Idaho Salmon and Steelhead
Overview of Management, Status and Factors Affecting Abundance

Jim Fredericks, Idaho Department of Fish and Game
Outline of Presentation

• Relationship of Idaho and anadromous fish
• Management and limiting factors
• Historical returns by species
Anadromous Species in Idaho

Chinook Salmon
- Spring
- Summer
- Fall

Steelhead
- Summer

Sockeye

Coho

Lamprey
Importance of Idaho

Snake Basin Historically Produced:

≈55% of Summer Steelhead

≈ 40-45% of Spring/Summer Chinook
Importance to Idaho

Economic Importance

- Typically 20-25% of angling effort
- Over $100 million annual spending
- 1,000 – 2,000 thousand (rural) jobs
- Chinook fisheries can generate up to $90 million
  - 2001 Chinook fishery = estimated $10 million in Riggins alone
  - Estimated total spending in Riggins that year was $44 million
Importance to Idaho

- Economic Importance
- Ecological Importance
  - Marine derived nutrients
  - Food source
  - Gravel cleaning
Importance to Idaho

- Economic Importance
- Biological Importance
- Cultural Importance
Limiting Factors -- 4 H’s
A “P”
And an “O”
Minimum Abundance Threshold (MAT)

- Based on viability and the relative amount of historical spawning and rearing habitat associated with each population
- Represents the number of spawners needed for a population to achieve the 5% risk level at a given productivity
- Required for de-listing, but not the sole criteria
Smolt to Adult Return Rates (SAR)

The survival from a beginning point as a smolt to an ending point as an adult.
Smolt to Adult Return Rates (SAR)

- For example
  100,000 smolts Migrate past Lower Granite Dam in 2016
  500- 1 Ocean Salmon Return to Bonneville Dam in 2017
  2,000- 2 Ocean Salmon Return in 2018
  800- 3 Ocean Salmon Return in 2019

\[
\text{SAR} = \frac{(500+2,000+800)}{100,000} = 3.3\%
\]
Hydrosystem
Hot water kills half of Columbia River sockeye salmon

Drought and record heat are behind the high water temperatures

By: Shuly Wasserstrom

Post: Jul 27, 2015 07:38 AM PDT
Updated: Jul 27, 2015 07:38 AM PDT
Long-term changes in Lewiston-BON WTT

Migration Year


WTT

dam construction

~2 days

~20 days
Passage Routes

**Non-powerhouse** = Spill (traditional or surface spillway weirs)

**Powerhouse** = Turbine or juvenile collection/bypass

Direct survival:
- spill > bypass > turbine

Direct & indirect survival (delayed mortality):
- spill > bypass
- spill > turbine
Wild Snake River Chinook SAR*

*2018 CSS Annual Report; to Upper Most SR dam
Wild Snake River Steelhead SAR
Simulation models
...integrate across river and ocean conditions...

Population in decline

Previous BiOp operations

Spill to 125% TDG
Anadromous Hatchery Programs

- 13 anadromous hatcheries in Idaho
  - Chinook-8, Steelhead-5, Sockeye-2, Coho-1
  - Multiple satellite facilities
  - Currently operated by IDFG and NPT

- Funding is provided by BPA (3), USFWS (6), Idaho Power (4)

- Primary Purpose – Harvest mitigation, but a conservation and restoration role for Sockeye and Chinook

- Mitigation is for downriver fisheries as well
  - Typically for every Idaho hatchery Chinook harvested in Idaho, 2-3 are harvested downstream
Idaho Hatchery Smolt Releases:

- 13M Sp/Su Chinook
- 1 M Sockeye
- 8M Steelhead
- 5M Fall Chinook
- 1M Coho Salmon
- Established in US v. OR production agreement
Tagging

All 28 Million PBT Tagged!
Segregated Management

- Hatcheries today are not the hatcheries of 40 years ago
- All facilities have approved Hatchery Genetic Management Plan to comply with ESA
Harvest
Regulation

**Magnuson-Stevens**
- Passed in 1976
- Primary law governing marine fisheries management in U.S. federal waters
- Extended regulated harvest from 3 to 200 miles off shore

**U.S. v. Oregon Management Agreement**
- Court upheld the Columbia River treaty tribes reserved fishing rights under the 1855 Treaties.
- Provided 50/50 harvest sharing of salmon between the treaty tribes and non-Indians
- State and Tribal entities work cooperatively towards rebuilding salmon runs, and developing fishery management strategies
- Allocates harvest in system below LGD
Idaho Management

• Meet brood stock (10,000 Sp/Su Chinook)
• Minimize encounters of wild stocks
• Fisheries and “impact rates” approved and permitted by NOAA Fisheries.
  • about 3.5% for steelhead
  • about 2% for Sp/Su Chinook.
• No non-tribal harvest of wild Chinook or Steelhead
Steelhead Harvest
Chinook Harvest

- Spring/Summer Chinook
- Fall Chinook

Graph showing Chinook Harvest from 1962 to 2016.
Habitat

- Efforts include stream restoration projects to improve production and life-cycle survival (higher growth rates)
  - BPA Accord Funding (≈4.5M)
  - PCSRF – Up to 5.25M annually
  - Mitchell Act Funding (Screening) ≈ $1M
Potlatch River Restoration

What is the potential increase in juvenile production (i.e. # of smolts) following implementation of these 3 projects?

Modeled Production - 19,075 Smolts (85% increase)
Smolts per female
Potlatch River Restoration

- Completed and planned projects will result in:
  - Access to over 20 miles of good habitat
  - Restoration of 21 miles of habitat

- An estimated increase in production of over 46,000 Steelhead Smolts (85% increase)
544 restoration projects:
• Opened 75 mi. of habitat
• Restored 352 mi. of habitat
• Installed 158 mi. of fencing
• Added 61 CFS to Lemhi
Fish Screen Program (Upper Salmon Basin)

- Affects ~4 million acres, 270 screens, and 2,500 water rights
- Protects ESA-listed salmon, steelhead, and bull trout from entrainment
- Modelling suggests entrainment has been cut from >70% to <2%
- Helps to maintain an agricultural based economy
Ocean Conditions

- Variations in Ocean Conditions – Impact survival and recruitment

upwelling $\rightarrow$ nutrients $\rightarrow$ plankton $\rightarrow$ forage fish $\rightarrow$ salmon
## NOAA Stoplight Chart

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**Ecosystem Indicators not included in the mean of ranks or statistical analyses:**
Sea Lion Predation

California Sea Lions have increased on west coast from 30K in 1980 to over 300K and are near carrying capacity.

In the 1980’s, Sea Lions started appearing in the Columbia River.

By 2018, 190 animals at Bonneville Dam and 60-80 animals at Willamette Falls.

Have consumed up to 10,000 fish in the spring (mostly spring chinook) at BON.

Consider:
- BON estimates vs. total estimates
- Run specific impacts
California vs. Steller

Steller Male
- Weight - up to 2200 lbs
- Length – up to 10.5 ft
- Present at BON – 10 months

California Male
- Weight - up to 1200 lbs
- Length – up to 8.5 ft
- Present at BON – 7 months
Adjusted estimates of salmonid consumption by California and Steller sea lions at Bonneville Dam
Wild/Natural Spring/Summer Chinook Salmon

Escapement Goal: 127,000

Delisting MAT: 31,500

Adults to uppermost Dam

- Ice Harbor
- Lower Monumental
- Little Goose
- Lower Granite
Hatchery Spring/Summer Chinook Salmon

Minimum Escapement Goal = 90,000
Hatchery Steelhead

Adults to uppermost Dam

- Minimum Escapement Goal = 90,000
- Niagara
- DNFH
- Magic Valley
- Hagerman
- Clearwater
Wild/Hatchery Sockeye

Escapement Goal: 9,000

Delisting MAT: 2,500
Hatchery Fall Chinook

Adults to uppermost Dam
Wild/Natural Fall Chinook

Escapement Goal: 14,360

Delisting MAT: 4,200