river genetic variability of salmon is poorly known.

The salmon stock was supplemented by voluminous stocking of hatchery-reared parr and smolts from the early 1980s until 2002. Frequent stocking of sea trout started in the early 1990s and it has been continued thus far. Stocking activities have been concentrated on the border river and the Finnish tributaries.

During the second half of the last century the Tornionjoki salmon and sea trout stocks declined and the years with the overall lowest abundance date back to the 1980s. In the late 1980s the annual run of wild smolts was 50,000–100,000 salmon. Since then, the salmon stock has recovered mainly by a sudden sharp rise in the late 1990s, as a result of which the annual smolt run rose to 500,000–700,000 salmon in the early 2000s. In the recent years the salmon abundance has further increased and the smolt run exceeded the level of one million salmon in 2008 for the first time. The counting of spawning run in 2009 indicates that currently 30,000–40,000 salmon spawners ascend the river.

Parr densities of sea trout have shown improvement in some periods after the 1980s. However, annual smolt run seems to be low, i.e. 10,000–20,000 trout smolts. Monitoring data indicates that several historical trout spawning tributaries have extremely low abundance and in some years possibly no sea trout reproduction at all.

Salmon and sea trout population facts

Population category: 1 (salmon), 3 (sea trout)
Reproduction area: 4,997 ha
Production capacity: 1.318 million smolts
Recent wild smolt production estimate: 1.18 million smolts (salmon 2009); 10,000–20,000 (sea trout)

Fishing regulations in the River Tornionjoki/ Torneälven

In the new border agreement between Finland and Sweden that come into force in October 2010, all fishery in the border river (agreement area) is forbidden from September 15 – December 15 with the exception of lamprey fishing. Fishing for salmon and sea trout with rod is allowed from June 1 – August 31. During this time it is forbidden to fish salmon and trout between Sunday 19:00 (Finnish time) and Monday 19:00.There is also a bag limit of one salmon or trout per fisher per day and the minimum legal length for salmon and trout is 50 cm. Salmon and trout fishing by traditional gillnet fishing methods and by a hoopnet (‘lippo’) is allowed during some days in June and July on the listed sites in the border river.

In the Swedish rivers Torneälven, Lainioälven and in some Swedish tributaries salmon fishing is forbidden during the whole year with exception the following exceptions. Salmon and trout fishing

with rod is only prohibited from September 1 – December 31. It is also forbidden to fish with gillnet and trapnets which is higher than 1.5 m and mesh size larger than 60 mm from May 1 – June 20 and September 1 – December 31 and also from Thursday 18:00 to Sunday 18:00 from July 1 – August 31. Dip net fishing is prohibited from May 1 – June 15. Minimum legal length for salmon is 50 cm. There is a bag limit of one salmon per fishermen and day. Recreational fishing is only allowed with a fishing license.

Specific actions for the development of the salmonid populations

In some spawning tributaries of sea trout, the water quality should be improved by establishing effective protection zones along the agriculture land by the river. The occurrence of extreme low flow conditions should be prevented by filling old, unnecessary ditches and by strict permission policy for any digging of new ditches (draining for forestry, agriculture or peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

The River Uskelanjoki

The River Uskelanjoki is ahistorical salmon river and a sea trout river flowing to the Archipelago Sea.

Basic hydrological facts

River length: 27 km of which 21 km accessible for salmonids
Size of catchment area: 566 km^2
Average flow: 5 m^3/ s
Daily lowest flow: 0.1 m^3/ s
Number of migration hindrances: No hindrances in the main stem

Habitat and water quality in River Uskelanjoki

The River Uskelanjoki begins from the junction of the three main headwater tributaries of Rekijoki, Terttilänjoki and Hitolanjoki. Due to the scarcity of lakes in the catchment area the changes in discharge are large. Forest covers about half of the catchment area, fields 44%, peat land 3% and lakes only 0.6%. Agriculture is very intensive in the catchment area and as fields are situated mainly on clay slopes they are especially susceptible to erosion.

The water quality has been rated poor due to the high nutrient and sediment loading and turbidity. More than half of the nutrient loading comes from agriculture, and a part of it originates from settlements and forestry. Earlier there were several mill and saw milldams in the river, and some dredging has been carried out in the rapids. Now there is at least one milldam about 21 km from the sea which may impede or prevent ascent of migratory fish.

River Uskelanjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District of River and the river type is a medium-sized river in regions with clay soils.

Ecological status: Poor
Biological status: Poor-Fair
Physical & chemical status: Poor
Hydrologic & morphological status: Good

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading and by preventing occasional periods of drought; removing migration obstacles and restoring reproduction areas of sea trout.

Natura 2000

The uppermost part of the river belongs to the Natura 2000 network.

The River Uskelanjoki salmon and sea trout stocks

There are some historical data on a salmon and sea trout fishery having been carried out in the lower reaches and at the mouth of the River Uskelanjoki. Considering the size of the river it is, however, unsure whether these fish have really been salmon or sea trout. The migratory fish stocks have disappeared during the 20th century probably due to the dams and degradation of water quality and habitats. However, on the basis of genetic studies, a genetically differentiated brown trout population is still left in the tributary of Hitolanjoki, and trout parr also exist in some other tributaries. Lately some adult sea trout have been found in the lower reaches of the river. Releases of hatchery-reared sea trout have been sometimes carried out near the river mouth. Due to the small size of the river, rehabilitation of only sea trout appears to be reasonable.

Salmon and sea trout population facts

Population category: 8 (salmon), 3 (sea trout)
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: 0

Fishing regulations in the River Uskelanjoki

Fishing is prohibited from September 11 – November 15. The minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

In some spawning tributaries of sea trout, the water quality should be improved by establishing effective protection zones along the agriculture land by the river. The occurrence of extreme low flow conditions should be prevented by filling old, unnecessary ditches and by strict permission policy for any digging of new ditches (draining for forestry, agriculture or peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Vantaanjoki

The River Vantaanjoki is a potential salmon and sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 101 km totally accessible for salmonids
Size of catchment area: 1,685 km^2
Average flow: 16.9 m^3/ s
Daily lowest flow: 1.4 m^3/ s
Number of migration hindrances: No information

Habitat and water quality in River Vantaanjoki

The River Vantaanjoki begins from Lake Erkylänjärvi 110 m above the sea level. There are only some lakes and ponds in the river basin covering 2.5% of the catchment area. Six main tributaries (Paalijoki, Kytäjoki, Palojoki, Tuusulanjoki, Luhtaanmäenjoki and Keravanjoki) and several brooks empty into the river.

There are about 20 hectares of rapids in the main stem accessible for ascending migratory fish. In addition, there are rapids also in the tributaries and brooks. The dredged rapids in the main stem and in the largest tributaries have been restored for smolt production in the 1990s and in the 2000s. Many brooks have also been restored. During large flows the water is very heavily clouded by clay, and clay sediments originating from agricultural drains may occasionally reduce the survival of hatching eggs.

The River Vantaanjoki was earlier the main raw water source of municipal water for the city of Helsinki, but after building of a pipeline from Lake Päijänne in 1982 it only serves as its reserve. In the summer 1 m^3/s of water from the Päijänne pipeline is drawn into the upper part of the River Keravanjoki in order to increase the flow and to improve the water quality.

Several dams have been built in the Vantaanjoki river system, but at present the main stem is totally accessible for ascending migratory fish, following the building of the fish ways in the 2000s. There is only one power plant dam left in one of the two outlets at the river mouth without a fish way, but the second outlet is free and shaped as a natural fish way.

The water quality is good in the uppermost parts of the main tributary of Keravanjoki and in the tributary of Kytäjoki. However, the water quality deteriorates downstream due to diffuse loading from agriculture and the municipal waste waters. The sediment loading caused by erosion during high floods results in silting of rapids and impair the quality of the spawning and nursery habitats of sea trout. In the main stem the water quality is satisfactory.

River Vantaanjoki according to the Water Framework Directive

The name of the water management district is the Kymijoki-Gulf of Finland River Basin District and the river type is a large river in regions with clay soils.

Ecological status: Fair
Biological status: Poor-Fair
Physical & chemical status: Fair
Hydrologic & morphological status: Poor-Good

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment loading; removing migration obstacles and restoring reproduction areas of salmon and sea trout; and ensuring the survival of the remaining brown trout populations.

Natura 2000

The river is not part of the Natura 2000 network.

The River Vantaanjoki salmon and sea trout stocks

There are old references on salmon and sea trout fishery in the lower reaches of the River Vantaanjoki since the 14th century, owned by the crown or by the church. The occurrence of salmon in the river is unsure. The original migratory fish stocks have later disappeared due to the construction of mills, saw mills and power plant dams and deterioration of water quality.

Sedentary brown trout populations remain in some headwater brooks of the Vantaanjoki river system. One of them (Epranoja stock) is on the basis of genetic studies possibly original. The sea trout population in the main stem originates mainly from the Isojoki river sea trout stock. In some years, ascending adult sea trout have been caught at the river mouth and their eggs have been hatched to be released as fry. Parr and fry of the River Ingarskilanjoki sea trout stock have also been released.

The fish stocks have been monitored by electro-fishing since the1980s, and more regularly since 2000s. Nowadays the monitoring is carried out at 28 permanent sites every second year. 0+ sea trout parr have been observed at 15 sites and salmon parr at 6 sites. Parr (0+) density of sea trout has also been monitored annually since 2005 in the lowest brook (Longinoja) draining into the river.

The salmon stock originates from the river Neva and there is occasional reproduction in the main stem. The annual number of wild smolts migrating into the sea has not been assessed, but on the basis of parr densities it is only a fraction of the production potential of the river. The spawning and nursery habitats of sea trout are underutilized. Catch-sized rainbow trout are released annually in many parts of the river system for angling purposes. Also juvenile grayling have been stocked in the river.

Salmon and sea trout population facts

Population category: 6 (salmon and sea trout)
Reproduction area: ~ 20 ha in the main stem
Production capacity: 40,000–50,000 smolts/year (sea trout)
Recent wild smolt production estimate: No information

Fishing regulations in the River Vantaanjoki

Fishing of brown trout is totally prohibited in the uppermost reaches of the river. Fishing in the river requires a local special licence, and there are various bag limits in different parts of the river. Minimum legal size for salmon is 60 cm and for sea trout 50 cm. The closed season is from September 11 – 15 November.

Specific actions for the development of the salmonid populations

Water quality should be improved by reducing nutrient and sediment load from agriculture, settlements and industry. Effective protection zones along agricultural lands by the river should be established. Better control of waste waters is necessary especially in the Riihimäki town and Nurmijärvi municipality for avoiding accidental releases of sewage into the river. Also pumping clear water from the Päijänne pipeline into the upper reaches would improve water quality during dry seasons. The brooks flowing into the main stem should be restored suitable for sea trout reproduction.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Ähtävänjoki

The River Ähtävänjoki is ahistorical salmon and sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 120 km of which 7 km accessible for salmonids
Size of catchment area: 2,030 km^2
Average flow: 15 m^3/ s
Daily lowest flow: 3 m^3/ s
Number of migration hindrances: 9

Habitat and water quality in River Ähtävänjoki

The River Ähtävänjoki falls for about 200 m from the uppermost headwater brooks to the sea. Many tributaries drain into the river, the largest of them is the River Vimpelinjoki. Lakes cover 10.5% of the catchment area, which is a rather high percentage in this region of Finland. The largest lakes in the watercourse are Lakes Alajärvi (11 km^2), Lappajärvi (142 km^2) and Evijärvi (28 km^2), which all are regulated for flood prevention and for power production. Due to the abundance of lakes and flow regulation the hydrologic conditions are exceptionally stable.

The connection of the river to the sea was closed in 1961, when the reservoir of Luodonjärvi-Öjanjärvi was built by damming the estuary area in front of the river. This reservoir is used as a raw water source of the industry situated in the neighbouring towns. The watercourse is rather heavily regulated. There are nine hydropower plants in the watercourse. The lowest one, the Herrfors power plant dam, is situated about 7 km upstream of the reservoir of Luodonjärvi-Öjanjärvi.

The power plants have mainly been built between the 1960s and the 1980s. In addition, there are several bottom dams used for raising water level in the pools. There are three fish ways over the dams closing the reservoir outlets, but at least one of them is not working well. The river has been

dredged several times in order to prevent floods and promote log floating. The lower reaches of the River Ähtävänjoki have been rated as heavily modified because of the high damming degree.

The water quality is poor in the lowermost reaches, fair upper in the river and good in some of the uppermost tributaries. About 40% of the phosphorus and nitrogen load comes from agriculture. Other major sources of nutrient loading are fur farming and settlements. The water quality in the reservoir, in the estuary area, and in the lower reaches of the river may sometimes drastically deteriorate due to occasional periods of very acid water (<pH 5). Fish kills have sometimes occurred, and the last incident was in the autumn 2006. The phenomenon is more common after especially dry summers or due to intensified drainage on the acid clay soils that are situated in areas 60 m above the sea level.

River Ähtävänjoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a large peat land river.

Ecological status: Poor (lowest part); Fair (the middle and upper part)
Biological status: Poor (lowest part); Fair (upper and middle parts)
Physical & chemical status: Poor (lowest part); Good (middle and upper parts)
Hydrologic & morphological status: Poor–Fair

The main measures in the water management plan are the construction of fish ways over the dams; to continue and strengthen actions to reduce nutrient load from agriculture, fur farming and settlements; to prevent occurrence of accidental periods of very low pH; and restoration of rapids.

Natura 2000

The main stream between the man-made lake Luodon-Öjanjärvi and Lake Evijärvi belong to the Natura 2000 network.

The River Ähtävänjoki salmon and sea trout stocks

The River Ähtävänjoki has once had original salmon and sea trout stocks. The stocks were lost in the early 20th century because of the dams built in the river and when the river was embanked.

Brown trout have, however, occurred in the remaining natural sections of the river. Also pearl mussel (*Margaritifera margaritifera*) occurs in these areas. Pearl mussels need parr of brown trout or salmon as an intermediary host in their life cycle. Due to the lack of salmonid parr in the river, pearl mussels are not able to reproduce.

Salmon and sea trout population facts

Population category: 8 (salmon and sea trout)

Fishing regulations in the River Ähtävänjoki

A local fishing licence is required for fishing in the river. The bag limit varies according to the fishing location in the river. Minimum legal size for both species is 50 cm. Fishing is prohibited from September 11 – November 15.

Specific actions for the development of the salmonid populations

Nutrient and especially sediment loading should be reduced by the establishment of effective protective zones along the agricultural lands by the river. Low pH events should be avoided. Flow regulation should be reduced and rapids restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

3. Sea trout populations and rivers in Finland

The River Espoonjoki

The River Espoonjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 13 km of which 13 km is accessible for salmonids
Size of catchment area: 132 km^2
Average flow: 1.1 m^3 / s
Daily lowest flow: No information
Number of migration hindrances: 0

Habitat and water quality in River Espoonjoki

The River Espoonjoki consists of two smaller tributaries of Glomså and Glimså, which join each other at 8 km from the river mouth. The tributary of Glimså begins from Lake Espoon Pitkäjärvi, 19.2 m above the sea level and 13 km from the sea. The tributary of Glomså begins from Lake Bodominjärvi, 30 m above the sea level and 13 km from the sea. During the large flow the river water is clouded by clay.

Totally about 1 hectare of rapids is accessible for ascending fish in the river system, including also the most important brook of Ryssänoja in the headwaters of the Glomså. An old mill dam has earlier closed the Glomså, but it has collapsed and does not prevent migration except during very low flow.

Water quality in the whole river system is fair due to diffuse loading and nutrients coming from agriculture. The sediment load caused by erosion during high floods results in silting of rapids and impairs the quality of the spawning and nursery habitats of sea trout.

River Espoonjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is a medium-sized river in regions with clay soils.

Ecological status: Fair
- Biological status: Fair
- Physical & chemical status: Fair–Good
- Hydrologic & morphological status: Fair

The main measures in the water management plan are to remove the remaining migration obstacles, to improve water quality by reducing nutrient and sediment load, and to safeguard the maintenance of the brown trout populations in the headwater streams.

Natura 2000

Espoonjoki is not included in the Natura 2000 network.

The Espoonjoki sea trout stock

The original sea trout stock still exists in the Espoonjoki river system. There are sedentary brown trout populations in the Ryssänoja brook, which is located so near the sea that it could also produce smolts into the sea.

The densities of sea trout parr have been monitored by electrofishing since the1990s. Nowadays the monitoring is carried out regularly at one site in the Glomså and at one site in the Glimså. 0+ parr densities have varied between 1 and 55 parr/100 m^2. The densities have been higher in the Ryssänoja brook. In 2010, parr from Ryssänoja brook will be moved into the empty rapids of the river system for extending the living area of the wild trout population.

The annual number of wild smolts migrating into the sea has not been monitored, but based on the parr densities and the production area it is probably less than 2,000.

Sea trout population facts

Population category: 1
Reproduction area: 1 ha
Production capacity: No information
Recent wild smolt production estimate: < 2,000

Fishing regulations in the River Espoonjoki

Sea trout fishing is totally closed in the whole river. Minimum legal length for sea trout is 50 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing an effective protection zone along agricultural lands by the river. The rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Ingarskilanjoki

The River Ingarskilanjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: approximately 30 km
Size of catchment area: 160 km^2
Average flow: 1.6 m^3/ s
Daily lowest flow: 0.1 m^3/ s
Number of migration hindrances: 1 (it contains a fish way)

Habitat and water quality in River Ingarskilanjoki

The Ingarskilanjoki is a very small river flowing through a heavily cultivated agriculture area. The length of the main stem is less than 30 km. It begins from the Lohjanharju esker area about 60 m above the sea level. There are no remarkable lakes in the catchment area, and only 0.17% is covered by small lakes. Two main tributary brooks empty into the river. By the large flows the water is heavily clouded by clay.

There are totally about 1.5 hectares of rapids in the main stem and brooks accessible for ascending migratory fish. Most of the rapids in the main stem have been restored for parr production. The first brook from the river mouth, the Kocksbybäcken has been also restored. Clay originating from agriculture drains may occasionally reduce the survival of hatching eggs.

Earlier a mill dam closed the Ingarskilanjoki river system about 12 km from then river mouth, but at the beginning of the 2000s a fish way was built over it allowing ascent of migratory fish.

Water quality is fair in the whole river system due to diffuse loading and nutrients from agriculture. The sediment loading caused by erosion during high floods results in silting of rapids and impairs the quality of the spawning and nursery habitats of sea trout.

River Ingarskilanjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is a medium-sized river in regions with clay soils.

Ecological status: Fair
- Biological status: Fair
- Physical & chemical status: Fair
- Hydrologic & morphological status: No information

The main measures in the water management plan are to safeguard the maintenance of the trout populations, improvement of water quality by reducing nutrient and sediment load and measures for stabilizing the hydrological circumstances and preventing the incidental extreme low flows in the river.

Natura 2000

The river is not included in the Natura 2000 network.

The Ingarskilanjoki sea trout stock

An original sea trout stocks still exists in the Ingarskilanjoki river system. At the end of the 1980s, 141 sea trout parr were caught by electrofishing and transported to the Porla hatchery, situated in the town of Lohja, and brood stocks were raised from the offspring of these trout. The hatchery brood stocks are nowadays in Laukaa Fish Farm in Central Finland. The brood stocks have been renovated two times in the 2000s by electrofishing natural parr from the river. A local brown trout population exists in the headwater brook of the Ingarskilanjoki, which could also produce smolts into the sea.

The parr density of sea trout has been monitored by electrofishing since the1980s and more regularly since 2000. Nowadays the monitoring is carried out annually at seven sites in the main stem and at three sites in the most important tributary brook of Kocksbybäcken. 0+ sea trout parr have been observed in all areas. The parr densities have varied in the main stem between 1 and 123 parr/100 m^2. In the Kocksbybäcken brook the density has sometimes been higher.

The annual smolt production has not been monitored, but on the basis of the parr densities and the production area it is probably less than 2,000 smolts.

About 20,000 hatchery-reared sea trout smolts originating from the Ingarskila stock are released annually at the river mouth for increasing the number of spawners ascending the river. Until 2009 also reared 1-year old parr were released into the rapids of the river.

Sea trout population facts

Population category: 5
Reproduction area: 1.5 ha
Production capacity: No information
Recent wild smolt production estimate: less than 2,000

Fishing regulations in the River Ingarskilanjoki

Sea trout fishing is prohibited totally in the whole river and in the river mouth area in the sea. Minimum legal length for sea trout is 50 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing effective protection zones along the agricultural land by the river. Measures should be taken for stabilizing the hydrological conditions and preventing the incidental extreme low flows in the river.

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

The River Isojoki

The River Isojoki is a sea trout river flowing to the Bothnian Sea.

Basic hydrological facts

River length: 75 km
Size of catchment area: 1,098 km^2
Average flow: 12.4m^3/ s
Daily lowest flow: 1.6 m^3/ s
Number of migration hindrances: 5

Habitat and water quality in River Isojoki

The length of the main stem is 75 km. Its uppermost sources are in the groundwater areas in the Lauhanvuori national park, situating about 160 m above the sea level. There are only few little lakes and ponds in the river basin covering 0.2% of the catchment area. Three main tributaries and several headwater brooks empty into the river. The river flow varies greatly depending on the season.

There are totally about 27 hectares of rapids in the main stem accessible for ascending migratory fish. The rapids have partially been dredged for timber floating and flood prevention, which reduce their potential for smolt production. Also sand originating from forest drains may occasionally reduce the survival of hatching eggs.

There are altogether six sawmill and power plant dams hindering ascent of fish in the river system, five of them in the main stem. Two lowest dams in the main stem are nowadays partially open, but the others totally or partly hinder the upstream migration of fish in low flow conditions. Nowadays there are two power plant dams in use, Peruskoski 11 km from the sea and Villamo 45 km from the sea. A fish ladder has been built over both of the dams, but the lower one is accessible only during floods, and the functioning of the upper one is even more uncertain. Also the two uppermost dams in the main stem are impassable for fish. In 2009, an environment permit has been given for building of a new fish way over Peruskoski dam, and another onehas been applied for the lowest sawmill dam of Sandgrundfors. In addition, the Lågfors dam stops fish ascent in the Kärjenjoki tributary.
Water quality is good in the uppermost parts of the main stem and in the tributary of Heikkilänjoki, which are the most important areas for the reproduction of sea trout in this river system. Water quality deteriorates, however, downstream in the river due to diffuse loading from agriculture, forestry, peat mining and settlements. Water quality is poor in the tributaries of Karijoki and Kärjenjoki and fair in the lower parts of the main stem. Commonly existing acid soils near the coast occasionally result in very low pH values (<pH 5) impairing water quality and threatening the survival of sea trout eggs and parr. Also the sediment load caused by erosion during high floods results in silting of rapids and impairs the quality of the spawning and nursery habitats of sea trout.

River Isojoki according to the Water Framework Directive

The name of the water management district is The River Basin District of River Kokemäenjoki- Archipelago Sea-Bothnian Sea and the river type is a large peat land river.

Ecological status: Fair-Good
Biological status: Good
Physical & chemical status: Good
Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve water quality by reducing nutrient and sediment load and by preventing occasional periods of acid water with appropriate measures in agriculture and forestry, to remove migration obstacles and to restore reproduction areas of sea trout and to stabilize the hydrological circumstances and preventing the incidental extreme low flows in the river.

Natura 2000

The main stem belongs to the Natura network.

The Isojoki sea trout stock

The Isojoki is the only river which has an original remaining wild sea trout stock on the Finnish coast of the Bothnian Sea. In its tributaries and headwater brooks, there are also several sedentary brown trout populations. Studies using enzyme electrophoretic methods could separate at least five groups of brown trout populations differing from each other and from the sea trout population in the main stem. Outside the Bothnian Bay, Isojoki sea trout is the most commonly used stock in sea trout stocking in Finland. Also many private hatcheries have their own parent stocks for producing eggs and smolt for compensatory stocking in the sea or rivers.

Isojoki sea trout stock has been supported annually by abundant releases of reared parr and smolts since the 1990s. In some years also eyed eggs or newly hatched fry have been released in the river.

Even though there are some earlier studies on the occurrence of sea trout in the River Isojoki, the stock has been monitored by electrofishing since the1970s and more regularly since 1995. The parr density was already in the 1970s decreased due to dams hindering the ascent of spawners, the dredging of rapids and by disturbances in water quality due to extensive drainage of fields and peat land forests as well as due to effluents of local settlements and potato manufacturing plants. The point loading has later decreased.

The ascent has been especially limited in dry summers and autumns when the dams impede fish from migrating up the river. The annual density of 0+ parr has generally been low and unstable, about 4 parr/100 m^2 on average. Nowadays the reproduction of sea trout takes place mainly in the upper reaches of the main stem and in the lower parts of some tributaries. Only some 0+ parr have been found annually in the lower reaches of the river. In the upper reaches the density has been in some areas 10–20 parr/100 m^2 thus indicating a much higher reproductive potential. The annual number of wild sea trout smolts migrating into the sea has not been assessed, but on the basis of the parr densities it is only a fraction of the smolt production potential of the river and the wild stock is considered endangered.

Sea trout population facts

Population category: 4
Reproduction area: 27 ha
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Isojoki

The closed season is from September 11 – November 15. Minimum legal length for sea trout is 50 cm. Using worm as bait is prohibited. On the basis of the local fishery collectives there is a bag limit of five salmonids (including sea trout, grayling and whitefish) per day.

Specific actions for the development of the salmonid populations

An effective protection zone should be established along agricultural lands by the river. The water quality should be improved by reducing nutrient and sediment load from agriculture, forestry and peat mining. The sporadic periods of very acid water in the river should be eliminated by avoiding too forceful measures in land use, like undue drainage and cultivation (agriculture and forestry). The occurrence of extreme low flow conditions should be prevented by reducing fast surface runoff throughout the catchment. The present situation could be improved by filling old, unnecessary ditches and by strict permission policy for any digging of new ditches (draining for forestry, agriculture and peat mining). The rapids should be restored suitable for sea trout reproduction.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Lestijoki

The River Lestijoki is a sea trout river and a historical salmon river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 110 km of which 35 km accessible for salmon and 11 km for sea trout
Size of catchment area: 1,371 km^2
Average flow: 11.8 m^3/ s
Daily lowest flow: 1.2 m^3/ s
Number of migration hindrances: 2

Habitat and water quality in River Lestijoki

The River Lestijoki starts from Lake Lestijärvi, 141 m above the sea level. Lakes cover only 6.3% of the catchment area, and there are no lakes along the main river. The tributaries draining into the main stem are small. In its lower reaches, the river flows about 7 km in two branches which join again 4 km before the sea. About a half of the catchment area is composed of forest. Peat land covers 38% and fields about 10% of the area. The upper part of the catchment area consists of large bogs and forests and the lower part includes more agricultural lands. The flow in the river varies a lot seasonally and depending on the changes in precipitation. Typically the lowest flow season is late winter but sometimes also late summer.

There are altogether about 26 hectares of rapids in the river downstream of the Lake Lestijärvi. The rapids were dredged for timber floating in the 1910s and 1940s, but they have recently been restored upstream of the lowest dam. The power plant of Korpela dam, at 35 km from the sea, was built in 1925. It formed a total migration obstacle in the river. A fish way over this dam is being planned in 2010. About 9 hectares of rapids are situated upstream of the Korpela dam.

The water quality in the river is excellent in the uppermost section and good in the lower reaches. Forestry and agriculture are the main sources of nutrient and sediment load. Agriculture and forestry increase the nutrient and sediment load in the river, which may negatively affect mid- and late summer conditions for parr and spawners and increase the growth of macro vegetation. The lowest part of the river is situated in regions with acid sulphate soils and pH levels may sometimes be very low and result in fish kills.

River Lestijoki according to the Water Framework Directive

The name of the water management district is the Kokemäenjoki-Archipelago Sea-Bothnian Sea River Basin District and the river type is a large peat land river.

Ecological status: Good (the uppermost part); Good (the lower parts)
Biological status: Fair
Physical & chemical status: Good (the uppermost reaches); Fair (the lower reaches),
Hydrologic & morphological status: Fair

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste; restoration of dredged rapids from log floating; and building a fish way to the lowest dam.

Natura 2000

The river belongs to the Natura 2000 network.

The River Lestijoki salmon and sea trout stocks

Salmon and sea trout used to ascend the River Lestijoki, and both species have been caught in the sea at the river mouth as well as in the river. There was salmon fishing in the river until the 1950s, but the original stock died out in the 1960s due to the extensive dredging carried out in the river for flood prevention.

The river has once been an important sea trout river. The original stock weakened together with salmon, but it survived, and the sea trout stock still exists in the river. The stock is genetically different from other stocks and it is considered as one of the few remaining original sea trout stocks in Finland.

A brood stock has been reared from the spawn of the ascending adult fish, and hatchery-reared parr and smolts have been released in the river for supporting the weakened wild stock. Some wild reproduction still occurs in the river, but the existence of the population is entirely dependent on stocking. Since the 1990s, some local fishery collectives have promoted river fishing by stocking catch-sized rainbow trout and sea trout in the rapids.

Salmon and sea trout population facts

Population category: 8 (salmon), 5 (sea trout)
Reproduction area: 17 ha (salmon), 26 ha (sea trout)
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Lestijoki

Fishing is prohibited from September 11 – November 15. Minimum legal length for both species is 50 cm. Using worm as bait is prohibited. Using nets is only allowed during one month in the spring.

Specific actions for the development of the salmonid populations

The water quality should be improved by the establishment of effective protection zones along agriculture lands by the river. The occurrence of extreme low flow conditions should be prevented by decreasing possibilities for fast surface runoff throughout the catchment (draining for forestry, agriculture and peat mining).

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Mankinjoki

The River Mankinjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 6.7 km
Size of catchment area: 174 km^2
Average flow: 2 m^3/ s
Daily lowest flow: 0.02 m^3/ s
Number of migration hindrances: no information

Habitat and water quality in River Mankinjoki

The River Mankinjoki begins from Lake Loojärvi 13.5 m above the sea level. The largest tributary of the river is Gumbölenjoki that starts from Lake Nuuksion Pitkäjärvi about 20 km from sea and 27 m above the sea level. There is a migration obstacle (Gumböle mill dam) about 6.5 km from the sea. The most important brook is the Karhusuonpuro flowing into the Gumbölenjoki downstream from the Gumböle mill dam. The flow varies greatly. During large flows the water is clouded by clay.

There are about 1.1 hectares of rapids in the main stem available for migratory fish. 0.3 hectares are situated in the main stem and the rest in the Gumbölenjoki and Karhusuonpuro. No remarkable restorations have been done in the rapids of the main stem.

Water quality is good in the whole water system. In the tributary of Gumbölenjoki, there is a raw water reservoir and waterworks of Dämman about 10 km from the river mouth. The waterworks are regulating the flow over the dam into the Gumbölenjoki, and the allowed minimum discharge is only 0.02 m^3/ s. The operation of the waterworks will be withdrawn during the year 2010.

River Mankinjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is a medium-sized river with clay soils.

Ecological status: Good
- Biological status: Good
- Physical & chemical status: Good
- Hydrologic & morphological status: no information

The main measures in the water management plan are to remove migration obstacles and return the natural discharge in the tributary of Gumbölenjoki, to improve the water quality by decreasing nutrient and sediment load and to safeguard the maintenance of the brown trout populations in the headwater streams.

Natura 2000

The river is not included in the Natura 2000 network.

The Mankinjoki sea trout stock

The existing sea trout stock in the Mankinjoki river system is probably original. A sedentary brown trout population remains in the headwater brook of Nuuksion Myllypuro draining into the lake Nuuksion Pitkäjärvi.

The population density of sea trout parr has been monitored by electrofishing since the1990s and more regularly since 2000. There is one fishing site in the main stem and two sites in the tributary of Gumbölenjoki, where the densities of 0+ parr have varied between 1 and 25 parr/100 m^2. 0+ parr have been observed also in the main stem of the Mankinjoki.

The annual production of wild smolts has not been studied, but on the basis of the parr densities and the production area the potential of the river does not outrun 1,500 smolts per year.

The spawning and nursery habitats of sea trout are underutilized. There are several reasons for this, but the most serious problem is the gillnet fishing of whitefish and pikeperch in the sea. As the fishing mortality of young sea trout as by-catch is high, adult trout are not able to reach the river to spawn.

Sea trout population facts

Population category: No information
Reproduction area: 1.1 ha
Production capacity: no information
Recent wild smolt production estimate: less than 1,500

Fishing regulations in the River Mankinjoki

Salmon and sea trout fishing is closed from 11 September – 15 November. Minimum legal length for sea trout is 50 cm and salmon 60 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

After ending of the waterworks in the Gumbölenjoki, the discharge in the tributary of Gumbölenjoki should be raised to follow the natural discharge. The water quality should be improved by establishing an effective protection zone along agriculture lands by the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Mustajoki

The River Mustajoki is a sea trout river flowing to the Saimaa Canal.

Basic hydrological facts

River length: 50 km totally accessible for salmonids
Size of catchment area: 296 km^2
Average flow: 2.5 m^3 / s
Daily lowest flow: >0.5 m^3 / s
Number of migration hindrances: No information

Habitat and water quality in River Mustajoki

The River Mustajoki watercourse is divided between Finland and Russia. It begins from the Finnish territory from Lake Karhusjärvi, situated about 60 m above the sea level and 15 km from the border. After crossing the border it joins the tributary of Soskuanjoki and empties finally into the man-made canal of Saimaa near its outlet into the Bay of Vyborg beneath the lowest lock. In Russia this river is known with the name of Malynovka. On the Finnish side the most important headwater streams are the brooks of Alhonpuro and Pölkkyoja.

The river water is rich in humus due to many bogs in the catchment area, and the water quality is satisfactory on the Finnish side. The most significant amount of the diffuse nutrient and sediment load comes from agriculture and forestry. New risks to water quality are posed by the plans to start peat mining in some bogs in the catchment.

River Mustajoki according to the Water Framework Directive

The name of the water management district is Vuoksi River Basin District.

Ecological status: Fair
- Biological status: No information
- Physical & chemical status: Fair
- Hydrologic & morphological status: Fair

The main measures in the water management plan are to safeguard the maintenance of the sea trout stock by removing migration obstacles, restoring rapids and by strict fishing regulations; to improve water quality by reducing nutrient and sediment loading with appropriate measures in agriculture and forestry; and to stabilize the hydrological circumstances and preventing the incidental extreme low flows in the river.

Natura 2000

The river does not belong to the Natura 2000 network.

The Mustajoki sea trout stock

In South-eastern Finland, the river Mustajoki is the only river with a remaining original brown trout stock that has migration connections to the Bay of Vyborg. Genetic studies have shown that on the Finnish side this trout stock is the only one which still represents the sea trout stocks typical to the humus rich rivers in the Bay of Vyborg, the eastern Gulf of Finland. Therefore trout parr from the river Mustajoki were collected in 2008 and 2009 and moved into a hatchery for establishing a brood stock to be used in stocking in the eastern areas of the Gulf of Finland.

Sea trout population facts

Population category: 1
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Mustajoki

Fishing is prohibited in the river.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing an effective protection zone along the agricultural lands by the river. Rapids should be restored. Occurrence of extreme low flow conditions should be prevented. Peat mining and draining of new forest areas and bogs should be prohibited.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Pattijoki

The River Pattijoki is a potential sea trout river flowing to the Bothnian Bay.

Basic hydrological facts

River length: 34 km of which 12 km is accessible for salmonids
Size of catchment area: 141 km^2
Average flow: No information
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Pattijoki

The river Pattijoki begins from a small pond situating 97 m above the sea level. The catchment area consists of agricultural land, forests and bogs. A part of the water is led to the reservoir of Haapajärvi and used as a raw water source for the steel industry.

The river has been dredged almost entirely in order to prevent floods. Therefore the river flow varies a lot seasonally depending on the changes in precipitation. In the lower course of the river,

there are three bottom dams which are partial migration hindrances. The regulation dam situated 12 km from the mouth prevents migration during low flow season.

The water quality is poor. Agriculture and forestry are the main sources of nutrient and sediment load. The lowest part of the catchment area is located on acid sulphate soils and therefore pH in the river can be very low after dry seasons or after extensive ditching operations.

River Pattijoki according to the Water Framework Directive

The name of the water management district is Oulujoki-Iijoki River Basin District and the river type is a medium-sized peat land river.

Ecological status: Poor
- Biological status: No information
- Physical & chemical status: Poor
- Hydrologic & morphological status: Poor/Fair

The main measures in the water management plan are to safeguard the survival of the natural brown trout population, to continue and strengthen actions to reduce nutrient load from agriculture and forestry, to prevent occurrence of accidental periods of very low pH, to enable migration across the regulation dam in all circumstances.

Natura 2000

The rivers do not belong to the Natura 2000 network.

The Pattijoki sea trout stock

There is an original brown trout stock remaining in the upper reaches of the river. There is a partial migration connection between the river and the sea, but it is not known whether there is a tendency for the trout to become anadromous.

Sea trout population facts

Population category: 6
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Pattijoki

The catching of salmon and brown trout is prohibited from September 11 – November 15 and the minimum legal length for the species is 50 cm. Using worm as bait is prohibited.

Specific actions for the development of the salmonid populations

The water quality should be improved by the establishment of an effective protection zone along the agricultural lands by the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Sipoonjoki

The River Sipoonjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 40 km
Size of catchment area: 220 km^2
Average flow: 2.4 m^3 / s
Daily lowest flow: 0.1 m^3 / s
Number of migration hindrances: 1 (it contains a fish way)

Habitat and water quality in River Sipoonjoki

63% of the catchment area of the river Sipoonjoki is covered with forests, 34% with arable land and 0.6% with lakes. More than ten brooks empty into the river. The most important brook for sea trout is Byabäcken and its headwater brooks situated in the lower reaches of the river. The flow varies greatly.

The water quality of the river is poor due to the high nutrient and sediment load, which is caused mainly by agriculture and settlements along the river side. This is especially due to the prevalence of nutrient rich and easily eroded clay soils and effective drainage of fields situated on slopes along the river banks. The uppermost headwater brooks have been dredged for drainage. The mill dam of Broböle in the lower reaches of the river has earlier been a migration obstacle, but nowadays the ascent of fish is possible via a natural fish way built in 1995.

River Sipoonjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is a medium-sized river in regions with clay soils.

Ecological status: Poor
- Biological status: Fair
- Physical & chemical status: Poor
- Hydrologic & morphological status: Poor

The main measures in the water management plan are to restore the dredged and silted rapids, to improve the water quality, to apply strict fishing regulations at the river mouth and in the sea close to it and to safeguard the maintenance of the trout populations in the headwater streams.

Natura 2000

The main stem and eight of the brooks emptying into it belong to the Natura 2000 network.

The Sipoonjoki sea trout stock

The existing sea trout stock in the Sipoonjoki river system is probably original. A trout population is left in the headwater brooks of Byabäcken and Ritobäcken. Despite the construction of a new fish way, no trout have been found in the main stem upstream of the Broböle rapids.

The population density of sea trout parr has been monitored by electrofishing since the1990s. The densities have been commonly very low, and only few or no parr at all have been found in the 2000s in the lowest rapids in the Byabäcken. Thus the population size has been dramatically reduced causing serious genetic risks for the trout population. The sea trout stock is therefore at risk of extinction.

There is smolt production only in some years and the enhancement requires efficient improvement of both the river environment and fishing regulations.

Sea trout population facts

Population category: 1
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Sipoonjoki

Salmon and sea trout fishing is closed from September 11 – November 15. Minimum legal length for sea trout is 50 cm and salmon 60 cm. All fishing is prohibited in the rapids of the main stem and in the Byabäcken and in its headwater brooks.

Specific actions for the development of the salmonid populations

The water quality should be improved by establishing an effective protection zone along the agriculture lands by the river. The dredged and silted rapid areas of the river system should be restored, especially in the Byabäcken brook.

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

The River Siuntionjoki

The River Siuntionjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 48 km
Size of catchment area: 483 km^2
Average flow: 5.5 m^3 / s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Siuntionjoki

The river Siuntionjoki begins from Lake Enäjärvi situated 57.5 m above the sea level. There are some lakes and ponds in the river basin covering 5.3% of the catchment area. One main tributary, Kirkkojoki, and several brooks empty into the river. The flow varies greatly between winter and

summer and also during summer depending on the amount of rain. During large flow the water is heavily clouded by clay leaching from the cultivated area.

In the main stem, there are 18 rapids, with a total length of 5.6 km, accessible for ascending migratory fish. Some rapids in the main river and in the main tributary have been restored for smolt production. The power plant dam of Sågarsfors, situating about 20 km from the river mouth, has been pulled down and rebuilt as a natural fish way. Another small power plant, situated about 6 km from the river mouth in Sjundbygård, does not create an obstacle for migrating sea trout. There is a salt water regulating dam for industry at the Siuntionjoki river mouth which may occasionally be a migrating obstacle for ascending sea trout. In the lower reaches of the Siuntionjoki river system, there are two flow-through lakes (Vikträsk and Tjusträsk) with a large pike population which could prey on down migrating sea trout smolts.

Clay originating from agricultural drains may occasionally reduce the survival of hatching eggs or fry especially in the Kirkkojoki, which is flowing through a heavily cultivated agricultural area. During high floods, the sediment load due to erosion results in silting of rapids and impairs the quality of the spawning and nursery habitats of sea trout.

River Siuntionjoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District.

Ecological status: Fair
- Biological status: No information
- Physical & chemical status: No information
- Hydrologic & morphological status: No information

The main measures in the water management plan are to remove migration obstacles and restore reproduction areas of sea trout, to improve water quality by reducing nutrient and sediment load and to safeguard the maintenance of the brown trout populations in the headwater streams.

Natura 2000

Parts of the river belong to the Natura 2000 network.

The Siuntionjoki sea trout stock

The sea trout stock of the river Siuntionjoki is probably original. Also sedentary brown trout populations are left in some of the headwater brooks. One such population is living in the Lempanså, a headwater stream of the Kirkkojoki tributary, and another in the brook of Kvarnbäcken, which empties into the main stem below Sågarsfors.

In the Lempanså, the parr densities have been on a very low level, but in autumn 2009 their status appeared to be better. In the Kvarnbäcken, the parr densities were high until the end of the 1980s but decreased dramatically after that. In 1995 the rapids in the brook of Kvarnbäcken were heavily silted up due to repair works of a road in the upstream area. Sea tout parr have been regularly observed also in the rapids of the main stem, but the densities have been low. The fish stocks have been monitored by electrofishing since the 1980s.The annual number of wild smolts migrating into the sea has not been assessed, but the production potential of the river could be about 7,000 smolts.

The spawning and nursery habitats of sea trout are underutilized.

Sea trout population facts

Population category: 1
Reproduction area: 3.1 ha
Production capacity: approximately 7,000
Recent wild smolt production estimate: No information

Fishing regulations in the River Siuntionjoki

Salmon and sea trout fishing is closed from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

The water quality should be improved by the establishment of an effective protection zone along the agriculture lands by the river.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Urpalanjoki

The River Urpalanjoki is a sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 80 km
Size of catchment area: 647 km^2
Average flow: 5 m^3 / s
Daily lowest flow: No information
Number of migration hindrances: No information

Habitat and water quality in River Urpalanjoki

This watercourse of Urpalanjoki is divided between Finland and Russia. In Russia the name of the watercourse is Serga. It begins in the Finnish territory from the lakes Latvanen and Urpalojärvi, located about 60 m above sea level. 557 $km^2$of the catchment area of the river is situated in Finland and 90 km^2 in Russia. In the lowest reaches the river flows 15 km in Russia before emptying into the eastern Gulf of Finland.

In Finland, there are two power plant dams of Muurikkalan Myllykoski and Salajärvenkoski in the lower reaches of the river, and Joutsenkoski and several bottom dams further up in the river. The lower dams and the upper bottom dams are more or less passable for ascending fish with high flow, but the uppermost power plant dam totally stops the ascent.

The upper part of the river has been defined as a heavily modified river due to the high proportion of reaches blocked by dams. There has been a fence on the Russian side of the border hindering

the ascent of fish. The rapids are partially dredged and restoration would improve their suitability for smolt production.

River water is naturally rich in humus and eutrophic due to the occurrence of nutrient rich soils in the catchment area. Agriculture, forestry, settlements and peat mining are the main sources of nutrient loading. Water quality is poor in the upper part of the watercourse and satisfactory lower in the river on the Finnish side.

River Urpalanjoki according to the Water Framework Directive

The name of the water management district is Vuoksi River Basin District and the river type is a medium-sized peat land river, and the upper part is a heavily modified river.

Ecological status: Poor/Fair
- Biological status: No information
- Physical & chemical status: Poor/Fair
- Hydrologic & morphological status: No information

The main measures in the water management plan are safeguarding the maintenance of the sea trout stock by removing migration obstacles and by strict fishing regulations, improving water quality by reducing nutrient and sediment load with appropriate measures in agriculture and forestry and restoring reproduction areas of sea trout.

Natura 2000

Urpalanjoki is not included in the Natura 2000 network.

The Urpalanjoki sea trout stock

According to historical records both salmon and sea trout have earlier ascended the river Urpalanjoki, but the occurrence of salmon is more or less unsure. The original sea trout stock still remains in the river. In recent years, no sea trout parr or natural reproduction have been observed in the river on the Finnish side of the border, but sea trout parr still exist in the lowest Russian reach of the river. Sea trout may occasionally migrate to the Finnish side, but the natural reproduction is probably rare. On the Russian side, however, the reproduction is regular. River lamprey commonly ascend the river and are caught also on the Finnish side of the river.

Sea trout population facts

Population category: 1
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Urpalanjoki

Sea trout fishing is prohibited from September 11–November 15. Minimum legal length for sea trout is 50 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

The water quality should be improved by establishing an effective protection zone along the agriculture lands by the river. Rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

The River Virojoki

The River Virojoki is a potential sea trout river flowing to the Gulf of Finland.

Basic hydrological facts

River length: 30 km of which 3.7 km is accessible for salmonids
Size of catchment area: 357 km^2
Average flow: 4.2 m^3 / s
Daily lowest flow: no information
Number of migration hindrances: 5

Habitat and water quality in River Virojoki

Lakes cover 3.8% of the Virojoki catchment area. There are two major tributaries joining the main stem in its upper reaches. The most important tributary for sea trout is the Saarasjärvenoja brook, which drains the river 3.6 km upstream from the river mouth. The flow varies greatly depending on precipitation.

River water is humus rich and rather eutrophic, and water quality is classified as satisfactory due to the high nutrient and sediment load. The majority of the nutrient and sediment load is caused by agriculture, but some loading also comes from forestry and settlements.

There is an electric power plant dam about 1.6 km from the river mouth that is a partial migration obstacle, and the power plant dam of Kantturakoski about 3.7 km from the river mouth creates a total migration obstacle for ascending fish. In addition, there is one power plant dam, two mill dams and one regulating dam further up in the river system, and all of them are total migration obstacles for ascending fish. The lowest part of the river has therefore been defined as a heavily modified river because of the high proportion of dammed stream reaches.

River Virojoki according to the Water Framework Directive

The name of the water management district is Kymijoki-Gulf of Finland River Basin District and the river type is a medium-sized river in regions with mineral soils, and the lower part is a heavily modified river.

Ecological status: No information
Biological status: No information
Physical & chemical status: Fair
Hydrologic & morphological status: No information

The main measures in the water management plan are safeguarding of the maintenance of the trout population by strict fishing regulations in the river and in the sea close the river mouth, restoring the dredged and silted rapids, removing of the migration obstacles and improving of water quality.

Natura 2000

The river does not belong to the Natura 2000 network.

The Virojoki sea trout stock

There is a remaining trout population in the Saarasjärvenoja brook. This population is mainly sedentary, but some of the trout probably migrate into the sea and return to spawn in this brook. According to historical records most trout caught in this brook have weighed less than 300 g, but the largest ones were over 2 kg in size. According to genetic studies, the existing sea trout stock in the Virojoki river system is probably original. The status of the stock has been classified as critically endangered.

In addition, an abundant sedentary brown trout population remains in the uppermost part of the main stem. The genetic properties of this population are not known, but due to dams it has been living separately almost a hundred years and may thus be genetically different from the migratory population in the lower reaches.

Sea trout population facts

Population category: 6 (Virojoki); 1 (Saarasjärvenoja brook)
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Virojoki

Salmon and sea trout fishing is closed from September 11 – November 15. Minimum legal length for sea trout is 50 cm and salmon 60 cm.

Specific actions for the development of the salmonid populations

The water quality should be improved by the establishment of an effective protection zone along agriculture lands by the river. Rapids should be restored, especially in the Saarasjärvenoja brook.

The recommendations in the general report of the HELCOM SALAR project concerning

accessibility and river fisheries management are applicable for this river.

Small sea trout rivers of the northern Bothnian Bay

The Rivers Olhavanjoki, Viantienjoki, Akkunusjoki and Kaakamonjoki are sea trout rivers flowing to the northern BothnianBay.

Basic hydrological facts

River name	*Length*	*Catchment area*	*Average flow*	*Daily lowest flow*	*Migration hindrances*
Olhavanjoki	29 km	326.2 km^2	3.5 m^3/s	-	0
Viantienjoki	30 km	125 km^2	5 m^3/s	0.01	0
Akkunusjoki	40 km	440 km^2	5 m^3/s	0.5	1 (partial)
Kaakamojoki	61 km	478 km^2	6.4 m^3/s	0.5	0

Habitat and water quality in River Olhavanjoki

All the rivers are typical small boreal forest rivers with (naturally) humus rich water and rather extreme flow conditions, and these characteristics are further compounded by human impacts. Some hectares of potential reproduction area exists in each of the rivers and generally their physical quality seems reasonable for most of the ice-free season. However, the rapids are scarce in the river Kaakamojoki and there are no good spawning or nursery areas.

The river Olhavanjoki starts from the lake Kaihuanjärvi over 29 km from and 77 m above the sea. The catchment area consists of agricultural lands, peat lands and forests. The water quality in river Olhavanjoki is poor. The annual lowest flow season is late winter but sometimes it is also in late summer. The river was dredged during 1975–1976 because of floods and in order to ease the draining for forestry and to increase the field areas. The water volume and depth of the river decreased considerably due to this procedure.

The river Viantienjoki starts from the pond of Kaupinlampi 25 km from and 62 m above the sea. The catchment area is similar to Olhavanjoki consisting of agricultural as well as peat lands and forests. Kaupinlampi is on the edge of the large Martimoaapa mire area which explains the humus rich water. Due to high spring floods the river was dredged in 1960s and as a result of this the river dried up and the water volume decreased from the natural state. In the past years many rapids have been restored and the water level has risen somewhat in the pool sections.

The river Akkunusjoki flows into the lower part of the river Kemijoki, about 6 km from the sea just below the Isohaara dam. The last 2 km Akkunusjoki flows in a man-made channel, because the river originally emptied into river Kemijoki above the dam and therefore a new channel was made. Akkunusjoki starts at the connection of two brooks (Sompuoja and Kirakkajoki) The water quality has deteriorated in recent decades due to mire ditching, forestry and agriculture, and in the lower part especially due to the municipal waste waters entering the river. The procedures have caused erosion and silting and thus shallowing and eutrophication of the river. However the water quality is classified as good.

The river Kaakamojoki flows into the mouth of the river Kemijoki from the north. Agriculture and forestry are widespread in the catchment area, which has caused an excessive nutrient load in the river. Also two peat mining areas, a limestone mine and a sewage treatment plant burden the river making it one of the most challenging river systems in terms of water quality restoration. The high

nutrient load can be seen in a phosphorous content which is one of the highest in Lapland.

Small and middle-sized potential rivers of the northern Bothnian Bay according to the Water Framework Directive

The name of the water management district of Olhavanjoki is Iijoki River Basin District and the other rivers belong to the Kemijoki-Simojoki River Basin District; the river type is a small peat land river.

Ecological status: No information
- Biological status: No information
- Physical & chemical status: No information
- Hydrologic & morphological status: No information

The main measures in the water management plan are to continue and strengthen actions to reduce nutrient load from agriculture, forestry and municipal waste and to restore riffles and rapids from dredging.

Natura 2000

No information

The sea trout stock of Olhavanjoki and the relating rivers

As far as it is known there are no salmon or sea trout in the rivers Akkunusjoki and Kaakamojoki although in the latter one trout parr was observed in the 1960s. Sea trout has vanishedfrom the river Olhavanjoki, although it is known that the river has maintained a sea trout stock still after the Second World War. Also some salmon are known to be caught from the lower rapids of river Olhavanjoki.

In the tributary of the river Viantienjoki, brook Kurkioja, there is a local brown trout stock but its status is not well known. In the dry summer of 2006 the brook Kurkioja practically dried up and probably caused increased mortality for the trout stock. However, grayling is abundant in these rivers. Moreover, in the autumn lamprey ascends all the rivers and whitefish ascends at least Olhavanjoki to spawn.

Sea trout population facts

Population category: 6
Reproduction area: 13 ha
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the River Olhavanjoki and the related rivers

Sea trout fishing is closed from September 11 – November 15. Minimum legal length for sea trout is 50 cm. Using worm as bait is prohibited in the rapids.

Specific actions for the development of the salmonid populations

The water quality should be improved by establishing an effective protection zone along the agriculture lands by the rivers. Rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning river fisheries management are applicable for this river.

Small sea trout rivers of the southern and middle Bothnian Bay

There are a number of potential sea trout rivers and brooks in Finland flowing to the southern and middle BothnianBay. These include the River Temmesjoki and eleven smaller brooks.

Basic hydrological facts

Name of the river/ brook	*River length*	*Catchment area*	*Average flow*	*Migration hindrances*
Temmesjoki	186 km	1,181 km^2	9.1 m^3/s	-
Viirretjoki	40 km	160 km^2	-	-
Yppärinoja	21 km	-	-	-
Limingoja	32 km	187 km^2	2.0 m^3/s	-
Piehinkijoki	36 km	176 km^2	1.9 m^3/s	-
Olkijoki	approx. 20 km	-	-	-
Majavaoja	approx. 18 km	-	-	-
Lumijoki	approx. 18 km	-	-	-
Liminkajoki (Ylioja)	17 km	-	-	-
Kalimenoja	34 km	224 km^2	2.0 m^3/s	-
Pöntiönjoki	20 km	207 km^2	-	-
Kruunupyynjoki	63 km	787 km^2	6.0 m^3/s	-

Habitat and water quality

The River Temmesjoki has two tributaries, rivers Ängeslevänjoki and Tyrnävänjoki, which join the main stem from north 8 km before the river mouth. Lakes cover only 0.5% of the catchment area of the river.

Water quality is poor in the Temmesjoki and Tyrnävänjoki and poor in the Ängeslevänjoki. The upper parts of the catchment area consist of large bogs and forests, and agriculture is concentrated in the lower parts of the river basin. Agriculture, forestry and peat mining are the main sources of nutrient and sediment load.

At least whitefish, grayling and river lamprey have earlier ascended the river Temmesjoki and the river has also had abundant crayfish populations. Some of the headwater brooks may have had brown trout populations, but the occurrence of sea trout is not known. Considering the size of the river and providing that water quality and the habitats could be improved in this river, it has some potential for reproduction of sea trout.

The Finnish sea trout brooks flowing to the Bothnian Bay extend from 18–40 km in length. They are commonly located approximately 50 m above the sea level between larger river watercourses discharging into the eastern parts of the Bothnian Bay. Their catchment areas are rather similar consisting mostly of forests and bogs, while agricultural lands are often situated near the river banks.

The water quality in these rivers is commonly poor, and agriculture and settlements are the main sources of the nutrient load. The intensive drainage of bogs and forests results at least occasionally in rather heavy sediment loads. Most of the brooks have been dredged for preventing flooding and the quality and the quantity of the potential spawning and nursery areas of salmonid fishes have therefore been considerably reduced. In some streams also dams may prevent the ascent of spawners.

Finnish sea trout rivers flowing to the southern and middle Bothnian Bay according to the Water Framework Directive

The name of the water management district is The River Basin District of River Kokemäenjoki-Archipelago Sea-Bothnian Sea (Viirretjoki), Oulujoki-Iijoki River Basin District (others).

Ecological status: No information
- Biological status: No information
- Physical & chemical status: No information
- Hydrologic & morphological status: No information

The main measures in the water management plan are to prevent the occurrence of acid river water, to reduce the nutrient and sediment load, restoration of the rapids, removing of migration obstacles and stocking of parr and smolts.

Natura 2000

No information

The sea trout stocks

About one hundred years ago at least the rivers Viirretjoki and Piehinkijoki were known as sea trout streams, and whitefish and river lamprey ascended most of the brooks. Stocking experiments and electric fishing have shown that trout parr are able to survive at least the first summer and often also over the winter in these brooks. However, natural reproduction was not observed in these experiments.

Sea trout population facts

Population category: 6
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations

Fishing of salmon and sea trout in the rivers is prohibited from September 11 – November 15 and the minimum legal length for both species is 50 cm.

Specific actions for the development of the salmonid populations

The incidents of acid water peaks should be eliminated. The water quality should be improved by the establishment of effective protective zones along agricultural lands by the rivers. The dredged rapids should be restored. The incidents of acid water peaks should be avoided.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

Small sea trout rivers of the Bothnian Sea

In Finland there are a number of potential sea trout rivers flowing to the Bothnian Sea.

Basic hydrological facts

Name of the River/ Brook	*River length*	*Catchment area*	*Average flow*	*Daily lowest flow*	*Migration hindrances*
Hirvijoki	40 km	284 km^2	-	-	-
Laajoki	21 km	-	-	-	1
Teuvanjoki	43 km	542 km^2	5.5 m^3/s	0.02 m^3/s	1
Närpiönjoki	40 km	995 km^2	8 m^3/s	0.3 m^3/s	4
Vesimyllynoja	2 km	-	-	-	-
Hakarinoja-Kiviraumanoja	3 km	-	-	-	-
Kaljasjoki	12 km	-	-	-	-
Unajanjoki	3 km	-	-	-	-
Raumanjoki	8 km	-	-	-	-
Pinkjärvenoja	10 km	-	-	-	-
Malax å	25 km	500 km^2	3.6 m^3/s		
Harrström å	7 km	140 km^2	-	-	-
Kasalanjoki	8 km	208 km^2	-	-	-

Habitat and water quality in the Finnish sea trout rivers flowing to the Bothnian Sea

These minor coastal rivers have mostly a small catchment area and discharge. Many catchments have a lot of bogs and acid soils which are nowadays commonly drained for agriculture and forestry. The river waters are typically brownish and slightly acid due to humus compounds and the water quality is commonly poor. The extensive drainage of catchments with acid soils may also result in occasional peaks of very acid water (<pH 5) and fish kills. The flow conditions are extreme with very high fluctuations between high (spring) and low (summer and winter) discharge. Because most of these rivers have been dredged for flood prevention, the reproduction areas of sea trout have been radically reduced and may mostly be very limited.

The Finnish sea trout rivers flowing to the Bothnian Sea according to the Water Framework Directive

The name of the water management district is The River Basin District of River Kokemäenjoki-Archipelago Sea-Bothnian Sea

Ecological status: No information
Biological status: No information
Physical & chemical status: No information
Hydrologic & morphological status: No information

The main measures in the water management plan are to prevent the occurrence of acid river water, to reduce the nutrient and sediment load and to restore the rapids and remove the migration obstacles, and to stock parr and smolts.

Natura 2000

No information

The sea trout stocks of the Finnish rivers flowing to the Bothnian Sea

Brown trout or sea trout parr have been found in the electrofishing carried out in the Pinkjärvenoja and Raumanjoki. The rivers of Närpiönjoki and Hirvijoki have maybe earlier had their own sea trout stocks, In addition, the rivers of Teuvanjoki and Harrström å have maybe had some ascending whitefish, grayling or river lamprey in former times. The other rivers and brooks are potential streams, but this probably requires considerable improvement of water quality, hydrology and habitats

Sea trout population facts

Population category: Rivers with possibilities for natural reproduction, category 6
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the Finnish sea trout rivers flowing to the Bothnian Sea

Fishing of salmon and sea trout in the rivers is prohibited from September 11 – November 15 and the minimum legal length for salmon is 60 cm and for sea trout 50 cm.

Specific actions for the development of the salmonid populations

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

Small sea trout rivers of the Gulf of Finland

There are eight Finnish rivers and a number of brooks flowing to the Gulf of Finland that are classified as potential sea trout rivers.

Basic Hydrological facts

Name of the River	*River length*	*Catchment area*	*Mean flow*	*Daily lowest flow*	*Migration hindrances*
Vaalimaanjoki	40 km	238 km^3	2 m^3/s	-	2
Ravijoki	21 km	60 km^2	0.6 m^3/s	-	1
Vehkajoki	40 km	380 km^2	3.9 m^3/s	-	3
Summanjoki	36 km	569 km^2	4.6 m^3/s	0.5 m^3/s	5
Taasianjoki	78 km	530 km^2	4.1 m^3/s	0.37 m^3/s	-
Loviisanjoki	25 km	118 km^2	1.3 m^3/s	-	1
Ilolanjoki	37 km	309 km^2	2.4 m^3/s	-	1
Mustijoki	70 km	783 km^2	7.5 m^3/s	-	5

Habitat and water quality in the Finnish rivers flowing to the Gulf of Finland and the state of their sea trout stocks

The river Vaalimaanjoki is located in the Finnish territory while its mouth is in the Russian side of the boundary. The river is totally blocked by dams. The lowest dam is close to river mouth. Strong anthropogenic changes have been carried out in the river. The original sea trout stock was lost due to these activities in the 1960s.

The river Ravijoki is closed by a mill dam 2 km from the river mouth. Strong anthropogenic changes were made in the 1950s when all rapids were changed to channels. The original sea trout stock was lost in the 1960s due to damming and anthropogenic changes in the river. At the present no sea trout have been found in the river.

5.8 % of the River Vehkajoki catchment area consists of lakes. The river has five tributaries. The river is closed by three dams which block the entry to the river. The river has been dredged for timber floating and for lake draining before the 1950s. In former times the river was not known as a sea trout river. However, in the 1980s there was a self-sustaining trout population below the second lowest dam. The origin of these trout is unknown, because releases have been carried out with both sea trout and brown trout.

The Finnish sea trout rivers flowing to the Gulf of Finland according to the Water Framework Directive

The rivers Vaalimaanjoki, Ravijoki, Vehkajoki, Summanjoki, Taasianjoki, Loviisanjoki, Ilolanjoki and Mustijoki belong to the Kymijoki-Gulf of Finland River Basin District and their river types are medium-sized rivers in regions with clay soils.

Ecological status: Fair
- Biological status: No information
- Physical & chemical status: No information
- Hydrologic & morphological status: No information

Natura 2000

No information

Lakes cover 2.2% of the River Summanjoki catchment area. In the water course there are five dams closing the river. The lowest dam is about 7 km from the river mouth. This dam blocks the entry to the river except during high flow when ascending is possible over the dam. The second lowest dam makes a total barrier to the river about 13 km from the sea.

Summanjoki has been dredged for preventing flooding and for timber floating. Due to these anthropogenic activities a great deal of the river is flowing in a man-made channel offering only some reproduction areas for sea trout. Water quality in the river is poor due to humus which originates especially from the peat industry in the upper reaches of the river. The river is eutrophied due to agricultural areas surrounding the river.

Summanjoki has earlier supported a naturally reproducing sea trout stock. However, the anthropogenic changes have negatively affected the sea trout reproduction. At present there is no self-sustaining sea trout in the river. Due to releases, ascending sea trout as well as some parr originating from natural spawning have been found in the river. Naturally reproducing trout probably exist in the upper reaches of the river, but connection between these areas and the sea is blocked by dams.

Lakes cover only 0.46% of the River Taasianjoki catchment area. The river water is very heavily clouded by clay and it contains lots of nutrients originating from agriculture. There are no migration obstaclesin the main stem. Restorations have beenmade in main stem and in some rapids situated there, but so far no natural sea trout have been found in the river.

The river Loviisanjokiis small and lakes cover 4% of its catchment area. There is a dam about 20 km from the river mouth. The river is very heavily clouded by clay and water contains lot of nutrients originating from agriculture. There are no remarkable rapids in the river and sea trout has not been found.

The river Ilolanjoki is very heavily clouded by clay and the water includes a lot of nutrients originating from agriculture. A total obstacle for ascending fish is a dam at about 10 km from the river mouth. Sea trout can reach the rapids situating downstream from this dam. A small brook flows also into the river in the same area. Before the 1970s ascending sea trout were occasionally found in the river, but nowadays the few trout existing in the river originate from the egg stocking.

Lakes cover only 1.5% of the river Mustijoki catchment area. The ecological status of the river is fair. Clay originating from the fields may occasionally cloud the river water. The nutrient concentration in the water is high especially in rainy seasons.

In the 1930s the river Mustijoki was one of the most important sea trout rivers in the region of central Gulf of Finland. The river was totally blocked in 1965 by the waterworks dam built 2 km from the river mouth and the sea trout stock was destroyed. In 1994 a fish way was built over this dam. The next migration obstacle is located in Tjusterby, 6.3 km from the river mouth. The most important production areas are situating upstream of this dam, but one potential brook flows into the river also downstream of it. Some adult sea trout were found in the fish way in autumn 2008. However, no natural parr have been observed in the restored rapid areas so far.

In addition to these rivers, there are a number of brooks emptying in the Gulf of Finland (see table below). These brooks are known to some extent to have potential for sea trout reproduction. In addition to the brooks listed here, there are a number of small brooks in the area without a closer knowledge of their suitability or their potential for sea trout production.

The brooks have both advantages and limitations regarding the smolt production of sea trout. Most of the brooks are very small and their potential to support sea trout stock may be small. Many brooks can, however, be very productive in relation to their size and sea/brown trout may become adapted in the local special conditions. In many brooks the trout are sedentary and the smolt migration to the sea may be negligible.

The brooks suffer from water shortage at least occasionally. The brooks are very sensitive to nutrient and sediment load originating mainly from agriculture and partly from forestry or other sources. Therefore the periods of minimum flow are in many brooks risky for the survival of sea trout. Also the brook mouth area is sometimes critical for migrating fish. The opening of the brook mouth into the sea is often shallow and the entry of ascending fish to the brook may be almost closed due to dense vegetation. Fish and bird predation also increases mortality of migrating smolts in these shallow brook mouth areas. In addition, the fishing carried out in front of the brook mouth increases mortality of ascending sea trout even though fishing is directed to other species and sea trout is caught as by-catch.

The potential sea trout brooks emptying to the Gulf of Finland

Name of the Brook	*Length*	*Presence of sea trout*	*Actions needed*
Paisillanoja	5.5 km	no sea trout	improving the water quality, restorations
Pihlajanjoki	12.5 km	no sea trout	improving the water quality, restorations
Päkinoja	1.8 km	no sea trout	improving the water quality, restorations, assure minimum flow
Pyölinjoki	8.5 km	no sea trout	improving the water quality, restorations
Sahanoja/Pyölijoki	9.8 km	no sea trout	improving the water quality, restorations, assure minimum flow
Nummenjoki	11.5 km	no sea trout	improving the water quality, restorations
Siltakylänjoki	9.8 km	no sea trout	improving the water quality, restorations
Svartbäcken	3.8 km	no sea trout	improving the water quality, restorations
Krapuoja	7.5 km	sea trout stocking	improving the water quality, restorations

Name of the Brook	*Length*	*Presence of sea trout*	*Actions needed*
Mellunkylänpuro	4.6 km	sea trout stocking	improving the water quality, restorations
Mustapuro	3.8 km	sea trout stocking	improving the water quality, restorations
Viikinoja	4.2 km	sea trout stocking	improving the water quality, restorations
Mätäpuro	4.5 km	sea trout stocking (natural reproduction)	improving the water quality, restorations
Mätäjoki	4.7 km	sea trout stocking	improving the water quality, restorations, removing of migration obstacles
Monikonpuro	6.5 km	sea trout stocking/original sea trout (natural production until 2002 when disappeared)	improving the water quality, restorations, removing of migration obstacles
Gräsanoja	7.5 km	sea trout stocking	improving the water quality, restorations, removing of migration obstacles
Finnoonoja	7.2 km	sea trout stocking (natural reproduction)	improving the water quality, restorations, removing of migration obstacles
Bobäcken	3.5 km	sea trout stocking/original sea trout (natural production until 2002 when disappeared)	restorations, removing of migration obstacles, assure minimum flow
Finnträskinpuro	5.1 km	sea trout stocking	restorations, removing of migration obstacles, assure minimum flow
Estbyån (Humaljärvi)	15.5 km	sea trout stocking	restorations, removing of migration obstacles, assure minimum flow
Inkoonjoki	9.5 km	no sea trout	improving the water quality, restorations
Marsjönpuro	3.0 km	sea trout stocking	assure minimum flow, restorations
Fagerviksån	2.0 km	sea trout stocking	removing of migration obstacles, restorations
Raaseporinjoki	10.0 km	sea trout stocking	improving the water quality, restorations, removing of migration obstacles
Ekerönpuro	2.0 km	sea trout stocking	restorations
Bockbodabäcken	3.1 km	sea trout stocking	improving the water quality, restorations
Tomasbölebäcken (Kullaanjärvi)	9.5 km	sea trout stocking	restorations
Sunnanvikbäcken		sea trout stocking	improving the water quality, restorations
Kvarnbackabäcken	2.2 km	sea trout stocking	assure minimum flow, restorations
Trollbölebäcken	1.0 km	sea trout stocking (natural reproduction)	assure minimum flow, restorations

Name of the Brook	*Length*	*Presence of sea trout*	*Actions needed*
Harpar-Storträskbäcken	3.0 km	sea trout stocking	improving the water quality, restorations
Sandbäcken	4.0 km	no sea trout	improving the water quality, restorations

Sea trout population facts

Population category: 6
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the rivers and brooks

Fishing in the river is prohibited from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm.

Specific actions for the development of the salmonid populations

The water quality of the rivers and brooks in the area should be improved by establishing efficient protection zones along the agricultural land by the rivers/brooks. The reproduction habitats of sea trout should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

Small sea trout rivers in the eastern Gulf of Finland

The Rivers Hounijoki, Tervajoki, Vilajoki and Santajoki are sea trout rivers flowing to the Gulf of Finland.

Basic Hydrological facts

Name of the River	*River length*	*Catchment area*	*Mean flow*	*Daily lowest flow*	*Number of hindrances*
Hounijoki	60+ km	622 km^2	-	-	-
Tervajoki	35 km	204 km^2	-	-	-
Vilajoki	36 km	344 km^2	-	-	-
Santajoki	36 km	569 km^2	-	-	-

Habitat and water quality in Rivers Hounijoki, Tervajoki, Vilajoki and Santajoki

All these rivers are situated southwards from the Salpausselkä esker flowing southeast and emptying into the Bay of Vyborg, the eastern part of the Gulf of Finland. The upper parts of these rivers are situated in Finland and the lower reaches in Russia. Their catchment areas are rather similar consisting mostly of forests and bogs, while agricultural lands are commonly situated near the river banks.

The water quality is commonly fair and agriculture and settlements are the main sources of nutrient load. The intensive drainage of fields, bogs and forests results in sediment loading, and due to the dredging of the brooks and rivers the quality and quantity of spawning and nursery areas for salmonid fishes have been considerably reduced.

The River Hounijoki begins from the lake Humaljärvi near Lappeenranta town at56 m above the sea level. About 370 km² of the catchment area and 25 km of the upper reaches of the river are situated within the Finnish territory. After crossing the border the Russian name of the river is *Buslovka*. The catchment area in Russia is 252 km². In Russia it joins the river Rakkolanjoki (in Russian *Seleznjovka*). The total length of the river from Humaljärvi to the sea is about 60 km including the lakes.

The River Tervajoki begins from the lakes Lipiäinen and Kypärinen east from the town of Lappeenranta about 45 m above the sea level. 108 km² of the catchment area is situated in Finland and 96 km² in Russia. The length of the river on the Finnish side is about 14 kmincluding the lakes. After crossing the Russian border it continues still 21 km with the name of *Polevaja* before entering the sea.

The River Vilajoki has its sources in the bog areas south from the Salpausselkä esker west from Lappeenranta town. 252 km² of of the catchment area is situated in Finland and 92 km² in Russia. The uppermost reaches extend over 20 km upstream from lake Korppinen (45 m ASL), from which the proper river begins. Including lakes, this middle river stretch in Finland is about 16 km long. After crossing the Russian border in lake Pukalus it advances with the name *Tarhanovka*still 20 km before emptying into the sea.

The river Santajoki is situated south from the river Vilajoki and is known in Finland also as river Kaltonjoki. It begins from Lake Ottojärvi (45 m above the sea level) and flows through a chain of river stretches and small lakes southeast towards the Russian border. After crossing the border its Russian name is *Pestšanaja.* Including the lakes, the length of the river in Finland is 14 km and in Russia 21 km. 122 km² of the catchment area is located in Finland and 65 km² in the Russian territory.

Rivers Hounijoki, Tervajoki, Vilajoki and Santajoki according to the Water Framework Directive

The name of the water management district is Vuoksi River Basin District.

Ecological status: Fair
- Biological status: Fair
- Physical & chemical status: Fair
- Hydrologic & morphological status: Fair

The main measures in the water management plan are to improve the water quality in the rivers, to restore the rapids and the catchment areas and to conduct a survey of the current status of trout in these rivers and compiling an enhancement program.

Natura 2000

The rivers do not belong to the Natura 2000 network.

The Hounijoki, Tervajoki, Vilajoki and Santajoki sea trout stock

About one hundred years ago at least the rivers Vilajoki and Santajoki were known as rather good sea trout rivers, and also whitefish and river lamprey ascended the river Vilajoki. Except for in the

Vilajoki, no natural brown trout or sea trout have been currently found in the upper reaches of these rivers. In the Vilajoki, both 0+ and 1+ trout parr were found in electrofishing in autumn 2010. The actual state of the rivers on the Russian side is not known. However, by restoring the habitats, reducing the nutrient and sediment loads and by strict regulations of fishing these rivers still have some potential for smolt production.

Sea trout population facts

Population category: Vilajoki 3, the others 6
Reproduction area: No information
Production capacity: No information
Recent wild smolt production estimate: No information

Fishing regulations in the rivers

Fishing in the river is prohibited from September 11 – November 15. Minimum legal length for sea trout is 50 cm and for salmon 60 cm.

Specific actions for the development of the salmonid populations

Water quality should be improved by establishing effective protection zones along the agricultural lands by the rivers. Rapids should be restored.

The recommendations in the general report of the HELCOM SALAR project concerning accessibility and river fisheries management are applicable for this river.

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