Lake Cle Elum Fish Passage Project
Sockeye Reintroduction

Future of Our Salmon Conference: Restoring Historical Fish Passage
Presented by David Fast

Salmon Extinction in the Yakima Basin

- "Not an Option!" or
- The Preferred Alternative?

Historic Salmon Runs

Modified from Alex Conley

Species/Run	Estimates	Current Status	Low	Year	High	Year
Spring Chinook	200,000-500,000	Supplemented Population	666	1995	23,265	2001
Fall Chinook	38,000-100,000	Supplemented Population	523	1988	13,000	2002
Summer Chinook	??	Extirpated 1970'S Began Reintroduction 2008	-	till 12	237 1820	2012 2013
Coho	40,000 150,000	Extirpated 1980'S Reintroduced 1997	-	till 93	10,248	2009
Sockeye	100,000 200,000	Extirpated Early 1900's Reintroduction 2009	-	Till 2009	10,000(+15) 700+	2012 2013
Steelhead	30,000 100,000	Wild Population Kelt Reconditioning	505	1996	6,793	2010
Total	408,000-1,050,000		1,700			
Bull Trout	??	Wild Population			2500 to 3000 adults	
Lamprey	??	Wild Population			0 to 87 adults	

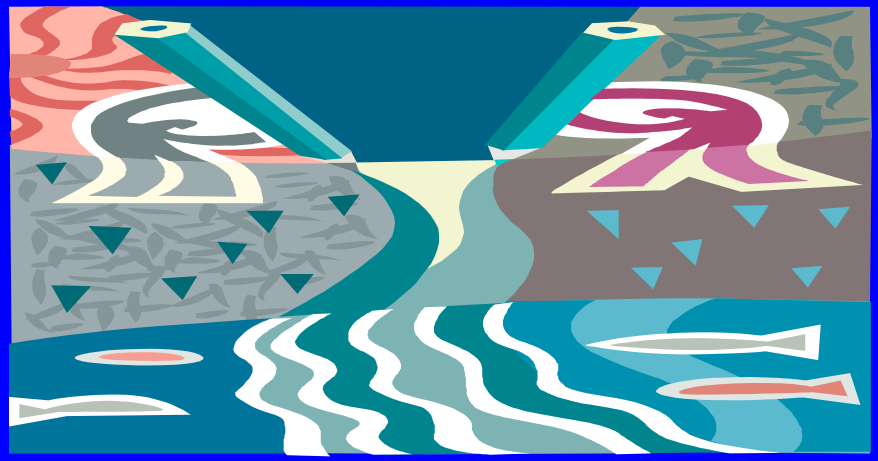
Yakima Basin
Sockeye Nursery Lakes

Historically supported ~200,000 fish

Hyas Lake
Venus Lake
Circle Lake
Lake Rowena
Shovel Lake
Deep Lake
Spade Lake
Tucquala Lake
Trail Creek
Waptus Lake
Cle Elum River
Fortune Creek
Pete Lake
Camp Creek
Waptus River
Spectacle Lake
Cooper Lake
CooperRiver
Thorp Creek
Howson Creek
Cle Elum Lake
Domerie Creek
0 1 2 3 4 5 6 7 8 9 10
Miles

Fish Passage Study Objectives

- Evaluate Production Potential of Species above Dams
- Determine Interim Smolt Outmigration Success using coho salmon as surrogate for all species
- Evaluate sources of Mortality
- Design Long Term Passage Solution
- Evaluate Adult Upstream Passage Options



Potential Anadromous Fish Reintroduction

- Coho Salmon
- Sockeye Salmon
- Steelhead
- Spring Chinook
- Also could help Bull Trout movement

Sockeye Salmon Potential

- Sockeye juveniles use lake for rearing
- Four methods used to evaluate sockeye production potential
  1. Smolts per Lake Surface Area
  2. Euphotic Volume Method
  3. Spawners per Hectare
  4. Available Spawning Habitat

- From Preliminary Report by Steve Grabowski

Sockeye Salmon Potential

Lake Surface Area	1,514,250 smolts
Euphotic Volume	1,627,715 smolts
Spawners per Hectare	788,940 smolts
Available Spawning Habitat	379,926 – 741,852

* From Preliminary Report by Steve Grabowski, BOR

Release Pipe Into Flume

Fish Flume Down Face of Dam

Outfall of Flume into River

SOCKEYE REINTRODUCTION

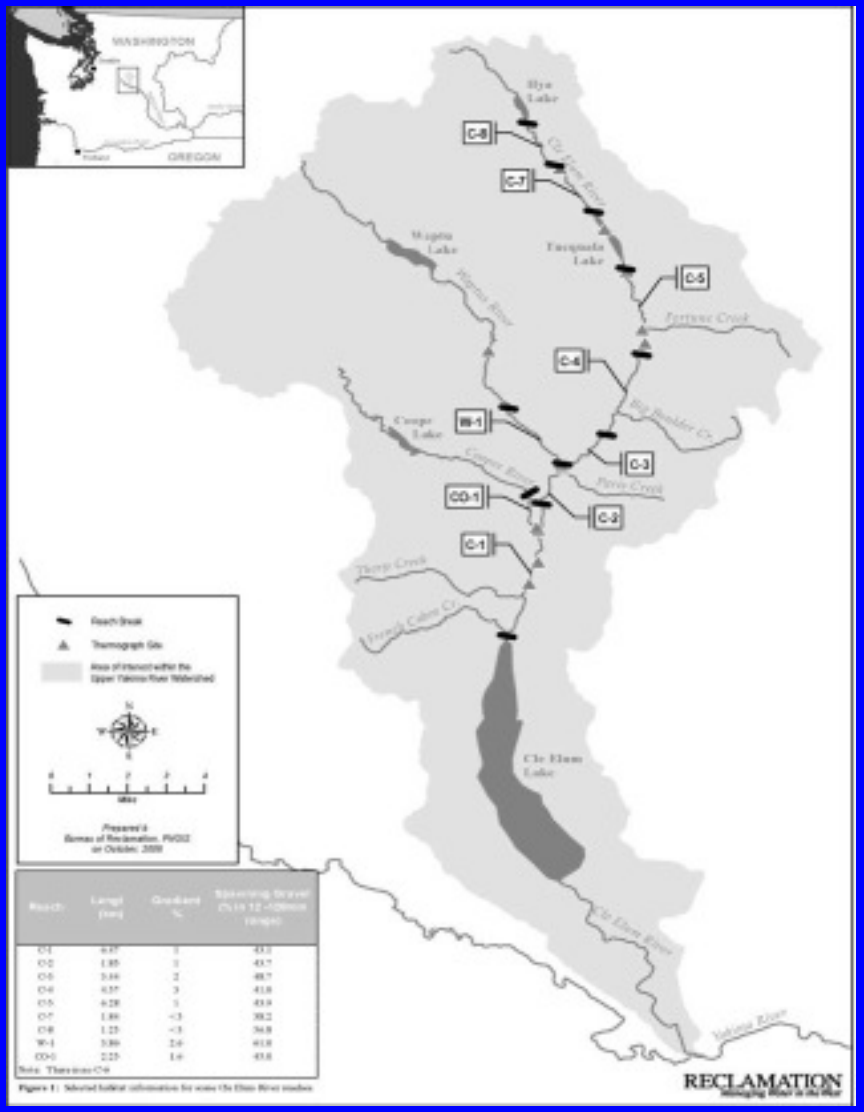
- Historical runs of ~200,000 adults to Yakima
- Extirpated in early 1900's as lakes were impounded
- Two donor stocks Lake Wenatchee and Lake Osoyoos
- After escapement goals are reached at Bonneville Dam returning sockeye adults were collected at Priest Rapids Dam
- The Adult take number was increased from 1000 in 2009 to 2500 in 2010, 4100 in 2011 and 10,000 this past year 2012.
- YN transferred 9,000 sockeye to Lake Cle Elum and 1000 to Cooper Lake.
- 1000 DNA Samples were taken at PRD

Area of Interest within Washington State
Dams Diversions
Acclimation Sites
Cities
Rocky Reach Dam
Rock Island Dam
Wanapum Dam
Priest Rapids Dam
Roza Diversion Dam
Wapato Dam
Upper WIP Diversion Dam
Wapato Diversion Dam
Lower WIP Diversion Dam
Sunnyside Diversion Dam
Horn Rapids Diversion Dam
Prosser Dam
McNary Dam
John Day Dam
Jack Creek Acclimation Site
Clark Flat Acclimation Site
Methow Hatchery
Columbia River
Yakima River

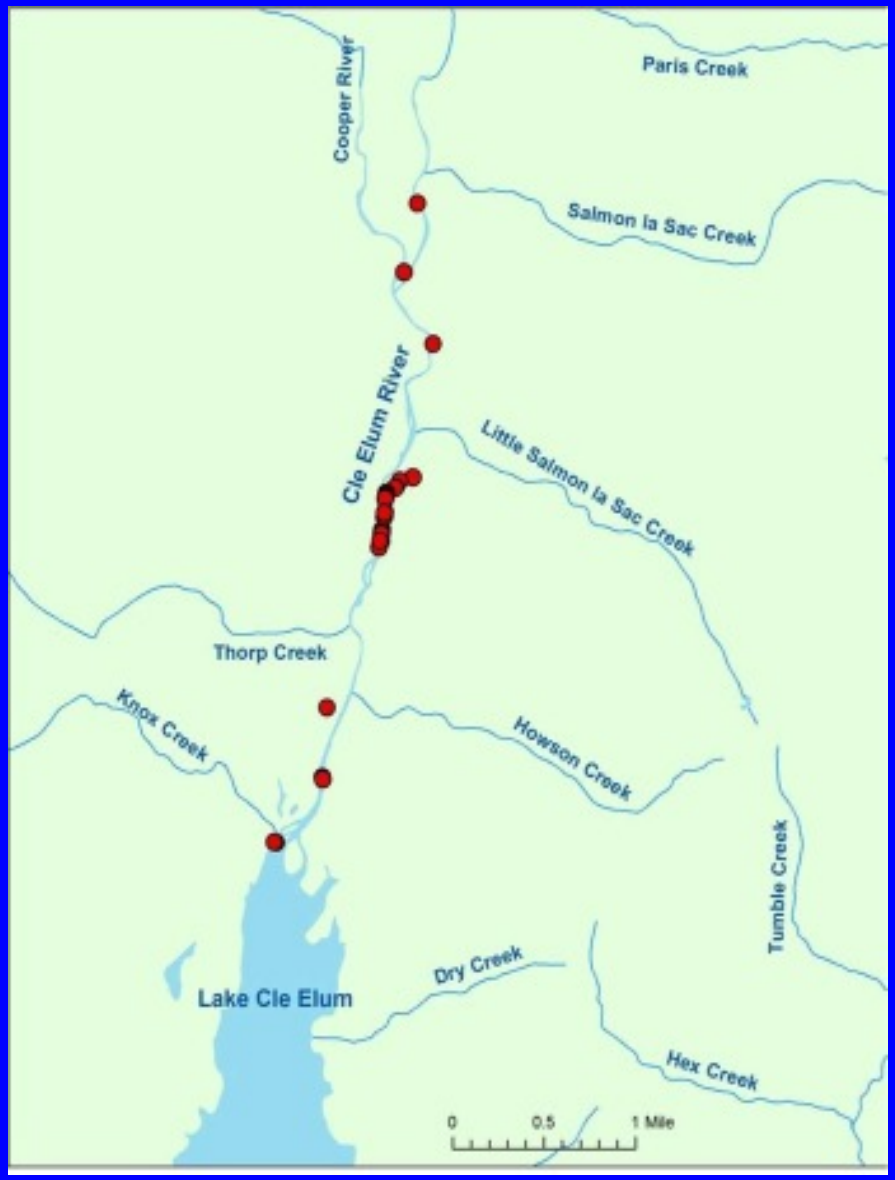
Lake Cle Elum Sockeye Reintroduction

Year	Adults Transported
2009	*1,000*
2010	*2,500*
2011	*4,500*
2012	*10,000*

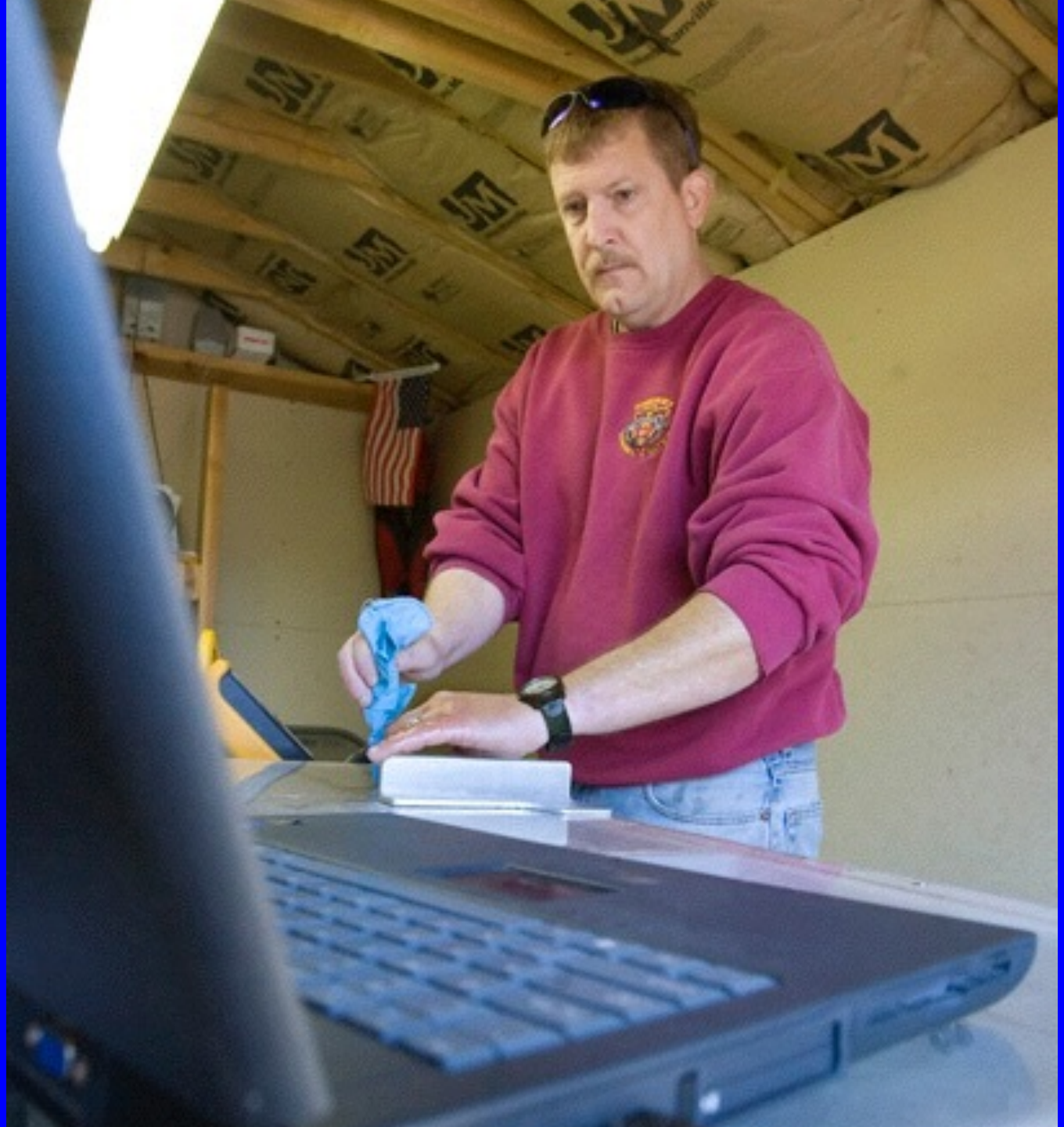
Some of the first sockeye to spawn in upper Cle Elum R. watershed in over 100 years



Spawning Activity 2009 vs. 2012



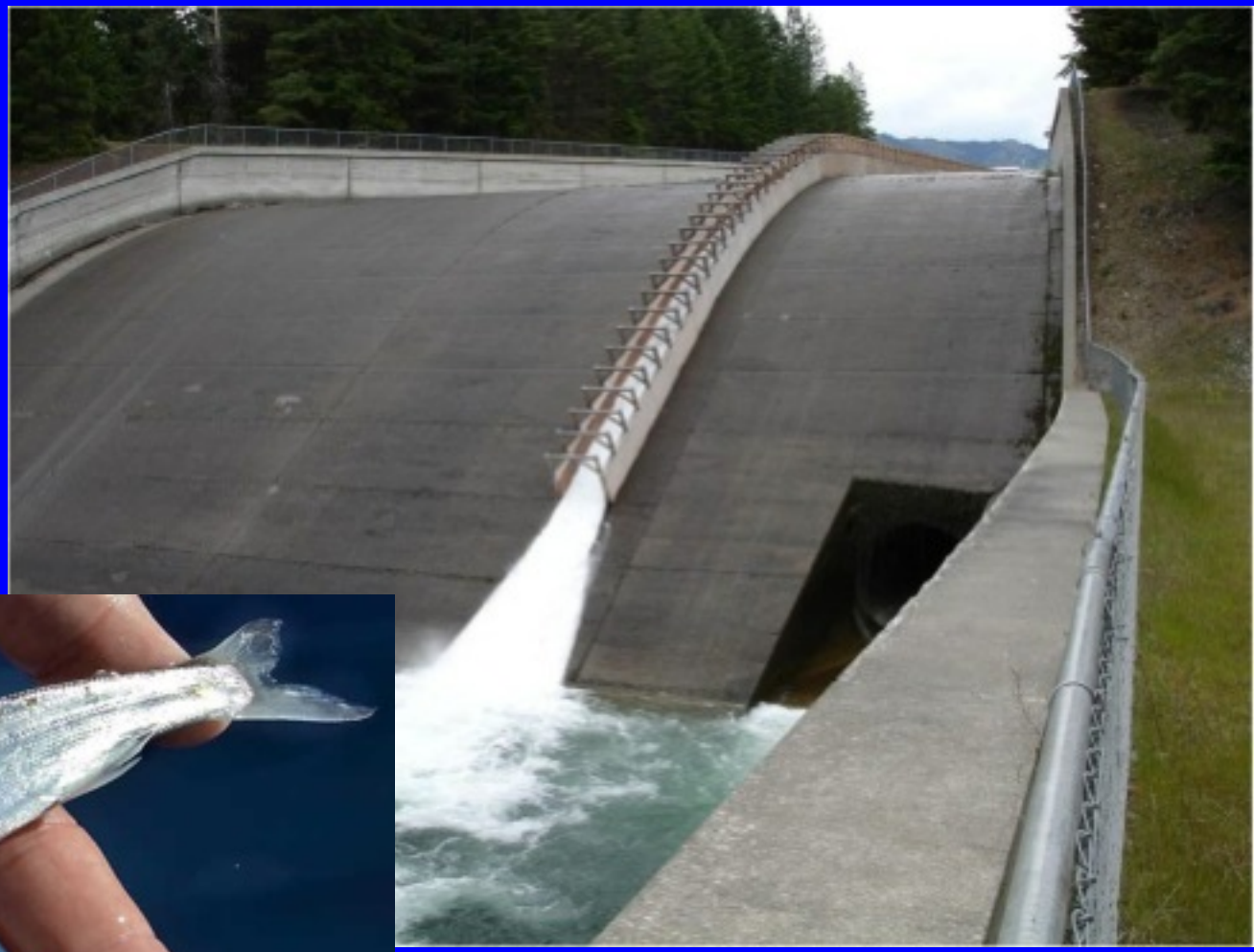
Sockeye Outmigration



BULLS
1

L. Cle Elum Sockeye Reintroduction

About 80,000 juveniles (progeny of 2009 adult plants) were estimated to have passed Prosser in 2011.



Wild smolt at Roza, 5/10/2011

First Return

Sockeye Ceremony

Wednesday, July 10, 2013
10am - 1pm
Lake Cle Elum

20331 Salmon La Sac Road, Ronald, WA 98940

The Yakama Nation is hosting a sockeye celebration for Yakama members and the public that will entail a prayer service, traditional Yakama dancers, guest speakers and potluck lunch.*

"We ask that you bring side dishes, following this alphabet

A-H: Beverages, I-P: Fruits or Dessert, Q-Z: Salad/Casserole

Yakama tribal elders describe the value of kálux (blue backs/sockeye) to the people as a winter sustenance food to carry people until new spring food arrives. Historically, at least 200,000 sockeye would annually return to four lakes in the Yakima Basin. Sockeye are returning to the Yakima Basin for the first time in 100 years as a result of Yakama Nation reintroduction.

yakamafish-nsn.gov/restore/projects/yakima-basin-sockeye-reintroduction

Event sponsors include:
Yakama Nation Fisheries, Cascade Playtime Rentals, PCSRF, Suncadia Community Council, and Pyramid Communications.

Yakama Nation Fisheries

Chuck Carl & Brian Saluskin haul sockeye

Mel Sampson releases kálux @ Lake Cle Elum

Media Contact:
Brian Saluskin, Fish Passage Biologist, passagebio@qwestoffice.net
Emily Washines, wase@yakamafish-nsn.gov 509-865-5121 ext.6315 or 509-853-8140

After 100 years, Sockeye return to the Yakima River.

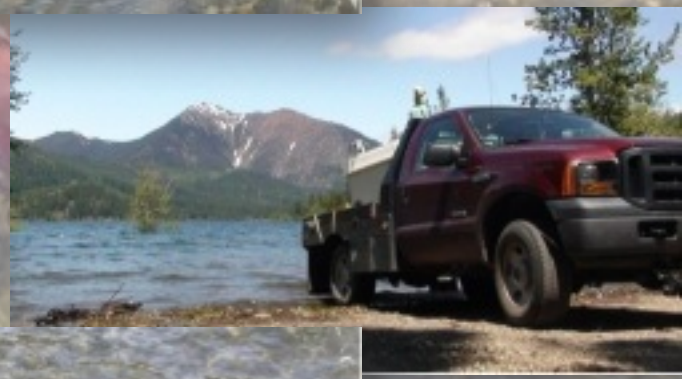
4X4

Moving Forward

- Continue with reintroductions
- NEPA is Complete
- Baseline Data Collection
- Acoustic surveys
- Genetic Sampling
- Pit tag out migrating smolts
- Construct juvenile passage facility
- Evaluate Adult Passage over Dam (whooshh)

Spring Chinook Reintroduction

- First generation (S-Line) hatchery spring chinook adults have been transported to Cle Elum Lak
- 15 a day can be transferred from Roza Dam to the lake daily
- These Chinook will spawn naturally in the wild and supply more nutrients to the system
- They are also turning over substrate that has not been moved for over a hundred years



Cle Elum Dam Downstream Fish Passage Modeling & Design

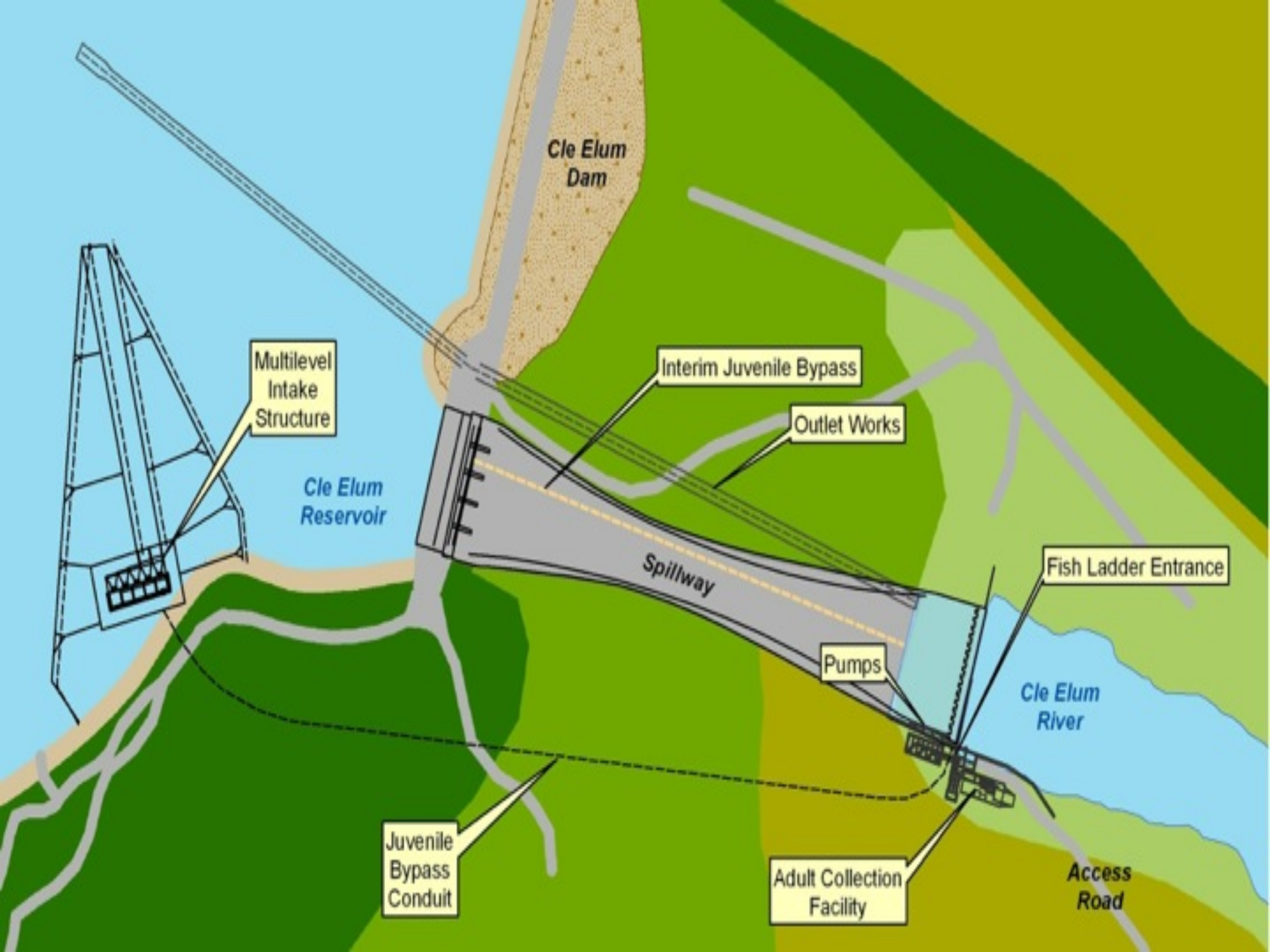
Reclamation

Joel Hubble, Yakima Field Office
Leslie Hanna, Hydraulic Investigations & Research Laboratory
Jason Wagner, Water Conveyance Group

Fish Passage Concept- original design

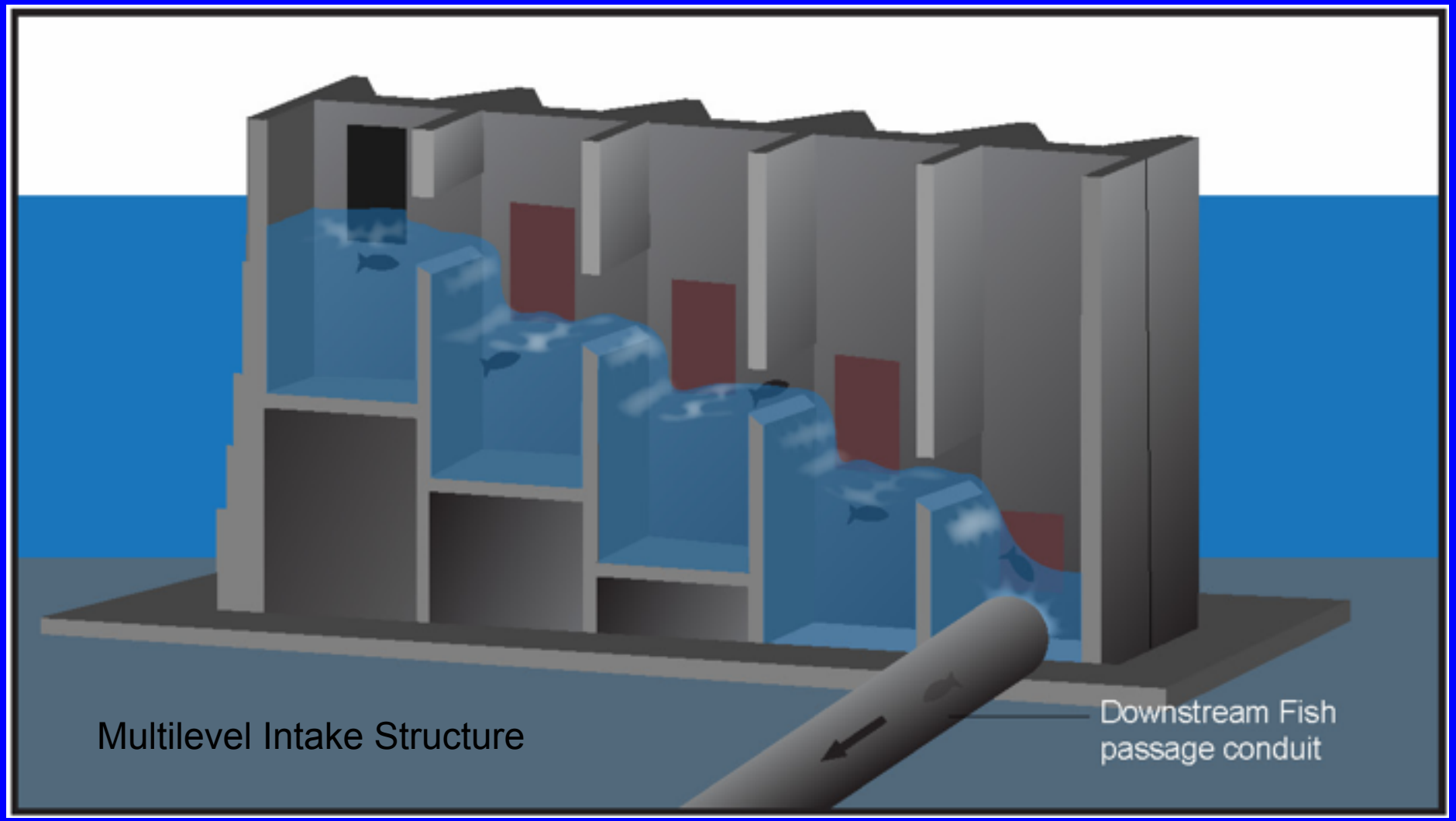
- **Downstream juvenile passage**
  - **Multi-level gated intake structure; conduit to below dam**

Inlet Structure located in the forebay

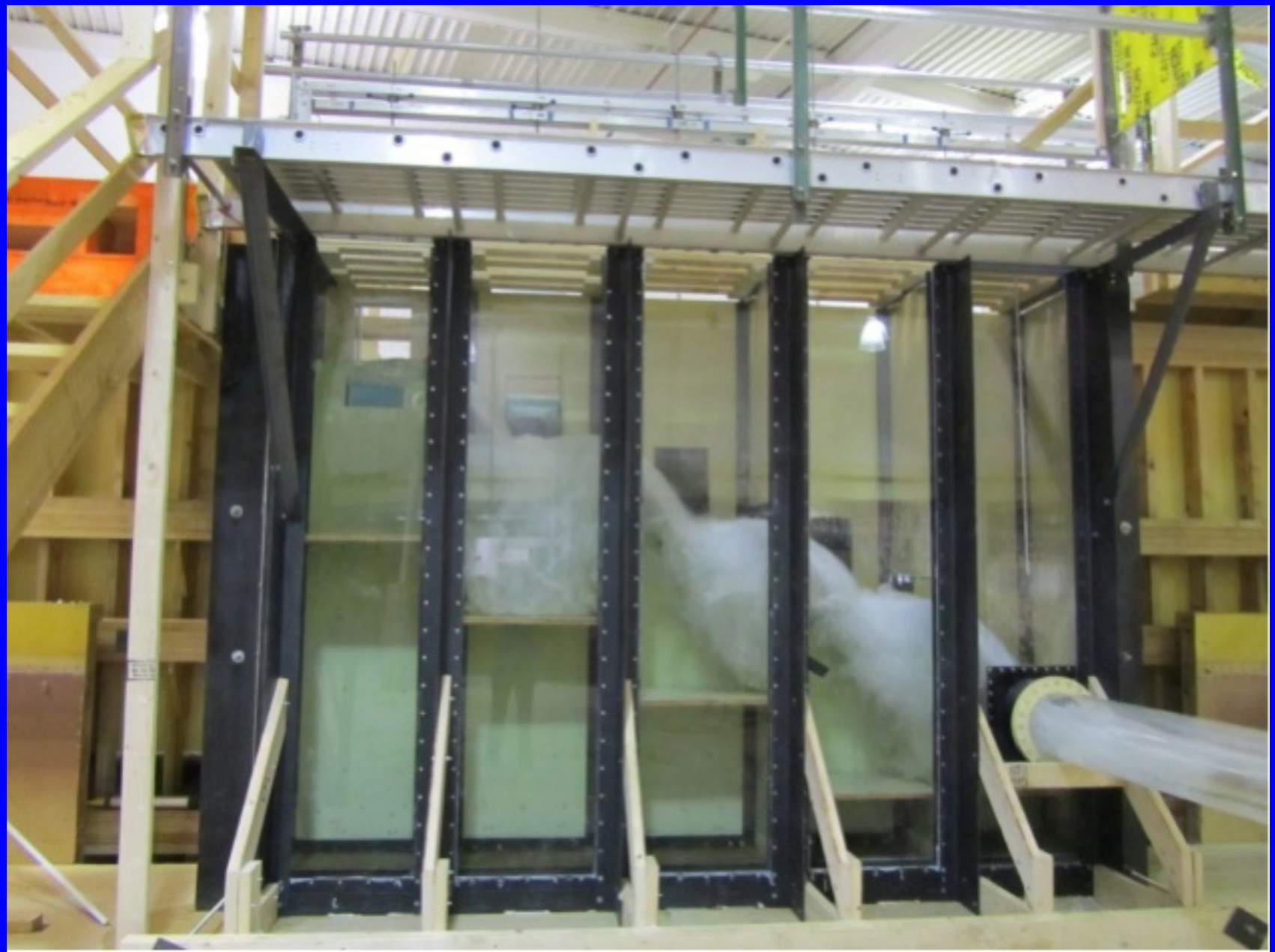

Cle Elum Dam
Multilevel Intake Structure
Interim Juvenile Bypass
Outlet Works
Cle Elum Reservoir
Spillway
Fish Ladder Entrance
Pumps
Cle Elum River
Juvenile Bypass Conduit
Adult Collection Facility
Access Road

Original Design

Eliminated Because: The potential for excessive turbulence in the down well plunge pools inside the multilevel intake structure.



Hydraulic Model of the Original Design



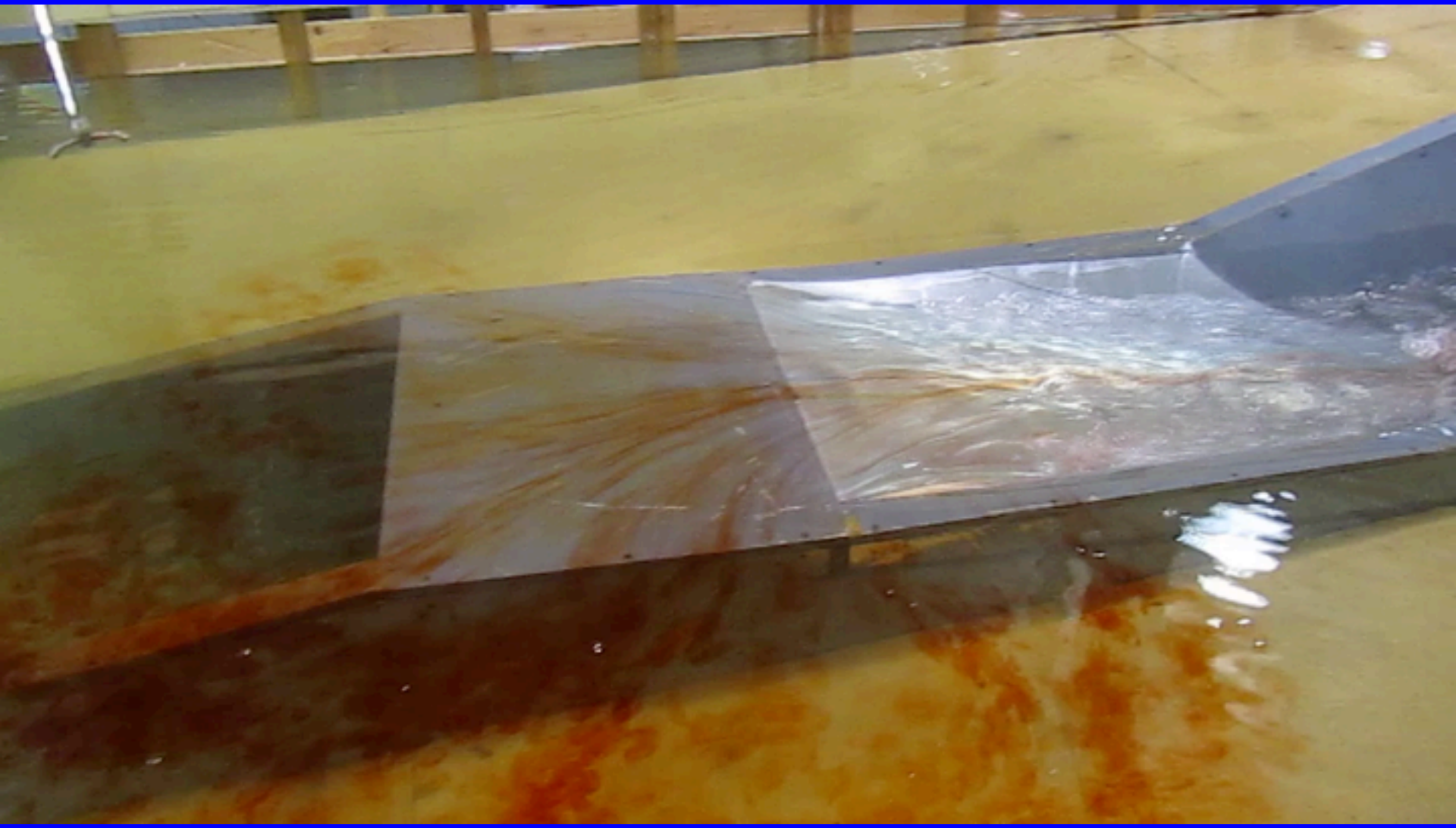
Hydraulic Model of the Original Design (400 cfs)

Initial Inlet Structure

Operating at 400 ft^3/s with Depth Over Sill = 3.5 ft

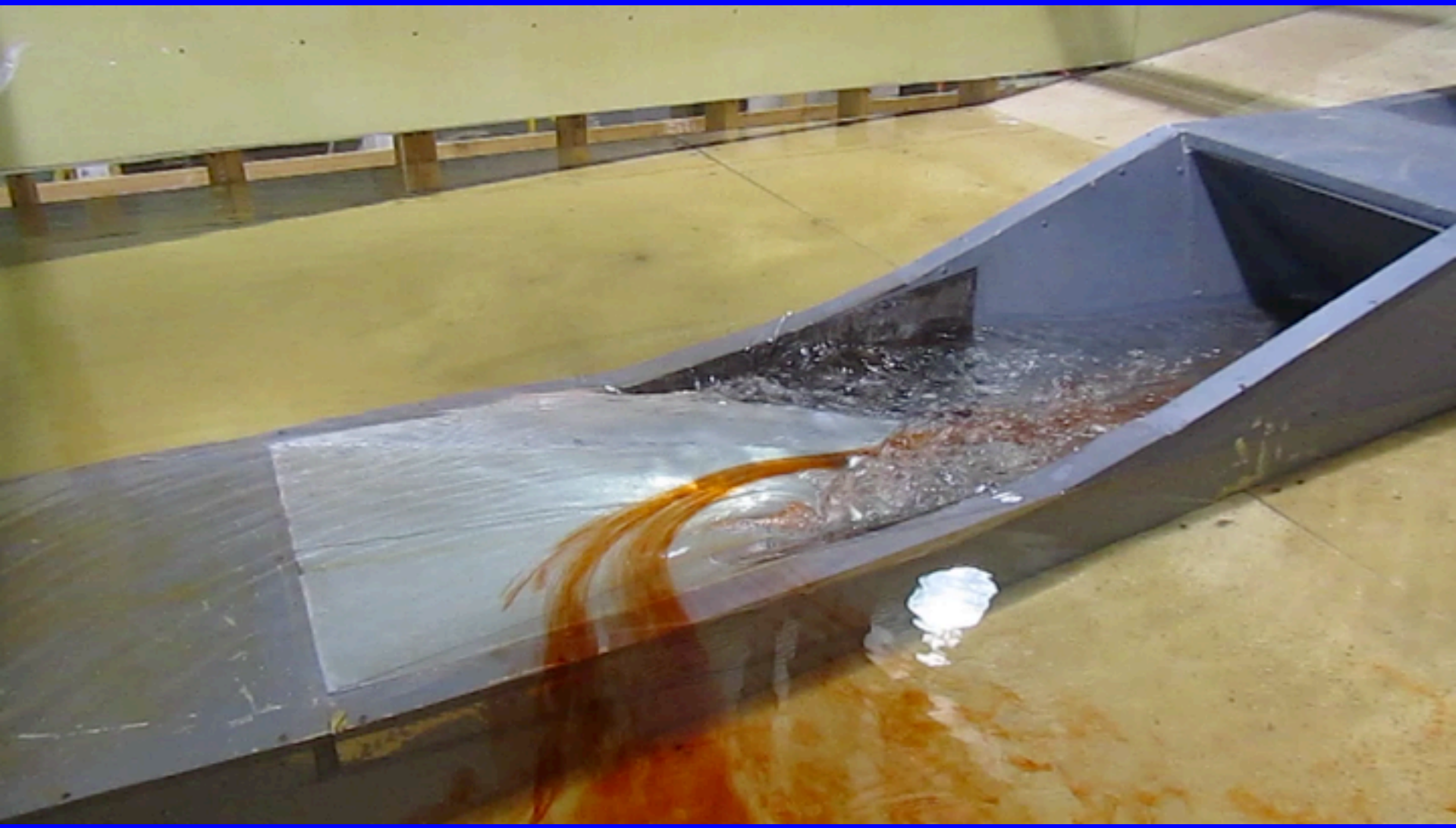
2nd Inlet Structure Design

Operating at 200 ft^3/s

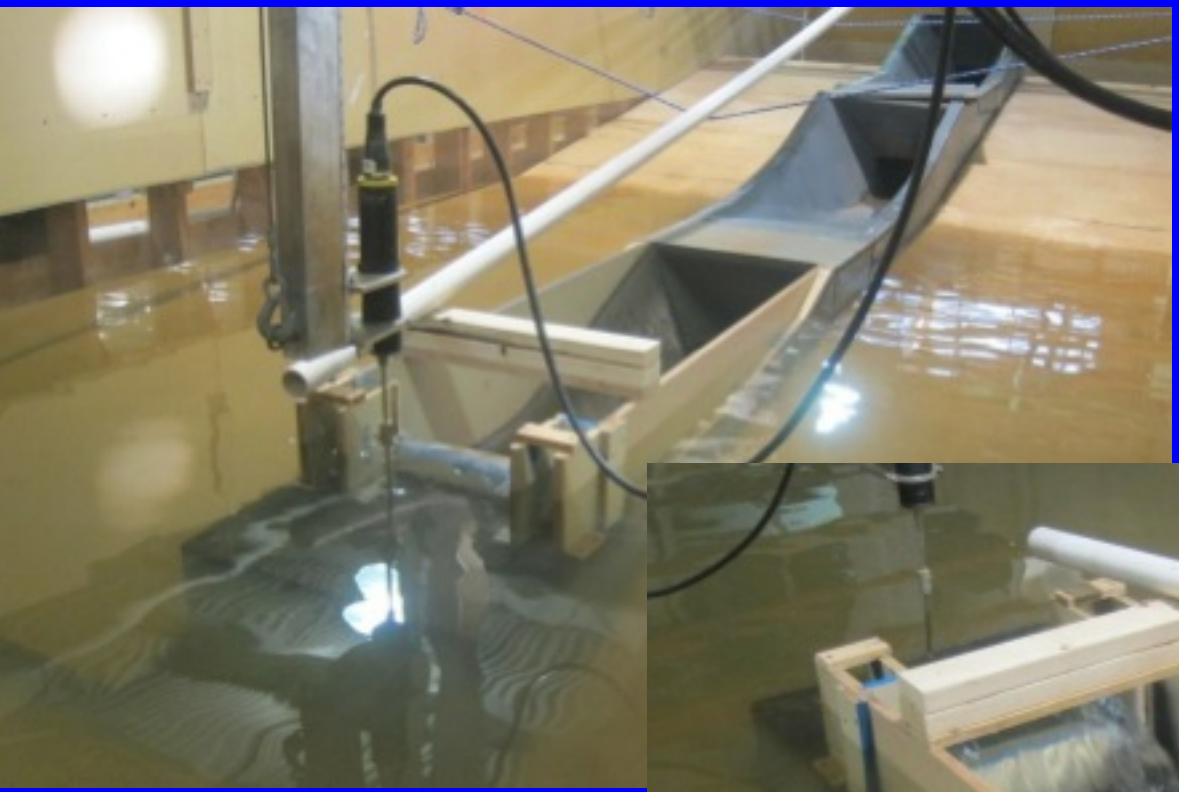


3rd Inlet Structure Design

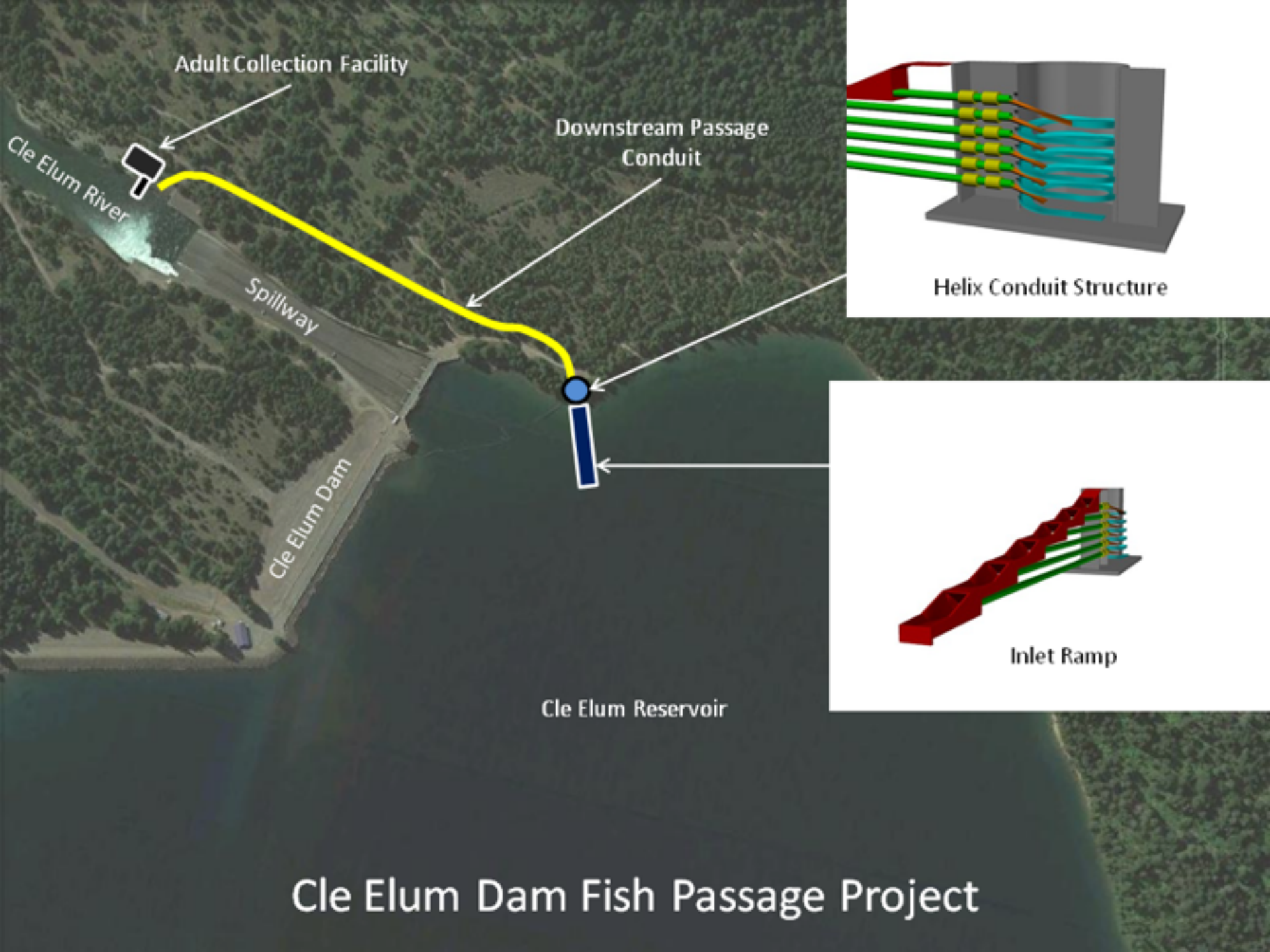
Operating at 400 ft^3/s



4th Inlet Structure Design



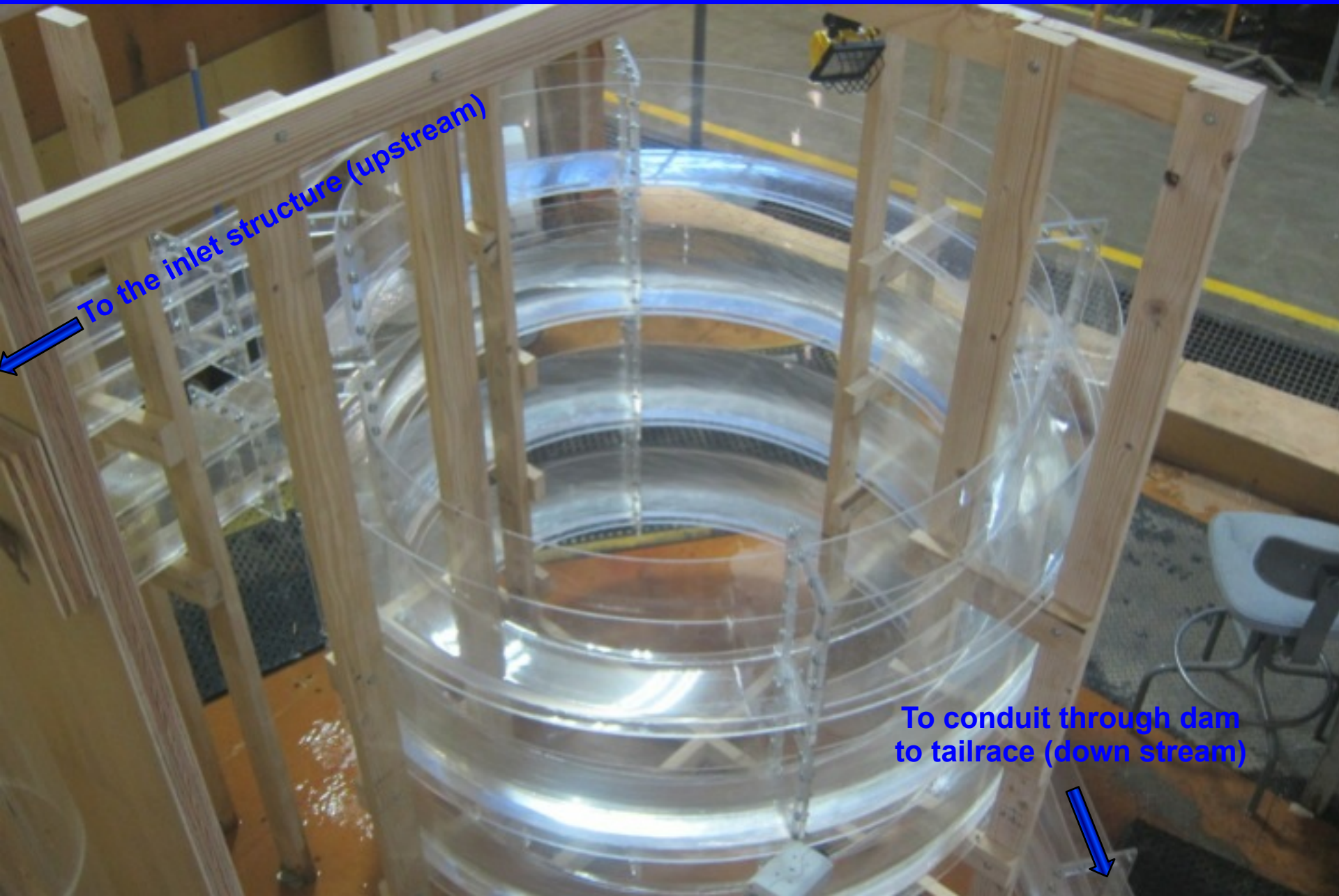
Weir Crest- similar to the interim flume



Cle Elum Dam Fish Passage Project

Helix Tower

Function- moves fish from the inlet structure into conduit bypass through the dam



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: FAST@YAKAMA.COM**

That's All