CNL(14)74

NASCO Implementation Plan for the period 2013-18

Norway

Updated 1 December 2014

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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').*

	Norway
Jurisdiction/Region:	**N/A**

1. Introduction

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

To conserve and restore spawning stocks at levels of abundance and with a composition that ensures genetic diversity and the full utilisation of the natural productive capacity of salmon habitat. Salmon habitat shall be managed to preserve diversity of nature and its productive capacity, and threats and adverse impacts shall be identified and eliminated. Wherever this is not possible, adverse impacts on the production, abundance and composition of salmon stocks shall be counteracted or neutralized. Impacts threatening the genetic diversity of salmon shall be reduced to not-harmful levels.

The internationally acknowledged Precautionary Approach shall be applied as a basic principle for all sectors involved. As a basic rule, those responsible for adverse impacts on the salmon resource shall also be responsible for restoration and compensation measures.
Within this framework, the salmon resource shall be managed to the greatest possible benefits to society, fishing right holders, and recreational fishermen.

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)

Spawning targets have been calculated for 439 out of the approx. 465 Norwegian salmon rivers, and this has contributed to reducing the risk of overfishing for these salmon stocks.

The Norwegian Scientific Advisory Committee for Atlantic Salmon Management (SACAS) has assessed whether the spawning targets have been reached for about 200 river stocks. (Ca. 98% of total river catch of salmon in Norway is from these rivers). For the purpose of giving advice on harvest the management target was defined as reached when *the average probability for reaching the spawning target the four previous years was more than 75%.*

There are a number of factors that affect salmon stocks, and many of them are man-made. The Norwegian Environment Agency has assessed how these factors affect the condition of salmon in Norwegian rivers. The assessments are based on catch statistics, scientific inquiries, and advice from SACAS.

The assessment is based on effects of human impacts, which affect fish production, accordingly affecting stock abundance and capacity to produce a harvestable surplus. The genetic status of stocks has been assessed regarding impact from escaped farmed salmon. In the future, the genetic integrity of stocks will also be based on gene markers. Stock assessments for individual rivers can be found in the Norwegian Salmon Database.

Stock status is grouped into categories (1.3).

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
Lost or Critically endangered	Rivers where the stock has been lost because of insufficient numbers of spawners or which has a high probability of becoming qualitatively lost due to a persistent and very high proportion of escaped farmed salmon (average proportion above 35% for the period 1989-2009).	49
Bad status	Rivers where the stock is threatened and can become lost if negative impact persists or increases. Examples are rivers where the fish is infected by the deadly parasite *Gyrodactylus*, and rivers where there is a persistent and high proportion of escaped farmed salmon (average proportion 20-35% for the period 1989-2009).	46
Poor status	Rivers where the stock is vulnerable and can become threatened if negative impact persists or increases, including rivers where there is a persistent and relatively high proportion of escaped farmed salmon (average proportion 8,7-20% for the period 1989-2009).	140
Moderate status	Rivers where the stock has either reduced exploitable surplus, reduced young fish production (more than 10%), insufficient spawning stock (below spawning target) or rivers where there is a persistent and moderate proportion of escaped farmed salmon (average proportion 3,3-8,7% for the period 1989-2009).	191
Good status	Rivers where the stock has good status but requires special concern to avoid reduction in status, including all naturally small stocks (less than 500 ascending individuals), and stocks with a small proportion of escaped farmed salmon (average proportion 1,6-3,3% for the period 1989-2009).	39

High status	Rivers with a large salmon stock (more than 500 ascending individuals) which are very little affected by negative impact factors. Average proportion of farmed salmon is less than 1,5% for the period 1989-2009	0
TOTAL:		465

Additional comments: The sole use of spawning- or management targets in order to define the status of stocks is not satisfactory because this means that stock status remains good as long as those targets are obtained, even at the cost that no fishery occurs. Or said with other words, as long as fisheries can be reduced further, "stock status" measured in terms of those targets will not diminish. This is a major flaw in the current system (for fisheries management and categorization) and should be corrected as soon as possible, in line with NASCO goals for salmon management, which incorporate both conservation and use (sustainable fisheries based on surplus in line with natural productive capacity).

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)*

In Norway there is generally only one yearly salmon run. The salmon is widely distributed from the temperate south to the arctic north. There are numerous small populations and some large ones. There is large variation in phenotype and life history traits between stocks, reflecting the diverse conditions under which the salmon lives. A survey has defined several categories of stocks based on duration of stay at sea and body size: "Typical grilse stocks", "grilse stocks with large grilse", "2SW stocks", and MSW stocks". Norway also has two stocks of landlocked salmon. In recent years several genetic studies have documented a wide range of genetic diversity between river stocks.

There have been few studies on diversity within specific Norwegian salmon rivers, but the stock complex of the border River Tana stands out as an exception. This river system comprises of more than 30 morphologically and genetically distinct spawning stocks, resulting in nearly 100 different combinations of smolt ages, sea ages and previous spawning times.

The stock diversity is taken into account by reducing selective effects of fisheries, and more strict regulations are implemented for threatened, vulnerable or reduced stocks that enter into the system with national salmon rivers. Escaped farmed salmon poses a threat to the genetic diversity. This is met by measurements to reduce escapements, by a targeted fishery on escaped fish, and by reducing fishing pressure on wild fish stocks with high numbers of farmed salmon in the spawning populations. The Norwegian research Council has funded a project to find out more about the ecological effect of genetic interaction between farmed and wild Atlantic Salmon.

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)

Norway has 440 rivers that sustain self-reproducing stocks of Atlantic salmon. The total river length of these rivers is approximately 9 600 km, and total river area currently available for salmon production is estimated to 262 000 000 m^2. In addition to these river habitats, there are numerous lakes in low-gradient watercourses with potential juvenile salmon habitat. Some lakes in Northern Norway are documented to be important habitats for older salmon parr, and seem to be of particular importance at the pre smolt stage. Constructions of fish passages during the past 140 years have increased the potential available habitat for salmon by 2 500 km, which represents approximately 26 % of the overall salmon freshwater habitat. However, some of the fish passages are not in function due to construction failure or lack of maintenance. Restoration of inefficient fish passages can potentially increase the current salmon habitat by 5-10 %. After liming acidified rivers in Southern Norway have become suitable for salmon production and recolonized by salmon, partly by stocking, and now contributes to approx. 15 % of total annual salmon production.

1.6 What is the current extent of freshwater and marine salmonid aquaculture?	
Number of marine farms	2013: 959 Grow out licences, 36 Brood stock licences, 56 Research licences 991 licences are producing in seawater. The number of sites in seawater per 31 December 2011 is 1 020.
Marine production (tonnes)	In 2013 the production of farmed Atlantic salmon in Norway was 1 168 324 tons (Sale of Atlantic salmon)
Number of freshwater facilities	230 Juvenile licences in freshwater.
Freshwater production (tonnes)	In 2013 the sale of smolt of Atlantic salmon was 295 289 000 individuals. If the smolt size is set to 100 g, the production can be estimated to ca. 29.000 tons. In accordance with Norwegian legislation a fish farmer is granted licence for the farming of salmon, trout and rainbow trout. Consequently, the figures reported cover the total numbers of farms rearing salmon, trout and rainbow trout.
Append one or more maps showing the location of aquaculture facilities and aquaculture free zones in rivers and the sea. Annex 1, 2, 3, 4, and 5.	

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/no/comments*

Yes

2. Fisheries Management:

2.1 What are the objectives for the management of the fisheries for wild salmon? *(Max. 200 words)*

The objective for the management of the salmon fisheries is to ensure that natural stocks are managed in such a way as to maintain natural diversity and productivity. Within this framework, the management shall provide a basis for the improvement of stocks with a view to raising yields for the benefit of holders of fishing rights and recreational fishermen.

Fisheries shall be based on stocks that are at full reproductive capacity, and the fisheries on other stocks should be reduced as much as possible. Management targets should be met consistently.

The proportion of escaped farmed salmon in spawning stocks shall be reduced by reducing fishing pressure on wild fish. Strict regulations should be implemented particularly on threatened, vulnerable or reduced stocks from national salmon rivers.

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)*
(This can be answered by providing a flow diagram if this is available.)
(Reference: Sections 2.1 and 2.7 of the Fisheries Guidelines)

Norwegian Environment Agency is responsible for regulating all salmon fishing in Norway. The Norwegian Scientific Advisory Committee for Atlantic Salmon Management (SACAS) gives advice for regulating the fisheries. Advice is given in five semi quantitative categories depending on the assessed average probability for achievement of spawning target over the last four seasons in any given stock (the management target would be 75% probability or higher). Starting with a low probability (20% or lower) resulting in advice to reduce fishing pressure very much. Although there is no standardized regulatory response to the different categories of advice, this category would normally translate into a 50% or more reduction in fishing pressure. On the other end of the scale there is a category of 75% or higher average probability of spawning target achievement combined with an estimated average spawning stock size of 140% or more of the spawning target resulting in advice that fishing pressure can be increased provided that sea mortality doesn`t decrease. This could result in a cautious lift in fishing regulations. Similar advice is given by the SACAS at an aggregated level for fjords and coastal areas resulting in similar regulatory responses. Based on this advice, given guidelines and on input from local and regional stakeholders, the county governors develop proposals for regulations of the fisheries. Where regional councils have been established, the regulations suggested will be discussed by the council. Where such councils have not been established, relevant organisations are invited to discussion meeting.

Norwegian Environment Agency sends its proposals on a national hearing. EU and Russia are invited to comment on the proposals regarding the fisheries in counties Troms and Finnmark and in southern parts of Norway. The Sámi Parliament is consulted at certain stages of the regulatory process.

The primary regulatory measures besides fishing gear, is to regulate the fishing season. Alternative regulatory measures such as personal bag limits (day or season), weekly fishing time, quotas, and catch and release are among other measures used to regulate fisheries.
In all National Salmon Rivers and in many other rivers mainly where regulations are based on local proposals, the fishery and salmon run must be assessed mid-season. If there is a risk that the spawning target will not be met, pre-agreed measures may be implemented. A specific toolkit, consisting of a procedural memo and specially adapted spread sheets for each individual river, has been developed for this assessment.

Regulatory measures on fisheries targeting stocks that do not reach their management target are aimed at permitting stock recovery. Implemented regulations must reflect the gap between the management target and estimated spawning-target attainment, so that the measure taken gets stricter the greater the gap. In cases were target attainment is low, the fishery in rivers and sea areas, where those stocks are potentially targeted, will not be permitted.

Flow diagram: Annex 6.

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.)*
(Reference: Section 2.7 of the Fisheries Guidelines)

For the period 2009-2012 SACAS estimated that management targets were met in 53% of 191 evaluated rivers (comprising about 98% of the total reported river catch), 25% were at risk of not meeting management targets, whilst targets were most probably not met in 21% of the evaluated rivers*. The assessment of management targets indicated a significant improvement from 2006-2009 to 2009-2012.

*) Fisheries in rivers may be permitted on some salmon stocks that do not reach their management target, other rivers might be closed for salmon fishery. The exact number of stocks not meeting management targets where fisheries still operate is not available and must be submitted later.

All net fisheries in coastal areas and many fjords are to a certain degree harvesting stocks that are below their management targets. However all fisheries targeting stocks that do not meet their management target, have been reduced over the last years. Implemented regulations reflect the gap between the management target and estimated target attainment, so that the measures taken get stricter the greater the gap, se also section 2.2. As a result of already implemented restrictions management target attainment has improved.

The border River Tana has considerable net fisheries, and the rod catches are also substantial. These fisheries are undertaken despite the stocks being far from meeting their spawning targets. Bilateral negotiations between Finland and Norway are going on and aim at establishing an adaptive management framework that allows for regulatory measures aiming at a sustainable fishery. The regulatory measures will be based on a stock rebuilding program. The challenges in River Tana are described and commented in Finland's IP.

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? *(Max. 300 words in total)*
(Reference: Section 2.8 of the Fisheries Guidelines)

(a) A mixed-stock fishery is a fishery exploiting a significant number of salmon from two or more river stocks. Mixed-stock fisheries include both fjord and coastal fisheries, and fisheries in the main stem of certain large rivers with several tributary river stocks, i.a. River Tana.

There are net fisheries in fjords and coastal areas, primarily using bag nets, whereas bend nets are only permitted in Finnmark. Almost all these fisheries are to a certain degree harvesting stocks that are below their management targets.

(b)
Mean catches in sea fisheries last 5 years (2007-2011): bag nets: 209 tons bend nets: 122 tons.

(c)
For the purpose of targeting the regulation of the mixed stock fisheries in the fjords and coastal areas more precisely, Norway is currently divided into 23 salmon fishery regions on which the advices on harvesting and regulation schemes are based. Fishing time is used as a primary means to reach the management targets. In several sea areas and in more than 100 rivers no fishing is permitted. Alternative measures, such as bag limits, may be implemented in river fisheries on the basis of proposals from local level. However, the effectiveness of alternative measures must be considered in each case. Pre agreed regulatory measures are implemented in river fisheries if there is a risk that spawning targets are not met.

2.5 How are socio-economic factors taken into account in making decisions on fisheries management? *(Max. 200 words)*
(Reference: Section 2.9 of the Fisheries Guidelines)

A number of organisations representing fishing right holders, public interests and conservation interests are involved in different aspects of salmon management. In order to facilitate stakeholder participation and influence in salmon management, e.g. fishing regulations, a number of local and regional councils have been established. On a national level salmon advisory and consultation meetings are normally held once or twice a year. National organizations of fishing right holders, recreational and commercial fishing interests, nature conservation, aquaculture and hydropower industries, and relevant authorities are represented. Over the last decade, local management bodies in salmon rivers have been given greater responsibility, especially local river-by-river organizations of landowners and fishing right holders.

The national government has consultation obligations with the Sami Parliament. This is governed by an agreement between the Government and the Sami Parliament.

2.6 What is the current level of unreported catch and what measures are being taken to reduce this? *(Max. 200 words)*
(Reference: Section 2.2 of the Fisheries Guidelines and the Minimum Standard)

The average level of total catch from 2007 to 2011 has been estimated to approx. 1000 tons. Average reported catch was approx. 700 tons, and the average level of estimated unreported catch in the same period has been 300 tons (30 %).

Over the last years systems and routines for reporting catches have been gradually improved in many salmon rivers, amongst them many of the major sport-fishing rivers. The reporting system has been improved due to better organization of fishing right holders and local management of salmon rivers. Measures taken may also include introducing deposits on catch reports, employing data technology to support the collection, compilation of catch reports and increasing general awareness of the importance of more accurate catch reports amongst fishermen. These improvements are considered to have led to more accurate catch reports from angling in rivers.

The reporting system for salmon catches in sea by bag net and bend net has been improved by the introduction of catch journals mailed directly to Statistics Norway by the fishermen themselves. The return of catch journals from sea catches is now about 95 per cent.

A project aimed at reducing unreported catch was initiated in 2012.

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 F1	Excessive harvesting pressure on mixed stocks, when the catches including fish from weak stocks
Threat/ challenge F2	Insufficient knowledge on sea survival. The effects of sea lice on fish populations cause special challenges predicting the number of returning salmon.
Threat/ challenge F3	Spawning targets need further development
Threat/ challenge F4	In the border River Tana considerable net fisheries and rod catches are taking place despite the stocks being far from meeting their spawning targets.

2.8 What actions are planned to address each of the above threats and challenges in the five year period to 2018?		
Action F1:	Description of action:	Annual assessments of the management target achievement for the previous 4-5 year period are made by The Norwegian Scientific Committee for Atlantic Salmon Management (SACAS). In response to advice from the committee regulatory measures will be introduced normally every four or five years or if necessary annually or within season, as described in section 2.2. Special caution is exercised when regulating the fishery in areas with the risk of impacts from aquaculture. Fishing season, in sea and river fisheries will be used as a primary means to reach the management targets. Pre-agreed regulatory measures are implemented in rivers if there is a risk that spawning targets are not met.
	Planned timescale:	Continuously
	Expected outcome:	Increase in number of stocks reaching management targets.
	Approach for monitoring effectiveness & enforcement:	SACAS is assessing the achievement of management targets on an annual basis.
Action F2:	Description of action:	Introduction of mandatory mid-season assessment of the fishery and salmon run and pre-agreed measures in more rivers. Consider the introduction of similar requirements for sea-fisheries. Further develop the specific toolkit, consisting of a procedural memo and specially adapted spread sheets for each individual river.
	Planned timescale:	Continuously
	Expected outcome:	Increase in number of stocks reaching management targets.
	Approach for monitoring effectiveness & enforcement:	SACAS is assessing the achievement of management targets on an annual basis.
Action F3:	Description of action:	Introduction of "second" generation spawning targets.
	Planned timescale:	A revised approach for setting spawning targets, including applying a standardized habitat classification system, will be evaluated in a number of rivers in 2013. Depending on the outcome of this evaluation revised spawning targets will be implemented for all rivers with salmon stocks from 2014 and onwards.
	Expected outcome:	More precise spawning targets and better stock management.
	Approach for monitoring effectiveness & enforcement:	

Action F4:	Description of action:	Negotiate a new regulatory regime for the river Tana with Finland, and introduce a stock rebuilding program in collaboration with Finland.
	Planned timescale:	2012-2016.
	Expected outcome:	A new agreement in 2016, followed by stock-rebuilding up to spawning target achievement in the river Tana.
	Approach for monitoring effectiveness & enforcement:	A Norwegian-Finish scientific working group is assessing the achievement of management targets on an annual basis.

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 prioritised, taking into account the principle of 'no net loss' and the need for inventories to provide baseline data? *(Max. 200 words)*
(*Reference: Section 3 of the Habitat Guidelines)*

Risks to productive capacity in salmon rivers have recently (2011) been identified and evaluated by a scientific committee appointed by Norwegian Environment Agency. One of the main conclusions was that major riverine factors such as hydropower development and acidification are dealt with in a satisfactory manner. Potential mitigation measures in regulated rivers have recently been evaluated. In 2013 a major review of potential mitigation measures in watercourses will be conducted, as a part of the implementation of the EU Water Framework Directive. In National salmon rivers there are certain restrictions against all physical and chemical impacts that might reduce habitat productivity and hence salmon production. These restrictions are formulated in the protection regime implemented in National salmon rivers, and specified for major impacts such as hydropower development, water diversions, water removal due to irrigation and water supply, channelization, dredging, road constructions, artificial migration obstacles, fish farming, water effluents, removal of riparian vegetation and removal of river bed substrate.

3.2 How are socio-economic factors taken into account in making decisions on salmon habitat management? *(Max. 200 words)*
(Reference: Section 3.9 of the Habitat Guidelines)

The socio-economic factors are taken into account in the process of judging whether a project including withdrawal of fresh water or a project affecting the freshwater habitat should be granted. In the licensing process pros and cons of the project are evaluated, and socio-economic factors are included in this evaluation.

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 H1	Acidification
Threat/ challenge H2	Hydro power development
Threat/ challenge H3	Artificial migration obstacles
Threat/ challenge H4	Other habitat deterioration

3.4 What actions are planned to address each of the above threats and challenges in the five year period to 2018?		
Action H1:	Description of action:	Liming of 22 acidified salmon rivers and if feasible include five additional rivers in the long-term liming program
	Planned timescale:	Continuously in accordance with action plans (timescale for current action plan is 2011-2015)
	Expected outcome:	Restored salmon stocks and fishing possibilities
	Approach for monitoring effectiveness & enforcement:	Annual surveys on juvenile salmon populations and mandatory reports of annual river catches of salmon
Action H2:	Description of action:	All rules of operations for the largest and oldest hydropower plants are subject to revision within 2022. A major challenge is how the water needed for reintroduction of Atlantic salmon and other environmental improvements shall be weighed in relation to the goals for producing renewable energy (the RES Directive). Measures in National Salmon Rivers will be given high priority. Positive and negative effects will be evaluated. If the positive values turns up to exceed the negative values new conditions will be set. Other actions are habitat improvements, fish-ladders, adjustment in the manoeuvring regimes etc.
	Planned timescale:	2013-2022 (timescale for revision of concessions)
	Expected outcome:	In general, an increase in water discharge in dewatered areas, no ramping, less fluctuations in water levels, and more environmentally friendly allocation of water and habitat improvements in critical periods of the salmon life cycle will be evaluated in each specific river.
	Approach for monitoring effectiveness & enforcement:	Regular surveys on juvenile and adult salmon populations and mandatory reports of annual river catches of salmon
Action H3:	Description of action:	Removal or reconstruction of artificial migration obstacles such as pipes and culverts through roads
	Planned timescale:	2013-2018
	Expected outcome:	Effective fish passages increase available nursery habitats in upper reaches of salmon rivers - removal of migration obstacles increases available habitat in tributaries of larger salmon rivers and in smaller coastal streams
	Approach for monitoring effectiveness & enforcement:	Surveys before and after modifications
Action H4:	Description of action:	a) Increased focus on enforcing the current legislation against habitat deterioration, to avoid further negative impact on salmon nursery habitat. Special focus will be on National Salmon Rivers, in which there are particular restrictions against most types of habitat

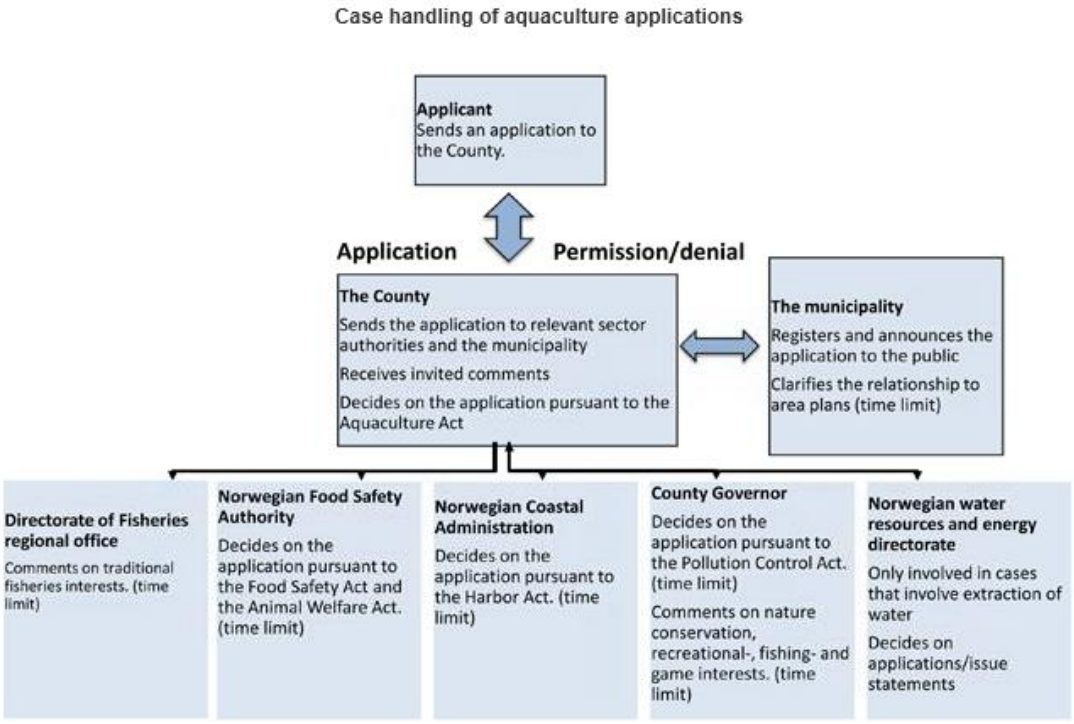
		encroachment. An important part of this initiative is to bring updated information on the new regime to important stakeholders such as landowners and road constructors. b) Habitat restoration and biotope adjustments. A lot of weirs have been constructed throughout the country. In later years several of these have been reconstructed to improve the passage of migrating anadromous salmonids. In Northern Norway in particular several actions have taken place to improve the salmon habitat. Several rivers that were channelized in the 1990'ies have achieved improvements by opening of river reaches to be active during floods, placement of large stones to increase habitat heterogeneity, rebuilding of flood protection works, including jacks and other constructions to increase hydraulic heterogeneity.
	Planned timescale:	2013-2018
	Expected outcome:	Increased productivity in nursery habitats for Atlantic salmon due to decreased habitat degradation and increased connectivity in salmon river systems
	Approach for monitoring effectiveness & enforcement:	General monitoring of juvenile and adult populations

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) See b. Almost the same requirements pass for freshwater sites as for marine sites.

(b)



The concern for wild salmon stocks is included when decisions are taken regarding the localizations of aquaculture. The assessments are based on best available knowledge and advice from the County Governor as regional authority for environmental issues, and from the veterinary authorities (NFSA) regarding the spread of fish diseases.

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? *(Max. 200 words)*
(Reference: BMP Guidance)

The national goal is that disease in aquaculture (including sea lice) will not have a regulating effect on stocks of wild fish.

Norway has taken measures in accordance with NASCO's Guidance on Best Practice, and has regulations concerning fish health and sea lice in fish farms in place, which also take into consideration the possible spread of diseases to wild populations of fish.

Before the siting of aquaculture facilities are approved, Norwegian Food Safety Authorities (NFSA) has to take into considerations the impact on wild salmon stocks – Regulations No 823 of 17 June 2008: Regulations on the establishment and expansion of aquaculture establishments, pet shops etc., When taking a decision pursuant to that regulation the principles of the Nature Diversity Act should be taken into account by the NFSA .

The national regulations for sea lice have been amended several times over the past years and new regulations entered into force January 2013. The new regulation shall ensure better coordination between farmers and the trigger level for sea lice is now changed to a maximum level. The demand for coordinated treatment during spring is now included in the national sea lice regulation.
The national regulations allows NFSA to order coordinated de-licing operation, fallowing and if necessary slaughtering. In addition they can establish special zones with stricter regulations than the general regulatory framework. Two such zones have already been established.

Sea lice monitoring program on wild salmonids is in place. The program is managed by the Institute of Marine Research. Sea lice load in aquaculture is seen in Annex 7, while sea lice load on wild stocks of salmonids is seen in Annex 8.

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? *(Max. 200 words each)*
(Reference: BMP Guidance)

(a) Freshwater

Special inspections are set up to identify and stop all leakages from land based juvenile and smolt production. Scientists claim this has reduced the number of spawning farmed salmon.

The table presented below states that "A technical standard on land based aquaculture constructions has been developed" This standard corresponds to NS 9415 and sets out technical requirements on the construction of land based aquaculture farms, hence covering smolt farms. Work on including this standard into the legislative framework is going on. Furthermore, land based farms (i.e. smolt production sites and hatcheries) must have double protection on water outlet to reduce probability of escape through water outlet.
The reply given under (b) covers both marine farms and smolt farms/hatcheries.

(b) (The tables are based upon NASCO's SLG(09)5 Guidance on Best Management Practices)

A. Containment - International Goal:

100% farmed fish to be retained in all production facilities

Possible actions to be taken:	**Norwegian governmental actions:**
Codes of Containment including operating protocols	*A special regulation is set.*
Technical standards for equipment	*The Ministry of Fisheries and Coastal Affairs has set regulations concerning Technical Requirements for fish farming installations and their operation.* *Technical standard for floating cages (NS 9415) and corresponding regulation has been updated.* *A technical standard on land based aquaculture constructions has been developed.*
Verification of compliance	*Frequent inspections are made.*
Risk-based site selection	*The Directorate of Fisheries executes risk-based selection of topics and objects.*
Mandatory reporting of escape events and investigation of causes of loss	*This has been mandatory for a long time. Reports are made public on a regular basis.*
Adaptive management in response to monitoring results to meet the goal	*Ongoing process – some actions are taken. Vision no escapees – Action plan from the Directorate of Fisheries has been implemented since 2007.*

B. Reporting and tracking regarding containment:

Possible actions to be taken:	**Norwegian governmental actions:**
Number of incidents of escape events and standardized descriptions of the factors giving rise to escape events	*This requirement is accomplished. All escape sites are inspected. Every episode is investigated.*
Number and life-stage of escaped salmon (overall number; % of farmed production)	*This requirement is accomplished. Annual graphics are made. See next page.*
Number of escaped salmon in both rivers and fisheries (overall number; % of farmed production) and relationship to reported incidents	*A new national monitoring programme is being implemented from 2014. The aim is to increase quality and quantity of the investigations. The programme is coordinated by the Institute of Marine Research.*

Escapes and escape incidents of farmed salmon in Norway

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Escaped farmed salmon	553 000	717 000	921 000	298 000	111 000	225 000	291 000	367 000	38 000	198* 000
Escape incidents			32	23	20	34	38	17	10	20*

*preliminary figures pr 31.10.13 based on reports from the fish farmers

4.4 What progress has been made to implement NASCO guidance on introductions, transfers and stocking? *(Max. 200 words)*
(Reference: Articles 5 and 6 and Annex 4 of the Williamsburg Resolution)

Article 5: c.f. 4.3

Article 6: The objective of the Act Relating to Salmonids and Fresh-Water Fish is, inter alia, to ensure that natural stocks of anadromous salmonids are managed in such a way as to maintain natural diversity and productivity. It is prohibited both to import anadromous salmonids (and other fresh water species) and release any kind of anadromous salmonids (and other fresh water species) in watercourses, fjords and the sea without a distinct permission. Release of both imported and local stocks of fish for enhancement activities is regulated by the act.
As regards stock enhancement programmes, Norway has established cultivation zones to avoid transfer of non-indigenous stocks. It is not allowed to transfer eggs or fish between these zones. If salmon is to be reintroduced or enhanced in one zone, the stocking material has to come from the local stock reared at a hatchery in the same watershed or river-basin. Exemption may only be granted for disinfected eggs from the national gene bank program. All these activities are regulated by provisions and guidelines given by Directorate of Nature Management.
Ordinary salmon stocking programs, in order to enhance local populations are kept at a minimum level and gradually replaced by

1) Habitat protection and restoration
2) Rebuilding strategies based on conservation and restoration programs reflecting the Norwegian gene bank model.

4.5 What is the policy/strategy on use of transgenic salmon? *(Max. 200 words)*
(Reference: Article 7 and Annex 5 of the Williamsburg Resolution)

"The deliberate release of all genetically modified organisms in Norway is regulated by the Norwegian Gene Technology Act. The Act sets out five criteria to be considered prior to a potential release of a transgenic organism; risk to the environment, risk to human health, sustainability, benefit to the society and ethics.

Generally, Norway has a restrictive legislation and policy on transgenic organisms – no plants or animals have been approved for commercial release so far. In addition, the political platform of the current coalition government states that "we shall continue to have a restrictive attitude to" genetically modified organisms".

4.6 What measures are in place to prevent the introduction or further spread of *Gyrodactylus salaris*? *(Max. 200 words)*

NFSA implements regional regulations for the areas infected by *G. salaris* to prevent spreading of the disease to other river courses.

We have implemented two regional regulations: the Vefsn region and the Driva region. In addition we have started preparation, hearing and implementation of regional regulation for the Romsdal region and planning on doing this for the Lyngen region in spring 2013.

Norway has a national surveillance program in place; in addition we have regional surveillance programs for the river courses treated for *G. salaris*: The Steinkjer region from autumn 2011, the Lærdal region from summer 2013, and the Vefsn region from summer 2014.

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 A1	Sea lice is considered mainly a problem for the wild salmonids and the authorities have shifted the focus from considering the sea lice levels in fish farms only, but also taking the sea lice infestations on wild salmonids into account when deciding upon measures in aquaculture.
Threat/ challenge A2	Genetic interaction and escape can be a threat to wild salmon. More research is necessary to measure the effects and find ways to avoid the influence from farmed salmon.
Threat/ challenge A3	*Gyrodactylus salaris*
Threat/ challenge A4	Several alien species are spread and threaten local populations of Atlantic salmon. Among these species are pink salmon (*Oncorhynchus gorbuscha*) and European minnow (*Phoxinus phoxinus*)

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

Action A1:	Description of action:	A regional carrying capacity model for sea lice is now being developed.
	Planned timescale:	2013 – 2017
	Expected outcome:	Based on farmed salmon biomass and other parameters in a region, the numbers of sea lice copepodites in the area can be estimated. Taking into account the dispersion patterns for selected times the copepodite transmission within the region can be determined. Adaptive management in response to monitoring results will then be possible.
	Approach for monitoring effectiveness:	The field methods used in the on-going national sea lice surveillance (sentinel cages, gill net fishing for sea trout) can be used to monitor the effectiveness of the action.
Action A2:	Description of action:	1. Further improvement of precautionary measures e.g : - Site based technical certificate for every fish farm in sea. - Stricter requirements concerning mesh size and number of fish held in one cage.

		- A public consultation on amendments of the The Norwegian Aquaculture Act to improve legal base for environmental measures has been undertaken. 2. Research on sterile farmed salmon to reduce genetic and ecological threats to wild salmon populations. 3. Additional long-term monitoring programs and studies of ecological processes and the environmental impacts of fish farming. 4.Test of resistance board weirs etc. to monitor and remove escaped salmon from Norwegian rivers 5. Search for better methods and technical solutions tracing the origin of farmed Atlantic salmon escapees. (This can be done by using DNA Parentage Assignment (industry based project) or other suitable methods.
	Planned timescale:	1. 2012-2016 2. 2012-2018 3. 2012-2018 4. 2013-2016 5. 2012-2018
	Expected outcome:	1. Reduced genetic interaction between farmed and wild Atlantic salmon. 2. Reduced spawning activity of farmed salmon in rivers. 3. -4. Get better knowledge and measures to cope with escaped Atlantic salmon. 5. Methods for immediate identification of escaped Atlantic salmon and basis for action against leaking sites. Secure identification of the guilty polluter.
	Approach for monitoring effectiveness & enforcement:	1. Consider all relevant statistics to see if the number of escapees is reduced. 2. Evaluate reports from scientists and fish farmers using sterile fish. 3. Evaluation of programs and studies made by relevant research institutions. 4. Evaluation of results made by The Hardangerfjord pilot and other relevant programs. 5. The Directorate of Fisheries will investigate episodes concerning strayed/farmed salmons found in fjords and rivers and will evaluate...
Action A3:	Description of action:	Proposal for a new action plan for the control of *Gyrodactylus salaris* is being developed.
	Planned timescale:	The proposal will cover the period 2013-2016.
	Expected outcome:	To combat the parasite in two regions, Rauma region consisting of 5 infected rivers, and Skibotn region consisting of two infected rivers. In addition, there are plans to build a long-term fish barrier in the River Driva.
	Approach for monitoring effectiveness & enforcement:	After completing combat action in a river, a five-year monitoring program starts. The purpose of this monitoring program is to determine if the combating has been successful.

Action A4:	Description of action:	It is prepared an action plan to reduce the impact of pink salmon in the rivers in the county of Finnmark, the northernmost county in Norway. The plan includes monitoring and removal of pink salmon in rivers. There is also a plan to reduce minnow impact on native fish populations in the river Namsen in the middle part of Norway. Currently, minnow are not spread to the Atlantic salmon distribution area. Monitoring is therefore the most important action so far.
	Planned timescale:	Removal of pink salmon in rivers in Finnmark is carried out annually. Mostly pink salmon migrate up the river every other year. Removal of pink salmon is therefore most important in the years where the density of pink salmon is high.
	Expected outcome:	The aim is to reduce the breeding population of pink salmon to a minimum.
	Approach for monitoring effectiveness & enforcement:	An annual monitoring program of pink salmon in the Finnmark county, and of minnows in the river Namsen.

Annex 1 Sites for salmon and rainbow trout farms, Southern Norway
Annex 2 Sites for salmon and rainbow trout farms, Middle of Norway
Annex 3 Sites for salmon and rainbow trout farms, Northern Norway I
Annex 4 Sites for salmon and rainbow trout farms, Northern Norway II
Annex 5 National Salmon Fjords
Annex 6 Decision making process for fisheries regulations, flow diagram
Annex 7 Sea lice level in aquaculture
Annex 8 Sea lice level on wild salmonids

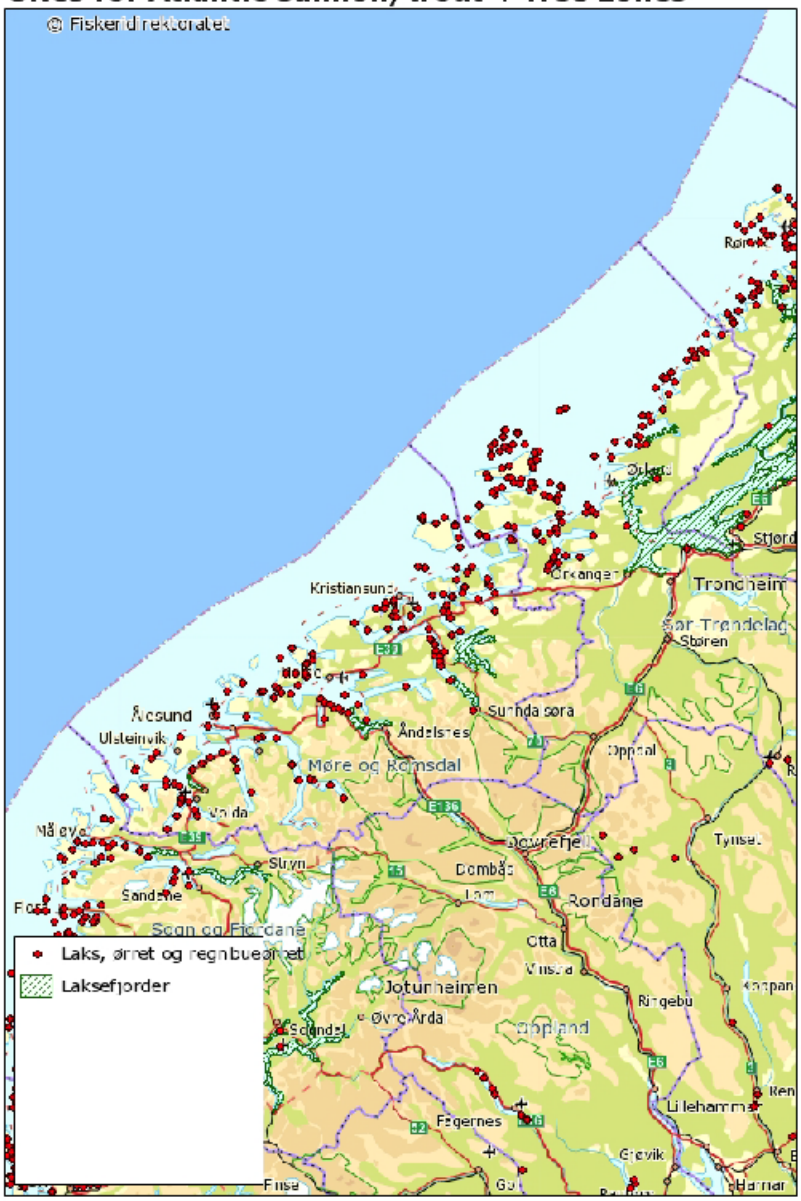
Annex 1

Sites for Atlantic salmon/trout + free zones

Målestokk: 2 162 694

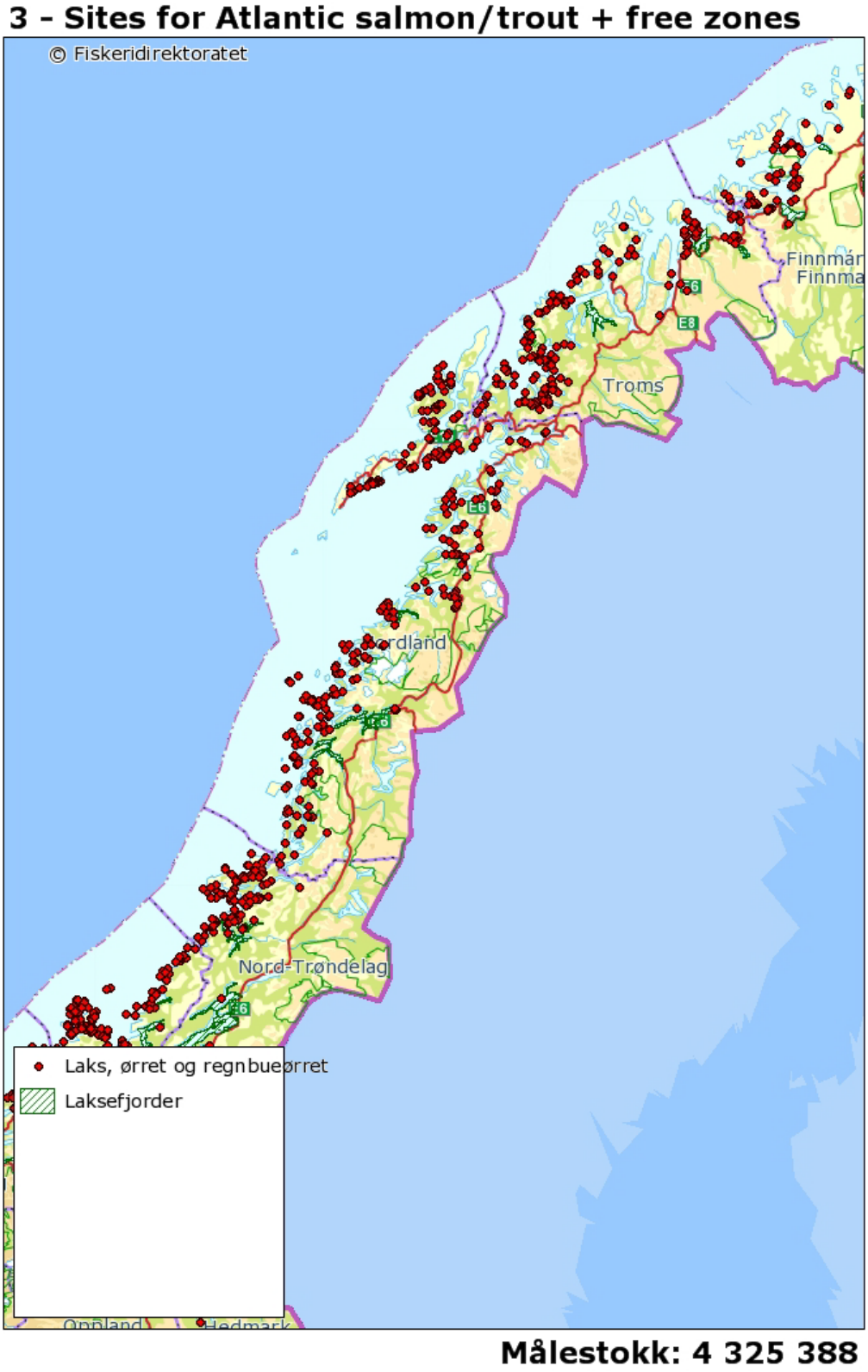
Annex 2

Sites for Atlantic salmon/trout + free zones



Målestokk: 2 162 694

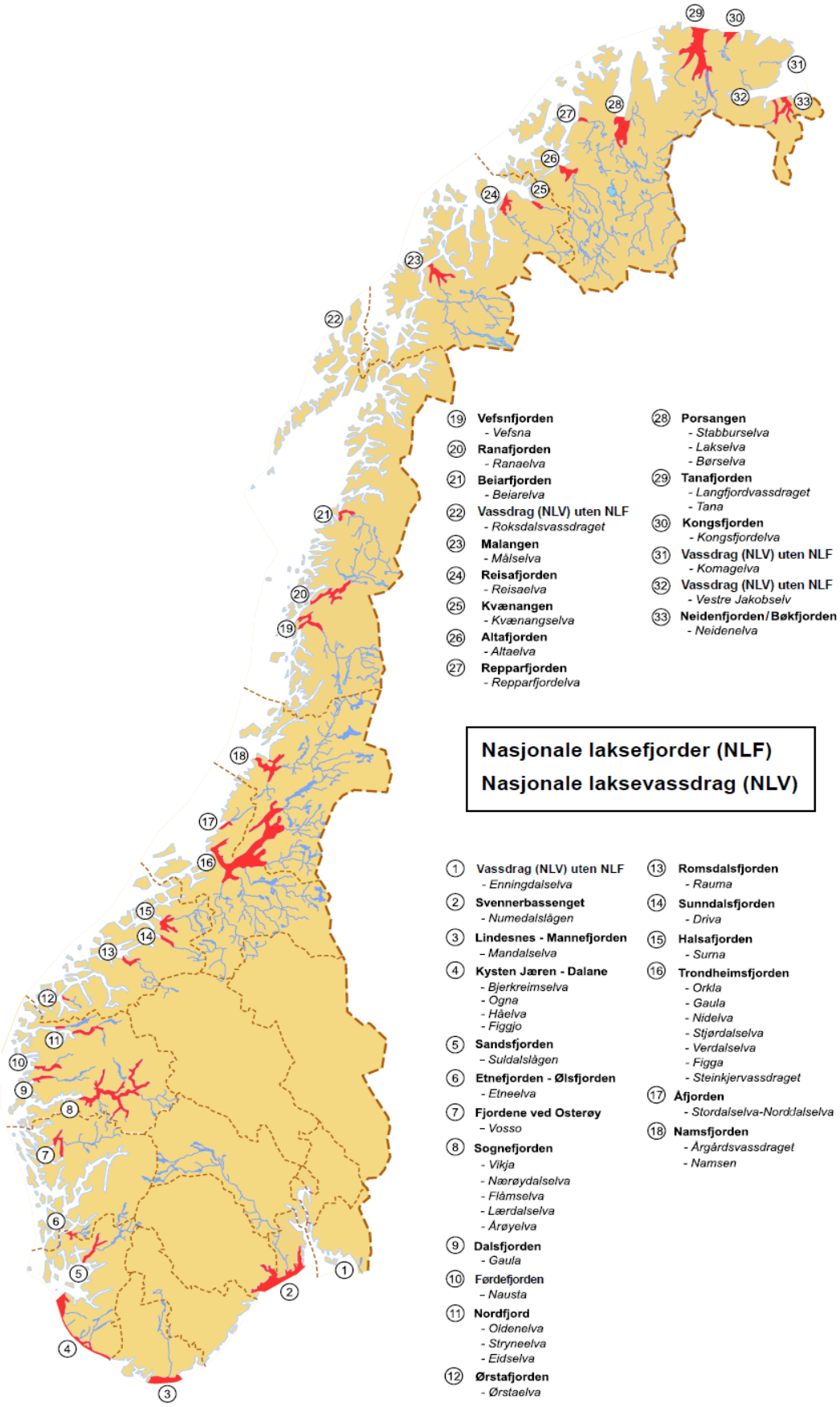
Annex 3


3 - Sites for Atlantic salmon/trout + free zones
© Fiskeridirektoratet
Troms
Nord-Trøndelag
Laks, ørret og regnbueørret
Laksefjorder
Målestokk: 4 325 388

Annex 4

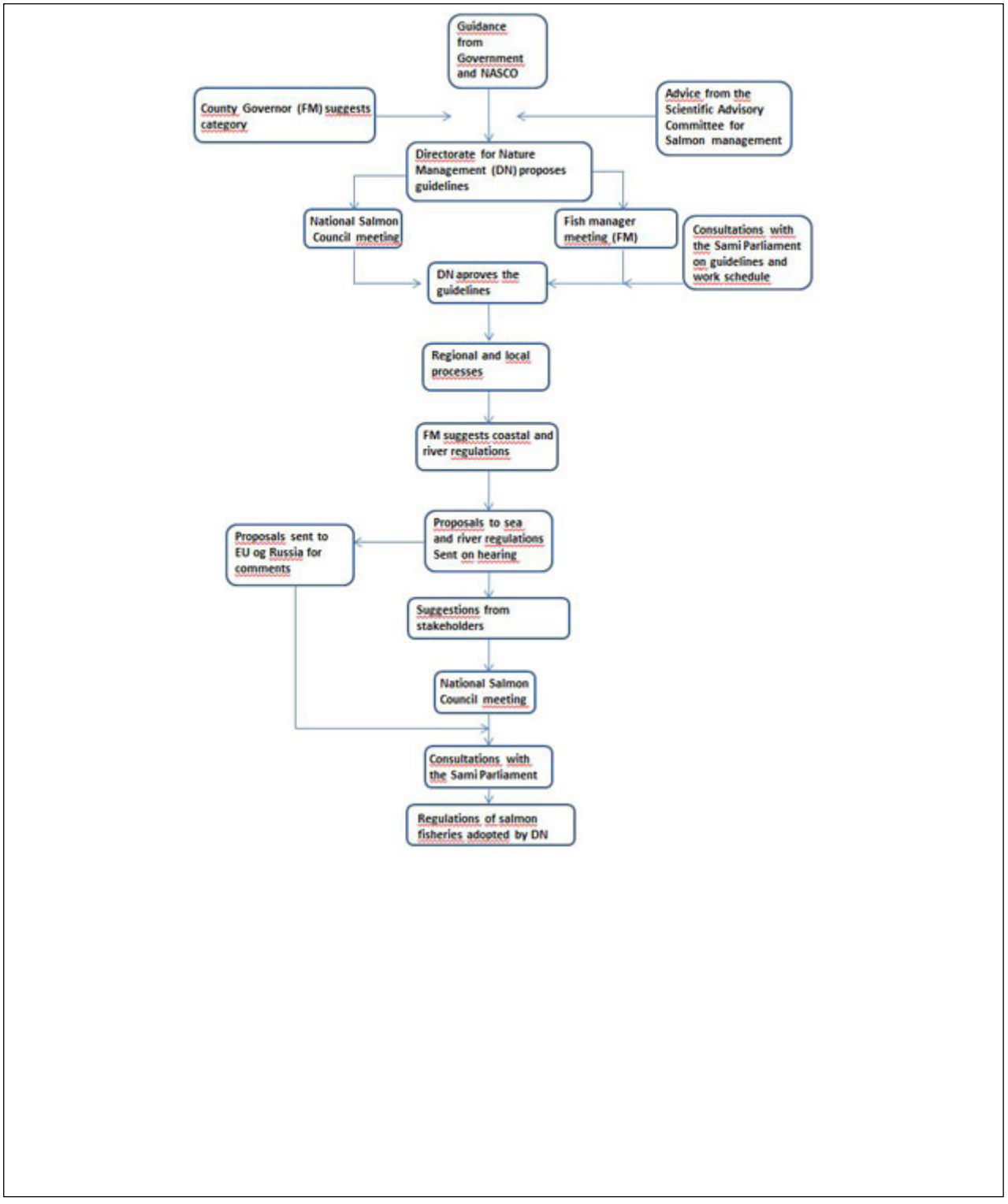

4 - Sites for Atlantic salmon/trout + free zones
© Fiskeridirektoratet
Mehamn
Berlevåg
Båtsfjord
Vardø
Havøysund
Honningsvåg
E69
Hammerfest
94
E6
Vadsø
E75
Deanušaldi
Tana bru
Kirkenes
Leavdnja
Lakselv
Alta
Kárášjohka
Karasjok
Finnmárku
Finnmark
92
Finnmarksvidda
Guovdageaidnu
Kautokeino
Laks, ørret og regnbueørret
Laksefjorder
Målestokk: 2 145 602

Annex 5


Nasjonale laksefjorder (NLF)
Nasjonale laksevassdrag (NLV)
1 Vassdrag (NLV) uten NLF
- Enningdalselva
2 Svennerbassenget
- Numedalslågen
3 Lindesnes - Mannefjorden
- Mandalselva
4 Kysten Jæren - Dalane
- Bjerkreimselva
- Ogna
- Håelva
- Figgjo
5 Sandsfjorden
- Suldalslågen
6 Etnefjorden - Ølsfjorden
- Etneelva
7 Fjordene ved Osterøy
- Vosso
8 Sognefjorden
- Vikja
- Nærøydalselva
- Flåmselva
- Lærdalselva
- Årøyelva
9 Dalsfjorden
- Gaula
10 Førdefjorden
- Nausta
11 Nordfjord
- Oldenelva
- Stryneelva
- Eidselva
12 Ørstafjorden
- Ørstaelva
13 Romsdalsfjorden
- Rauma
14 Sunndalsfjorden
- Driva
15 Halsafjorden
- Surna
16 Trondheimsfjorden
- Orkla
- Gaula
- Nidelva
- Stjørdalselva
- Verdalselva
- Figga
- Steinkjervassdraget
17 Åfjorden
- Stordalselva-Norddalselva
18 Namsfjorden
- Årgårdsvassdraget
- Namsen
19 Vefsnfjorden
- Vefsna
20 Ranafjorden
- Ranaelva
21 Beiarfjorden
- Beiarelva
22 Vassdrag (NLV) uten NLF
- Roksdalsvassdraget
23 Malangen
- Målselva
24 Reisafjorden
- Reisaelva
25 Kvænangen
- Kvænangselva
26 Altafjorden
- Altaelva
27 Repparfjorden
- Repparfjordelva
28 Porsangen
- Stabburselva
- Lakselva
- Børselva
29 Tanafjorden
- Langfjordvassdraget
- Tana
30 Kongsfjorden
- Kongsfjordelva
31 Vassdrag (NLV) uten NLF
- Komagelva
32 Vassdrag (NLV) uten NLF
- Vestre Jakobselv
33 Neidenfjorden/Bøkfjorden
- Neidenelva

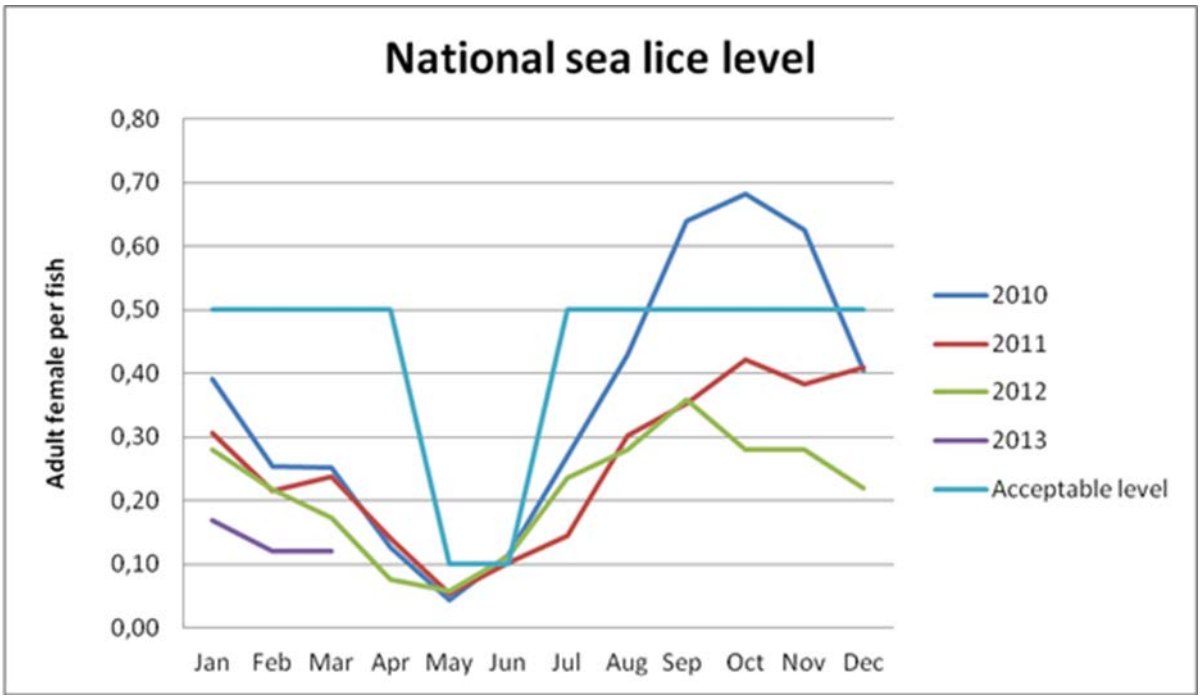
Annex 6

Regulation of Salmon Fisheries in Norway



Annex 7

Sea lice levels in fish farms



Annex 8

Sea lice load on wild samonids:

+ = low, ++ = moderate, +++ = high

District	2000-2007	2008	2009	2010	2011	2012
Jæren	+	+	+	+	+	+
Ryfylke	+++	+	+++	+++	+++	++(+)
Ytre Hardanger	+++	+++	++(+)	+++	+++	+++
Indre Hardanger	+++	+++	+++	+	++	+++
Hordaland	+++	+	+	++	+++	+++
Sognefjorden	+++	+(+)	+(+)	++	++	++(+)
Sunnfjorden	+++	++	++	++	++	
Nordfjord	+++	++	++		+(+)	
Storfjordsystemet						++(+)
Romsdalsfjorden	+++	++	++	+	+	+ (+)
Stadt	+++	++	++	+	+	
Trondheimsfjorden	+	+	+	+	+++ (ytre)	+++
Altafjorden	+	+	+	+	++	+
Porsangerfjorden	+	+	+	+	+	