***Ad Hoc* Review Group**

# IP(07)14 FINAL

***Implementation Plan***

***European Union (Sweden)***

FISKERIVERKET
Avdelningen för resursförvaltning
Handläggare
Peter Funegård
tel. 031-743 03 25

Datum
2008-03-05

Beteckning

Ert Datum

Er beteckning

**Swedish national implementation plan 2007-2011**

## 1. Introduction

Several national authorities including the Swedish Board of Fisheries, the Environment protection Agency and the concerned County Administrations participate in the ongoing management and monitoring of rivers with wild salmon production on the Swedish west coast. In addition several local organisations and NGOs take active part in the ongoing rehabilitation and management of the rivers.

The status of the rivers with Atlantic Salmon populations has been described in detail in a report from 1999 (Fiskeriverket information 9:1999) and a revised report will be made during 2008. Specific measurements for each salmon river have been recommended and a comprehensive national programme has been developed and has started to be implemented.

A basic criteria for local organisations to receive governmental funding for habitat protection an restoration in a river is that the estimated potential should at least be 1000 wild salmon smolts per year. Many of the smallest rivers are being biologically restored in conjunction with ongoing long term liming programmes. Voluntary work and funding from various non - governmental funds are also important parts of the ongoing and planned work.

A significant part of the Swedish rivers on the west coast are utilized for both hydro-power and for agriculture. The water quality is heavily affected by acidification but the ph in most of the rivers has been kept on an acceptable level through various liming programmes. In addition the water quality is affected by discharges from industries and some river areas have been destroyed because of physical constructions used for water canals to supply important agriculture areas.

Some problems for the juvenile salmon have been created by deforestation and cleaning up of old water canals which especially have had a negative effect for the smallest rivers during dry periods.

## 2. Objective

### 2.1 Management of salmon fisheries

The long term objective of the Swedish implementation plan is to reach the potential level in all 23 rivers. The medium term objective for the period 2007 – 2011 is to reach at least 75 % of the total potential production level and that at least 50 female salmons should spawn, where physically possible, in each river in order to reduce the risk for genetic erosion. This target refers to the NASCO goal of maintain all salmon stocks above their conservation limits. The Swedish Board of Fisheries regulates the fishery within the Swedish Boarders in the sea up to the first migration barrier in freshwater.

### 2.2 Protection and restoration of Atlantic salmon habitat

The quality of the assessment of the potential production levels in each river is improving and new information regarding the possible production in various local areas will be used to revise the present potential during 2008. Potential production levels are linked to available habitat area suitable for salmon, which is exepected to increase within the period. The water frame directive (2000/60/EG) gives the authorities sufficient tools to improve and increase salmon habitats.

### 2.3 Management of aquaculture, introductions and transfers and transgenics

Stocking measures and aquaculture activities are under strict control of competent authorities in order to minimise possible effects on wild stocks and risks for spreading of notifiable diseases. All stocking and aquaculture activities require a permit from the Count Administrative boards and new aquaculture establishments in salmon rivers are banned according to regulations issued by the Swedish Board of fisheries.

## 3. Salmon rivers on the Swedish west coast

There are 23 rivers producing wild salmon on the Swedish west coast. The present total yearly production has been estimated to about 200.000 smolts per year and the maximum potential has been assessed to be in the range of 300.000. Many of the rivers are very small and it is only 12 of them with a yearly potential production of more than 5000 smolt. These rivers will also be considered especially in relation to the increased development of tourism based on various fishing activities.

The present total reproductive area has been assessed to be about 250 ha and it has been calculated that it will be possible to restore at least another 50 ha. A prerequisite for this development is that the number of returning spawners will continue to increase and the low marine survival is a alarming threath for the future development.

In 75 % of the major rivers increased protected areas have been proposed and are gradually being implemented. Continued habitat rehabilitation and improved water regulation have been recommended in more than 65 % of the rivers and the aim is to investigate all possible means to ensure enough water flow to make it possible for the salmon to spawn and reproduce annually in all potential spawning areas.

| Rivers | **Present** **Smolt** | **Area** (ha) | **Smolt/100** $M^2$ | ***Future (2011)*** ***Smolt*** | ***Area*** (ha) | ***Smolt/100*** $m^2$ |
|---|---|---|---|---|---|---|
| Enningdalsälven | **300** | 1,7 | 1,8 | *2000* | *2,5* | *8,0* |
| Strömsån | **300** | 1,1 | 2,9 | *800* | *1,1* | *7,3* |
| Örekilsälven | **21200** | 23,0 | 9,2 | *30000* | *23,0* | *13,0* |
| Bäveån | **200** | 0,5 | 4,0 | *500* | *0,5* | *10,0* |
| Arödsån | **500** | 1,0 | 5,3 | *1200* | *1,2* | *10,0* |
| Bratteforsån | **600** | 2,1 | 2,9 | *2000* | *2,1* | *9,5* |
| Anråse å | **300** | 2,2 | 1,4 | *500* | *2,2* | *2,3* |
| Göta älv | **14900** | 17,2 | 8,6 | *20000* | *23,6* | *8,5* |
| Kungsbackaån | **5100** | 4,4 | 11,6 | *6250* | *4,5* | *13,9* |
| Rolfsån | **3000** | 3,1 | 9,7 | *5000* | *3,6* | *13,9* |
| Löftaån | **2500** | 1,0 | 25,0 | *6000* | *2,5* | *24,0* |
| Viskan | **23000** | 16,1 | 14,3 | *31700* | *25,5* | *12,4* |
| Himleån | **4300** | 3,6 | 11,9 | *8500* | *6,6* | *12,9* |
| Tvåkersån | **1400** | 1,2 | 11,7 | *3500* | *2,0* | *17,5* |
| Törlan | **100** | 0,9 | 1,1 | *1000* | *1,2* | *8,0* |
| Ätran | **37600** | 54,9 | 6,9 | *91500* | *64,8* | *14,1* |
| Suseån | **9600** | 9,5 | 10,1 | *14600* | *12,3* | *11,9* |
| Nissan | **8100** | 10,9 | 7,4 | *13000* | *12,9* | *10,1* |
| Fylleån | **9500** | 17,8 | 5,3 | *27000* | *19,8* | *13,6* |
| Genevadsån | **17600** | 13,9 | 12,7 | *29400* | *14,6* | *20,1* |
| Lagan | **5000** | 8,8 | 5,7 | *8000* | *9,9* | *8,1* |
| Stensån | **21300** | 12,4 | 17,1 | *22300* | *13,5* | *16,5* |
| Rönneå | **20000** | 27,0 | 7,4 | *30000* | *29,0* | *10,3* |
| **Total** | **206400** | 234 | | ***354750*** | *279* | |
| **Medium** | | | 8,8 | | | 12,7 |

## 4. Fisheries management

### 4.1. Present status of coastal fishery

Commercial salmon fishery in the sea and in estuaries is nowadays carried out almost exclusively with fixed trap nets. In the mid-1980s there were more than 100 trap nets along the coast from the Norwegian border and until the southernmost Swedish area having salmon rivers. At that time salmon fishery also took place with fixed gill nets. Since then the number of trap nets have gradually decreased and gill nets have been banned. From 2003 and onwards all releases of salmon in the area is fin-clipped, rising the opportunity to separate farmed and wild stocks in the fishery.

In 2007 only a very few fishermen utilised their licenses to fish with five bottom set nets and in the county of Halland the catch have been less than 1000 kg. This is a very significant reduction of the fishery and in the last years the gears have mainly been located outside the rivers where compensatory releases of reared smolts take place. This is the result of a deliberate policy from regional authorities to utilize the reared stocks as much as possible, while wild stocks should be less exploited by coastal fisheries.

In 2002 the protected areas outside some of the smaller rivers were extended. The coastal salmon catch has also decreased gradually, both in level of the total catch and in absolute numbers. In 2005 the coastal salmon catch made up 1.4 tonnes or 416 salmon. This was only 10 % of the total salmon catch in the area.

### 4.2 Possible future development of the coastal fishery

At present it seems unlikely that the commercial salmon fishery in the sea will increase in the future. There is no management plan to phase out more of the coastal fishery, but the low catches and profitability of the trap net fishery will probably lead to a further decrease of the fishery. In the future only very small catches will be taken by commercial coastal gear and this minor fishery will not be any real threat for the wild salmon populations.

### 4.3 Present status of river fishery

Fishery occurs in almost all of the 23 salmon rivers. In a few of the rivers the salmon stock is to small to support any fishery. Angling is the main fishing method and it has gradually increased its proportion of the total catch. The river fishery is often organized in fishing clubs or in special Fishery Management Areas, subject to special legislation to support a good organization of the fishery. In three rivers there are traditional fisheries with traps or nets. No catch data are available from these fisheries and the catches are a part of the unreported catch. In 2005 angling catch constituted 11.3 tonnes (2928 salmons) or about 75 % of the total salmon catch.

### 4.4 Possible future development of the river fishery

River fishery will probably continue to increase its share of the total salmon catch, due to the dwindling coastal fishery. The catches in absolute numbers are however subject to the development of the stocks. Efforts to eliminate traditional fisheries in the three rivers where they occur are likely to take place in the near future, but the outcome can not be predicted at present.

## 5. The index river Ätran

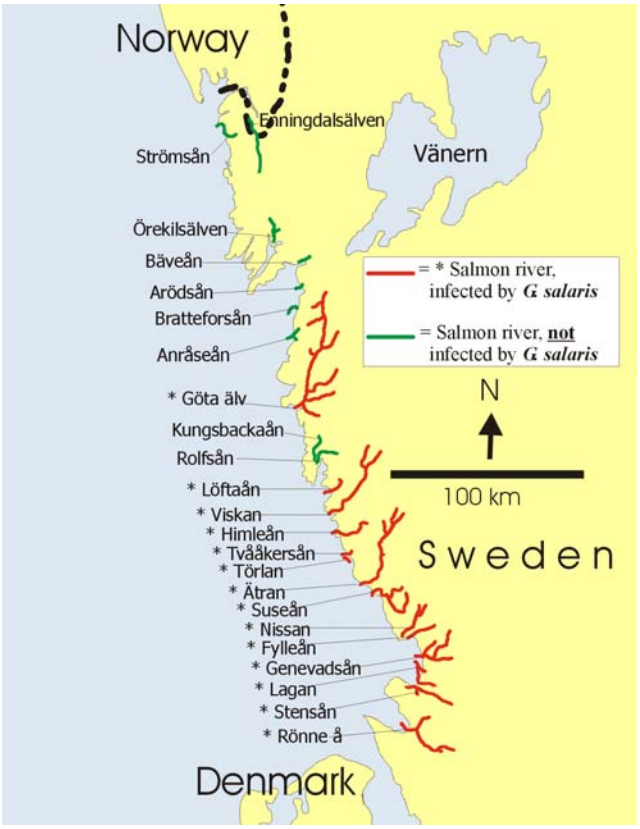
In similarity to many other salmon producing countries in the North Atlantic area, Sweden has an index river, river Ätran. This river is located in the middle of the west coast area, Figure 1.

River Ätran is acidified and is also affected by a G. salaris infection since the early 1990s. The parr production in the river is at present much lower than the estimated potential. Many of the elements that are essential in an index river are already implemented such as smolt trapping, counting of ascending salmon, electro-fishing surveys, Carlin tagging of smolts and good control of the salmon fishery in the river.

At present the data from the index river are not fully used and integrated in the management of salmon stocks. It is expected, however, that the time series on catches, parr densities, ascending spawners and descending smolts available from River Ätran will be of increasing importance in the future management. The planned work will therefore continue to include the development of full time series of population dynamics in the river system. It is also expected that data from this river will be of importance for

establishment of conservation limits in all similar rivers on the Swedish west coast.

Figure 1. Present distribution of salmon in rivers at the Swedish west coast. The map also shows where infection of G. salaris had been observed in October 2006.




## 6. Threats and future management

### 6.1 Acidification and water supply

Except for the reduced marine survival the future threats are mainly acidification and lack of sufficient water supply in the small rivers. Primarily it has been assessed that the present level of coastal and in river fishery is not a severe threat but until the marine survival will improve the fisheries will continue to be heavily regulated.

To ensure enough of water with good water quality in all rivers is one of the major challenges for the future management. The water supply is a especially sensitive problem for the smallest rivers during dry periods and therefore it will necessary to change many of the present water courts.

A major part of the present production level has been ensured because of a very comprehensive liming programme which has been going since the mid 80s. A continuation of the present programme for at least another 10 - 20

years will ensure a sustainable production level of wild salmon until the acidification of the west coast has been significantly reduced.

## 6.2 Aquaculture and stocking of salmon

### 6.2.1 Management of fish-farms and releases

Operational fish-farms and various releases of fish in the drainage area of each wild salmon river are being assessed in order to minimize the risk of spreading diseases, parasites and genes. One of the long term objectives in the Swedish plan is to ban all rainbow trout farming in the geographical areas of the parts of the rivers which are or have the potential of producing wild salmon. Health certificates are obligatory for all fish farms and enhancement releases and non utilised permissions to farm fish will be terminated. In 2006 a legal possibility was open for recalling aquaculture permissions. Sweden has in 2004 been given additional guarantees for certain salmon diseases in accordance with the EU fish health directive (2006/88/EG) and these guarantees will be strongly defended in the future. In 2006 a control zone for VHS could be outruled since 4 years had passed last outbreak. The EU fish health directive (2006/88/EG) over-rule the national legislation for minimizing spreading of diseases.

### 6.2.2 Enhancement stocking

Enhancement stocking of salmon will in general not be allowed in the rivers or along the coastal zone. Some releases in order to rebuild weak wild salmon populations will be considered and the present hydro-power compensatory releases in lagan, Nissan and Göta rivers will most likely continue according to the present water court decisions. However some of the compensatory releases might be changed to more sustainable measurements such as restoration of spawning areas and elimination of migration hinders although the possibilities are limited in most rivers. Since 2003 all reared salmon have to have their adipose fin removed in order to be able to direct the fishery on the reared salmon..

### 6.2.3 Straying of reared salmon

Straying reared salmon especially from Norwegian farms is still regarded as a major threat for the small Swedish salmon populations and monitoring of unexpected releases because of accidents will continue to be a important issue for the future monitoring. The earlier problem with possible straying rainbow trout will not continue because there are no plans to start any new farms along the Swedish coast. A ban on establish new farms in salmon river has been in force since 1985.

## 6.3 The parasite *Gyrodactylus salaris*

### 6.3.1 Status

The parasite *Gyrodactylus salaris* was first found on the Swedish west coast in 1989. In the period since then the parasite has spread gradually from salmon rivers in the southern region to the middle parts (Malmberg and Malmberg 1991), see Figure 1. In total 14 out of 23 salmon rivers are by now (October 2006) infected after the last infection detected in 2005.

There are indications that the parasite has led to negative developments in some salmon rivers, with resulting lower parr abundance. Laboratory experiments have also revealed that some salmon populations are sensitive to the parasite. In total, however, the Swedish west coast salmon populations have experienced a much smaller negative impact than Norwegian wild salmon populations. In some rivers there has probably not been any negative influence at all and the parasite seems to have disappeared completely from the first river to be found to be infected in 1989.

### 6.3.2 Future management

In 2001 a monitoring programme of *G. salaris* was initiated at the Swedish west coast. All larger non infected salmon rivers are screened annually at several sites, while smaller rivers are checked every second year. The monitoring will continue in the future and also some of the infected rivers will be monitored annually, in particular the index river Ätran. Release of fish in non-infected rivers is not allowed in the lower parts of the rivers but exemptions can be made for releases in upper parts of non-infected rivers.

## 7. Possible actions

The long term objective of the Swedish implementation plan is to reach the potential level in all 23 rivers. The medium term objective for the period 2007 – 2011 is to reach at least 75 % of the total potential production level and that at least 50 female salmons should spawn, where physically possible, in each river in order to reduce the risk for genetic erosion.

The current situation with low adult returns is probably linked to a poor survival in the sea. The reason for this is at the moment not fully understood and will be further investigated. Other problems faced by the Swedish atlantic salmon stocks are acidification, degraded spawning and rearing habitats, lack of buffering zones in the vicinity of the rivers and unfavourable water holding regimes in many water power plants. However, changes in fishing pressure are known to give quick responses on salmon abundance compared to other possible measurements.

Given this, there is a need for decreased fishing mortality among wild stocks and, subsequently, the low survival of wild fish must be taking into account in management of mixed fisheries close to the river mouths..

### 7.1 Fishery

The Swedish board of fisheries will during 2008 initiate the development of river-specific targets for juvenile densities and spawning stocks for most of the concerned salmon rivers. The new data is to be delivered during 2009.

The current national system to collect and analys necessary catch data will be revised during 2008 – 2009 in order to produce and publish more standardize fishery statistics.

New regulations will be developed and implemented by the end of 2009 for the remaining mixed stock fishery in the coastal fishery in the Gulf of

Laholm close to the index river Ätran in order to be able to separate the catch of wild and reared stocks.

In addition the possibilities of implementing different fishing periods for rivers and coastal areas along the Swedish west coast will be assessed during 2008 – 2009 in order to improve the protection of especially weak wild salmon stocks.

**7.2 Habitat restoration**

A major activity will be initiated during 2008 to make a detailed review of present water court decisions and to work out river specific proposals for more appropriate minimum water supply after an inventory of dams and water power facilities in all 23 salmon rivers. This work is expected to finish by the end of 2009 but changing water regimes for certain dams requires normally decions from water courts in which delivery dates can not be assessed.

Development of plans for further integrating use of land and water in the watersheds within the EU water frame directive will also be implemented in close cooperation between the Swedish board of fisheries and the recently established regional water management authorities. The program for planning the integrated use of land and water runs in a period of 6-year ending with management plans for each watershed.

The impact of acid rain on water quality have decreased recent years but there are still liming programmes running in the area. The liming measures are planned to run until 2009 but will be reassessed afterwards.

**7.3 Monitoring**

The yearly national monitoring programme will be extended in order to include DNA- analyses and other genetical based assessment of the smallest wild populations. Extended sampling in small rivers and pair wise comparisons of populations will also be considered in some of the rivers to facilitate a assessment to find out if the present rate of fishery is to high for some of the weakest populations.

New information and data that has been collected from the Index river Ätran during the last years will be reviewed and continuously reported by the Swedish board of fisheries on an annual basis.