

THINK TWICE

ABOUT EATING FARMED SALMON

Behind farmed salmon's attractive price are some devastating costs.



SALMON ATLANTIC
STEAK
FARM RAISED
COLOR ADDED



| NET WT | UNIT | PRICE | TOTAL PRICE |
|---------|------|-----------|-------------|
| 0.55 lb | | \$5.99/lb | \$3.29 |

TOTAL
PRICE
\$3.29

TRUE COST

DEVASTATING



www.farmedanddangerous.org

What is salmon aquaculture?

Salmon aquaculture (farming) is the industrial production of salmon from egg to market. Most of the industry still uses open net-cages in the ocean, and these floating feedlots hold up to a million fish in an area the size of two football fields.

An environmental hazard



Open net-cage salmon farm
Photo: Lara Renehan

Net-cage salmon farming is currently one of the most harmful aquaculture production systems. Farm waste and chemicals such as antibiotics and pesticides pass through the cages into surrounding waters, harming other marine life.

The high densities of fish and exposure to pathogens create breeding grounds for disease and parasites. Escapes of thousands of farmed fish are far too common, as are the deaths of predators like seals and sea lions, which are killed trying to access the pens of fish.

Environmental threats are not limited to the coastal areas where most farms are located; the threats extend into the entire ecosystem. When wild salmon populations decline as a result of net-cage aquaculture, this may affect hundreds of species linked to wild salmon in the food chain like orca whales, coastal wolves, grizzly, black and Spirit Bears and even thousand-year-old cedar trees that derive critical nutrients from wild salmon carcasses. The 2009 Fraser River sockeye collapse, in which only 1.3 million wild salmon returned instead of a predicted 10 million, is only one of the most recent cases in which net-cage salmon farms have been implicated in wild salmon declines.

Fewer fish in the ocean

Salmon farmers often claim their industry is helping to “feed the world.” In truth, the salmon farming industry accelerates demand for already stressed wild fish stocks and strains the marine food web and food supply. On average, it takes **one and a half to five kilograms** of wild fish (used in feed) to produce **one kilogram** of farmed salmon. Much of the wild feed for farmed salmon is taken from the southern hemisphere, diverting local protein from people and ecosystems in poorer nations to raise a luxury product for northern consumers.



Wild sockeye salmon
Photo: Ian McAllister/Pacificwild.org

Risks to wild salmon: sea lice, disease & escapes



Sea lice on wild pink juvenile salmon
Photo: Alexandra Morton

Wherever salmon is farmed in open net-cages alongside wild salmon and trout, wild fish suffer reductions in abundance as a result of farm impacts — by more than 50% per generation on average.¹

Salmon farms in BC are typically located in sheltered waters along wild salmon migration routes. Sea lice infestations on these farms can infect and kill passing

juvenile wild salmon migrating to sea. Research in BC indicates that a single salmon farm can increase natural sea lice levels by 73 times and elevate infection rates for 30 km beyond the net-cages.²

High numbers of fish in salmon farms and little control over what enters net-cages can also lead to the outbreak of disease. The 2007 Infectious Salmon Anemia (ISA) epidemic in Chile led to the destruction of three quarters of their salmon farming industry. Some say BC is a “sitting duck” for a viral epidemic spread between salmon farms, which could have a devastating effect on BC’s wild salmon populations.

Atlantic salmon comprise 91% of salmon farmed on BC’s Pacific coast. It is estimated that “leakage” (small escapes that occur during ordinary operations) can total 0.5-1% of annual production. A 1% leakage would translate into approximately 160,000 Atlantic salmon escaping into BC’s marine environment each year. On top of that, **mass escape events** occur all too frequently where tens of thousands of Atlantic salmon escape at once. Escaped farmed fish have the potential to out-compete wild salmon for habitat and food as well as transfer disease and pathogens to wild fish.

¹ Ford JS, Myers RA (2008) A global assessment of salmon aquaculture impacts on wild salmonids. *PLoS Biol* 6(2): e33. doi:10.1371/journal.pbio.0060033

² Krkošek, M., Lewis, M. A. and Volpe, J. P. (2005). Transmission dynamics of parasitic sea lice from farm to wild salmon. *Proceedings of the Royal Society B* 272: 689-696.

Sustaining coastal economies

The salmon farming industry was at first welcomed in BC due to the promise of much needed jobs for coastal communities. However, by the 1990s, the BC salmon farming industry had tripled production without a corresponding increase in new jobs.

A 2007 independent economic report prepared for a BC Legislative Committee concluded the entire BC salmon farming industry generates only 2,900 direct, indirect and induced jobs. Meanwhile, the ecological impacts of salmon farming continue to threaten the commercial, sport, and First Nations wild fisheries, which support more than 16,000 jobs and contribute at least \$1 billion to BC’s economy each year. Marine and wilderness tourism, the fastest growing sector within BC’s multi-billion dollar tourist industry, is also negatively affected.

First Nations

Many coastal First Nations in BC call themselves “salmon people.” For millennia, their cultures and societies have been sustained by wild salmon and the riches of the sea. First Nations’ traditional food is now at risk due to the open net-cage salmon farming industry. If wild salmon stocks and other marine resources decline as a result of salmon farming impacts, there will be little left to harvest and a critically important Aboriginal right to resources in traditional territories, recognized by the Supreme Court of Canada, will be denied.



Photo: Beltra/Greenpeace

Pesticide and antibiotic use

The industry is heavily reliant on the use of vaccines, antibiotics and pesticides in an effort to control disease and parasites on salmon farms. These treatments are typically administered through medicated feed or baths which allow these substances to be released into the environment, potentially harming marine life. An article published in *Environmental Microbiology*³ links the wide use of antibiotics in salmon farming to the emergence of antibiotic-resistant bacteria, and increased antibiotic residues in farmed salmon products.

Outbreaks of sea lice, a crustacean, are most commonly treated with SLICE™ containing emamectin benzoate (EB), a pesticide added to the feed of farmed salmon. The environmental effects of this chemical are largely unknown but EB in fish waste or uneaten food pellets has the potential to affect other crustaceans like crabs, shrimp and lobster. This can jeopardize the livelihoods of coastal fishing communities reliant on wild species.

Meanwhile, sea lice from many major salmon farming regions have shown disturbing signs of resistance to treatments, including EB, likely due to frequent and heavy applications. While alternative pesticides are now being tested, reliance on chemicals to farm salmon in the open water creates a vicious cycle of heavier pesticide use, more resistance and more damage to the environment.

Colouring farmed salmon

Wild salmon range in colour from pink to red because of the food they eat. Since farmed salmon do not benefit from a wild diet, natural and artificial colourants are added to their feed to alter their flesh from an unappealing grey to a marketable “salmon” colour. The Salmofan™ is used to choose the desired shade of pink for fish and the corresponding level of canthaxanthin and astaxanthin is added to their feed.

³ Cabello, F. C. (2006). Heavy use of prophylactic antibiotics in aquaculture: a growing problem for human and animal health and for the environment. *Environmental Microbiology* 8(7): 1137-1144.

⁴ http://www.ctvbc.ctv.ca/servlet/an/local/CTVNews/20100219/bc_ctv_investigates_food_fish_100219/20100304?hub=BritishColumbia

Health concerns

Consumers may choose salmon because of the health benefits of omega-3 fatty acids. However, a study in the *Journal of Nutrition* (2005), found that in some regions “farmed salmon contain levels of 13 fat-soluble persistent organic pollutants that are on average ten times higher than those found in wild salmon.” Research published in the *Journal of the American Medical Association* (2005) encourages the overall consumption of seafood for its health benefits. However, the study showed the rate of cancer risk from consuming farmed salmon from certain regions is three times higher than wild salmon.



Photo: Edward May

A *CTV News Investigation* (2010) compared wild and net-cage farmed salmon and found that wild salmon are more nutritious than farmed with eight times more Vitamin D and three times more Vitamin A per 100 gram serving. The test also showed that farmed salmon are fattier which means they may have more omega-3s, but it also means they can “accumulate higher levels of toxins such as PCBs, a banned toxin found in materials like asbestos.”⁴



Farmed salmon
flesh colour selector

For salmonids pigmented with CARDHYLL® Pink (astaxanthin)
Albanco salmonids
Farmed salmon
Salmofan™
Farmed salmon
flesh colour selector

Predator control



Photo: John Brouwer

Every year seals, sea lions, whales, birds and other fish are affected by open net-cage salmon farms. Fisheries and Oceans Canada data reveals that from 1996 to 2008, 3,239 Harbour seals, 768 California sea lions and 330 Steller sea lions were reported deliberately shot and killed by BC salmon farms. In 2007, 51 sea lions became entangled in nets and drowned at a single farm and

in 2008, a humpback whale became entangled in a farm net. Industrial salmon farms in BC were not even required to report drowning deaths to the government until the spring of 2009 and no data are available yet.

Are you unknowingly eating farmed salmon?

There are no commercially viable Atlantic salmon fisheries left in the world. If you buy Atlantic salmon, it is from an open net-cage farm. Atlantic salmon is the most commonly farmed species, but some farms operating in the Clayoquot Sound UNESCO Biosphere Reserve raise Pacific Chinook (spring or king) salmon.

Retailers and restaurants often advertise “fresh” salmon. This usually means fresh from the farm—not from the fisherman. Be sure to ask if their salmon is farmed or wild. If it is farmed, don’t buy it unless it is raised in an environmentally responsible closed containment system.

Organic or eco-label farmed salmon?

Any salmon farm using open net-cage technology has similar environmental impacts. Unfortunately, some of these farms are selling their product with an “organic” or “eco” label. “Organic salmon farms” currently certified in Europe continue to use open net-cage technology which does not eliminate waste, prevent escapes and marine mammal entanglements or contain the spread of parasites and disease. Antibiotics and chemical treatments for parasites are also allowed under many European organic certification programs. Eco-labels now appearing on net-cage salmon are masking bad practices in order to profit from sustainable seafood trends.

The US National Organic Standards Board voted to disallow certification of net-cage fish farms where the reproduction or migratory routes of wild fish or other marine life could be impacted. Here in BC that’s the whole coast, yet Fisheries and Oceans Canada has been working behind closed doors with the salmon farming industry to develop a standard that would allow net-cage salmon farms to be labelled as “organic.” The public needs to get involved and voice their concerns in order to protect the integrity of the organic label and stop destructive salmon farms from getting eco-credit they don’t deserve.



Solutions

Salmon farming in BC can be made safer for wild salmon, marine ecosystems, coastal communities and human health while still providing jobs in coastal communities. CAAR works with government and industry to foster change and advocates for a shift to closed containment technology for salmon aquaculture.

CAAR has also engaged in lengthy negotiations with the BC division of the largest salmon farming company in the world, Marine Harvest Canada (MHC), about interim measures to protect wild salmon while net-cages are still in the water. As a result, MHC has taken steps in one region of BC to reduce sea lice levels by emptying some farms during the wild salmon out-migration season and coordinating lice treatments. While these measures encompass only a few farms on one migratory corridor, the company's actions may provide some interim relief to the area's wild salmon, better enabling them to survive their out-migration. However, all farms ultimately need to be transitioned from open net-cages into closed systems.

Closed containment is a proven, viable technology, and is currently used to raise species such as tilapia, trout and salmon in Canada, the US and China. In BC, there are numerous projects currently underway to develop commercial-scale closed containment salmon farming systems. Whether sited on water or land, closed-tank systems can eliminate escapes, eliminate or greatly reduce the risk of disease and parasite transfer to wild salmon, and provide employment opportunities closer to communities. Government and industry must change the focus of their research and investment in aquaculture towards the full implementation of closed containment technology.

CAAR believes the salmon farming industry needs to:

- ✓ Use technology that eliminates the risks of disease and parasite transfer as well as fish escapes;
- ✓ Guarantee untreated waste is not released into the ocean;
- ✓ Label fish as 'farmed' so consumers can make informed choices;
- ✓ Develop feed for farmed salmon that doesn't deplete fish stocks around the world;
- ✓ Ensure wildlife is not harmed as a result of fish farming;
- ✓ Prohibit the use of genetically modified fish;
- ✓ Reduce and/or eliminate the use of chemicals, antibiotics and pesticides in fish farming;
- ✓ Ensure contaminants in farmed fish don't exceed levels deemed safe by international standards; and
- ✓ Stop locating fish farms in areas opposed by Aboriginal groups or other local communities.



Closed containment facility

What can you do?

Wherever you live, **say no** to net-cage farmed salmon and let friends, family and seafood businesses you support know why.

In the US, tell your retailers and restaurants to demand a more sustainable product.

In Canada, contact the Prime Minister or your MP, urging them to invest in the development of closed containment technology; ask Fisheries and Oceans Canada (DFO) to fulfill its mandate to protect wild salmon.

There are useful resources to help you make more sustainable seafood choices. In the US check the Monterey Bay Aquarium's Seafood Watch program. In Canada, visit SeaChoice.org.

Thousands of citizens worldwide are helping to hold industry and government accountable for the impacts of net-cage salmon farms by asking for change. You can too!

Visit www.farmedanddangerous.org to learn more.

About CAAR

The member groups of the Coastal Alliance for Aquaculture Reform (CAAR) are:

- David Suzuki Foundation
- Georgia Strait Alliance
- Living Oceans Society
- T. Buck Suzuki Environmental Foundation
- Watershed Watch Salmon Society

Don't eat farmed salmon until
the industry cleans up its act



www.farmedanddangerous.org



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