

# IT'S ALL ABOUT salmon

SUMMER 2005



seafood  
choices  
ALLIANCE

## Wild times for salmon

A paper published in March in the journal *Proceedings of the Royal Society B* (a publication of the U.K.'s national academy of science) investigates how a single salmon farm altered the natural transmission dynamics of sea lice from farm to wild salmon in British Columbia. The study is the first to isolate and measure the impact of one fish farm on sea lice outbreaks in wild salmon.

The authors infer that the transfer of parasitic sea lice from salmon farms to wild salmon populations may be much larger and more extensive than previously believed. The numbers of sea lice, which occur naturally in the wild, become concentrated in salmon farms where the fish are stocked at higher densities than in the wild.

"Sea lice production from the farm we studied was four orders of magnitude—30,000 times—higher than natural," says lead author Marty Krkosek. "Infection of wild juvenile salmon was 73 times higher than ambient levels near the farm."

The researchers studied the sea lice infection levels of migrating juvenile pink and chum salmon as they approached and passed a salmon farm. Unlike other species, pink and chum salmon leave their natal rivers while still much smaller than a person's baby finger and weighing only half a gram. The numbers of sea lice found on these juvenile wild salmon were significant.

"We found lice levels exceeded what we would find normally, extending for 30 km—even though the farm is only about 0.2 km long," says John Volpe, coauthor from the University of Victoria. "Conservatively this means that the parasite footprint of the farm is 150 times larger than the farm itself."

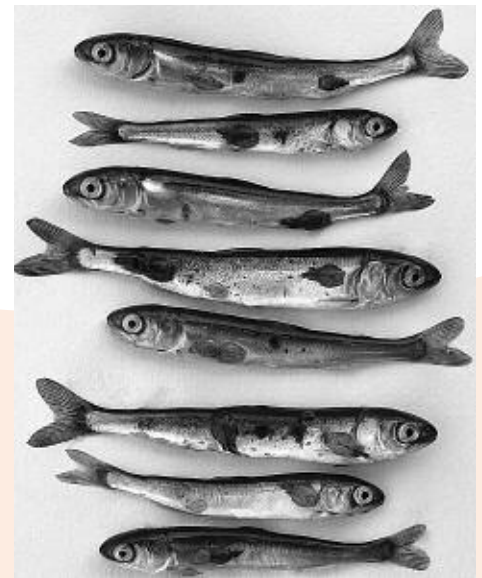
Furthermore, sea lice larvae mature and reproduce on these young salmon as they make their way from natal stream to open ocean. Each louse produces 300–800 eggs, which pose a second round of infestation to not only the young salmon in the school but also to other previously unexposed populations coming from geographically disparate regions or potentially to other species of fish, such as herring, that the migrating school passes.

"Parasites are a key negative side effect of fish farms on the local fish stocks," says Andrew Dobson, an epidemiologist from Princeton University. "We're seeing similar effects in Scotland, Norway, and Ireland."

According to Dobson, previous studies have not quantified the direct transmission. "This study captures the chain of events," he says.

Based on these findings and those of previous studies, the authors sounded a cautionary note for the expansion of salmon farming operations.

"There's a double bottom line here. The full ecological costs of industrial scale salmon farming must be quantified as well as the economic ones," says Volpe. "For the migratory runs we studied, there may be very little time left."



Juvenile pink salmon infected with sea lice.

Alexandra Morton, Raincoast Research Society

For more information, log on to: [www.math.ualberta.ca/~mlewis/publications/SeaLicePub.htm](http://www.math.ualberta.ca/~mlewis/publications/SeaLicePub.htm) ●

## WHAT'S NEWS

**Malachite Green** Earlier this year, malachite green (a suspected carcinogen) was detected in 310,000 farmed chinook salmon from **Stolt Sea Farms'** British Columbia operations. While the Canadian Food Inspection Agency issued a recall (which was not made public), some 80,000 pounds of this contaminated salmon were already destined for market in the United States, Canada, Japan, and other Asian countries. Malachite green, a fabric dye, is applied as a fungicide to salmon eggs and smolts in salmon hatcheries. Farmed salmon contaminated with malachite green have been found in Scotland and Chile in the past 2 years. Contamination levels of malachite green in the tainted Stolt salmon ranged between 0.31 and 1.3 parts per billion. The European Commission has a 2 ppb limit and Japan's is 5 ppb. Canada and the United States have a zero-tolerance policy for malachite green, and it is banned for use in food in the United States, Canada, Norway, Chile, and Scotland. Stolt, which recently merged with Nutreco under the name Marine Harvest, and the Canadian government have yet to confirm the origin of this contamination.

**Wild Atlantic Salmon** The **Atlantic Salmon Federation** and **WWF** have monitored the progress of Canada, the United States, Norway, Scotland, and Ireland in protecting endangered wild Atlantic salmon from threats from salmon aquaculture. Canada received the lowest ranking in their 2005 report, released earlier this summer, scoring 2.1 out of a possible 10 in terms of national performance on eight criteria, including proximity of aquaculture pens to wild Atlantic salmon rivers. Online at [www.asf.ca](http://www.asf.ca) and [www.worldwildlife.org/salmon](http://www.worldwildlife.org/salmon).

**Alaska** In June, **Yukon king salmon** made a return to the U.S. domestic retail market after thirty years of nearly total export to Japan. Typically, only a small portion of the catch is destined for the fresh market; much of the salmon is flash frozen at the point of origin and shipped to processors in Japan. Yukon kings have about 10% more oil content than their famous cousins from the Copper River. In July, the *Anchorage Daily News* reported that the turnaround in the state's salmon industry appears due to a combination of "government-subsidized marketing, bad press for farmed salmon and an increasing appetite for wild salmon." The paper further stated that "more Americans than ever are thinking salmon for dinner, whether it's from the Copper River or a net pen in Chile." Runs of **Copper River sockeye and coho** will continue through early September. The final opening for the summer troll season is August 14th. The Alaskan troll fishery filled approximately 77% of its king salmon quota during the last opening.

**Pacific Northwest** The Ninth Circuit Court of Appeals recently upheld a decision to increase spill over four dams on the Columbia and Snake Rivers. Scientists have long confirmed that spill is the most effective method of aiding salmon on their journey to the ocean, even more effective than the current trucking and barging of baby salmon around the dams. **Save Our Wild Salmon** urges supporters to write their U.S. Senators telling them to safeguard the recent court decision. More information is available at [www.wildsalmon.org](http://www.wildsalmon.org).

**Norway** A recent report by **WWF-Norway**, titled *On the Run—Escaped farmed fish in Norwegian waters*, states that increased farmed salmon escapes pose an additional threat to already depleted wild Atlantic salmon. According to the report, approximately 500,000 farmed fish escape into Norwegian waters every year, meaning one out of every four salmon or trout found in the country's coastal waters are fish farm escapees.

**Canada** In March, the **Coastal Alliance for Aquaculture Reform** (CAAR) announced that Colorado based retailer **Wild Oats Natural Marketplace** had discontinued selling farmed salmon from British Columbia because of risks to the environment and First Nations culture. And new research from Living Oceans Society and CAAR found that 80% of British Columbians surveyed want the government to start investing in closed containment. 72% of those polled said the BC government should stop the expansion of industrial salmon farming. For more information, visit [www.farmedand-dangerous.org](http://www.farmedand-dangerous.org). ●