

# 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)

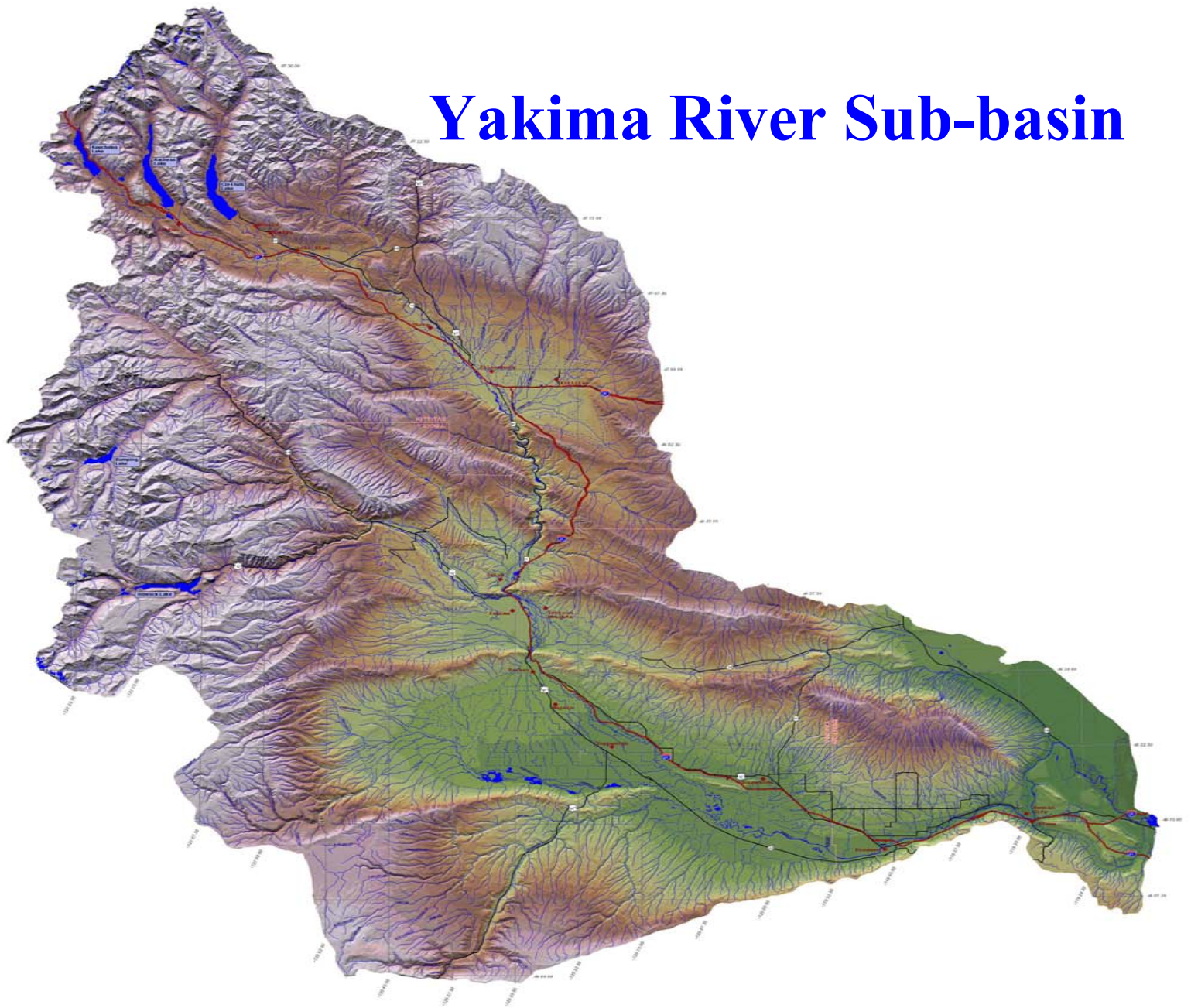
National Marine Fisheries Service  
(NMFS)

University of Idaho

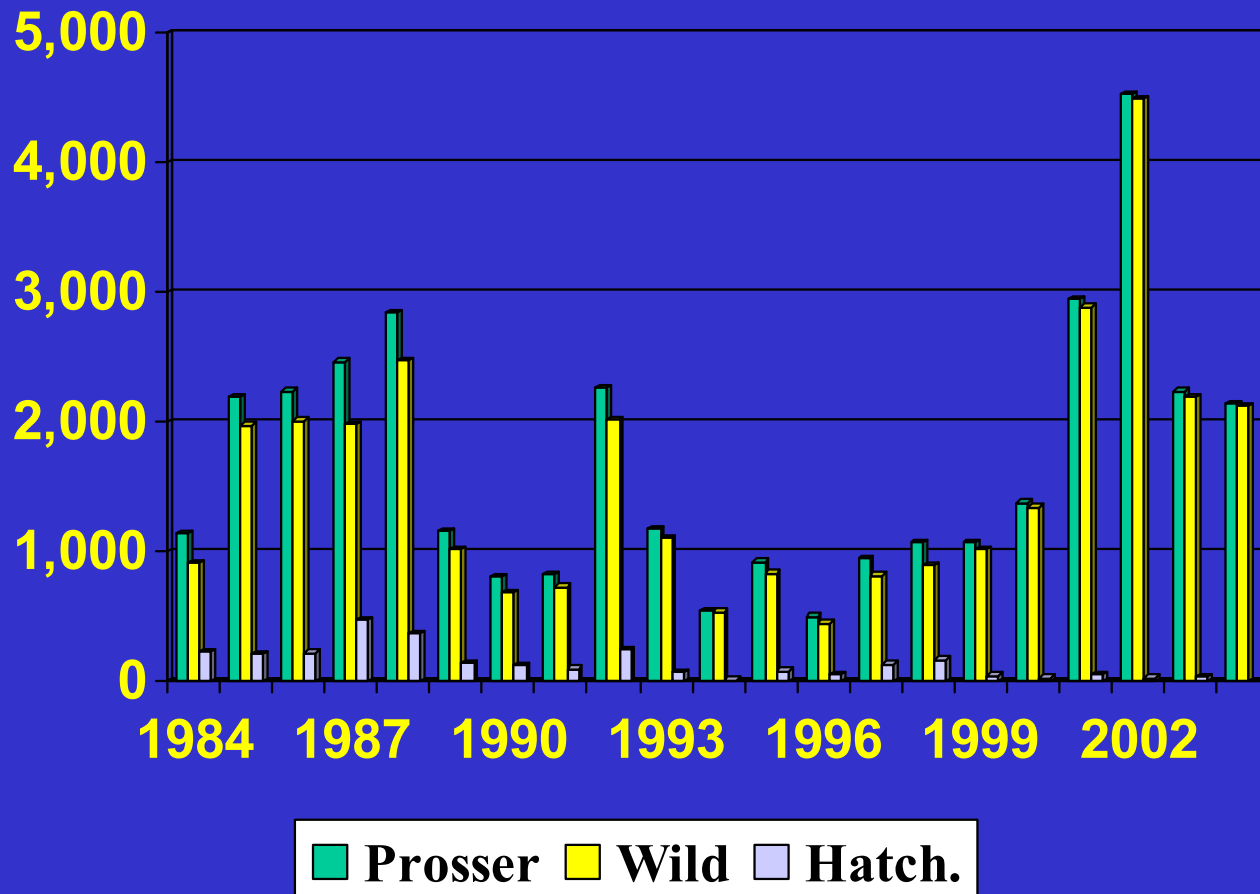
# Natural Life History of Steelhead (*Oncorhynchus mykiss*)

- 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



# 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.”

# Methods

- Area and facility
- Kelt collection and processing
- Feeding and treatment
- Mortalities
- Maturation assessment and release for spawning









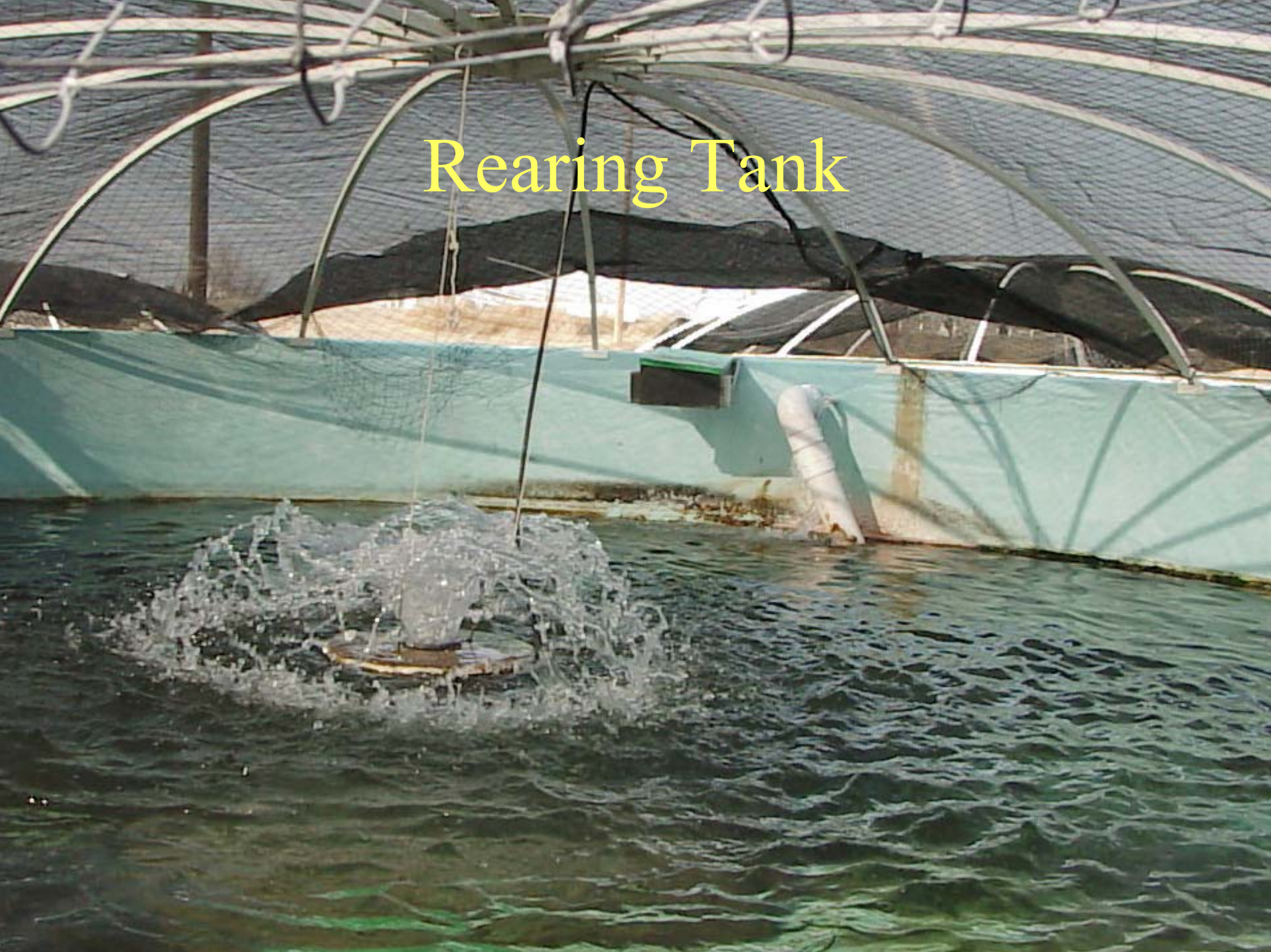


# Steelhead Reconditioning Area





# Rearing Tank





# Juvenile Fish Separator

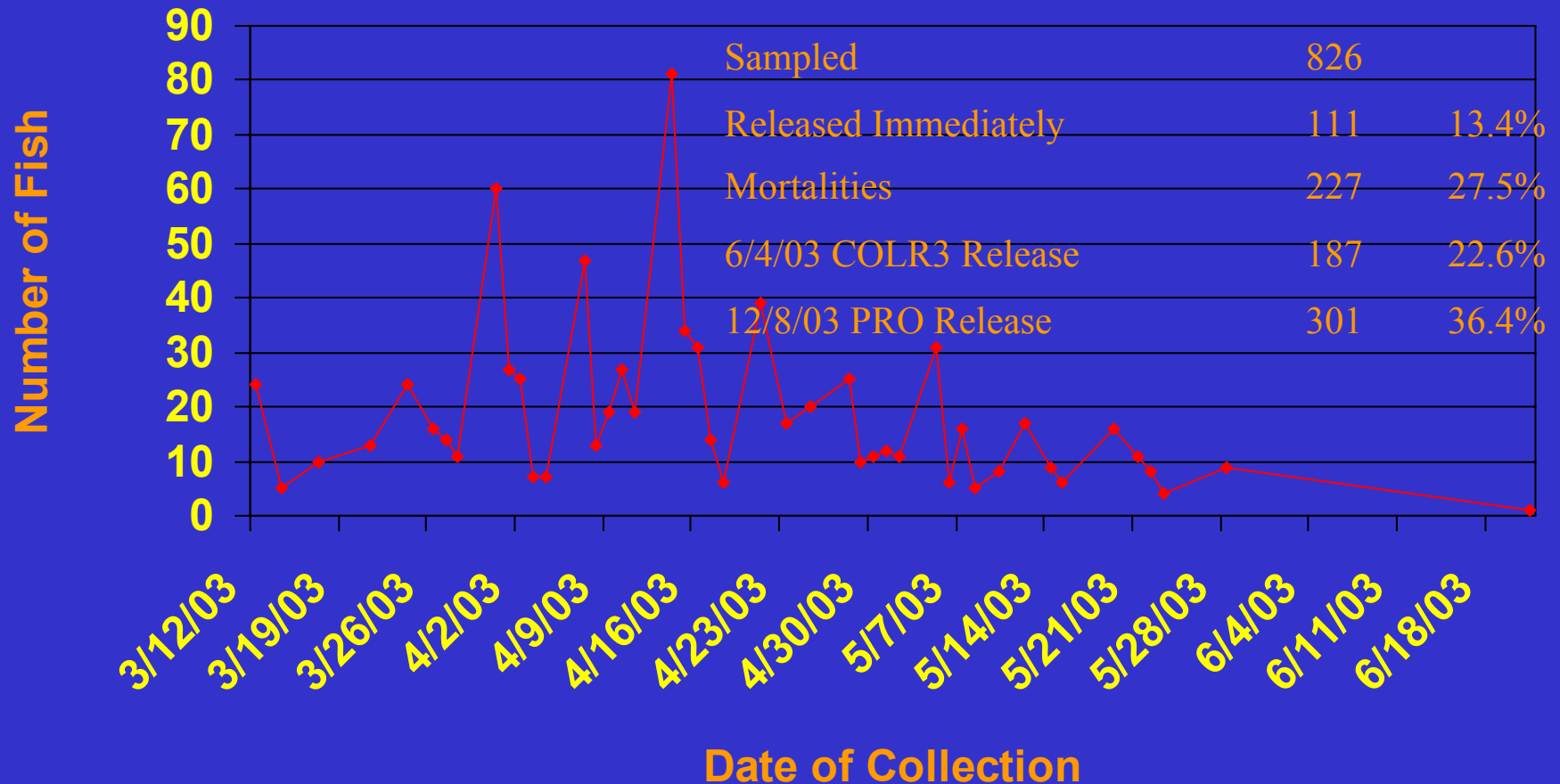








# Chandler Kelt Collection, 2003







# 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







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





# Mortalities









# Maturation Assessment and Release for Spawning





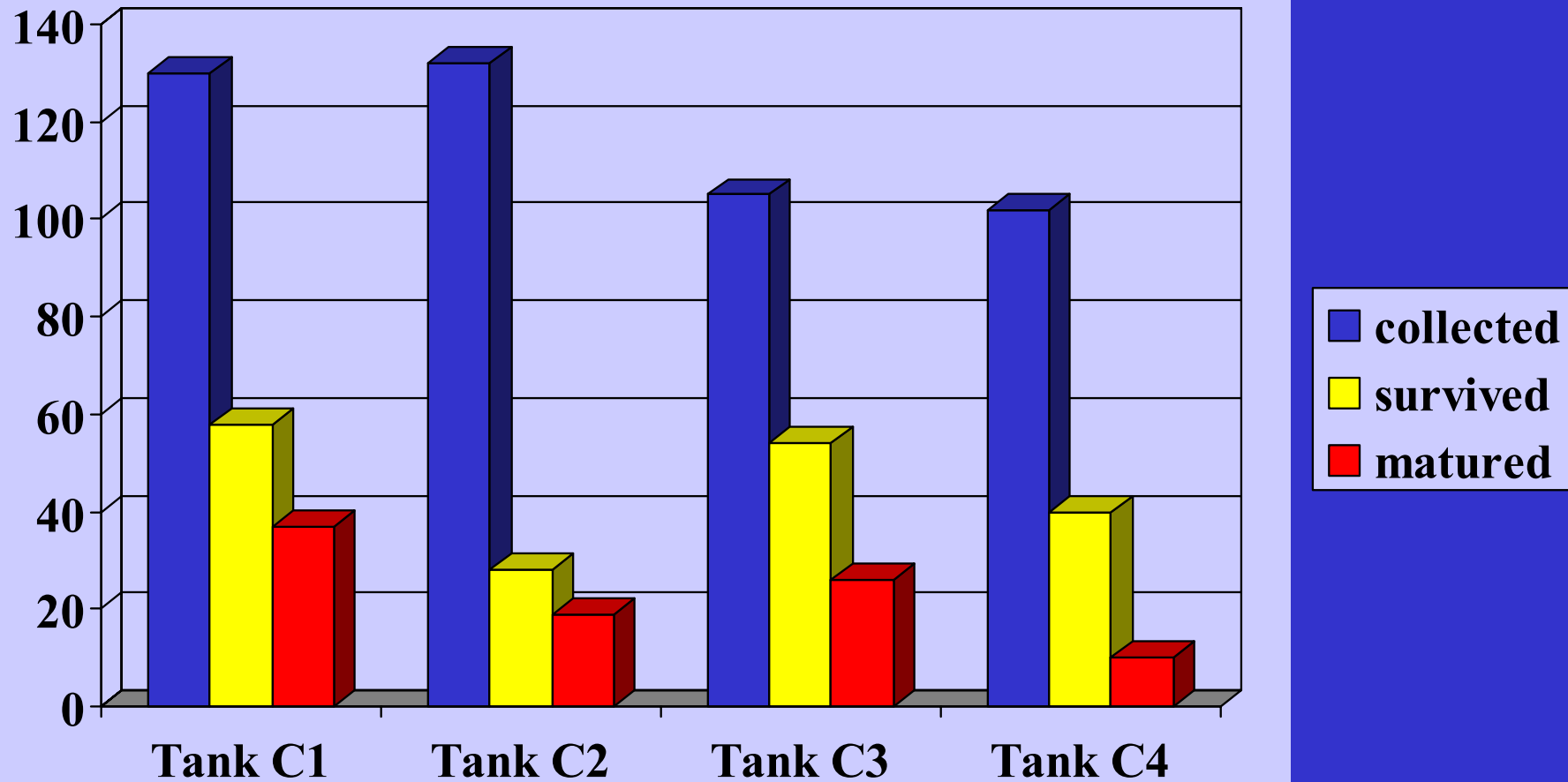


# Steelhead Kelt Feed Analysis

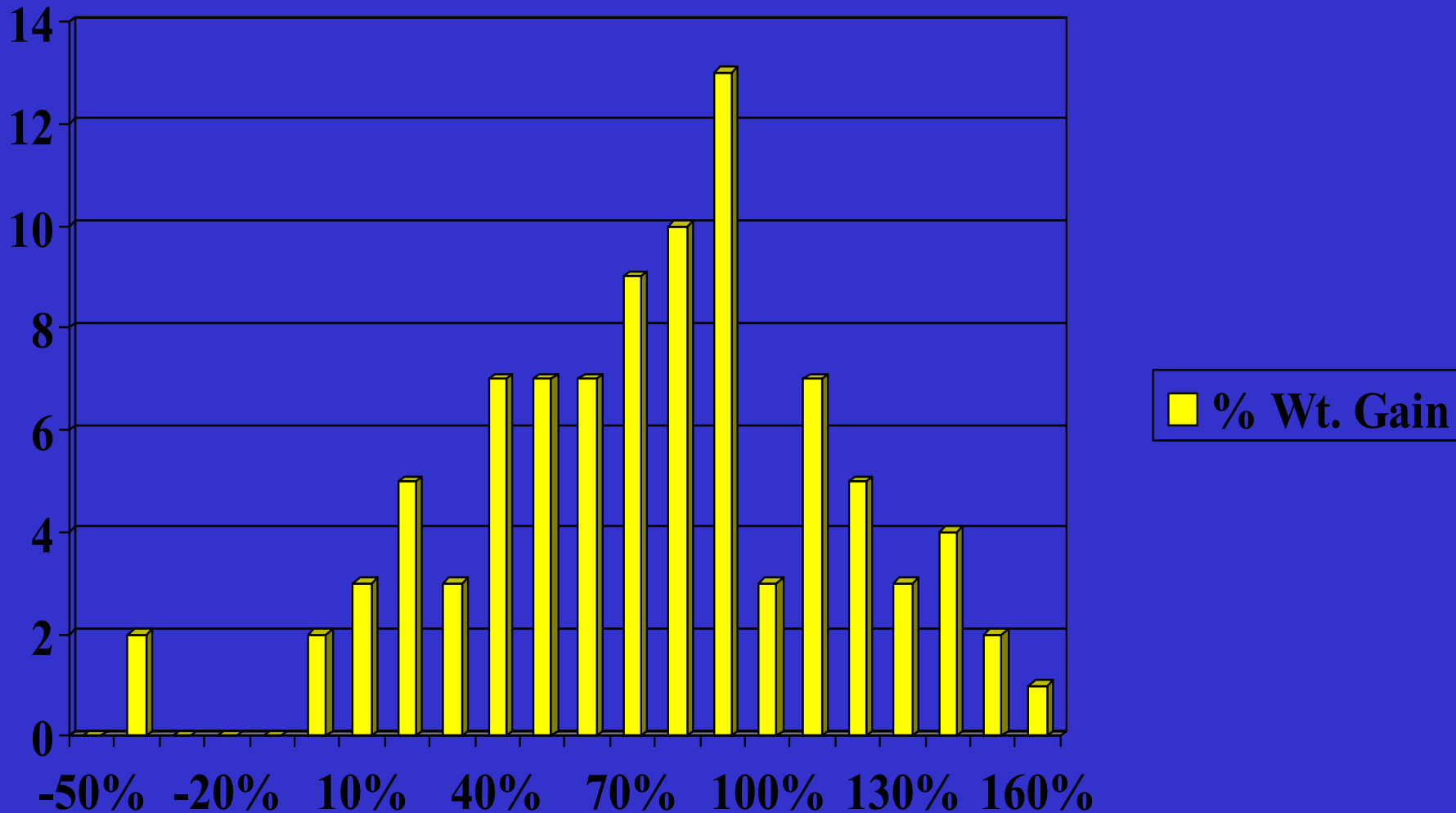
Tank/Feed		Fish Reconditioned and Released*
C1	SFDK/MC	36 (37.9%)
C2	YAKAMA	20 (21.1%)
C3	SFDK/MC	28 (29.5%)
C4	FR KRILL	11 (11.6%)

\* Total of 95 released

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



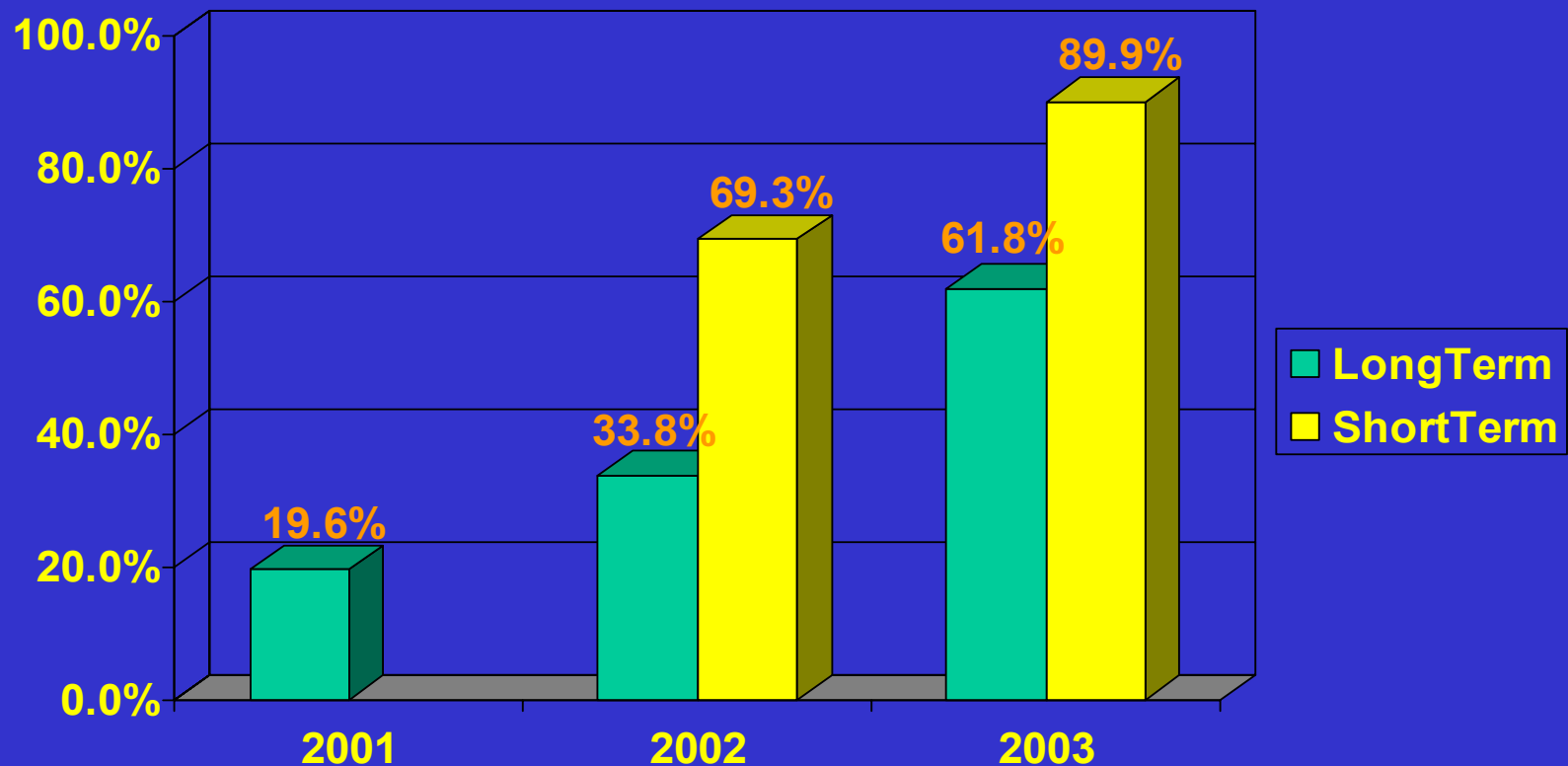
# Percent Weight Gain for Reconditioned Kelts 2001



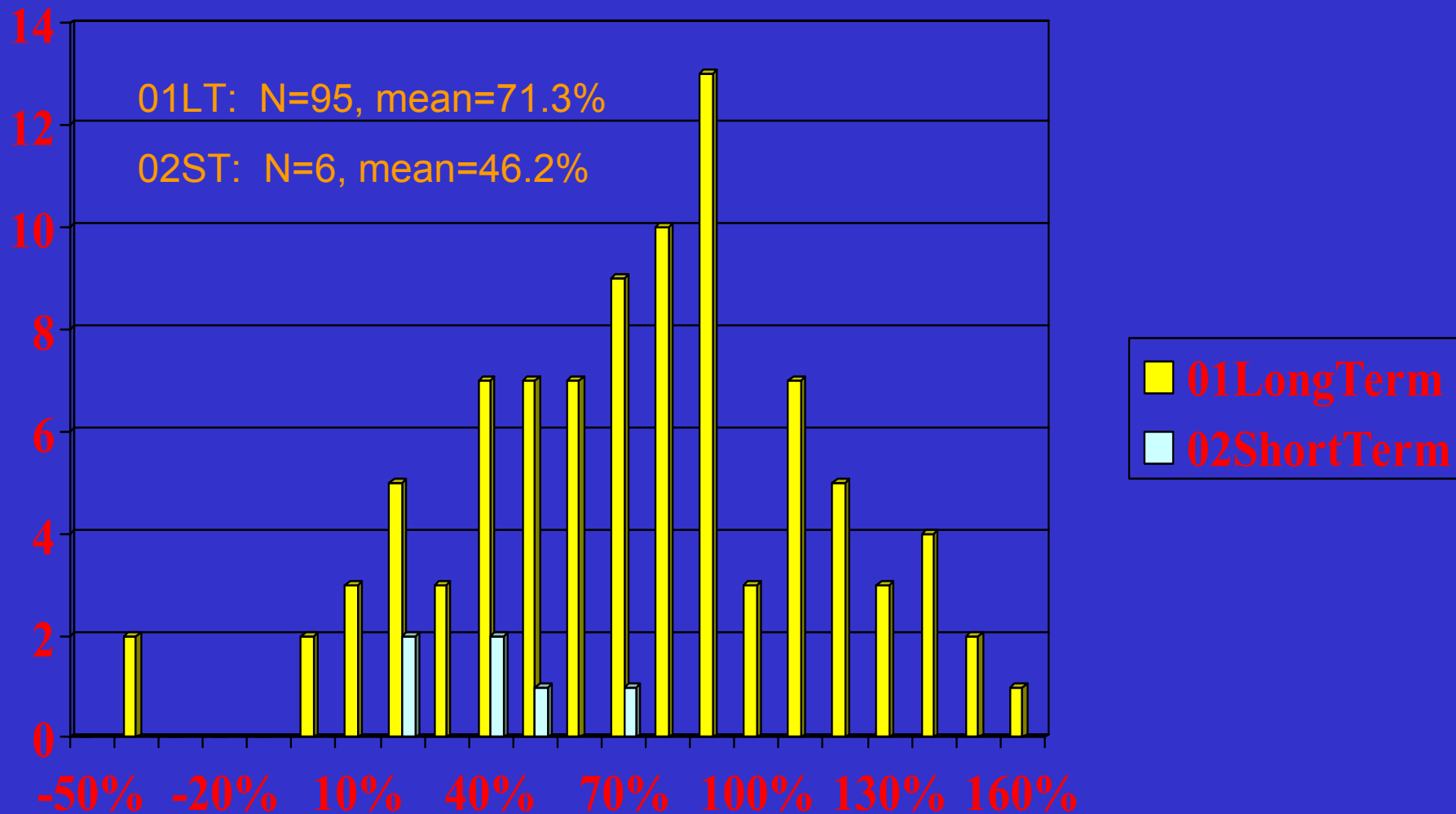
## Short-Term Kelt Reconditioning

- **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- and Long-Term Survival of Reconditioned Kelts to Release

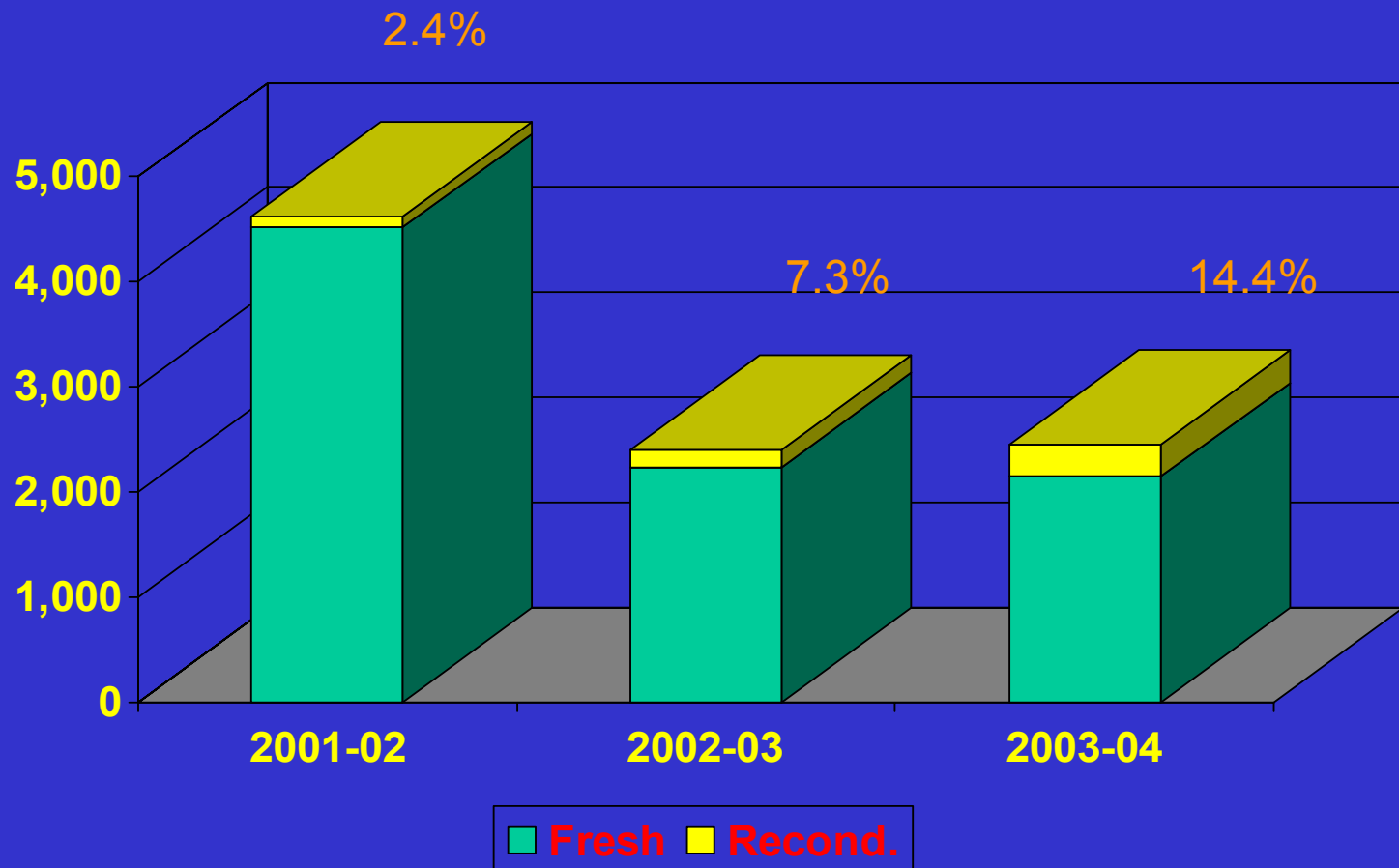


# Percent Weight Gain for Reconditioned Kelts



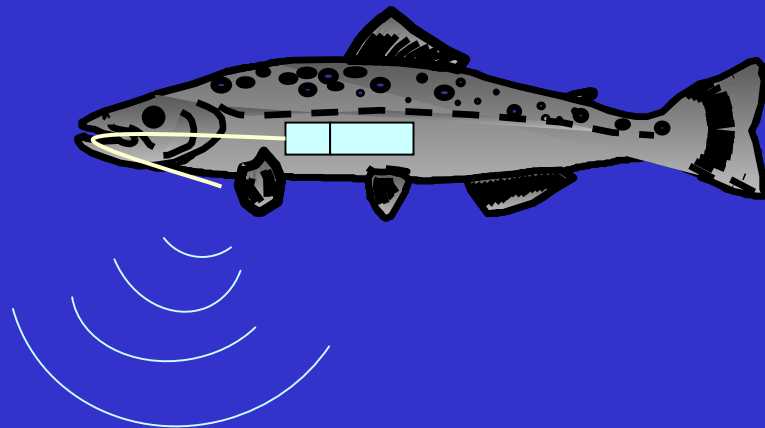


# Yakima R. Steelhead Escapement with Reconditioning



Percentage increase in escapement due to reconditioning.

# Spawning Distribution of Reconditioned Steelhead Kelts Yakima River 2001-2002





# Yakima Basin

0 10 20  
km

## KEY

- Diversion Dam
- City
- Acclimation Site
- ✦ Telemetry Site

