



NORGES BONDELAG



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LAKSEELVER

**GREENPEACE**

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## **COMPLAINT TO THE EFTA SURVEILLANCE AUTHORITY (ESA) CONCERNING THE NORWEGIAN GOVERNMENT'S FAILURE TO COMPLY WITH THE PROVISIONS OF THE WATER FRAMEWORK DIRECTIVE 2000/60/EC (WFD) WITH REGARDS TO THE BIOLOGICAL EFFECTS AND OTHER SIGNIFICANT IMPACTS OF AQUACULTURE**

This complaint is filed on behalf of the following associations, representing the interests of local communities and river owners and for the sake of nature conservation, biodiversity and outdoor recreation:

- The Norwegian Association of Hunters and Anglers (NJFF)
- The Norwegian Biodiversity Network (SABIMA)
- The Norwegian Farmers' Union (Bondelaget)
- The Norwegian Salmon Rivers (Norske Lakseelver)
- The Norwegian Society for the Conservation of Nature (Naturvernforbundet)
- The Norwegian Trekking Association (DNT)
- The Union of Outdoor Recreation Organizations (Norsk Friluftsliv)
- WWF Norway
- Greenpeace Norway

### **Introduction**

Norway is by far the largest aquaculture producer in Europe. In 2014, Norway produced 1 258 000 tons of salmon alone. The aquaculture industry has various environmental impacts affecting large areas of Norwegian coastal waters, with negative effects on migrating (wild) fish like the Atlantic salmon<sup>1</sup>. Environmental impacts from aquaculture, and the major drops in the populations of (wild) salmon, sea trout and arctic char is a major concern for the Norwegian public.

The Norwegian authorities fail to include biological effects of aquaculture in the implementation of the Water Framework Directive (WFD) in Norway. The issue was presented to the ESA last year, although not in the form of a formal complaint. As the water authorities have not made any progress in the matter, and the government has decided that the effects of aquaculture will not be included in the River Basin Management plans (RBMPs) for 2016-2021, we now choose to submit a formal complaint.

The magnitude of biological effects of aquaculture is not reflected in the Norwegian WFD reports so far.

The biological effects of aquaculture include:

- The escape of farmed fish, which is a problem since farmed fish are genetically different and less diverse than the wild stock of the same species and primarily bred to grow fast in captivity. They also compete with the wild salmon for spawning areas.
- Increased infestation pressure from sea lice in areas with fish farms, as fish farms provide hosts for sea lice in coastal waters throughout the year and function as breeding grounds for the sea lice. This is a threat to the wild fish populations as sea lice infestation reduces both the survival and reproduction rates of wild salmonids.
- Norwegian fish farms use substantial amounts of various drugs, pesticides and other chemicals, which end up in the marine ecosystem. The effects are generally poorly investigated, but it is for instance expected that the release of substances that inhibit the chitin synthesis in sea lice will affect other crustaceans as well.
- Fish farms also produce large amounts of nutrient rich organic waste and are by far the biggest anthropogenic source of phosphorus in Norwegian coastal waters.

These problems are subject to recurring debates in Norwegian media and have sparked several research projects funded by either the government or the aquaculture industry. They are also continuously being described by the Norwegian government as 'important challenges'. Ever since the first planning cycle, with the pilot River Basin Management Plans, there is also an ongoing discussion in Norwegian water management about how to include (or according to the Directorate of Fisheries: *whether* to include) the biological effects of aquaculture in the WFD-work.

#### **Biological effects of aquaculture are still kept out of the WFD-implementation in Norway**

The responsible authorities have managed to keep the effects of aquaculture out of the characterization of coastal waters, and thereby out of the RBMPs and Programmes of Measures (PoMs). The biological effects of aquaculture have therefore not yet been included in the Norwegian WFD-implementation.

The government's decision to keep the biological effects of aquaculture out of the RBMPs for 2016-2021 is clearly stated in a letter from the Minister on Climate and Environment dated 7 April 2015 to a local wild salmon council in western Norway.<sup>ii</sup>

As a result of this, the problems are not visible in the Norwegian WFD-reports. For instance, the "[Summary report for Norway, WFD Article 5 Characterisation, Status May 2013](#)"<sup>iii</sup> only mentions the problems with sea lice and escaped farmed fish in a short sentence on page 5 and a footnote on page 19.

The Norwegian government's decision to keep the biological effects of aquaculture out of the RBMPs for 2016-2021 clearly contradicts the message from the commission to the Norwegian government in the "[Commission staff working document, Norway, Accompanying the document Report from the commission to the European Parliament and the Council on the Implementation of the Water Framework Directive, River Basin Management Plans](#)",<sup>iv</sup> dated 14 November 2012. In chapter 4.4, the commission states that, "*Biological impact factors such as Gyrodactylus salaris infections, escaped farmed fish and alien species are also mentioned as important pressures in some Pilot RBMPs, but the Royal Decree clearly states that biological impact factors should not be included for coastal waters in the Pilot RBMPs or PoM. (...) Future RBMPs must encompass all significant pressures, including biological impact factors in coastal waters*".

Keeping the effects of aquaculture out of the RBMPs for 2016-2021 is not in line with the [Royal Decree of 11 June 2010](#)<sup>v</sup>. In the chapter on coastal waters ("*Særlig om kystnære farvann*"), it is explained that the decision to keep biological impact factors out of the characterization of coastal waters, and thereby

out of the RBMPs and PoMs, would only apply to the voluntary plans for 2010-2015. The Royal Decree of 2010 makes it clear that, where considered a significant pressure, it should be possible to include biological impact factors in coastal waters in the characterization and the RBMPs for the period 2016-2021. The Royal Decree further clarifies that measures against the impacts from aquaculture should be based on the Norwegian "[Strategy for an environmentally sustainable aquaculture](#)"<sup>vi</sup>, which focuses on escapes, nutrient releases, diseases and parasites (including sea lice) as the main environmental challenges today and in the near future. This national strategy document underlines that it will be especially relevant when developing environmental goals and measures for these topics in the RBMPs to be implemented in 2016-2021.

The intentions in the Royal Decree of 2010 are reflected in the Norwegian authorities' comments on the complaint from the commission as presented in the document "[Norges 15 forbedringspunkter, Faglig vurdering av tilbakemeldingen på Norges første vannforvaltningsplaner og relevante signaler fra EU-kommisjonens samlede gjennomgang, med anbefaling for oppfølging.](#)"<sup>vii</sup>, from 18 June 2013.

In chapter 8, the Norwegian Directorates behind this document comment on the remark from the commission, explaining that the Royal Decree from 2006 only concerned the voluntary areas included in the RBMPs for 2007-2009. The directorates point out that in the Royal Decree of 2010, it was decided that, where considered significant pressures, biological impact factors in coastal waters should be included in the characterization, and thereby included in the plans prepared up until 2015. Note that this was written as late as June 2013, only a little more than a year before the public hearing of the RBMPs for 2016-2021.

The authorities' apparent inability to fulfil their own intentions in the Royal Decree of 2010 may partly be explained by the White Paper on Norwegian seafood policy ([Meld. St. 22 \(2012–2013\) Melding til Stortinget, Verdens fremste sjømatnasjon, Tilråding fra Fiskeri- og kystdepartementet 22. mars 2013](#))<sup>viii</sup>, which on page 123 states that *"measures to reduce the environmental impact may have big consequences for the industry and public interests. Even if the goal is to have as little environmental impact from aquaculture as possible, one still has to consider the interests of the seafood industry and other associated public sectors before concluding on measures. Where the interests of the seafood industry and other associated public interests are considered more important than concerns for wild stock of anadromous salmonides, environmental measures may therefore be out of the question."* (our translation)

In our contact with the River Basin Districts (RBDs) and sub-districts, we also keep hearing about the obstacles experienced by the competent authorities of the RBDs and sub-districts. A common explanation, when local NGOs question why there are no proposals for measures in water bodies that are known to be infected with sea lice or where there is a big percentage of escaped farm fish, is that the national and regional offices of the Directorate of Fisheries, due to their mandate and how they are organized, cannot take part in the regional work coordinated by the competent authorities in each RBD.

As an example, here is a quote (translated by us) from the document with [analyses of proposed environmental measures in the sub-district Sunnhordland](#)<sup>ix</sup> in RBD Hordaland (page 16): *"When beginning to work with the WFD in sub-district Sunnhordland, one could foresee that there would be quite some emphasis on the environmental effects of aquaculture. This was more or less put on hold when the government stopped the work with characterizations considering sea lice and escaped fish, awaiting guidelines from the ministries. The environmental impact of sea lice and escaped fish was set as "unknown" in "vann-nett", and environmental status and risk assessment was set as "undefined". (...) There are 80 seafood fish farms and 18 fish hatcheries in sub-district Sunnhordland."*

This has even led to a letter dated 15 July 2013 from the (then) Ministry of Environment, in consultation with the (then) Ministry of Fisheries and Coastal Affairs, about the need for improved cooperation

between the environmental and fisheries-/ coastal authorities ("[Samarbeidet mellom miljøvernmyndighetene og fiskeri- og kystmyndighetene når det gjelder vannforvaltningsplanarbeid](#)")<sup>x</sup>. In the letter, the Ministry underlines the very basics of what is expected from the environmental agencies and the fisheries and coastal authorities in terms of co-operation concerning the RBDPs and implementation of the WFD.

The last bullet point on page 2, second last sentence, informs the agencies that when there is disagreement (between the environmental and fishery agencies), the impact level from sea lice and escaped farmed fish should be set as "unknown" and the environmental status and risk assessment be set as "undefined" in the Norwegian water information system, Vann-nett. It also states that the matter is raised for further clarification. To this date, however, no clarification on the topic has been made besides the letter from the Minister explaining that biological effects of aquaculture are to be kept out from the RBMPs for the planning cycle 2016-2021.

One obstacle is the fact that the authorities still have not developed environmental indicators or environmental quality standards for what should be considered as acceptable environmental impact. In a report from 2012, "[Riksrevisjonens undersøkelse av havbruksforvaltningen, Dokument 3:9 \(2011–2012\)](#)"<sup>xi</sup>, the Office of the Auditor General of Norway wrote that it was important to define ruling indicators and to strengthen the monitoring and measurement tools, in order to meet the complex environmental challenges of the aquaculture industry. The Office of the Auditor General wrote that this would be necessary in order to reach sustainability and continued growth in the sector. The Institute of Marine Research is developing indicators to measure the environmental effects from sea lice and escaped farmed salmon.

In a document prepared for the meeting on the WFD and RBMP work held on 22 May 2014, between the ESA, the EU Commission and the Norwegian Authorities,

In Norway's answers on 22 May 2014 to the "preliminary questions" from the ESA and the EU Commission<sup>xii</sup>, the Norwegian authorities refer to a letter from January 2014 (question no 7) where they explain that "there still remains to conclude characterization of watercourses, or sections of watercourses, with anadromous fish. The reason is that it has been unclear how the status of watercourses with anadromous fish should be assessed." The Norwegian authorities write that "the remaining characterization will be performed by the Central Government" and further that "the Ministry has the understanding that the completion of the characterization will require time, and that there will remain a number of watercourses where the status for anadromous fish will be set as undefined."

In their reply to the "preliminary questions"<sup>xiii</sup>, the Norwegian authorities also write that (question no 62) "A new white paper will be produced during the coming year. This will figure out the path forward towards new sustainable growth together with an industry complying with the WFD requirements." We, the undersigned organisations, wish to underline that the White Paper on "Predictable and environmentally sustainable growth in Norwegian salmon and trout farming" (Meld. St. 16 (2014-2015))<sup>xxiv</sup> does not describe how the proposed growth will comply with the WFD requirements.

The Norwegian authorities also point at some of the existing legislative tools, for instance the fact that "The Aquaculture Act has recently been amended to include a legal base for compulsory use of sterile fish. A system with indicators for genetic interaction and thresholds for acceptable level is under implementation." These tools will probably be very useful once they are applied, but remain theoretical.

From a WFD point of view, environmental measures should be implemented where the environmental status is moderate or worse, or where there is a risk that the status may deteriorate. The problem of keeping biological effects of aquaculture out of the classification work and out of the water information system Vann-nett, is that all environmental measures in the PoMs are based on the environmental

status registrations in Vann-nett. If a problem is not registered there, it 'does not exist' in the water management efforts in the river basin districts. If one important sector that causes significant pressures on water bodies is kept out of the river basin management planning, then Norway has not achieved Integrated Water Management in line with the WFD.

### **The authorities and aquaculture industry recognize the problems**

Up until recently, the authorities responsible for aquaculture, mainly the Directorate for Fisheries, claimed that there was lack of scientific evidence for tracing the problems with sea lice and genetic pollution in the wild fish back to the industry. There has, however, been a fundamental change of mind, perhaps due to reports like the above-mentioned investigation of aquaculture by the Office of the Auditor General of Norway, which clearly states that the farmed salmon industry has a negative impact on the environment.

The Norwegian government and the aquaculture sector itself have financed lots of research on the biological effects of aquaculture, and also on what mitigating measures the industry may use in handling these problems. This has resulted in several research and monitoring reports that describe the problems with sea lice in various areas and the genetic pollution of wild salmon stocks, especially. To mention a few, these reports include:

- Vollset *et al.* 2014. [Salmon lice increase the age of returning Atlantic salmon](#), in Biology Letters, 29 Jan 2014. (researchers from the Norwegian Institute of Marine Research and Uni Research.)<sup>xiii</sup>
- Fiske, P. 2013. [Surveillance of escaped farmed salmon in rivers in the autumn 2010 – 2012](#), NINA report 989. (Norwegian Institute for Nature Research)<sup>xiv</sup> (In Norwegian, English abstract on page 4.)
- Svåsand *et al.* 2015. [Risk assessment of Norwegian aquaculture 2014](#), (Norwegian Institute of Marine Research)<sup>xv</sup> (In Norwegian)

The results of the risk assessment for 2014 by the Institute of Marine Research show that [sea lice and escaped salmon are the biggest environmental problems](#)<sup>xvi</sup>. The conclusion was the same the previous year.<sup>xvii</sup>

Increased amount of sea lice in fish farms will have a severe effect on the populations of wild salmonids in Norwegian coastal waters. As shown in recent publications, such as Vollset *et al.* 2014, sea lice infections cause severe problems for the host even in cases where the infection is not directly lethal. Changes in the behavioral pattern and reduced survival and reproduction rates pose a great threat to the populations of wild salmonids. The White Paper on "Predictable and environmentally sustainable growth in Norwegian salmon and trout farming"<sup>xxiv</sup> states that there is a strong correlation between the amount of farmed fish, the sea lice infestation rate on the farmed fish and how big the effect of sea lice will be on wild salmonids, especially sea trout.

According to the report "[The surveillance programme for resistance to chemotherapeutants in salmon lice \(\*Lepeophtheirus salmonis\*\) in Norway 2014](#)" by the Norwegian Veterinary Institute<sup>xviii</sup>, resistance and reduced sensitivity to available treatment is generally widespread along the coast. The results also show a pronounced increase in prescribed medication used as delousing agents. Whereas the 2013 report showed resistance in sea lice to available chemotherapeutants in all counties but Finnmark, the results obtained in 2014 show a loss in sensitivity to certain medications in Finnmark as well. An increase in infestation rate that cannot be controlled due to increased resistance to chemotherapeutants in sea lice, could be detrimental to many local river populations of anadromous salmonids in Norway.

At the same time, the former Norwegian Climate and Pollution Agency, now part of the Norwegian Environment Agency, has [expressed concern regarding the environmental effects of two types of drugs, diflubenzuron and teflubenzuron, used in the pest management of sea lice](#).<sup>xix</sup> This will also have

implications with regards to the implementation of the WFD. One of the studies that lead to these worries is the report "[Flubenzuroner i fiskeoppdrett - miljøaspekter og restkonsentrasjoner i behandlet fisk](#)"<sup>xx</sup>, from January 2013, by researchers from the Norwegian Institute of Marine Research and the National Institute of Nutrition and Seafood Research.

In the report of the [Office of the Auditor General's investigation into the management of aquaculture](#), it is stated that the current environmental monitoring methods are insufficient and poorly adapted.<sup>x</sup> As an example, the Auditor General mentions that in Hordaland county, up to 40 per cent of the fish in the rivers are escaped farmed fish. The national average for the period 2000 – 2010 was between 15 and 28 percent. As the Auditor General points out, there is no established limit for what could be seen as an acceptable level, but researchers suggest that it would be somewhere around 3-5 %.

On the website of the Norwegian Ministry of Climate and Environment, the ministry presents the Norwegian Official Report on reasons for the decline in the wild salmon stock, «[NOU 1999: 9, Til laks åt alle kan ingen gjera?, Om årsaker til nedgangen i de norske villaksbestandene og forslag til strategier og tiltak for å bedre situasjonen](#)».<sup>xxi</sup>

In the English summary, the Ministry writes: *"Due to the growth of aquaculture, the salmon louse has hosts in coastal waters year-round. Adult salmon and smolt have increased the incidence of lice infestations in areas with considerable fish farming, and salmon lice are probably a significant cause of mortality in migrating smolt."*

Other points from the report (our translation):

- Registrations show that the worst infections on wild fish are concentrated to areas with intense aquaculture,
- It is probable that the contribution of sea lice larvae is bigger from farmed fish than from wild fish
- Farmed fish may cause greater lice infections rates as they are heavily infected with sea lice winters and summers.
- It is a consistent problem that there is no systematic monitoring of sea lice on wild salmonids in Norway, why there is little knowledge on the actual development of the sea lice population.

The aquaculture industry itself is also highly aware of these problems. On the topic of escapes, the Norwegian Seafood Federation has made the following statement on their website<sup>xxii</sup> (our translation):  
- *The efforts to prevent escapes continue. Statistics from The Directorate of Fisheries on escapes show that almost 200 000 salmon escaped from Norwegian fish farms in 2013. – This increase from 2012 is not good. The industry needs to learn from those who are successful with implementing mitigating measures, says Tarald Sivertsen, chair of The Norwegian Seafood Federation's Escapes Commission.*

The problems are of such magnitude that Marine Harvest, the biggest aquaculture company in Norway, with some 25-30 % of the world market for salmon and trout, in their response to the governments' proposal on how to make the licensing regulations more flexible, point to the problem of sea lice. They write that the situation today, when it comes to the effects of sea lice on the wild population and the spreading of diseases between fish farms, is so severe that the Norwegian aquaculture industry is not ready to grow as much as outlined in the proposal.<sup>xxiii</sup>

In the White Paper from the Ministry of Industry and Fisheries on "[Predictable and environmentally sustainable growth in Norwegian salmon and trout farming](#)"<sup>xxiv</sup> from March 2015, the government writes *"as per today we don't have detailed knowledge about the effects sea lice in a fish farm have on the surrounding wild fish. It is however substantiated beyond doubt that the total prevalence of sea lice in the fish farms imply increased infection pressure in wild salmonids."* (our translation)



Despite the many unsolved problems, the recent white paper declares that the government wishes to pave way for the industry to produce five times as much farmed salmon and trout in 2050 as it did in 2010. "Given that the environmental and fish health problems of today are solved", as they say.

In conclusion, it is overwhelmingly clear that both the Norwegian authorities and the industry fully recognize the problems, and on this basis it is unexplainable and unacceptable that the problems are kept out of RBMPs and PoMs.

### Public debate about the effects of aquaculture

The debate about the effects of aquaculture is a hot and never-ending story in Norwegian media. Norwegian anglers and various groups with interest in rivers with anadromous fish (whether land owners, tourist businesses or environmental NGOs) are concerned about the authorities' inability to deal with the problems. To a large extent, both the industry and the Norwegian government publicly recognize that these issues need to be handled.

### Short description on the situation in Norway

There are more than 1000 aquaculture farms spread mainly from Rogaland in the southwest to Finnmark in the northeast. There are about 350-400 million salmon at any given time in Norwegian fish farms today, which is almost 1000 times as many as the number of (wild) returning salmon.

The number of returning salmon is less than half of what it was 30 years ago. According to the Norwegian Scientific Advisory Committee for Atlantic Salmon Management, sea lice and escaped farmed salmon are non-stabilised threats to the (wild) salmon population, posing a high risk for further damage and a high level of impact, as described in the image below.<sup>xxv</sup>

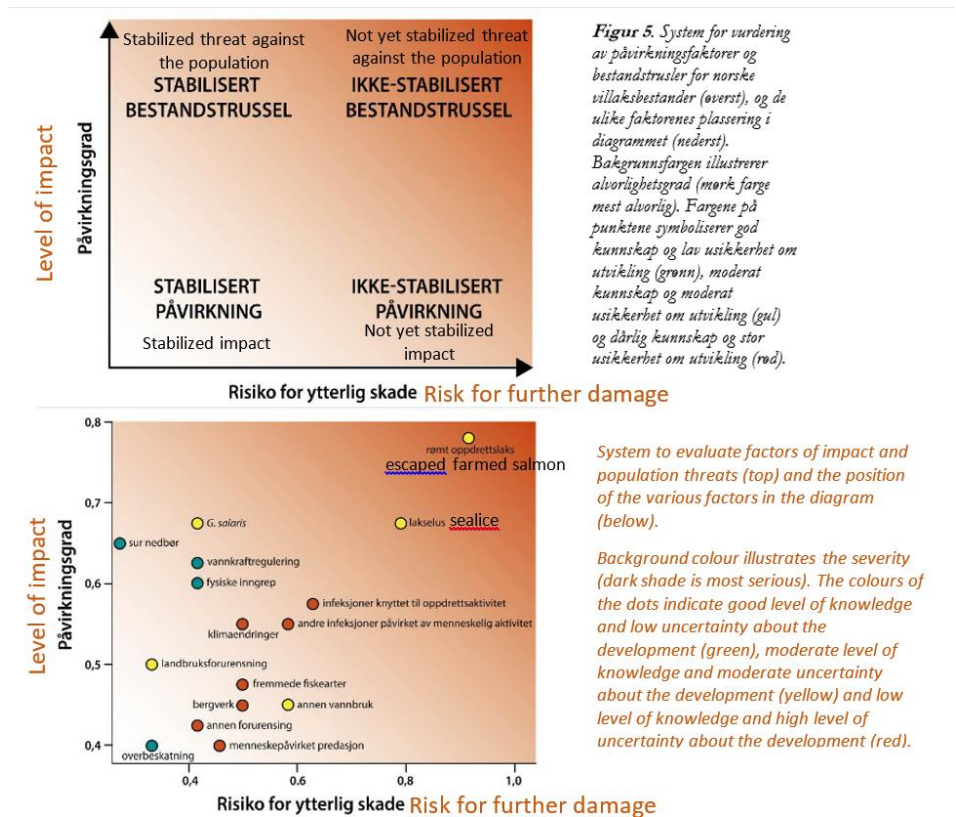


Figure 1: Sea lice and escaped farmed salmon are not yet stabilized threats against the population of (wild) Atlantic salmon, with a high level of impact and a high risk of further damage (our translation). From the 2015 status report on Norwegian salmon populations, by the Norwegian Scientific Advisory Committee for Atlantic Salmon Management.

## Escapes

The Parliament recently instructed the Government to develop a strategy to reach their defined goal: zero escapes from Norwegian fish farms.<sup>xxvi</sup>

The Directorate of Fisheries presents the official numbers on reported escapes each year.<sup>xxvii</sup> The numbers show that in the two worst years, 2006 and 2005, the numbers of escaped salmon reached 921 000 and 717 000 respectively. The official number on reported escapes for 2014 (preliminary numbers) was about 320 000 fish, of which 303 000 were salmon. In comparison, only about 400 000 - 500 000 (wild) salmon return to the Norwegian coast each year.

The escape trend for 2015 is hardly better, with 188 000 salmon and rainbow trout having escaped by June, according to the official numbers of escapes presented by the Directorate of Fisheries. On their website, the Directorate however writes that (our translation): “The Directorate of Fisheries acknowledges that there are escape episodes beside those that are reported and presented in the overview.”

The fact that there is almost 1000 as many farmed salmon in the cages of Norwegian fish farms as the total numbers of (wild) salmon returning to the coast each year explains why an “acceptable loss” for the aquaculture industry will still pose an enormous threat to the wild stock.

Most counties in Norway have rivers with 10-25 % escaped salmon in the spawning population. These fish pose a great genetic risk for the gene-pool of the almost 400 indigenous wild salmon populations. In Hordaland, which has the highest density of fish farms, and also the highest numbers of escaped fish in the coastal waters and rivers, only 28 % of the salmon in the rivers are expected to be free from genetic influence from farmed salmon.<sup>xxviii</sup> There are big variations within Hordaland, with some rivers having 10-25 % farmed fish or hybrids in the population, while it is estimated that more than 75% of the salmon are either escaped farmed fish or hybrids genetically influenced by farmed salmon in other areas.<sup>xxix</sup>

The escaped fish does not only pose a threat in terms of “genetic pollution” of the wild stock, leading to e.g. possible behavioural changes, but may also facilitate dissemination of pathogens.<sup>xxx</sup>

There are unfortunately not very effective measures for re-catching escaped fish. The fish farm companies are responsible for catching fish within 500 m from the fish farm. The authorities may extend the zone for recapturing, but 500 m is the basic rule. Once the fish is further away, the authorities may ask fishermen and anglers to collect by-catch of salmon assumed to be escaped farm fish, and either hand back it to the company or deliver it to the authorities.

For instance, after the escape of 40 000 salmon in the county of Sogn og Fjordane in April 2015, the authorities opened up for killing salmon of a specific size in that area, for about a month, rather than releasing them back to the fjord as would otherwise be the rule. Half way into the period, the county authorities reported that only some 1000 fish had been caught.<sup>xxxi</sup> This also points to how difficult and inefficient the recapture of escaped fish can be.

## Sea lice

The sea lice feed off the skin of salmon and can cause serious and lethal skin wounds. Open wounds can also create a pathway for other pathogens. Adult salmon or trout can be infested with a few lice without suffering severe damage, even though the growth rate may decline and the migratory pattern may be altered, while just a couple of lice on a juvenile salmon can be harmful or fatal. Sea lice may also carry diseases between farmed and wild salmon.

The sea lice threatens wild salmon stocks along the coastline from Rogaland to Nordland, and is an increasing problem even further north. In areas with high lice infection rates, vulnerable wild salmon



and sea trout stocks may go extinct. In the Hardangerfjord, which has the highest concentration of fish farms in Norway, most salmon populations are reduced below levels allowing any harvest. The sea trout populations are similarly heavily reduced.<sup>xxxii</sup> There are also alarming reports of sea lice on wild fish in other areas, including in the Trøndelag region, which is one of the most important areas for Norwegian wild salmon.

Rising sea water temperatures in northern areas will bring the sea lice problems further north, and thereby also threaten the sea-run arctic char *Salvelinus alpinus* as well as salmon and sea trout.

#### Inorganic pollution

In addition to the problems with genetic pollution (escapes) and sea lice, we also want to bring your attention to the increasing problems with dissemination of chemicals from treatments against parasites.

Due to the increasing resistance in sea lice to other available chemotherapeutants, many Norwegian fish farms have started using chitin synthesis inhibitors again, after a voluntary ban in the 1990s. The use of diflubenzuron and teflubenzuron reached over 7500 kg in 2014, according to the statistics presented by the Norwegian Institute of Public Health.<sup>xxxiii</sup>

These pesticides, distributed via the feed, inhibit the synthesis of chitin, which is essential in the exoskeletons of insects and crustaceans. The problem is that the effect by no means is limited to sea lice, and that the chemicals are not contained by the cages but, as the Norwegian Institute for Water Research (NIVA) puts it, “by their very nature, chitin synthesis inhibitors are likely to also have significant effects on non-target species such as crustaceans and amphipods” in the surrounding area.<sup>xxxiv</sup> According to NIVA, monitoring studies in and around fish farms have shown the presence of these substances in the marine environment.

Shrimp fishers are especially concerned, not only about the use of chitin synthesis inhibitors, but also about the use of hydrogen peroxide baths. With this treatment, the farmed fish is simply immersed in hydrogen peroxide, either in an enclosed area of the cage or in a well boat. According to the Norwegian Institute of Public Health, the use of hydrogen peroxide (100 %) in aquaculture has increased from nothing in 2008 to over 30 000 tons in 2014. The Institute of Marine Research is concerned about the risks of dumping hydrogen peroxide due to the potential negative effects on crustaceans and other marine organisms around the fish farms<sup>xxxv</sup>.

Fish farms also leak other chemicals, for instance copper from anti-fouling treatment of the net-pens. In 2013, over 1000 tonnes of copper was applied to the net-pens of Norwegian fish farms, to prevent biofouling. The Norwegian Environment Agency estimates that 80-90 % of this copper is lost to the surrounding water<sup>xxxvi</sup>. The copper use, and pollution, has increased a lot over the last 10 years. The concerns over this are well expressed in the [comments by the County Governor of Hordaland](#)<sup>xxxvii</sup> in the public consultation of the White Paper on “Predictable and environmentally sustainable growth in Norwegian salmon and trout farming” (Meld. St. 16 (2014-2015)). The County Governor is concerned about the increased use of copper, which has increased from 0.4 kg of copper per kilo fish produced in 2001 to 0.85 kg of copper per kilo fish produced in 2013. According to the County Governor of Hordaland, environmental investigations of sediments under, or close to, fish farms show highly increased copper concentrations in the sediments. Toxic concentrations of copper is detrimental to benthic fauna, resulting in a reduced turnover of the organic matter sediments under the cages. This is worrying for the sake of marine organisms, but damaged local ecosystem services will also make the site unsuitable for aquaculture for decades to come. The County Governor also writes that low levels of sea lice itself is not a good enough indicator of sustainable aquaculture, as long as there are high releases of chemotherapeutants, chemicals and copper, since we have little knowledge about the effects of these substances in the marine environment.

## Organic waste

There are also enormous amounts of biogenic waste (fish faeces, undigested food and other forms of discharge, including solid and dissolved nutrients) generated by fish farming. Based on numbers from the Norwegian Environment Agency the nutrient release from Norwegian fish farms is equivalent to the nutrient release in wastewater from 10 million people. That is twice the Norwegian population. There is little doubt that the Norwegian municipalities (responsible for running wastewater treatment plants with enough capacity for all inhabitants) and the agricultural sector (which has introduced a whole array of strict measurements to control and reduce especially Phosphorus and Nitrogen run off) face stronger requirements to reduce nutrient leakage than the fish farming industry.

While the fish farming industry stresses that the feeding technology has become much more efficient in recent years, such that less of it is wasted, the production has increased enormously. Hence, the total amount of organic releases has kept increasing. Today, aquaculture is by far the biggest anthropogenic source of Phosphorus to Norwegian coastal waters.<sup>xxxviii</sup>

In the White Paper from March this year, the government writes that, “releases from fish farms mostly consist of substances that are natural to the sea”. The problem is obviously the concentrations, and whereas the government does not see the nutrient rich releases from aquaculture as a problem today, they are open to the idea that the environmental impact may no longer be limited to just below that cage but that, with increased production, the impacts will be noticeable in surrounding areas.<sup>xxii</sup>

## Norwegian aquaculture and the WFD

One of the main objectives behind the WFD was to have a single piece of framework legislation, and to have one common cross-sector management system (Integrated River Basin management) for water. When the Norwegian government chose to implement the WFD in Norway, this meant accepting the overarching goal of an integrated water resource management (“*helhetlig vannforvaltning*” in Norwegian).

The various pieces of legislation, to which the Norwegian authorities abide, are the same as prior to the implementation of the WFD, but the relevant authorities must accept that their work for a better water environment is part of the integrated water resource management. It is simply essential that *all* main pressures and impacts on waterbodies are included in the WFD work. If one of the main pressures in any type of water body is exempted, this carries the risk of undermining the whole process of developing Water Basin Management Plans, as all stakeholders will know that the pressures they are discussing and measures they are designing will not target one of the main problems in the area.

The WFD calls for an integrated water resource management where sectors concerned need to cooperate to a much further extent than they are used to. The Municipalities, the agricultural sector, the hydroelectricity sector and industry are all involved and all definitely contributing. We therefore think it is inexcusable that the Ministry of Trade, Industry and Fisheries has managed to exempt fish farming and its effects on the environment from the WFD work, despite the acknowledged significant impact from this sector on the environment.

## Data and assessment tools for environmental impact from aquaculture is not integrated in the WFD implementation in Norway

The Norwegian authorities have not integrated or related the existing assessment tools such as the environmental quality norm for wild populations of *A. salmon*<sup>xxxix</sup>, which is used for the classification of salmon and legally based in the Norwegian Nature Diversity Act.

The 2015 status report on Norwegian salmon populations, by the Norwegian Scientific Advisory Committee for Atlantic Salmon Management, concludes that the main not yet stabilized threats to the population status for wild salmon in Norway are escaped farmed salmon and sea lice. In other words,

the main threats are environmental impacts come from aquaculture. This scientific advisory committee, with key experts from most relevant research institutions in Norway, has warned the authorities responsible for Norwegian salmon management about the severe situation for several years. They have also stressed the need to increase the mitigation measures to reduce the negative impact from salmon farming with emphasize on escapes and the uncontrolled situation of high number of sea lice in the many thousand cages along the coast.

Data and status assessment for all rivers in Norway with Atlantic salmon, seatrout and searun arctic char are published by the Norwegian Environmental Agency at [lakseregisteret.no](http://lakseregisteret.no)<sup>xi</sup>. The dominating pressures on the population status are impacts from sea lice and, for (wild) Atlantic salmon, interbreeding with escaped salmon. In our view, it is inappropriate that this data and knowledge is not transferred to the WFD implementation.

The situation for many populations of anadromous fish in numerous Norwegian rivers is simply alarming. Norway has an international responsibility to safeguard the Atlantic salmon, with Norwegian waters being some of the most important living areas for Atlantic salmon in the world<sup>xii</sup>. We also have a special responsibility to sustain the searun arctic char, a Nordic species which uses the estuaries even more than salmon.

### **Allowing potentially damaging individual projects, such as fish farms**

In the recent [judgement from the Court of Justice of the European Union, in Case C-461/13](#)<sup>xliii</sup>, the court states that deterioration of the status of a body of water is established as soon as the status of at least one of the quality elements, within the meaning of Annex V to the directive, falls by one class, even if that fall does not result in a fall in classification of the body of surface water as a whole.

According to the judgement, “Article 4(1)(a)(i) to (iii) of WFD must be interpreted as meaning that the Member States are required — unless a derogation is granted — to refuse authorisation for an individual project where it may cause a deterioration of the status of a body of surface water or where it jeopardises the attainment of good surface water status”.

The court concludes “... that Article 4(1)(a) of Directive 2000/60 does not simply set out, in programmatic terms, mere management-planning objectives, but has binding effects, once the ecological status of the body of water concerned has been determined, at each stage of the procedure prescribed by that directive.” (Directive 2000/60 referred to here is the WFD).

In the judgement the court writes that “Indeed, it is impossible to consider a project and the implementation of management plans separately.”

The court writes that, “unless a derogation is granted, any deterioration of the status of a body of water must be prevented, irrespective of the longer term planning provided for by management plans and programmes of measures. The obligation to prevent deterioration of the status of bodies of surface water remains binding at each stage of implementation of Directive 2000/60 and is applicable to every surface water body type and status for which a management plan has or should have been adopted.”

The court makes it clear that such a derogation can only be granted if all practicable steps have been taken to minimize the negative impact on the body of water and if the programmes of measures and management plans have been adapted accordingly.

The enormous growth of the fish farming in Norway has been made possible because the government has paved way for increased production in open sea cages. The government’s policy is to maximise the use of the comparative advantages given by the nature of the Norwegian coastline, with its many deep but relatively protected fjords and strong coastal currents. This may explain why few Norwegian

companies have invested much in closed systems – as that would open up for production elsewhere in the world and reduce Norway’s competitive advantage over other countries on the common market. There are however a few companies that are currently setting up semi-closed system fish farms in Norwegian fjords, and who report that the implementation costs are returned by less chemical use, less diseases, a reduction in fish deaths prior to slaughtering, less leakage of nutrients to surrounding waters, no escapes and no sea lice. In our view, this means that the first claim (a) in Article 4.7; “all practicable steps are taken to mitigate the adverse impact on the status of the body of water”, is highly relevant. In our opinion, Norwegian authorities should consider limiting licenses to farms using available technologies that reduce the risks for escapes, decrease organic and inorganic pollution and isolate the farmed salmon from the wild stock, thereby no longer allowing the fish farms to function as breeding grounds for the salmon lice.

We are deeply concerned about the massive plans for increased growth of the Norwegian aquaculture industry in the years to come. As we see it, this sector is not managed in a sustainable way, and will have a significant impact on both the ecological and chemical status of a number of different water bodies. If the massive plans for increased growth are fulfilled, we foresee that major deterioration in the status of many water bodies in Norway will take place due to new aquaculture licenses. This may not be in line with Article 4.7, as we see several shortcomings in Norway:

- Norwegian licensing authorities do not ensure that the conditions of Article 4(7) are met before granting permits for individual projects.
- The RBMPs lack WFD relevant assessment of the impact from existing aquaculture and also lack risk assessment and analyses of new licences.

The integration of relevant assessment tools in the WFD work seems to be pending for unknown reasons. The assessment, for individual projects as well as for the cumulative effects with other projects in the area, should be done at quality element level according to Annex V. Therefore, an inter-calibrated WFD adapted assessment and classification system for fish and other biological quality elements urgently needs to be agreed upon and incorporated in the Norwegian WFD work. There are several applicable systems in use, but there is no linkage to WFD or RBMP work.

### **Missing transitional waters**

When the WFD was introduced in Norway, it was decided not to use the category ‘transitional waters’.<sup>xliii</sup> Instead, Norway uses freshwater influenced categories of coastal water, such as “Fjord influenced by freshwater”, “Fjord heavily influenced by freshwater” and “Specific Water Bodies”. This means that there is no category of water between water bodies categorized as rivers and water bodies categorized as coastal waters.

Norwegian fjords are different from typical estuaries of many large European rivers, and the arguments for cutting out transitional waters are explained in the characterization report from May 2013.<sup>xliiv</sup> The problem with using coastal water types is that fish are not included among the biological quality elements in the classification system for coastal waters<sup>xliv</sup>. This in turn means that the reported environmental status of fjords, estuaries and other brackish water areas does not reflect the population status of important species such as eel, sea trout and arctic char, which all spend substantial time in the fjords and transitional waters – habitats heavily influenced by aquaculture in Norway.

**The above information shows the magnitude of the challenges connected with aquaculture and the implementation of the WFD in Norway. The RBMPs that will be implemented 2016-2021 lack considerations regarding one of the most challenging threats to the ecological conditions of Norwegian water bodies. We, the undersigned organisations, sincerely hope that ESA will take this complaint into consideration and request the Norwegian government to incorporate biological effects of aquaculture in the Norwegian implementation of the WFD.**

Yours sincerely,

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