

Cle Elum Dam Fish Passage

Mark Johnston, Dave Fast, and Brian Saluskin

July 17, 2002 at Roza Dam

(RM 127.9)



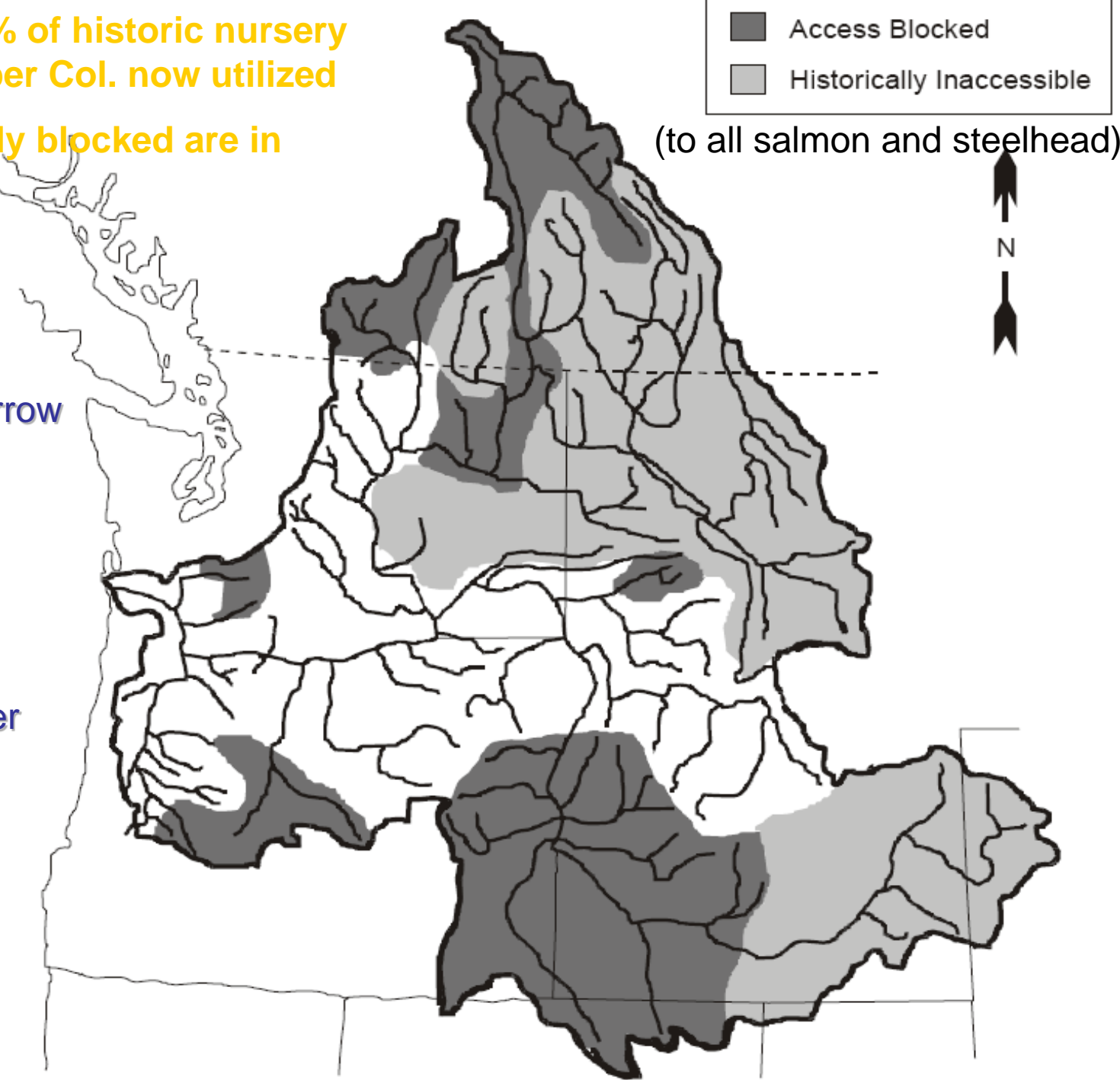
Cooperative Study

Bureau of Reclamation, Yakama Nation, WDFW, NOAA Fisheries & Forest Service

Mullan (1986): <4% of historic nursery lake habitat in Upper Col. now utilized

4 of the 13 currently blocked are in yakima river basin

- Bumping*
- Cle Elum*
- Keechelus
- Kachess
- Upper and Lower Arrow
- Whaishan
- Slocan
- Osoyoos**
- Skaha
- Okanogan
- Wenatchee**
- Big, Little, and Upper
- Payette
- Wallowa
- Redfish**
- Alturas**
- Pettit**
- Stanley**
- Yellowbelly**
- Suttle

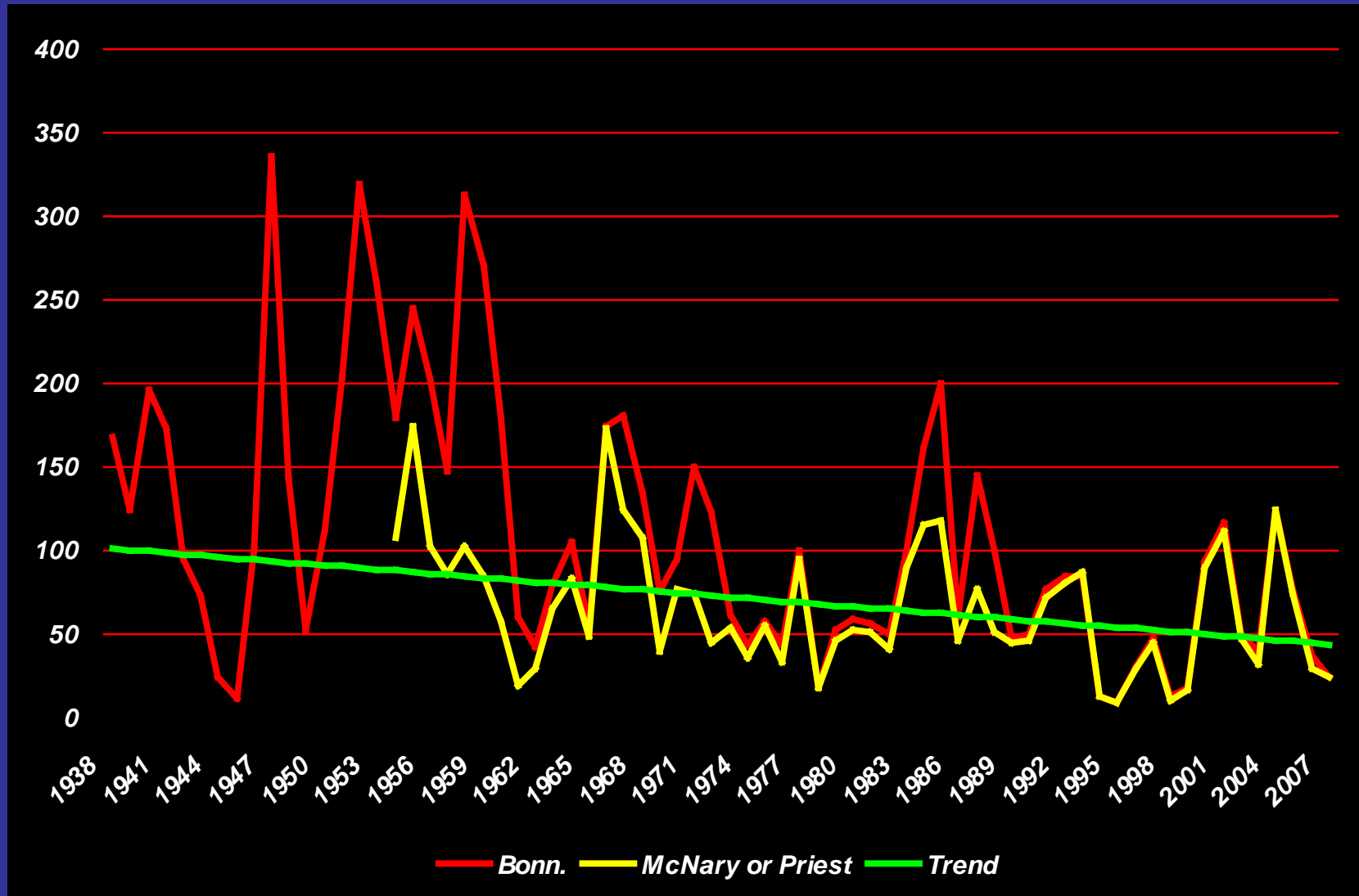


Potential Anadromous Fish Reintroduction

- Coho Salmon
- Sockeye Salmon
- Steelhead
- Spring Chinook
- Also could help Bull Trout movement (not functioning properly)

Columbia Basin Sockeye Counts, 1938-2007

Thousands of Fish



Cultural and Ecological Significance



Stan Wamiss

Restoring to Yakima Basin increases:

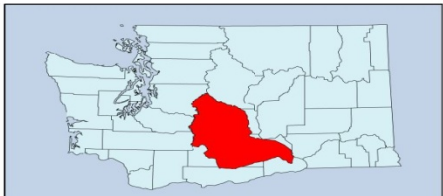
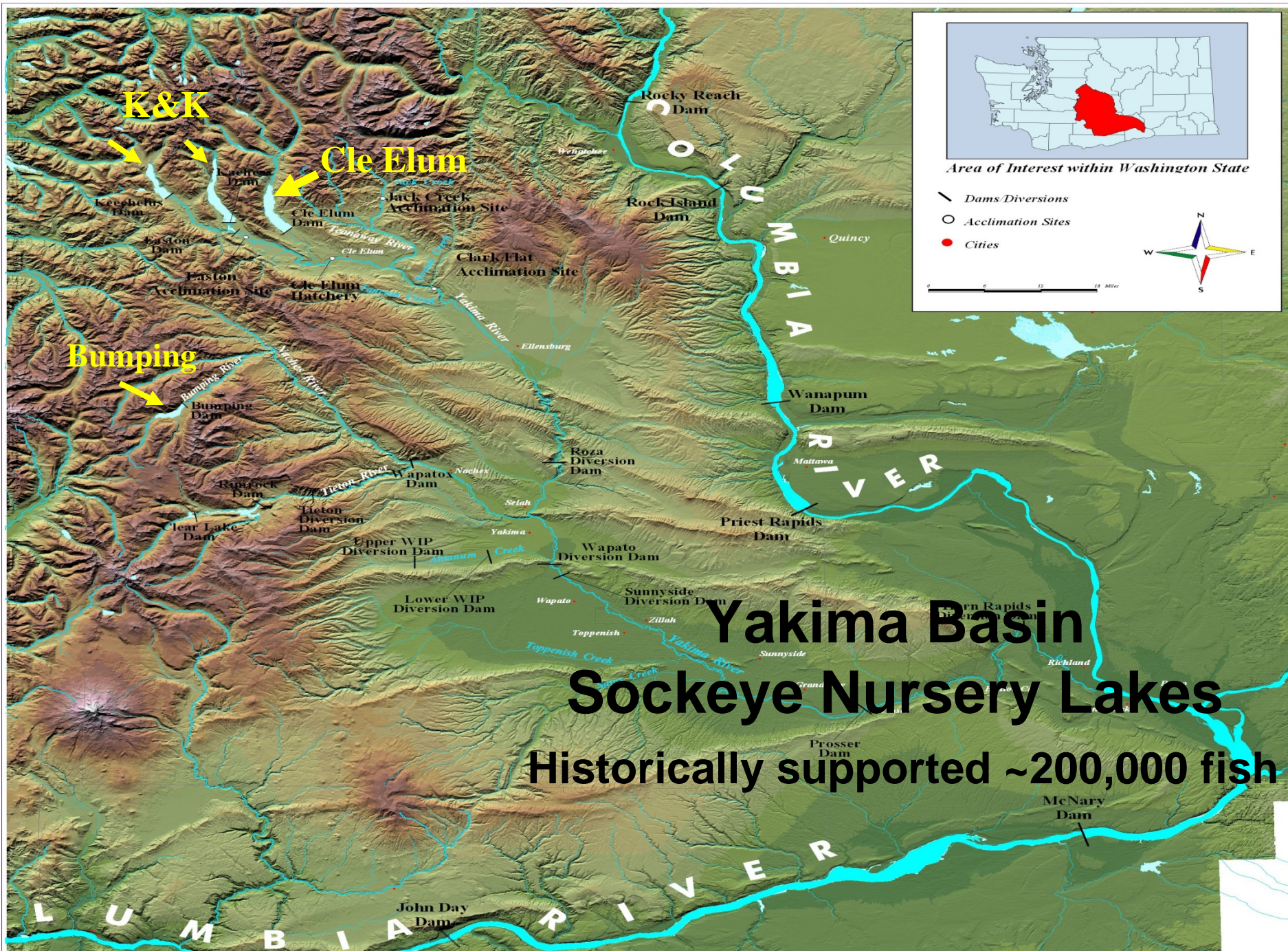
- Abundance
- Spatial Distribution
- Diversity
- Productivity

of Aggregate Upper Columbia Sockeye



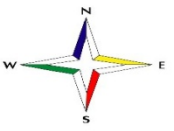
Restore and Enhance

Tribal Fisheries and Culture



Area of Interest within Washington State

- Dams/Diversions
- Acclimation Sites
- Cities



Yakima Basin
Sockeye Nursery Lakes
 Historically supported ~200,000 fish

Published by: J. James "N" Water Resources, 1918
 14700 Main St, Everett, WA 98201, 425.339.2222, www.jjwr.com

Yakima River Basin

Water Enhancement Project

(Title XII of Public Law 103-434, 31 Oct 1994)



Protect, mitigate, enhance fish & wildlife



Improve reliability of water supply

Includes directives to develop:

- Water conservation
- Water acquisition
- Habitat enhancement
- Improved fish passage and screening

Lake Cle Elum and Watershed

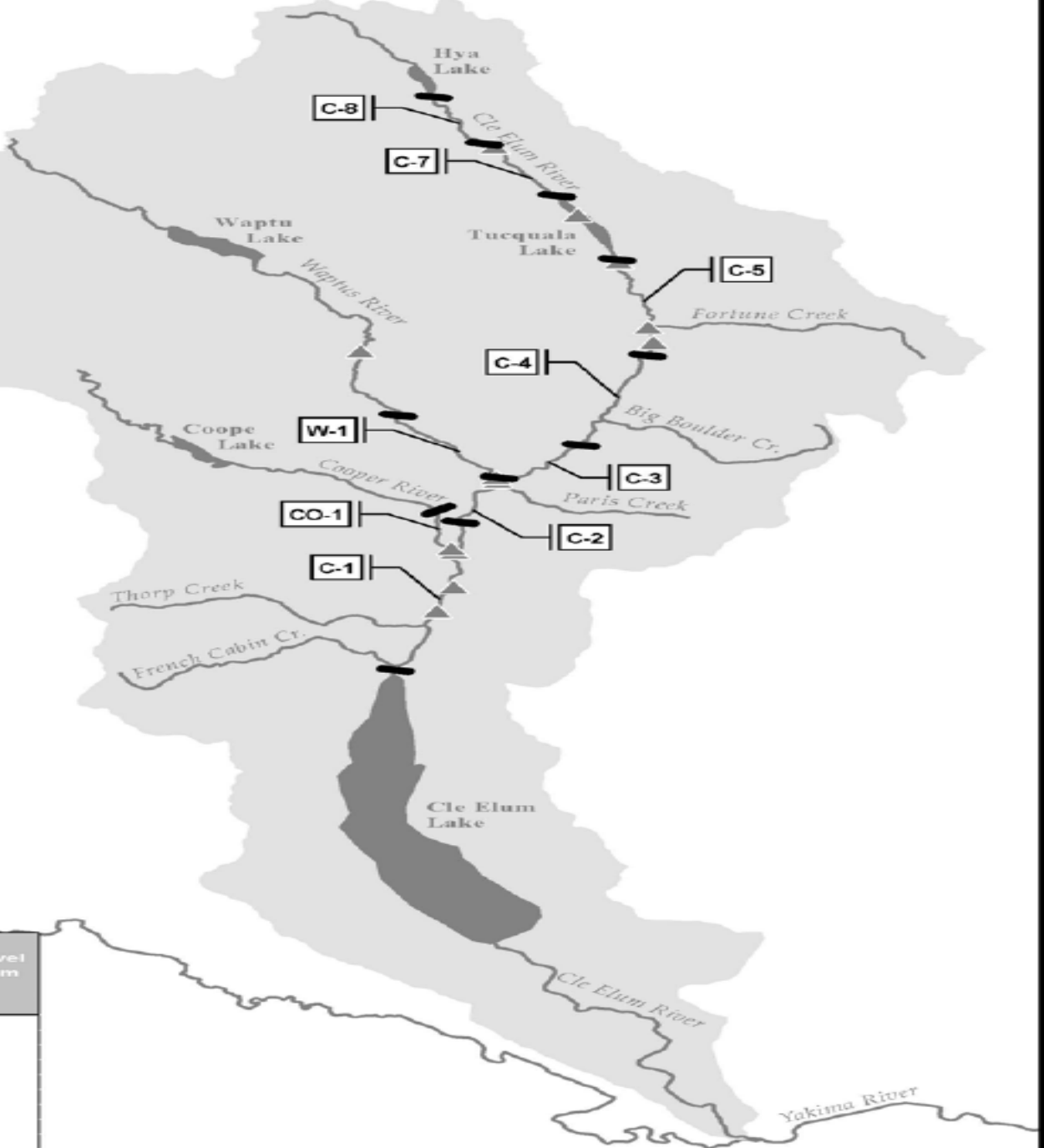


Prepared by
 Bureau of Reclamation, PNGIS
 on October, 2006

Reach	Length (km)	Gradient %	Spawning Gravel (% in 12 - 128mm range)
C-1	6.47	1	43.1
C-2	1.85	1	43.7
C-3	3.44	2	48.7
C-4	4.57	3	41.0
C-5	6.28	1	43.9
C-7	1.84	<3	38.2
C-8	1.25	<3	56.8
W-1	3.86	2.6	61.0
CO-1	2.25	1.6	45.0

Note: There is no C-6

Figure 1: Selected habitat information for some Cle Elum River reaches.



CLE ELUM LAKE SOCKEYE SALMON RESTORATION FEASIBILITY STUDY 1987-1993

(Flagg/NOAA et al. 2000)

- L. Wenatchee viable donor stock
- Juveniles planted in net pens grew and survived (100,000 annually)
- From 4 to 20 adults returned
- “Extremely encouraging potential” for restoration with necessary passage modifications

Cle Elum Lake

Sockeye Production Potential

Steve Grabowski, BOR, 2007

<u>Method</u> All at lowest lake levels (sept)	<u>Est. Smolt Production</u> Using 2% egg to smolt survival
Lake Surface Area	1,514,250
Euphotic Volume	1,627,715
Spawners per Hectare	817,695
Available Spawning Habitat	1,227,798



30,000 to 50,000 Adult Spawners assuming average survival and median pool elevation

Cle Elum Lake

Coho Production Potential

Steve Grabowski, BOR, 2007

<u>Method</u>	<u>Est. Smolt Production</u>
All at lowest lake levels (sept)	Using 1% to 6% egg to smolt survival
Juvenile Overwintering Habitat	123,267 smolts
Available Spawning Habitat	596,817 smolts

15,000 to 36,000 Adult Spawners assuming average survival and median pool elevation

Reintroduction Feasibility with Temporary Juv. Passage 2006-2007

- Coho used as surrogate fish
- Release 10,000 PIT tagged coho from Net Pens ~one half mile from dam
- Release 1000 below dam for comparison
- Release 1000 directly into outlet flume (detection efficiencies, flume survival)

Reintroduction Feasibility with Temporary Juv. Passage 2008

- Released 6,000 directly into the lake
- Release 6,000 PIT tagged coho from Net Pens ~one half mile from dam
- 170,000 feed fry plants using tribal funding



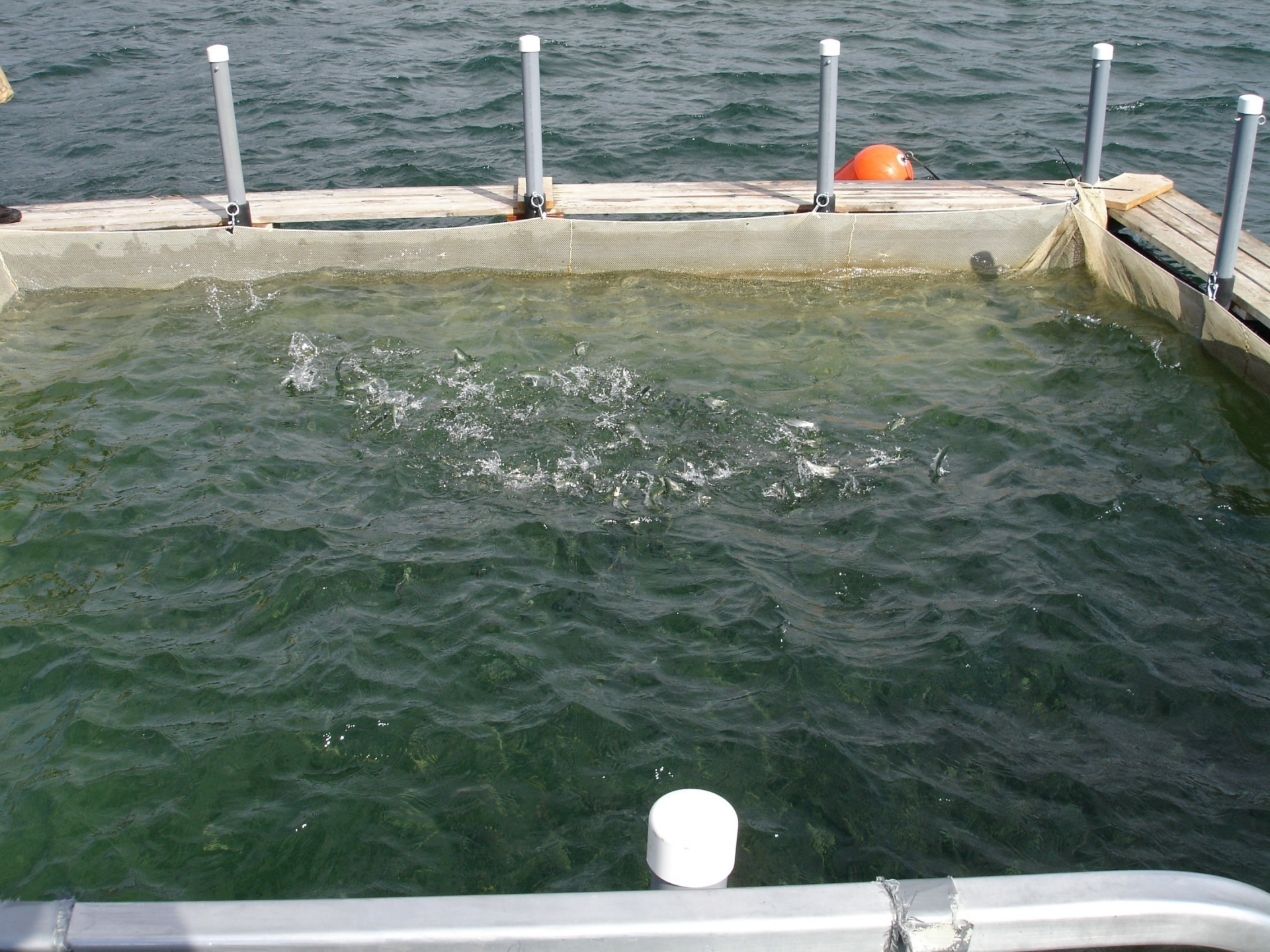


Photo of Headgate



Release Pipe Into Flume

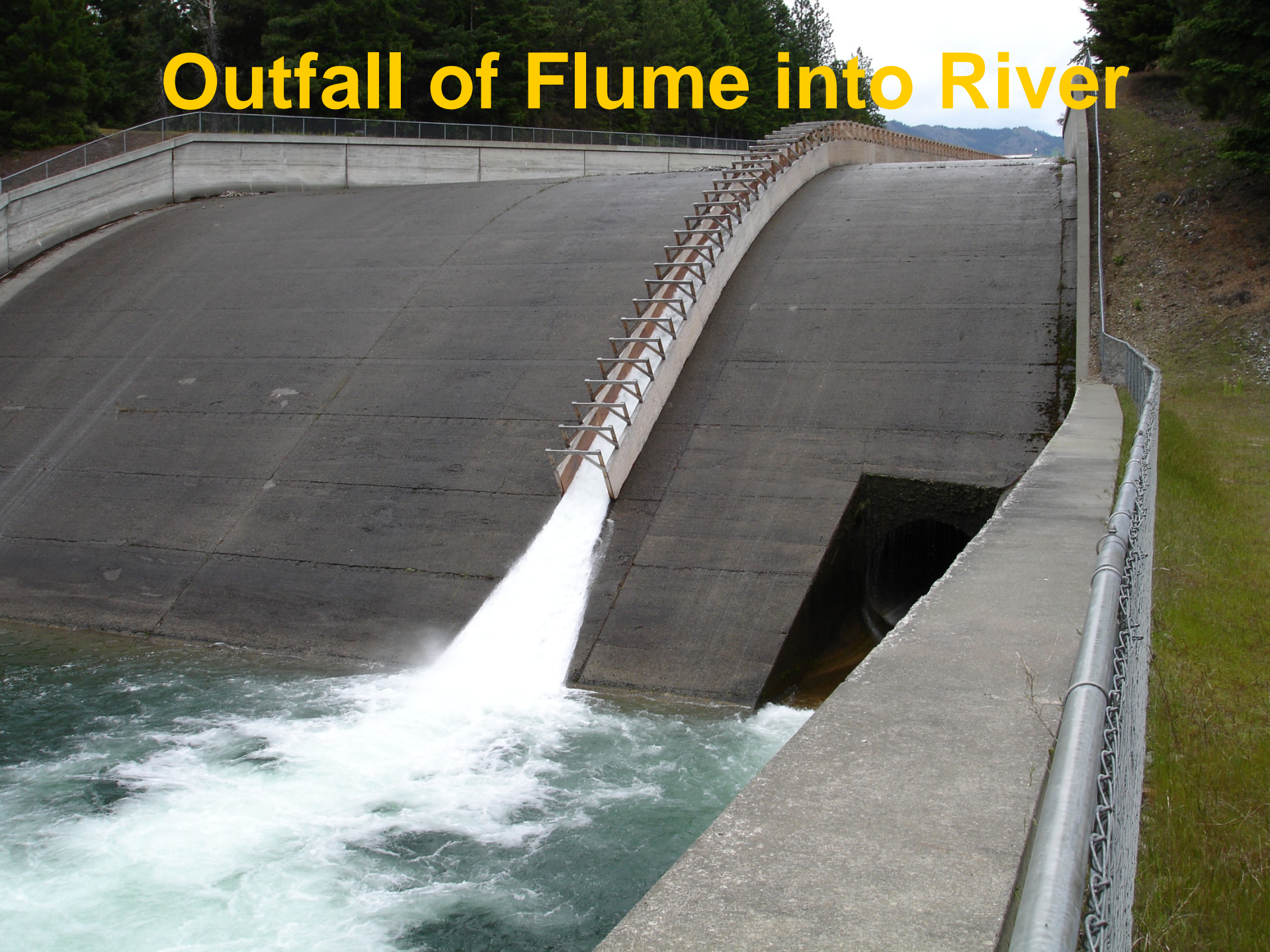


Fish Flume Down Face of Dam



PIT Tag Detectors
300 feet apart

Outfall of Flume into River



Preliminary Conclusions

2006:

- Operated on spill 6Jun – 9Jul
- Total of 617 through the flume

2007:

- Operated on spill 4Apr – 11Jul
- Total of 4,587 through the flume
- Of these 986 were 2006 net pen fish
- Adult returns of 2006 fish: 21 (Bonn), 9 (Prosser)

Preliminary Conclusions

2007:

- **Detection Efficiencies is 96% Accurate**
- **We conclude that fish can safely pass over the entrance weir, pass through the plunge pool, and survive changing flume velocities with little or no physical injury.**

Where We At Today?

- **CANADA (DONOR STOCK)**
- **NEPA (EIS)**

Near Term Reintroduction Plan

- **Begin with fry/parr plant in 2008 (if logistics can be worked out)**
- **Release fry/parr (when available) to monitor outmigration success and survival**
- **Collect returning adults at Roza Dam for reservoir releases**
- **Release adults in reservoir to monitor location and timing of spawning**

Acknowledgements

- **Dr. Stephen Grabowski (BOR)**
- **Dr. Dave Fast**
- **Mark Johnston**
- **Bill Bosch**
- **Cle Elum Forest Service**

Access Reports and Documents

- Yakima Dams Fish Passage Study web page located at:

http://www.usbr.gov/pn/programs/ucao_misc/fishpassage/index.html

- My email: passagebio@qwestoffice.net