AquaSeed's SweetSpring™ Salmon

By
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Overview

- Who We Are
- First Step – Partial Reuse System
- Smolt RAS System
- Grow-out RAS System
  - Tanks
  - Feeding System
  - Filtration System
  - Purging System
  - Fish Transfer and Harvesting System

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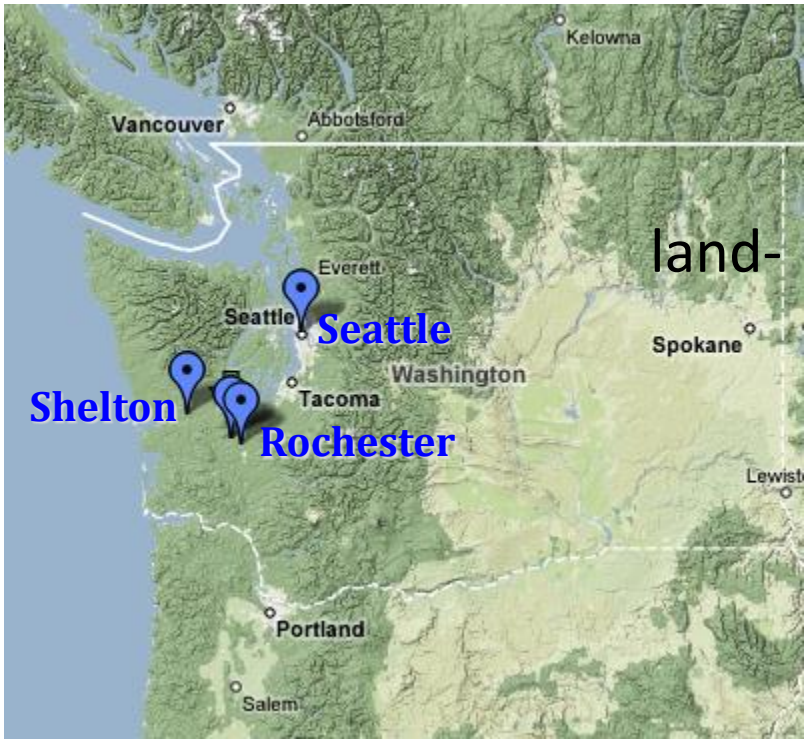
Who We Are

- Privately held company incorporated in 1988
- Locations in WA
  - Main office - ***Seattle***
  - Freshwater based farms – ***Rochester*** & ***Shelton***
- SweetSpring Contract Growers
  - Teton Fishery
  - Hill Fishery



Domsea Heritage

- Domsea® Coho pedigree stock
  - founded by Union Carbide in 1969
  - Acquired by Campbell Soup in 1979
  - Acquired by AquaSeed and relocated to Swecker Salmon Farm in 1991
- Longest pedigree bred salmon: 20 generations (40 yrs)

First Step - Partial Reuse System

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Smolt RAS System Description

- HTE microbead biofilter
- Two 15 ft. x 4 ft. tanks
- One 6 ft. x 3 ft. first feeding tank
- Two radial flow separators
- Foam fractionator with ozone
- Two Low Head Oxygenators (LHOs)
- Advanced oxidation system (Ozone + UV)

Smolt RAS System

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Advanced Oxidation System

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Smolt RAS System Parameters

- 700 gpm recirculating flow
- 7 gpm replacement water
- 100% system volume replacement per day
- 15 minute system turnover rate
- Optimum 15C (59F) growing temperature
- Produces 24,000 smolts @ 60 grams every two months
- Maximum feed load – 55 kg/day
- Maximum fish density – 80 kg/m3

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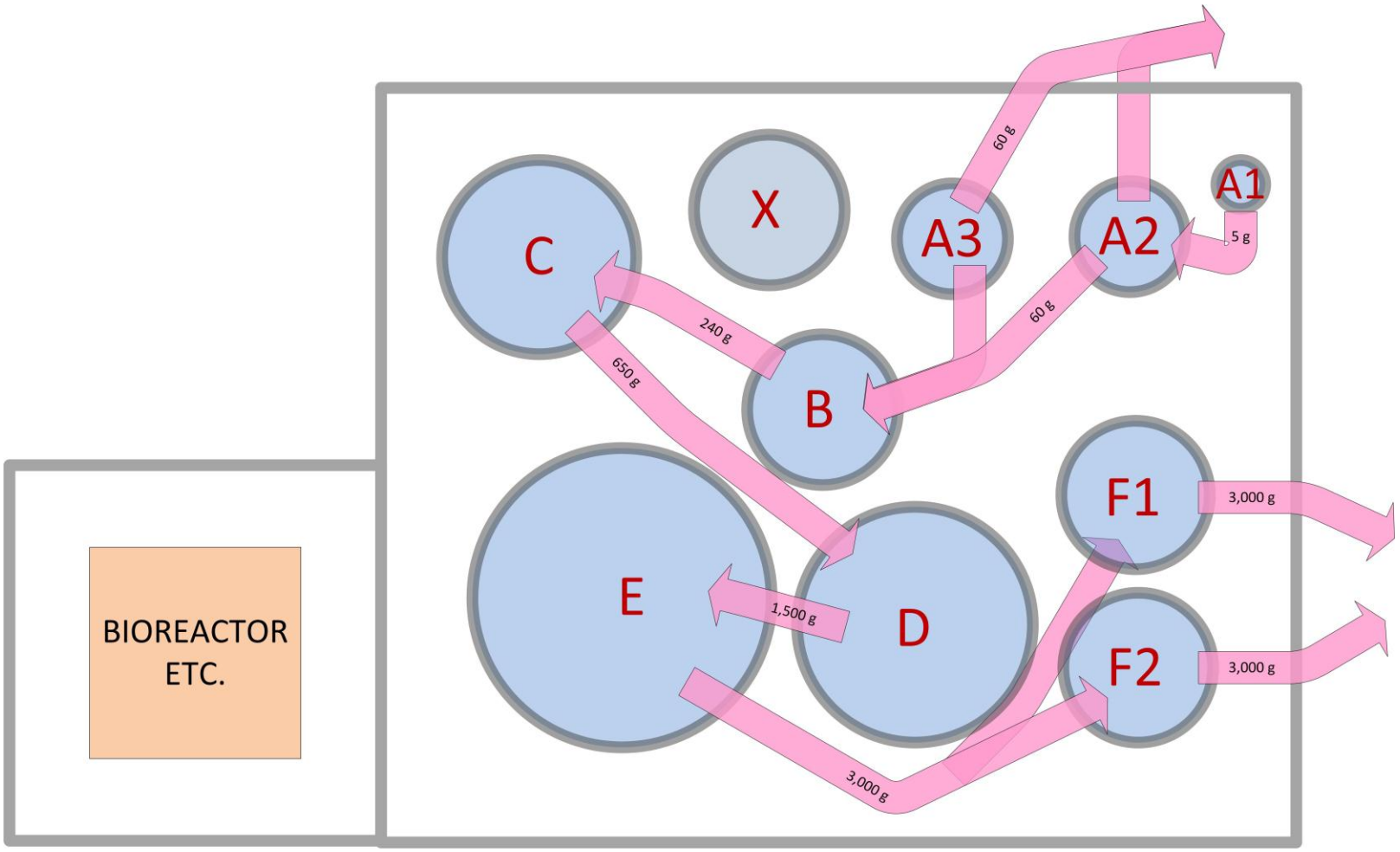
Grow-out RAS System Bio-plan



Grow-out RAS System Bio-plan

- Produce 181,000 kilos of 3 kilo fish per year
- New crop added every two months
- Each crop is moved to a larger tank every two months
- Eight month grow-out from 60 grams to 3 kilos

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Grow-out RAS System Parameters

- Total RAS water flow – 10,000 gpm (5000 gpm to tanks and 5000 gpm to biofilter)
- Replacement water – 50 gpm
- System cycle rate, tanks – 35 minutes
- Water reuse rate – 99%
- 20% system volume replacement/day
- Maximum feed load – 800 kg/day
- Maximum fish density – 85 mg/m3

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Grow-out RAS System Tanks

- Two 20 ft. x 5 ft. tanks (one for special projects)
- One 26 ft. x 6.5 ft. tank
- One 30 ft. x 10 ft. tank
- One 40 ft. x 10 ft. tank
- Tank number and sizing for 8 month grow-out
- Tanks have built in adjustable inflow nozzles

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Grow-out RAS Feeding System

- Hybrid system consisting of Arvo-tec feeders and Cablevey cable disc refilling system
- Feeder hoppers located in tank center
- 360 degree electric spreaders for optimum feed distribution
- Fed by three silos outside building

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Grow-out RAS System Filtration and CO2 Stripper Description

- Four 20 hp. axial flow propeller sump pumps
- Split flow – two pumps supply LHO, other two supply two below grade FSB biofilter cells
- CO2 stripper is combined with the pump sump
- Two air blowers pull air from the pump end of the sump under the stripper nozzle deck

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Low Head Oxygenation System Description

- Two aluminum LHO units (one for each pump) with concrete reservoir
- Pump RPM controlled by pressure transducer to maintain proper reservoir water level
- Reservoir bottom sloped 10 degrees to center bottom discharge
- Ozone added to oxygen inflow - ORP and pH sensors are also located on reservoir wall

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LHO and Ozone Generator

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LHO with Foam Accumulation

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Purging System Description

- Two 20 ft. x 10 ft. deep tanks
- One stacked CO2 stripping tower and LHO
- Two pumps located in tank side boxes
- 1500 gpm total recirculating flow
- 100 to 200 gpm replacement water
- Capacity – 8,000 kilos of fish per tank

Purge System

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Fish transfer and Mortality Collection Sump Description

- Pneumatically actuated tank center drain screens
- Central fish handling sump
- Transvac twin canister vacuum pump
- Fish are pumped tank to tank from the central fish handling sump using the tank center screens

Fish Transfer and Mortality Collection Sump

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Pneumatically Actuated Tank Center Drain Screen Installation

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Fish Transfer to Purge Tanks and Harvesting

- Fish are pumped with pneumatic fish pump using the transfer sump
- Fish are dewatered and piped to a counter extended over the purge tank lip
- Fish are held in purge for up to 10 days
- Fish are pumped to a stunner/bleeder and then to an ice slurry filled tote

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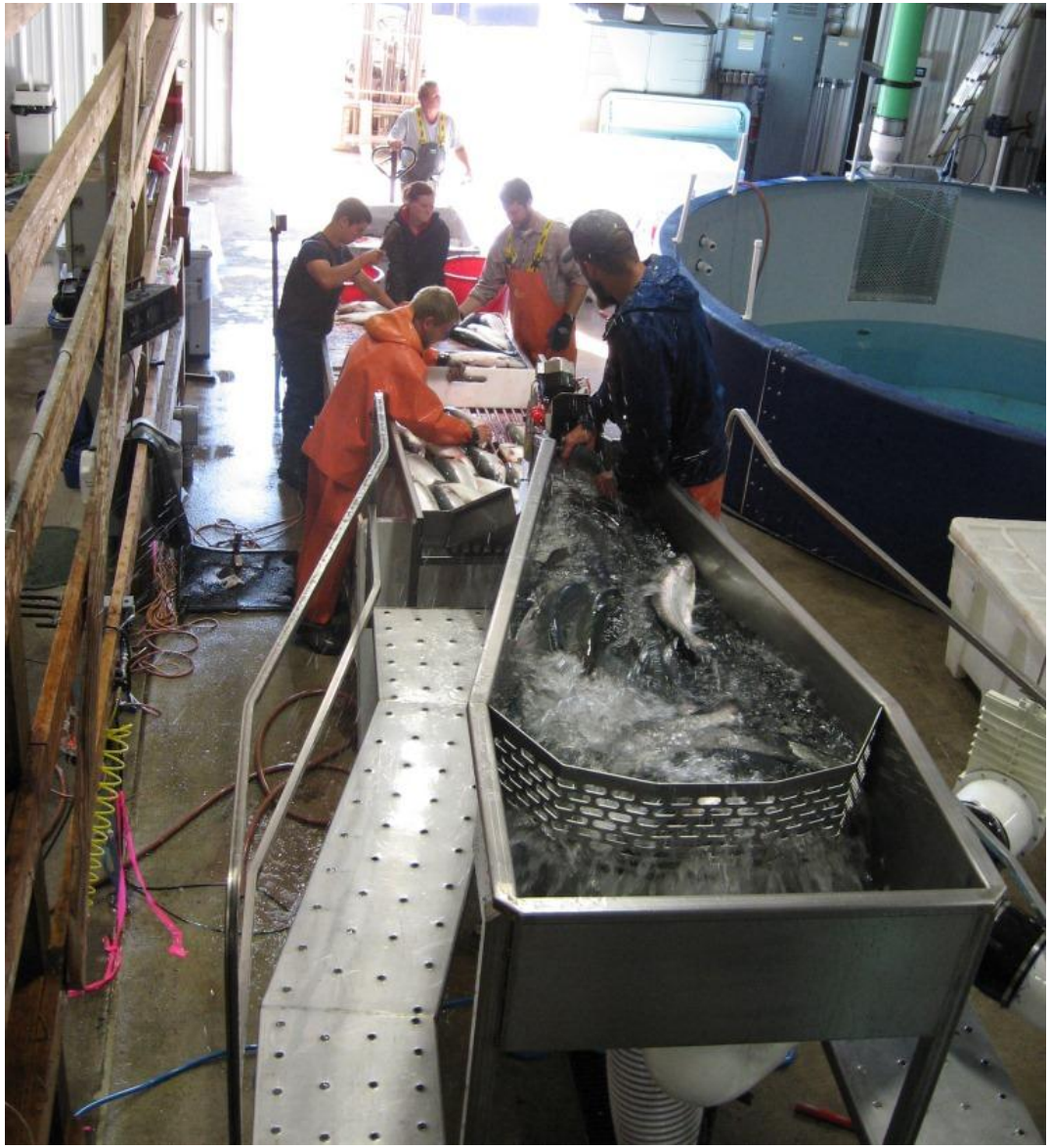

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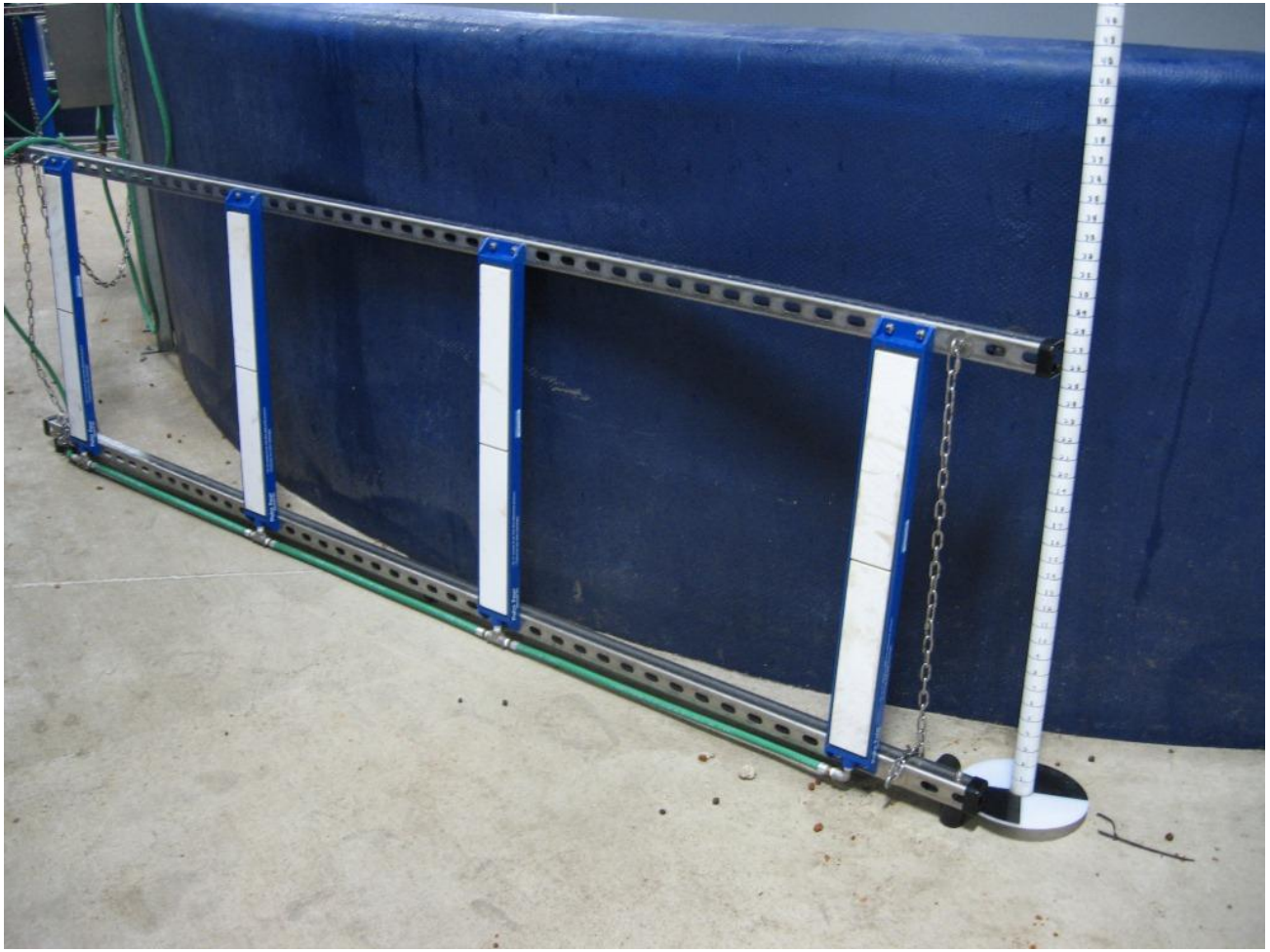
Two Essential Devices - Diffuser Rack and Secchi Disc



Collaborative Innovation

Monterey Bay Aquarium · Charter Member

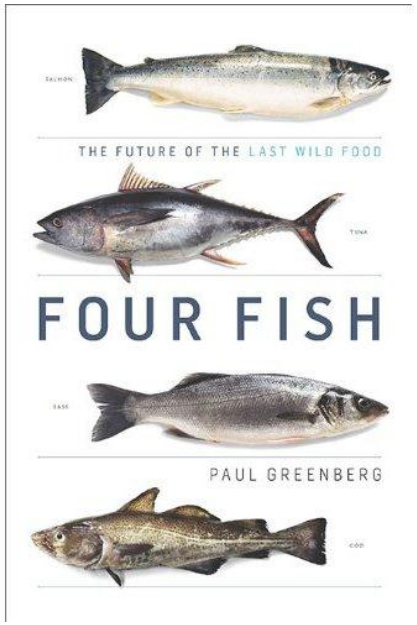
Monterey Bay Aquarium Seafood Watch

Overwaitea
B.C.'s very own food people.

Gordon and Betty Moore Foundation
Creating positive outcomes for future generations

The Technology Farm

SweetSpring



"Let the fittest, most closed system survive and reap the economic benefit inherent within that victory."

Paul Greenberg, 2010 (pg 74)

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Thank You...

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