

# Wanapum Dam Spillway Monolith 4 & Interim Fish Passage Operation Plan



TMT

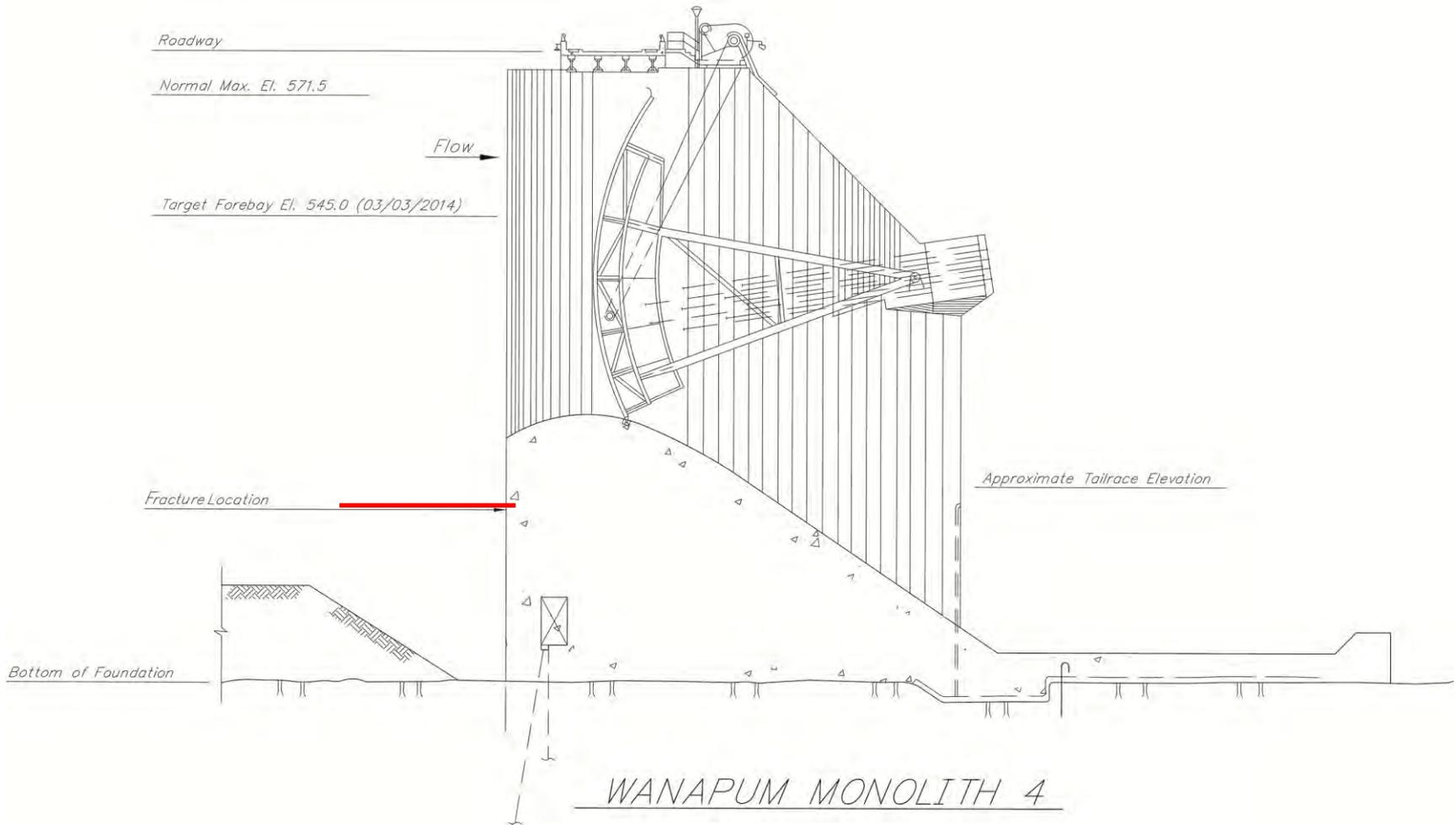
April 2, 2014





1 2 3 4 5 6 7 8 9 10 11 12

# Wanapum Dam



The fracture was found below the water level on the forebay side of the dam.

# Goals and Objectives

- Dam operations
  - Stabilize monolith 4
  - Investigate root cause
  - Intermediate pool raise
  - Full restoration of pool and spillway
- Natural resources
  - Requirements of FERC License Order
  - Fish Passage
  - Hanford Reach Fall Chinook Protection Program
  - Other

# Stabilize Spillway Monolith 4

- **Goal Completed**
  - Monolith settled; crack essentially closed
  - Operating with forebay of 541-545' (25-30' below normal)
  - Emergency Action Plan – Condition C
  - Monolith inspections continue
- Will be revisited once we have determined the exact fracture geometry

# Investigate Root Cause

- Independent Board of Consultants
- Reservoir level remains until following completed;
  1. Define failure – How and why
  2. Can event develop on the other piers
  3. Plan to rehab 4 and other piers as necessary.
- Independent Forensic Investigation Team (FIT)
- BOC and FIT required a series of data and reports to be submitted (~17 reports in development).

# Pier Drilling



# Pier Drilling Video



# Intermediate Pool Raise

- Partial restoration of forebay level to at least minimum operating levels (562').
  - Preliminary estimate July 1
- Board of Consultants require additional information prior to any pool raise
- Draft Repair Plan
  - Pins, anchors, and tendons
  - Minimum two months

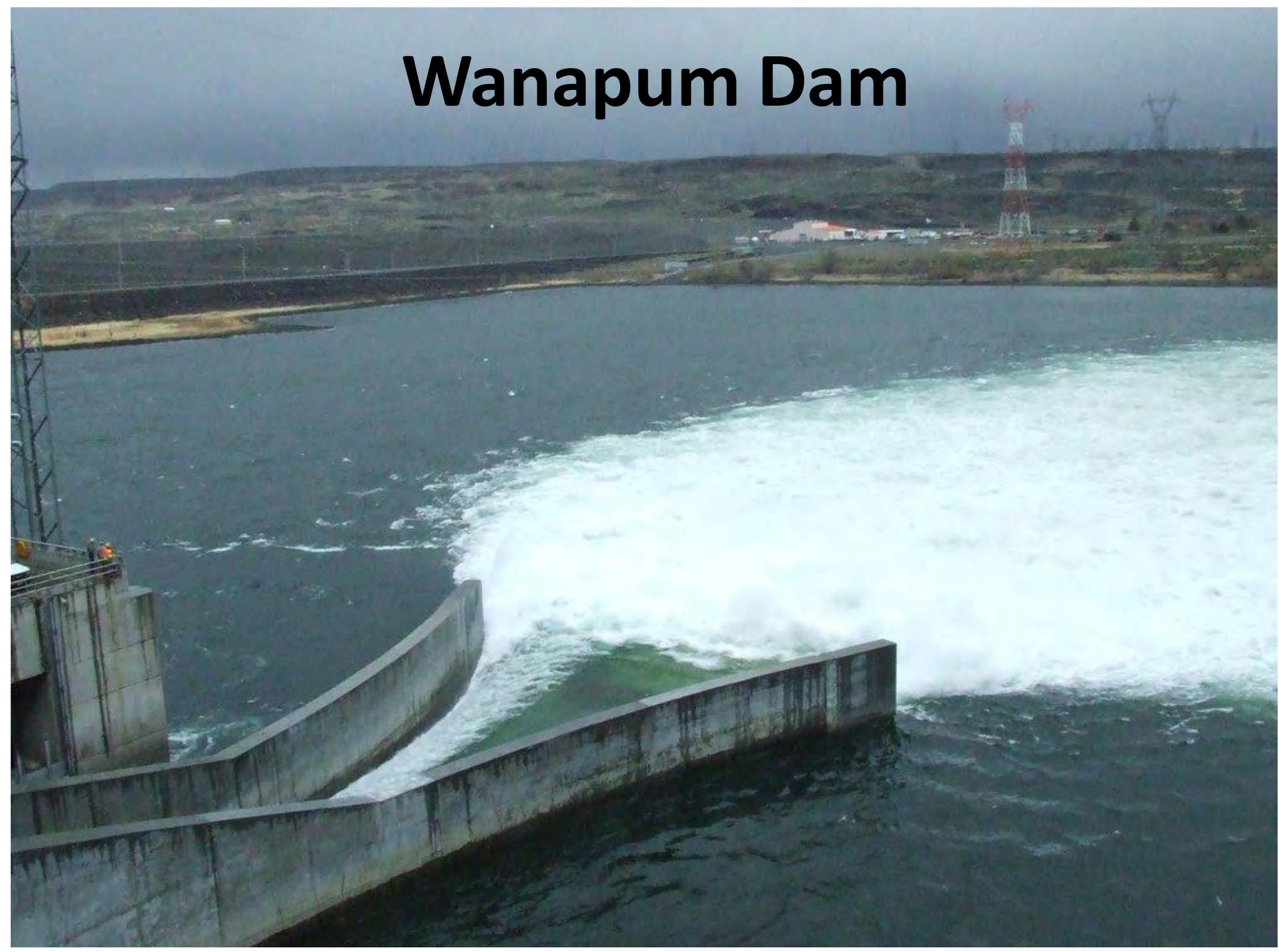
# Fish Passage

- Juvenile bypasses
  - Wanapum – Operating with reduced discharge
  - Priest Rapids – New for 2014
- Wanapum ladder modifications
  - April 15<sup>th</sup>
- Trap and haul
  - April 15<sup>th</sup>



1 2 3 4 5 6 7 8 9 10 11 12

# Wanapum Dam



# Priest Rapids Dam



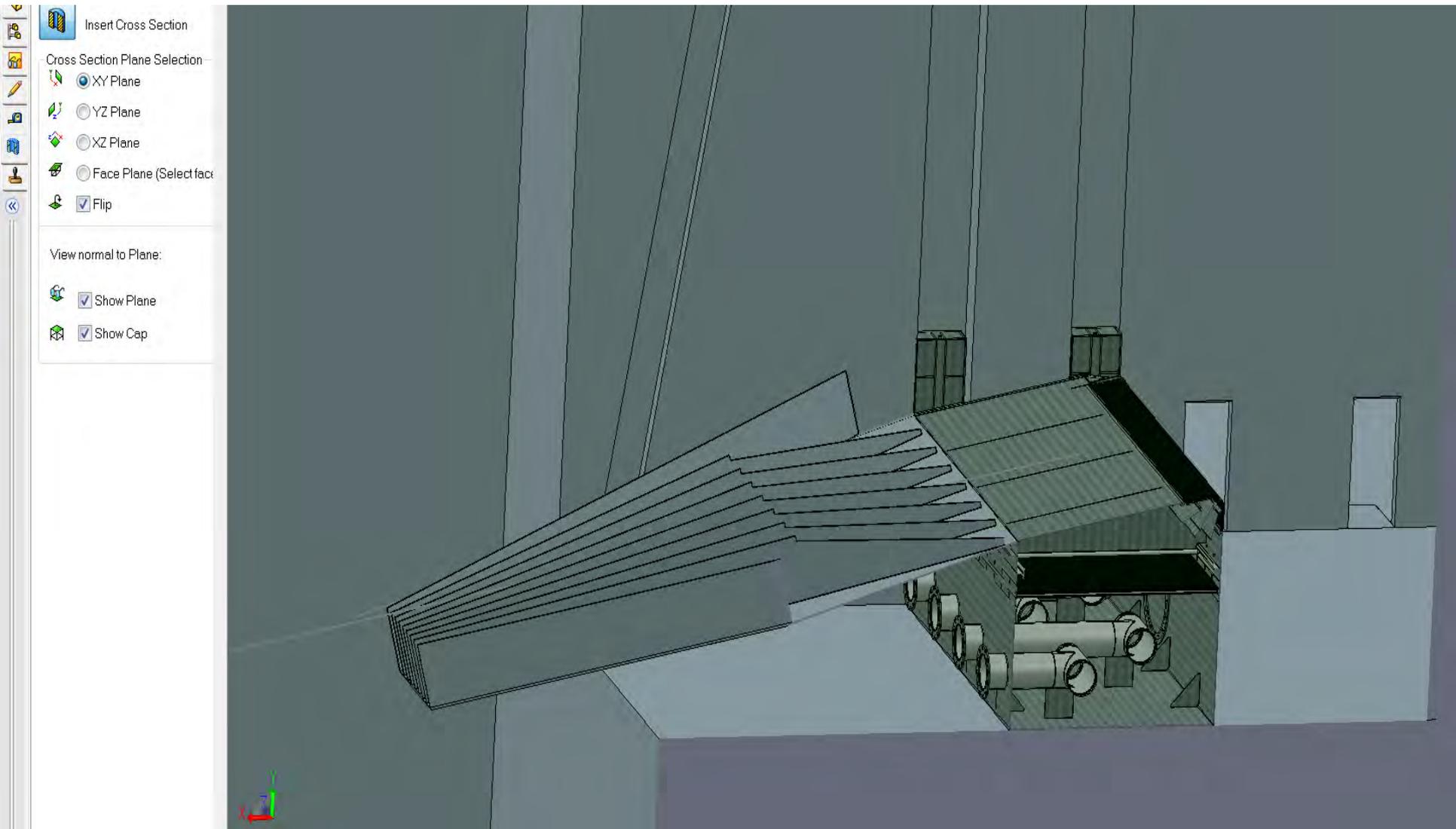
# Wanapum Left Bank Fish Ladder



# Wanapum Left Bank Fish Ladder



# Wanapum Left Bank – Phase I



**Insert Cross Section**

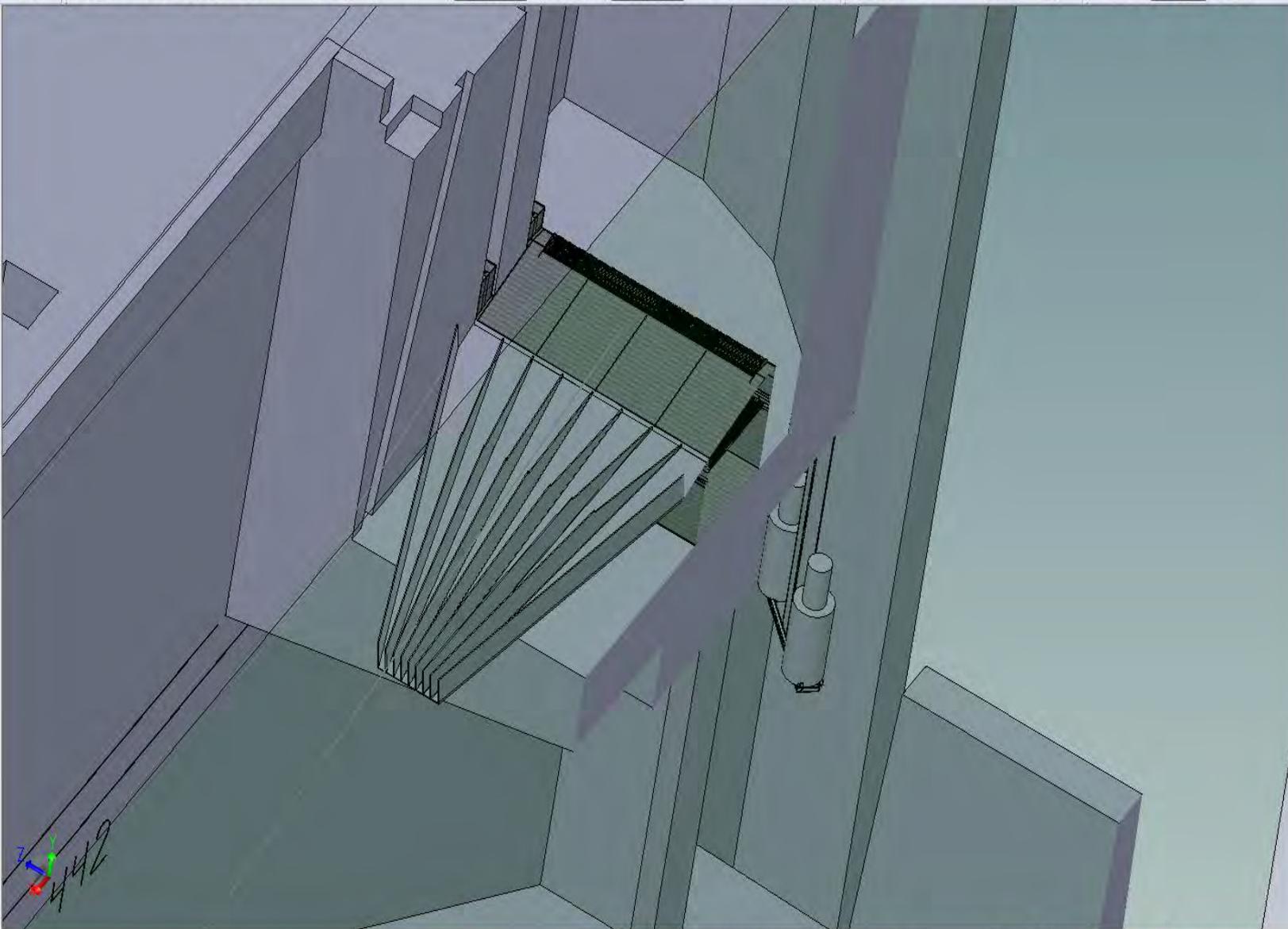
Cross Section Plane Selection -

- XY Plane
- YZ Plane
- XZ Plane
- Face Plane (Select face)

Flip

View normal to Plane:

- Show Plane
- Show Cap

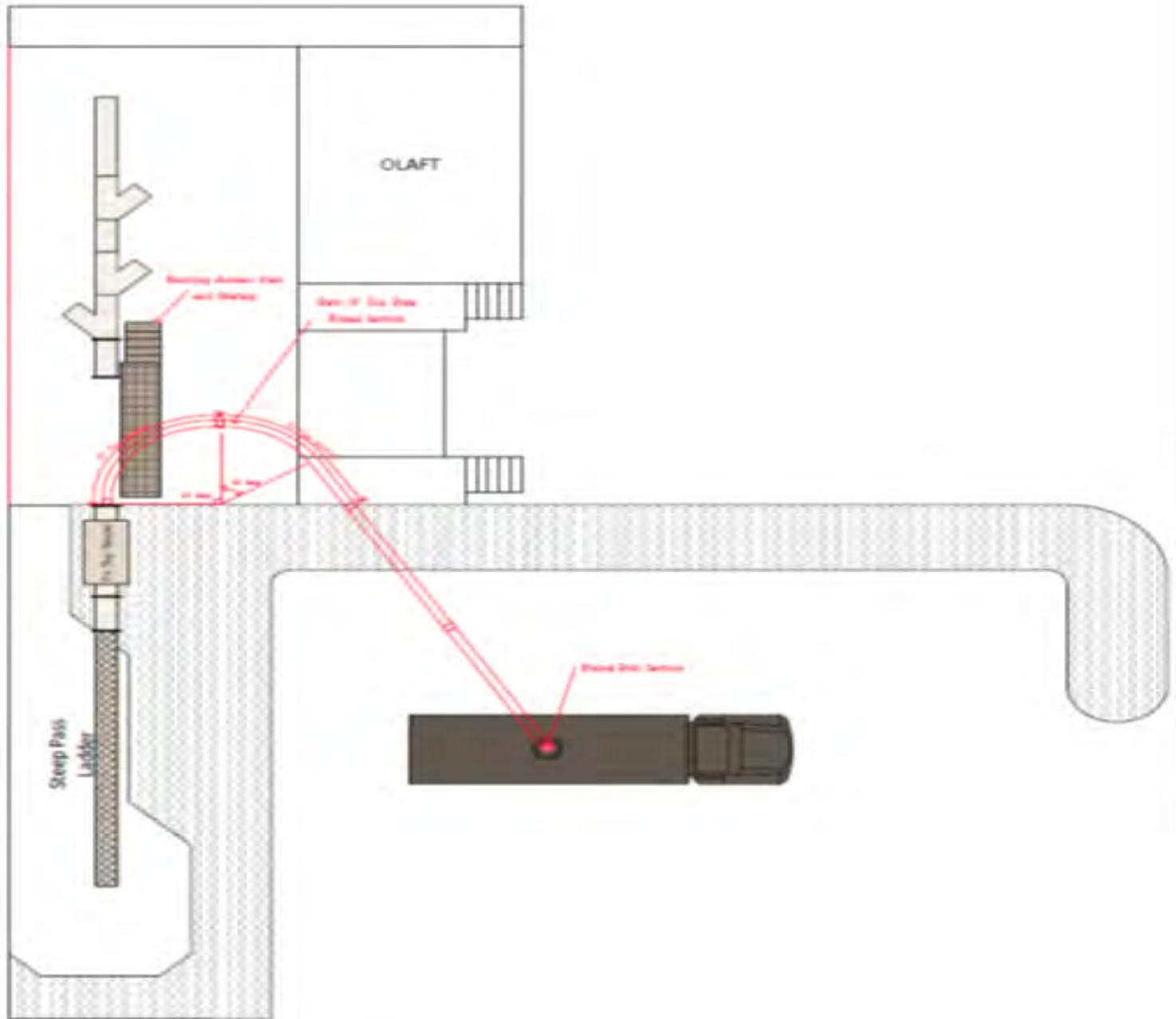


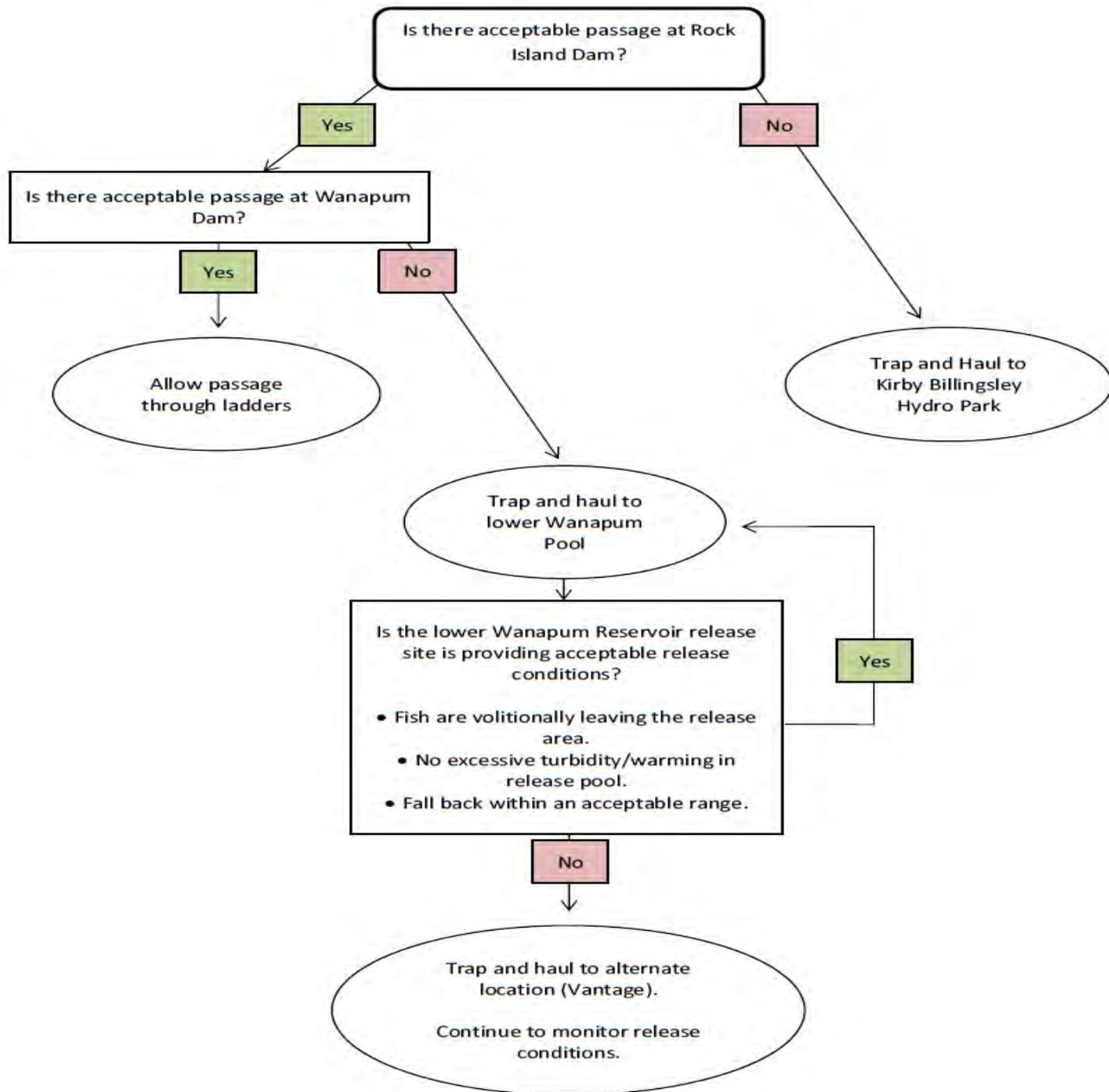
# Wanapum Right Bank Fish Ladder



# Priest Rapids Off Ladder Adult Fish Trap



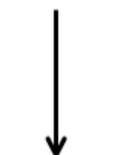




# Adult Salmonid Passage Monitoring

- Detection Infrastructure
  - Priest Rapids Dam right & left bank fishways
  - Priest Rapids off ladder adult fish trap (OLAFT)
  - Temporary systems at Wanapum (right & left fishways)
  - Rock Island Dam
  - Other upstream locations
  - Additional PIT Tags applied at Bonneville
  - Additional PIT Tags applied at OLAFT
  - Stuehrenberg et al. (1995), Bjornn et al. 1997; Peery et al. 1998, English et al. 1999

Intercept and PIT-tag  
500-1000 spring  
Chinook



Bonneville



McNary



Priest



OLAFT

1) Monitor travel time (MCN-OLAFT) to evaluate delays at OLAFT using run-of-river tags



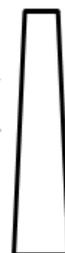
2) Intercept and PIT-tag fish at OLAFT and return to PRD ladder to evaluate Wanapum ladder passage



New PIT array



Wanapum



3) Monitor travel time from WAN to RI

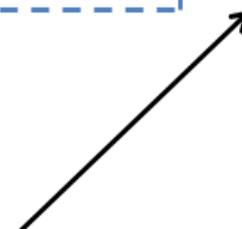


Rock Island



Trap and Haul  
(release location dependent on ladder operations)

4) Monitor trap and haul fish from release to upstream arrays (RR, Wells, Tumwater, etc.)



# Additional Ongoing Work and Priorities

- Decision tree and alternatives analyses
- Adult Salmonid Counting – starting April 1 at Priest Rapids Dam
- Wanapum Dam Temporary PIT Tag array
- Adult Salmonid Passage – PRD – WAN- RIS – Other
  - Review of previous adult passage study information
- Additional PIT Tags at Bonneville Dam (1-2K)
- Additional PIT Tags at PR OLAFT
- Fall back at Wanapum via PIT Tag
- Review of modeling data for WFUB
- Review of hill curve data for Wanapum turbines
- Review of Wanapum spillway information
- Acoustic telemetry
- Juvenile salmonid run-of-river PIT Tag
  - OSU/Realtime Research 5,500 yearling Chinook; 5,500 juvenile steelhead
- Stranding of benthic fauna
- Water Quality Transect Monitoring
- Aerial photography and mapping

# Summary

- Approximately 200 people working on this
  - Internal, consultants, and independent experts
- Expect extended reduced forebay elevation
  - Minimum July 1
- All passage routes available for juveniles
- Ladders and trucking operational April 15<sup>th</sup>
- Extensive monitoring and adaptation
- Decision trees under development
- Direct interaction with agencies and tribes
- <http://grantpud.org/your-pud/media-room/wanapum-dam-spillway-response>