SALMON BROODSTOCKS IN SEAWATER – LIFE IN A 20’ OCEAN – THE MANCHESTER EXPERIENCE

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The Queen of Everything
Overview

- Manchester Research Station
- Salmon Captive Brood programs
- Salmon culture in seawater – the good & the not-too-good….
Facilities

- Manchester Research Station
ESA-listed salmon captive broodstocks
  • Sockeye, chinook, (pinks)

Steelhead research

Sablefish research (aquaculture)

Shellfish research

Macroalgae (seaweed)

Genetics lab
Manchester Temperature (°C) 12/15/09-12/14/10
-(note-no data available for 5/14-6/15/10)

Data from NANOOS probe records
(www.ecy.wa.gov/programs/eap/mar_wat/data.html)
Manchester Salinity data (o/oo): 12/15/09-12/14/10
(note-no data available for 5/14-6/15/10)

Data from NANOOS probe records
(www.ecy.wa.gov/programs/eap/mar_wat/data.html)
Seawater Rearing Facility
THE OLD vs THE NEW

1995

2006
Seawater Processing
First Step in Maintaining Biosecurity

- 2200 gpm processed seawater
- Sand Filters remove all particles larger than 20 microns
- Cartridge Filter remove all particles larger than 5 microns
- Ultra violet light used to disinfect filtered water
Programs & Cooperators

Redfish Lake Sockeye – 1991 to 2020??
Salmon River Spring Chinook – 1994 to 2010
- Idaho Dept of Fish and Game
- Shoshone-Bannock Tribe
- NOAA Fisheries
- Oregon Dept of Fish and Wildlife
- Bonneville Power Administration

Grande Ronde River Spring Chinook - 1994 to 2010
- Oregon Dept of Fish and Wildlife
- Confederated Tribes of the Umatila Indian Reservation
- Nez Perce Tribe
- NOAA Fisheries
- Bonneville Power Administration
Puget Sound Spring & Fall Chinook – 2007 to 2017
• Washington Dept of Fish & Wildlife
• Lummi Tribe
• Nooksack Tribe
• Stillaguamish Tribe
• Northwest Indian Fisheries Commission
• NOAA Fisheries

Elwha River Odd Year Pinks
• Lower Elwha Klallam Tribe
• Washington Dept of Fish & Wildlife
• NOAA Fisheries
• National Park Service
Manchester Research Station
120’ x 110’ brood building with 20 - 20’ d tanks x 5’ h
120’ x 54’ brood building with 12 - 16.5’ d tanks x 5’h
SMOLT to ADULT
Freshwater to seawater

Smolts transferred into freshwater pools
Seawater added at 5gpm
Transition to 100% seawater in 1 – 2 days

Manchester – Bldg 22
SMOLT to ADULT
1 – 5 years

Reared in variety of circulars from 6’ to 20’ diameter

Rearing density – 0.5 lbs/ft³
Loading density – 7 lbs/gpm

May & June – smolts coming in

June & July – adults going out
  • Maturity sorting
  • Transfer back to freshwater for spawning
Smolt to Adult
1 - 5 years

- Cross-sectional view of the fish.
SMOLT to ADULT

1 – 5 years

Maturity sorting using ultrasound (Manchester Research Station)
Transferred in 2/3 freshwater & 1/3 seawater
Fish are crowded up and netted into transfer trucks
Transfers vary from 1 – 16 hours
ADULT TRANSFER
Seawater back to Freshwater
BENEFITS
• Normal life cycle environment
• Moderate temperature fluctuations
• Excellent fin quality
• Good survival (50 – 80%)

CHALLENGES
• Transition - freshwater to seawater to freshwater
• Organic soup – crab larvae, algae blooms, jelly fish, scuba divers….
• Marine growth in inflow plumbing – mussels, sponges, barnacles, starfish
• Marine organisms in the rearing tanks – sponges
• Hell on equipment & people
Sponge attacks

Survival

Percent

BY07  BY08  BY09  BY10  BY11

Yearlings  Zeros
A Big Thank You to:

All the cooperators – state, tribal, federal agencies
(no bloodshed or fisticuffs over the years....)

Staff of the Manchester Research Station

James Hackett – facility maintenance head guy who keeps the whole complicated system running
Questions?