

Disasters in Ocean Aquaculture

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Ocean aquaculture — the mass production of fish in large, floating net pens or cages in the sea — has often led to environmental and other disasters in the countries where it has been practiced commercially. Expanding this dirty, costly industry in waters off the United States could harm consumers, fishermen and the marine environment. Here's why:

Hundreds of Thousands of Fish Escape

Growing fish in open-water facilities is inherently risky. While suppliers of giant underwater cages and floating net pens may tout the structures' strength and ability to withstand strong ocean currents, in practice, there have been hundreds of thousands of fish escapes from open-water fish farms each year.

Some recent examples of escapes:

- From late December 2008 through early January 2009, a series of massive escapes in Chile — totaling more than 700,000 salmon and trout from various farms — prompted the leader of the Chilean Senate's Environmental Committee to proclaim the incidents an "environmental disaster."¹
- In October 2009, a Canadian newspaper reported that 40,000 fully grown Atlantic salmon had escaped from a net pen facility in British Columbia when a machine removing dead fish from the bottom of the pen broke a hole in the net. The company reportedly recovered less than 3 percent of the escaped fish at the time the article was written, though efforts to recover the fish were ongoing.²
- In October 2010, 70,000 harvest-ready salmon escaped from a farm in Norway, resulting in a loss to the company of at least \$600,000. Only months earlier, fish at the same location had suffered from an outbreak of pancreatic disease resulting in high levels of mortality.³

Why are escapes a cause for concern? Generally, escaped fish can spread a number of diseases exacerbated by stress and the cramped conditions of their confinement⁴ — including pancreatic and amoebic gill disease,⁵ infectious

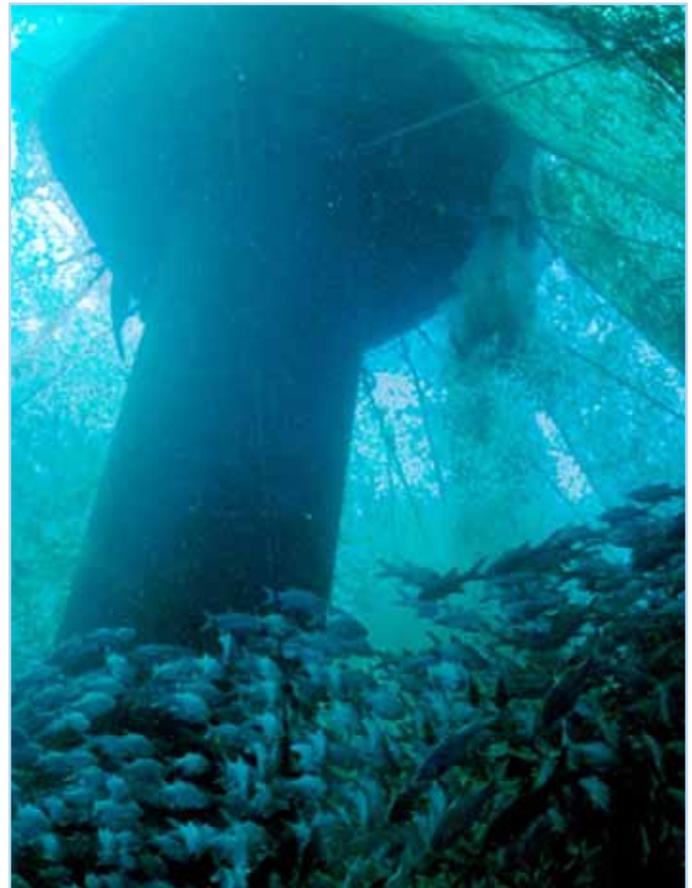


Photo courtesy NOAA.

salmon anemia (ISA)⁶ and, most often, increases in sea lice,⁷ commonly associated with highly stocked net pens. Sea lice are tiny tick-like parasites that attach themselves to the fish, reproduce quickly and slowly drain their hosts of nutrients. They have been a problem in commercial salmon farms worldwide throughout the last decade, and there



An open-ocean aquaculture site off the coast of Hawai'i Island where more than 700,000 pounds of amberjack, marketed as Kona Kampachi, are commercially grown. Photo by Christina Lizzi/Food & Water Watch.

is some evidence that the lice have become resistant to traditional chemical treatments — such that some researchers are now calling them “super lice.”⁸ Sea lice not only harm and often kill captive fish (thus reducing profits for the facilities), they also have been found to infect and decimate populations of wild fish in Scotland, Norway, western Ireland and Canada’s Pacific coast — all areas in which industrial-sized fish farms are well-established.⁹

In Canada, the Living Oceans Society says that escaped farmed fish from British Columbia have been found in 80 rivers in the province, despite assurances that the fish would not survive in the wild.¹⁰ Statistics for the Norwegian farming industry, meanwhile, suggest that more than 500,000 fish escapes occurred in 2009 alone — including cod, halibut, salmon and trout.¹¹

In addition to spreading disease, escaped fish are a risk to the creatures that live around them. Some recent studies have demonstrated that confined fish over time eventually will lose genetic diversity due to inbreeding — meaning that if these farmed fish escape into the wild and breed, wild fish might lose natural traits that help them survive in the wild.¹² Also, the production of genetically engineered fish could be another cause for concern.¹³

Use of Unsafe Chemicals in the Industry

Because caged fish often live in cramped conditions on many fish farms, some companies rely on chemical baths or the application of chemicals in fish feed to treat or pre-empt diseases that can spread quickly among fish.¹⁴ However, these chemicals can have a harmful effect on the local environment when released freely into the ocean, and sometimes can even harm the fish themselves.

In October of 2010, Scotland’s Marine Farms reported deaths of at least 6,000 fish (and possibly as many as 20,000) after using an illegal and highly toxic pesticide which is permitted for aquaculture use in neighboring Norway. The company is now under investigation by national authorities and may face prosecution.¹⁵

In New Brunswick, Canada, a debate rages on about the use of cypermethrin and deltamethrin as treatments for sea lice on the salmon farms there.¹⁶ Opponents of the salmon-farming industry claim that the chemicals harm local lobster populations. In October 2010, the country’s environmental authority conducted tests in which lobsters exposed to deltamethrin died on the first day of the trial, and the agency subsequently banned the use of the chemical in open waters. The salmon farmers have called for further testing.¹⁷

Death of Other Marine Wildlife

Fish farms can be harmful to other marine wildlife as well. In April of 2007, 51 California sea lions died in a mass drowning after they were caught in the nets of a fish farm near Vancouver Island.¹⁸ It is likely that the sea lions, naturally attracted to the captive fish, were attempting to eat the fish in nets and got tangled in the process.

There is also some evidence to suggest that fish farming may negatively impact endangered great white sharks. Great whites have been observed visiting tuna farms off the coast of Mexico and southern Australia, and at least one has been killed as a result of interactions with valuable farmed tuna.¹⁹ A similar incident occurred at Hawaiian aquaculture facility Kona Blue Water Farms when a 16-foot tiger shark (considered a sacred animal to native Hawai-

ians) was killed after spending too much time around the farm and one of the company's divers.²⁰

In the most horrific example, in April 2009, the Seal Protection Action Group (SPAG) in Scotland claimed that as many as 5,000 seals are being shot annually by Scottish fish farmers, in what amounts to a "secret slaughter."²¹ The group says it has witnessed the shooting on fish farms, and its members have come across seals washed up on shore with bullet holes in their heads. According to a representative of SPAG: "The seal shooting takes place in very remote locations in sea lochs around Scotland and there are no witnesses, and under the law the industry doesn't even need to release the figures of the numbers they have killed." The farming industry counters that the killings are necessary to protect their investment, and alleges the number is closer to 500. However, this is still a high number considering that there has been a decline in seal populations that is especially noticeable around fish farms.²²

Pollution, Disease and Genetic Contamination

Fish farms can be an enormous source of pollution to the environment. A shocking study commissioned by the World Wildlife Fund found that in 2000, Scotland's 350 marine salmon farms produced more sewage waste (measured in terms of nitrogen and phosphorous) than the country's human population.²³ The effluent, or fish waste, from offshore facilities is high in concentrated nutrients that can contribute to toxic algal blooms and hypoxic (low-oxygen) zones that can harm marine life; fish waste is also sometimes visible as a "plume" on the surface of the waters surrounding the cages.²⁴

Diseases in fish farms can spread rapidly among fish grown in close captivity, and as mentioned above, this may result in spreading infection to wild populations. It can also devastate the fish farming industry itself, even when farms

are spread thousands of miles apart. A recent study on the global impact of white spot syndrome virus to shrimp farms found that as the virus spread across the globe in the 1990s, it became increasingly severe and has spread even to wild marine populations in Europe.²⁵ Similarly, several studies in the last two years have suggested that the devastating ISA virus that hit Chile's salmon farms in 2007 likely originated in an outbreak in Norway in 1996 — which suggests that the virus probably persisted in the wild environment for more than a decade before beginning to affect Chile's industry.²⁶

Also contributing to the pollution around fish farms is the antibiotic- and hormone-laden feed sometimes used in farm facilities. The long-term effects of these chemicals on the marine environment (where they do not naturally occur) are not well understood.²⁷ However, some studies have shown an increase in antibiotic-resistant bacteria in the effluent flowing out of fish farms²⁸ and in the sediment that settles underneath pens.²⁹

Bathing is routinely done in commercial fish farms to combat the spread of disease and parasites, but even this process can sometimes go awry. In September of 2010, Australian company Clean Seas Tuna announced that about 80 metric tons of kingfish had accidentally died after a bathing period and said that it would review its bathing policies. It is not clear what bathing practices the company was using.³⁰

Human Impacts — and Community Opposition

There is, understandably, significant concern from consumers about the effects of antibiotic usage in animals grown for human consumption and the general safety of ocean-farmed fish, since the inputs (such as toxic metals or other chemicals that contaminate the ocean) cannot be controlled or monitored. Antibiotic residues have been detected in samples of Chilean farmed salmon³¹ and other types of imported farmed seafood, which has fueled some fear that its overuse could contribute to human resistance to important antibiotics if the treated fish is regularly consumed.³² Furthermore, a pair of widely recognized scientific studies published in 2004 found significantly higher levels of contaminants in farmed salmon than its wild counterpart, with the highest levels of contamination present, on average, in European farmed samples.³³ Contaminants shown to be present include PCBs and dioxins (both persistent organic pollutants), toxaphene and dieldrin (both insecticides), and PBDE, a toxic flame retardant that is similar in composition to PCBs.³⁴

Community opposition to the presence of open-ocean fish farms has grown internationally, with movements arising from Australia³⁵ to Canada³⁶ to the United Kingdom³⁷ and many places between. Negative perception surrounding the open-ocean fish farming industry in much of Europe led one Norwegian fish farm executive to observe that "many can't even stand the sight of a fish farm" in his country.³⁸



Photo courtesy NOAA.

Open-water fish farms can also hurt fishing communities. In Chile, there is clear evidence of the long-term effects and non-viability of the salmon farming industry: The industry once employed 55,000 people, but fewer than half remain due to the spread of a devastating ISA virus that hit in 2007 and left the country with a far lower production capacity. The president of the National Confederation of Salmon Workers says, “the situation is catastrophic.”³⁹

In another example, international salmon farming wreaked havoc on local salmon fishermen in Alaska throughout the 1990s from thousands of miles away. From 1992 to 2001, the value of the Alaskan salmon harvest plunged from \$600 million to barely more than \$200 million, a drop of more than 60 percent. Research found that the large supply of farmed fish contributed to a “drastic drop in the ex-vessel value of the Alaska salmon harvest.”⁴⁰ While Alaskan salmon prices have certainly rebounded, this required significant marketing efforts from both the state and local fishermen, and many fishing families did not make it through the tough times — people lost homes, fishing licenses and livelihoods. Ocean-farmed fish may serve only to displace fishermen and hurt economies of local communities.

Let’s learn from the mistakes of other countries and prevent development of this troubled industry in U.S waters.

Endnotes

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