



**CNL(13)41**

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

***EU - Denmark***



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

***The main purpose of this Implementation Plan is to demonstrate what actions are being taken by the jurisdiction to implement NASCO Resolutions, Agreements and Guidelines.***

*Questions in the Implementation Plan refer to the following documents:*

- *NASCO Guidelines for Management of Salmon Fisheries, CNL(09)43 (referred to as the 'Fisheries Guidelines');*
- *Minimum Standard for Catch Statistics, CNL(93)51 (referred to as the 'Minimum Standard');*
- *NASCO Guidelines for Protection, Restoration and Enhancement of Atlantic Salmon Habitat, CNL(10)51 (referred to as the 'Habitat Guidelines');*
- *Williamsburg Resolution, CNL(06)48; and*
- *Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks (SLG(09)5) (referred to as the 'BMP Guidance').*

<b>Party:</b>	
<b>Jurisdiction/Region:</b>	<b>EU Denmark</b>

## **1. Introduction**

### **1.1 What are the objectives for the management of wild salmon? (Max 200 words)**

Originally, Denmark had nine rivers with wild salmon populations; one river (Gudenå) going to the Kattegat and the last eight rivers going to the North Sea. The rivers are all lowland rivers running through moraine landscapes. All populations feeding in the North Atlantic. Genetic analyses comparing archival material (scales) with present wild fish from rivers showed that in the beginning of the 2000<sup>is</sup> there were only wild salmon left in four rivers: Storå, Skjern Å, Varde Å and Ribe Å, and that wild salmon had disappeared in the other rivers (Gudenå, Konge Å, Sneum Å, Brede Å and Vidå). The genetic analysis comparing archival scales with up to date scales showed that little genetic drift had taken place during up to 70 years. A National Salmon Rehabilitation Plan (2004) was therefore developed for the four rivers with wild salmon. The stocks in the four rivers were very small and from the very few anglers catch in river Skjern Å the spawning run in this river with the supposed biggest population was estimated to be less than 100 spawners annually. But generally data were very sparse from all four rivers. And with no information about the original stocks size before man made deteriorations of the habitats and it was not possible to set up reference points in 2004 see paragraph 1.2.

The objective of the Plan and for the management of the wild salmon is to secure that salmon does not disappear from these four rivers still holding wild salmon, and that the stocks as far as possible through a number of initiatives over the following years can be brought back to an originally estimated number of spawners. In the other four rivers the Plan recommends that it shall be evaluated which initiatives may be taken to reestablish wild salmon in these potential salmon rivers. In the river going to the Kattegat a solution is linked to problems with a hydropower station and cannot be solved within a foreseeable time period.

The present National Salmon Rehabilitation Plan was adopted in 2004 and shall be revised in 2013/2014 based on research and monitoring results since 2004.

### **1.2 What reference points (e.g. conservation limits, management targets or other measures of abundance) are used to assess the status of stocks? (Max 200 words)** *(Reference: Sections 2.4 and 2.5 of the Fisheries Guidelines)*

Based on marked and tagged (fin clip and CWT) stocked salmon (F1) and electrofishing in autumn combined with PIT tagging during the spawning run the total spawning run is estimated every year, and an estimate on the number of spawners in each of the four rivers with wild salmon is calculated. Both the number of wild salmon from natural spawning and spawners from stocked F1 fish is calculated. The minimum reference point or objective within the current management plan is an annual run of at least 1000 spawners with wild origin (natural spawning) in each of the four rivers with wild salmon. Each of the four rivers is assessed every fourth year in a four year cycle. Before the implementation of the national rehabilitation plan in 2004 the run of wild salmon into these four rivers with wild salmon was very low and mostly based on anglers catches, and the numbers were at that time probably mostly from stocked F1 salmon, and there were no data of the original spawning size before man made deterioration; so the present reference point of an annual spawning run of at least 1000 wild salmon in each four river was based on estimates of present and potentially spawning habitats from restoration projects in the coming period after 2004 and from productivity potentials in productive lowland rivers. It is expected that the revised national rehabilitation plan in 2013/2014, where a large number of monitoring data have been collected

(see paragraph 2.2) since 2004 and where present spawning streams for salmon have been identified based on radio-tagged spawners will make it possible to establish more reliable reference points, at least in the four rivers with original wild salmon.

No reference point or objectives has been established in the remaining five rivers running into the North Sea with extinct wild salmon, but it is expected that reference points or at least objectives of numbers of spawners will be established in the four rivers in the new management plan 2013/2014. At present only stocking with F1 salmon from the nearby wild salmon stocks takes place (genetically are the four wild salmon populations very closely related) and there are at present no monitoring results from these last rivers; only record of anglers catches as an index of spawning run.

**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 of category and link to reference points	No. rivers
1	In the four rivers which have original population the reference point has not yet been achieved but populations have improved considerably during the recent years; salmon are stocked (F1, ½- and 1-yearlings)	4
2	In the remaining four rivers, with no original salmon populations left, salmon are stocked (F1, ½- and 1-yearlings) and salmon migrate into the rivers to spawn but no detailed monitoring takes place.	4
3	In the river running into the Kattegat the returning salmon spawners are all stocked fish (F1) and no monitoring takes place in the river. Sporadically unsuccessful spawning occurs downstream the power station.	1
4		
<i>Insert additional categories as required</i>		
<b>TOTAL:</b>		<b>9</b>

Additional comments:

**1.4 How is stock diversity (e.g. genetics, age composition, run-timing, etc.) taken into account in the management of salmon stocks? (Max 200 words)**

Broodstocks for stocking are obtained (electro fishing) each year from each of the four rivers with original populations running into the North Sea and in the River Gudenå (see below). The stocks are not mixed at hatchery. At least 100 salmon (50 pairs) are used as broodstock for each of the four rivers each year. Before and after 2004 the fish were screened before used as broodstock by genetic analysis in the four rivers. These analyses were stopped in 2005 because the results showed that mostly only salmon belonging to the rivers migrated into these. Very few wild strayers from nearby rivers and from aquaculture are caught during electro fishing and these last fish are usually easily visually identified and taken out of the river. They are not used for breeding.

In the four other rivers to the North Sea without originally stocks left, salmon are stocked with F1 offspring from nearby rivers, mostly Skjern Å. In the river Gudenå going to the Kattegat (no wild salmon) F1 smolt are stocked with two strains: one from one of the rivers with wild Salmon (River Storå) and one strain from western Sweden (Ätran), but from 2012 only the River Storå will be used as broodstock here. So, if the problem with the hydropower station is

solved and river restoration has taken place only salmon from river Storå will be used to rebuild this lost salmon population.

So, from 2012 only F1 salmon from Danish river are used as broodstock in Denmark and for stocking in all nine salmon rivers.

Since 2011 quotas have been set up for the river sport fishing in the salmon rivers for all eight rivers going to the North Sea. Quotas are based on the estimates of the total spawning run (wild and F1) in the four rivers with wild salmon and guesstimated spawning run in the other four rivers with no yet documented wild spawning. In all rivers the quotas have been divided into 50 % below or equal 75 cm total length (grilse) and 50 % above 75 cm (MSW salmon). In all these rivers the season has been reduced to 16<sup>th</sup> April to 15<sup>th</sup> October to protect winter and spring fish. Besides, ethical rules have been agreed with the anglers; how to handle and release salmon, use of baits and tackle.

In the river to the Kattegat there is no quota because all salmon derives from stocked smolt, but the anglers have negotiated closed season and number of caught salmon per angler.

**1.5 To provide a baseline for future comparison, what is the current and potential quantity of salmon habitat? (Max 200 words)**  
*(Reference: Section 3.1 of the Habitat Guidelines)*

One of the major problems in Danish salmon rivers was the numerous migratory obstacles, transport of sand and fine sediments and in some streams acid water and ochre from old lignite mining areas.

Obstacles and weirs also stem and reduce water flow. Removing these will allow access to the original river bed with stone and gravel and create spawning areas for both salmon and sea trout, when fine sediment is washed away. It is foreseen that many original salmon spawning and growth up areas shall be opened up in the coming years.

It is expected that removing obstacles and weirs is one of the most important factors to create new spawning and growth up areas in former lost salmon habitats in Danish rivers. In addition numerous spawning grounds have been established by addition of stone and gravel in medium sized tributaries of the salmon rivers.

In the 2000<sup>ies</sup> many barriers were removed and many will be removed in the coming years because of EU's WFD to open up new spawning and growth up areas. These areas have not been quantified in detail at present but will be recognized during routine monitoring surveys of present and potential spawning and rearing areas in the coming years see paragraph 1.2; but the current initiatives have multiplied salmon spawning and nursery areas in all eight rivers.

In 2006 the total useable habitats for spawning and growth up for salmon were monitored in river Skjern Å. Length (total measured length 331.1 km) and width (mean 9.3 m) of medium - bigger stretches were measured, and out of a total area of  $3.093 \cdot 10^6$  m<sup>2</sup> a total of  $1.811 \cdot 10^6$  m<sup>2</sup> (59 %) were estimated to be the potential salmon habitats in this river systems. These figures are not known in the other river systems, see paragraph 3.3 and 3.4.

<b>1.6 What is the current extent of freshwater and marine salmonid aquaculture?</b>	
Number of marine farms	Atlantic salmon: zero, but see paragraph 4.1 Brown trout ( <i>S. trutta</i> ): zero Rainbow trout ( <i>O. mykiss</i> ): 10
Marine production (tonnes)	Atlantic salmon: zero Brown trout: zero Rainbow trout: about 10,000 tons
Number of freshwater facilities	Atlantic salmon: two Brown trout: 15 Rainbow trout: about 250
Freshwater production (tonnes)	Atlantic salmon: 110,000 half-yearlings, 203,000 one-yearlings and 120,000 smolt produced in two recycled hatcheries Brown trout: 465,000 fed fry, 250,000 half-yearlings, 325,000 one-yearlings and 1,435,000 smolt Rainbow trout: about 30,000 tons
All freshwater facilities (salmon, brown trout and rainbow trout) are situated in Jutland except one brown trout facility at Funen. The marine farms are situated in the Great Belt, around the islands of Lolland & Falster (West Baltic) and in Jutland at Horsens Fjord and Ringkøbing Fjord (salmon, see paragraph 4.1).	
<b>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?</b> <i>Yes/no/comments</i>	
Yes	

<p><b>2. Fisheries Management:</b></p>
<p><b>2.1 What are the objectives for the management of the fisheries for wild salmon? (Max. 200 words)</b></p>
<p>The objective for the fisheries management of the wild salmon is to ensure that the salmon does not disappear in the four rivers with original wild salmon stocks, and that the stocks during the next 10 years hopefully is brought back to the originally estimated level of spawners (present a minimum of 1000 naturally produced spawners each year - see paragraph 1.2), and at the same time allow a limited sport fishing, see paragraph 2.2 and 2.3, based on the number of estimated spawners (wild and stocked F1).</p> <p>The fishing management means to ensure that the stocks in a foreseeable time will reach the minimum conservation limits and at the same allowing limited angling quotas in each eight river, reduced open period for sport fishing, protection of MSW salmon through size differenced quota, restrictions in tackle and baits, ethical rules for the fishery and annual monitoring of the spawning run (wild and F1).</p>
<p><b>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)? (Max. 200 words)</b>  <i>(This can be answered by providing a flow diagram if this is available.)</i>  <i>(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines)</i></p>
<p>As described in paragraphs 1.2 and 1.4 stocking and monitoring of spawning size takes place in each of the four rivers with wild salmon biannually; which enable to split the total number of spawners up into wild salmon and stocked F1 salmon. From the number of stocked F1 fish and the resulting number of F1 spawners, survival from stocking to spawning will be estimated. The total spawning run minus caught salmon (stocked F1 and wild) is expected to participate in the spawning. The wild stock (derived from original wild spawners and derived from spawning results from earlier stocked F1 fish) has increased substantially during the recent years. Therefore a recreational sport fishing with quotas taken less than approx. 10 % of the total spawning run (wild and stocked) has been negotiated between fishery authorities, anglers and land owners. The quotas are regulated annually depending on monitoring results.</p>
<p><b>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? (Max 200 words.)</b>  <i>(Reference: Section 2.7 of the Fisheries Guidelines)</i></p>
<p>In all salmon rivers sport fishing takes place for salmon and sea trout. The anglers co-finance (the National Rod License) the two hatcheries producing the stocking material; participate in electro fishing for broodstocks and stock the produced fish after guidelines set up by fishery authorities and do restoration of smaller streams. It has therefore been negotiated that limited quotas for the sports fishery have been allowed in all rivers except the river going to the Kattegat (only stocked F1 fish). The quotas are based on the estimates of the spawning run (wild and stocked fish) in the four rivers with wild salmon and guesstimated spawning run in the other four rivers with no yet documented wild spawning. See also paragraph 2.2.</p>



<p><b>2.4</b></p>	<p><b>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?</b> <i>(Max. 300 words in total)</i>  <i>(Reference: Section 2.8 of the Fisheries Guidelines)</i></p>
	<p>(a) Except in the Baltic Sea no commercial marine fishery targets salmon in Denmark. Salmon by-catch in other fisheries is less than 100 kg according to the official fishery catch statistics. The only important fishery targeting salmon outside the Baltic Sea is sports fishing in rivers.</p> <p>The salmon is protected against commercial fishery in many coastal waters where it is illegal to catch salmon in the fjords of Ringkøbing (river Skjern Å) and Nissum (river Storå). In the area where the southern six salmon rivers are found it is not permitted to use gill nets (in the Wadden Sea). In the long estuary Randers Fjord (river Gudenå) a commercial and recreational fishery with pound nets and gill nets takes place but only on stocked fish, se paragraph 2.6.</p>
	<p>(b) The mean annual catches (caught but released excluded) in nine rivers in the period 2008 – 2012 were in total 1661 salmon distributed on the rivers as follows:</p> <p>Storå: 107  Skjern Å: 407  Varde Å: 131  Sneum Å: 59  Konge Å: 31  Ribe Å: 45  Brede Å: 29  Vidå: 33  Gudenå: 820</p>
	<p>(c) See paragraph 2.2 and 2.3</p>
<p><b>2.5</b></p>	<p><b>How are socio-economic factors taken into account in making decisions on fisheries management?</b> <i>(Max. 200 words)</i>  <i>(Reference: Section 2.9 of the Fisheries Guidelines)</i></p>
	<p>A salmon management plan in all the eight rivers going to the North Sea has been implemented and is evaluated in close contact between fishery authorities and the local anglers associations and through several annual meetings between angler associations and land owners (they have the fishing rights which is rented out to the anglers).</p> <p>It is the perception, that allowing local access to sports fishing salmon increases local awareness and as effect results in improved protection of habitats, illegal fishing etc.</p>

<b>2.6 What is the current level of unreported catch and what measures are being taken to reduce this? (Max. 200 words)</b> (Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard)	
It is believed that unreported catch is at a very low level in the eight rivers running into the North Sea, because most of the fishery is run by the local well organized angler associations.	
In the river running to the Kattegat the fishery is much less regulated; it is possible to receive a guesstimate of anglers catch in the river, but unreported catch in this river and the large estuary Randers Fjord is guesstimated to be about 6 tonnes annually. In river Gudenå and the estuary fishing is exclusively on stocked F1 fish, see paragraph 1.4.	
<b>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)?</b>	
Threat/ challenge F1	Bird predation
Threat/ challenge F2	Net fishing in coastal area (fjord) targeting whitefish and flounder
Threat/ challenge F3	Reference points with limited accuracy
Threat/ challenge F4	

Copy and paste lines to add further threats/challenges which should be labelled F5, F6, etc.

<b>2.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?</b>		
<b>Action F1:</b>	Description of action:	In several areas bird predation from especially cormorants ( <i>Phalacrocorax carbo sinensis</i> ) is a considerable and well documented problem (Denmark has at present the largest cormorant populations in Europe). Denmark has a national cormorant plan that regulates recruitment where problems with predation on salmonids i.e. salmon and sea trout have been documented.
	Planned timescale:	Running process
	Expected outcome:	Reducing the mortality on salmon and trout parr in rivers and during their smolt migration from rivers through estuaries to the North Sea
	Approach for monitoring effectiveness & enforcement:	Running monitoring programme in corporation with other authorities (Ministry of the Environment).
<b>Action F2:</b>	Description of action:	By-catch of salmon and sea trout is currently being evaluated in a research project in the Ringkøbing Fjord.
	Planned timescale:	2012 – 2013
	Expected outcome:	Identification of the by-catch size. If it is a problem an even more restricted fishery (other species than salmonid) in the

		fjords will be suggested. If it not a problem the present restriction will be continued.
	Approach for monitoring effectiveness & enforcement:	If it is a problem negotiation between fishery authority and local fishermen.

<b>Action F3:</b>	Description of action:	As described in paragraph 1.2 there is at present no reliable reference point for salmon in the four rivers with wild salmon, and the present at least 1000 spawners annually is more considered as an objective within the present management plan from 2004, but as described in paragraph 1.2 the new management plan 2013/2014 will assess whether there can be made reliable reference points; at least in the four rivers with wild salmon and based on monitoring results.
	Planned timescale:	2013 - 2014
	Expected outcome:	Reliable reference points
	Approach for monitoring effectiveness & enforcement:	Monitoring of spawning run will be continued in the Implementation Plan period to 2018; at least in the four rivers with original wild salmon. In the other four rivers with extinct salmon are there currently not taken a position on whether monitoring program will be launched
<b>Action F4:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness & enforcement:	

*Copy and paste lines to add further actions which should be labelled F5, F6, etc.*

<b>3. Protection and Restoration of Salmon Habitat:</b>	
<b>3.1 How are risks to productive capacity identified and options for restoring degraded or lost salmon habitat prioritised, taking into account the principle of ‘no net loss’ and the need for inventories to provide baseline data? (Max. 200 words)</b> <i>(Reference: Section 3 of the Habitat Guidelines)</i>	
It is well documented by both fishery and water authorities that the physical conditions of Danish streams and river habitats have been degraded especially during the last two hundred years. In these areas measures are in the process to be implemented to increase the physical quality of habitats because organic pollution as such is not a problem today in Danish rivers. In addition, habitats have been improved in many smaller streams and some larger rivers by addition of spawning material (i.e. stone and gravel). All these measures are a consequence of EU’s WFD, see paragraph 1.5, and as described in paragraph 1.5 general knowledge of the physical condition of watercourses and the monitoring results has showed that the current initiatives have multiplied salmon spawning and nursery areas since 2004 in the four rivers with wild salmon.	
<b>3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management? (Max. 200 words)</b> <i>(Reference: Section 3.9 of the Habitats Guidelines)</i>	
The fishery and environmental authorities are in close contact with local stakeholders and educate local water authorities and anglers in restoration methods. Due to the involvement in the negotiation of quotas and management as such the local anglers and land owners participate and feel responsible for the national salmon management plan.	
<b>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)?</b>	
Threat/ challenge H1	Migration barriers
Threat/ challenge H2	Habitat degradation and lack of spawning gravel
Threat/ challenge H3	Limited quantitative baseline information on habitats
Threat/ challenge H4	

*Copy and paste lines to add further threats/challenges which should be labelled H5, H6, etc.*

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

<b>Action H1:</b>	Description of action:	<p>There have been thousands of obstacles and weirs in connection with fish farms, irrigation, factories, hydropower stations, culverts etc. Many man made obstructions have been removed during the last twenty years but there are still many obstacles for migrating salmon and sea trout in Danish rivers. For example, in 2010 the hydropower station in River Varde Å was closed providing both access to upper parts of the river and about 16 km of the original main stem of the river was reopened and is now used for spawning by salmon and sea trout.</p> <p>In contact with local authorities, anglers and stakeholders river restorations projects are selected and evaluated in relation to maximise the effect of the input of financial resources.</p> <p>These activities are also initiated and a follow up of EU's Water Plans (Water Frame Directive) that has as results an improvement of the environmental conditions in river, lakes and coastal areas.</p>
	Planned timescale:	A national river basin management plan for the period 2013 – 2015 has been agreed between authorities of fishery and environmental.
	Expected outcome:	It is expected that about 1500 migratory obstructions (most of them small in small streams) shall be removed, but it is expected that both salmon and sea trout benefit from this.
	Approach for monitoring effectiveness & enforcement:	A new national salmon management plan is expected to be made and approved in 2013/2014, and it is expected that a monitoring programme will be continued (see paragraph 1.2 and 2.2)
<b>Action H2:</b>	Description of action:	About 1000 km river streams, mostly smaller streams, will be restored from earlier canalization, pipelaying and dredging. This mostly benefits sea trout populations, but it is expected that also salmon populations to a minor degree will benefit from this and use these streams as spawning and growth up areas.
	Planned timescale:	A national river basin management plan for the period 2013 – 2015 has been agreed between authorities of fishery and environmental.
	Expected outcome:	New spawning and nursery areas for mainly sea trout but also to a certain degree salmon.
	Approach for monitoring effectiveness & enforcement:	These smaller rivers and streams (up to about 6 – 8 m wide rivers) are routinely monitored during the national stocking programme for trout. In several of these smaller inlets salmon also spawn and grow up, and effects will be established.

<b>Action H3:</b>	Description of action:	As described in paragraphs 1.2 and 1.5 the original spawning and rearing areas for salmon before human activities is estimated in 2006 in river Skjern Å but not known in the other seven rivers going to the North Sea, but monitoring results and identification of spawning areas since 2004 (see paragraph 1.2) have identified present and potential habitats for salmon in Danish rivers. The present spawning and growth up areas at present are below the total (i.e. present and potential) habitats for salmon and as described in paragraph 1.5 it is expected that the total habitats for salmon shall be reached within a foreseeable time period.
	Planned timescale:	2013 – 2018
	Expected outcome:	More habitats are opened up for spawning and growth up for salmon and these areas will be identified and quantified
	Approach for monitoring effectiveness & enforcement:	Monitoring (spawning size) as described in paragraph 1.2 is expected to document the results of habitat improvements and river restoration.
<b>Action H4:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness & enforcement:	

*Copy and paste lines to add further actions which should be labelled H5, H6, etc*

#### **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 minimise the risks to wild salmon stocks? (Max. 200 words for each)**

(a)

New aquaculture facilities for salmonids in freshwater are not expected to be established in Denmark in the future; the last salmonid farm in freshwater was established in the beginning of the 1970ies. Fifty years ago there were about 750 salmonids farms (mostly rainbow trout) and at that time all the farms took water from the river via a stem. The original 750 farms are now reduced to about 250 farms and the number of farms is expected to be reduced further in the future. The present total fish production is higher than previously, while the farms are increasingly shifting to produce without water intake from the rivers. In the remaining farms production is more technical and economical efficient, the water intake from river has since been reduced considerably and is often supplied by water from the underground in many farms. Combined with recirculating and modern water cleaning techniques many stems have been removed, or more efficient bypasses have been constructed. Theoretically, new freshwater fish facilities could be established, there is no law against them, but the production will then be without any contact with a river.

(b)

As described in paragraph 1.6 there are at present 10 marine farms (net cages and rainbow trout) in Denmark and, theoretically, new farms could be established in the future after permits (e.g. geographical location, total production and effects on the marine environment) from authorities; there is no law against them; but at present it is not expected that new marine farms will be established though potential areas around Danish coastal areas have been appointed. The present general problems for marine cage farms in Denmark are wind all the year, water current, ice during winter and environmental protected areas. Consequently the productive season is from spring to autumn and this is perhaps the reason only rainbow trout is produced.

A new salmon aquaculture facility (land based using freshwater and saltwater; recirculation; a total annual production of 1,000 tonnes) is under construction at Hvide Sande close to the outlet from Ringkøbing Fjord (river Skjern Å). At present there are major problems with the final permit (regarding the possible effect of water from the fish farm on wild homing salmon and spawning migration to river Skjern Å where a major concern is the effect from pheromones) and at present it is not known if this problem will be solved in near future and if the farm will receive permission to produce salmon.

<p><b>4.2</b></p>	<p><b>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? (Max. 200 words)</b>  <i>(Reference: BMP Guidance)</i></p>
<p>There are no sea based salmonids aquaculture facilities in western Denmark, and the newly established breeding facility at Hvide Sande is operated under controlled conditions with no possibility of sea lice escape to the environment.</p>	
<p><b>4.3</b></p>	<p><b>What progress can be demonstrated towards the achievement of the international goals for ensuring 100% containment in (a) freshwater and (b) marine aquaculture facilities? (Max. 200 words each)</b>  <i>(Reference: BMP Guidance)</i></p>
<p>(a)  In Denmark the salmon for stocking are produced at two fully recirculated hatcheries. No fish escape from these hatcheries and no escapees from the potential facility at Hvide Sande (see paragraph 4.1(b)) are expected. At hatcheries in freshwater (rainbow trout and brown trout) water inlet from river has a 6 mm screen and outlet to river a 10 mm screen, and this is why escaped rainbow trout are found in rivers and sea. It is expected in the coming years that nearly all freshwater facilities will be more or less recirculated farms, see paragraph 4.1(a), and that very few fish might escape.</p>	
<p>(b)  There is no sea based salmon aquaculture in Denmark.</p>	



<p><b>4.4 What progress has been made to implement NASCO guidance on introductions, transfers and stocking?</b> (Max. 200 words) (Reference: Articles 5 and 6 and Annex 4 of the Williamsburg Resolution)</p>	
<p>Denmark has very strictly veterinary rules and disease free zones in aquaculture.</p> <p>In addition, all transporting of fish between water bodies must be authorized and where stocking takes place (re salmon and brown trout) it is based on local F1 strains only and based on documented need (i.e. difference between potential density minus present density) and according to the habitats evaluated productivity capacity.</p> <p>Further releases of salmon in the coming years will be based on opening up of new restored habitats see paragraph 3 and monitoring the spawning run of wild salmon (see paragraph 2). Releases of wild F1 salmon will be stopped when the original estimated spawning and growth up areas and level of spawners has been reached see paragraph 2.1, because it is a principle in Denmark that stocking of fish is treating the symptoms of deterioration of the aquatic environment.</p>	
<p><b>4.5 What is the policy/strategy on use of transgenic salmon?</b> (Max. 200 words) (Reference: Article 7 and Annex 5 of the Williamsburg Resolution)</p>	
<p>Not an option in Denmark because transgenic fish species has never and probably will never be used in Denmark for aquaculture purposes and stockings. There have only been some earlier experiments with all-female and triploids rainbow trout in aquaculture production but never salmon and brown trout.</p> <p>Productions of genetically modified organisms are only possible after approval from the competent authorities in Denmark and permission for salmon will never be given.</p>	
<p><b>4.6 What measures are in place to prevent the introduction or further spread of <i>Gyrodactylus salaris</i>?</b> (Max. 200 words)</p>	
<p>In Denmark different species of <i>Gyrodactylus</i> (incl. <i>G. salaris</i>) have been found on wild salmon and it is assumed that salmon in Denmark is less susceptible to these national <i>Gyrodactylus</i> species.</p> <p>Moving aquatic organisms between water bodies without authorization is illegal in Denmark and the same applies for import of living fish species for stocking (with the exception of elvers - <i>Anguilla anguilla</i>; before stocking in nature these are kept in aquaculture facility for about three to six months).</p> <p>When monitoring streams and rivers in Denmark all equipment (equipment for electrical fishing, boots etc) is disinfected when moving between water systems.</p>	
<p><b>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)?</b></p>	
<p>Threat/ Challenge A1</p>	

	No threats in Denmark.
Threat/ challenge A2	
Threat/ challenge A3	
Threat/ challenge A4	

*Copy and paste lines to add further threats/challenges which should be labelled A5, A6, etc.*

<b>4.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?</b>		
<b>Action A1:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness:	

<b>Action A2:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness & enforcement:	
<b>Action A3:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness & enforcement:	
<b>Action A4:</b>	Description of action:	
	Planned timescale:	
	Expected outcome:	
	Approach for monitoring effectiveness & enforcement:	

*Copy and paste lines to add further actions which should be labelled A5, A6, etc*