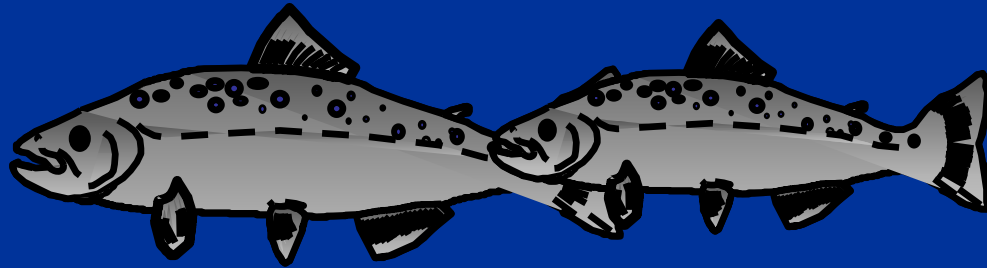


Columbia River Salmon Restoration: Can we succeed without Hatchery Intervention?

Presented by:

Bill Bosch

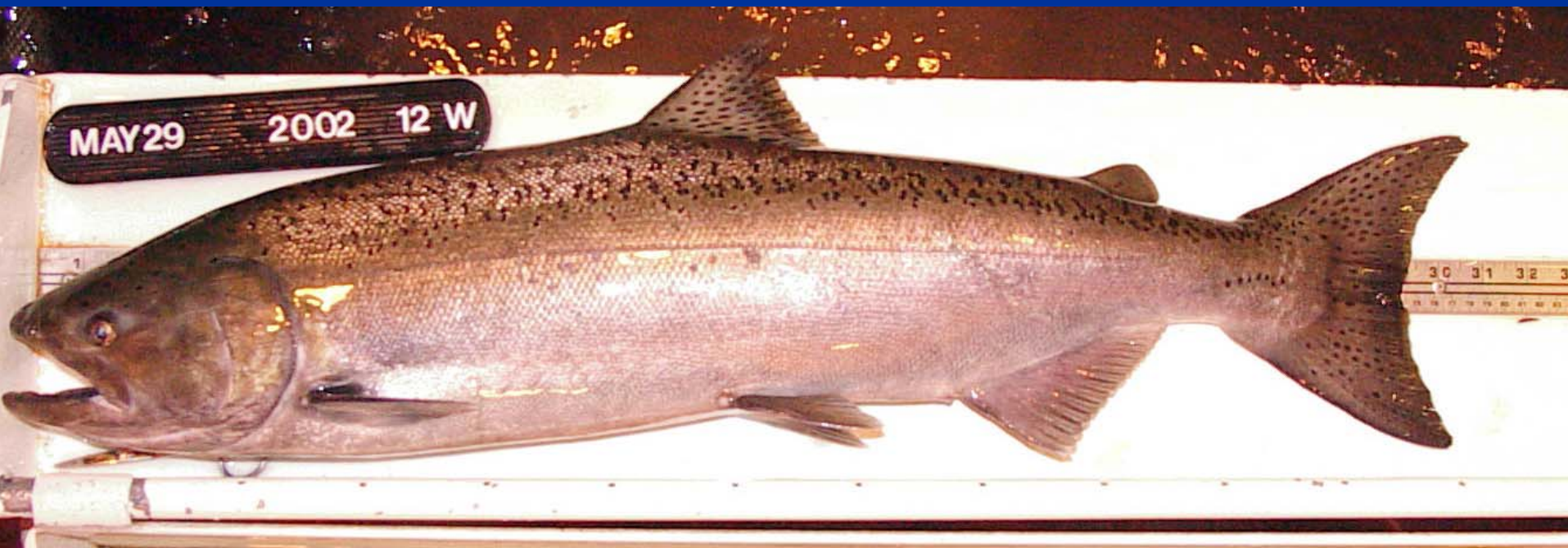


The Hogan Decision

- **ESA authorizes agencies to list species, sub-species, or “Distinct Population Segments (DPS)”**
- **NMFS developed concept of “Evolutionarily Significant Unit (ESU)” to help interpret DPS for salmon**
- **In many listings NMFS included both hatchery and wild salmon in the same ESU, but only listed the wild fish for ESA protection**
- **Judge Hogan said listing distinctions below that of subspecies or DPS not allowed under ESA**

Some Arguments for Separation

- Differences in spawning/rearing environments
- “Genetic pollution” from inter-breeding
- Competition for food
- Introduction of diseases
- Mixed stock harvest pressures

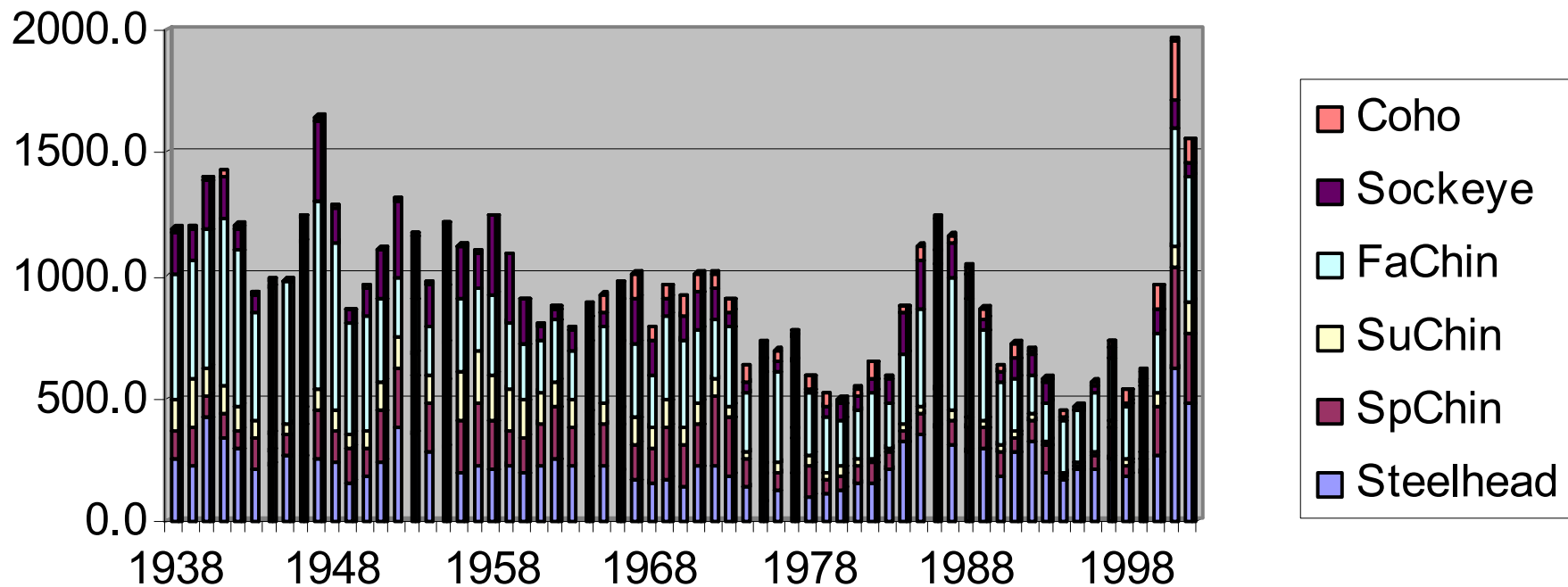


Some Arguments for Inclusion

- Ancestry was wild
- ~60% or more of life cycle spent in wild
- ~99.5% of bio-mass accumulated in wild
- Survived past up to 9 hydro projects



Columbia Upriver (Bonn.) Counts 1938-Present (Thousands of Fish)



NMFS Bi-Op on Artificial Propagation

March 29, 1999

Adult hatchery produced fish comprise:

- **50% of Fall Chinook**
- **70-80% of Spring/Summer Chinook**
- **70% of Steelhead**
- **95% of Coho**

ESA

- **emphasizes conservation in wild**
- **conservation may be facilitated by artificial means**

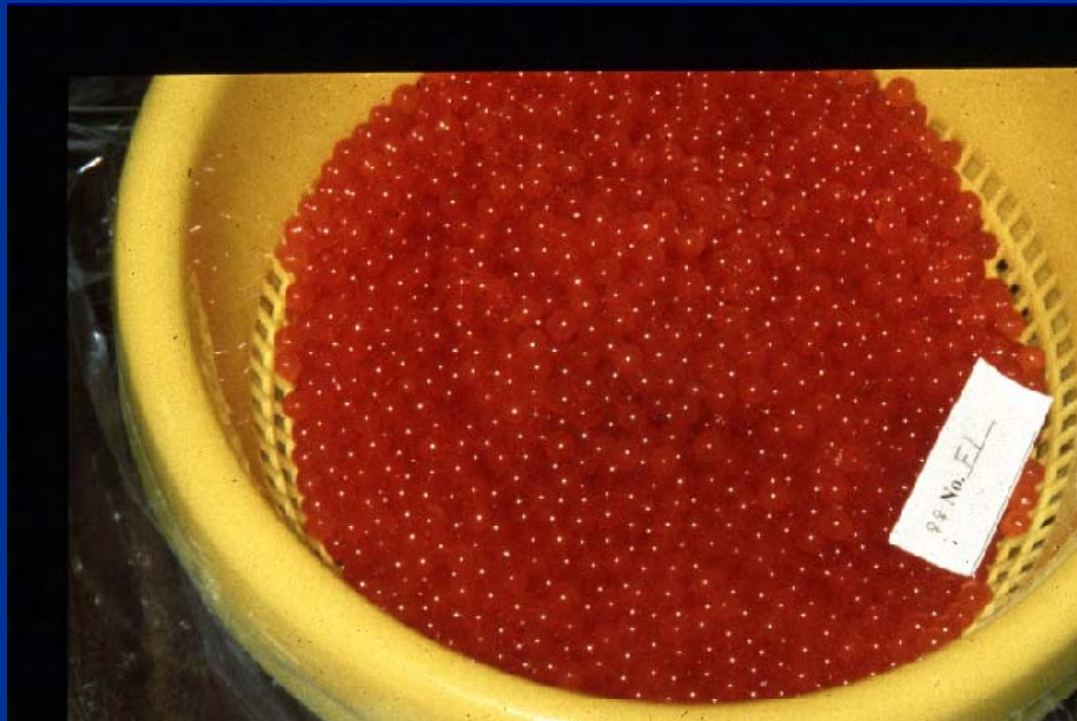
“... the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, **propagation**, live trapping, and transplantation...” 16 U.S.C. Sect. 1532(3).

Political Realities / Four H's



Examples of Hatchery Practices Not Conducive to Integration

- Out-of-Basin Transfers
- Nth Generation hatchery or farmed fish
- to breed a non-native trait (e.g., earlier run timing)
- focus on quantity rather than quality of production



Examples of Hatchery Practices Conducive to Integration

- Random, representative broodstock selection
- local broodstock
- low densities
- use natural broodstock if possible
- careful spawning and rearing protocols

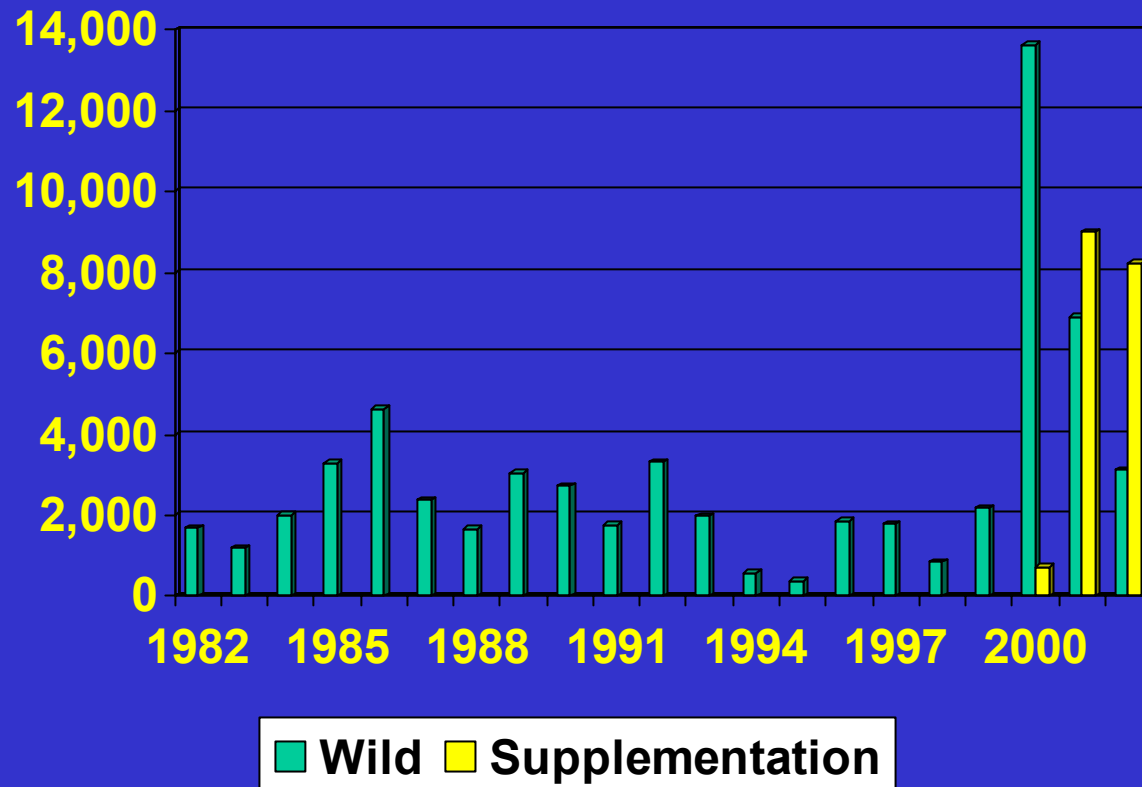


YKFP Supplementation and Research Program

Purpose and Overall Project Goal

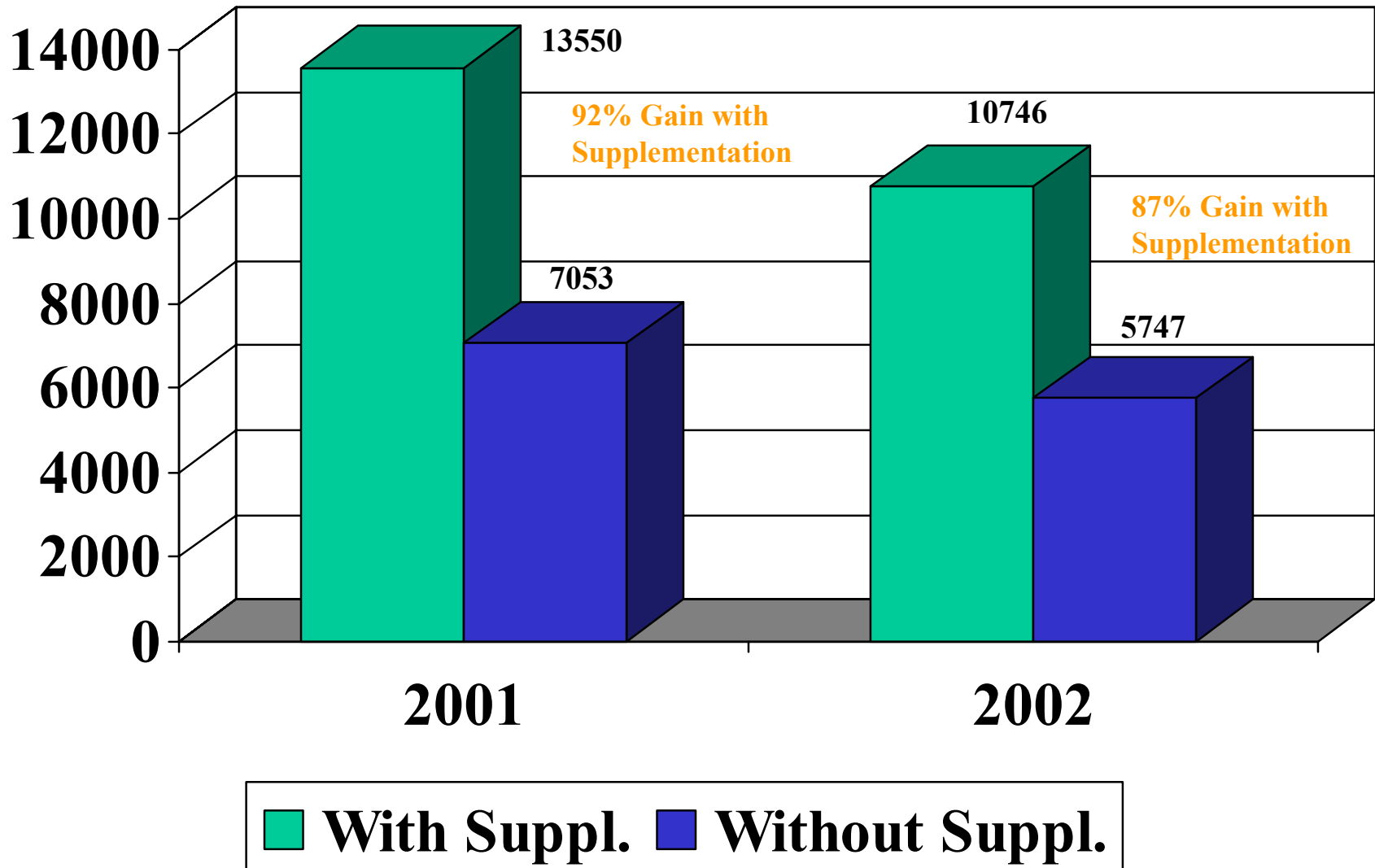


Upper Yakima Spring Chinook Returns, 1982 - 2002

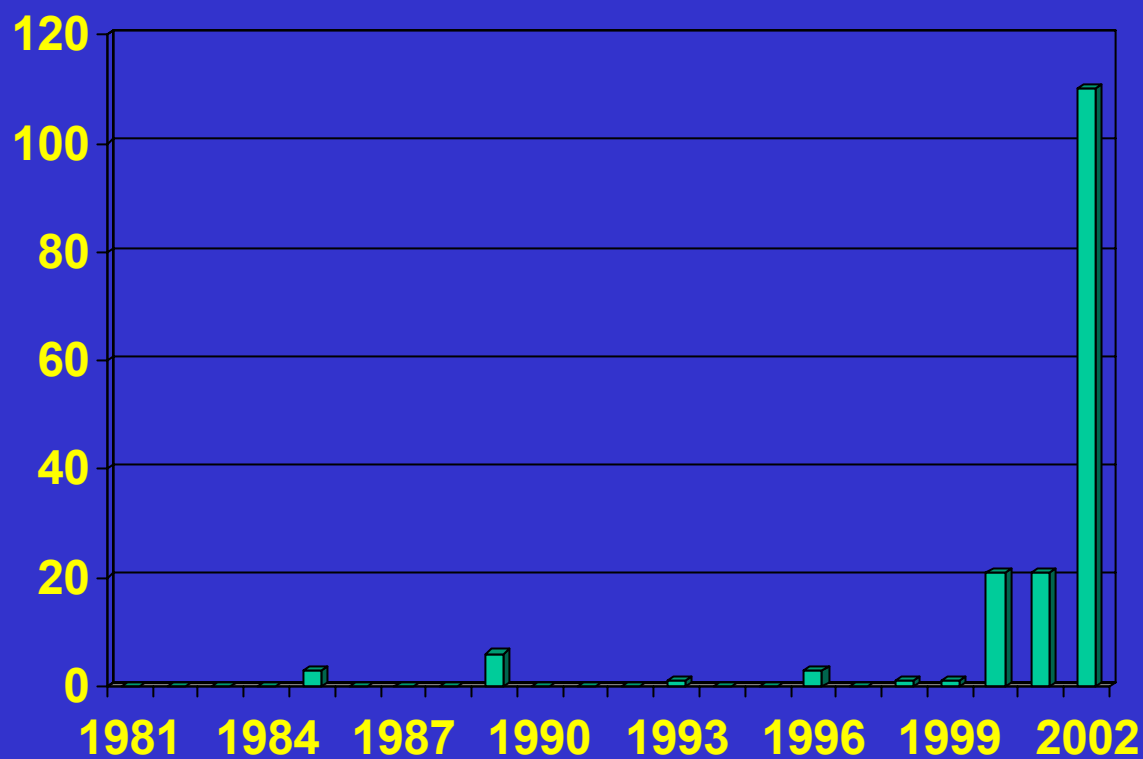


Upper Yakima Spring Chinook

Age 4 Returns with and without Supplementation



Teanaway R. Spring Chinook Redd Counts, 1981 - 2002

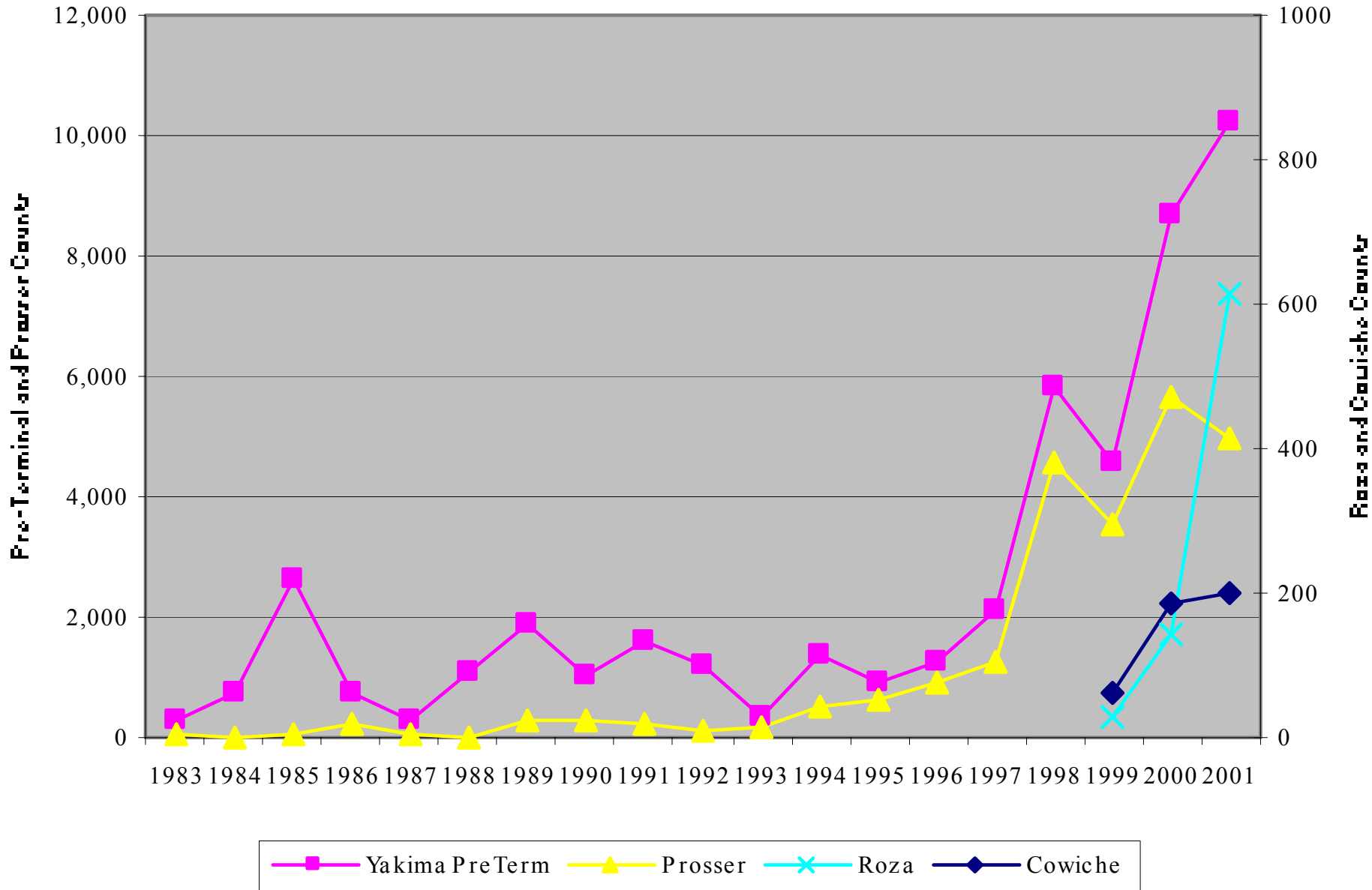


Yakima River Coho

- **Virtually extinct in the mid-1980s**
- **Must rely on out-of-basin transfers**
- **Direct-stream 'harvest augmentation' releases from late 1980s to mid-1990s**
- **Beginning in 1995, began to move releases upriver to try to re-establish naturally spawning population**



Yakima River Adult Coho Returns, 1983-2001.



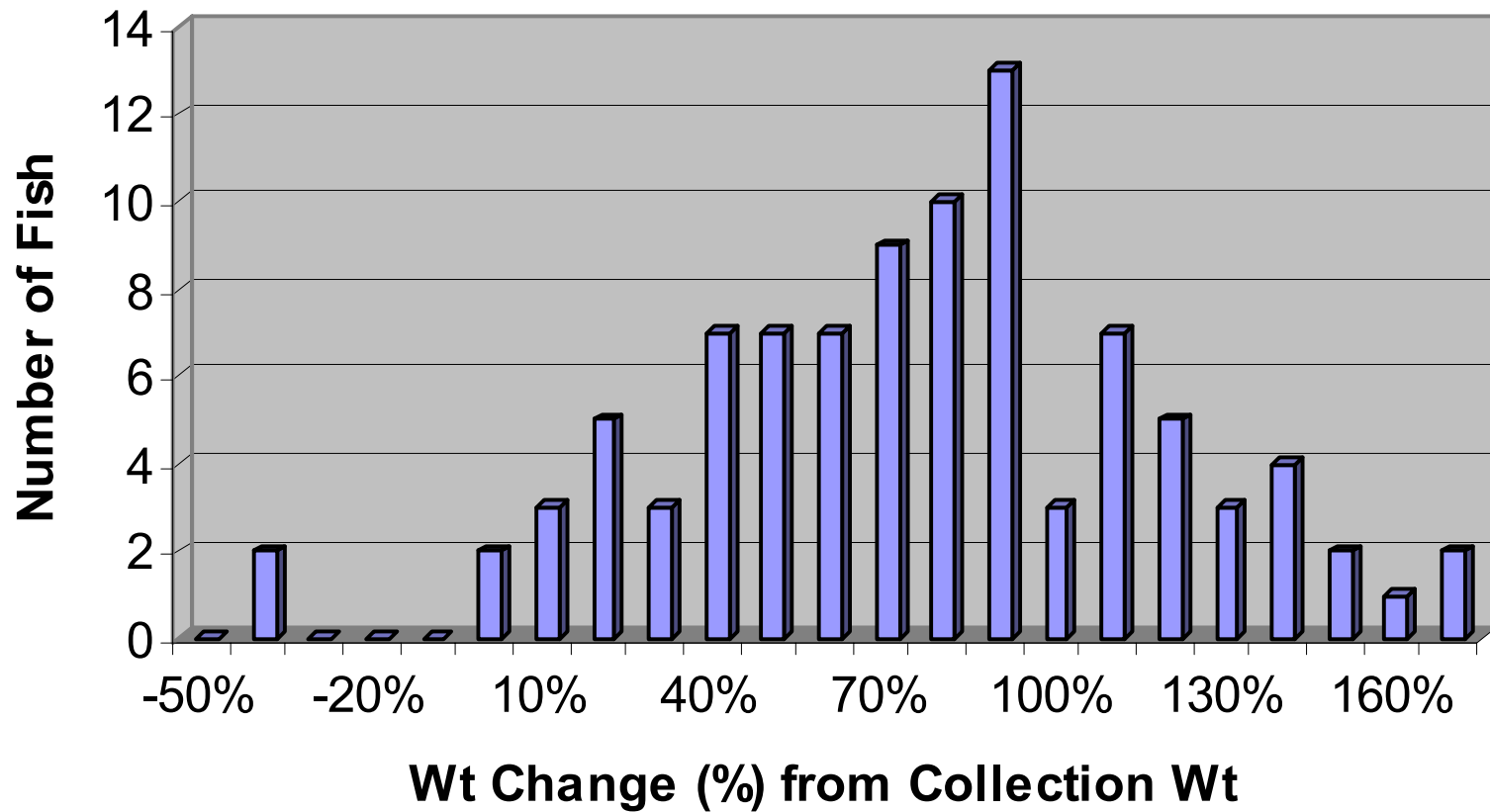
Yakima River Steelhead Kelt Reconditioning

- **Capture steelhead returning to ocean after completing first spawning cycle**
- **Place in “intensive care” program and encourage feeding**
- **Program started in 1999**
- **Reconditioned and released about 100 fish each year**
- **These are fish that otherwise would probably just die**

“Fresh” Steelhead kelts
feeding in Prosser
Hatchery holding pond,
April 12, 2002.



Wt Gain (%) Distribution for Reconditioned Kelts





Reconditioned Steelhead Female in process
of constructing her redd in Satus Creek,
April 1, 2002.

Be Careful but Be Realistic



Hatchery fish/technology are being used responsibly in the Yakima to:

- Rebuild depressed spring chinook
- Restore extirpated coho
- Boost productivity of ESA-listed wild steelhead

“The question we must deal with is not whether the domestic and the wild are separate or can be separated; it is how, in the human economy, their indissoluble and necessary connection can be properly maintained.”

- Wendell Berry, Sierra Magazine, May/June ‘02