



**CNL(13)45**

***NASCO Implementation Plan for the period 2013-18***

***EU – Sweden***



Dnr

Datum

**CNL(13)45**

**Swedish Implementation Plan 2013-2018 for Conservation, Restoration and Management of Atlantic Salmon**

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Party:	European Union
Jurisdiction/Region:	Sweden
Policymaker/Responsible Authority	The Swedish Agency for Marine and Water Management, SwAM

**Background**

NASCO Annual Meeting 2012, CNL(12)39, decided that the Parties shall provide a NASCO Implementation Plan for the period 2013-2018, CNL(12)42.

Implementation Plans shall demonstrate actions taken by the jurisdiction to implement NASCO Resolutions, Agreements and Guidelines on management of salmon fisheries, protection and restoration of Atlantic salmon habitat and management of aquaculture, introductions and transfers and transgenics.

EU COM has announced that Implementation Plans shall be delivered to EU COM. Thereafter will EU COM report to NASCO.

The Swedish Agency for Marine and Water Management are the national authority responsible for conservation, restoration and sustainable use of sea, lakes and rivers.

The Swedish Implementation Plan has been formed in cooperation with the Swedish University for Agriculture Science and the County Administrative Boards with responsibilities on Atlantic salmon. The decision-process includes stakeholders in the form of a written remittance on a proposed Implementation Plan.

The Implementation Plan has 21 January 2013 been decided by the Director General of The Swedish Agency for Marine and Water Management.

**Introduction**

**1.1 What are the objectives for the management of wild salmon?**

The long term objective of the Swedish implementation plan is to reach at least 75% of the potential production level in all salmon rivers. The medium term objective for the period 2013 – 2018 is to reach at least 50 % of the total potential production level in all rivers

**1.2 What reference points (e.g. conservation limits, management targets or other measures of abundance) are used to assess the status of stocks?** (Reference: Sections 2.4 and 2.5 of the Fisheries Guidelines).

As CLs have not been established for individual rivers by stock-recruitment methods, and there is only one facility with spawner and smolt census, the present status of individual stocks is monitored and evaluated using electrofishing for parr in combination with catch statistics. Smolt production in other rivers is difficult to measure so it is estimated from abundance of parr in the rivers. The potential parr abundance of each site is predicted from habitat quality and abundance of salmon parr in 1985-1990, a period when the spawning run was high according to the index river spawner trap, as well as from ICES calculations of PFA (pre-fishery abundance). The present parr abundance (>0+) is expressed in per cent of the potential, giving the present abundance of presmolt. For rivers with an average status below 50%, the catch in the river fishing is not allowed to increase.

**1.3 To provide a baseline for future comparison, what is the current status of stocks relative to the reference points described in 1.2, and how are threatened and endangered stocks identified?**

Category	Description	No. of rivers
1	Stock with parr abundance above 75% of potential (17%)	4
2	Stocks with parr abundance of 50-75% (57%)	13
3	Stocks with parr abundance below 50% (22%)	5
4	Stocks with parr abundance below 25% (4%)	1
<b>Total</b>		<b>23</b>

Threatened and endangered stocks are those with a production of <25% of the potential. Today this only concerns Enningdalsälven, the border river between Norway and Sweden. A fruitful cooperation with Norway is established and a bilateral salmon restoration plan has been developed in 2012 (D. Johansson & T. Hesthagen). New fishing rules for the coastal fishery have been implemented reducing the effort. Extensive restoration was carried out in 2012. Liming continues. A fish counter was established in 2010 in the river. CLs have been developed by Norway. A recovery of the stock is expected.

**1.4 How is stock diversity (e.g. genetics, age composition, run-timing, etc.) taken into account in the management of salmon stocks?**

Age, length and sex composition and well as run-timing is being monitored in several rivers through catch statistics and from the index river (smolt trap, spawner trap). From this the open season has been set. In some rivers the fishing season has been shortened after discussions with the local fishing

association. Increased open season (March) was tested in one river (R. Suseån) with good stock status, but resulted in high by-catches of trout kelt and was abandoned.

Stock diversity is maintained as stocking is not allowed in wild rivers. Reared smolts are released in three large rivers. In two of the rivers local stocks are used, in the third river (R. Nissan) the stock from nearby R. Lagan is used as the original stock was lost in the 1920s.

Genetic screening (base line) of stocks is not carried out, but planned for 2014-2015. The purpose is to facilitate identification of stocks in eventual mixed-stock fishery, but also to enable to screen for alien salmon (see section 4.8).

**1.5 To provide a baseline for future comparison, what is the current and potential quantity of salmon habitat?** (Reference: Sections 3.1 of the Habitat Guidelines).

Atlantic salmon reproduces in 23 main rivers on the Swedish west coast. Several of the rivers are small (16 have less MQ than 10 m<sup>3</sup>/s, and 5 below 2 m<sup>3</sup>/s). Focus on the management will be on rivers with a potential annual smolt production above 1000 smolt.

It is estimated that 237 ha salmon habitat was available in 1999. A recent estimate of the salmon habitat area is lacking, but it is estimated to be 250 ha. A compilation of the recent data will be carried out in 2014-2016. It is estimated that 279 hectares may be available in the future. If salmon habitats is included upstream large hydropower station more than 279 hectares may be available.

**1.6 What is the current extent of freshwater and marine salmonid aquaculture?**

Number of marine farms	0
Marine production (tonnes)	0
Number of freshwater facilities	1 (only smolt production)
Freshwater production (tonnes)	0
Append one or more maps showing the location of aquaculture facilities and aquaculture free zones. NOT APPLICABLE!	

Within the habitat of Atlantic salmon there is today only one aquaculture facility with salmonid fish. This is the hatchery and salmon rearing station at Laholm, River Lagan. Only Atlantic salmon of the River Lagan strain is used. Circa 400 ascending adult salmon are stripped of eggs and milt annually. Annually 100 000 one year old smolt and 30 000 two year old smolt are produced. These are stocked in Rivers Lagan and Nissan as compensation for hydropower development that has lead to loss of rearing habitat. The production of salmon is in a hermetic closed area (indoor facility), and no fish is kept in cages in the freshwater or the sea. No fish can escape from the facility.

The production of smolt for R. Göta älv is placed in a facility inland (upstream of several migration obstacles). Otherwise no salmon or rainbow trout farms exist in coastal waters or in coastal rivers within the range of Atlantic salmon. However rainbow trout is farmed at seven places in watersheds emptying on the Swedish west coast. All these are in inland waters, well beyond the migration of Atlantic salmon.

**1.7 To aid in the interpretation of this Implementation Plan, have complete data on rivers within the jurisdiction been provided for the NASCO rivers database?**

Yes, but the salmon habitat figures needs to be updated (see section 1.5).

Even small rivers with salmon reproduction will in the future be included in the plan in order to prevent spread of parasites as for example *Gyrodactylus salaris*. Small rivers with a potential below 1000 smolts may be excluded regarding setting Conservation Limits and data in NASCO rivers database.

## **2. Fisheries management**

**2.1 What are the objectives for the management of the fisheries for wild salmon?**

With the primary aim of preserving or restoring stock status, fishing should be adapted to each stock status and diversity, while maintaining a common framework as far as possible with respect to general rules and legislation. Salmon should be fished in order to as far as possible avoid mixed-stock fisheries. Fishing in freshwater should only be carried out with gear allowing caught wild fish/females to be released unharmed when required, in freshwaters rod and line and in marine waters with the same gear and trap nets.

**2.2 What is the decision-making process for fisheries management, including predetermined decisions taken under different stock conditions (e.g. the stock level at which fisheries are closed)?**

(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines).

The Swedish Agency for Marine and Water management monitors and evaluates the status of the stocks and the fishing with the assistance of the County Administrative Boards and the Swedish University of Agricultural Sciences. Suggestions of altered management are first discussed in this group. Fishing rights owners, environmental organizations or the public can also suggested actions for conservation and rebuilding of the stocks. If there is need for urgent regulation of fishing rules the Swedish Agency for Marine- and Water Management can take urgent measures to regulate or even stop salmon fisheries both on the coast and in the rivers.

The decision-making process includes all stakeholders in the form of a written remittance of suggested fisheries management from the Swedish Agency for Marine and Water management. Biannually or annually a

conference, where all stakeholders are invited, is held presenting stock status, suggestions on future fishery management and where the advice of ICES and NASO is presented. In 2012 this conference was held at October 31<sup>st</sup>, i.e. after the fishing season.

Today no CLs or MTs are developed for river catch. Awaiting this (scheduled for 2015-2018) the landing of salmon is not allowed to increase in rivers with weak stocks. As of yet no river fishing has been stopped during the fishing season.

**2.3 Are fisheries permitted to operate on salmon stocks that are below their reference point and, if so, how many such fisheries are there and what approach is taken to managing them that still promotes stock rebuilding?** (Reference: Sections 2.7 of the Fisheries Guidelines).

The reference point is set at 50% of potential production (see section 1.2-1.3). Six stocks are below this level. In three of the rivers no fishing occurs. In River Enningdalsälven a reduced fishing is allowed, but not in the upper parts where the spawner count is low. The stocks are being monitored by a joint operation from Norway and Sweden. In River Kungsbackaån fishing is permitted, but was reduced to 13 salmon in 2011, as compared to an average of 20 in 2000-2010. Further, restoration is carried out and fish ways have been built. In River Löftaån fishing is restricted and only one salmon was landed in 2011, which also has been the case 2000-2010.

**2.4 Are there any mixed-stock salmon fisheries and, if so, (a) how are these defined, (b) what was the mean catch in these fisheries in the last five years and (c) how are they managed to ensure that all the contributing stocks are meeting their conservation objectives?** (Reference: Section 2.8 of the Fisheries Guidelines).

a) Mixed-stock fisheries are defined according to NASCO as fisheries exploiting a significant number of salmon from two or more river stocks. Further, such fisheries are at hand when reared salmon is fished together with wild salmon from tributaries in the three rivers with releases of smolt.

b) The commercial coastal catch, 25% of the total catch in weight in 2011, is a mixed stock fishery. During 2007-2011 the average catch on the coast was 2154 kg.

Also within the three river systems with releases of reared salmon there is a mixed stock fishing on wild and reared salmon. It is not required by national legislation or local fishing rules that caught wild salmon is released back in these systems. The proportion of wild salmon is low (<5%). On average for five years the salmon catch in these rivers has been 15.6 tonnes in total, but the number of wild salmon below 780 kg.

c) As no sampling program is established from the coastal fishery the amount of wild and reared (fin-clipped) fish has to be estimated from catches in nearby rivers. Which stocks are caught can't be evaluated as a screening of a genetic base-line is missing, i.e. it is not possible to separate stocks from tissue samples. It is suggested from 2014 that only gears should be allowed that makes it possible to release catches of salmon unharmed and that all wild salmon shall be released in these fisheries. There are four commercial trapnet fisheries at the Swedish coast. Three of them near or in the estuary of a river with compensatory (hydropower stations) releases of fin-clipped smolt. In these fisheries only fin-clipped salmon is allowed to catch and all wild salmon shall be released alive. There is also a commercial gill-net fisheries in the southern part of Kattegatt. In the region two rivers is emptying in the sea with large compensatory releases of fin-clipped smolt. These fisheries are a mixed stock fisheries both targeting wild and reared salmon.

**2.5. How are socio-economic factors taken into account in making decisions on fisheries management?** (Reference: Section 2.9 of the Fisheries Guidelines).

The decision-making process includes all stakeholders in the form of a written remittance of suggested fisheries management, which gives a transparent process and is common in Sweden. Biannually or annually a conference, where all stakeholders are invited, is held presenting stock status, suggestions on future fishery management and where the advice of ICES and NASO is presented.

**2.6 What is the current level of unreported catch and what measures are being taken to reduce this?** (Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard).

The total unreported catch of Atlantic salmon in the years 2007-2011 has been estimated to be 10 % of the national catch.

a) In one river (R. Rolfsån) a traditional privately owned fishery with gill nets is allowed due to immemorial usage. No catch data are available, so this fishery represents an unreported catch.

b) Included in the unreported catch is the fishing in coastal waters by non-commercial fishermen using rod and line and gill nets.

New gill net regulations expecting to reduce unreported non-commercial catch in coastal waters were implemented in 2013.

Follow up of legislations are continuously made by control units at the local County administrative board and Swedish coast guard.

A census of the non-commercial catch in the coastal waters will be conducted if deemed required after new fishing regulation is implemented in 2014, reducing catch of wild salmon.



**2.7 What are the main threats to wild salmon and challenges for management in relation to fisheries, taking into account the Fisheries Guidelines and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Fisheries Management FAR Review Group, (CNL(09)11)?**

Threat/challenge 1	Lowered sea survival of salmon.
Threat/challenge 2	Mixed-stock fisheries.
Threat/challenge 3	Setting CLs and MTs.
Threat/challenge 4	Improving catch statistics.
Threat/challenge 5	Over-exploitation of MSW in relation to 1SW in rivers.

**2.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?**

**Fisheries management (F)**

Action:	F1
Referring to threat/challenge:	1
Action:	Implementing new fishing rules to lessen exploitation of wild salmon in rivers with low status.
Timescale:	2013-2018
Presently running:	Yes, but weak stocks or fisheries with unreported/uncertain catches will have restrictive rules.
Funding:	Through base program for salmon monitoring and management.
Outcome:	Increased stocks through lessened exploitation.
Monitoring:	Parr surveys, catch statistics in rivers.
Enforcement:	Legislation, if possible voluntary agreement.
Action:	F2
Referring to threat/challenge:	2
Action:	Phasing out mixed-stock fisheries on wild salmon in reared rivers, and mixed stock fisheries on the coast.
Timescale:	2013-2014
Presently running:	No, but reared salmon fin-clipped.
Funding:	Through base program for salmon monitoring and management.
Outcome:	Increased stocks through lessened exploitation.
Monitoring:	Parr surveys, catch statistics in rivers.
Enforcement:	Legislation, if possible voluntary agreement.
Action:	F3
Referring to threat/challenge:	2
Action:	Fin-clipping of reared salmon and trout, annually ca 180,000.
Timescale:	2013-2018
Presently running:	Yes since 2005.
Funding:	Obligatory for hatcheries.
Outcome:	Allows for reared and wild salmon to be distinguished.
Monitoring:	County Administrative Boards annually check pre-smolt before stocking.
Enforcement:	Legislation.

Action:	F4
Referring to threat/challenge:	2
Action:	Genetic base line of salmon stocks.
Timescale:	2014-2016
Presently running:	No (studies have been carried out in River Göta älv & R. Rönne å).
Funding:	Extra funding required; ca 40 000 Euro for baseline. Stocks in mixed-stock fisheries identified. International exchange of data possible.
Outcome:	
Monitoring:	Report.
Enforcement:	Funding, voluntary participation by fishermen.

Action:	F5
Referring to threat/challenge:	3
Action:	Running monitoring in index river (smolt & spawner census, tagging of smolt, electrofishing).
Timescale:	2013-2018
Presently running:	Yes, but spawner trap efficiency needs to be evaluated.
Funding:	Through base program for salmon monitoring and management. Also through National Liming programme. Stock-recruitment data, sea survival, run-timing, diversity of stock, age at smolting, age in the sea.
Outcome:	
Monitoring:	Data to database and reported to ICES.
Enforcement:	Funding.

Action:	F6
Referring to threat/challenge:	3
Action:	Establishing Conservation Limits & Management Targets from index river data and habitat surveys.
Timescale:	2015-2018
Presently running:	No (other methods used).
Funding:	Through base program for salmon monitoring and management.
Outcome:	Individual river assessment facilitates management and advice.
Monitoring:	Parr surveys, catch statistics & exploitation in rivers.
Enforcement:	Legislation, if possible voluntary agreement.

Action:	F7
Referring to threat/challenge:	3
Action:	Establishing in-river exploitation levels, through tagging/returns & catch and effort statistics in two rivers.
Timescale:	2014-2016
Presently running:	No
Funding:	Extra funding required; annually 20 000 Euro.
Outcome:	Aiding MTs, and also required for International assessment through ICES.
Monitoring:	Catch & effort statistics in rivers.
Enforcement:	Voluntary agreement with fishing associations.

Action:	F8
Referring to threat/challenge:	4
Action:	Improving catch statistics (C&R, effort)
Timescale:	2014-2018
Presently running:	No
Funding:	Through base program for salmon monitoring and management.
Outcome:	Aiding MTs, and also required for International assessment through ICES.
Monitoring:	Tagging returns.
Enforcement:	Funding, legislation, if possible voluntary agreement.

Action:	F9
Referring to threat/challenge:	5
Action:	Reducing over-exploitation of MSW in rivers through restrictions on landing large fish. (Compare F1.)
Timescale:	2013-2018
Presently running:	No (effect of different scenarios evaluated on river-basis).
Funding:	Through base program for salmon monitoring and management.
Outcome:	Increased egg deposition. <u>Action aimed at weak stocks or where catches are unreported/uncertain.</u>
Monitoring:	Parr surveys.
Enforcement:	Legislation, if possible voluntary agreement.

Action:	F10
Referring to threat/challenge:	1, 2, 3, 5
Action:	Coordinating and securing monitoring of recruitment (parr) in rivers.
Timescale:	2013-2018
Presently running:	Yes, to some extent. All data are compiled, but securing monitoring for longer time frames required.
Funding:	Monitoring funded by several different programmes and authorities, as well as voluntary work.
Outcome:	Securing monitoring in at least 17 of 23 rivers, preferably all rivers if feasible.
Monitoring:	Parr surveys compiled at the Swedish Electrofishing Register (SERS) at the Swedish University of Agricultural Sciences.
Enforcement:	Long-time funding, coordination, voluntary agreements.

Action:	F11
Referring to threat/challenge:	3, 4, 5
Action:	Initiate and support formation of fish management units in salmon rivers
Timescale:	2013-2018
Presently running:	Yes, but formation of fish management units in river should be high-lited.
Funding:	Governmental and private funding
Outcome:	A more effective decision process involving fishing rights owner regarding decision on CL, regulation of fisheries, data collection, habitat restoration.
Monitoring:	Registration of fish management units in salmon rivers
Enforcement:	Legislation, voluntary agreement, engagement and involving of stakeholders

### 3. Protection and Restoration of Salmon Habitat

#### 3.1 How are risks to productive capacity identified and options for restoring degraded or lost salmon habitat prioritized, taking into account the principle of 'no net loss' and the need for inventories to provide baseline data? (Reference: Section 3 of the Habitat Guidelines).

Risks to productive capacity is identified and options for restoring degraded or lost salmon habitat is prioritized in accordance with the Water Framework Directive. Elimination of risks to productive capacity and options for restoring salmon habitats is also a measure to achieve Swedish environmental quality objectives.

At present there are several inventories carried out by different authorities to map salmon habitat, but with somewhat different methods. Hence, no national update of the available total habitat has been done since 1999, although data is present at the County Administrative Boards and need to be compiled and quality controlled. This should be undertaken in 2014-2016.

In 2015-2011 a plan for prioritizing restoration will be produced taken into account the status of stocks, the amount of habitat that can be restored/gained and the cost efficiency of measures. In this plan hydrological restoration and improving the riparian zone will be addressed as well as fish ways, hydropower use and habitat restoration.

Six salmon rivers are included in the NATURA 2000-network (Enningdalsälven, Örekilsälven, Bratteforsån, Rolfsån, Stensån and Ätran-Högvadsån). Further some tributaries with wild salmon in River Göta älv is included (Lärjeåån, Säveån) as well as parts of River Lagan (Karsefors rapids).

**3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management?** (Reference: Section 3.9 of the Habitats Guidelines.)

Activities that could damage habitat (ex. rivers/streams) are regulated in the Swedish Environmental code.

All operations and measures covered by the Code must pursue the objectives and comply with the common rules of consideration established by its provisions. The general rules of consideration comprise several fundamental principles (ex. The precautionary principle and the best possible technology principle, the appropriate location principle, The resource management and ecocycle principle). All the rules of consideration are to be applied in the light of benefits and costs. The conditions associated with operations must be based on environmental considerations while not involving unreasonable expense. Furthermore the Code also stipulates that water operations may only be undertaken if the benefits from the point of view of public and private interests are greater than the costs and damage associated with them. The purpose of this provision is to prevent water operations that are not justified in terms of the public economy.

As a general rule stakeholders participation/approval is always required when habitat restoration is carried out. Fresh waters are privately owned, and the fishing is privately managed within the framework set by the Swedish Agency for Marine and Water management. This means that stakeholders are an important part of the restoration work.

**3.3 What are the main threats to wild salmon and challenges for management in relation to estuarine and freshwater habitat taking into account the Habitat Guidelines, and the specific issues on which action was recommended for this jurisdiction in the Final Report of the Habitat Protection, Restoration and Enhancement FAR Review Group, (CNL(10)11)?**

Threat/challenge 1	Acidification.
Threat/challenge 2	Habitat degradation due to clearing, channelization, sediment load and summer drought.
Threat/challenge 3	Hydropower activities (migration obstacles, hydropeaking, reservoirs).

### 3.4 What actions are planned to address each of the above threats and challenges in the five year period to 2018?

Action:	Protection and restoration of salmon habitat (H) H1
Referring to threat/challenge:	1
Action:	Continued liming of acidified salmon rivers and tributaries.
Timescale:	2013-2018, annually
Presently running:	Yes
Funding:	National liming programme
Outcome:	Increased pH, lowered toxic aluminium. Increased juvenile survival, increased biodiversity.
Monitoring:	Parr surveys, chemical monitoring carried out by County Administrative Boards
Enforcement:	Governmental funding.
Action:	H2
Referring to threat/challenge:	2
Action:	Habitat surveys compiled, quality assured and new data added if required.
Timescale:	2014-2016
Presently running:	No, but the different County Administrative Boards are working with the issue.
Funding:	Extra funding required; 20 000 Euro annually.
Outcome:	Quality controlled data on salmon habitat and quality compiled in a database.
Monitoring:	Database.
Enforcement:	Funding.
Action:	H3
Referring to threat/challenge:	2
Action:	Plan for continued habitat restoration in salmon rivers. (Also including H2 & H4)
Timescale:	2014-2016, whereafter the plan is annually updated when new information is available.
Presently running:	No, actions are being undertaken, but a national plan is lacking.
Funding:	Needed for priority of rivers/actions.
Outcome:	Extra funding required; 20 000 Euro annually.
Monitoring:	Plan in 2015, with the cooperation of the County Administrative Boards. Different plans exist.
Enforcement:	Through the National Remedial measures database (Åtgärdsdatabasen). Reporting to NASCO database.
Enforcement:	Funding.

Action:	H4
Referring to threat/challenge:	3
Action:	Establishing criteria for BAT (best available technology) for hydropower generation.
Timescale:	2015.
Presently running:	No. National guidelines required.
Funding:	Funded through the Swedish Agency for Marine and Water management.
Outcome:	Plan in 2015. Implemented in all Counties.
Monitoring:	See H5 - below
Enforcement:	Guideline.

Action:	H5
Referring to threat/challenge:	3
Action:	Establishing criteria and workflow for surveillance of hydropower plants according to Environmental Law & BAT.
Timescale:	2015.
Presently running:	No. National guidelines required.
Funding:	Funded through the Swedish Agency for Marine and Water management.
Outcome:	Plan in 2015. Implemented in all Counties.
Monitoring:	Through the County Administrative Boards.
Enforcement:	Guideline. Compare H4 (above)

#### **4. Management of Aquaculture, Introductions and Transfers, and Transgenics.**

##### **4.1 What is the approach for determining the location of aquaculture facilities in (a) freshwater and (b) marine environments to minimize the risks to wild salmon stocks?**

- a) No new establishment of aquaculture operations are allowed in wild salmon rivers, from the estuary to the first definitive migration barrier.
- b) A control zone for VHS was established at the mouth of River Göta älv, but have been taken away as no outbreak has occurred since 2002. No fish farms exist on the coast today.



**4.2 What progress can be demonstrated towards the achievement of the international goals for effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild stocks attributable to sea lice?** (Reference: BMP Guidance).

Sea lice are not a problem in Sweden as there are no salmon farms in coastal waters.

**4.3 What progress can be demonstrated towards the achievement of the international goals for ensuring 100% containment in (a) freshwater and (b) marine aquaculture facilities?** (Reference: BMP Guidance).

Sweden has imposed:

That health certificates (including disease control, screening for parasites) are obligatory for all fish farms and enhancement releases.

All fish stocking needs permit from the County Administrative Boards.

Fish farms are located after a risk-assessment with respect to wild salmonid stocks and nutrient load. No fish farms in salmon rivers.

The maximum quantity of fish farmed is decided by the County Administrative Boards.

The County Administrative Boards supervises the fish farms with respect to given permits, health control and reared salmon smolts are quality controlled annually before stocking.

**4.4 What progress has been made to implement NASCO guidance on introductions, transfers and stocking?**

- The EU fish health directive (2006/88/EG) is implemented in the national legislation for minimizing spreading diseases.
- Sweden has a strict control of stocking requiring health certificates and stocking permits.
- No stocking of Salmonidae may be carried out in salmon rivers worthy of protection against parasites and fish diseases
- Reared salmon of the local strain is stocked in compensation for hydropower development in three rivers (in R. Nissan the local stock went extinct in the 1920s. It is now stocked with R. Lagan salmon).
- Otherwise, no stocking of salmon occurs.
- All reared and released salmon and trout have their adipose fin clipped to enable C&R of wild salmon in rivers with both wild and reared salmon.
- Annually 2000 reared salmon are Carlin-tagged to study sea survival and return rates, as well as straying.
- Genetic screening of all salmon stocks (establishing a base line; see action F4) is planned for 2014-2016.

**4.5 What is the policy/strategy on use of transgenic salmon?** (Reference: Article 7 and Annex 5 of the Williamsburg Resolution).

Transgenic salmon is not used, and will not be allowed 2013-2018.

**4.6 What measures are in place to prevent the introduction or further spread of *Gyrodactylus salaris*?**

- a) Sweden has an extensive monitoring programme for *G. salaris*. The monitoring programme 2001-2011 was evaluated in 2012. With minor improvements it will continue.
- b) In 1999 a legislation was implemented regarding aquaculture, stocking and transfer of fish for wild salmon rivers running to Kattegatt or Skagerrak. This was updated in 2011. Fish of the family Salmonidae may not be stocked in salmon rivers free of *Gyrodactylus* on the west coast.
- c) In 2003 the rules became stricter regarding transfer of fish to fish farms (permits required from the County Administrative Board).
- d) Occurrence of *G. salaris* in fish farms must be reported to the Swedish Board of Agriculture (SJVFS 2002:16).
- e) An information leaflet and small posters were produced by the Sport fishing association of Sweden in cooperation with the Swedish Agency for Marine and Water Management and are used in connection with sport fishing in rivers.

**4.7 What are the main threats to wild salmon and challenges for management in relation to aquaculture, introductions and transfers, and transgenics, taking into account the Williamsburg Resolution, the BMP Guidance and specific issues on which action was recommended for this jurisdiction in the Final Report of the Aquaculture FAR Review Group, (CNL(11)11)?**

Threat/challenge 1	Spread of <i>Gyrodactylus salaris</i>
Threat/challenge 2	Spread of alien (escaped) salmon to salmon rivers from salmon farms and releases in other countries.

**4.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?**

Action:	Aquaculture A 1
Referring to threat/challenge:	1
Action:	Monitoring of <i>Gyrodactylus salaris</i>
Timescale:	2013-2018, annually
Presently running:	Yes
Funding:	Special funding; annually 25 000 Euro.
Outcome:	Updated information on G. salaris distribution and infection. Database quality controlled by Swedish University of Agricultural Sciences
Monitoring:	Sciences
Enforcement:	Governmental funding.
Action:	A2
Referring to threat/challenge:	2
Action:	Genetic screening of alien (escaped) salmon. (Compare action F4).
Timescale:	2014-2018
Presently running:	No
Funding:	Annually 6 000 Euro. Determination of origin of alien salmon. Based on established base line (action F4).
Outcome:	
Monitoring:	Included in annual reports to NASCO/ICES.
Enforcement:	Funding