Down on the salmon farm

Breeding **fish** in captivity spawns natural **concerns.**

by Doug George

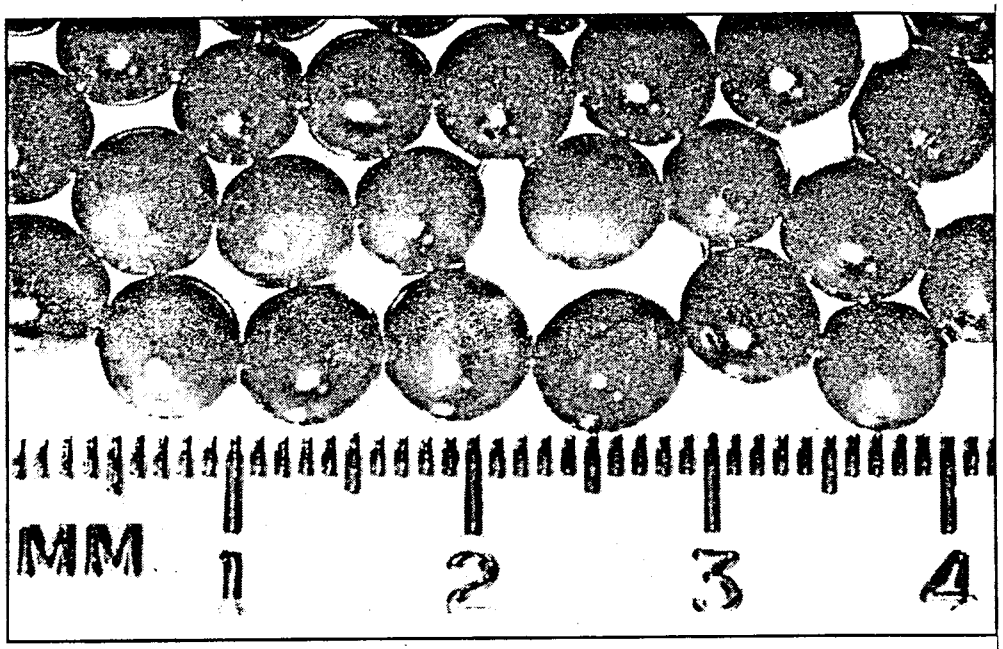
Salmon. For some people, this word conjures images of silvery hook-jawed ichthyoids charging up a waterfall to mate, spawn and die. For others, it's a tantalising tease of tonight's barbecue dinner, smeared with lemon and Cajun spices. In parts of Atlantic Canada, the fish helps the pay rent. But in those same places, salmon may represent another human assault on the ocean—and an industry reluctant to change its ways.

Salmon and humans have been intertwined for centuries. Entire Native Canadian and American cultures are based on plying the Atlantic coast for the meter-long fish. Wild salmon were caught for survival and sport, prized for their protein-laden pink flesh and apparent abundance.

Towards the end of last century, the situation began to change. In 1975, 1.75 million salmon returned from 4,000-km ocean migrations to their native Maritime rivers. By the year 2000, the population had shrunk 67 percent to 568,000. In some areas, the damage from over-fishing was nearly complete. When the Inner Bay of Fundy Atlantic salmon was designated endangered by Environment Canada in 2001, there were less than 250 of the fish left. Commercial salmon fishing was banned to allow stocks to recover.

"Not so fast," you're thinking. "I just saw shelves full of fresh salmon at the grocery store." The fish you saw are not wild and probably have never even swum in a river. They were farmed like any other meat you buy, bred and fed in controlled environments in the watery coves and inlets of New Brunswick, Nova Scotia and Newfoundland.

When the wild stocks began taking a dive in the 1970s and 1980s, salmon aquaculture—fish farming—took off. In New Brunswick, where almost 90 percent of Atlantic Canada's salmon is farmed, production swelled from six tonnes in 1979 to 29,100 tonnes in 2000. A Department of Fisheries and Oceans report in 1999 stated as many as 15 million salmon—or 26 times the wild population—were in cages peppering the Maritime coasts. Aquaculture pumped $223 million into the New Brunswick economy in 2000, the province's largest food-producing sector.



Chicken of the sea From egg to market, salmon can be raised out of the wild, in farmers' care. photo DLS National Image Library

"We're proud of what we do," says Jamie Smith, research and environmental management coordinator for the New Brunswick Salmon Growers Association. "The benefits of fish farming outweigh the risks to the environment as a whole."

Smith cites three main benefits to fish farming. In Charlotte County, the centre of NB farming, one in four jobs is related to salmon aquaculture and most of the 1,800 workers are under 40 years old. "This keeps our young people in the province," he says. As well, exporting salmon brings in dollars. The third benefit relates to our hunger for salmon. "Aquaculture is filling the gap, now that we can't catch wild salmon," Smith says. "We're taking away pressure on wild stocks."

Inka Milewski, a marine biologist and past president of the Conservation Council of New Brunswick, co-authored *After the Gold Rush*, a 1997 book examining salmon aquaculture. She says she saw the farms' potential to relieve wild stocks, but has been disappointed by the reality. "These are fundamentally industrial livestock operations, like hogs or chickens, except the waste is simply discharged into the environment, unregulated," she says. "When did we decide the marine environment can be a big toilet?"

Her concern revolves around feeding practises and fish waste. Farmers spread food pellets made of fish meal, oils, vitamins and minerals in the floating fish cages. Uneaten food, along with fish feces, falls through the water and settles on the sea floor. Eventually, if the waste continues to fall, the bottom community resembles a wasteland of brown or black muck. Other marine animals either move or are drowned in waste; oxygen levels drop as bacteria break down the food and

feces. This process is called eutrophication and Milewski says farms cause this with no penalty.

New feeding techniques, using underwater cameras and pellets that sink slower, are being employed, says Smith. And because food is a major cost, farmers have a strong interest in preventing waste. Even so, Milewski says the issues haven't changed in years.

The Department of Fisheries and Oceans was mandated to "find ways to make finfish aquaculture sustainable without harming aquatic habitats," and put money into a three-year project on the east and west coasts. Barry Hargrave, an ecologist at the Bedford Institute of Oceanography who's been involved in the program, suggests an environmental tax system similar to the one used in the paper and pulp industry: "The mills pay a tax to clean their waste up and now they are more efficient and contain their waste."

Direct threats to wild salmon are more controversial. Fish that escape from farms are suspected of breeding with wild stock. Called introgression, the result depends on who's asked. Smith says this could increase the strength of wild stocks. Milewski says genetic dilution occurs. Within the DFO, introgression is viewed as a real problem, but no studies can clearly pinpoint the risk. Peter Amiro, a fish biologist at BIO, says intermingling has been blamed for lower performance in the next generation of salmon, "but we've found no evidence." Throw in disease transmission from farms to the wild and the story continues along the same lines: Industry says it's not a significant problem, environmental groups cite examples of sea lice and E. coli outbreaks and government researchers conduct surveys, trying to define the problem and develop answers.

Back at the dinner table, a different set of concerns arise. Milewski and activists in BC say many people simply are simply unaware of where their dinner came from. "People don't realise the fish in the store is farmed and doctored," she says. For example, to get that healthy-looking red flesh, a chemical dye, canthaxanthin, is added to feed pellets. The dye is based on a naturally occurring chemical found in crustaceans, which is how wild salmon get their redness. Once used in self-tanning pills in the 1980s, canthaxanthin was removed because of cancer risks. This summer, the European Union banned the use of the dye from fish feed, but the CFIA allows its use at the same levels the EU once did.

Few things about the future of aquaculture are certain, other than its continued growth. Smith anticipates the market will double between 2001 and 2005. Milewski is not anti-salmon; her group and others like it are pushing for land-based farms that control all waste, reduce additives and do not expose wild stocks to farmed ones. Hargrave says technology is too expensive for that kind of system, and would rather focus on current practises, although last week's sudden death of almost a million salmon at farms in Scotland—caused by a mass invasion of tiny jellyfish—may raise more doubts about them.

Meanwhile, a few wild salmon, with their escaped farmed cousins, are running the Maritime rivers as you read this. Flies are being cast by hundreds of sport fishers, all hoping for that one bite. But if they don't get a nibble, that's OK; there's enough fresh salmon at the store—it's harvest season on the farms.