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# FISH FARMING INTERNATIONAL

July 2012 Issue 7 Volume 39  
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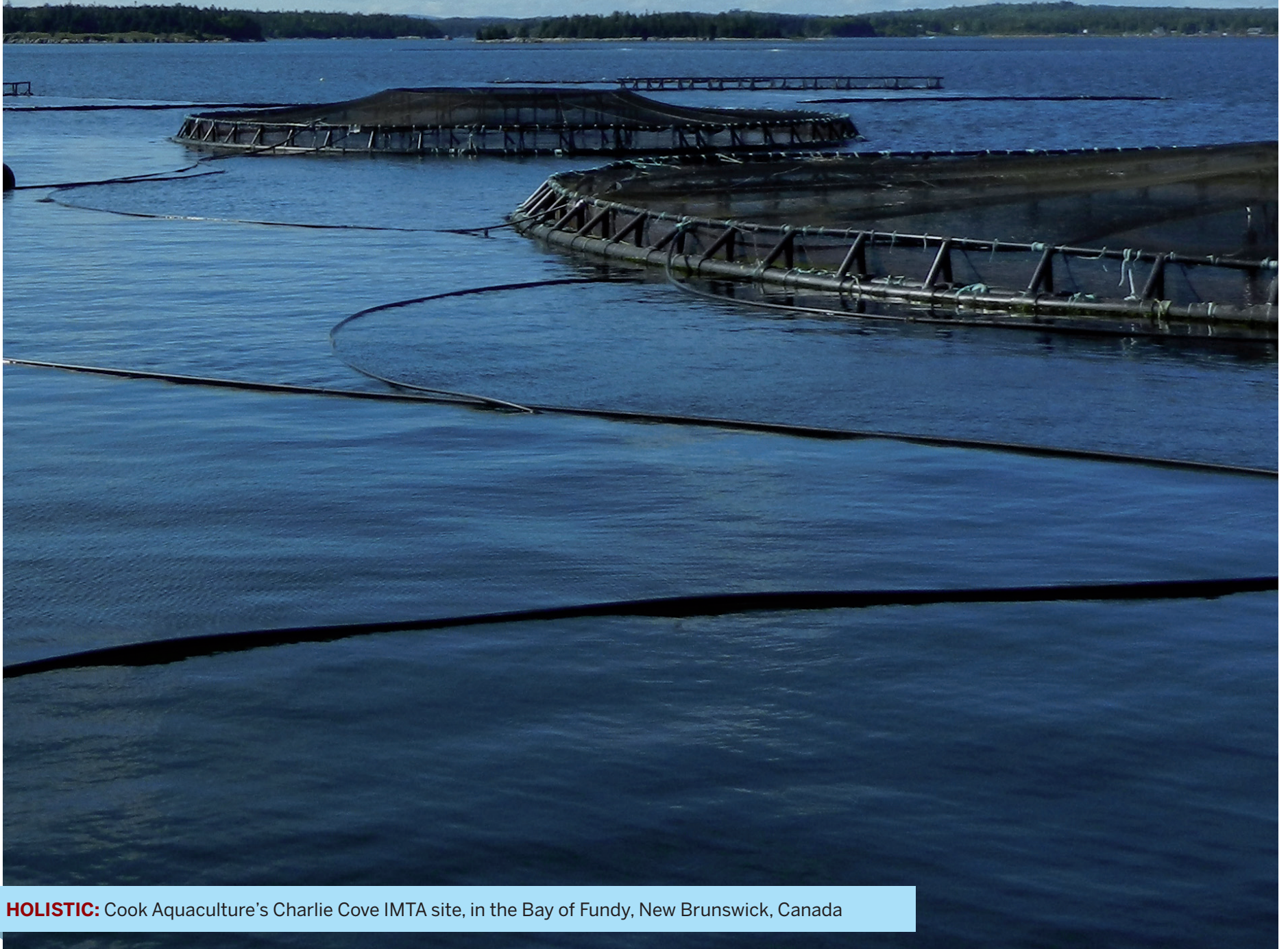
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# RAISING A

ELEVEN YEARS AFTER LAUNCHING ITS FIRST IMTA FARM, COOKE AQUACULTURE HAS DEVELOPED A PASSION FOR HOLISTIC FISH FARMING.

# SALMON ECOSYSTEM



**HOLISTIC:** Cook Aquaculture's Charlie Cove IMTA site, in the Bay of Fundy, New Brunswick, Canada



## FACT FILE

**Main Species for commercial sale:** *Salmo salar*  
- Atlantic salmon

**Company:** Cooke Aquaculture

**Year project started:** 2001

**Location:** South West New Brunswick in the Bay of Fundy, Canada.

**Farm system:** Integrated Multi-Trophic Aquaculture (IMTA), the farming, in proximity, of aquaculture species from different levels of the food chain that have complementary ecosystem functions.

**Primary benefits:**

- Environmental sustainability - biomitigative services for improved ecosystem health
- Economic stability - improved output, lower costs, product diversification, risk reduction and job creation in coastal and rural communities

- Societal acceptability - better management practices, improved regulatory governance and appreciation of differentiated and safe products.

- Other species used for commercial sale: Two species of brown seaweeds/kelps (*Alaria esculenta* and *Saccharina latissima*) and mussels (*Mytilus edulis*)

- Other species included: Sea urchins, sea cucumbers, scallops and sea worms

- Market for salmon, mussels and scallops: human consumption

- Market for kelp: human consumption, food ingredients, cosmetics, use in salmon feed.



**BALANCE:** Frank Powell, IMTA manager at Cooke Aquaculture Inc., oversees the production at the IMTA site, which includes the mussels.

Could fish farms begin to resemble natural habitats, where species of multiple shapes and sizes all thrive in the same environment? They could if integrated multi-trophic aquaculture (IMTA) spreads. As Cooke Aquaculture gains attention for its investment in this holistic type of farming, the benefits are becoming clearer from both economic and environmental perspectives.

IMTA is a multi-species farming concept designed to mimic a natural ecosystem inside a fish farm pen. It is not new, but the effort to understand its impact at a scientific level is, said Thierry Chopin, well-known seaweed expert and scientific director of the Canadian Integrated Multi-Trophic Aquaculture Network (CIMTAN).

"It's a new way of thinking about seafood production," Chopin said.

Since becoming the first to launch an IMTA project at the modern, commercial level in 2001, Cooke Aquaculture has not only drawn attention from the scientific community, which is keen to see what happens when this scientific idea is applied to a money-making model, but also from unassociated organizations. The non-profit foundation the New Brunswick Innovation Fund honored Chopin for what it called his "groundbreaking work" on IMTA at its 2010 gala.

The for-profit world has also taken note. Loblaw's Sustainable Seafood Initiative Website, *Oceans For Tomorrow*, has dedicated an entire page to publicizing the fact it carries Cooke's IMTA product, branded "WiseSource Salmon."

It calls the product "a more responsible choice," and explains the benefits of IMTA.

As interest grows, so is the knowledge of the benefits of farming multiple species on one site.

Shawn Robinson, a scientist who helped Chopin spearhead the effort to get fish farmers to test IMTA, emphasizes that IMTA is a more logical way to farm fish than current methods.

"Aquaculture's taken the industrial agricultural model - one species. I'm a beef farmer, I'm a chicken farmer, I'm a dairy farmer. I grow pigs, I grow grain," Robinson, with Canada's Department of Fisheries and Oceans, said in a Cooke video on the project. "Yet in reality, the

habitat of any farm is never limited to a single species. If you're growing grain, you're growing grasshoppers. You're growing ants, you're growing birds. We've just recognized that fact and said, look we really have an ecosystem here, and all we're doing is recreating that."

As beneficial as the IMTA idea sounds, it took five years of public outreach to get salmon farmers to try it, said Chopin. "It was like preaching in the desert," he said.

Eleven years later, said Nell Halse, Cooke Aquaculture spokesperson, the company "shares a lot of passion" with Chopin and Robinson, and it sees IMTA as a significant part of the company's sustainability efforts.

"In the past it was a matter of saying, okay here is a piece of water where we can farm fish - they survive well, they grow, and we can get them to market. But now it's a much bigger picture, and it's all

about that focus on sustainability," Halse told viewers in the video.

### The benefits of IMTA

The ability to mimic the natural environment means all of the natural processes that keep salmon healthy in the ecosystem can keep them healthy inside a pen. By combining species from multiple rungs of the food chain ladder, their symbiotic relationships become mutually beneficial.

Salmon benefit from the cleaning abilities of mussels and seaweed, which benefit from the waste from the salmon. Meanwhile, the farmer can harvest a variety of species commercially, which creates a more diversified business. Chopin also argues that these better management practices can also improve public perception and support of aquaculture.

Cooke's IMTA venture is already resulting in some diversification of the

business. The company sells kelp from its IMTA sites to a Swiss company for use in spa treatments, and it is also selling the mussels and scallops for human consumption, said Andrew Lively, marketing and communications manager for Cooke.

Volumes are too small to make a significant impact on overall profit levels for the North American salmon farming giant, Lively said, but the activity lays the groundwork for future ventures.

The company is also testing the use of kelp in its feed as a replacement for fish protein. The kelp could make up 1 to 10 percent of the feed composition. Chopin is currently conducting tests to determine the optimal level, he said.

Apart from producing more species to use and even sell commercially, IMTA may also be healthier for the fish, although more studies are needed.

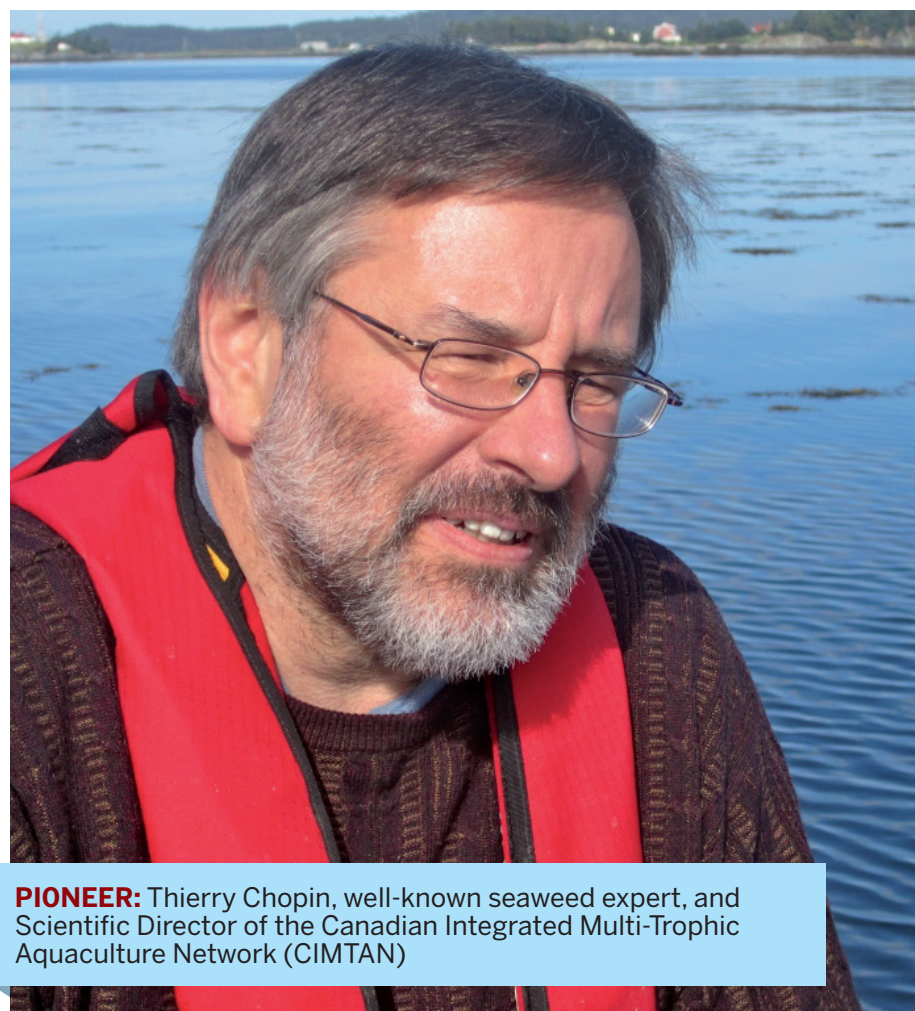
"Do I have any defensible proof that it's making a difference to the health of the salmon? I would say at this moment, no," Robinson said. "There have not been enough long-term experiments to have scientific proof, he said. "But if you have some long-term low level removal (of salmon waste) going on, would that be a benefit? And I think overall that it does."

The removal of waste means salmon avoid the negative impacts of leaving waste to sit at the bottom of the ocean.

"If you have too much of this stuff, you get too much bacteria action going on, and then the bacteria wind up using a lot of oxygen off the bottom, and they use up so much that the bottom loses all of its oxygen," Chopin said.

The salmon's uneaten feed and wastes, nutrients and byproducts are recaptured and converted into fertilizer, feed and energy for the other species. The key is to combine both "fed aquaculture" - in this case salmon - with "extractive aquaculture" - species such as mussels and scallops, which utilize organic and excess nutrients from fed aquaculture for their growth. The mussels and scallops feed on the waste from the salmon, which makes for a better environment for the fish.

As the scientifically provable benefits of the method continue to be researched, there is certainly no shortage of ideas on the ways in which IMTA can be conducted. Robinson and Chopin's have recently added sea urchins, sea cucumbers, and sea worms to the mix.



**PIONEER:** Thierry Chopin, well-known seaweed expert, and Scientific Director of the Canadian Integrated Multi-Trophic Aquaculture Network (CIMTAN)