

Farming Atlantic Salmon

Here in BC, as in other places where salmon are farmed, Atlantic salmon are the most common species grown. Atlantics make up a little more than 80 per cent of total farmed salmon production in this province, with the remainder made up of native Pacific salmon species (mainly Chinook and Coho).

Why farm Atlantic salmon in BC?

There are six species of native Pacific salmon, and although they look similar to their Atlantic cousins there are significant differences. Atlantic salmon are more docile and have a longer-history of domestication, making them better adapted to a farm setting. Atlantic salmon have high survival rates, convert food to body weight very efficiently, and produce high quality products with very little processing waste. Several BC farms do continue to raise Pacific species, and over time these stocks are becoming better adapted to the farm setting. However, it is doubtful that Pacific salmon will ever completely catch up to the performance of the naturally docile and efficient Atlantic salmon.

Could Atlantic salmon cause problems for BC fish species?

The introduction of a species that is exotic (not native) to an area calls for great caution. There have been instances where an exotic species have been released into the wild and have disrupted the local ecosystem. On the other hand, almost all of our terrestrial agricultural plants and animals are exotic in B.C. and yet they do not create undue adverse impacts. The possible impacts of the presence of farmed Atlantic salmon in the Pacific has been the subject of multiple scientific assessments, and the level of environmental risk has consistently been found to be low (Alverson and Ruggerone, 1997; Nash, 2001; Parametrix, 1990; Tupper, et al., 1998).

Could Atlantic salmon establish themselves in the wild in BC?

The evidence strongly suggests they cannot. There have been intentional efforts to establish Atlantic salmon populations in various places around the world over the past 130 years. Including some 200 attempts involving millions of Atlantic eggs and fry in BC early in the last century. Despite the scope of this and other introduction efforts, no sea run population of Atlantic salmon has ever been established outside its natural home range. (In contrast, introduced rainbow trout and brown trout are thriving in many of the same habitats where Atlantic salmon introductions failed.) Indeed, even re-introductions of Atlantics from areas within their natural range where they have disappeared are very challenging. Interestingly, one study indicates that the reintroduction of Atlantic salmon (into a stream that historically supported only Atlantic salmon) was being hindered by the competition from Pacific salmon and trout that have been subsequently introduced (Jones and Stanfield, 1993). This species is simply not a good colonizer, particularly when other species like Pacific salmon and trout are present.

What happens to Atlantic salmon when they escape from a salmon farm?

A farmed salmon that escapes into the wild in the Pacific is poorly adapted for survival, and only small proportions of escaped salmon ever survive to be caught in fisheries or later found in rivers. Of the escaped Atlantic salmon that are recovered from BC waters, 94% have nothing in their stomachs (McKinnell, et al., 1997), clearly demonstrating their poor ability to obtain food. With limited skills to find food or avoid predators, it is very likely that most farm escapees will quickly be consumed as part of the marine food chain. See *Escapes From Salmon Farms* for more details on what is being done to prevent salmon escapes.

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Do Atlantics have a better chance of competing because wild Pacific stocks are weakened from overfishing or habitat changes?

Many of the attempted Atlantic salmon introductions were in the Southern Hemisphere where there were no native salmonids. Despite this lack of direct competition for Atlantic salmon, there was still no success in establishing sea-run populations. The conditions that create challenges for Pacific salmon are likely even more limiting for Atlantic salmon.

Have Atlantic Salmon reproduced in the wild in B.C.?

An extensive Atlantic Salmon Watch Program has identified very small numbers of juvenile Atlantics in B.C. rivers that appear to be the result of successful spawning. There is no indication, however, that this is happening on a frequent or increasing basis. This is not surprising given the worldwide failure in establishing exotic sea-run Atlantic salmon populations, and given research which indicates that farmed salmon are poor spawning competitors compared to wild salmon (Fleming, et al., 1996). During some of the attempts to introduce sea-run Atlantic salmon in Chile, some adults were also observed to return to the stocked rivers and spawn (lay eggs), but the adaptability of Atlantic salmon is so poor that the resulting runs disappeared just a few years after they stopped being supplemented with hatchery fish (Lindberg, 1984).

Could Atlantic salmon spread exotic diseases?

When any plant or animal is imported into BC it is very important to make sure no exotic diseases or parasites are brought with them. The salmon farming industry is subject to some of the most stringent agricultural quarantine regulations in the world, involving multiple, redundant levels of protection. Farmers cannot bring in fish to BC – they can only bring in eggs, and the eggs must have come from facilities that are inspected and certified as disease free. The eggs must be disinfected with an iodine solution, brought to a quarantine facility for hatching and rearing, and then the young fish must remain in quarantine for several months while they undergo regular health testing and reporting. Only the fish that successfully pass all of these tests may be brought to an ocean salmon farm for further grow out. Today, few eggs are in fact imported because the farmers breed their own fry from parent fish that they have grown in BC for several generations. The stringent regulations have been effective, and as a result, there have been no recorded occurrence of exotic diseases in BC farmed salmon (Stephens & Iwama, 1997).

Atlantic salmon pose a very low risk, but BC salmon farmers continue to take precautionary action nonetheless. They are working with First Nations and government to monitor streams for the presence of Atlantic salmon, implementing numerous on-farm measures to reduce and hopefully eliminate salmon escapes, and researching technologies that could one day allow only female fish to be grown on the farms. This would bring the very low risk down to no risk.

Despite their poor colonization abilities, Atlantic salmon have qualities that suit them very well to growing on the farm. Farmers have established selective breeding programs that choose the best parent fish and aim to improve their quality, generation after generation. It is likely that Atlantic salmon will remain the dominant salmon species that is grown in BC and around the world for many years to come.
