

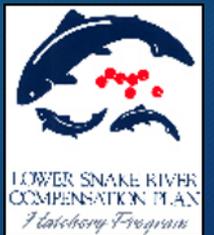
# Hand Feeding Steelhead



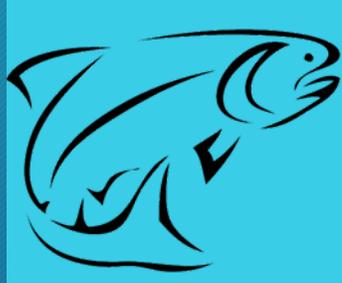
Clearwater Fish Hatchery

Idaho Fish and Game

Christopher Gregg

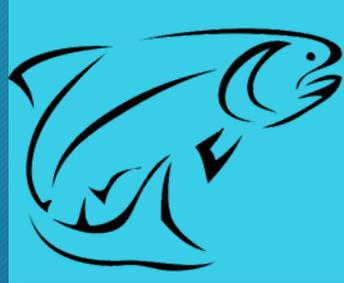


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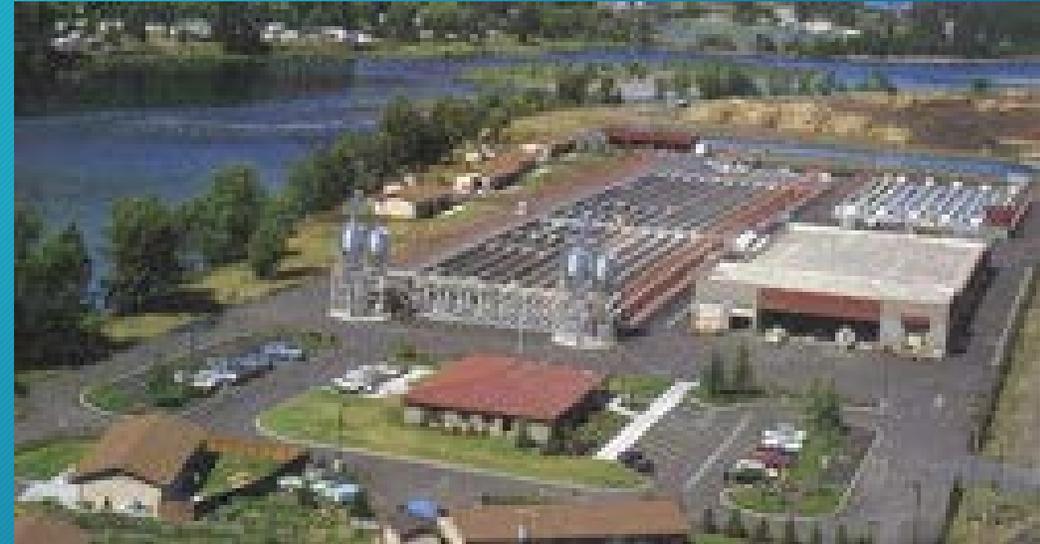
- Facility
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# Clearwater Fish Hatchery



## Facility

- Water supply
  - 73 CFS for production
  - Temperature range
    - 40°F to 56°F
- Rearing
  - 60 concrete early rearing vats
  - 46 concrete final rearing raceways



# Steelhead Production



## Goals

- Size at release 4.5 fish per pound (fpp)
- 843,000 release inventory
- Ten month rearing cycle
  - Initial ponding to release



# Fish Culture

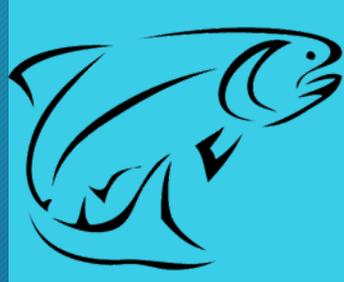


## Rearing Challenges

- Automatic bridge feeders
  - Present feed inefficiently in final rearing
    - 62% of steelhead growth occurs during final rearing
- Water temperature
  - Average maximum temperature allowed - 56°F
    - Steelhead achieve maximum growth rates at slightly warmer temperatures
      - ✓ 59°F - 64°F



# Historic Feeding Procedures

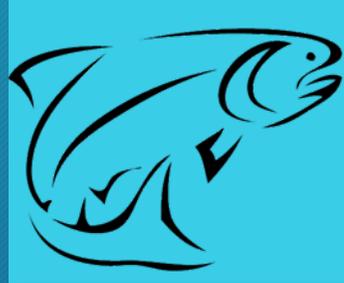


## Early Rearing

- Hand feeding - Initial feed through #0 crum
  - Feeding frequency - 8 to 10 times per day
- Automatic feeding - #1 crum through 1.2mm pellet
  - Feeding frequency - 10 to 15 times per day



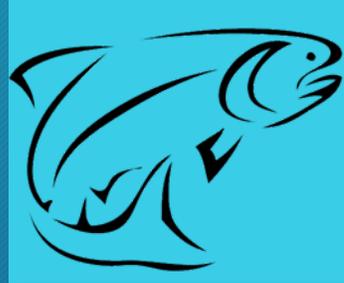
# Historic Feeding Procedures



## Final Rearing

- Hand feeding - 1.2mm through 1.5mm pellet
  - Feeding frequency - 6 to 8 times per day
- Automatic feeders (bridge) - 2.0mm through 2.5mm pellet
  - Feeding frequency - 6 to 8 times per day
    - Maximum pellet size 2.5mm

# Fish Culture Changes

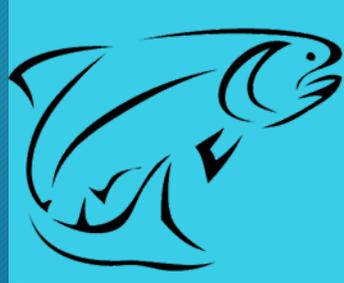


## Early Rearing

- Hand feeding - Initial feed only
  - Feeding frequency 8 to 10 times per day
- Automatic feeding - #0 crum through 1.2mm pellet
  - Feeding frequency - 25 to 30 times per day
    - Approximately every 30 minutes for 15 hours a day



# Fish Culture Changes

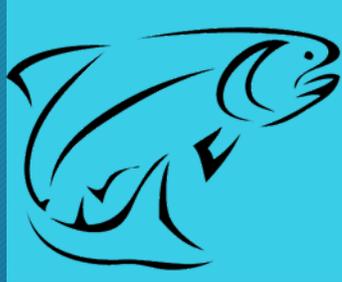


## Final Rearing

- Hand feeding - 1.2mm through 3.0mm
  - Feeding frequency - Decreased as fish size increased
    - 120 to 51 fpp - 4 to 5 times per day
    - 50 to 31 fpp - 2 to 3 times per day
    - 30 to 15 fpp - 1 to 2 times per day
    - > 15 fpp - one feeding per day



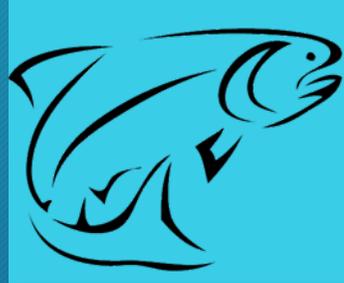
# Observations



## Fish Culture

- Feed conversion rates (FCR) are similar to historic rates or slightly better
  - BY15 year to date FCR - .79
- More active/aggressive fish at feeding
- Sweeping raceways is easier, and quicker than in past years
- Improved fin quality

# Conclusions



- Will meet our 4.5fpp release goal
- Time spent performing fish culture is a wash
  - More time spent feeding fish
  - Less time spent sweeping
- Provided an avenue to teach new employees
  - Proper feeding techniques
    - Perfect practice makes perfect performance
  - Species/Temperature awareness
    - All species have optimum temperature ranges where maximum growth can be achieved
  - Responsible fish culture (most important)
    - Good instruction + Positive attitude = Well fed fish + Clean raceways → Happy & Healthy fish

