

SOTA NYT Advertisement: Is Farmed Salmon Really What the Doctor Ordered?

Coastal Alliance for Aquaculture Reform

*“The omega-3 fatty acids found in fish reduce the risk of cardiac arrhythmias and sudden cardiac death following a heart attack. However, omega-3 fatty acids have not been shown to have any protective effect against cancer, and young people are not at risk of heart attacks. There are many other sources of healthy omega-3 fatty acids, especially walnuts, wild fish and some cooking oils. **One does not need to eat a contaminated fish to benefit from the omega-3 fatty acids.** The solution is clearly that the salmon farming industry must stop feeding the salmon food that is contaminated with carcinogens. Until safe salmon reach the supermarket, consumers should restrict their consumption of farmed salmon.”* Dr. David Carpenter, MD.

In the November 27th weekend edition of the New York Times, Salmon of the Americas, a farmed salmon marketing association, launched a six-page ad claiming extensive health benefits of farmed salmon. The ad also portrayed the industrial production of farmed salmon as ocean friendly and environmentally benign. The information below identifies inaccuracies in the industry-sponsored ad.

OMEGA-3 and Health

The Salmon of the America’s New York Times ad makes some claims that need to be addressed. The ad’s target audience is clearly pregnant women and mothers concerned with the health of their families.

Information from recently published studies clearly indicates that pregnant and nursing women should be concerned that the health benefits from farmed salmon may be offset or overridden by the contaminants in farmed salmon. Many published studies note that there are less contaminated sources of omega-3 fatty acids than farmed salmon and people should think twice about eating farmed salmon.

Background Information

A recent study in the Journal of Nutrition compared the quantitative cancer and non-cancer risks of exposure to organic contaminants in salmon with the n-3 (omega-3) fatty acid associated health benefits of salmon consumption. The authors state the following in some of their conclusions:

Young children, women of child-bearing age, pregnant women and nursing mothers not at significant risk of sudden cardiac death associated with CHD but concerned with health impairments such as reduction in IQ and other cognitive and behavioral effects, can minimize contaminant exposure by choosing the least contaminated wild salmon or by selecting other sources of omega-3¹.

Another study that examined consumption advisories for salmon based on risk of cancer and non-cancer health effects determined the following:

The levels of dioxins/furans, polychlorinated biphenyls (PCBs), and chlorinated pesticides were determined in farmed salmon for eight regions in Europe, North America, and South America, in salmon fillets purchased in 16 cities in Europe and North America, and in five species of wild Pacific salmon. Upon application of US Environmental Protection Agency (USEPA) methods for developing fish consumption advisories for cancer from mixtures of all of these substance for which USEPA has reported a cancer slope factor, the most stringent recommendation, for farmed salmon from northern Europe, was for consumption of at most one meal every 5 months in order

¹ Foran et al. Quantitative analysis of the benefits and risks of consuming farmed and wild salmon. American Society of Nutrition: Journal of Nutrition. 135:2639-2643. November, 2005.

to not exceed an elevated risk of cancer of more than 1 in 100,000. Farmed salmon from North and South America triggered advisories of between 0.4 and one meal per month. Retail market samples, in general, reflected levels found in regionally farmed fish, although much of the US salmon comes from Chile, which had somewhat lower contaminant levels than the North American farmed samples².

Dr. David Carpenter gives a clear explanation of the risk associated with consuming farmed salmon.

Most salmon sold in supermarkets today come from fish farms. Farming of salmon has several advantages, in that they are available year round, and are less expensive than wild salmon. However farmed salmon contain levels of 13 fat-soluble persistent organic pollutants (POPs) that are on average ten times higher than those found in wild salmon. The contaminants come from the feed fed the farmed fish, which is made from the fats and protein of trash fish.

So what are the health effects of eating a mixture of 13 POPs along with your farmed salmon? We applied U.S. Environmental Protection Agency cancer guidelines and advisories for frequency of fish consumption for three of these substances for which EPA has clear advisories, PCBs, toxaphene and dieldrin, making the assumption that the cancer risks were additive. We determined that on average one could only eat one meal of farmed salmon a month without increased risk of cancer. In the case of the most contaminated farmed salmon from Europe, the value would be one meal every four months! In contrast, wild salmon can safely be consumed up to eight meals per month.

While these are striking results, our estimation is clearly a large underestimate of the true risk. All of the other 11 POPs we analyzed are known to cause cancer, at least in animals. However we have not included these in our consumption advisories because EPA does not have clear standards for them. In addition we have not yet conducted any risk assessment for the non-cancer endpoints.

The greatest risk to human health from eating POPs-contaminated food is probably the detrimental non-cancer effects known to occur from exposure of the unborn child. Prenatal exposure to PCBs and dioxins results in an irreversible reduction in IQ in the child, reduced attention span, an increase in antisocial behavior, reduced immune system function and altered thyroid and sex steroid hormonal systems. The recent studies from Europe report that little boys exposed to these compounds prenatally are feminized.

The half-life of these compounds in the human body is the order of 10 years. Therefore if a 10-year-old girl eats a contaminated salmon, when she gets pregnant at age 20 she will have half of her contaminants still in her body to pass on to her child. In order to protect the fetus, it is critical that all females from the day of birth until the reproductive years are over, exercise care in what they eat.

The omega-3 fatty acids found in fish reduce the risk of cardiac arrhythmias and sudden cardiac death following a heart attack. However, omega-3 fatty acids have not been shown to have any protective effect against cancer, and young people are not at risk of heart attacks. There are many other sources of healthy omega-3 fatty acids, especially walnuts, wild fish and some cooking oils. One does not need to eat a contaminated fish to benefit from the omega-3 fatty acids. The solution is clearly that the salmon farming industry must stop feeding the salmon food that is contaminated with carcinogens. Until safe salmon reach the supermarket, consumers should restrict their consumption of farmed salmon³.

Ocean Farming: Good for the Ocean? A Peaceful Coexistence?

² Huang, et al. Consumption advisories for salmon based on risk of cancer and non-cancer health effects. Environmental Research.

³ http://www.checonet.org/healthhouse/education/articles-detail.asp?Main_ID=831

Using the term ocean farming, when describing intensive feedlot production methods such as open net cage salmon farming, is similar to what land based intensive feedlots do when they term their operations “agribusiness”. It water downs the realities of their operations. Salmon farms are large-scale operations that can confine more than a million fish per farm. One could also question whether salmon farms represent a peaceful coexistence with the natural environment.

Is it Peaceful Coexistence?

Predator Control

The intensive production of farmed salmon in open net cages submerged in the marine environment does attract native species that naturally prey on fish. Salmon farmers view these natural inhabitants as “pests” and are permitted to kill animals such as seals and sea lions because they represent a threat to the salmon farms. According to Canadian federal records there were approximately 5000 sea lions and seals killed from 1990 to 2000⁴.

November 20, 2005-Marine Harvest Caught in Wildlife Slaughter

The Salmon Farm Monitor Group reported that Marine Harvest, Scotland’s leading manufacturer of farm salmon has been shooting seals. Dead seals have been washed up on beaches whilst others, shot but not killed are left to die⁵.



The Killing of Sea Mammals: As revealed by the Friends of Clayoquot Sound

Creative Salmon shot and killed sea lions and disposed of them in mass graves in 2000 in Clayoquot Sound⁶.

⁴ Georgia Strait Alliance. Regulating salmon aquaculture in BC: A report card. www.farmedanddangerous.org/?action=d7_article_view_folder&Join_ID=82852

⁵ <http://www.salmonfarmmonitor.org>

⁶ <http://www.focs.ca/fishfarming/killingmammals.asp>



Sea lion shot by Creative Salmon and disposed in this pit in Clayoquot Sound in 2000.

Escapes

The United Nations along with many scientists and conservationists maintain that the introduction of non-native species is one of the greatest threats to ecosystems. Over a million farmed salmon were reported by industry to have escaped into BC waters from 1987-1996 inclusive. About half of these escapes were Atlantic salmon. The real number of escapes is possibly much higher, as many escapes have likely gone unreported⁷.

When concerns were first raised about the impact of these exotic species escaping into BC waters, government officials insisted that Atlantic salmon would not reproduce in BC waters. Research, including DNA testing, has confirmed that a number of BC streams have been found to contain juvenile Atlantic salmon, indicating that these fish have in fact successfully spawned in the wild.

When farmed salmon escape, they pose several problems to wild species⁸:

- Escaped salmon can be carriers of disease and parasites, which pose a threat to wild salmon populations.
- Farmed native species that escape also pose as a threat as they are capable of breeding with local populations of wild salmon that are genetically adapted to specific streams. The resulting genetic dilution may reduce the area-specific adaptability causing weaker stream populations and poorer survival.
- In British Columbia most of the salmon farmed are Atlantic salmon. The potential negative consequences of successful colonization of Atlantic salmon in BC streams could be dramatic.
- Escaped farmed salmon compete with wild salmon for habitat and food thereby putting wild salmon at increased risk.

"As these Atlantic salmon colonize these rivers, they are taking up space. It's an ecological ratchet. Every time a square metre is turned over to the Atlantic salmon, that square metre is not available to the Pacific steelhead - they've lost their habitat." Dr. John Volpe.

February 1, 2005: 33,000 Salmon Go Wild On The West Coast of British Columbia

⁷ Atlantic Salmon Watch Program. Jointly managed by Fisheries and Oceans Canada and B.C. Fisheries. http://www.pac.dfo-mpo.gc.ca/sci/aqua/ASWP_e.htm

⁸ <http://www.davidsuzuki.org/Oceans/Aquaculture/Salmon/Escapes.asp>

⁹ <http://www.expressnews.ualberta.ca/article.cfm?id=1175>

Friends of Clayoquot Sound discover (almost a year later) what is believed to be the single biggest escape in recent Canadian history. Norwegian multinational Grieg Seafood lost approximately 33,000 farmed Atlantic salmon in May 2004 from their Muchalet Inlet farm in Nootka Sound on the West coast of Vancouver Island. This mass escape brings reported escapes of Atlantic salmon into the Pacific waters of British Columbia to over 400,000 since 1991. Since 1987 ca. 1.4 million farmed salmon (Chinook, Coho, Steelhead and Atlantics) have been reported escaped from their cages - ca. 250,000 Atlantic salmon alone since 1998 many into the waters of Clayoquot, Nootka and Kyuquot Sounds¹⁰.

February 22, 2005: Salmon Storm Escape Figure Given. 629,000 Salmon Escape

More than 600, 000 farmed salmon escaped into waters off the west coast of Scotland during January's storms, it has been claimed. Less than 10% are known to have died, according to the Scottish Wildlife Trust and WWF Scotland. Experts warn the 629,000 fish left alive and free may have a "potentially disastrous" impact if they ended up breeding with wild salmon¹¹.

May 12, 2005: Escaped Farm Fish Threaten Wild Salmon Stocks

Around half a million farmed fish escape into Norwegian waters every year, meaning one out of every four salmon or trout found in Norway's coastal waters are fish farm escapees. Large numbers of escaped farmed salmon have been reported in Scotland. In January 2005 alone over 629,000 farmed fish are known to have escaped.

Waste

The sources of chemical pollution from salmon farms include antibiotics and other medications, feed additives, antiparasitics, paints and antifoulants used on netcages and boats to prevent marine growth, and disinfectants. Many of the chemicals used in aquaculture have been adopted from other industrial sectors and have never been evaluated with respect to their effects on marine ecosystems¹².

In 2003, more than 25,000 kilograms of antibiotics were used on B.C. salmon farms¹³.

The main source of organic pollution from salmon farms is fish excrement and uneaten feed. The amount of feces produced by farmed salmon can vary depending on feed formulations. Studies show that 25 - 50 % of the dry feed consumed can end up as feces¹⁴. Other contributions to organic waste are fish mortalities that sink to the seabed, and fish blood from farms that harvest and bleed fish on site.

Cermaq, which was fined more than any other company in B.C. in 2002, was also fined \$90,000 over six years for fish oil spills, in one case resulting in harm to wild salmon spawning habitat¹⁵.

Chemical Use

The list of chemicals used globally on salmon farms should make one question how "ocean friendly" "ocean farming" really is. Chemicals such as emamectin (Slice), ivermectin, cypermethrin, azamethiphos,

¹⁰ <http://www.focs.ca/news/index.asp>

¹¹ <http://news.bbc.co.uk/1/low/scotland/4287407.stm>

¹² <http://www.davidsuzuki.org/Oceans/Aquaculture/Salmon/Pollution.asp>

¹³ Cox, Sarah K. Diminishing Return: An investigation into five multinational corporations that control British Columbia's salmon farming industry

¹⁴ EVS Environmental Consultants. In 'Impacts of Freshwater and Marine Aquaculture on the Environment: Knowledge and Gaps (Preliminary Report). Prepared for Canadian Department of Fisheries and Oceans, June 2000, pp. 12.

¹⁵ Cox, Sarah K. Diminishing Return: An investigation into five multinational corporations that control British Columbia's salmon farming industry

malachite green, dichlorvos and canthaxanthin and astaxanthin (both food colourants) are used in farmed salmon production. Many of these are administered within the feed of farmed salmon¹⁶.

Emamectin benzoate, commercially sold as Slice, is currently undergoing clinical trials in Norway, Scotland, and Chile, in Canada. It has yet to be tested for food safety by the Canadian Food Inspection Agency, to be licensed by the Bureau of Veterinary Drugs (Health Canada), or to be permitted for use through the Pesticide Control Act. However, in 2003, more than 37 million Canadian farmed salmon were treated with Slice¹⁷.

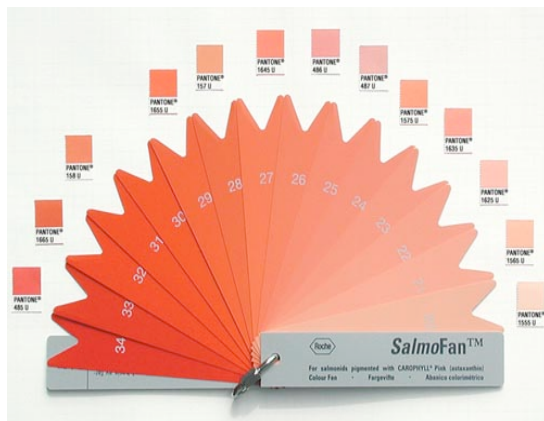
Slice is used on salmon farms to control the sea lice parasite that proliferates within the intensive rearing systems of salmon farms. Industry treats their stock to control sea lice outbreak as sea lice parasites affect the health of farmed salmon. One issue concerning conservation groups, First Nations and shrimp and prawn fishermen in particular is the ability of Slice to accumulate in sediments in the surrounding environment that could become toxic to marine life and also impact other crustaceans around the farms¹⁸. In fact, the label of the pesticide 'Proclaim', in which emamectin benzoate is the only active ingredient, clearly warns: "This pesticide is toxic to fish, birds, mammals, and aquatic invertebrates."

Scientists in Scotland have shown that mysid shrimp are highly sensitive to emamectin benzoate¹⁹. The equivalent of half a drop in an Olympic-sized swimming pool is enough to poison these small planktonic animals. In 2003, more than 10,500 kilograms of premix containing Slice were approved for use on Canadian salmon farms by Health Canada²⁰.

In addition to the chemical hazards associated with sea-lice outbreaks on industrial fish farms, the sea lice are threatening wild salmon populations. See the section below on Sea Lice and Wild Salmon.

The Colour of Farmed Salmon

The SOTA ad is correct in that farmed salmon do get their pink hue from the food. The predominant colourants used, canthaxanthin and astaxanthin, are produced by large multinational pharmaceutical companies and are infused in the animal feed. Salmon farmers choose the colour of the farmed salmon flesh in advance by using an industry tool called the SalmofanTM.



¹⁶ Staniford, Don. A Stain Upon the Sea: West coast salmon farming. *Silent Spring of the Sea*. Harbour Publishing, 2004.

¹⁷ <http://www.watershed-watch.org/ww/salmonfarming/sealice.html>

¹⁸ Cox, Sarah K. Diminishing Return: An investigation into five multinational corporations that control British Columbia's salmon farming industry

¹⁹ Staniford, Don. A Stain Upon the Sea: West coast salmon farming. *Silent Spring of the Sea*. Harbour Publishing, 2004.

²⁰ Cox, Sarah K. Diminishing Return: An investigation into five multinational corporations that control British Columbia's salmon farming industry

Without the use of food colourants, farmed salmon would be unappetizing grey.

Feeding a Carnivore: A Global Net Loss for Our Oceans

The main ingredients in salmon feed are fish mainly sourced from South America such as sardines, anchovies and herring. According to an analysis of existing information on salmon feed it currently takes 2-4kg of wild fish to produce the fishmeal needed to make 1 kg of farmed salmon²¹. This represents a net loss of protein, which from a global sustainability perspective is inefficient: The salmon farming industry is contributing to the decline of already strained global wild fish populations.

Modern Technology

The SOTA ad states that: “salmon are grown and processed under tightly controlled conditions, using the most modern technology...” Is this true?

Today’s salmon farming industry relies on open net cages. This is the same rearing system that has been in place since the 1970’s. These systems do not contain waste produced by the fish, allow disease transfer to wild fish stocks, and risk escapes of farmed fish to the wild.

There is, however, modern technology to address these concerns: Adopting closed containment systems, an existing technology, will greatly reduce the environmental impacts from salmon farming. To view the Coastal Alliance for Aquaculture Reform’s (CAAR) closed containment briefing package please visit: http://www.farmedanddangerous.org/?action=d7_article_view_folder&Join_ID=82852

Critics of closed containment technology often cite economic challenges as reasons for not implementing closed containment system. CAAR is proactive in assessing the economics of closed containment technology. *Closing in on Environmentally Sound Aquaculture* is a report that examines the shortcomings in current assessments of closed containment technology. This report is available at http://www.farmedanddangerous.org/?action=d7_article_view_folder&Join_ID=82852. The report concludes that:

“Reports that specifically assess closed tank salmon aquaculture technologies in BC fall short of providing accurate and comprehensive assessments of long-term financial and economic potential of these systems. A more thorough assessment that includes economies of scale and efficiency improvements, time horizon studies, sensitivity analyses and social cost are needed²².”

The Broughton Archipelago: Sea Lice and Pink Salmon

The New York Times ad makes it appear that pink salmon returns in the Broughton are healthy and that salmon farming has had no impact on wild salmon.

In 2005, pink salmon returns to the Broughton Archipelago showed the lowest return since salmon farming began. Two artificially enhanced rivers in the Broughton Archipelago received 97% of the returning salmon, while several other rivers in the area had less than 100 fish return²³.

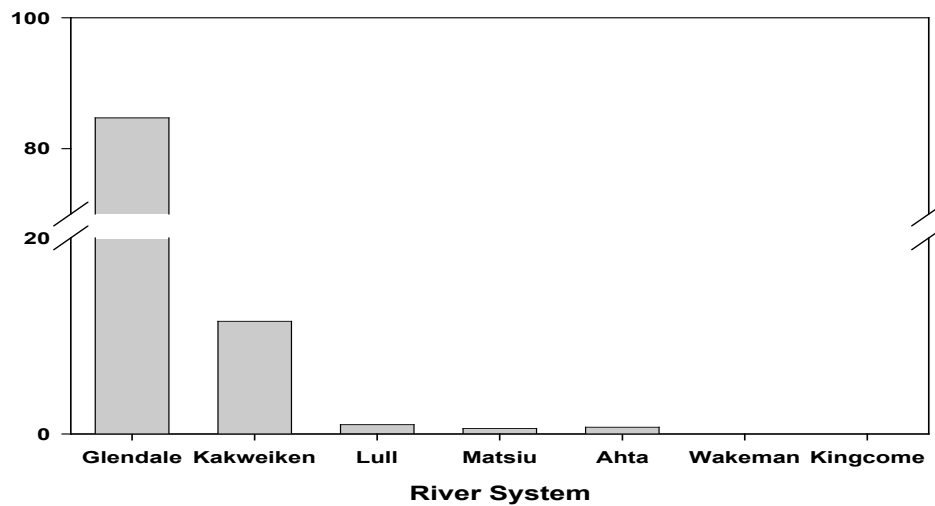
²¹ Tacon, Albert G.J. State of information on salmon aquaculture feed and the environment. [Htp://www.worldwildlife.org/cci/pubs/Feed_final_resaved2.pdf](http://www.worldwildlife.org/cci/pubs/Feed_final_resaved2.pdf)

²² Pendleton, et al. Closing in on environmentally sound salmon aquaculture: A fresh look at the economics of closed tank systems. April 1, 2005. http://www.farmedanddangerous.org/?action=d7_article_view_folder&Join_ID=82852.

²³ Broughton Archipelago Escapement Graphs. 2005. http://www.farmedanddangerous.org/?action=d7_article_view_folder&Join_ID=82852

The Wakeman River had a total run of 56 pink salmon this year, compared to runs in the tens of thousands prior to the arrival of fish farms. 56 salmon is not a sustainable wild salmon run. It is not enough to feed the bears, eagles, otters and forests that depend on wild salmon for their very survival. Salmon are the backbone of the coastal temperate rainforest, providing essential nutrients to the soil, trees, insects, birds and mammals that comprise a healthy ecosystem. The Kingcome River saw a total return of 53 pink salmon in 2005 compared to the thousands that once filled the river in fall. These river ecosystems cannot survive into the future with salmon runs that are virtually nonexistent. Trying to pretend the area as a whole is experiencing healthy returns of wild salmon by hiding the actual river by river counts in cumulative totals is misleading.

The graph below is the 2005 escapement figures for 7 river systems in the Broughton Archipelago.



The Broughton Archipelago is not unique in having wild salmon populations devastated by the spread of sea lice and disease from salmon farms. This has also happened in Norway and Scotland where it has long been known that sea lice from salmon farms impact wild salmon.

FMI Certification/SQF Standards

In the NYT ad, SOTA claims that they are working with the Food Marketing Institute (FMI) on safe Quality Food (SQF) certification. This is true, but since the standards have not been made available for review it is impossible to know if they are strong and effective or weak and ineffectual. Until the SQF standards are subjected to review they shouldn't be cited as an assurance of quality.

Furthermore, SQF typically deals with Food Quality Standards and does not deal with environmental impacts. However the SOTA ad claims that the SQF will deal with health, quality and environmental concerns.

This absence of environmental standards and consideration can be seen from the committees²⁴:

The Technical Committee is drawn from a field of technical experts that are representative of the global food industry. The Technical Committee, a team of food and quality systems specialists,

²⁴ Food Marketing Institute: <http://www.sqfi.com/committees.htm>

reviews the SQF system and makes recommendations to the SQF Institute on improvements to the Codes, the training materials, implementation, audit and certification requirements.

The make up of the Technical Committee covers the following disciplines:

- * Meat processing
- * Dairy processing
- * Seafood processing
- * Plant farming systems - horticulture and broad acre crops
- * Animal production systems
- * Government policy and legislation
- * Retailing
- * Wholesale distribution and transport
- * General food processing
- * Toxicology
- * Quality management systems
- * Microbiology
- * Agriculture & veterinary chemicals
- * HACCP
- * Packaging and packaging systems
- * Canning and aseptic systems

The WHO, FAO and the US Institute of Food Technologists will also be invited to participate on this Technical Committee.

It is clear that there is no environmental committee housed within the FMI standards and SQF certification. It should also be noted that FMI is a food marketing board lacking the expertise to determine the environmental impacts resulting from the salmon farming industry. The environmental monitoring of the salmon farming industry appears to be beyond their mandate. Relying on an industry trade association such as SOTA for environmental impact information is anemic at best.

Substandard Standards

CAAR is also concerned that Salmon of the Americas (SOTA), the trade association representing salmon farming companies, is partnering with FMI to develop this certification. SOTA is designed to increase the market for farmed salmon in North America. However, the growing body of peer-reviewed science proving the numerous health and environmental risks associated with farmed salmon is resulting in increased public awareness around this product. Consequently, SOTA is seeking a certification process that gives them a market advantage and give consumers a false sense of security around the product, not one that will necessarily address the health and environmental problems associated with this product.

We have encouraged FMI to develop a certification program that is open and transparent; one that ensures that the environment and human health are protected. We suggest that the following steps be taken:

- Scientists, conservation organizations, fishermen, and the salmon farming industry are involved as equal partners in the development of this certification program.
- That the standards are designed to ensure that the ecological and cultural values of the regions with salmon farms are not harmed by salmon farms
- That the certification program considers innovative technology that protects the environment from the negative impacts of salmon farming.
- That an economically viability transition strategy be developed to facilitate the transition to alternative technology.

SOTA and FMI have not taken this advice. The result will be a diluted certification that will only serve as a marketing tool for current unsustainable practices. Salmon farming will only become sustainable when it can meet the following criteria.

- Develop technology that eliminates the risk of disease transfer to wild fish and escapes of farmed salmon into the wild;
- Guarantee fish farm waste is not released into the ocean;
- Label all farmed fish so consumers can make informed choices;
- Develop fish feed that does not deplete global fish stocks;
- Ensure that wildlife is not harmed as a result of fish farming;
- Prohibit the use of genetically modified fish;
- Eliminate the use of antibiotics, biocides and harmful chemicals in fish farming;
- Ensure contaminants in farmed fish do not exceed safe levels;
- Respect the views of coastal residents by not locating farms where First Nations or other local communities object.