BC Salmon Farming

Growing pains + lessons learned = a better industry

BC Salmon Farmers Association

Salmon farming arrived on BC's Coast in the 1980s and is a relatively new agricultural industry compared to more traditional farming such as beef, poultry and pork. We're the first to admit that in the beginning we made some mistakes and had some growing pains. Since then, we've faced constant public and government pressure to improve our environmental and ecological record — far more in fact than any other agricultural sector.

Today BC's salmon farming industry is the most regulated and rigorously monitored in the world, and we are global leaders in the sustainability marketplace. We are extremely proud of the quality of our product, the integrity of our operations, and the strong role we play in supporting rural coastal economies.

This report outlines steps we've taken over the years to address concerns and continually improve how we do things.

escapes

concern:

farmed salmon will escape and destroy wild salmon species

We've heard your concerns that if Atlantic salmon were to escape their farm pens, they could colonize and compete against native Pacific species for food and spawning grounds, and could possibly wipe out Pacifics on the coast.

growing pains:

escapes did happen in the early days

When our industry was quite young, this concern was justified. Escapes did happen from farms in the early days. These escapes were due to a number of factors, including equipment failures, human error, poorly sited farms that broke apart in storms, and predators that tore into nets to get at fish.

our response:

We tackled the problem by investing in superior farming systems as technology developed. These include:

- installing better and stronger nets, including additional predator netting
- conducting regular net inspections
- reducing fish handling
- improving anchoring of nets and farm structures
- improving farm siting
- educating staff
- instituting an *Escape Prevention Plan* and an *Escape Response Plan* for each farm, which includes monitoring and reporting any escapes to our regulators
- participating in the Atlantic Salmon Watch program, introduced by the Government of Canada to track any Atlantics found in local streams and monitor for any possible colonization in BC waters.

Today's reality: *escapes from BC farm sites are extremely rare*

The actions we've taken over the past 15 years have virtually eliminated escapes from BC farm sites. Thankfully escapes are extremely rare, and when they do occur our regulator is notified immediately and steps are taken to recapture the fish. In addition, extensive plans are in place in the event of a large escape that include recapture efforts and increased surveillance of rivers and streams to ensure Atlantics would not establish a population.

These days, we know a lot more about what happens to Atlantics that do escape. Of the low proportion of escaped fish that survive to be caught or found in BC, over 94 percent have empty stomachs, indicating that their competition with wild salmon for food is insignificant. Very few Atlantics have been found in river systems and farm-raised salmon have been shown to have a significant competitive and reproductive disadvantage compared to wild salmon.

These findings are supported by research into the potential impacts of Atlantic salmon in the Pacific Ocean. That research has shown that Atlantic salmon have never successfully colonized BC waters – including when Atlantic salmon were intentionally released by the federal government from 1905 to 1991 – and that when farm-raised salmon have escaped, they have had very low survival rates.

fact check

Escape Statistics 1987-2009 (British Columbia Ministry of Agriculture and Lands)
http://www.al.gov.bc.ca/fisheries/cabinet/Escape_Stats.PDF

Escape Statistics 2011-2012 (Fisheries and Oceans Canada - Public Reports on Aquaculture)
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/escape-evasion-eng.html

Movements and survival of sonically tagged farmed Atlantic salmon
http://icesjms.oxfordjournals.org/content/63/7/1218.abstract

marine mammals

concern:

the methods used to protect farm salmon are hurting other species

We've heard your concerns that the actions taken by salmon farmers to keep predators away from the fish pens can be harmful to wildlife.

growing pains:

early techniques were modeled on land-based agriculture and were harmful

When farmers first began farming salmon, predators were dealt with the same way they were in land-based agriculture – with a gun. Firearms were kept on site and used when a seal or sea lion became too aggressive or acclimatized to the farm site as a source for food. Later, in order to reduce the number of marine mammals killed at farm sites, other methods were explored including Acoustic Deterrent Devices. These devices create an underwater noise that deters predators, but also impact echo-locating marine species, especially dolphins and whales.

our response:

All of our farm companies have voluntarily banned the use of firearms on their farms. Also, salmon farmers stopped using Acoustic Deterrent Devices before they were eventually banned in 2000.

To deter seals and sea lions, we commonly use predator nets. These large, robust, weighted nets surround the farm site and provide an additional barrier between the predator and the fish. These nets also provide an additional barrier to prevent fish escapes. Some farms also use non-lethal electric fencing that can be turned on at night when predators are most likely to visit.

For smaller predators such as birds, otters and mink, securely sewing top nets to side nets is a very effective deterrent. For persistent animals, live-traps are used to capture and relocate. In the very rare occurrence that no other solution can be found, farm companies can have the problem animal euthanized in a humane manner. This requires special permitting from the Department of Fisheries and Oceans for a specific animal, ensuring that this decision is not made lightly.

Today's reality: *Tailored deterrence and continuous improvement keep salmon and predators safe*

All interactions with marine mammals are reported to the Department of Fisheries and Oceans (DFO), which works with farmers to find a better solution. The majority of marine mammal reports involve harbour seals. The year 1995 marked a high with 577 seals killed. That had decreased by more than 90 percent to 56 in 2010, 57 in 2011 and 4 in 2012.

Salmon farmers are always working to increase their knowledge of other marine species and have reached out to marine mammal researchers to develop better, more effective techniques to protect fish and local wildlife. This includes engagement with experts from the University of British Columbia and the Vancouver Aquarium to learn more about these mammals and to share information salmon farmers collect.

fact check

Authorized marine mammal control activities – Quarterly reports ((Fisheries and Oceans Canada - Public Reporting on Aquaculture – Marine Mammals)
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/mar_mamm-eng.html

Nuisance Seal Licence Statistics 1990-2010 (Fisheries and Oceans Canada - Public Reporting on Aquaculture in the Pacific Region – Marine Mammal Interactions)
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/docs/mar_mamm/seal-phoque/licence-stat-permis-eng.html

sea lice

concern:

fish farms may magnify the sea lice problem and harm wild salmon populations

We've heard your concern about the impact of fish farms on the sea lice population, which came to light in the early 2000s when sea lice were observed on wild pink salmon smolts in the Broughton Archipelago. The theory is that wild fish could initially pass sea lice to farm-raised salmon and the lice would then reproduce quickly due to the large number of hosts available. These higher-than-usual levels of sea lice could then be passed back to wild salmon smolts as they migrated past salmon farms, possibly harming the vulnerable smolts at a critical stage in their development.

growing pains:

fish farmers were also worried about sea lice in the early days

When Atlantic salmon were introduced in BC it was found that they could become a harbour for sea lice infections. Initially farmers applied a topical anti-parasitic chemical in a bath solution, but in 1988 switched to a much more effective feed-based treatment using a product called Ivermectin created for domestic farm animals (learn more in the Chemical Treatments section).

our response:

Our farmers now follow a range of best management practices and monitoring programs to ensure fish farms don't become an additional source of sea lice.

We stopped using Ivermectin in 2000 because another treatment – emamectin benzoate (SLICE™) – was found to be more effective. SLICE™ is approved for use in BC and is prescribed and administered under the care of a veterinarian.

Farmers examine their fish at least once a month for regular sea lice counts. As per government regulation, if those counts show an average of three motile lice per fish during particular times of year, the farm is required to either treat the fish or remove them from the water during the outmigration period of wild fish. Sea lice counts are reported to the Department of Fisheries and Oceans which publishes this information on its website.

Today's reality: *Sea lice management strategies are working to protect wild salmon*

With these regulations and procedures in place, salmon farmers have been able to reduce the amount of sea lice on farm sites. SLICE™ has proven to be an effective, efficient treatment for lice on farms and is key in the industry's sea lice monitoring program. A recently completed long-range review found no correlation between sea lice levels on fish farms and returns of wild stocks.

In July 2013, a research paper released by the Broughton Archipelago Monitoring Program showed that the treatment by farmers in the Broughton Archipelago was effectively reducing the level of sea lice at the appropriate time for wild salmon out-migrations. The paper was the result of collaborative research by government, industry and environmental groups.

about sea lice

Sea lice are small marine external parasites found naturally on many species of fish. Farm-raised salmon are lice-free when they go into ocean pens.

fact check

Long range review of sea lice levels (University of California at Davis research study)
http://www.news.ucdavis.edu/search/news_detail.lasso?id=9698

Broughton Archipelago Monitoring Program
http://bamp.ca/pages/home.php

Modeling Parasite Dynamics on Farmed Salmon for Precautionary Conservation Management of Wild Salmon (Broughton Archipelago Monitoring Program research study)
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0060096#_blank

Quarterly sea lice reports from Department of Fisheries and Oceans
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/lice-pou-eng.html#Appendix

chemical treatments

concern:

routine use of chemicals is harmful to fish and the environment

We've heard your concerns that chemicals used in the course of farm operations could affect the safety of fish for consumption, and could impact other species and the environment.

growing pains:

chemicals were widely used by many industries in the early 1980s

A variety of chemicals have been used to control parasites and fungus. Early treatment methods included chemical baths – a process that involved draping a trap around the pen and adding chemicals to the water.

our response:

Increased research and improved understanding has led to better alternatives being developed and used on our farms.

Over the years, our knowledge of the effects of chemicals and new product developments has resulted in a reduction or elimination of their use. For example, bath treatments were stopped in the 1980s when food-based treatments were found to be more effective and environmentally friendly. The benefit of a feed-based treatment is that farmers can monitor the feed activity to ensure the fish are eating the food, and eliminate feed falling to the ocean floor.

As another example, the copper-based fungicide Malachite Green used to be routinely applied by salmon farmers and Department of Fisheries and Oceans (DFO) salmon enhancement hatcheries. In the 1990s it was identified as a carcinogen by Health Canada and was banned for use on fish for human consumption. Also seafood processing plants in BC are adding ultraviolet systems to their operations as a way of killing pathogens without using any chemicals.

Today's reality: *New developments in technology and science have virtually eliminated the need for chemicals.*

There are very few chemicals used anywhere near a farm site now, and best management practices and government regulations guide how any chemical substances are used and stored. We comply with all provincial and federal regulations and monitoring programs designed to prevent potentially harmful discharge to our oceans.

Environment Canada's management and regulations cover all stages of our fish lifecycle, from the discharge of any water at the hatchery to the removal of fish waste from our processing plants. Since 2011, the Department of Fisheries and Oceans has required all aquaculture license holders in British Columbia to prepare and implement a Chemical and Other Substances Management plan, which covers the control of disinfectants, anti-fouling agents and more.

fact check

Chemicals Management Plan, Government of Canada
http://www.chemicalsubstanceschimiques.gc.ca/plan/index-eng.php

disease

concern:

farmed fish could foster diseases and create antibiotic-resistant strains

We've heard your multiple concerns about disease, including that:

- Farmed Atlantic salmon could become a breeding ground for disease and/or could introduce an alien pathogen that would negatively impact wild Pacific salmon
- Treating farm-raised salmon with antibiotics could result in antibiotic-resistant strains of diseases (learn more in the Antibiotics section).

growing pains:

learning to prevent disease takes perseverance, ingenuity and rigour

Our farmers have shared the public's concerns about disease from the outset. When Atlantic salmon were first introduced in BC, salmon eggs were imported to develop the farm stock. Egg imports were subject to stringent regulations in order to protect wild fish stocks from any potential non-native pathogen being introduced. Soon after, BC salmon farmers began developing their own broodstock and egg sources in order to reduce/eliminate the need to import eggs.

In the early 2000s, a lack of communication between farmers about biosecurity led to the spread of infectious hematopoietic necrosis (IHN) between farms. While generally not harmful to Pacific salmon species, IHN outbreaks still raised concerns about increasing pressure on wild fish.

our response:

Farm-raised salmon are now vaccinated to protect them from most naturally occurring disease challenges present in the ocean (more about vaccinations in Antibiotics section).

While in their ocean net-pens, fish are monitored constantly for any signs of disease or illness. If an illness is observed, veterinarians will diagnose and prescribe treatment as required. Should an outbreak of a contagious virus occur, such as the naturally occurring IHN, our members' Viral Management Plan is immediately implemented, including a complete quarantine of the site and removal and disposal of fish in full collaboration with regulators.

Farmers participate in sampling programs run by the Canadian Food Inspection Agency and the Department of Fisheries and Oceans to assist with viral monitoring. Regular sampling by government, companies and independent third parties ensure that we have a very clear picture of the health of our fish.

Today's reality: *Farmed fish are healthy and disease-free, and farmers monitor health continuously*

Ongoing monitoring and research is key to the health and survival of both wild and farm-raised fish. We stringently monitor and test our fish, and take great pride in raising healthy fish and keeping the environment healthy for all species. Today, our farms have survival rates of around 95 percent. This shows a consistently healthy population that is unstressed and well cared for.

Viral and disease research into fish stocks is ongoing. We are currently partnering with several projects, including one through Genome BC, to identify new pathogens that may be in the waters of British Columbia and research their effect. Nine years of site-by-site fish health data was released to the public in 2011 by BC's salmon farmers in order to provide information to the Cohen Commission Inquiry into the Decline of Sockeye Salmon in the Fraser River.

about Atlantic salmon and diseases

All Atlantic salmon are disease-free when they enter ocean net-pens. However, there are a variety of viruses and bacteria naturally occurring in the ocean environment that can present a challenge to farm-raised salmon.

fact check

BC Salmon Farmers fish health data 2002-2010
http://www.salmonfarmers.org/research-and-resources

Department of Fisheries and Oceans Fish Health Management Reporting
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/health-sante-eng.html

Canadian Food Inspection Agency, Aquatic Animal Health Reports
http://www.inspection.gc.ca/animals/aquatic-animals/eng/1299155892122/1320536294234

antibiotics

concern:

fish farm antibiotics will harm wild fish, humans and the environment

We've heard your concerns that the use of antibiotics by our industry could result in antibiotic-resistant strains of disease that would harm wild fish and other species, impact the environment and cause human antibiotics to become less effective.

growing pains:

antibiotics were relied upon too heavily in the early days

As farmers learned how to raise fish in BC's coastal environment, decisions were made that led to a higher level of antibiotic use than is now needed. For example, the early reliance on Pacific salmon species led farms to be more susceptible to native diseases, which meant farmers would need to look to treatment more often. When Atlantic salmon were introduced to farming in BC, vaccines were not yet available for a few common ailments which meant that antibiotics were relied on more often to manage fish health.

our response:

Our industry has helped develop smolt vaccines that protect fish from known diseases before they enter the ocean net-pens. Vaccination dramatically reduces the need to use antibiotics.

We closely control how and when antibiotics are administered and report this information to government, and we actively monitor the surrounding environment to find other ways to keep our fish happy and healthy (learn more in the Ocean Floor and Water Quality section). Antibiotics are only used when absolutely necessary and are done so under the care of a veterinarian. The medication is mixed into the fish feed and feeding is closely monitored to ensure as little impact as possible to the water column, ocean bottom and other species.

Today's reality: *Reliance on antibiotics has decreased steadily; they are now used sparingly and extremely carefully*

Farmers understand the connection between a healthy ecosystem and healthy fish. By giving our fish a better start right out of the hatchery, understanding how best to reduce any stress while in the ocean, and paying more attention to potential side effects of excessive usage, we have steadily reduced the level of antibiotics used over the last 15 years.

In 2011, the BC Salmon Farmers Association released nine years of farm-by-farm fish health data. That information shows any incidents of illness on a farm site and the rate of antibiotic usage. The data all together shows an increase in the health of fish on farms in BC and the correlating reduction in treatment that is required.

did you know?

There are a number of naturally occurring diseases in the ocean water that can make farm-raised salmon sick. In an effort to keep our fish healthy, fish farmers use antibiotics prescribed by veterinarians to treat some of these conditions.

fact check

Antibiotic Use in BC Salmon Aquaculture 1995-2008 (British Columbia Ministry of Agriculture)
http://www.agf.gov.bc.ca/ahc/fish_health/Antibiotic_Graphs_1995-2008.pdf

BC Salmon Farmers fish health data 2002-2010 (Under "Fish Health")
http://www.salmonfarmers.org/research-and-resources

ocean floor and water quality

concern:

the volume of outputs from fish farms place a heavy burden on ocean floor and water quality

We've heard your concerns that the outputs of fish farming, such as debris, uneaten fish feed, fish waste, chemicals, and antibiotics, have a significant impact on the water column and ocean bottom.

growing pains:

early farmers did not fully understand the impacts of their farms

As new users of the marine waters, fish farmers did not start out having much understanding about the best environment for salmon farming. This caused us to have a greater impact than was necessary. For example, farming in protected areas was good for early farm structures, but meant there was less water flow and more impact on the ocean bottom.

Also, we determined feed volumes according to fish growth (not data from underwater cameras as is done today), which led to excess waste on the ocean bottom. And, as discussed in other sections, we used chemicals that research later indicated should be avoided.

In addition, some early farmers were unable to rotate crops like terrestrial farming because they were only operating one or two fish farms (versus multiple farms today), resulting in more pressure on the ocean bottom.

our response:

We apply over 30 years of knowledge to ensure fish farms are sited in the best locations, and we practice rigorous environmental monitoring to be confident that our farms are not having a negative impact on the surrounding environment.

Fish produce organic waste that may settle directly beneath the farm sites. 'Benthic' (ocean bottom) monitoring stations are set up as outlined in the farm's condition of license and data is reported to the Department of Fisheries and Oceans (DFO). As is done in land-based agriculture, salmon farm sites are fallowed after harvest to allow the ocean bottom and surrounding environment to recover from organic impacts. The length of time a farm is fallowed varies. Some companies have a minimum number of months a site will be left empty even if the ocean bottom recovers faster – others restock once the area returns to its natural state.

Underwater cameras allow farm workers to monitor the feed and adjust the feeding schedule and amount to ensure the fish are eating the feed. (Fish feed is the largest cost of raising salmon so it is also in the company's best interest to ensure as much as possible is being eaten and not wasted.) Advancements in feed technology have also reduced the amount of feed that reaches the ocean bottom, for example, by increasing digestibility and reducing waste.

DFO regularly monitors farm sites, particularly at 'peak biomass' (when the farm's allowable maximum capacity has been reached) to ensure that a threshold of impact is not exceeded. Those results are reported quarterly to the Department of Fisheries and Oceans, which publishes this information on its website.

Today's reality: *Best practices in farm siting and management have dramatically reduced their impact on the surrounding environment*

Our farmers understand more than ever that healthy fish depend on a healthy environment. By choosing better sites for farms and making more informed decisions about feeding our fish, our impact on the ocean bottom has been greatly reduced to the point that farm sites can be returned to pre-stocking levels within months – and even weeks – of harvest.

Environmental technology and monitoring is always improving and more research is being done on the oceanic system as a whole. Computer particle tracking modelling (DEPOMOD) shows farmers how organics from a farm site will spread and settle – information that allows regulators to determine the best sampling sites to monitor farm impacts.

The federal government requires fish farms to provide benthic monitoring data on a quarterly basis. This information is then compared to audits run by the Department of Fisheries and Oceans.

fact check

Benthic Monitoring (Fisheries and Oceans Canada)
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/benth-eng.html

Industry-generated benthic sampling data, reported quarterly
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/docs/benth/2013/Q1-T1-eng.html

Procedures and protocols for benthic monitoring:
http://www.pac.dfo-mpo.gc.ca/aquaculture/reporting-rapports/benth-protocol-eng.html

fish feed

concern:

the ingredients used in fish feed put unsustainable pressure on other marine species

We've heard your concern that the marine ingredients used in fish feed (e.g. herring or anchovy) may put those species under unsustainable pressure.

growing pains:

in the early days fish meal and fish oil were heavily used by many industries

In the wild, salmon eat other small fish, so it only made sense to use fish meal and fish oil as the primary ingredients in feed for farm-raised fish. Fish-meal and fish-oil are used as feed for many other kinds of land-based animals (including cats and dogs) and industries worldwide, which creates a high demand on the fishery that provides this key ingredient. These fisheries were, at times, not managed with the long-range health of the population in mind, and in farmers' efforts to provide what they believed to be the healthiest diet to their fish, they overused these products.

Early farming also didn't have access to important technology that is used regularly today, such as underwater cameras. This meant more feed was left uneaten when our sector was first developing – wasting valuable fish meal and fish oil.

our response:

Steps have been taken to reduce the amount of fish meal and fish oil in fish feed, while still maintaining the nutritional requirements for farmed salmon. Sources of protein that would otherwise have gone to waste – for example, poultry meal or wild capture fish processing trimmings, are excellent protein replacements. Salmon feed does not contain ruminant protein (cow, sheep, goat, etc.)

New developments in the production of feed have also helped reduce fish meal and fish oil waste. For example, changing the shape of pellets has made feed more appealing to our fish, and increased digestibility has meant more of the consumed pellets are absorbed by the fish.

Underwater cameras and ocean bottom monitoring ensure that feed is managed closely.

Where fish meal and fish oil are sourced from wild fisheries, our feed companies only purchase from certified fisheries to ensure they are well-managed and protected into the future.

Today's reality: *High efficiency feeding techniques have reduced the volume of fish meal and fish oil used*

While aquaculture worldwide is one of the fastest growing food production sectors, the fish meal and fish oil fisheries have not grown. That means fish meal and fish oil is used at the same level to produce much more food for farmed salmon (and many other industries as mentioned above). We recognize the need to continuously focus on efficient use and alternatives in order to meet current and future demand while not over-taxing the species used to make fish feed.

Sustainability improvements to feed ingredients and feed delivery have allowed the farmed salmon industry to improve feed conversion ratio to 1.2 to 1 – meaning it now takes just 1.2 kg of feed to produce 1 kg of salmon. That's much more efficient than other proteins – for example it takes 2 kg of feed to produce 1 kg of chicken, 3.2 kg of feed for 1 kg of pork, and 8 kg of feed to produce 1 kg of beef.

fact check

Information from the International Fishmeal and Fish Oil Organisation
http://www.iffo.net/what-are-marine-ingredients

Skretting Canada's report on improving sustainability in feed production
http://www.skretting.ca/Internet/SkrettingCanada/webInternet.nsf/wprId/508FA5EAF6EE717B88257A100076BBCB!OpenDocument

food safety

concern:

farmed fish are exposed to ongoing hazards that make them unsafe to eat

As farm-raised salmon began to enter the marketplace, questions were raised over its safety as a food product. Below is one example of a concern raised over the years.

farmed fish are unsafe to eat due to PCB exposure

PCBs in farm-raised salmon received a lot of media attention in the early 2000s and led to a food scare, with people being led to believe they should avoid eating farm-raised salmon due to its high PCB content.

growing pains:

early farmed fish were exposed to dangerous materials

PCBs are synthetically produced organic molecules that were manufactured for heavy industrial use (e.g. coolants and plasticizers) in the mid-20th century. While their production ceased in the 1970s, the compounds remained in our environment and accumulated in our food chain because of their slow decay rate.

our response:

Changes in fish feed composition have reduced the PCB levels in farm-raised fish. The biggest impact came from reducing the amount of wild fish as they were a key source of PCBs. The allowable safety limit of PCBs in Canada and the US is 2.0 ppm. Farm-raised salmon averages around 0.014 parts per million, compared to .07 parts per million in butter.

Today's reality: *Farmed salmon is very safe, chemical-free and highly nutritious*

Full traceability and regular monitoring and testing by the Canadian Food Inspection Agency show that farmed salmon is a very safe product for consumers – as a great source of low-fat protein with high levels of Omega 3s, and a wonderful part of a nutritious and health meal.

Canada's Food Guide recommends eating two portions of fatty fish, such as salmon, per week. Whether the salmon you eat is from one of our great wild fisheries or from a well-managed farm in BC, health experts agree it's an important addition to your diet.

did you know?

Wild salmon get their pink to red flesh from the food they eat – and so do farm-raised salmon. The carotenoid in the shrimp and krill that salmon eat not only tints their flesh, but also provides important nutritional benefits to the salmon.

fact check

Canada Food Guide
http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/choose-choix/meat-viande/index-eng.php

conclusion

There will always be challenges with large-scale food production. Over the past 30 years, BC's salmon farmers have learned that every challenge and mistake offers an opportunity for improvement, and we've really taken these lessons to heart. We've also learned that focusing on continued improvement will bring positive change, even in areas that don't seem problematic at the time.

We are constantly researching and developing new approaches and technologies to prevent the same mistake from happening again, and to farming in the most sustainable, environmentally-sound way possible. And we are always open to learning more: if you have any concerns not covered here, please get in touch.

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