

Case #13b. Farmed vs. Wild Salmon in Norway

By Stephen Castle, New York Times Nov. 6, 2017

Aerial view of fish farms helped Norway produce around 1.18 million metric tons of salmon last year. CreditSergey Ponomarev for The New York Times



SKJERJEHAMN, Norway — As a teenager, Ola Braanaas kept a few fish in an aquarium in his bedroom. Now, at 55, he keeps a lot more of them: around 1.2 million just in one windswept spot off the stunning coast of Norway, a giant farm with six large, circular structures each containing around 200,000 fish.

Once a rarity on global dinner tables, salmon is a staple today, thanks to a fish farming industry that has expanded at breakneck speed in recent decades, including in Norway, where in 2016 around 1.18 million metric tons were produced.

But now, Norwegian fish farmers face new curbs designed by **Norway's Fisheries Ministry** to protect the country's stocks of wild salmon, rules that have ignited anger from the industry and its opponents, prompting threats of court challenges from both sides.

The wild Norwegian salmon are members of an ancient species that, early in its life cycle, heads down river, swimming through Norway's famous fjords, and out to saltwater feeding grounds, before returning to their native rivers to spawn.

In recent years, however, the wild salmon population has more than halved, partly because of the spread of sea lice, parasites that feast on the mucus and skin of the fish before moving on to the muscle and fat, making the fish vulnerable to infections and sometimes killing them.

Sea lice, like the salmon, have existed in the ocean for eons but have emerged as a huge problem for the fish farms, where they multiply in such numbers that they kill farmed fish and pose a risk to young wild salmon as they pass the holding pens on their way to the open sea.



Inge Sandven, right, the head of the **Dale Hunters' and Anglers' Club**, by the Dale River outside Bergen, Norway. About half the fish he catches now are pure wild salmon, he said. CreditSergey Ponomarev for The New York Times

The lice problem is so bad that the worldwide supply of salmon on sale, the overwhelming majority of which is farmed, fell significantly last year, with Norway, the largest producer, especially hard hit.

To contain the problem, a system came into force in Norway from Norway's Fisheries Ministry on Oct. 15, 20018, under which farms in regions that are judged to severely threaten wild salmon numbers will have their production frozen and potentially, in future years, cut. If the lice are brought under control, then output can be increased.

Mr. Braanaas, the owner of Firda Seafood, says that there are already rules in place to control the lice, and that he will go to court if he is ordered to reduce production because of problems from other farms in his region. It is, he says, a “Stasi system,” a reference to the secret police of East Germany.

Norway’s biggest producer, **Marine Harvest**, is also unhappy with the new protocol, which it describes as premature, and wants more work done on the methodology used to decide when there is a lice problem that needs to be addressed.

Yet, environmentalists seem unimpressed as well. One group, **SalmonCamera**, plans to challenge the system in court, arguing that it is too lenient. Kurt Oddekalv, leader of the **Green Warriors of Norway**, says the system is a sign of “panic from the Fisheries Ministry.”



A fish market in Bergen. Once a rarity on dinner tables, salmon is now a global staple. Credit Sergey Ponomarev for The New York Times

Sea lice kill an estimated 50,000 adult wild fish a year in Norway’s rivers, and the wild salmon population has fallen to 478,000 from more than a million in the 1980s, according to one study. So depleted are stocks of wild salmon that around 100 of Norway’s 450 salmon rivers are closed to anglers.

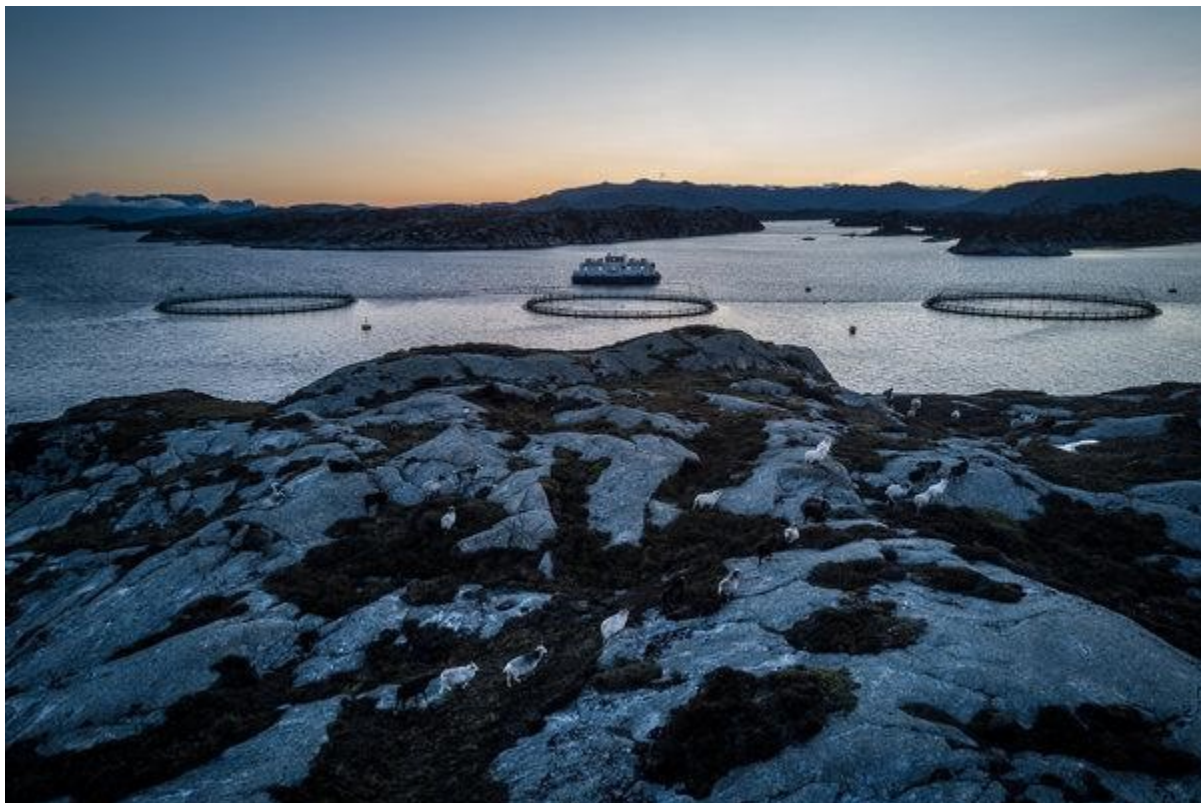
But there are other problems, too, beyond sea lice. Rune Jensen, the head of **SalmonCamera**, says that wild fish, like cod, congregate around salmon farms, attracted by the food there. These

predators eat the young wild salmon in greater numbers than normal as they make their way out to sea, or sometimes even force them into the farm cages.

But activists say the biggest threat is the genetic impact of farmed fish that escape their pens, reproduce with wild salmon and produce offspring ill-equipped to survive.

Over the last decade, fish farmers have reported more than 200,000 salmon escaping on average each year, though the real figures may be as much as four times higher than that in the years 2005 to 2011, according to one study.

The impact has been observed by Norway's anglers. Few people know the fishing grounds of the Dale River as well as Inge Sandven, the head of the **Dale Hunters' and Anglers' Club**. In just 15 minutes at one river pool, set against a spectacular backdrop of tree-covered hills, he had three bites but no catches.



An aerial view of a fish farm near Grima island, outside Skjerjehamn, in western Norway. Credit Serge Ponomarev for The New York Times

Then, the rod strained, and he slowly reeled in a small, shiny, olive brown salmon weighing a couple of pounds. Just by looking at it, as it thrashed in a net, Mr. Sandven could tell a lot about the fish: It was male and had probably spent three years in this river and one winter at sea.

But what he could not say: whether it was a pure wild salmon.

“It’s impossible to tell. It looks good, but I don’t know,” Mr. Sandven said, when asked if it might have farmed salmon genes. “It’s a 50/50 chance — that’s the experience of this year,” he added, before releasing his catch.

Mr. Sandven knows this because he supervises a wild salmon hatchery, and takes DNA samples from fish caught in this river before they are used for breeding. Recently, around half have failed the wild salmon purity test.

The genetic makeup is important, said Alv Arne Lyse, a fisheries biologist at the **Norwegian Association of Hunters and Anglers**. In farm fish pens, where there are no predators, the most aggressive salmon are the most successful, since the only concern is to get as much food as possible.

Escaped salmon then pass that trait on to hybrid wild salmon, who are then, to mix metaphors, like lambs to the slaughter out in the open seas.



Salmon in a hatchery in Byrknesoy, from where they are later sent to a processing factory. Credit Sergey Ponomarev for The New York Times

That is because in the ocean, awareness is far more important for survival than aggressiveness, as danger lurks all around.

“The offspring of farmed fish are more aggressive, but when they go out in the sea they have very high mortality,” Mr. Lyse said, adding that they also often lack the homing instinct to return to a specific river, since they were spawned in commercial hatcheries.

While previously pollution was a huge problem in aquaculture, he said, now “the only threats that are not under control are the genetic impact from escaped fish and sea lice.”

The fish farmers argue that they play a vital role in feeding the planet, and that they produce a crop worth \$8 billion annually to Norway, accounting for about 8 percent of the country’s exports.

The **Norwegian Fisheries Ministry** already has rules requiring farms to test the quantity of sea lice in pens and to take action if they exceed the limits.



Processing salmon at Firda Seafood. Ola Braanaas, the company’s owner, said he would go to court if he were ordered to reduce production because of problems from other farms in his region. Credit: Sergey Ponomarev for The New York Times

Marine Harvest uses so-called cleaner fish that feed on sea lice to help combat the problem. It is also investing in new techniques designed to eliminate the risk of escapes of farmed salmon and to cut lice numbers.

These include novel ideas such as the “egg” — a solid oval-shaped pen, yet to be constructed, which is enclosed, preventing any risk of salmon escaping, and making it harder for sea lice to enter and spread.

Information on the health of Norway's farmed fish is now publicly available online. But so divisive is the debate that environmental groups do not trust statistics provided by the farmers, and the two sides don't agree on the facts.

Along with his fellow Green Warriors, Mr. Oddekalv argues that the scale of fish farming in Norway is unsustainable, and that huge volumes of uneaten feed and fish excrement pollute the seabed. Over the years farmers have been criticized for using antibiotics in fish feed, something that is now barred in Norway, though additives designed to curb the lice also find their way into the food chain, Mr. Oddekalv argues.

"If people knew this they wouldn't eat salmon," he said, describing the farmed fish as "the most toxic food in the world."



Mr. Braanaas, who believes some of critics of the fishing industry are motivated by a sentimental reverence for salmon, collecting crab nets in Norwegian waters. Credit Sergey Ponomarev for The New York Times

In a statement, **Norway's fisheries minister, Per Sandberg**, described the new system for dealing with the sea lice problem as "fair" and constructed on a "safe legal basis."

He said that "as in all science, there are knowledge gaps," but that scientists agree that lice have a negative impact on wild salmon and that it would "be wrong not to act at all, due to some gaps in our knowledge."

At his home, which can be reached only by boat, Mr. Braanaas conceded that the Norwegian salmon farming industry has “made a lot of mistakes.” But he insisted there were many fewer problems there than in other parts of the world, like Chile, where he said that regulation is lighter and “greed takes over.”

As a self-made businessman whose parents mortgaged their home to help finance his first fish farm, Mr. Braanaas is proud of the company he has built and of the employment it provides in a remote part of Europe. And he believes some of its critics are motivated by a sentimental reverence for one particular species of fish.

“In India, they have the holy cow,” he said, reflecting over a beer. “In Norway, it’s the sacred salmon.”



Mr. Sandven, who supervises a wild salmon hatchery, on the Dale River.

Case Questions:

1. (4) Summarize the power situation Firda Seafood faces in this case. **(200 words. Be sure to include a “summary” of your summary!)**
2. (2) Define what model will best describe the public policy decision-making of the Norwegian Fisheries Ministry

Be sure to explain your choice [150 word limit].

3. (5) **Diagram** the worst and most likely case scenarios for Firda.

4. (4) What should Firda's strategy be going forward to ensure it will continue to farm salmon.

Summary of Actors in the Salmon Case

Firda

Norwegian Fisheries Ministry

Marine Harvest

SalmonCamera

Green Warriors of Norway

Norwegian Association of Hunters and Anglers

Dale Hunters' and Anglers' Club