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Salmon Farming May Doom Wild Populations, Study Says

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Intensive farming of salmon for American dinner plates is threatening some wild salmon populations with imminent extinction, according to the most detailed study ever done of the contentious issue. The report comes as the federal government and the aquaculture industry are pushing hard for a major expansion of fish farming in coastal areas.

The new research found a direct connection between the rapid growth of fish farming in the waters of the Broughton Archipelago off [British Columbia](#) and the abrupt decline of the region's wild pink salmon. What linked the two, the researchers found, were widespread infestations in the open-net salmon pens by sea lice. Older salmon easily tolerate the parasite, but young ones migrating through the same waters do not.

"These young salmon wouldn't be dying if it wasn't for the salmon farms and all those sea lice," said lead author Martin Krkosek, a fisheries ecologist at the [University of Alberta](#). "The wild population is dropping so fast that there isn't much time left to act."

With Americans' increasing appetite for fresh salmon, and with the farmed variety making up almost three-quarters of all salmon served, the finding is an unwelcome guest at the feast. Salmon farms have been suspected in the declines of wild salmon for some time, but the study published online yesterday by the journal *Science* is seen by some as the strongest evidence so far of a significant connection.

"This is the broadest look so far at the effects on a total population" of salmon farms, said Andrew Rosenberg, a former deputy director at the [National Oceanic and Atmospheric Administration](#) (NOAA) and an expert in the field.

"We're not talking about being mean to some individual fish; we're talking about a possible extinction within the next few years" of an important local population of pink salmon, he said.

The study comes at an awkward time for aquaculture advocates, including NOAA, who drafted the National Offshore Aquaculture Act of 2007 now pending in Congress. The bill would set up procedures to streamline and regulate a major expansion of fish farming.

Advocates argue that with the demand for fish -- especially salmon and other nutritious species -- expanding quickly, aquaculture is the only way to respond. Advocates also say that American aquaculture is far behind that of many other nations. Eighty percent of seafood for consumption in the United States, and two-thirds of the salmon, is imported, and much of it is farmed.

Kevin Amos, aquatic health coordinator for NOAA's Marine Fisheries Service, said the conclusions of the new study are unwarranted and unsupported. He said pink salmon runs vary greatly from year to year and are affected by many factors, including the salinity of rivers, the number of predators present and the extent of fishing in the area.

"We have to consider all things when establishing a cause and effect in aquaculture, and in this case the authors did not do that," Amos said.

The researchers collected Canadian records dating back to 1970 on the numbers of adult wild salmon returning from

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the ocean to British Columbia's rivers each year. The count included 14 populations that were exposed to salmon farms and 128 that were not.

They found that populations in the areas with many salmon farms were collapsing, while those in areas without farms were not. In addition, researchers found that when salmon farms were temporarily closed or allowed to lie fallow, the wild salmon populations from those rivers rebounded and sea lice infestations declined.

The paper's findings have implications beyond the Broughton Archipelago, where juvenile salmon have to swim past a nearly 50-mile string of fish farms before they reach the open ocean.

With lucrative fish farming now widespread in Atlantic [Canada](#) and along the coast of [Maine](#), northern [Europe](#) and [Chile](#), the industry has become increasingly controversial. Sea lice is the problem off British Columbia and in some areas of northern Europe, but a dispute over infectious salmon anemia is the central issue off the Maine and Canadian Atlantic coast. The escape of penned salmon is a key problem in Chile, where salmon are an aggressive, invasive species.

As the world's population expands, authorities in the United States and abroad have promoted aquaculture as a way to sustain current levels of fish consumption. Last month, the U.N. Food and Agriculture Organization issued a statement suggesting the global seafood supply will have to increase by 37 million metric tons to satisfy demand, and much of the seafood will have to be farmed.

Sea lice are naturally occurring parasites that attach themselves to wild salmon in the open ocean and feed on skin and muscle tissue. They thrive in open-net salmon farms because the fish are crowded together. Adult salmon living far offshore can cope with the lice, but wild juveniles heading to sea are vulnerable because they are small and thin-skinned.

Daniel Pauly, who directs the [University of British Columbia](#)'s fisheries center but was not involved in the study, said in an interview that he went into the archipelago a few years ago and collected 20 to 30 juvenile pink salmon, all of which were infected.

"It was like 'Alien,' " he recalled, referring to the movie in which an alien life form invades its victims' bodies before killing them. "They were destined to die."

Critics of current aquaculture practices in coastal areas generally propose two possible remedies: Building enclosed holding tanks that would contain diseases, parasites and escaping fish; and placing open-net farms much farther out to sea. Both alternatives are being studied, but officials say they would increase costs.

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