

# Kelt Reconditioning:

A Research Project to Enhance  
Multiple Spawning in the  
Yakima Basin Steelhead  
(*Oncorhynchus mykiss*)

# Acknowledgements

Columbia River Inter-Tribal Fish  
Commission (CRITFC)

Bonneville Power Administration  
(BPA)

Northwest Power Planning Council

US Bureau of Reclamation (USBOR)

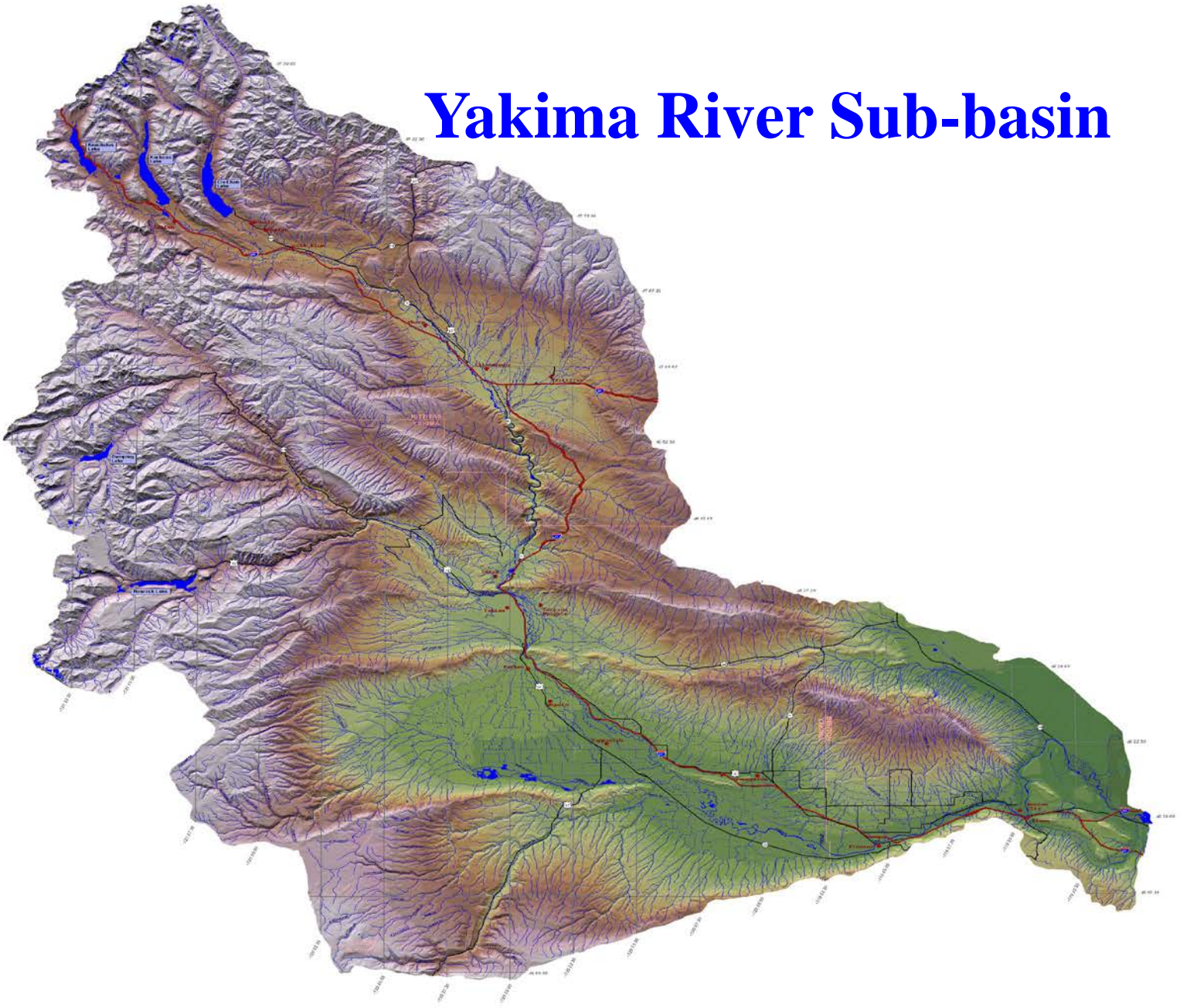
National Marine Fisheries Service  
(NMFS)

University of Idaho

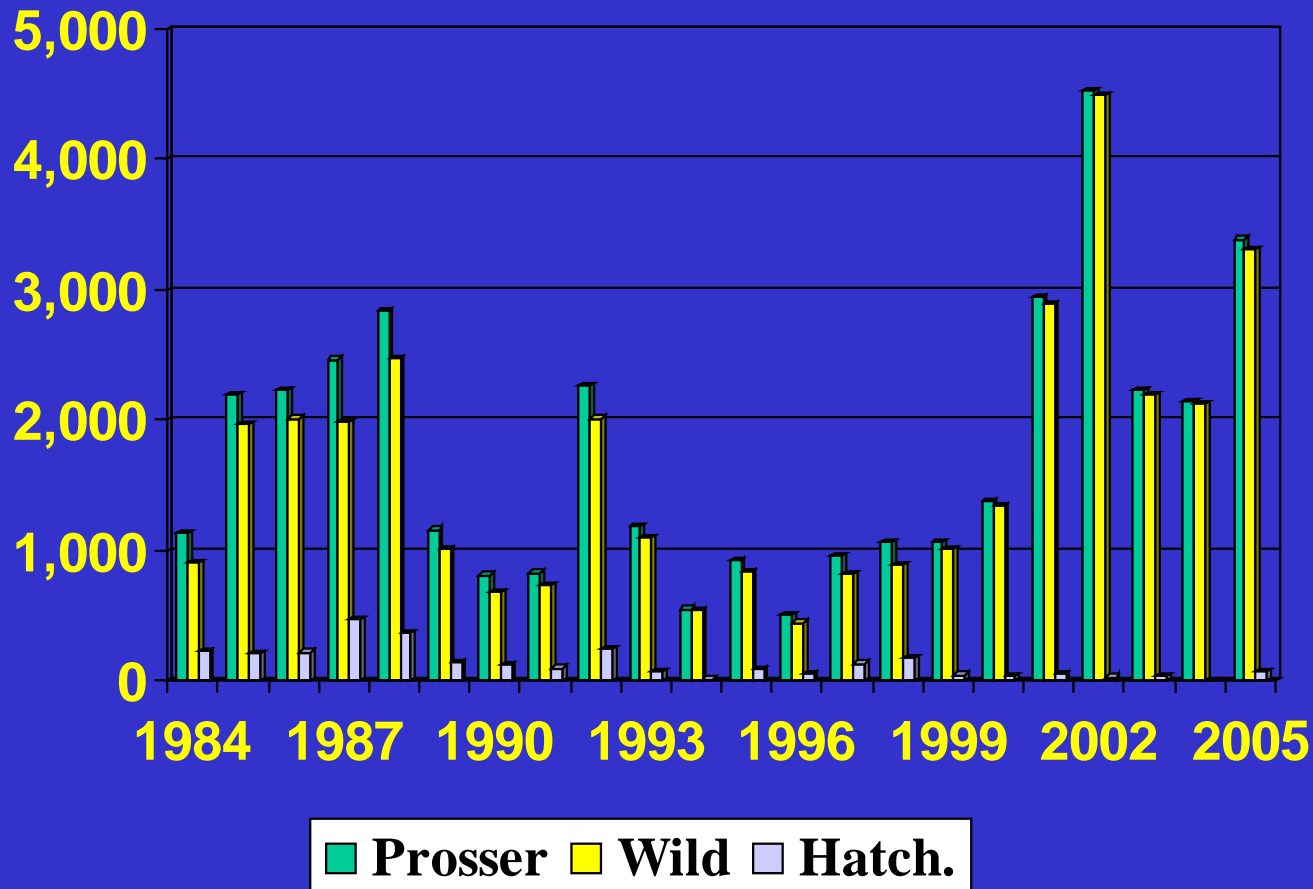
# Natural Life History of Steelhead (*Oncorhynchus mykiss*)

- Anadromous and Resident Forms
- Smoltify at various ages
- Multiple years in ocean
- Able to spawn on more than one occasion –  
    Spawned out adults (Kelts) return to the ocean,  
    gain weight, develop new eggs, then return to  
    fresh water streams to spawn again.

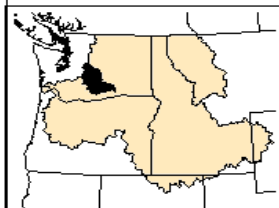
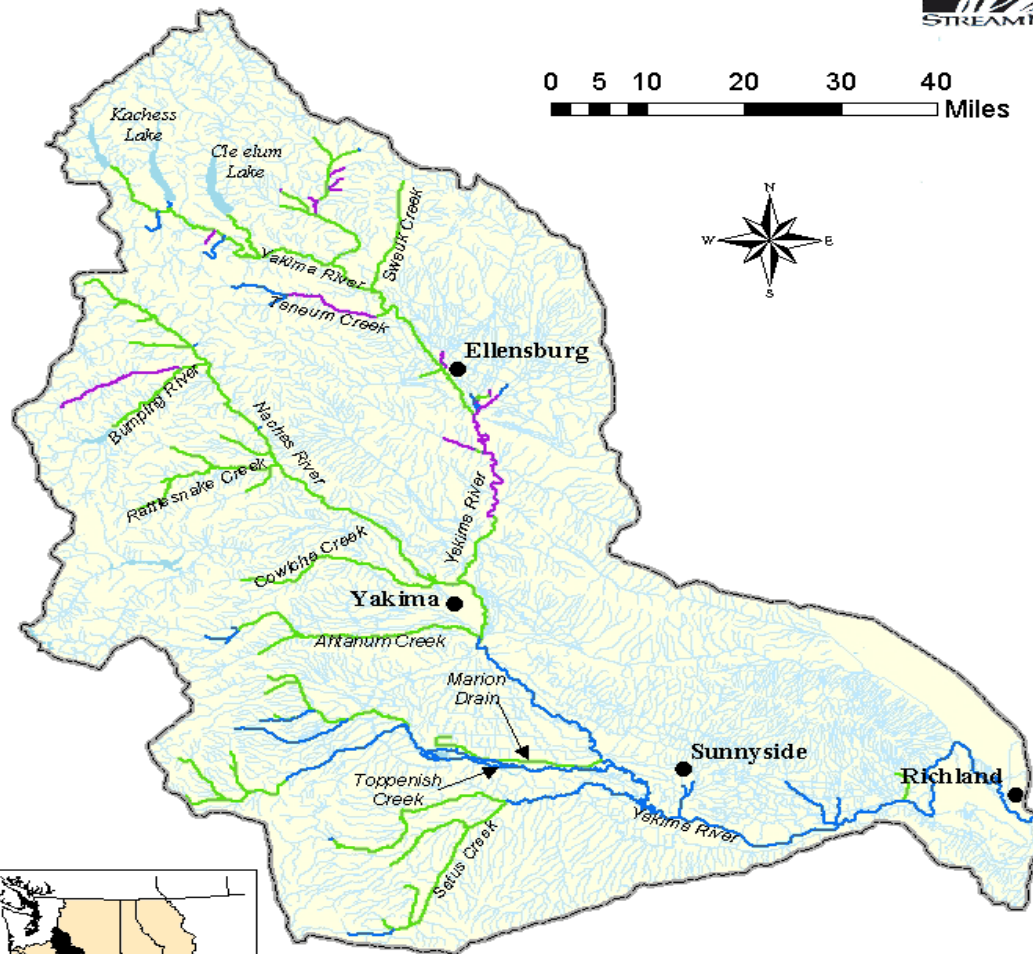
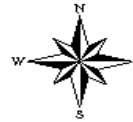
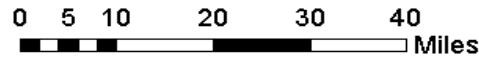
# Yakima River Sub-basin



# Yakima River Steelhead Returns, 1984 – Present



# Summer Steelhead Distribution - Yakima Subbasin



Yakima subbasin shown in black.  
Columbia River basin shown in tan.

## Summer Steelhead Distribution

- Primarily spawning and rearing
- Primarily rearing and migration
- Primarily migration

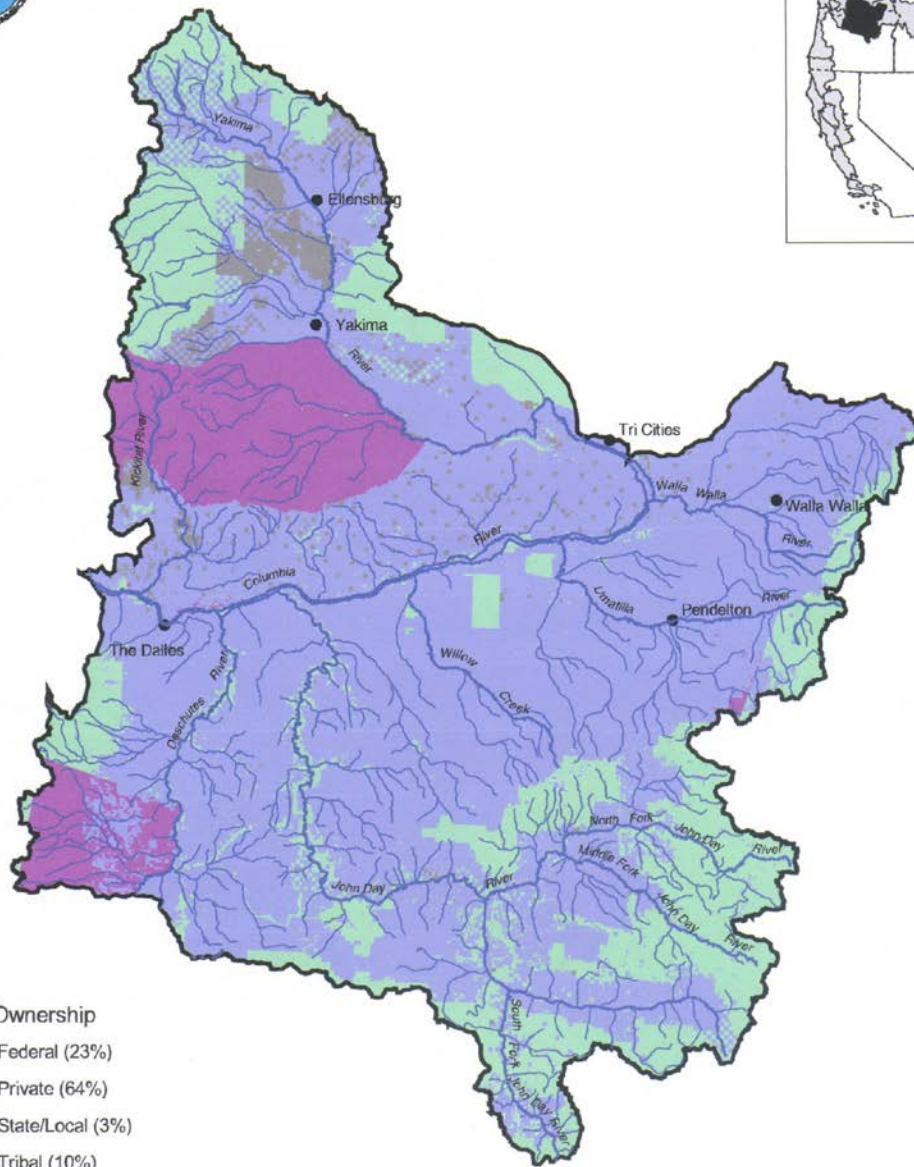
Map Date: February 2001. Data Sources:  
Washington Dept of Fish & Wildlife and Yakama Nation

# STEELHEAD ENDANGERED SPECIES LISTING





- NATIONAL MARINE FISHERIES SERVICE (NMFS) LISTED YAKIMA STEELHEAD AS THREATENED SPECIES – MARCH 25, 1999
- MIDDLE COLUMBIA RIVER “ESU”
- INCLUDES “ALL NATURALLY SPAWNED POPULATIONS OF STEELHEAD IN STREAMS FROM ABOVE THE WIND RIVER, WASHINGTON, AND THE HOOD RIVER, OREGON (EXCLUSIVE), UPSTREAM TO, AND INCLUDING, THE YAKIMA RIVER, WASHINGTON. EXCLUDED ARE STEELHEAD FROM THE SNAKE RIVER BASIN.”



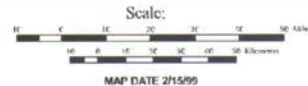
# MIDDLE COLUMBIA RIVER STEELHEAD ESU



### Land Ownership

-  Federal (23%)
-  Private (64%)
-  State/Local (3%)
-  Tribal (10%)

United States Department of Commerce  
National Oceanic & Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
HABITAT CONSERVATION DIVISION  
525 N.E. Oregon St., Suite 410  
Portland, OR 97232





# Methods

- Area and facility
- Kelt collection and processing
- Long-term, Short-term, and No-term rearing
- Feeding and treatment
- Maturation assessment and release
- Acoustic Tracking in Lower Columbia
- Reproductive Success Studies





# Juvenile Fish Separator

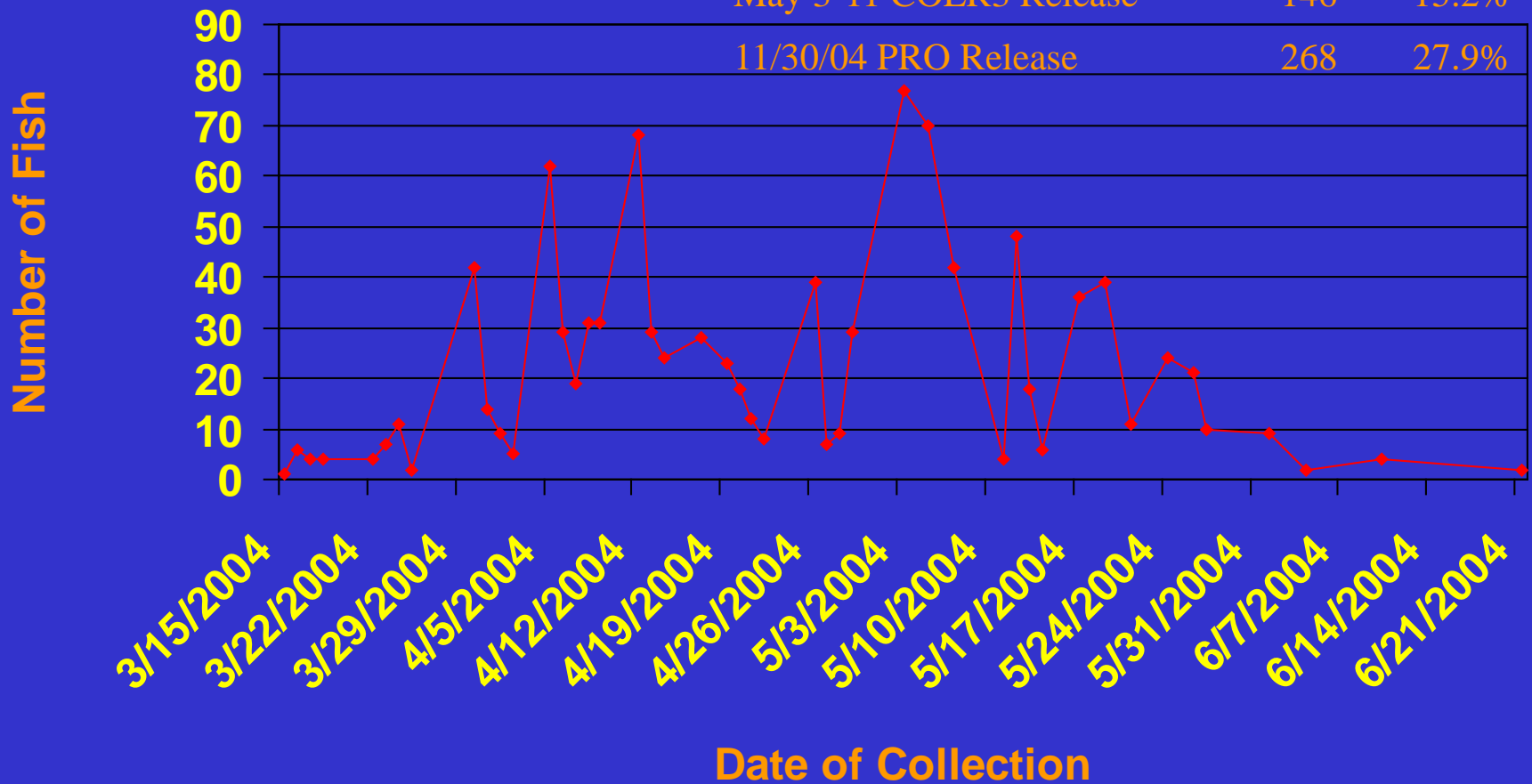






# Chandler Kelt Collection, 2004

Sampled	961	
Released Immediately	87	9.1%
Mortalities	423	44.0%
May 3-11 COLR3 Release	146	15.2%
11/30/04 PRO Release	268	27.9%













# Supplemental Data Sheet/key for Kelt

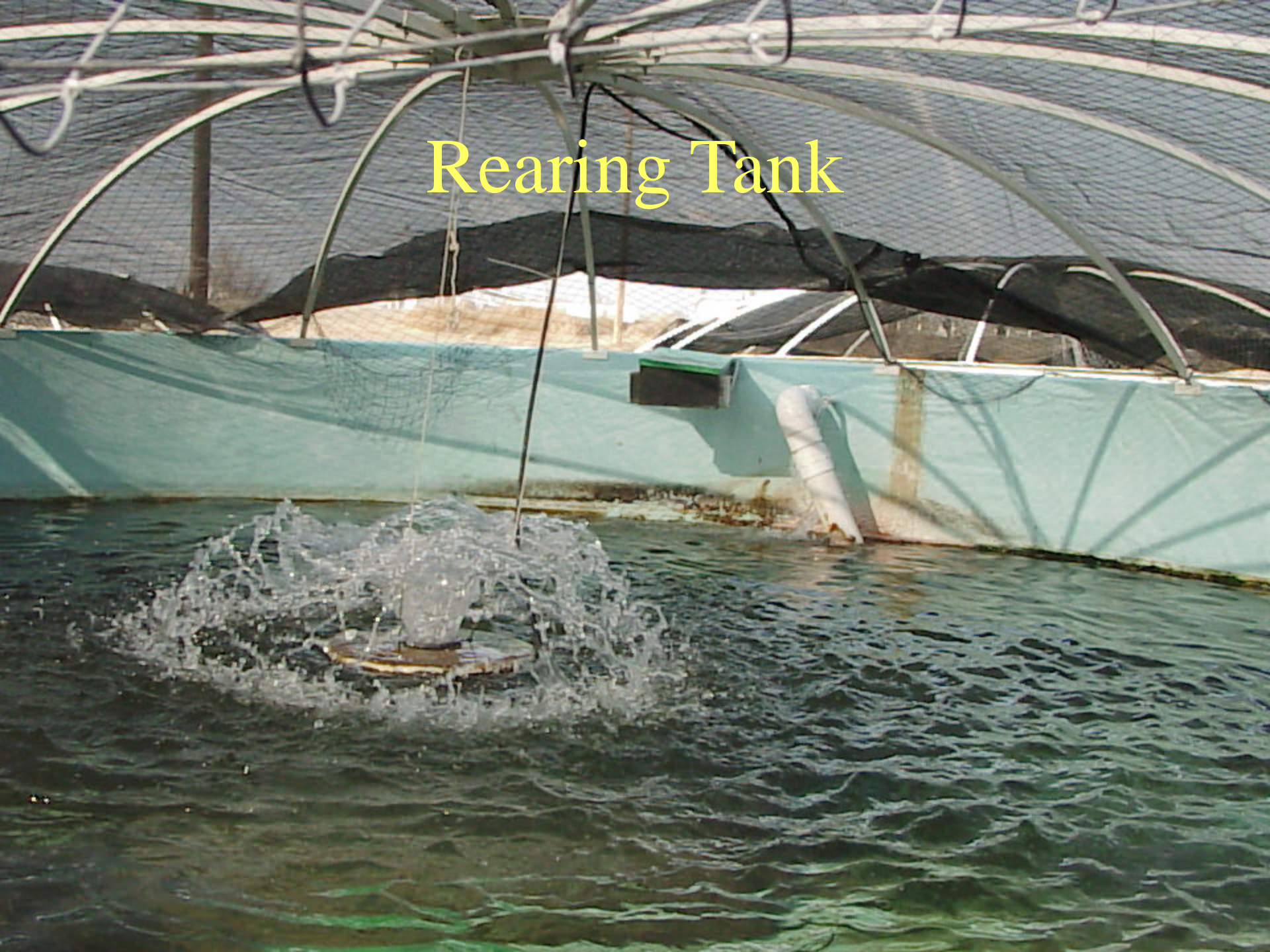
## In-processing

Collection Criteria	Description	Retain for Reconditioning
Abdomen Fat	Pre-spawner Green fish	No
	Thin Hard and imploded	Yes
Condition	Good Overall appearance is excellent	Yes
	Fair Appearance good scars and fin-wear	Yes
	Poor Appearance	No
Coloration	Bright Silvery appearance white abdomen	Yes
	Intermediate Mixture silver and gray	Maybe
	Dark Dark complexion	Maybe
Parasites	Yes parasites on gills	Maybe
	No No parasites on gills or fins	Yes

# Steelhead Reconditioning Area



# Rearing Tank





# Feeding and Treatment











# Maturation Assessment and Release for Spawning

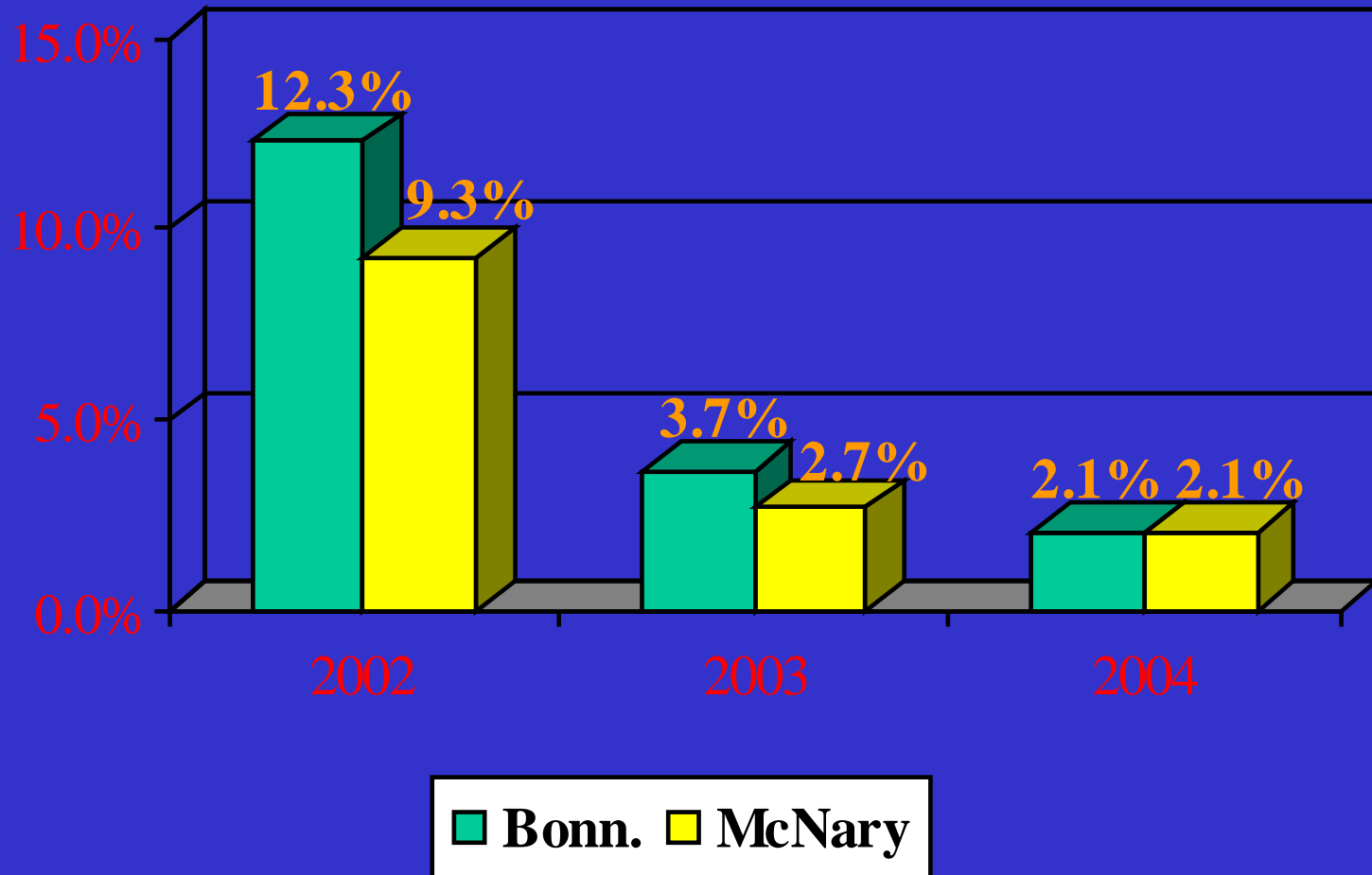




## Short-Term Kelt Reconditioning

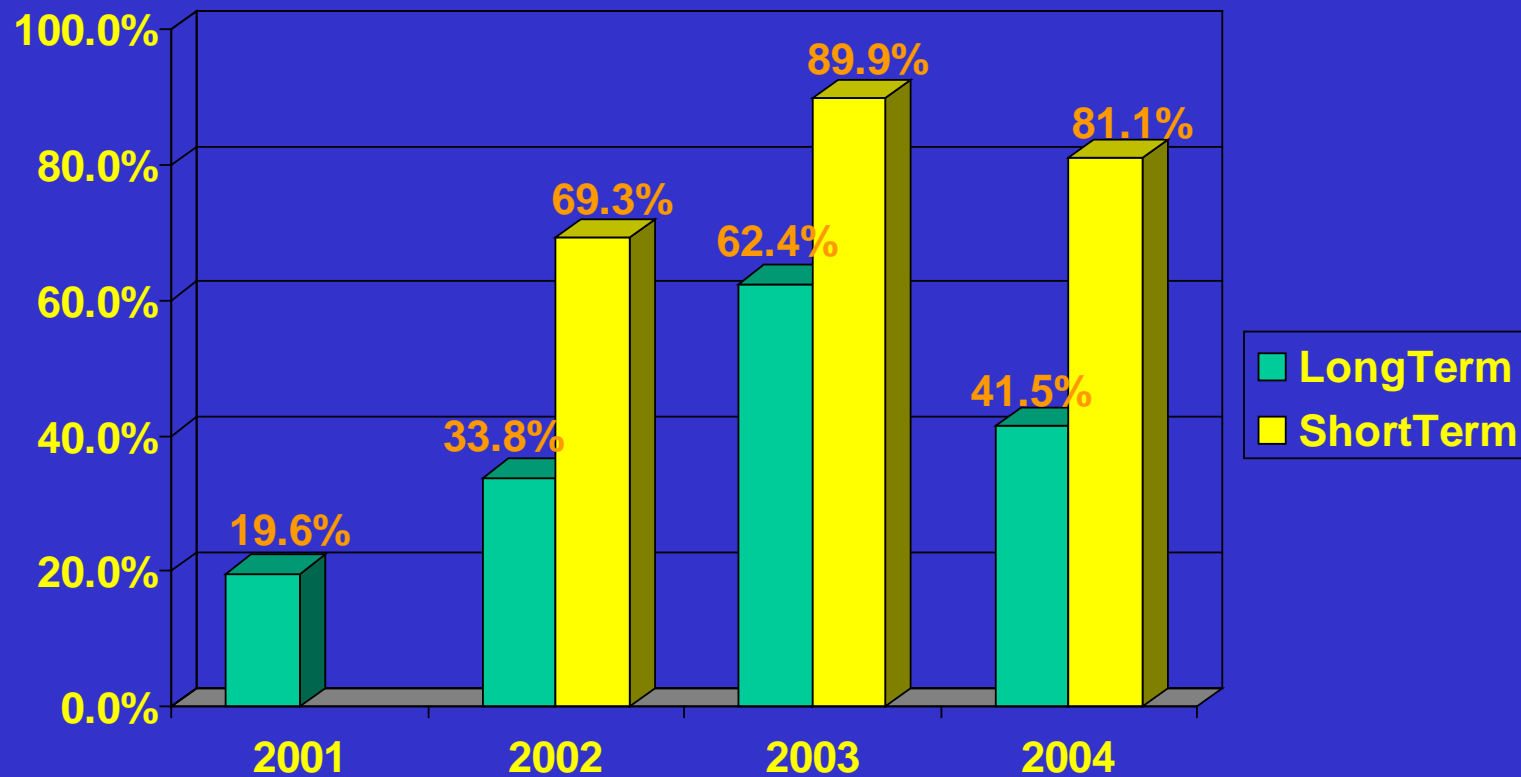
- **331 PIT fish released below Bonn. 5/20-28/2002**
- **40 fish (12%) detected at Bonn. (upstream) – 29 in fall of 2002 + 11 in fall of 2003**
- **31 fish (9.4%) detected at McNary (upstream) – 23 in fall of 2002 + 8 in fall of 2003**
- **13 fish detected in Yakima R. Sept02-Apr03**
- **10 fish detected moving downstream at Prosser or McNary in the spring of 2003**

# Short-Term Kelt Reconditioning Return Survival to Bonneville and McNary

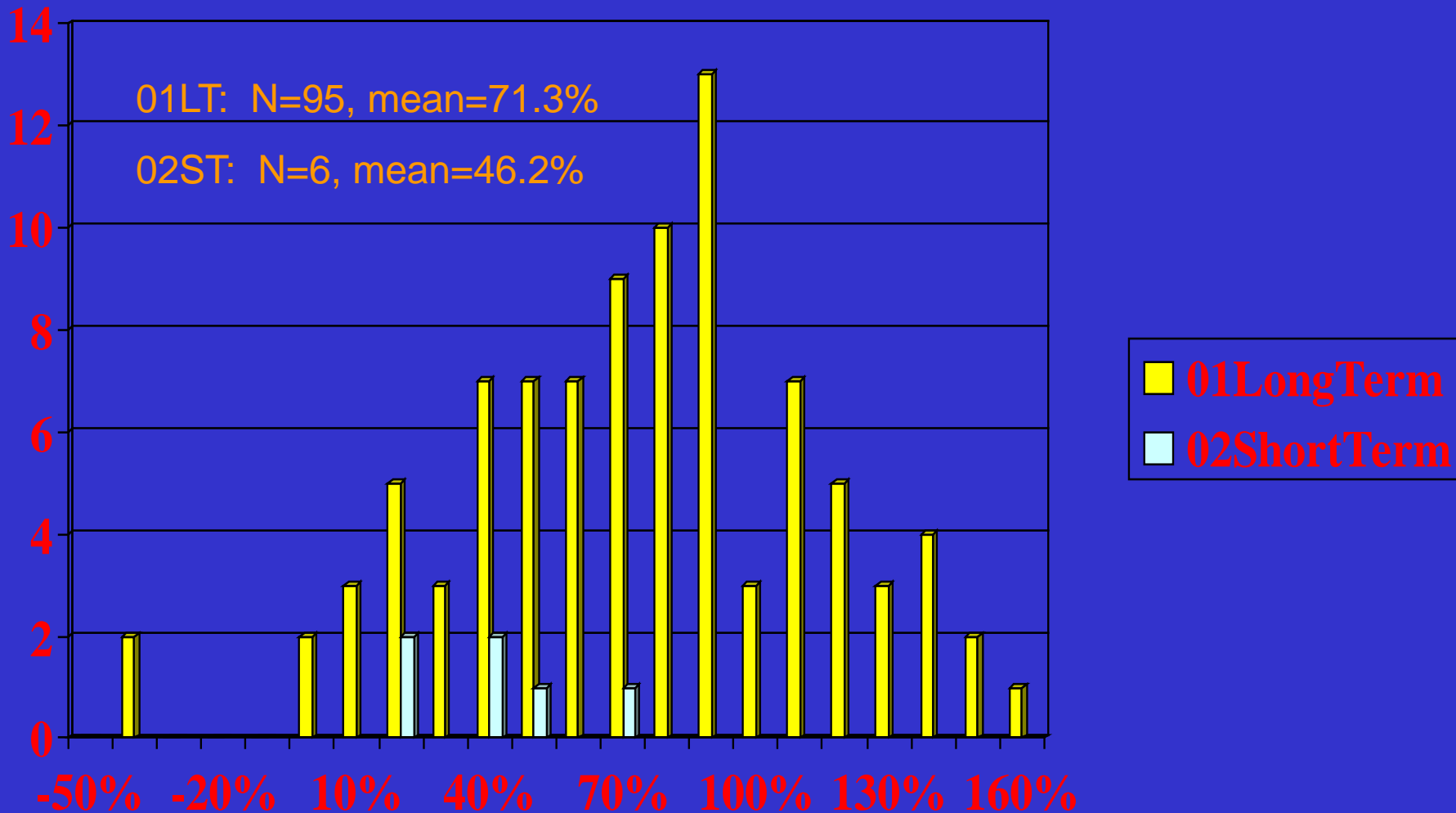




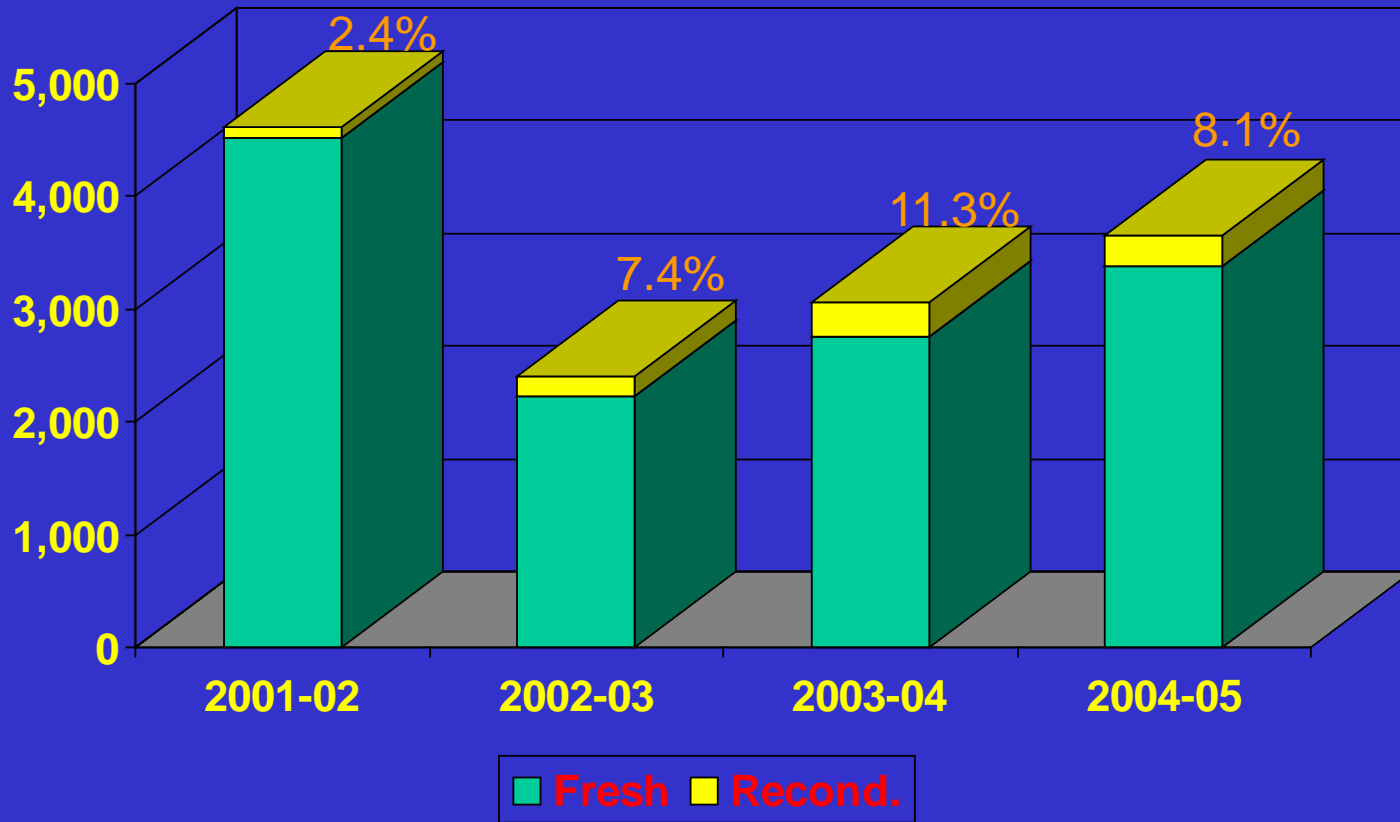
# Short- and Long-Term Survival of Reconditioned Kelts to Release



# Percent Weight Gain for Reconditioned Kelts

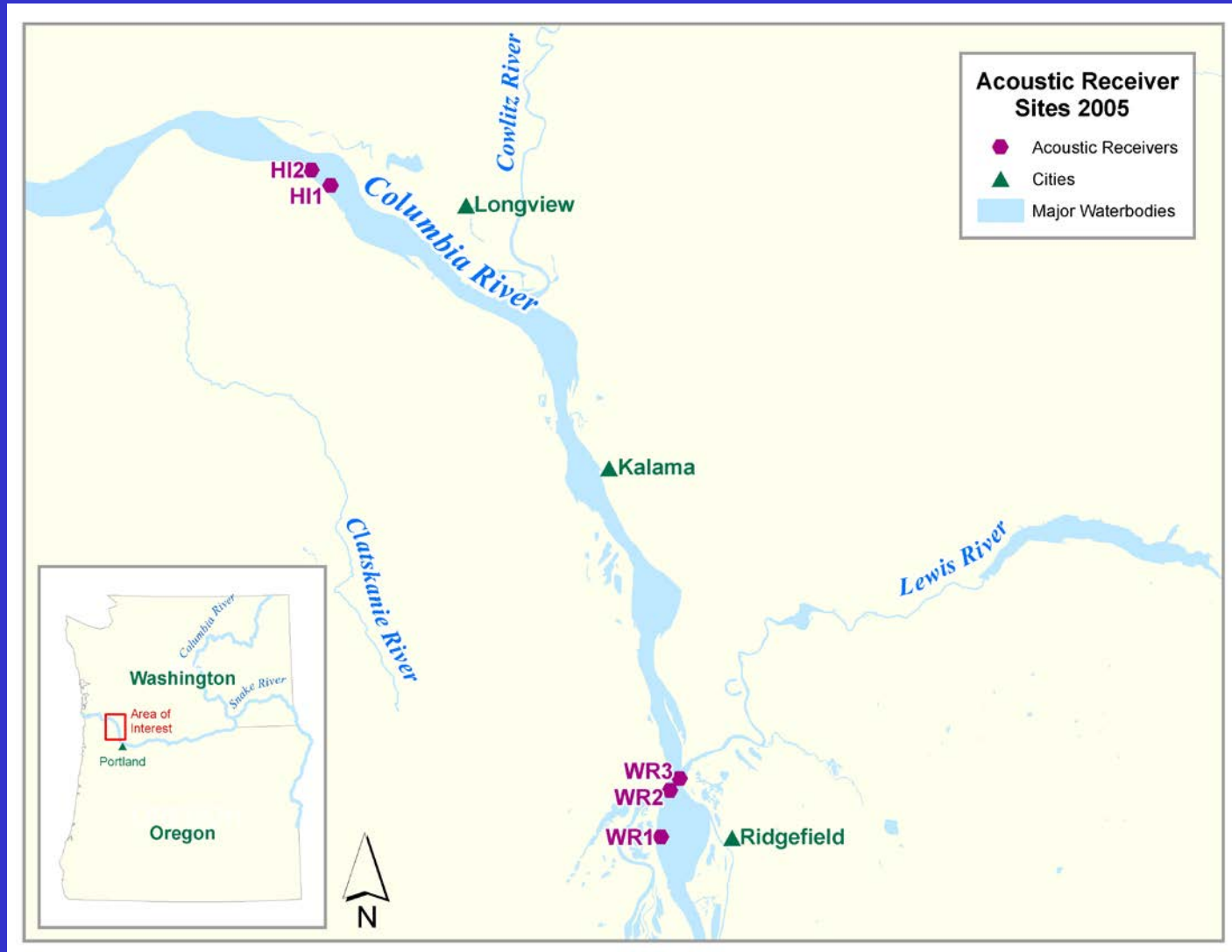


# Yakima R. Steelhead Escapement with Reconditioning

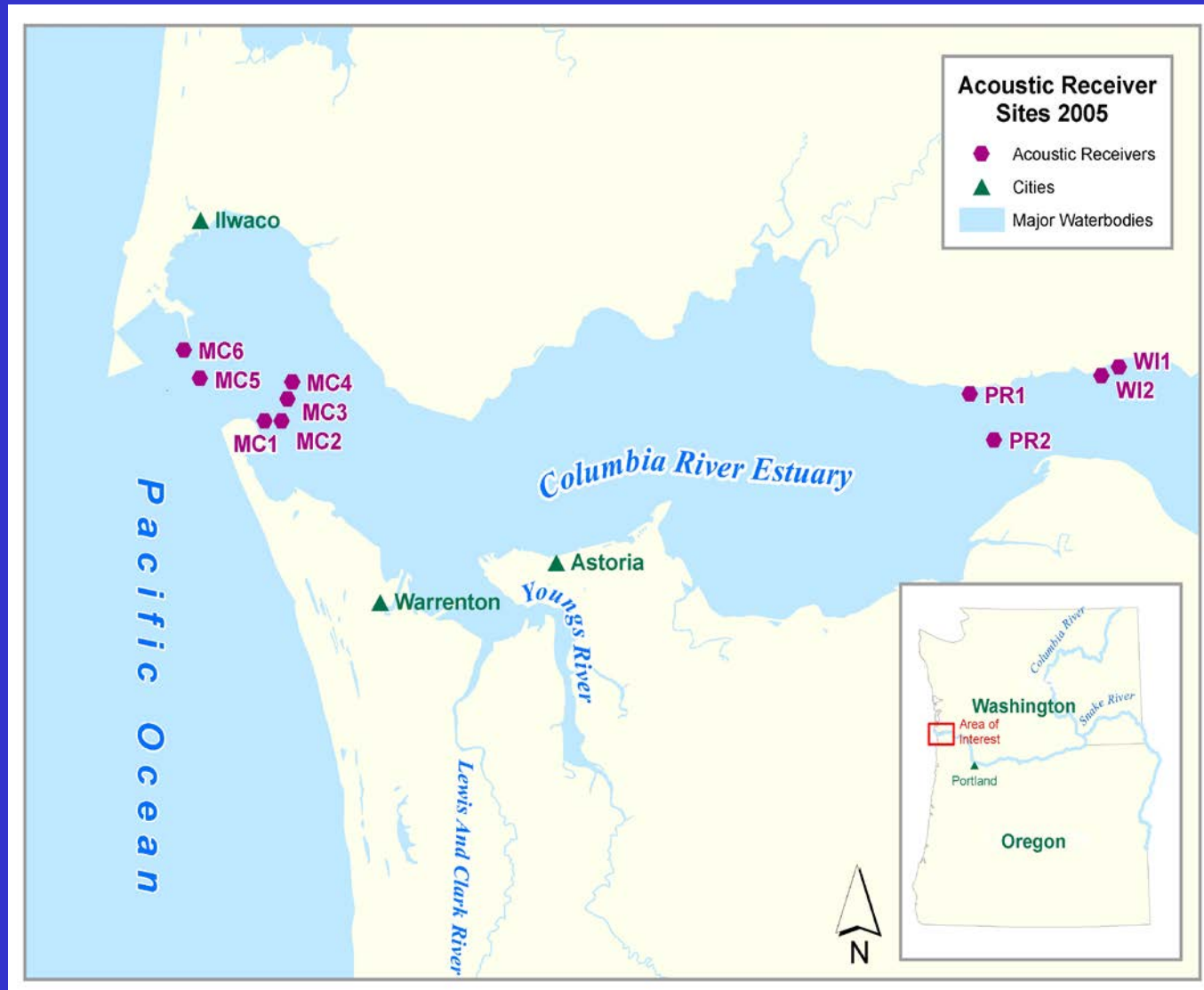


Percentage increase in escapement due to reconditioning.

# Acoustic Tracking in Lower Columbia

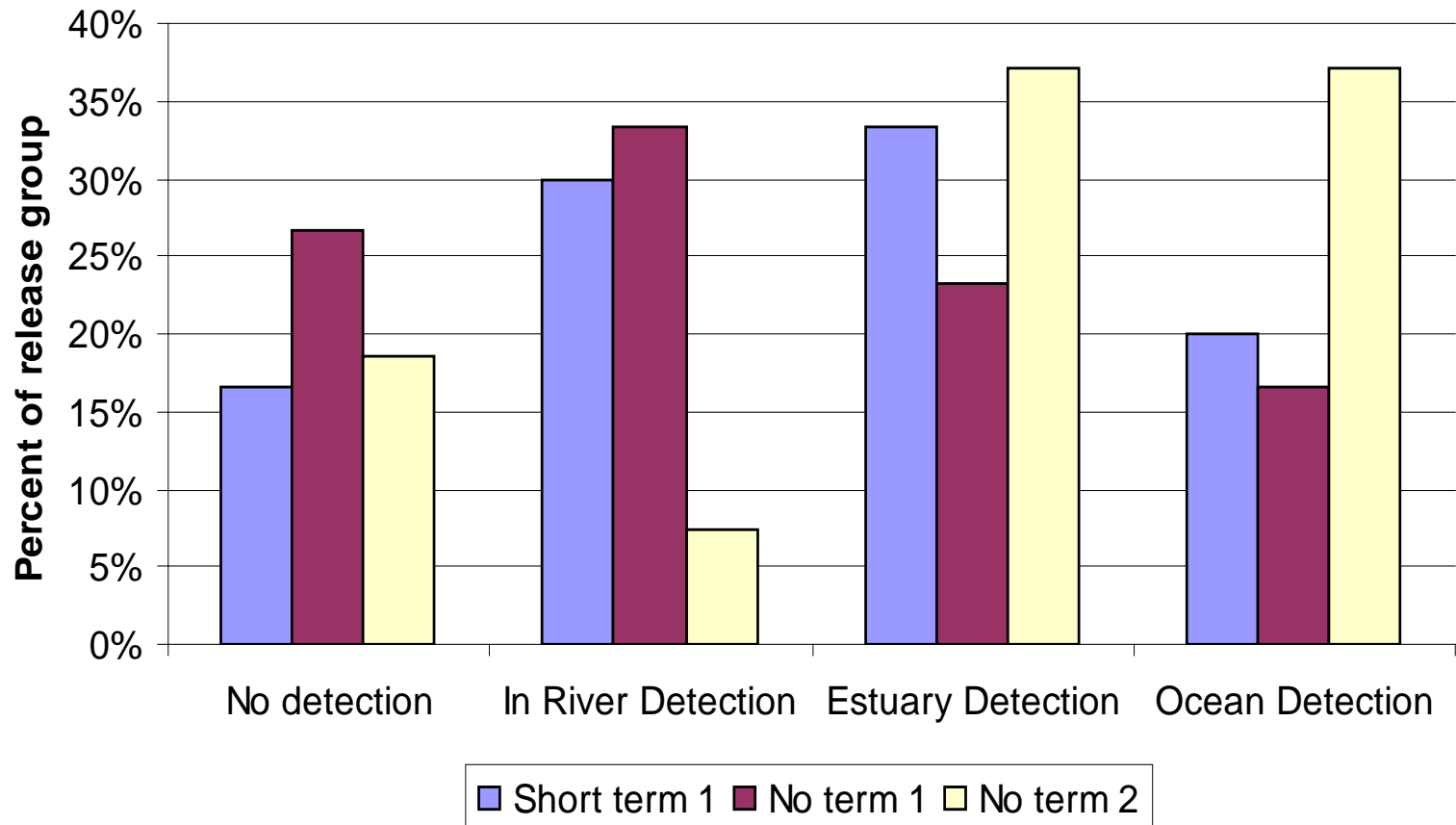


# Acoustic Tracking in Columbia Estuary



# Acoustic Detections

Location of Final Detection





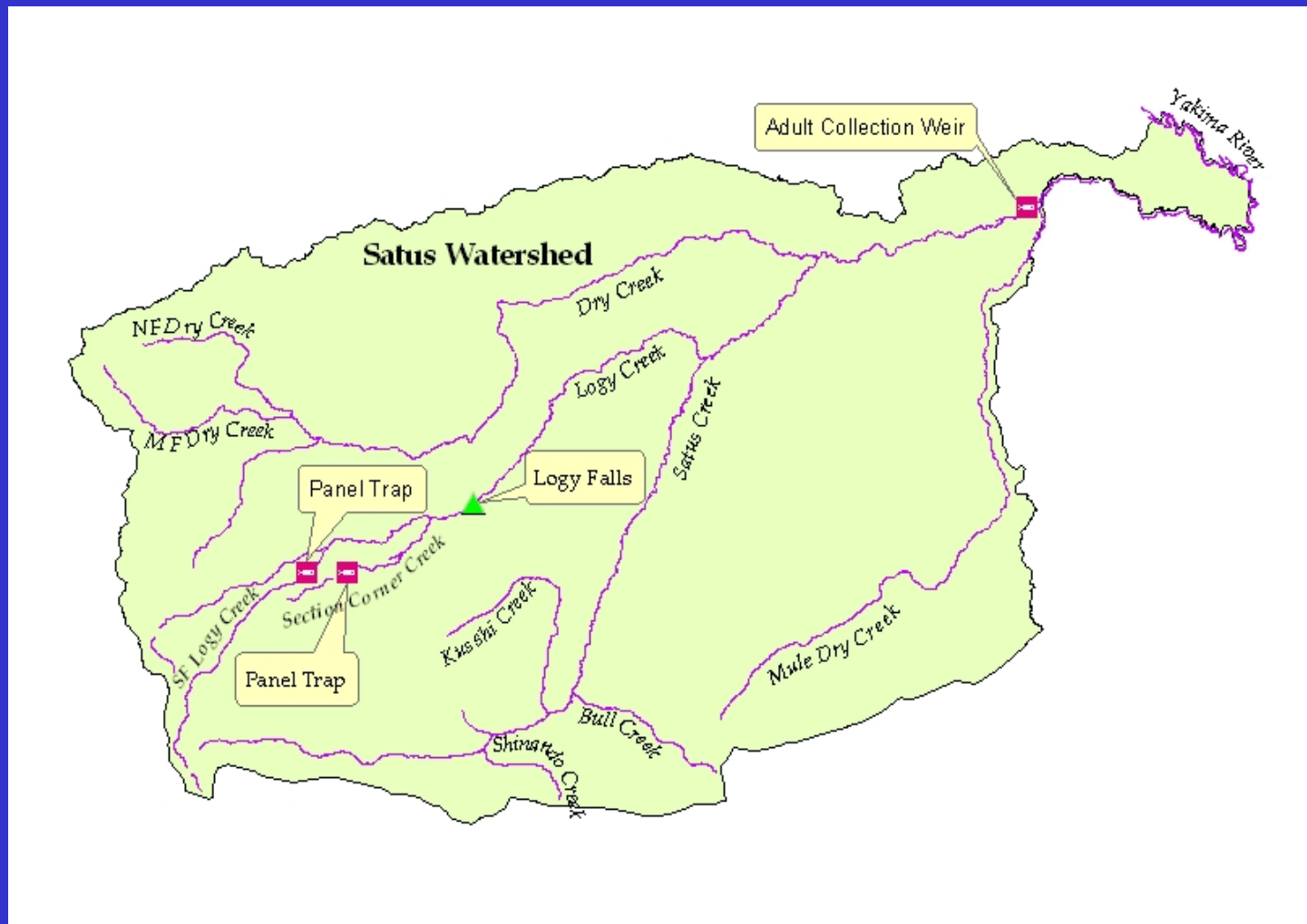




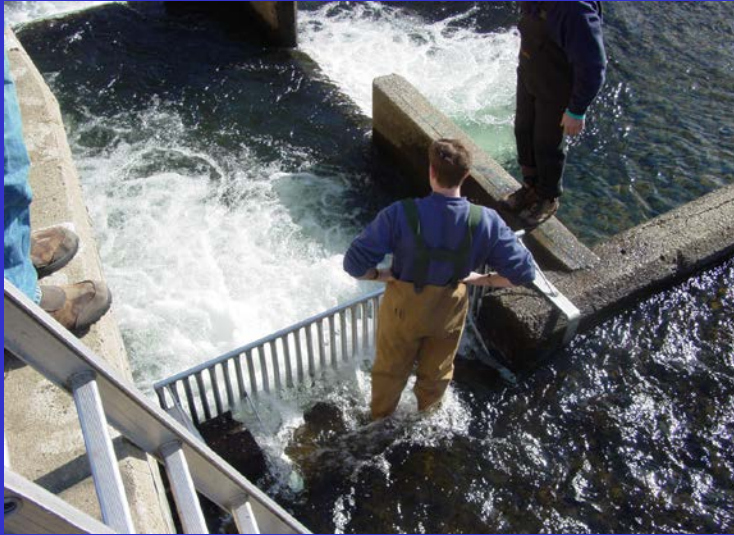
# **Evaluation of Reproductive Success of Reconditioned Kelts**

- **Two streams in Satus System**
  1. **South Section Corner**
  2. **South Fork Logy**
    - **5 female kelts, 6 maidens, 5 wild males**
- **Study areas above anadromous barriers**
- **Weirs and traps constructed January '05**
- **Fish introduced on March 10, 2005**

# Steelhead Reproductive Studies in Satus Creek Watershed



# Capturing Wild Maiden Spawners



- **Adult maiden male and female steelhead collected in trap in Lower Satus Creek**



# Tagging/ Ultrasound/DNA



- All Fish are PIT Tagged
- Females are ultrasounded to evaluate reproductive status
- DNA samples taken on all adults



# Trap Building



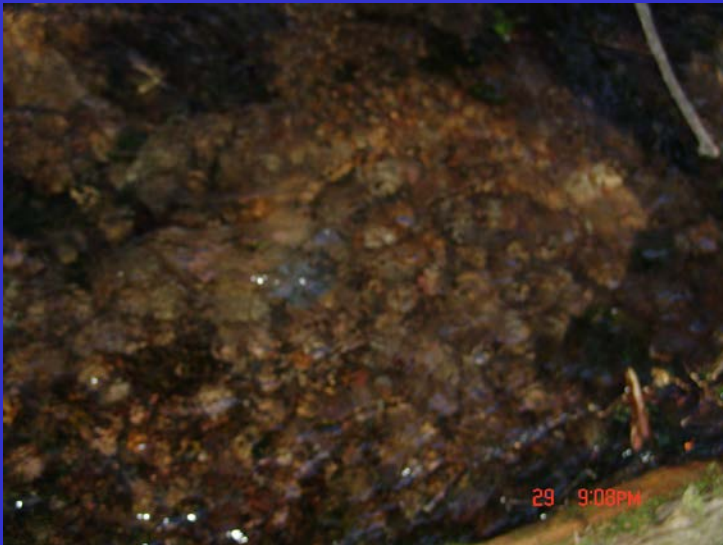
# Keeping the Trap Clean and Fish-Tight, Failures and Success



# Hauling Fish into the Experimental Areas



# Spawning is Initiated almost Immediately





# Spawning Surveys



- **Redd Surveys in both streams**
- **12 Redds in South Section Corner**
- **1 Redd in South Logy – trap blew out April 24, fish may have escaped.**



# Recapture of Maidens and Kelts



- Spawned out fish were collected in traps and transported back to Prosser Kelt Reconditioning Facility



# 600 TU's Later





# The End

- **QUESTIONS???**
- **COMMENTS?**
- **SUGGESTIONS!!!**

# Kelt Pictures Before and After



# Steelhead Kelt Feed Analysis

Tank/Feed	Fish Reconditioned and Released*
C1 SFDK/MC	36 (37.9%)
C2 YAKAMA	20 (21.1%)
C3 SFDK/MC	28 (29.5%)
C4 FR KRILL	11 (11.6%)

\* Total of 95 released

# Number of Steelhead Collected, Surviving, and Maturing in Each Food Treatment Tank

