



Fish Health

Healthy fish are an absolute requirement for a productive farm site and good-quality products. The health of their stocks is therefore a top priority for BC's salmon farmers.

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The health of farmed salmon has improved dramatically over time as farmers, veterinarians and scientists have developed new vaccines, gained new understandings of fish pathogens, and developed better fish husbandry. Domestication of the salmon stocks has also been a significant contributor to improved fish health. Farmed salmon today commonly have survival rates of 90-99% whereas wild salmon have rates of 2-3% or less.

- **How does a salmon farmer maintain healthy fish?**

Salmon, like other animals, need the right conditions in order to be healthy. Salmon farmers must choose farm sites that provide excellent growing conditions, and they must obtain or develop good quality fish stocks that are adapted to their environment. Farmers must provide nutritious food to their fish, reduce potential sources of stress, and employ knowledgeable staff that are attentive to the needs and conditions of the salmon. Finally, to maintain healthy fish the farmers must work closely with professional fish veterinarians and implement preventative fish health practices.

Is the selection of the fish stocks important?

Yes. One of the most important factors in the health of farmed salmon is the use of stocks adapted to captivity. This adaptation is called domestication, and it requires selection of the best parent fish over several generations. When BC salmon farms started out, they grew fish that came from non-domesticated Chinook and Coho salmon eggs. Today the health and performance of these species on the farm is dramatically better because of the domestication and selective breeding that has occurred.

survive and thrive. Salmon farms are located in well-rushed waters that meet a variety of specific criteria relating to factors such as temperature, salinity and depth. As well, considerable research has been conducted to develop highly nutritious food for farmed salmon. The right surroundings and the right food help to ensure that salmon grow quickly and are naturally resistant to disease.

What other health-related measures are taken at farms?

Farmers undertake many preventative measures to ensure the health of the fish. Parent fish for the next generation are screened with sophisticated techniques to ensure that they are healthy before they are used as a source of eggs. The eggs are disinfected with an iodine solution and then hatched and grown in facilities where contact with fish pathogens found in the natural environment is limited. Before being transported to the ocean pens, juvenile fish are often individually injected with a vaccine (a small dose of a dead natural pathogen) to stimulate their immune systems so that they are able to fight off any endemic diseases that they might be exposed to in the ocean.

What is the role of the fish health veterinarian?

There are several veterinarians in BC that specialize in salmon health. They work with the farmers to ensure their stocks are healthy and that appropriate husbandry is being provided for the fish. If, despite all of the preventative measures, some salmon become ill, the veterinarian will examine the fish and determine the appropriate action that must be taken.

Are antibiotics used on salmon farms?

Farmed salmon are commonly grown to maturity without any use of antibiotics during their lives. However, as with all farm animals, a veterinarian may decide to treat salmon with an antibiotic if they become ill. However, the use of antibiotics in salmon farming is very limited and more closely controlled than in other livestock industries. If antibiotics are used for salmon, it is usually just for a few days, once or twice in the life of the salmon, and they are used under the prescription of a licensed veterinarian (Sheppard, 2000).

Regulations require that no harvesting of the fish occur until medications are cleared from the fish's system, and there are minimum required withdrawal periods to ensure this occurs. Practices that are the greatest concern for the development of agricultural antibiotic resistance, namely the use of antibiotics as growth promoters or as "over the counter" medications, never occur in BC salmon farming. The Canadian Food Inspection Agency randomly tests farmed salmon to ensure it meets all government standards, with respect to the absence of medication and other food-health requirements.

BC MAFF Isolation and Management Procedures for IHN Positive Farm Sites

Infectious Hematopoietic Necrosis Virus (IHNV) is endemic to salmonids in the Pacific Northwest. This virus has been identified in cultured Atlantic salmon in saltwater netpens in British Columbia and a variety of wild non-salmonid species (St. Hilaire, 2000).

Preventing the Secondary Spread of IHNV

Based on previous studies of IHNV in British Columbia, it is known that the virus can be present in stocks before a rise in mortality is seen and normal farm management activities may present a risk of inadvertent movement of this agent. Once IHNV has been diagnosed on a site, operators should take the following action:

the disease. This sampling should include a review of the records to determine if fish from similar groups have been moved to other sites as these groups should be part of an intensified sampling program.

3. Movement of staff between the affected site(s) and other farms as well as access by non-essential staff and/or visitors to the affected site should cease. If it is essential for staff to move between sites, movements should be minimised and all protective gear (boots, raingear etc) should be thoroughly disinfected or separate gear should be used at each of the affected and unaffected sites and left on that site.
4. Where possible, boats and equipment used at affected sites should be designated for that site. If boats must be used to go between sites, efforts should be made to minimise the movement between sites and affected sites should be visited last. If equipment must be moved between sites it should be thoroughly cleaned to remove all debris and organic material and disinfected.
5. Depending on the mortality rate, dive frequency should be increased to ensure rapid removal of all dead and dying fish. All surfaces and equipment that come into contact with mortalities or infective material should be cleaned and disinfected. If possible, divers should be designated to dive at the affected site(s) only. If divers must go between sites, the affected site(s) should be visited last and divers should ensure that all equipment and gear is thoroughly disinfected between sites.
6. Depending on the overall morbidity rate, farms should attempt to remove all visibly sick, slow swimming or moribund fish from the surface of the pens. If the morbidity rate is high, this may not be feasible.
7. Mortalities should be disposed of in tight lidded, secure containers to avoid loss of fish or infected material and to prevent access by birds and other predators. Collection of mortalities by the mort barge should be done frequently and operator of the barge should be instructed to collect mortalities at the affected sites last and ensure thorough disinfection of all surfaces and equipment in contact with the affected mortalities before proceeding between sites.
8. Operators are encouraged to notify other facilities and companies (including transport companies) that may have received fish from the affected facility and/or neighbouring farms/facilities if there is a risk of exposure from the affected fish involved in the outbreak.
9. Fish from affected sites should not be used for broodstock.
10. Sites that have experienced an outbreak of IHN should remain fallow for a minimum of three months prior to re-stocking fish into the site. Once the site has been re-stocked, fish should be monitored for the presence of the virus up to three months post the last day of stocking.

Disinfection Procedure for IHN Infected Sites

1. Footbaths should be maintained and used by all personnel before getting on and leaving the site. These footbaths should be located at all boat docking points. They should be clearly visible and marked.
2. Footbaths should be kept clean and changed regularly. A record should be kept of these changes.
3. All mort bags should be thoroughly disinfected after use and before re-hanging on cages. This includes sites that use one bag per pen. In addition all hand rails, nets and walkways that come in contact with the mort bags should be disinfected.
4. All fish health personnel should disinfect all rain gear, field kits, and boots before getting on and leaving the site. Each site should maintain a separate disinfectant bucket and brush for visiting fish health personnel.
5. Any fish and sampling and / or dissection must be done in a tote to prevent blood, mucus, feces, etc. from leaking on the site and back into the system.
6. All tanks and dive bags should be disinfected before bringing onto the site. Before leaving the site, all dive gear should be thoroughly disinfected. This includes tenders and act divers.

virus through mortalities and other infectious materials. It is recognised that factors such as the size and age of the fish, proximity of the farm to the processing plant, disinfection capabilities at the farm and the processing plant, and method chosen for harvest will dictate the precautions required. In light of this, the following guidelines are recommended:

1. Operators moving fish to a processing facility should ensure that boats or vehicles do not release of water from transport tanks between the facility or farm and the processing plant.
2. Stunning and bleeding for harvest of fish at affected sites should be done in a manner that minimises the loss or spillage of water, ice or blood water. Operators should take precaution to avoid overfilling totes that can lead to spillage from harvest containers. Harvest totes or containers should be fitted with secure lids prior to transfer on to transport vessels. All surfaces that come into contact with infected materials and or fish should be cleaned and thoroughly disinfected.
3. Operators transporting harvesting or processing fish should contain all water, blood water and processing waste for disinfection or disposal to landfill. If disinfection is required, chlorination and dechlorination can be utilised if the residual chlorine levels are less than 0.01 mg/l. Other methods such as ultraviolet radiation and ozonation would be considered on a case by case basis.
4. All processing and transportation equipment should be thoroughly disinfected after processing is completed.

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