THE SALMON ISSUE

THE GLOBAL SALMON INITIATIVE
PR stunt or game changer?

INNOVATION DISTINGUISHES BETWEEN A LEADER AND A FOLLOWER.
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All about the feed
We look back at a quarter century of research at Skretting.

Proving a point
The First Nation farm proving salmon can be produced on land.

The year ahead
CEO of the world’s top salmon producer gives the lowdown on 2014.
In the northeast corner of Canada’s Vancouver Island, the four-person staff of the ‘Namgis First Nation’s closed containment salmon farm is attempting to do what many in aquaculture think is impossible, and make commercial farming of Atlantic salmon on land economically viable.

As the first land-based aquaculture system in North America to grow Atlantic salmon on a commercial scale, the ‘Namgis project was designed to eliminate the environmental and marine impacts from net-pen farming and create a sustainable business for themselves while providing a model for others to follow, says the project’s CEO, Garry Ullstrom. “Seeing is believing, and it’s our job to prove that it works,” he says.

That vision will get much clearer next month as the first cohort, which were put into tanks 11 months ago, will represent the first harvest of premium fish, those weighing between three and five kilograms, roughly six months earlier than if they were grown in the ocean.

A second cohort was added a few months afterward and a third cohort is being added this month to the project’s elaborate system to ensure continued harvests throughout the year, says Ullstrom. Once the project is running at its full potential approximately 470 metric tons of sustainable fish will be harvested annually. While that total may be a fraction of the millions of metric tons of farmed Atlantic salmon produced worldwide, it’s a step in the right direction, he says. The real test, however, will be whether the larger Atlantic salmon farmers utilize the ‘Namgis method and can replicate the results.

How it all began
About four years ago Guy Dean,
vice president of Albion Fisheries, was invited to attend an aquaculture innovation held by Tides Canada, the Conservation Fund Freshwater Institute (CFFI) and the Gordon and Betty Moore Foundation.

After seeing what the ‘Namgis First Nation and their project partner, environmental nonprofit group SOS Marine Conservation Foundation (Save Our Salmon), were working on, Dean says he knew he wanted to be part of it so he got together with representatives from the ‘Namgis First Nation, Save our Salmon, Tides Canada and Steven Summerfelt, director of aquaculture research at the CFFI, whose work focuses on pioneering technologies to increase farmed fish production in systems that practically eliminate water pollution, minimize water use, improve product freshness and safety all while increasing the profitability of the businesses.

“With these innovative fish production systems, our farmers can produce fish using much less water while meeting point-source effluent discharge regulations and reclaiming the nutrients that would normally be wasted,” says Summerfelt. “It also means we can strategically locate fish farms to reduce shipping costs and or capitalize on cheap electricity.”

In a closed containment facility there are also no fish escaping into the ocean or other bodies of water, it reduces the possibility of fish pathogens, making the use of antibiotics and harsh chemical therapeutics virtually nil, he says.

Creating a model for farming fish without needing medicine saves money and growing fish in a shorter time saves on feed and saves money, which are all positives, but Ullstrom says those are all bonuses to what is paramount: lessening the impact on the plant’s marine resources.

The CEO of the world’s biggest salmon farmer, Marine Harvest, says moving salmon farming on land is a hopeless strategy.

“It’s as ridiculous as saying pig farming should happen at sea,” Alf-Helge Aarskog said in an interview with the Norwegian daily Bergens Tidene (BT).

“Moving everything on shore is a hopeless strategy, in terms of area, economics and the environment. Many talk about moving salmon farming ashore, but no one’s saying pig farming should happen at sea. Fish should grow up in their natural environment,” Aarskog told BT.

FACT FILE
Farm: ‘Namgis First Nation salmon farm, producers of KUTERRA land-raised salmon
Location: Vancouver Island, British Columbia, Canada
Species: Atlantic salmon
Volume: 470 metric tons yearly
System: Land-based closed containment

Sustainable salmon has landed
Recirculation Aquaculture Systems (RAS) have been around for decades, but rarely used to farm Atlantic salmon past smolt size. State of the art equipment and adjustments to its configuration allow the ‘Namgis farm to operate economically.

Jackie Hildering,
percolated back into the ground. Through chlorinated, disinfected, fresh water, Ullstrom explains. Some salt water intrusion into the Vancouver Island, which contains and the use of ground water on designed by Skretting, fish feed combination of special salmon species, she said. Impacts on those wild Pacific is to prove there is a way to avoid farming Atlantic salmon on land to salmon depends on Pacific Oceans Society and Seachoice, says there hasn’t been a closed containment system that hasn’t been granted either a “green” or “yellow” rating mostly because there isn’t the risk of fish escapes. For a closed containment facility, a project is rated “green”, the highest certification, or “yellow” because of what type of feed is used, Stoner says. Skretting’s specialized feed for the Namgis project will probably give them a “green,” she guesses. “We’re really excited about it, because they’re showing closed containment can be financially viable,” Stoner says. The feed, which takes advantages of “microbalance”, uses raw materials to take even more pressure off marine resources and produces a much higher fish-in fish-out ration, according to Gavin Shaw, Skretting North America’s marketing manager. “Using special ingredients it binds up the fish feces to increase filtration efficiency, resulting in cleaner water,” Shaw explains.

The Life of land-based farmed salmon

There are currently five, 12 foot deep tanks at the Namgis site. Each is built with fiberglass walls and buried into the ground leaving about four feet above. But, before a cohort can be added to the grow-out tanks, they’re first put into the quarantine unit and need to pass inspection before being moved on. Water is pumped in at 15 degrees Celsius using heating coils under the cement, and heat exchangers are used to strip out the heat from the tanks once the biomass reaches certain levels and repurposed into energy. The farm was recently recognized by BC Hydro for being “power smart” and the project got a grant as a result, she says.

During their growth period, the fish are fed using an automatic, pneumatic computer system, says Ullstrom. An air fan blows feed along a tube through-out the building and into the desired tank at just the pressure to minimize feed breakage. Each of the tanks also has several cameras and various monitoring equipment to let someone know when something isn’t right. “The place has more alarms than the Mona Lisa,” laughs Ullstrom. “There’s a human aspect where biologists document the fish’s growth and there’s a series of computers which monitor the dissolved oxygen, carbon dioxide and nitrate levels.”

Unwet fish feed and feces are extracted from the water using a rotating drum filter layered with very fine micro film and pumped out periodically to be sent to a compost facility. Bio filters - bacteria used to remove the ammonia from the water - also remove smaller particles that are missed by the drum filters. Plans are already being set to separate the water from the sludge, dry it and use the remains as fertilizer to grow vegetables and other plant species at the site. “Our ultimate goal is to be the standard of sustainability,” Ullstrom says.

Green or yellow depends on feed

When the Namgis project started its ramp up to commercial grade farming in October, it also applied for certification from Monterey Bay Aquarium’s Seafood Watch Program and Seachoice. The first draft of the report is expected to be finished sometime this month, but Jenna Stoner, sustainable seafood campaign manager for Living Oceans Society and Seachoice, says there hasn’t been a closed containment system that hasn’t been granted either a “green” or “yellow” rating mostly because there isn’t the risk of fish escapes. For a closed containment facility, a project is rated “green”, the highest certification, or “yellow” because of what type of feed is used, Stoner says. Skretting’s specialized feed for the Namgis project will probably give them a “green,” she guesses. “We’re really excited about it, because they’re showing closed containment can be financially viable,” Stoner says.

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When one is out of the normal range it sets off a series of alarms and employee cell phones start ringing. Ullstrom says there has been the occasional alarm, but they’ve been few and far between. “We’re not at a steady state quiet yet,” he says. “Although we have fish throughout the facility, we’re still refining the systems.”

After a year, once they’ve reached the three to five kilogram size, each is put into a depuration tank for seven to 10 days, out of the recirculating water before they’re stunned, bled and shipped off to Albion Fisheries, which is processing the fish. “We get excited about this because it presents an opportunity to feed the masses and provide a highly sustainable and healthy alternative for the industry,” says Dean. “So far it looks very promising. We’ve already sold out of the first grow-outs.”

The scale of success
The real test for the ‘Namgis project will be if or when the large commercial salmon farmers adopt their methods and move to a more land-based model. For that to happen, investors will need to see the project’s economic viability.

Summerfelt says the work at the Freshwater Institute, which began its first grow-out of Atlantic salmon in land-based closed-containment systems in early 2009, have shown it’s possible to culture food-size densities that are technically and biologically feasible.

“The analysis suggests that the cost of producing food-size salmon in land-based systems is cost competitive with average net pen costs,” he says. “However, the economics of this technology will not be proven until industry has completed several years of commercial production. This is why the farm at ‘Namgis First Nation Project is so critical.” Momentum and interest in land-based closed-containment system technology has certainly grown in the past 36 months with more than a dozen pilot and large scale salmon grow-out projects either being planned or already ongoing in parts of North America, Denmark, China, Chile, France, Norway and Scotland.

That certainly wasn’t the case four years ago when no such facilities were operating, he says. “The people that can make this project work are the companies already farming salmon,” Summerfelt says. “This project will be a homerun when the large commercial ventures start using this technology, even if that means additional competition,” he concluded.