

BY IRENE POHLE

PLACE OF SALMON

AND FOR FARMED SALMON, THAT PLACE IS ON LAND. A WORKSHOP HELD AT THE WILFRED CARTER INTERPRETIVE CENTRE IN ST. ANDREWS, HOSTED BY ASF, AND THE CONSERVATION FUND FRESH-WATER INSTITUTE, PROMOTES CLOSED-CONTAINMENT AQUACULTURE TECHNOLOGY.



TOM MOYRAIT

Among the delegates at the Land Based Close-Containment Salmon Workshop were representatives from U.S. and Canadian federal and state/provincial governments, companies actively involved in developing land based close-containment (LBCC) systems and conservation bodies, including institutes, universities, First Nation lobby groups and angling interests. The high number of delegates, their diversity of interests, and the senior level of representation, made a clear statement about the perceived importance of the meeting.



ATLANTIC SALMON OPEN NET-PENS LIKE THE ONES that dot Canada's shores, are concentrated animal feeding operations, along the lines of industrial-sized, land-based beef feedlots. Except, as Alexandra Morton likes to say (see story, page 14), the ocean versions are the only farms where no one shovels manure. Wherever these kinds of aquaculture have set up shop, wild Atlantic salmon runs (and on the West Coast, Pacific salmon) have plummeted.

In order to promote a new, alternative technology, ASF hosted the Land Based Closed-Containment Salmon Workshop, in St. Andrews, New Brunswick, last October 10-11. A capacity crowd of 80 delegates included representatives from industry, academia, and both government and nongovernment agencies. They travelled from all over North America and Europe to learn more about producing salmon in land based closed-containment (LBCC) facilities.

Steven Summerfelt, head of the ASF-sponsored closed-containment project at the Conservation Fund Freshwater Institute (CFFI) in West Virginia, opened the workshop by providing an overview of developments in LBCC aquaculture. At the core of the land-based process is a new technology known as Recirculating Aquatic Systems (RAS). This technology allows the continuous filtering and recycling of as much as 99.8% of the water flow. During this recycling process, LBCC systems can control and capture over 98%

JACQUE HILDEBRAND (LEFT) (1)



of fish waste solids and phosphorus, plus much of the nitrogen, which can then be used in agriculture. Summerfelt told delegates that this makes LBCC "more of a giant water treatment facility," than a fish farm.

Other speakers then detailed the design and cost of building these facilities, which because they operate in such highly controlled environments, can increase fish production from 5 to 100 fold. On top of this, fish mature 6 to 8 months faster under conditions which are much more ideally managed than those in open net-pen aquaculture.

Afternoon sessions covered research into the very factors that help salmon grow including photoperiod, grow-out trials, feed designed specifically for LBCC systems and broodstock selection. After a full day of absorbing information, participants eagerly devoured the fruits of what the Workshop was all about, Atlantic salmon produced at an LBCC facility.

Although initially the salmon from LBCC is destined for a niche market (which pays a premium price), the ultimate aim is for it to become mainstream. Innovative entrepreneurs are taking advantage of the inexpensive electricity and ready manpower that come with being able to site close to major markets. These assets, plus much cheaper transport costs and the abundance of homegrown soy, grain and protein byproducts for fish feed, are fuelling industry prospects.

Currently, North American projects, built or planned, have capital investments of \$50 to 100 million. Seven of these are concentrated in British Columbia, Canada, and

six in the US. Europe has three LBCC projects, two in Denmark and one in Scotland. Other players include China, with two built and several planned, and Chile with two facilities in the planning stages. Still, up to now and to a large extent, Atlantic salmon LBCC projects have been mainly "grown on spreadsheets".

And that's why when workshop participants gathered at the Wilfred M. Carter Atlantic Salmon Interpretive Centre on day two there was a real buzz in the air. On the agenda was an update on existing and future LBCC projects. Delegates were particularly eager to hear about one project being set up in British Columbia to prove that commercial-scale Atlantic salmon farms are technically

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viable, biologically feasible and economically sustainable. In North America, commercial fish farmers are already raising Coho salmon, yellow perch, seabream, cobia, walleye, rainbow trout and tilapia using RAS technology. The success of the 'Namgis Closed-Containment Atlantic Salmon Farm in Port McNeill on North Vancouver Island



'Namgis workers confer with Eric Hobson (SO5) and Catherine Emrick (Tides Canada) during construction. The closed-containment facility (left) is more a water treatment plant, than it is a salmon farm. The venture will allow 'Namgis youngsters (facing page) to continue to celebrate their People's salmon-based culture.

will likely determine the future of LBCC Atlantic salmon aquaculture.

It is fitting that the 'Namgis First Nation should be taking a leadership role in developing LBCC. They are known as the "People of the Salmon" having depended on the wild salmon of their Territory for more than 4,000 years. These days, 'Namgis fishers are facing many threats to their livelihood. Open net-pen fish farms near traditional fishing grounds are polluting the sea with feces and chemicals used to eliminate sea lice and other pathogens, putting declining local salmon stocks under even greater pressure.

But the 'Namgis believe they have come up with a solution that will help save the wild stocks and keep them in the fishing business. As the K'udas Limited Partnership (K'udas means "place of salmon" in the language of the 'Namgis), they are building an Atlantic Salmon LBCC operation in their Territory 1.5 km from the ocean. The site has many advantages including an abundant supply of fresh and brackish water, access to an

explained how the 'Namgis intend to operate their LBCC project as a business. Generating profit will depend on controlling operating costs, but also on the success of marketing strategies. Toward this end a branding program is being developed and a strategic partnership with Albion Fisheries has already been negotiated to process and market harvested fish.

Eventually, the enterprise plans to incorporate value-added components in the form of organic fertilizer from reclaimed nutrients, aquaponics for local food production, custom processing and hatchery and transportation services.

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The demand for seafood that meets environmental non-governmental organization sustainability ranking criteria presently outstrips supply. Thus, the 'Namgis salmon farm is designed to meet the respected Monterey Bay Aquarium's "Seafood Watch" sustainability management regime.

And the People of the Salmon won't stop there. Plans are already underway for an expanded facility that will produce a total of around 2-3000 tonnes/yr. But the real success of the 'Namgis operation, as the original facility becomes profitable, will be in the level of comfort it provides to institutional lenders, governments and investors. Ultimately, it is their confidence and support that will allow expansion of similar LBCC facilities. "It is this kind of venture that will generate interest for development of a similar prototype on the East Coast," said ASF President, Bill Taylor.

On the last day of the Workshop, Taylor told participants that the debate between land-based and open net-pen aquaculture has evolved. "The discussion," he said, "has moved on to focus on the best ways forward towards a sustainable aquaculture industry; one that will have fewer impacts on wild salmon runs, be they Pacific or Atlantic. There will be new techniques and insights that will benefit all concerned in the production of Atlantic salmon, and in a wider context, food production as a whole."

In the end, the workshop's take-home message rang loud and clear: Environmentally-friendly, land based close-containment Atlantic salmon aquaculture is not only technologically and economically viable, but it also has a very bright future. Just ask the People of the Salmon.

Irene Pohle is the assistant editor of the *Journal*. For ASF's web resource on land-based closed-containment aquaculture visit <http://asf.ca/landbased-aquaculture.html>. 🐟



No turning back: ASF President Bill Taylor addresses the Land Based Close-Containment Salmon Workshop. "The discussion has moved," he told the participants, "to focus on the best way towards a sustainable form of aquaculture that will have fewer impacts on wild salmon runs."

industrial power grid, close proximity to the main highway and to local processing plants and composting facilities, and ample room for expansion.

Although the 'Namgis own 100% of the operation, they are not alone in this endeavor. They have partnered with the SOS Marine Conservation Foundation. Tides Canada is a lead funder and an advisor to the project. Together they have set out to prove the environmental and economic benefits of closed-containment Atlantic salmon farming. Eric Hobson, President of the SOS Marine Conservation Foundation and Vice-Chair of the K'udas Limited Partnership (ASF is indirectly involved through the Freshwater Institute), told the crowded room that smolts will enter the facility in January 2013, with the first harvest planned for January 2014. Hobson