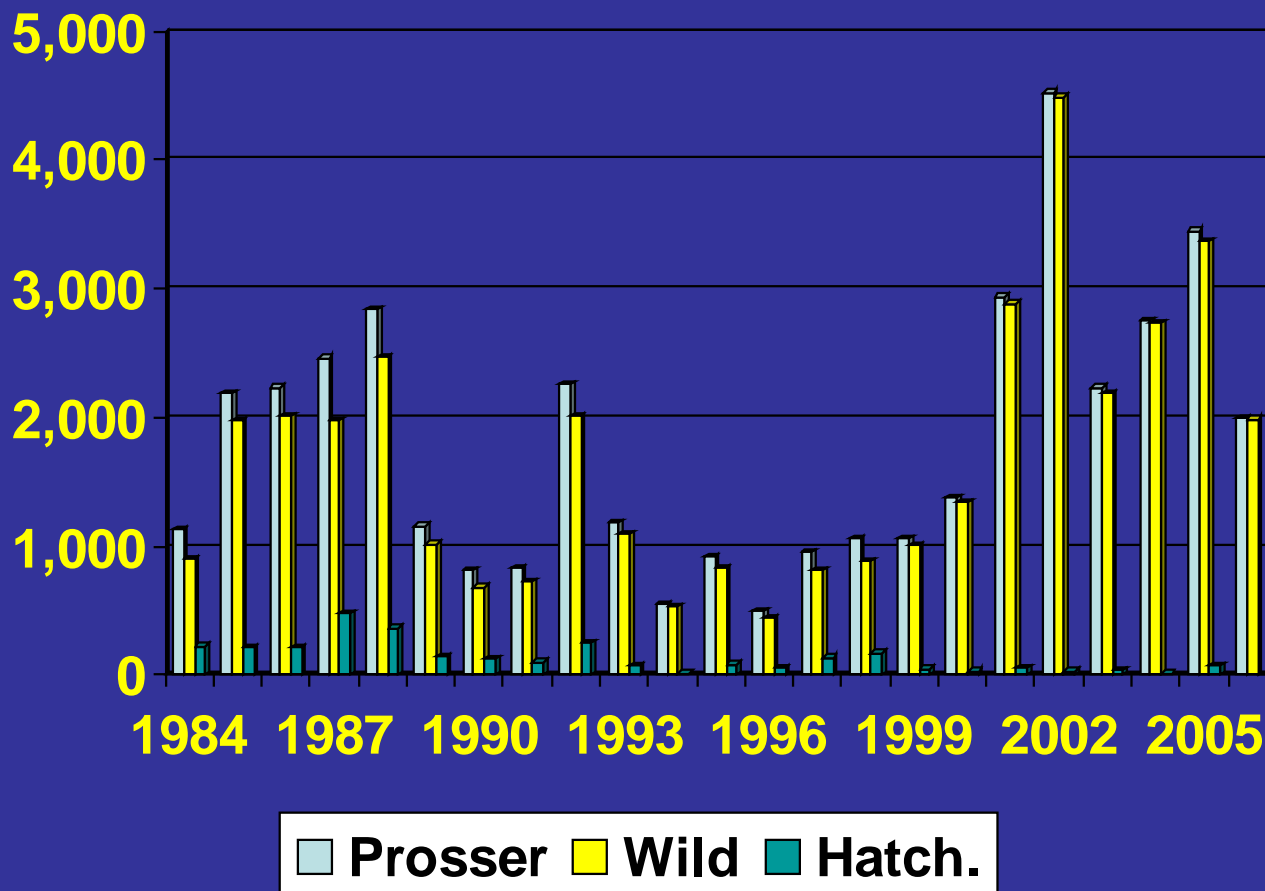


Evaluating the use of Kelt Reconditioning to Rebuild Steelhead Populations in the Yakima River, Washington

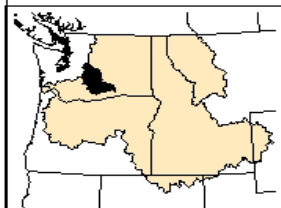
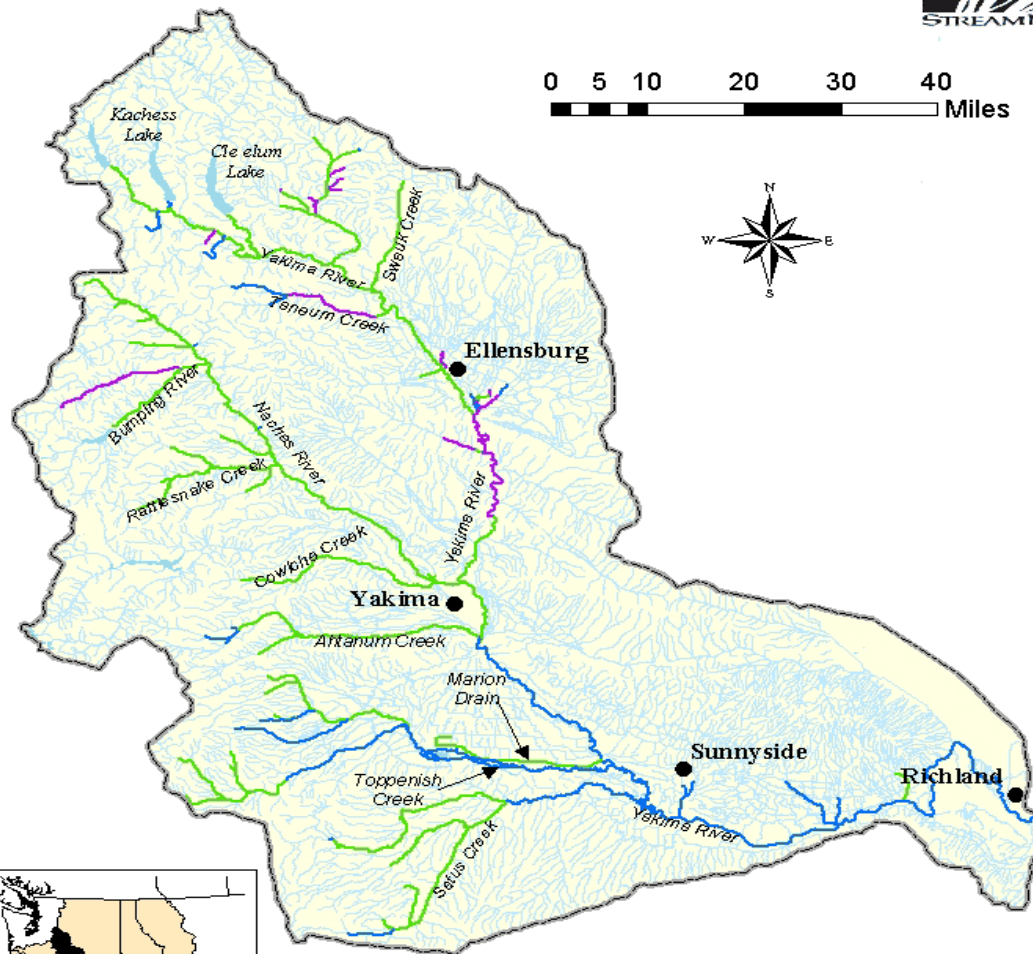
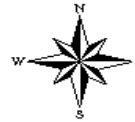
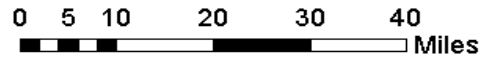
David E. Fast, Douglas R. Hatch, Joseph W. Blodgett,
Todd H. Newsome, Mark V. Johnston, Ryan Branstetter,
and William J. Bosch



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

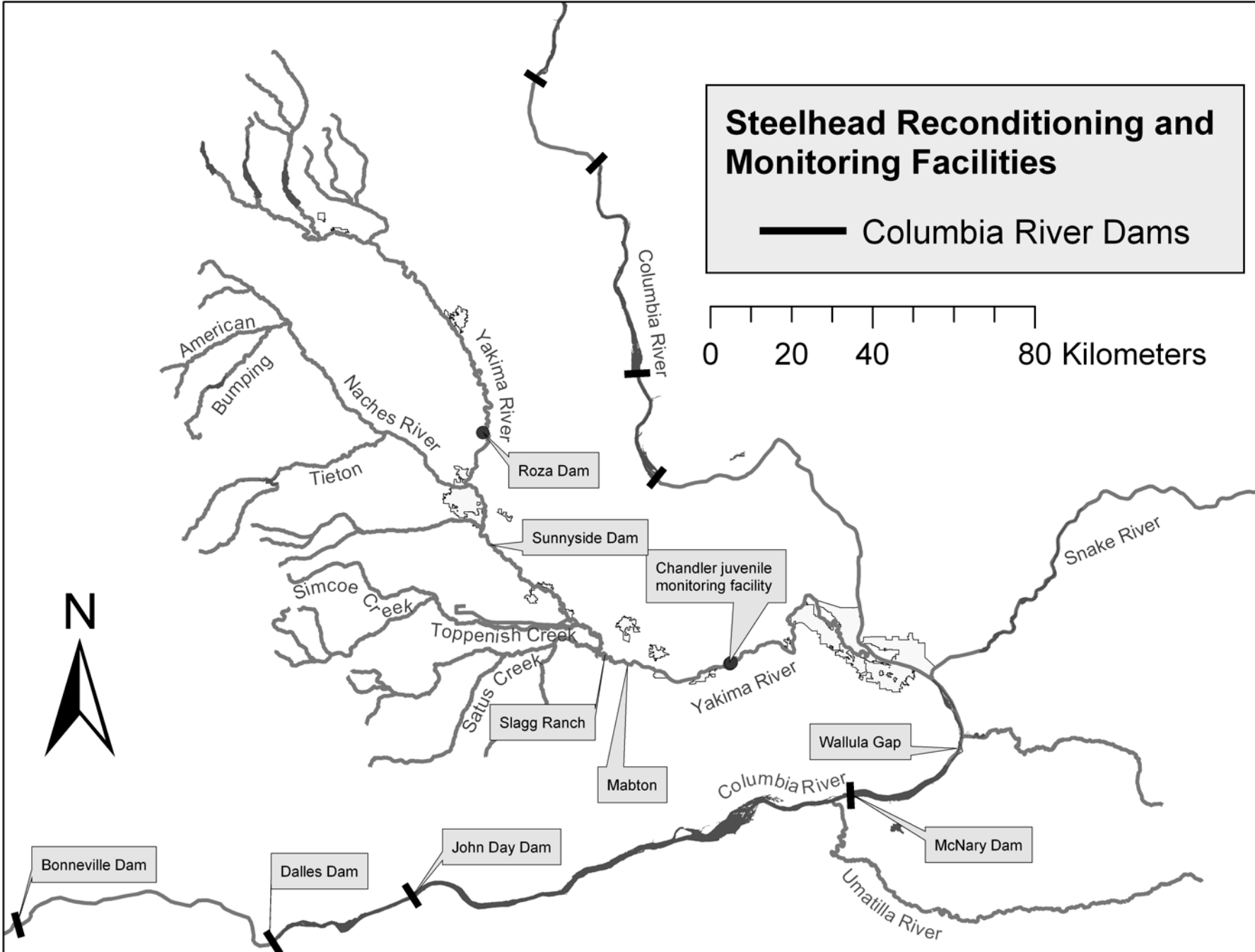
Natural Life History of Steelhead (*Oncorhynchus mykiss*)

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

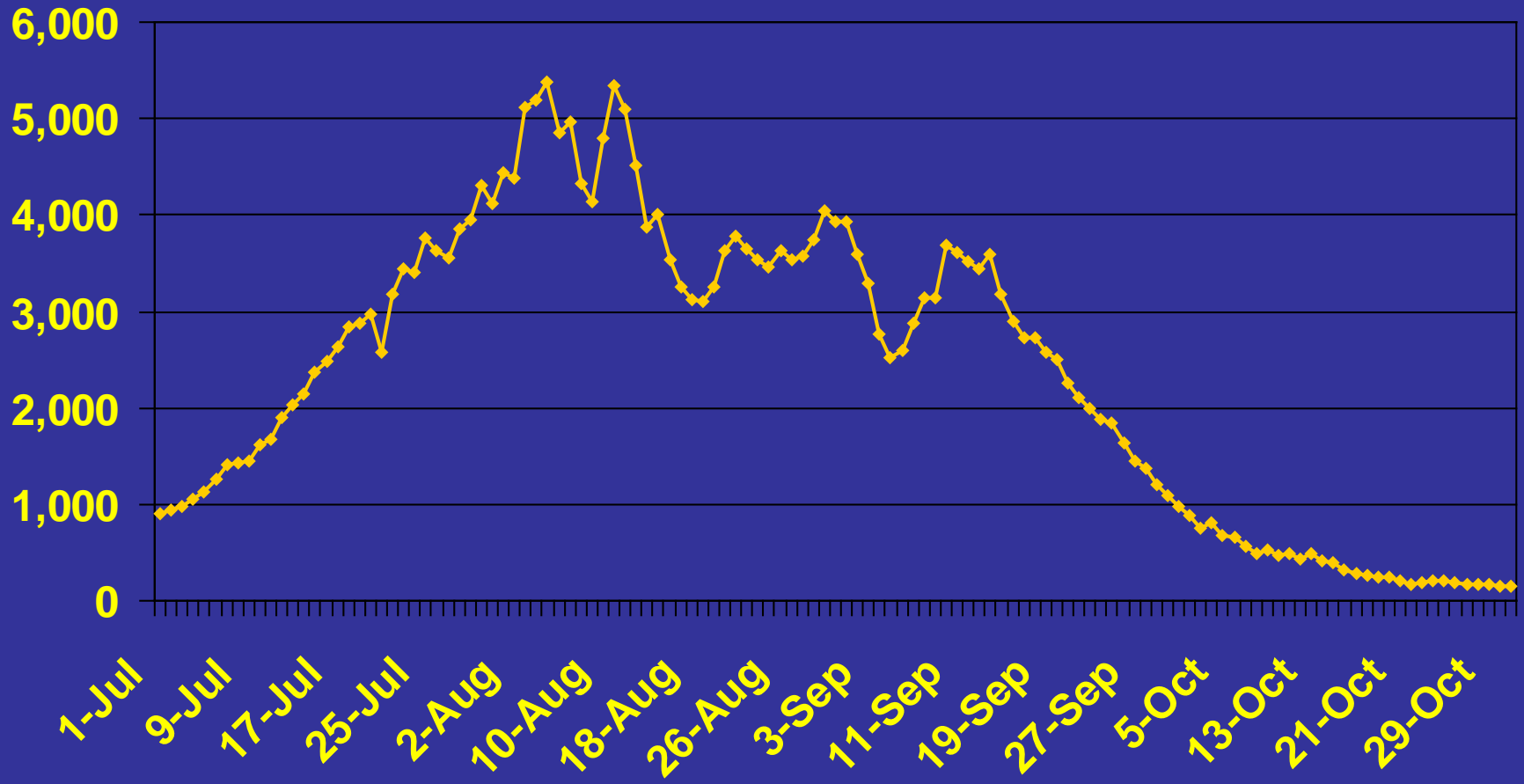
Steelhead Reconditioning and Monitoring Facilities

— Columbia River Dams

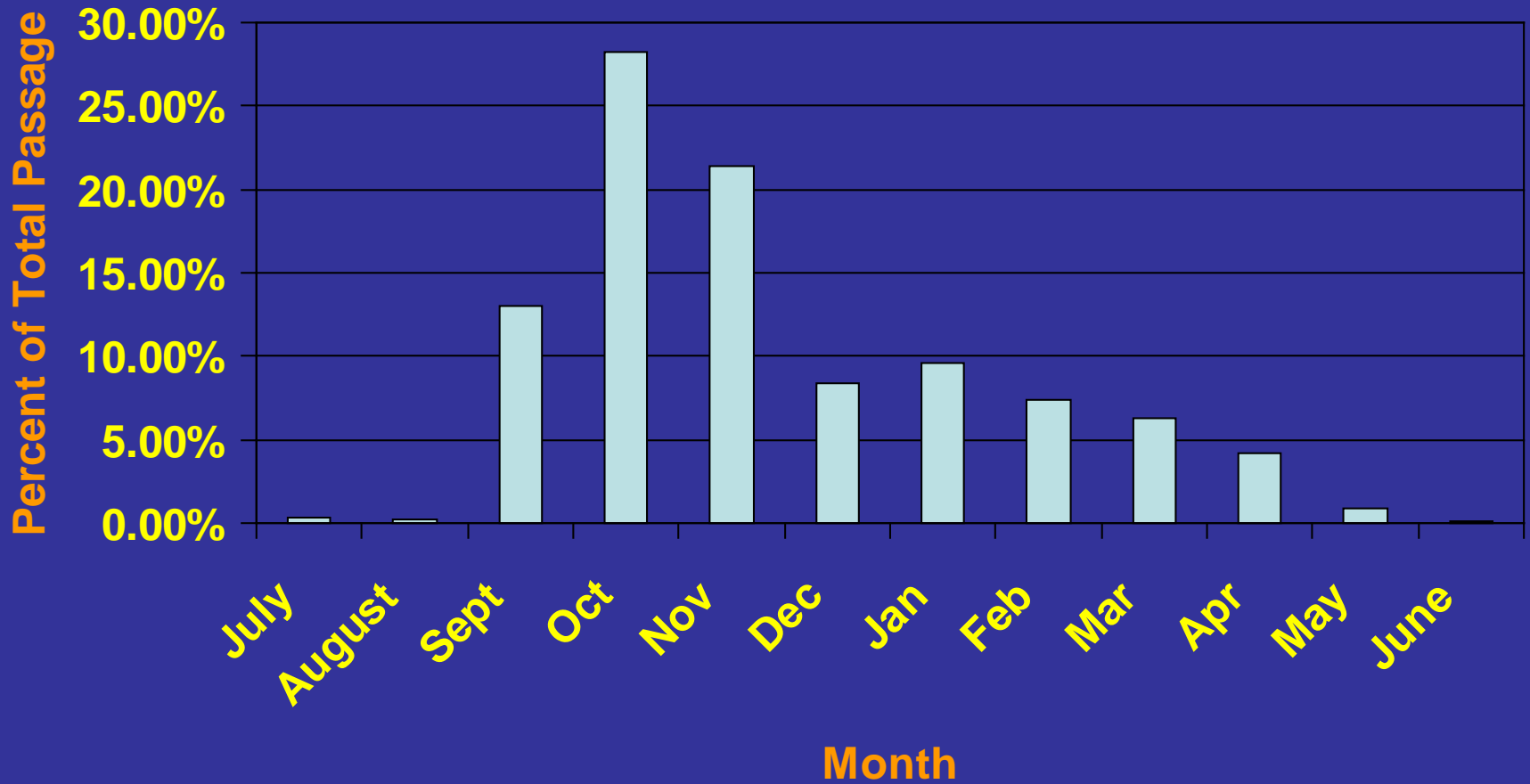
0 20 40 80 Kilometers



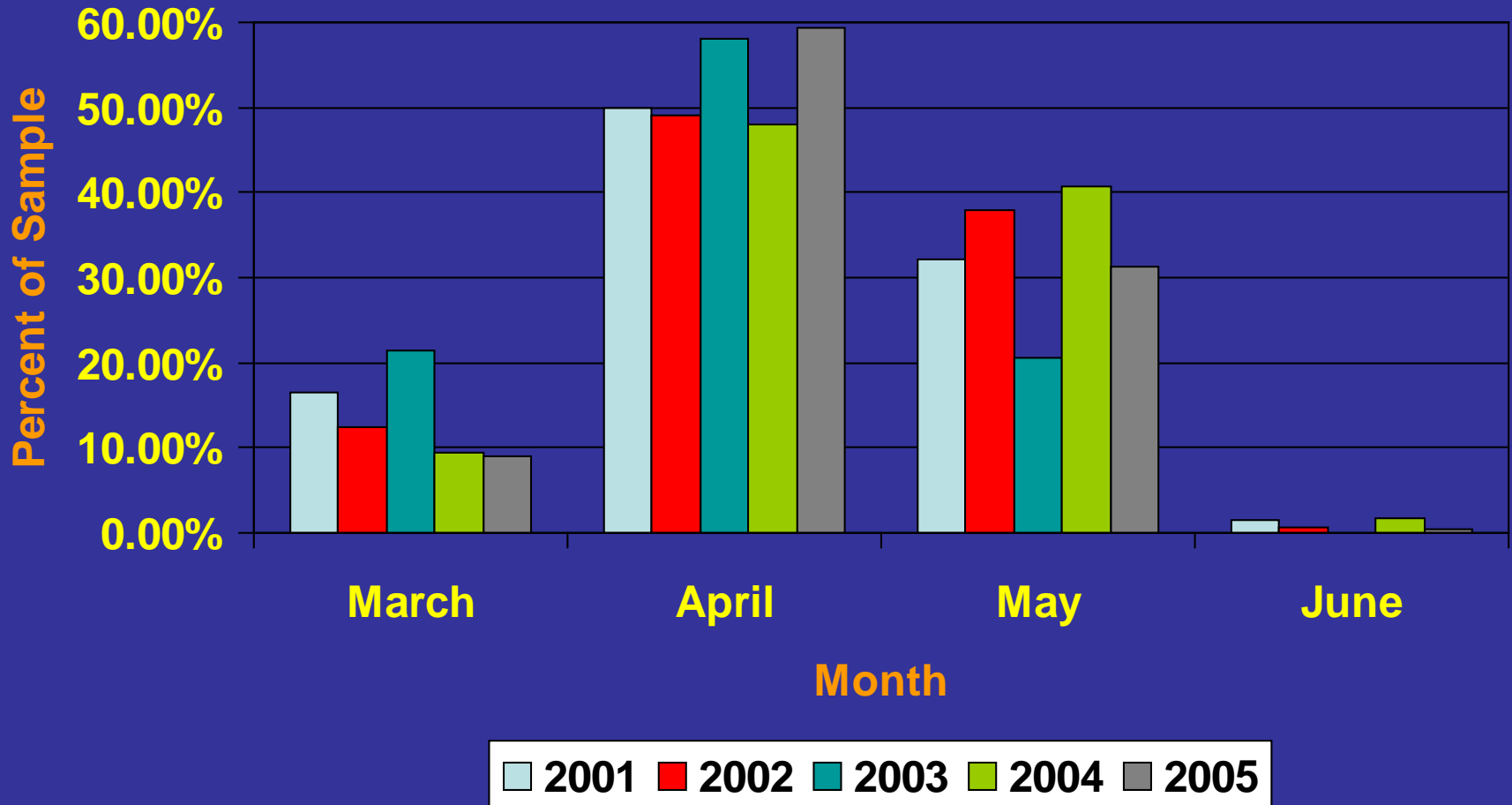
Summer Steelhead Passage Timing at Bonneville Dam



Average Upstream Passage Timing at Prosser Dam



Chandler Kelt Collection, 2001-05







Juvenile Fish Separator







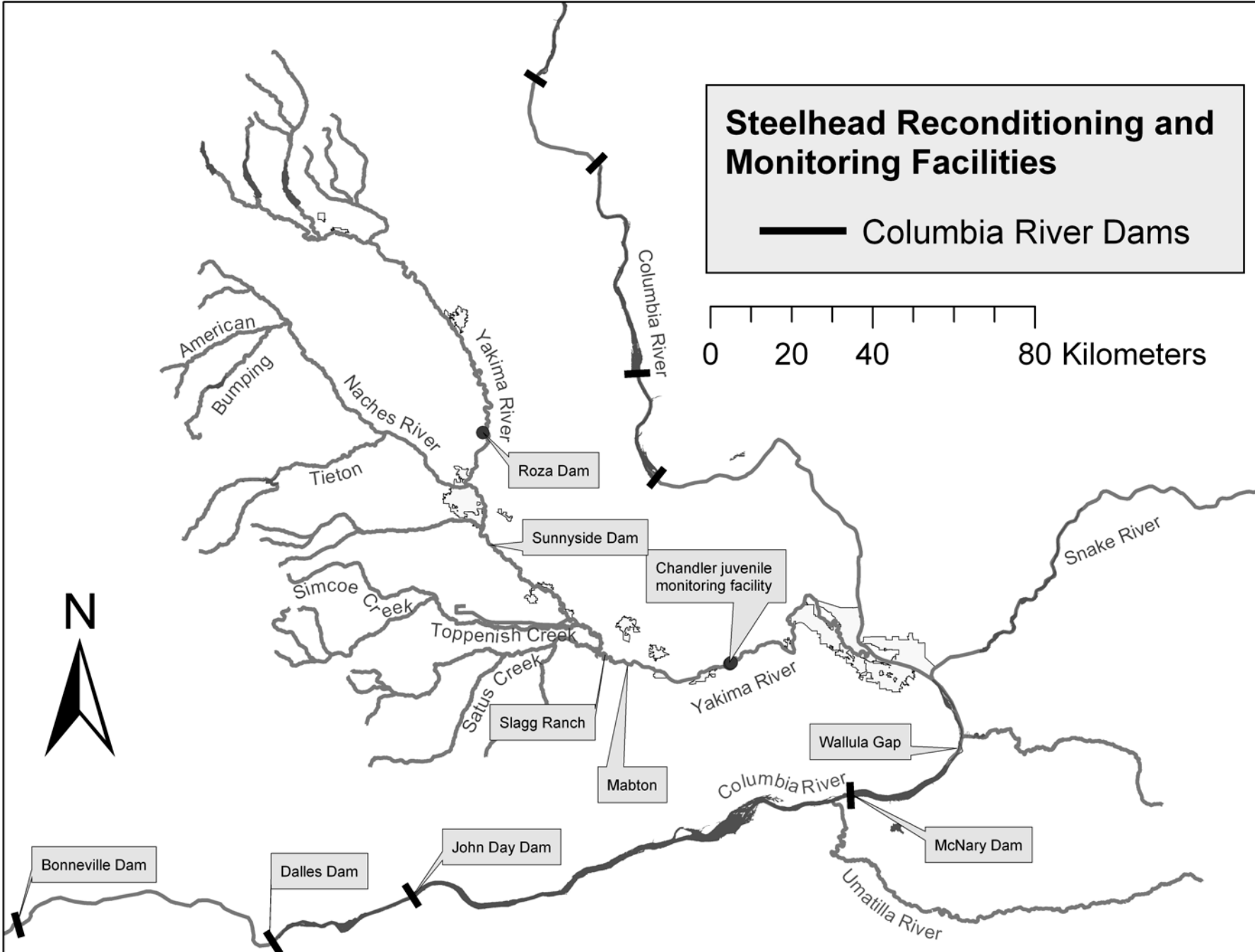
Steelhead Reconditioning Area



Steelhead Reconditioning and Monitoring Facilities

— Columbia River Dams

0 20 40 80 Kilometers



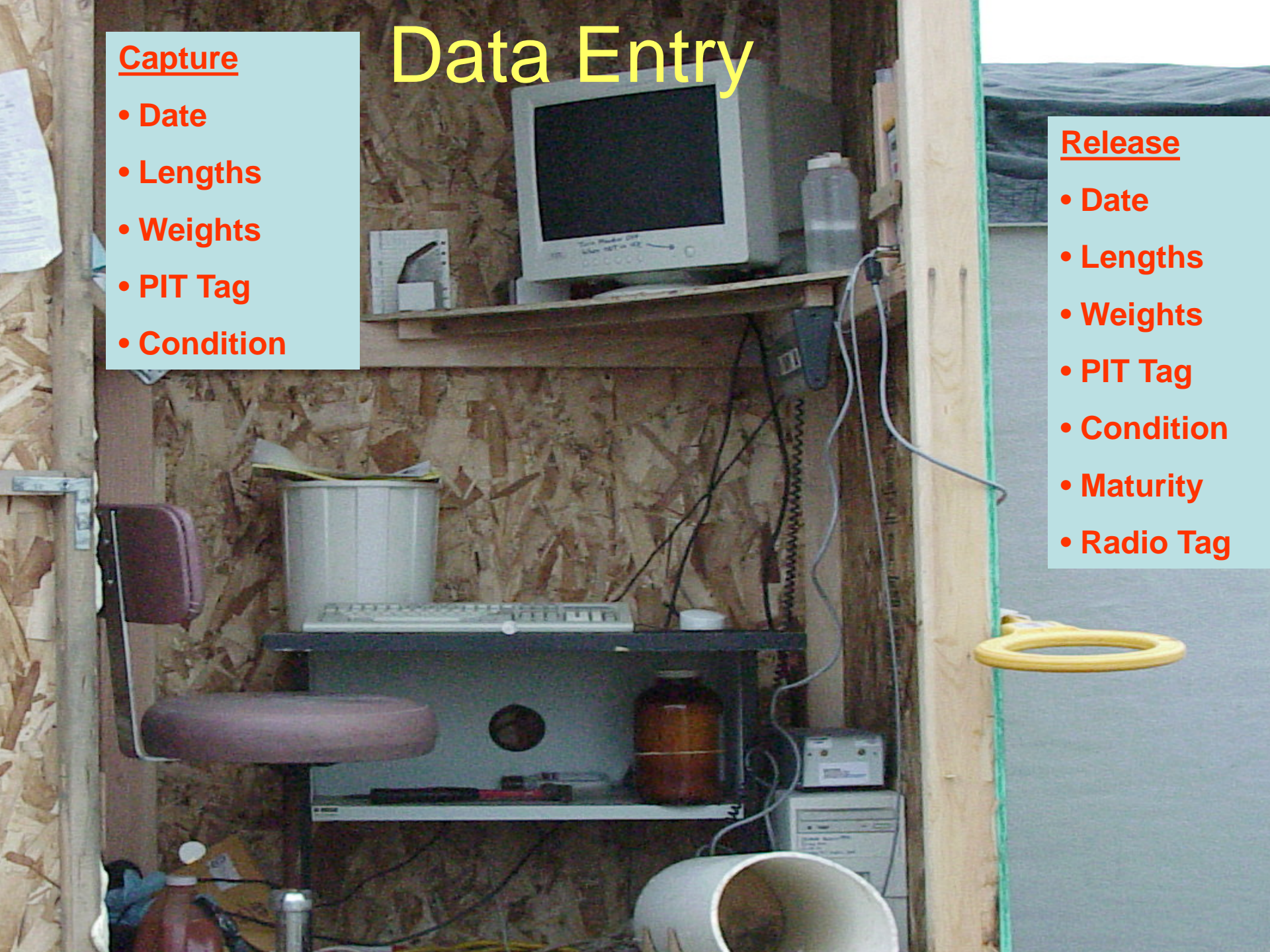
Data Entry

Capture

- Date
- Lengths
- Weights
- PIT Tag
- Condition

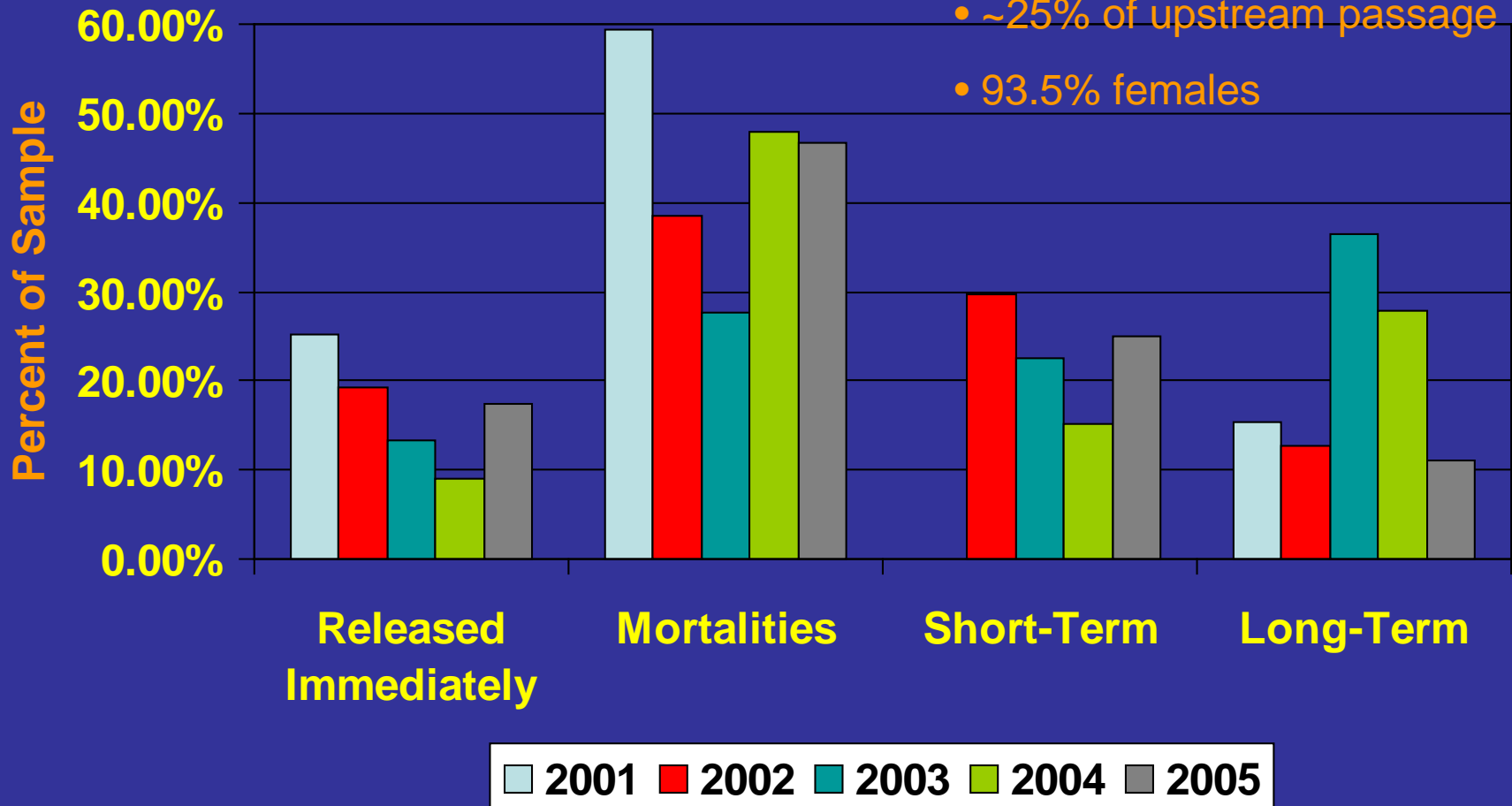
Release

- Date
- Lengths
- Weights
- PIT Tag
- Condition
- Maturity
- Radio Tag



Chandler Kelt Collection, 2001-05

- Sampled 4,512 kelts
- ~25% of upstream passage
- 93.5% females



Major Questions for Kelt Reconditioning



What feed(s) work best?



Can they grow and survive?



**Short (30-60 days) or Long (6-8 mos.)
Term?**



Reproductive Success???

2001 Feed Evaluation

Krill: 45% survival

No krill: 21% survival

Maint. Pellets: 60%
maturity

Krill only: 25% maturity

⇒ Krill + Maint. Pellets
= health/surv./mat.



Weight Gain

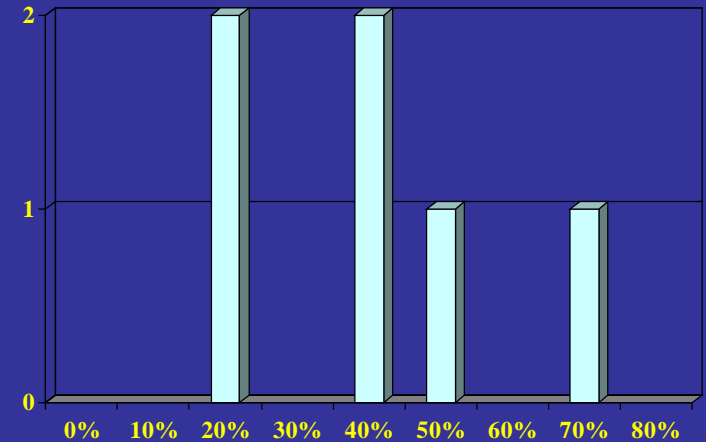
02-05ST: N=667, mean= -5.9%

02ST (from ocean): N=6, mean=46.2% →

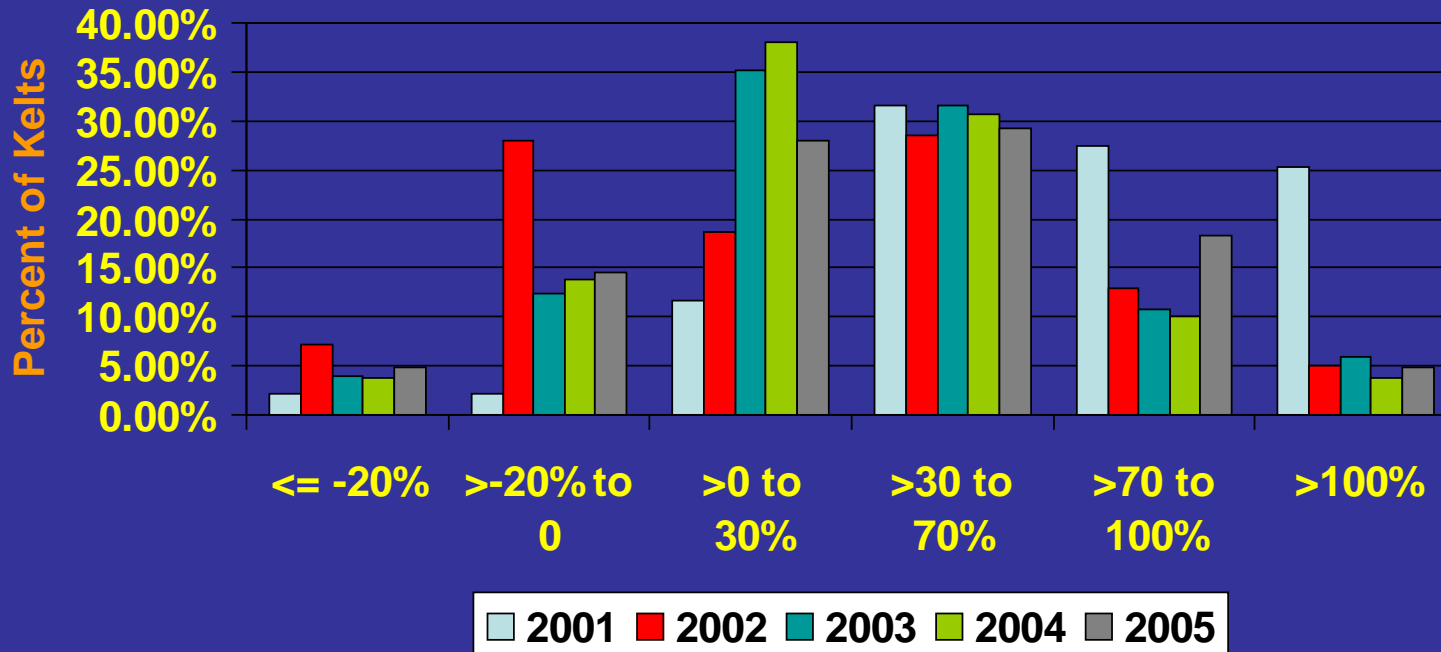
01-05LT: N=883, mean=37.7% ↓

Mature: mean=44.1%; Imm.: mean=6.9%

2002 Short Term



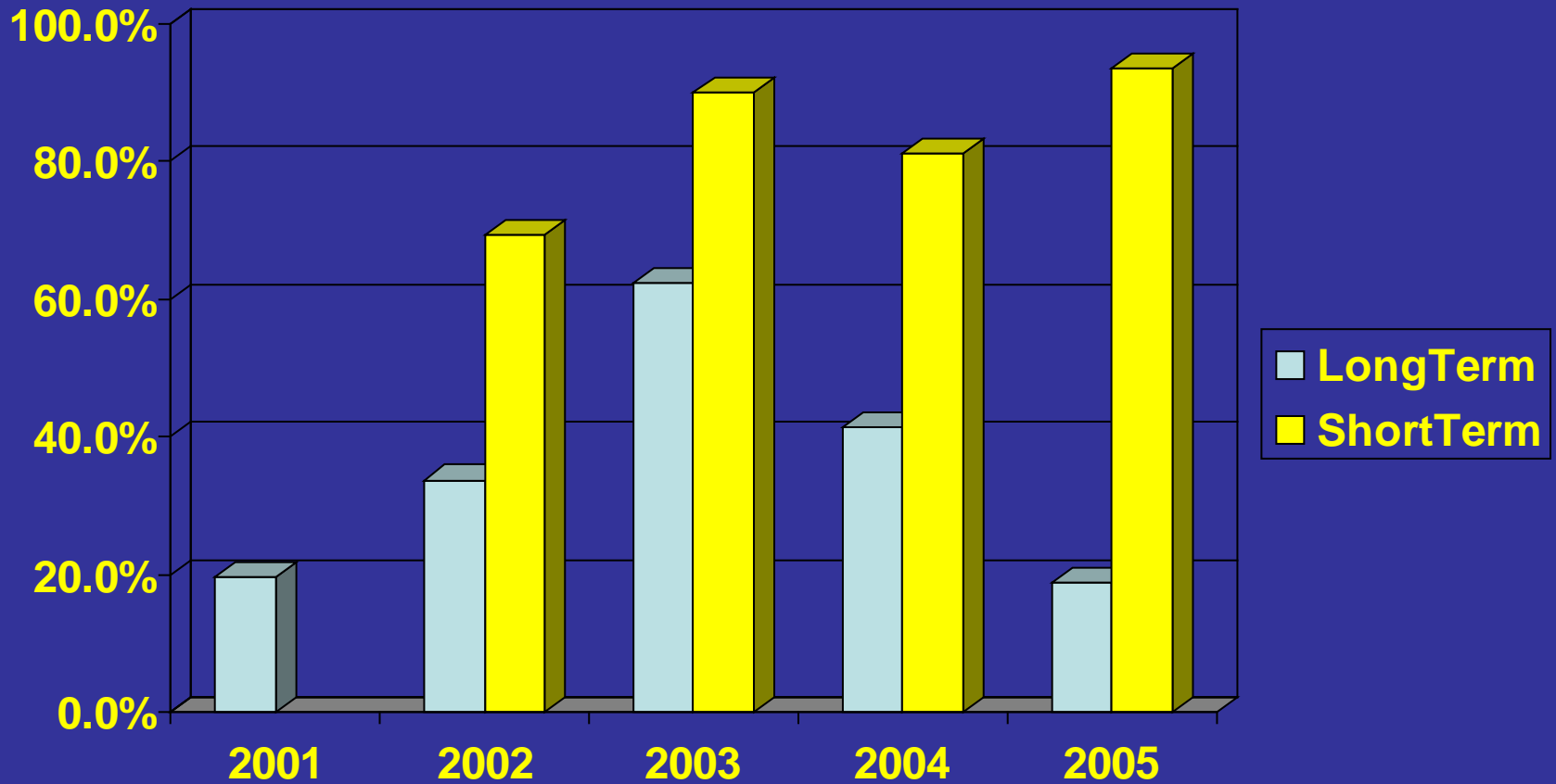
2001-05 Long Term



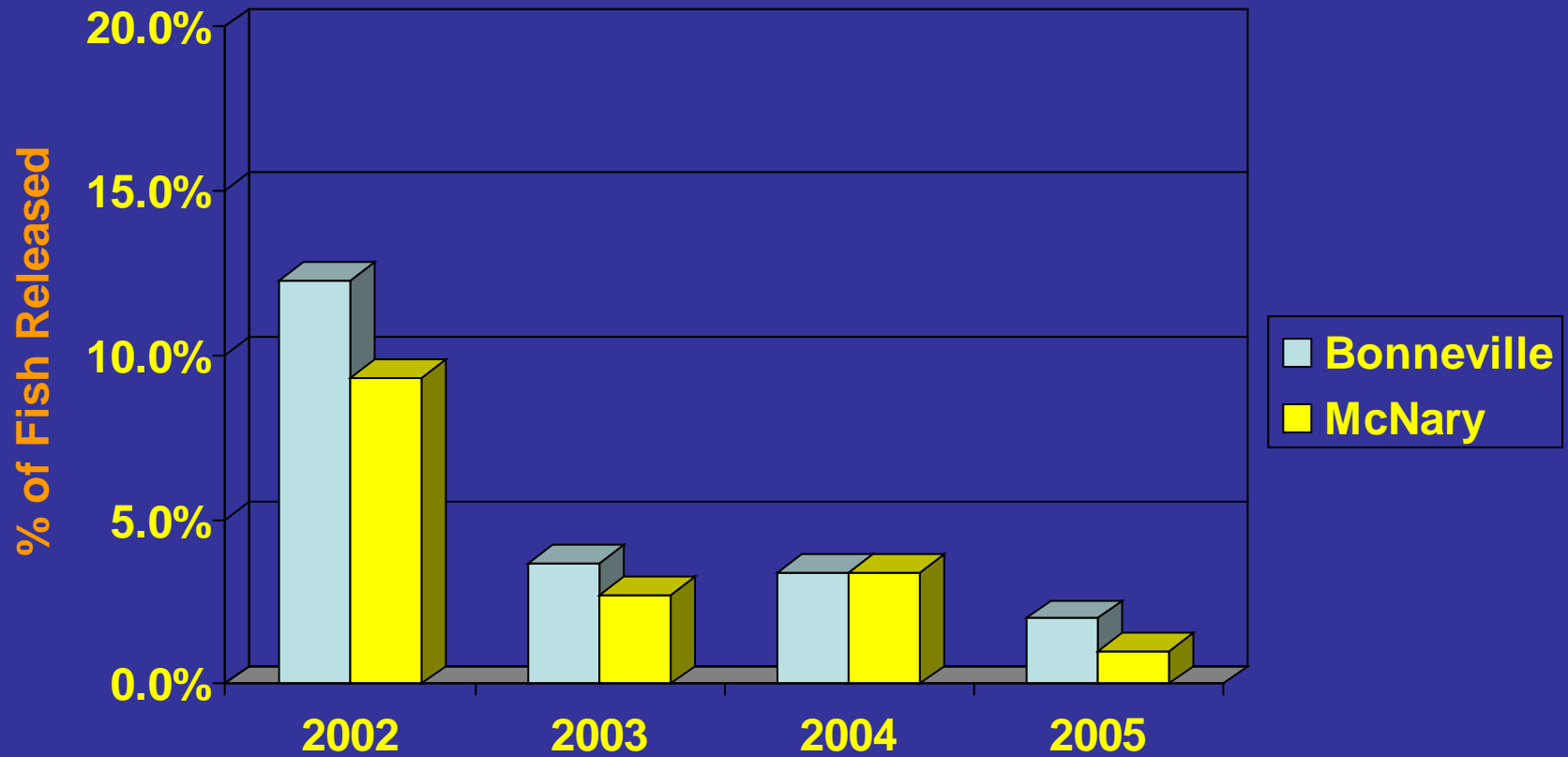
Kelt Pictures Before and After



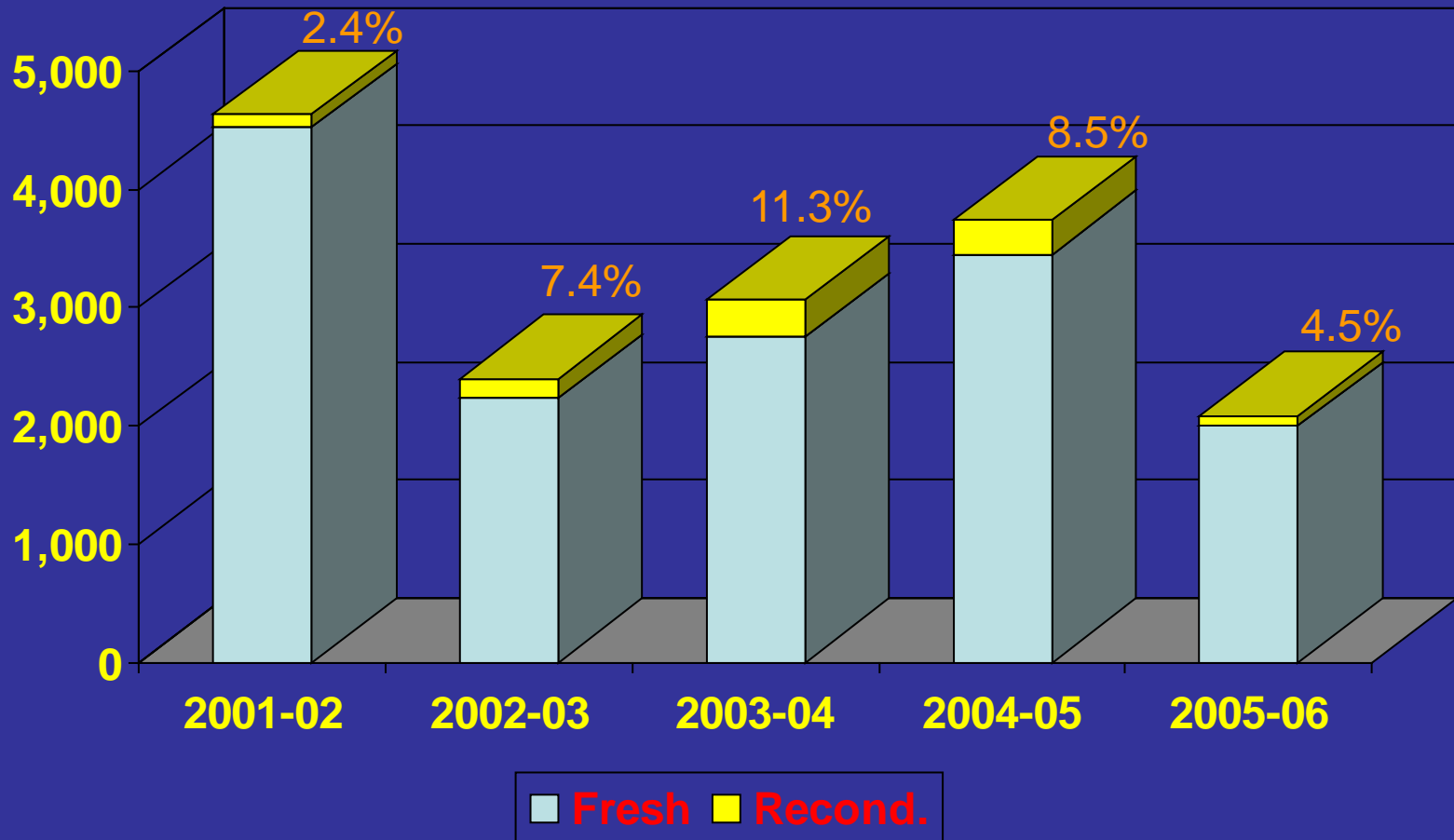
Short- and Long-Term Survival of Reconditioned Kelts to Release



Post-Release Survival of Short-Term Reconditioned Kelts

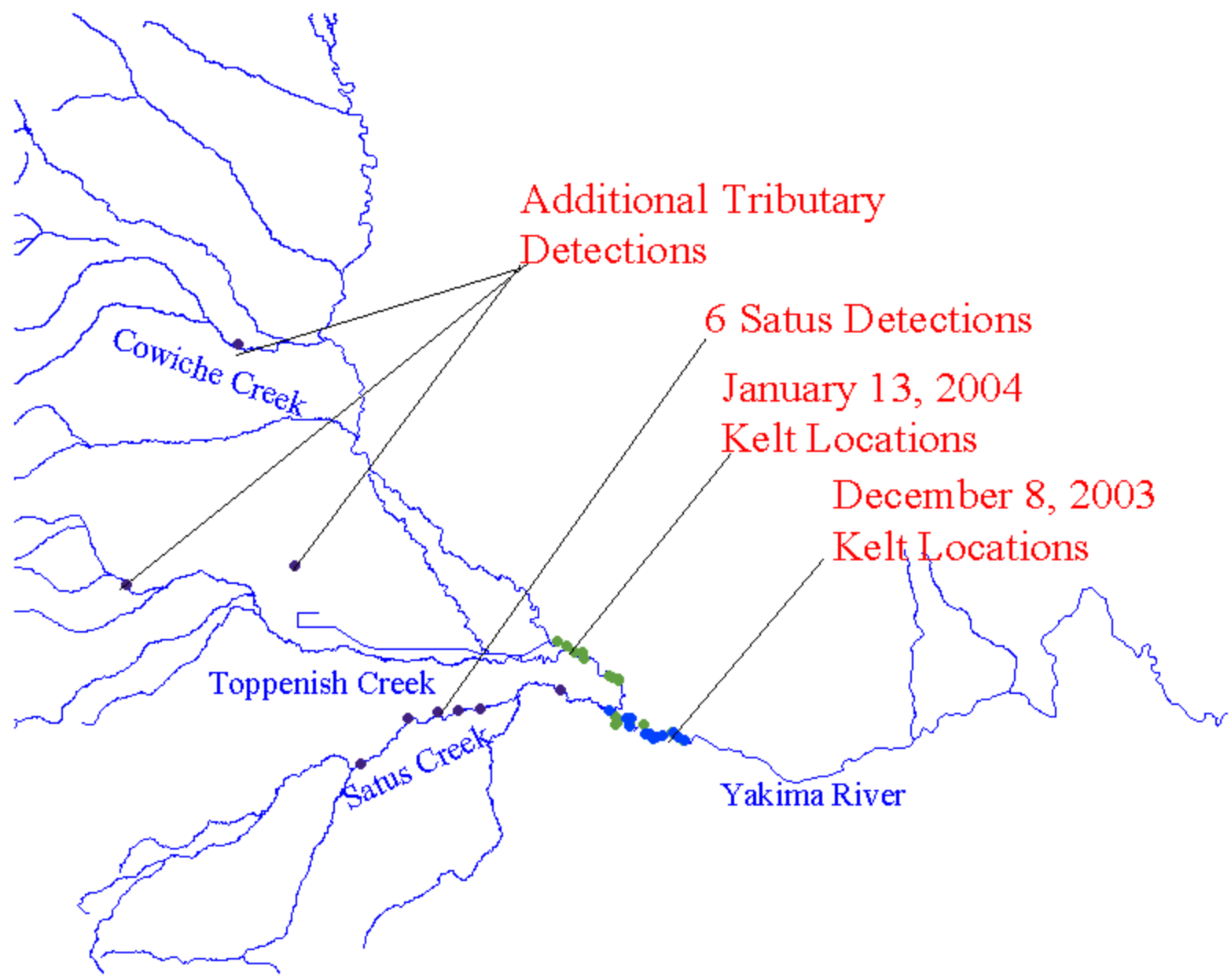


Yakima R. Steelhead Escapement with Reconditioning



Percentage increase in escapement due to reconditioning.

2003-2004 Radio Tagged Kelt Distribution



Additional Tributary
Detections

6 Satus Detections

January 13, 2004
Kelt Locations

December 8, 2003
Kelt Locations

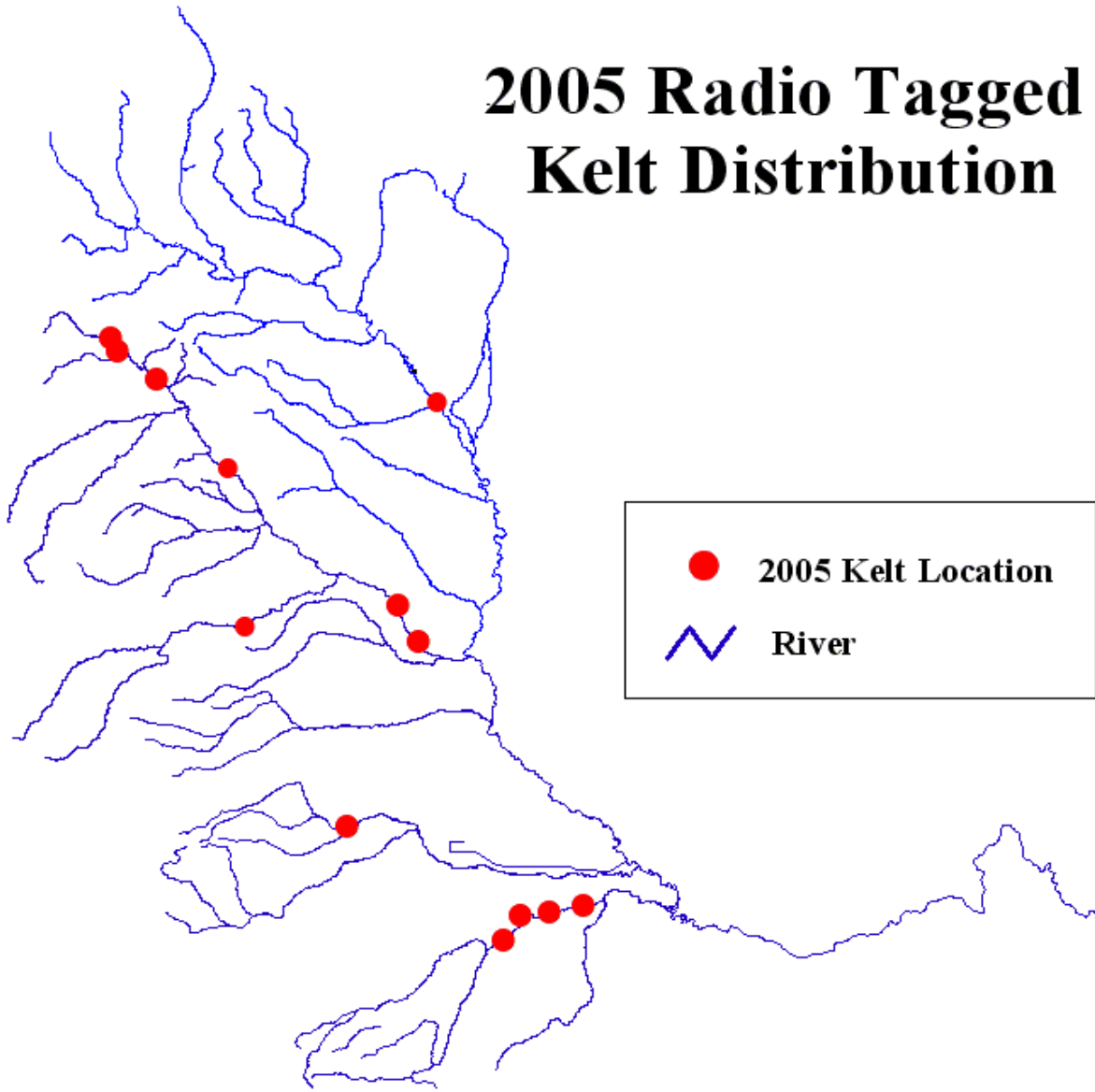
Cowiche Creek

Toppenish Creek

Satus Creek

Yakima River

2005 Radio Tagged Kelt Distribution



60 0 60 120 Kilometers



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

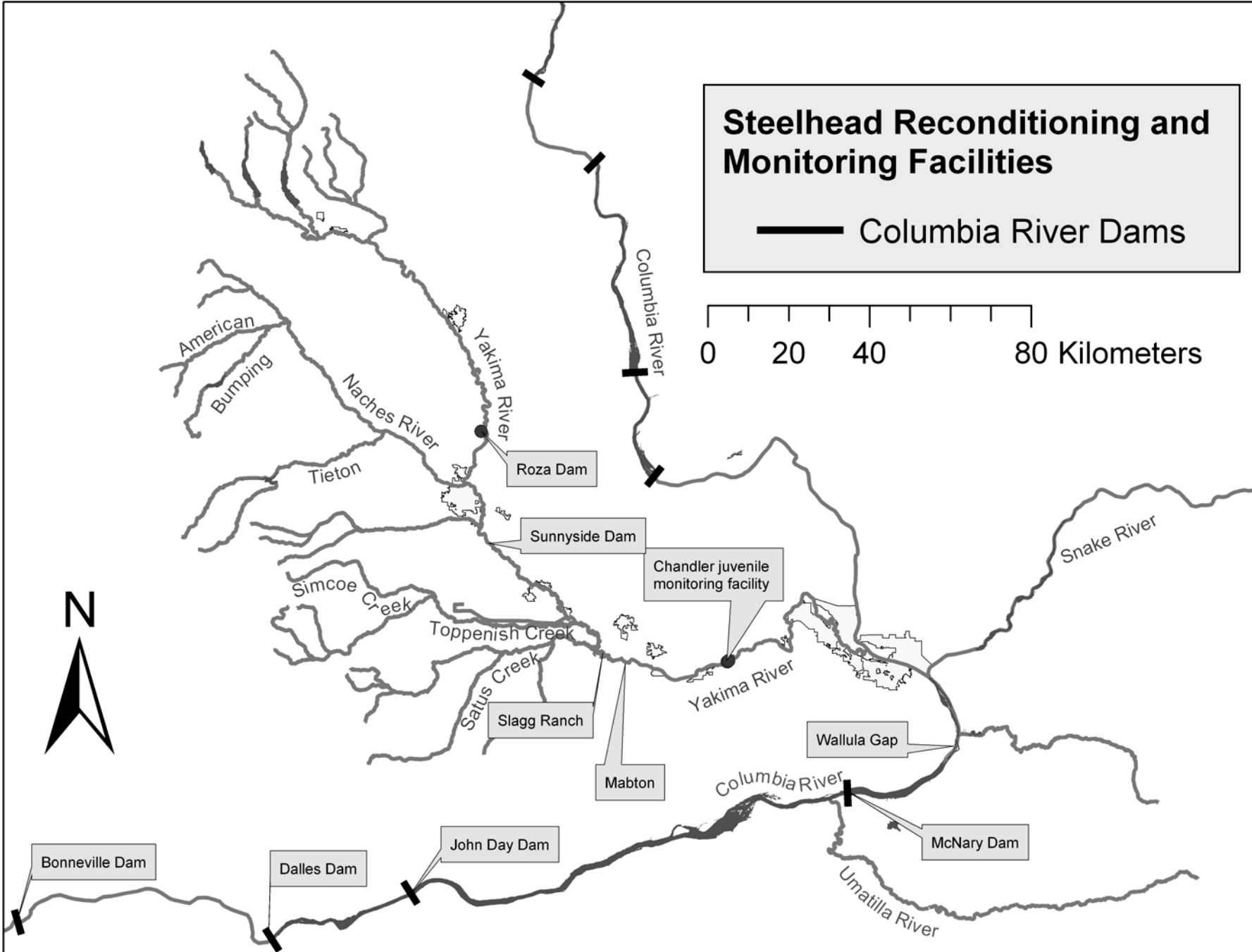
PIT detection data for reconditioned steelhead female radio tracked to Swauk
Creek in 2003 and 2004.

TagId	EventDate	EventType	SiteID	Sex / Age / Fork / Wt. / RT					
3D9.1BF1526D1A	2/25/2002	TAG	ROZ	F	2.1	58	4.6		
	8/17/2002	OBS	BWL						
	10/28/2002	OBS	MC1						
	3/6/2003	REC	ROZ	F	2.1	62	5.7	16	29
	4/9/2003	REC	CHA	F		61	4.3		
	12/8/2003	RLS	CHA	F		72	12.7	63	28
	3/15/2004	REC	ROZ			71	11.6	16	104

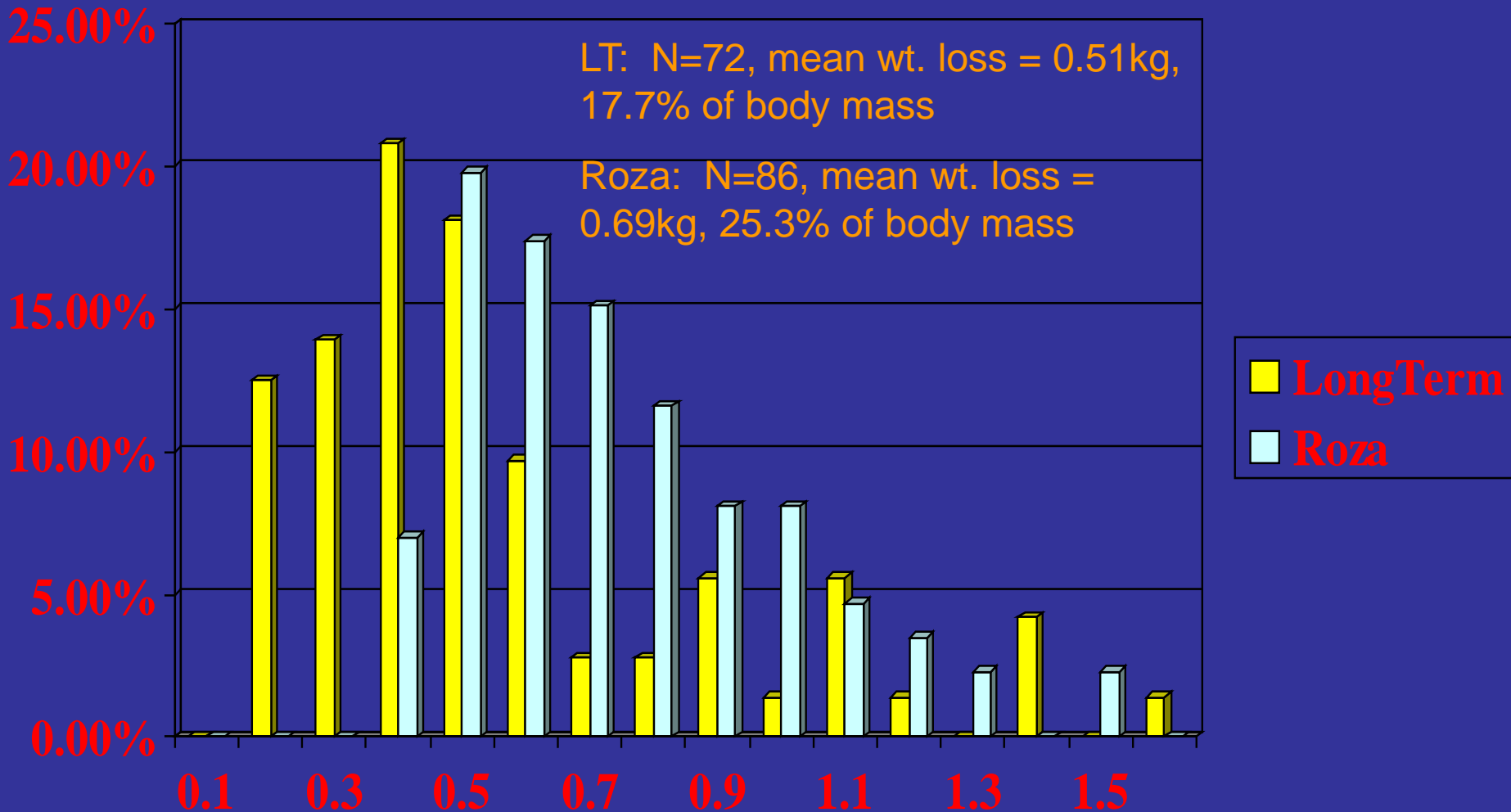
Steelhead Reconditioning and Monitoring Facilities

— Columbia River Dams

0 20 40 80 Kilometers



Female Weight Loss as Surrogate for Spawning Success



Conclusions



Reconditioning shows promise



Can increase spawner abundance

More Questions



How to repeat 2002 ST success? Or is it out of our control?



Can earlier release or altered feeding reduce over-ripening and resorbtion in LT kelts?

