



*A wild salmon affected by sea lice*

## Wild salmon and salmon aquaculture Threats and solutions

## Different proportions

More than 1.4 million metric tonnes of farmed salmon are produced in Europe annually (1.2 million in Norway alone in 2012). This equates to approximately 450 million salmon being held in pens or net cages. These salmon farms are often located in the river estuaries and threaten the very survival of wild Atlantic fisheries due to infestation with sea lice and millions of escapees.

With approximately 1,000 times more farmed salmon than wild salmon in the sea, and the farmed salmon being in coastal waters year round, the production of natural parasites such as sea lice (*Lepeoptheirus salmonis*) is far in excess of natural levels. Remedial treatment using chemicals to reduce the number of sea lice parasites have proven damaging for the environment and unsuccessful. Areas with intensive salmon farming pose a serious threat to wild salmon and sea trout habitat. A single farm aqua pen can contain up to 0.2 million salmon in Norway (this is the Norwegian legal max. limit). In comparison the total return of wild salmon to Norway is approximately 0.5 million. Escapees from a single salmon farm pen can therefore cause dire consequences in nearby salmon stocks. An Irish proposal for Galway Bay includes 72 open pens with an annual stocking programme of 7.2 million smolts in total at peak stocking levels.

## Farmed salmon is not a natural part of the ecosystem

Escaped fish from farmed cages are threatening the wild Atlantic salmon in many ways.

In the sea, the escaped salmon spread sea lice to wild salmon and sea trout. In the rivers, the farmed salmon interfere with the spawning process of the wild salmon and weaken the native wild strain as interbreeding reduces to the genetic fitness of adult wild salmon. If this is allowed to continue year after year, the result will be a diluted gene pool and reduced long-term survival of salmon and sea trout stocks, which are genetically unique in each river.

Local salmon stocks have for generations adapted to the changing conditions in the different rivers, and developed specific adaptations to suit their rivers. Farmed salmon however, are genetically different after several generations of selective breeding for commercial exploitation.

Interbreeding between wild and farmed salmon, will over time lead to diluted stock quality, with less ability to respond to the particular conditions in each river. The result will be that fewer parr and smolts will be produced in the rivers. The worst case scenario is the extinction of unique traits, and even unique salmon stocks in the future, due to this harmful influence from escaped farmed salmon.

In several rivers the percentage of farmed salmon is much higher than what scientists suggest is a safe limit (under 5%). In the country with the largest salmon industry, Norway, the average number of farmed salmon at the breeding grounds is 15% - more than three times higher than the official safe level. This must not be allowed to continue!

## Sea lice

Sea lice occur naturally in sea water, and prior to fish farming were of no significant threat to wild salmon, sea trout and sea-run char. However, because of the enormous amount of hosts held in fish farms throughout the entire year, an abnormally high concentration of sea lice has developed in coastal areas where fish farming is taking place. When the small smolts leave their rivers and migrate to the Atlantic Ocean to feed, they pass numerous fish farms on their way. Due to the large number of hosts in the pens, the sea lice concentration is often very high even when the salmon farmers treat their fish against sea lice infections. In some areas even an infection of one lice per 10 salmon in the pens adds up to a total number of lice that is unsustainable for wild salmon populations. 8-10 lice on a salmon smolt are lethal. Some areas off the Norwegian coast have experienced up to 95% mortality of migrating wild smolts due to sea lice emanating from the fish farm cages.

Chemical treatments are used to contain the population of sea lice in salmon farms, which works initially, but after some time the sea lice become resistant to treatment and without effective treatment, the population of sea lice is set to explode. This will have grave consequences for wild fish unless such dangerous fish farming practices are replaced with floating or inland closed and contained farms with effective barriers between the farmed fish and the natural environment.



Top: close up of two sea lice  
2nd: sea lice parasites on a salmon  
3rd: sea lice cause wounds and infections  
Bottom: pens, open aquaculture systems are the cause of the problem.

## What does EAA want?

EAA proposes the following measures to ensure that sea lice, farmed salmon and rainbow trout escapees **do not threaten or drive our unique wild salmon and sea trout stocks to extinction** in the areas that are most severely affected.

## Stop the escape of farmed salmon

Measures in the short term:

- Better monitoring of escaped salmon and their mixing with wild salmon.
- Limits and borderline values for frequencies of farmed salmon vs. wild salmon in rivers must be established to trigger action.
- A borderline value of less than 5% farmed salmon in river stocks must be implemented to initiate action against fish farms and removal of the threat of escaped fish.
- Escapees must be deemed unlawful and legal action against farms allowing escapes must be made more severe by all enforcement agencies in the Atlantic.
- Compulsory tagging of farmed salmon must be introduced, to enable the identification of the specific farm from which the fish have escaped. This tagging must include both an external (e.g. adipose fin clipping for fast recognition at site) and an internal tag (individual recognition back to site of escape).
- More measures to prevent escapes of salmon from farms must be introduced (e.g. by a more rigid construction).
- The exclusion of giant pens must be considered – as these pens can result in catastrophic escapes of salmon.
- To prevent genetic 'pollution' of indigenous (wild) salmon, only non-fertile (e.g. triploid) salmon should be used for mass-production.

Measures in the medium term:

- Move all salmon farming into closed & contained farms either floating on the sea or on land to eliminate escapes.

## Stop the sea lice problem

Measures in the short term:

- The growth of the industry must be put on hold until it can be proven to be sustainable for the future survival of the wild salmon, sea trout and sea-run char.
- Governments must enforce a higher degree of surveillance and monitoring of sea lice on wild salmonids especially at the critical time when they migrate past aquaculture sites.
- When examinations show damaging levels of sea lice, immediate action must be taken to treat or remove stock from salmon pens.
- Reduction of sea lice from farms must be achieved without causing detrimental effects to the environment.
- Giant pens that prevent effective sea lice counting and direct sea lice treatment should be banned.
- Authorities must forcefully apply the Precautionary and the Polluter Pays Principles.

Measures in the medium and long term:

- Move all salmon farming into closed & contained farms either floating on the sea or on land to eliminate sea lice infestation of wild Atlantic salmon and pollution