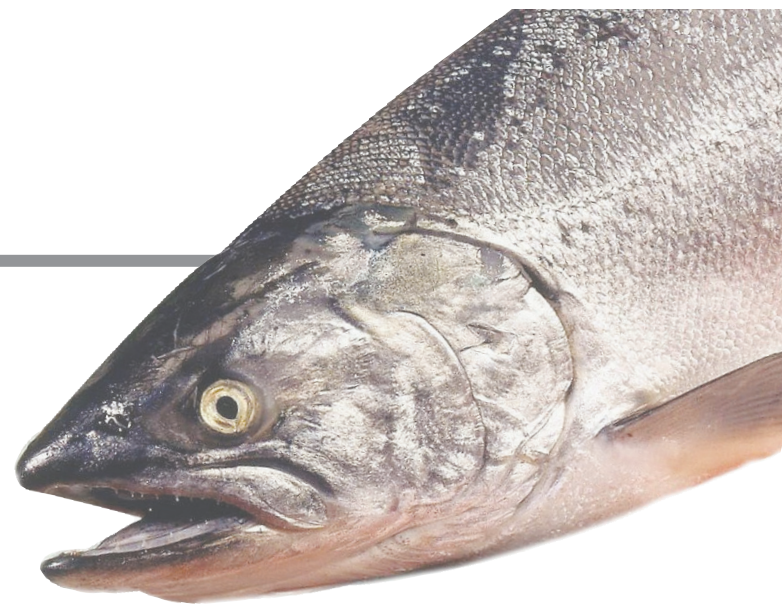


FISH FARMING WHAT SEEMED LIKE A GOOD IDEA ISN'T, AT LEAST NOT YET

Risky business



Gaelin Rosenwaks
Special to Sun Media

Aquaculture is largely viewed as a sustainable way to relieve pressure on wild stocks of fish and provide protein to the world's population. Today's open net-caged operations raising carnivorous fish do not meet this goal.

Canada is the fourth largest producer of farmed salmon in the world behind Norway, Chile and the U.K., having produced a total value of \$543 million in 2005. Of the aquaculture production in Canada, 48% is in the waters of British Columbia with 24% of the production centred in New Brunswick.

Growth

The 1980s saw a tremendous boom in all aquaculture production, with a four-fold increase from 11.4 metric tonnes (mt) to 45.7 mt from 1985-2000. Salmon farming mirrored this growth with increases in production from fewer than 50,000 mt in 1985 to more than one million mt in 2000, surpassing the wild capture of salmon.

In 1984, Ottawa encouraged foreign investment in the industry, paving the way for multi-national corporations to build salmon farms in the waters of B.C.

With Norwegian investment, a shift from farms growing predominantly Pacific salmon to farming Atlantic salmon occurred in B.C. waters. Atlantic salmon continue to dominate the B.C. salmon farming industry representing 80% of the market.

Nearly all salmon farming is done in net-pens floating in the ocean, often in protected bays and coves at the mouths of rivers. These open systems, often holding up to 700,000

fish in 12,000 square metres, are where many of the environmental issues arise.

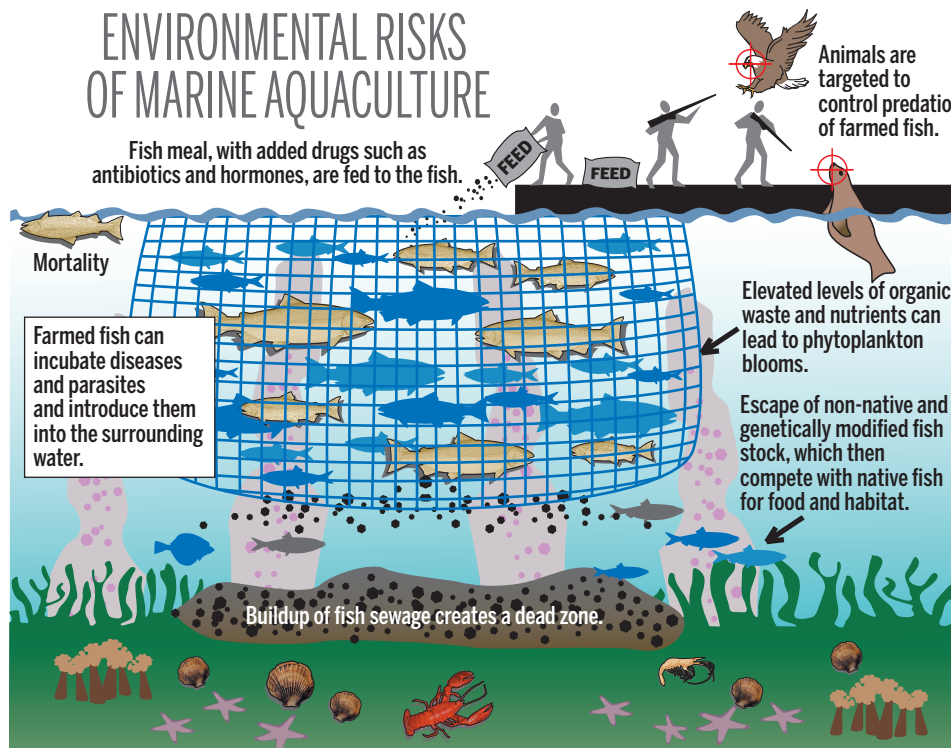
Pollution

The farm benefits from the circulation of clean oxygenated water and free removal of wastes into the surrounding waters. This pollution from waste feed and feces can smother bottom-dwelling marine life under the net-pens and the excess nutrients can lead to harmful algal blooms. Organic waste is not the only problem, antibiotics and pesticides given to the fish and anti-fouling paints used on the pens release harmful materials into the surrounding waters.

With high densities of fish, disease and parasites are often problems. These diseases can threaten wild populations of salmon as seen with the breakout of infectious salmon anemia in the Bay of Fundy in 1997.

Sea lice, a marine parasite, are another significant problem as an infestation can both lower the value of the harvested fish and harm wild juvenile salmon migrating from the river to the ocean. An infestation in the Broughton Archipelago led to a collapse of the pink salmon run in 2001.

The interaction between wild salmon and the farm does not end at the farm site. A high degree of escapement



of farmed fish into the wild has been observed. The UN declared that second to habitat destruction, "biotic invasions" are one of the world's major environmental issues, and this escapement is just that, a huge invasion.

Feed sources

While all of these environmental problems can be mitigated by human intervention, the problem of wild har-

vest of forage fish such as sardines, anchovies and herring used in the feed pellets will remain.

More than three pounds of these wild caught fish are needed to grow one pound of salmon resulting in a net loss of fish protein.

Not only are the effects seen in declining wild populations of these forage fish, but farmed salmon do not have the same nutritional

value as wild fish as they tend to have higher levels of toxins due to their feed and less of the desirable omega 3 fatty acids.

With continued research into environmentally sound farming practices and alternative feed, aquaculture of salmon may prove to be sustainable in the future.

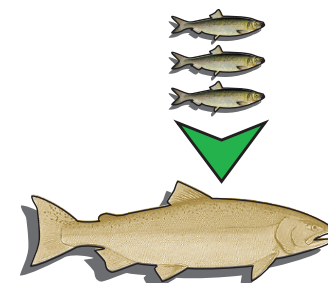
- Gaelin Rosenwaks is an oceanographer and conservation biologist based in New York.

FEEDING THE FISH

Fishing and Processing: Farming carnivorous fish such as salmon requires that small pelagic fish such as anchovies and sardines are caught by industrial fishing fleets. The small fish are processed into fishmeal and oil.

Feeding and Harvesting: The processed fishmeal and oil are fed to salmon in densely packed netpens. After about two years, the salmon are harvested and transported to markets primarily in the United States.

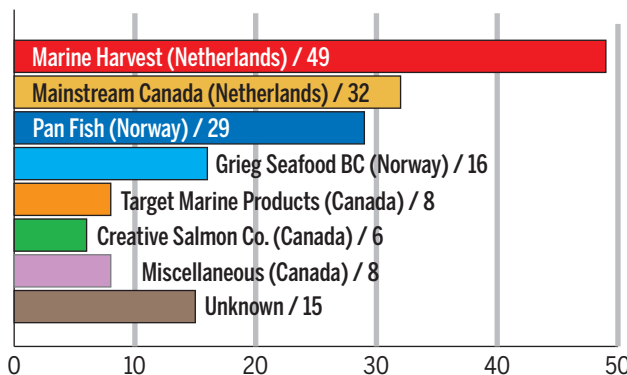
Ratio of Feed to Fish: In 2000, the production of 876,000 metric tonnes of farmed salmon required fish oil manufactured from 2.5 million metric tonnes of small pelagic fish.



Approximately three pounds of small wild fish are taken from the oceans to produce one pound of farmed salmon.

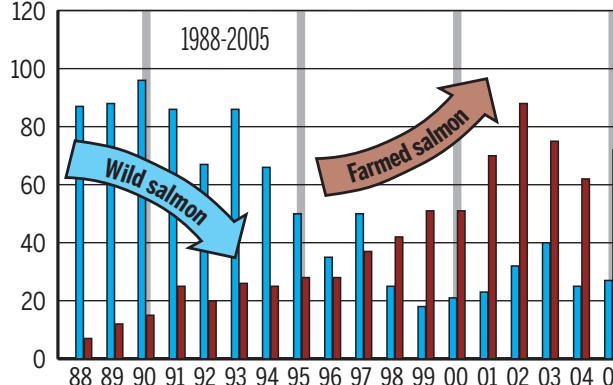
B.C. SALMON FARM LICENCES

Name of Company/ Ownership/ No. of Licences (as of Nov. 2006)



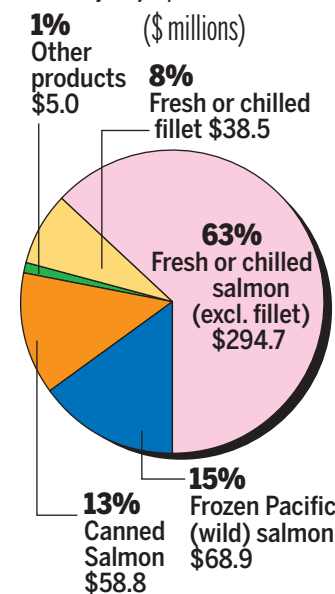
B.C. SALMON HARVEST/PRODUCTION

Quantity (tonnes in 000's)



SALMON EXPORTS

by major products, 2005



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Sources: Seaweb Aquaculture Clearinghouse, PEW Oceans Report, FAO Fisheries & Aquaculture Dept., MMK Consulting, LivingOceans.org

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