Updates on Land-Based Closed-Containment Systems For Salmon Growout

Steven Summerfelt
• Land-based closed-containment systems now operating or to be stocked with eggs in 2014
  – Langsand Laks and Danish Salmon (Denmark)
  – 'Namgis/KUTTERRA & Sustainable Blue (Canada)
  – BDV SAS (France)
  – Unknown Name (Poland)
  – Yantai and Xinjiang E’he (China)
• Farm capacity should exceed 5000 tonne/yr
• Land-based closed-containment systems now operating
  – Taste of BC; steelhead (Canada)
  – Bell Aquaculture; trout and Coho (USA)
  – Danish Model Trout Farms; trout (Denmark)
• Land-based closed-containment systems for Coho salmon that have struggles or failed
  – Sweet Spring salmon (USA)
  – Teton and East End Hutterite farms (USA)
Regional Distribution

- **North America** potential projects for salmon growout in land-based closed containment systems:
  - Canada: 7 projects (*2 in oper*; 5+ planned)
  - U.S.: 6 projects (*4 built*; 3+ planned)

- **Europe**
  - Denmark: 2 projects (*2 in operation*)
  - France: 2 projects (*1 in oper*; 1 planned)
  - Poland: 1 project (*under construction*)
  - Scotland/Ireland: 2 projects (2 planned)

- **China** (*2 in operation*, several planned)

- **Norway and Chile** (projects discussed)
• 300-500 tonne/yr initial module
• First premium harvest in April 2014
• 100+ tonne/yr initial module
• Stocked with eggs & smolt in 2013
• Lost largest cohort to power failure in 2014
Sweetspring Salmon, Rochester, WA

- 100+ tonne/yr Coho
- Currently restructuring
- Fish growth below expectation

Per Heggelund, Chris DePalma, Jim Terry, Sweetspring Salmon
Both targeted 100+ ton/yr Coho salmon production

Miller Colony pulls plug on commercial salmon farm

By Nancy Thornton
Acantha reporter

The Miller Hutterite Colony recently shut down what had been the first private, commercial salmon farm in the state that opened in December 2010.

A sister colony in Havre has also ceased raising salmon in a similar facility that used cutting-edge filtration technology to recirculate 99 percent of the groundwater used in the fish tanks.

David Wipf, Miller Colony’s spokesman and secretary/treasurer, confirmed on Jan. 24 that the colony had “pulled the plug” on raising coho salmon, but he declined to give any details at this time on the advice of the colony’s attorney.

The special fish eggs took a year to grow and the new business, labeled Teton Fisheries L.L.C., which the colony created with several unnamed partners, shipped its first cases of fresh head-on, gill-in gutted fish on Feb. 3, 2012.

At that time, Wipf said that the plan was to raise salmon to a premium weight of 6.6 pounds, however, the harvested fish were smaller than projections, reaching just four pounds on average.

It shipped the salmon in 50-pound cases to its West Coast partner/distributor for sale under the label, SweetSpring Salmon.

More than three years ago, after it suspended pig farming (Midway Colony south of Conrad continues that enterprise), Miller Colony began researching other agricultural businesses that would provide income, Wipf said in the earlier interview. Envirotech Ag Systems of Winnipeg, Manitoba, introduced the Miller Colony research team to AquaSeed Corp. of Rochester, Wash., a global leader of Pacific salmon conservation and a supplier of domesticated Pacific salmon seed stocks to salmon farms worldwide.

SweetSpring Salmon, an affiliate of AquaSeed, had begun limited distribution to food markets of the cultivated salmon in the Pacific Northwest, and during that time, the colony’s research team began talks with AquaSeed about the possibility of developing a freshwater salmon farm in Montana.

SweetSpring Salmon, in turn, contracted with the Overwaitea Food Group for the estimated production from the two colonies and one in Rochester.

Miller Colony’s new venture required approval of the state that licenses controlled species. The salmon could not be shipped live, for example, a measure to protect native fish populations in the event of an escape.

Last week, telephone and email messages from the Acantha to AquaSeed, SweetSpring and Envirotech were not returned.

John Holder of JLH Consulting Inc. and Holder Timmons Engineering L.L.C., who helped develop the recirculation system, said he could not comment on the demise of “unfortunate” matter except to say that the system worked and there were no problems with water quality.

In a discussion paper dated February 2012, available on the Web, SweetSpring noted it had received $1.6 million in grants to facilitate farm-raised salmon production from its three partner farms. It listed the capacity of the Choteau and Havre units as 300,000 pounds of fish each.

The purpose of the private grants was to demonstrate the technical and financial feasibility of on-land closed containment aquaculture technology.

The February 2012 document estimated that a facility producing between 200,000 and 400,000 pounds of fish might have between $998,000 and $1,594,000 in net operating expenses, but still have between a 15.9 percent and a 32.4 percent profit, respectively.

John G. Nickum, a retired biologist who has extensive knowledge of aquaculture and who wrote an in-depth article about the colony/SweetSpring partnership, available on the Web, said he would be very interested to know what happened, whether the suspension had to do with a nutrition issue or a question of technology or contract terms.

With the suspension of fish-raising, Miller Colony will be repurposing its large metal fish-raising building on the south end of the main complex located south of Bynum along U.S. Highway 89.

Teton County Sanitarian Corrine Rose, who learned about the closure on Jan. 15, said, “I was pleased to have it in the county. I had high hopes.”
• 1000 tonne/yr Atlantic salmon (16 m φ x 6 m deep culture tanks)
  – Harvesting salmon in late 2013 and 2014
2000 tonne/yr
Salmon eggs hatched April 2013

http://sorenfrandsen.wix.com/danishsalmon#!danish-salmon/c1l4l
• Already producing Atlantic salmon for several years in 20 ppt salinity

(Photo courtesy of Jonas Langeteig)
Yantai Salmon Farm
(Yantai, Shandong Province, China)

(slide courtesy of Idar Schei, AquaOptima)
Yantai Salmon Farm

• Now producing over 100 tonne/yr Atlantic salmon with plans to expand

  – See article by Mark Godfrey, SeafoodSource contributing editor reporting from Beijing, China, 01 August, 2013
• 1000 tonne/yr Atlantic salmon growout farm in the Gobi Desert (finishing constr.)

Danes build salmon farm in Gobi desert

August 23, 2013, 8:05 am

Undercurrent News

A Danish company is establishing a recirculation farm to grow salmon in the unlikeliest of places, the middle of China’s Gobi desert.

In association with a Chinese state-owned water supply company, Billund Aquakultur Service is setting up a recirculation plant in the northwest of the desert, close to the border with Mongolia, said the company in a press
• Large RAS expansions in Americas & Norway
  – To meet increasing smolt production requirements
  – To increase capacity to produce larger post-smolt (200 to 1000 g) on land
  – Enormous investment
    • Almost all new facilities are RAS
    • $100 million capital investment in single facilities
  – Technology is advancing rapidly to achieve economies of scale
• Approximately 1 dozen other land-based growout facilities are now being planned around the world
  – USA, Canada, France, and Scotland
  – additional 10,000+ tonnes of food-size salmon

• Confidence in technology is rising

• Scale of investment has increased to $5-30 million per project (maybe larger investments)
• Lessons to be gleaned from commercial farms
  – Technical: Water quality and RAS performance
    • Freshwater or brackish water operation & photoperiod
  – Biological: Fish growth, survival, harvest size, color, flavor
    • Availability of eggs/smolt
    • Early maturing males, if any
    • Disease & therapeutic use, if any
  – Economics: Fixed capital investment & operating costs
    • Farm gate sales price
    • Co-products being marketed, if any
  – Market acceptance