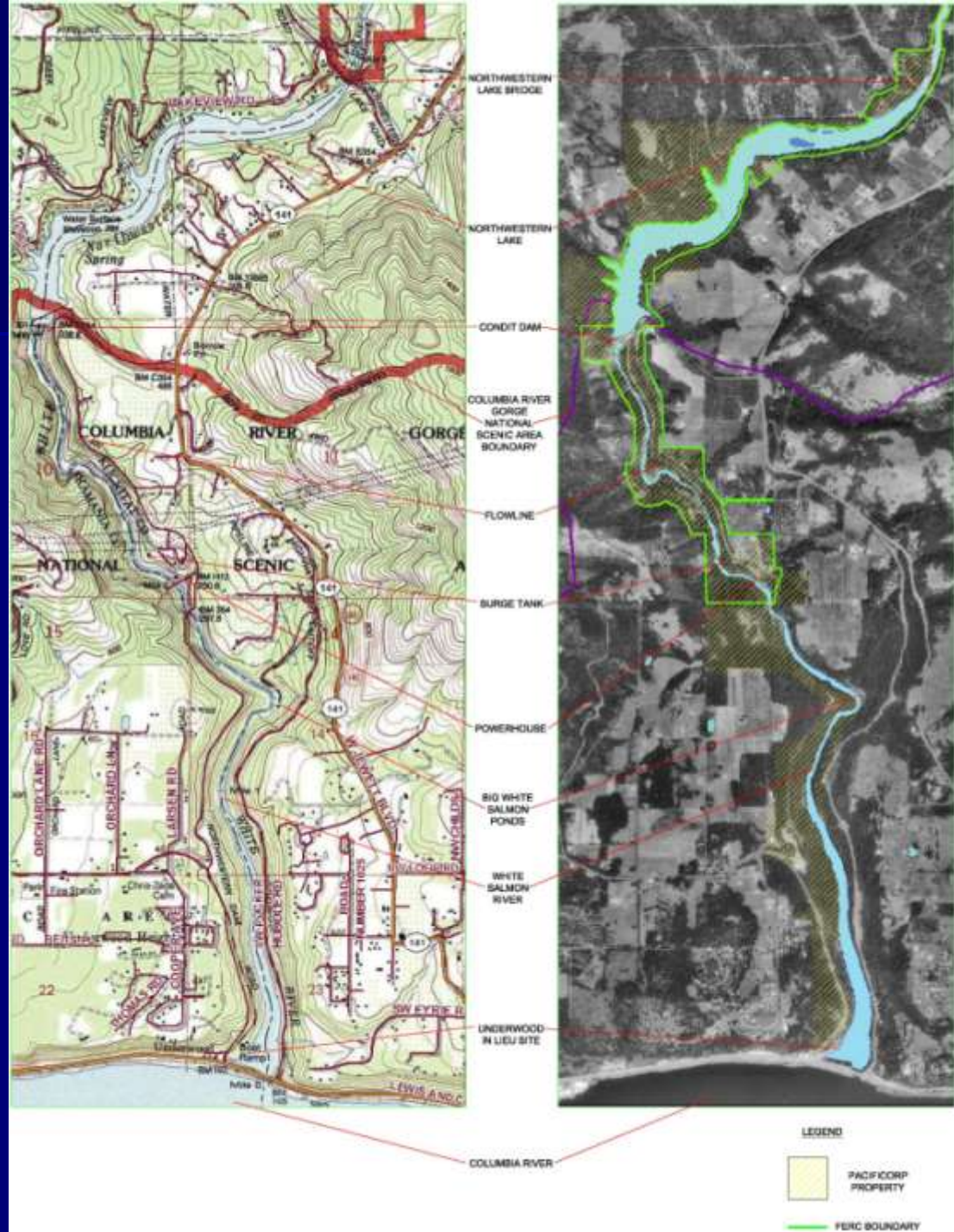


# Condit Project Decommissioning

**Presentation for Klickitat and  
White Salmon Rivers Conference  
March 2011**

# Project Location



# Project Overview

## ■ Reservoir

- 11,000 feet long, covering 92 acres
- Supplied by 386 square mile basin that extends to Mt. Adams
- Contains 2.4 million yds<sup>3</sup> of reservoir sediment



# Project Overview

## ■ Dam

- Concrete gravity dam, 125' high by 471' long
- 250'-long spillway
- One 10'Hx167'L Obermeyer gate
- Five radial gates 10'-wide x 10' high
- One vertical lift gate, 6' x 12'



# Project Overview

## ■ Water Conveyance

- 13.5' diameter by 5,100-foot-long wood stave flowline
- 40-foot diameter concrete surge tank
- The flowline bifurcates into 2 penstocks, 9' diameter x 650' long
- One penstock is steel pipe, while the other is wood stave



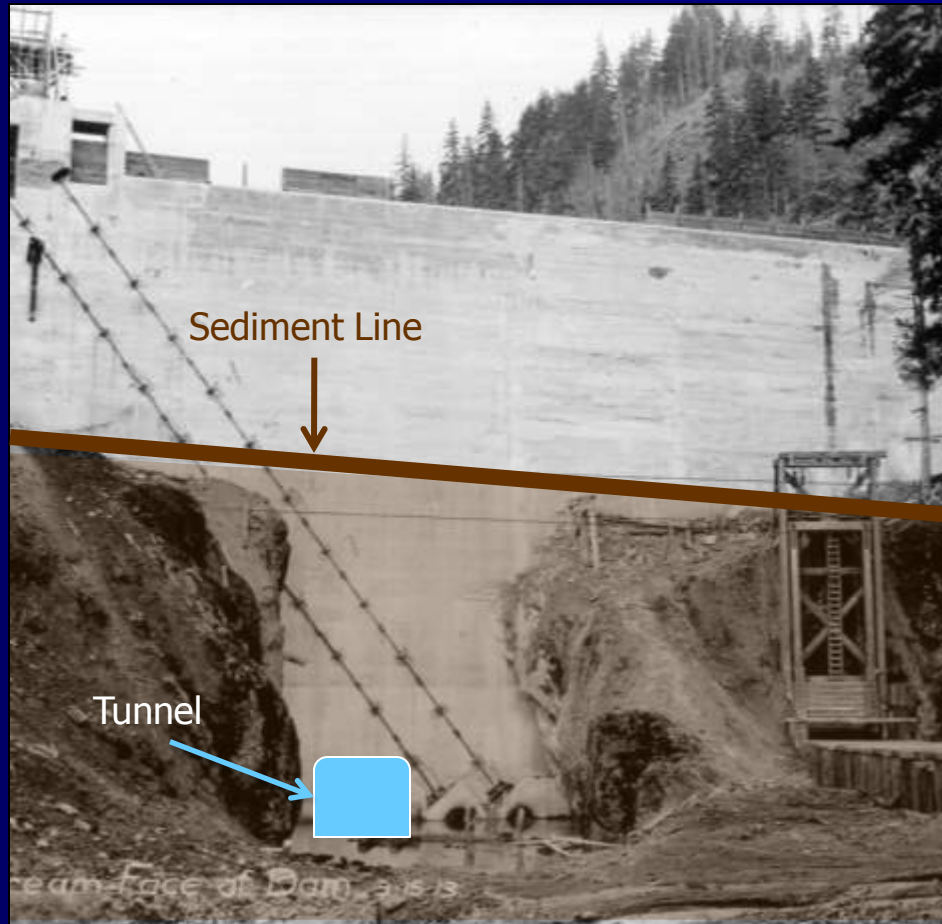
# Project Overview

## ■ Powerhouse

- Capacity: 13.7 megawatts
- 2 double horizontal Francis turbines
- 77,850 megawatt-hours per year

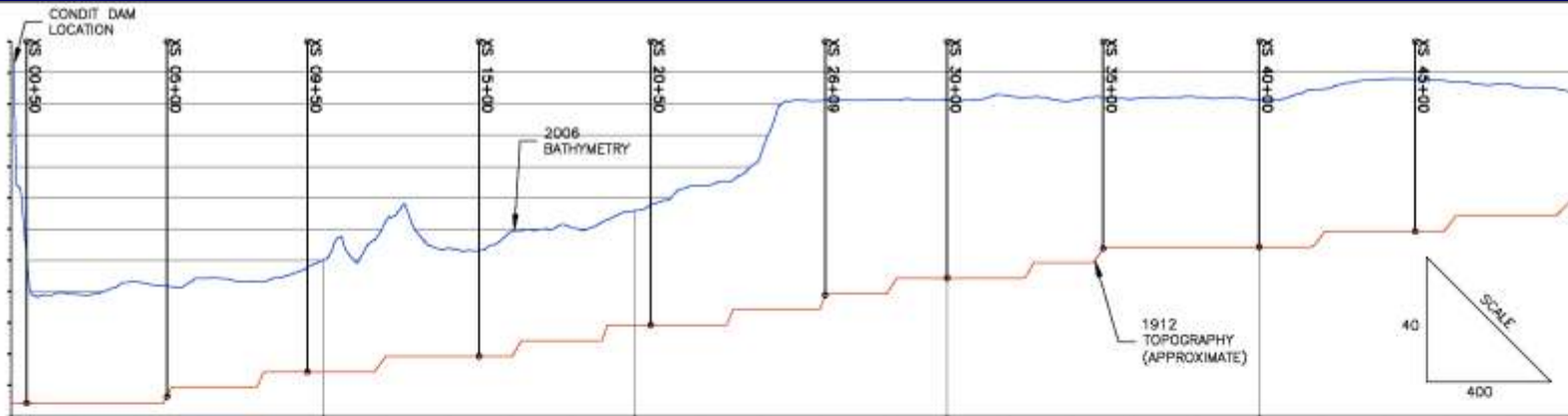


# Facilities Removal Dam

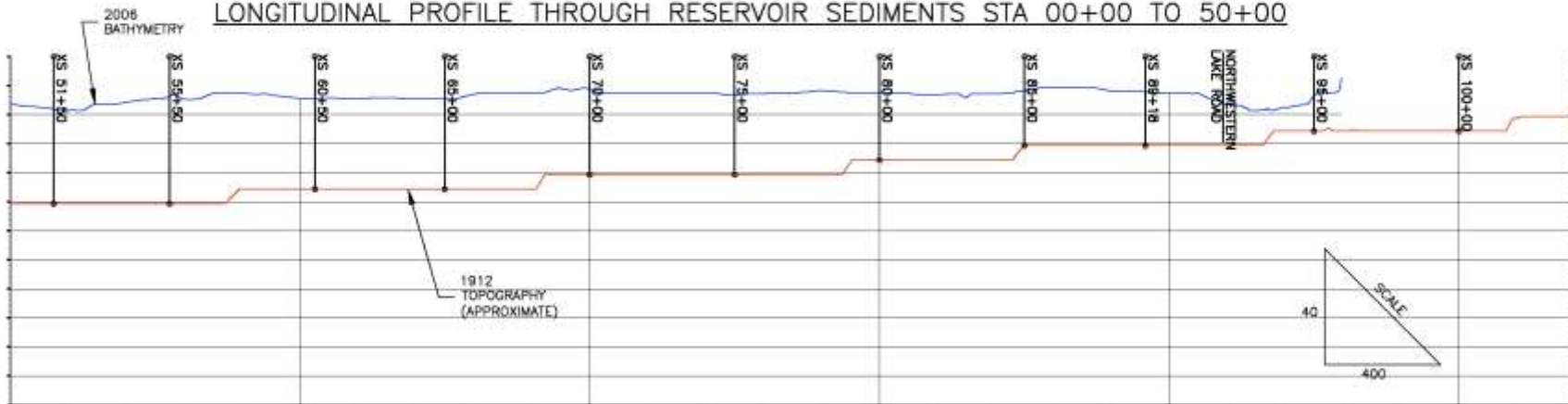


## Key Elements:

- Remove dam and old construction facilities
- Breach dam through tunnel
- 1.6 to 2.2 million cubic yards sediment released (75% fines)
  - Removed during initial breach and in following 1-3 years
- Re-contour shoreline for slope stability and public safety



LONGITUDINAL PROFILE THROUGH RESERVOIR SEDIMENTS STA 00+00 TO 50+00



LONGITUDINAL PROFILE THROUGH RESERVOIR SEDIMENTS STA 50+00 TO 104+00

NOTE:  
SURFACE TOPOGRAPHY INFORMATION PROVIDED BY OTHERS.

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE WASHINGTON STATE COORDINATE SYSTEM, SOUTH ZONE, NAD 83 CORSB6 EPOCH: 2002.0000 IN US SURVEY FEET.

THE VERTICAL DATUM IS CONDIT DATUM (PACIFIC POWER CONDIT PROJECT DATUM). THE VERTICAL DIFFERENCE BETWEEN NAVD 88 ELEVATIONS AND CONDIT DATUM ELEVATIONS IS -9.30 FOR THE CONDIT PROJECT DATUM.

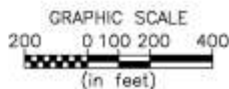
ELEVATIONS AND CONTOURS ARE ON CONDIT DATUM. TO CONVERT TO NAVD 88, ADD 9.30 FEET.

CENTERLINE ALIGNMENT USED FOR PROFILE INFORMATION REPRESENTS THE 1912 CHANNEL ALIGNMENT FOR THE WHITE SALMON RIVER.

THE PROFILE IS CUT ALONG THE 1912 THALWEG (LOW FLOW CHANNEL) OF THE WHITE SALMON RIVER.

LEGEND

-  2006 BATHYMETRY
-  1912 TOPOGRAPHY (APPROXIMATE)
-  CROSS-SECTION LOCATION





CONDIT DAM DECOMMISSIONING  
NORTHWESTERN LAKE - PROFILE  
THROUGH RESERVOIR SEDIMENTS

PACIFICORP ENERGY



**Table 2.3 Size Distribution of Reservoir Sediment**

<b>Material Description</b>	<b>Minimum Size (millimeters)</b>	<b>Maximum Size (millimeters)</b>	<b>% of Material</b>	<b>Volume (cubic yards)</b>
Clay		0.004	7.4	178,257
Silt	0.004	0.0625	28.8	697,783
Very Fine Sand	0.0625	0.125	23.6	571,936
Fine Sand	0.125	0.25	16.2	392,217
Medium Sand	0.25	0.5	10.8	260,805
Coarse Sand	0.5	1	7.6	183,103
Very Coarse Sand	1	2	2.3	56,695
Very Fine Gravel	2	4	1.1	25,938
Gravel and larger	4		2.3	54,805
		<b>Total</b>		2,421,539

# Facilities Removal - Dam

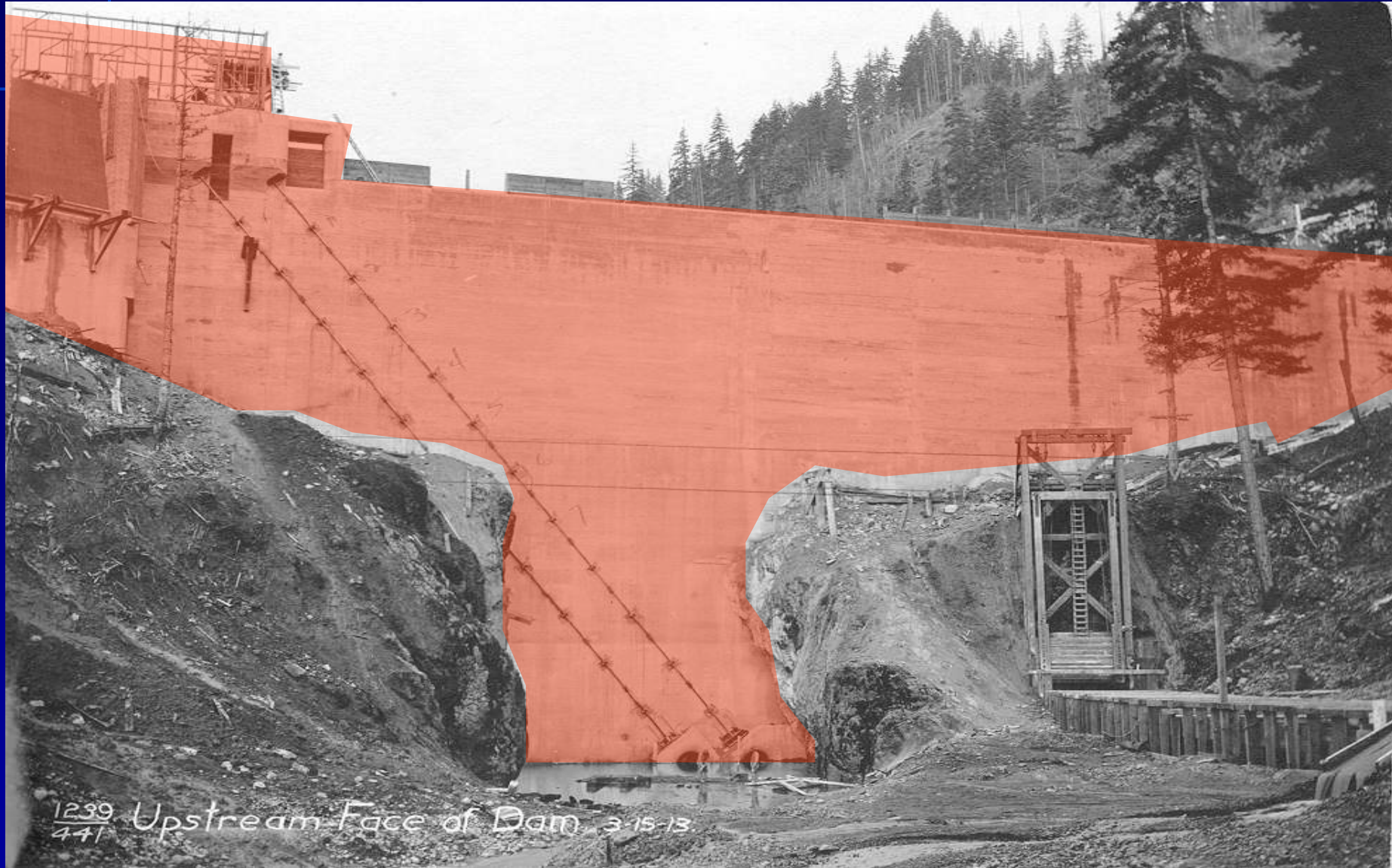
Sediment Assessment, Stabilization, and Management Plan

**Sediment &  
Woody Debris  
Removal**

**Tunnel**



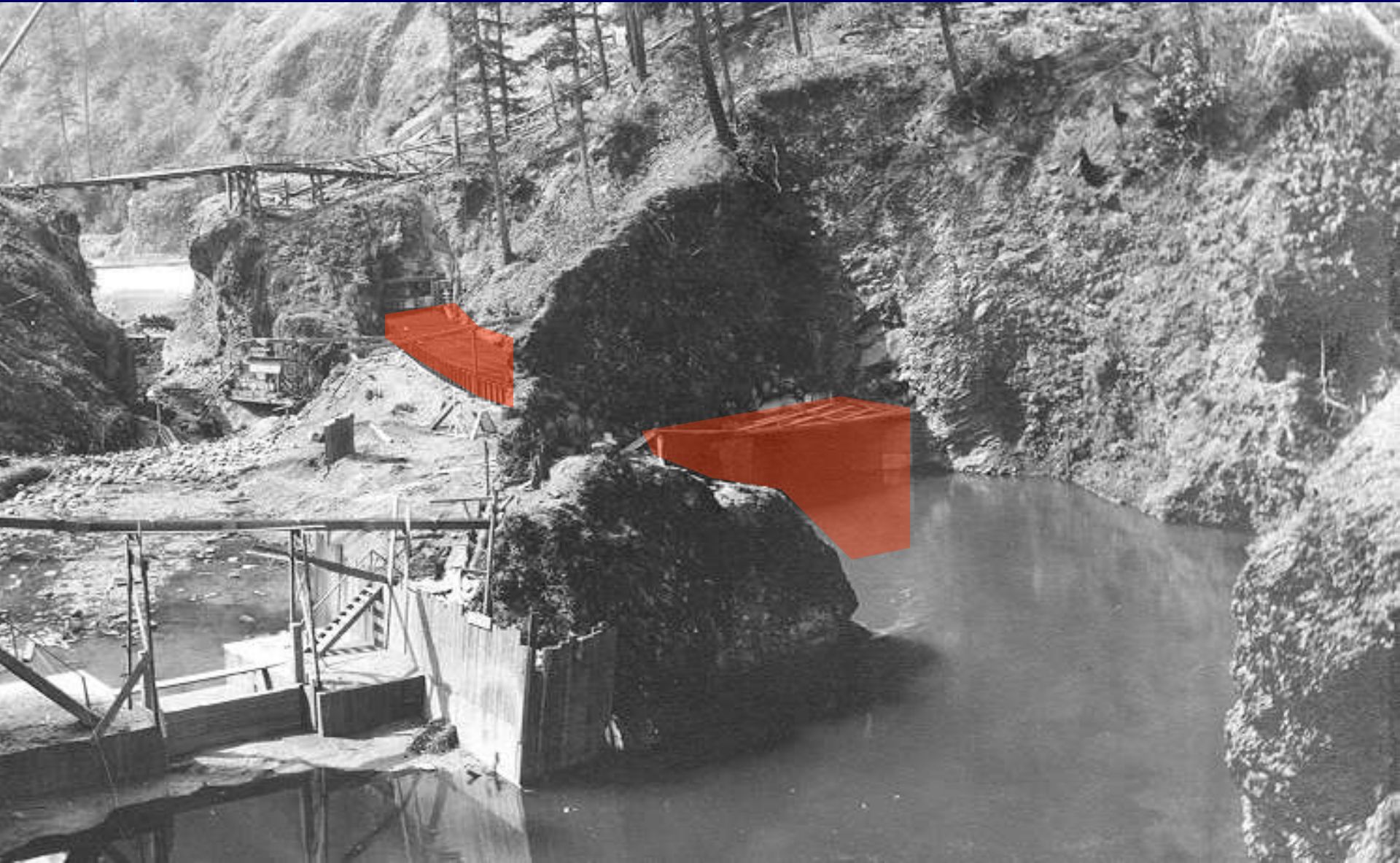
# Facilities Removal Dam



1239  
441 Upstream Face of Dam 3-15-13

# Facilities Removal

## Tunnels & Flumes Used in Construction



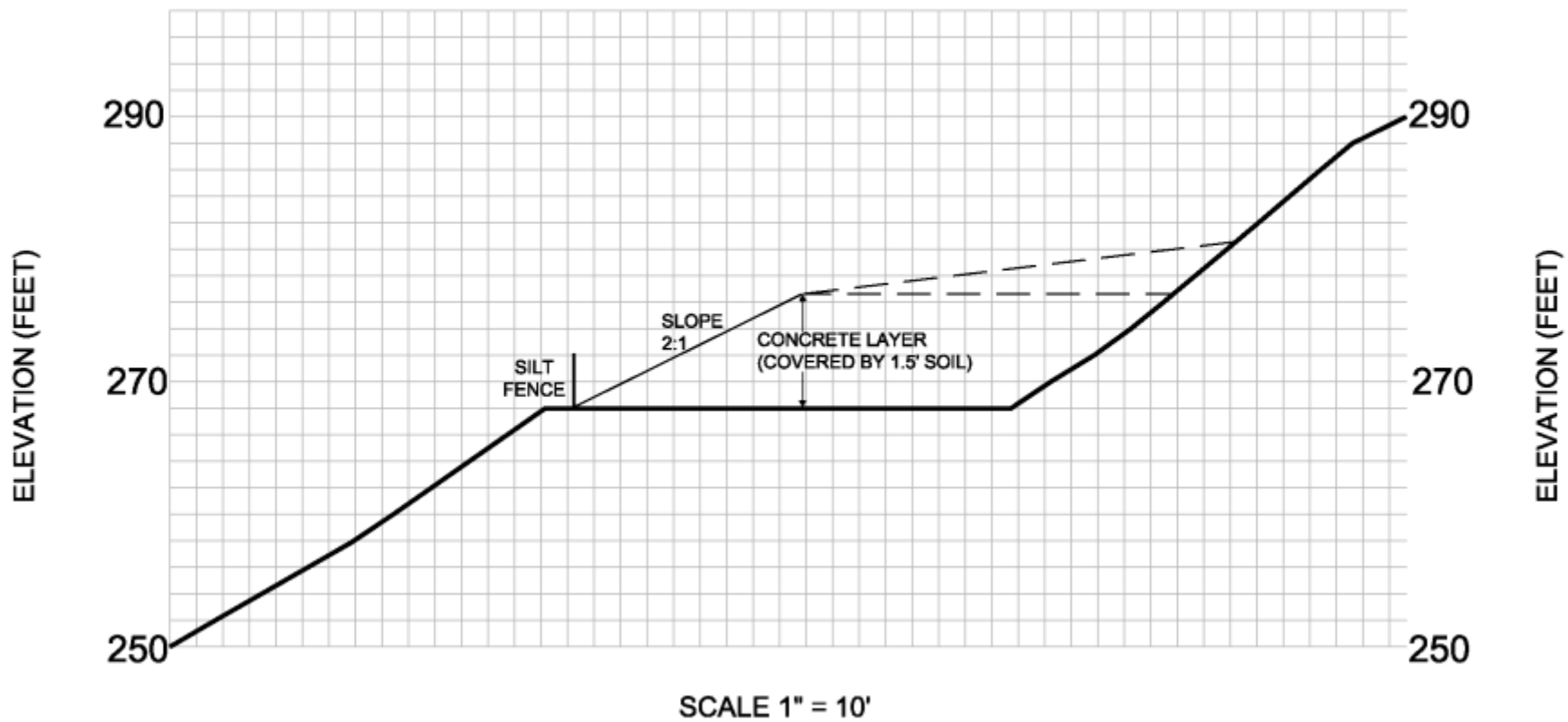
# Facilities Removal Flowline



# Facilities Removal Flowline & Penstocks

- Remove flowline timber framework, wood stave pipe, and concrete thrust block
- Use flowline alignment for concrete disposal
- Cover and revegetate for restoration
- Penstocks removed up to the powerhouse
- Seal penstocks with concrete bulkheads





# Facilities Removal Tailrace

Powerhouse is not removed





# Sediment/Water Quality Predicted Effects

- At breach the river will be very muddy, laden with fine sediment - 76,000 NTUs turbidity
- Turbidity will dissipate as it mixes with the Columbia River - 790 NTUs turbidity in Columbia River three miles downstream
- Turbidity decreases exponentially with time, episodic events during restoration of former reservoir
- Variables – incomplete mixing, preferential flow patterns, river bed geometry, other hydrodynamic factors

# Expected Outcomes

## Increased River Habitat

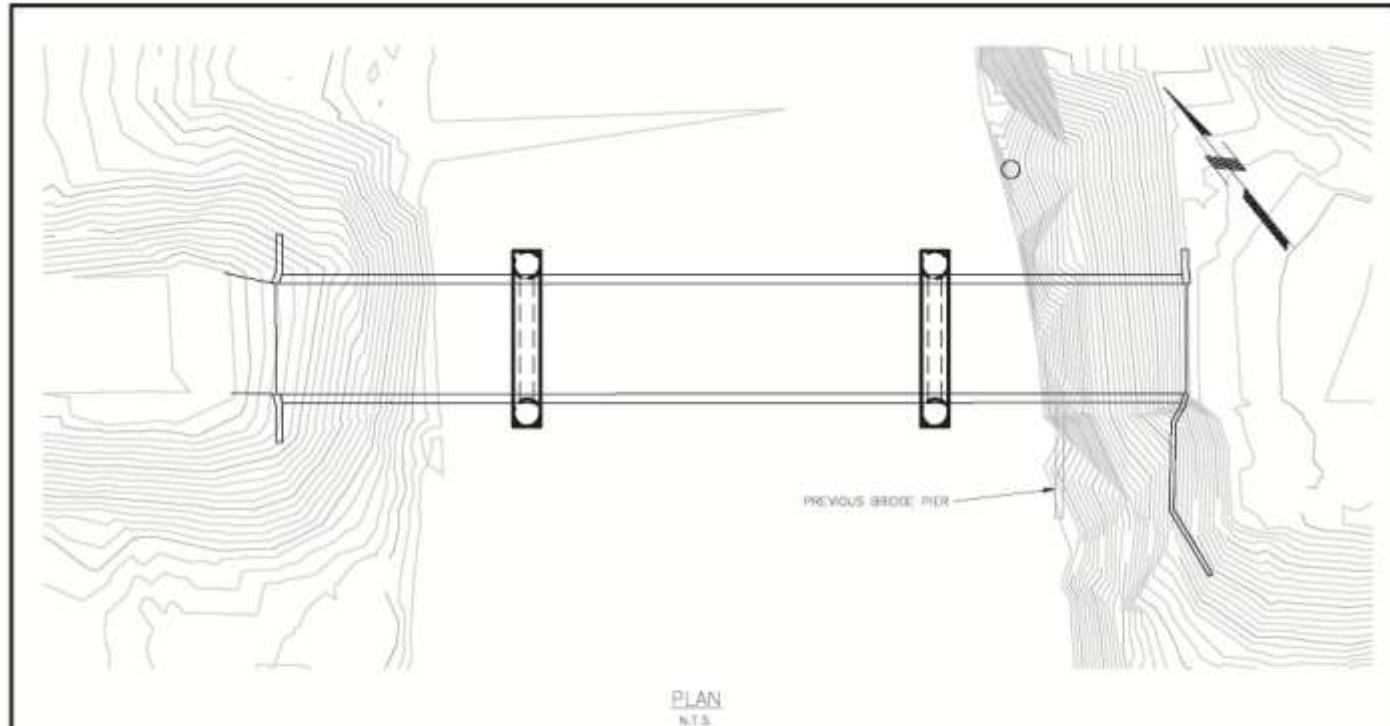
- 18 – 33 miles of potential river habitat available to steelhead and salmon
- Restoration of natural runs of anadromous fish upstream of the dam
- Benefit wildlife dependent upon anadromous fish
- Restore the conservation value of designated critical habitat in the lower White Salmon River
- By increasing summer flows in the bypass reach, temperatures may be restored to cooler conditions
- Unregulated flows are expected to restore the transport of sediment and large woody debris through the former reservoir and lower White Salmon River which will benefit habitat quality
- Increase whitewater recreation opportunities

# Northwestern Lake Bridge

- Construct new bridge piles
- Minimize disturbance
- Concrete BMPs
- No discharge of turbid construction water to river
- No old material into waters of the state
- Shutdown river to boaters
- Routine single lane restrictions; at least one 24-hour closure
- Construction June-September



# Northwestern Lake Bridge



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PROJECT NO. 86540  
 DRAWN: 05/10  
 DRAWN BY: TLK  
 CHECKED BY: SC  
 FILE NAME: 86540F2.FH10

**PLAN VIEW  
 DRILLED SHAFT  
 ALTERNATIVE**

NORTHWESTERN LAKE BRIDGE

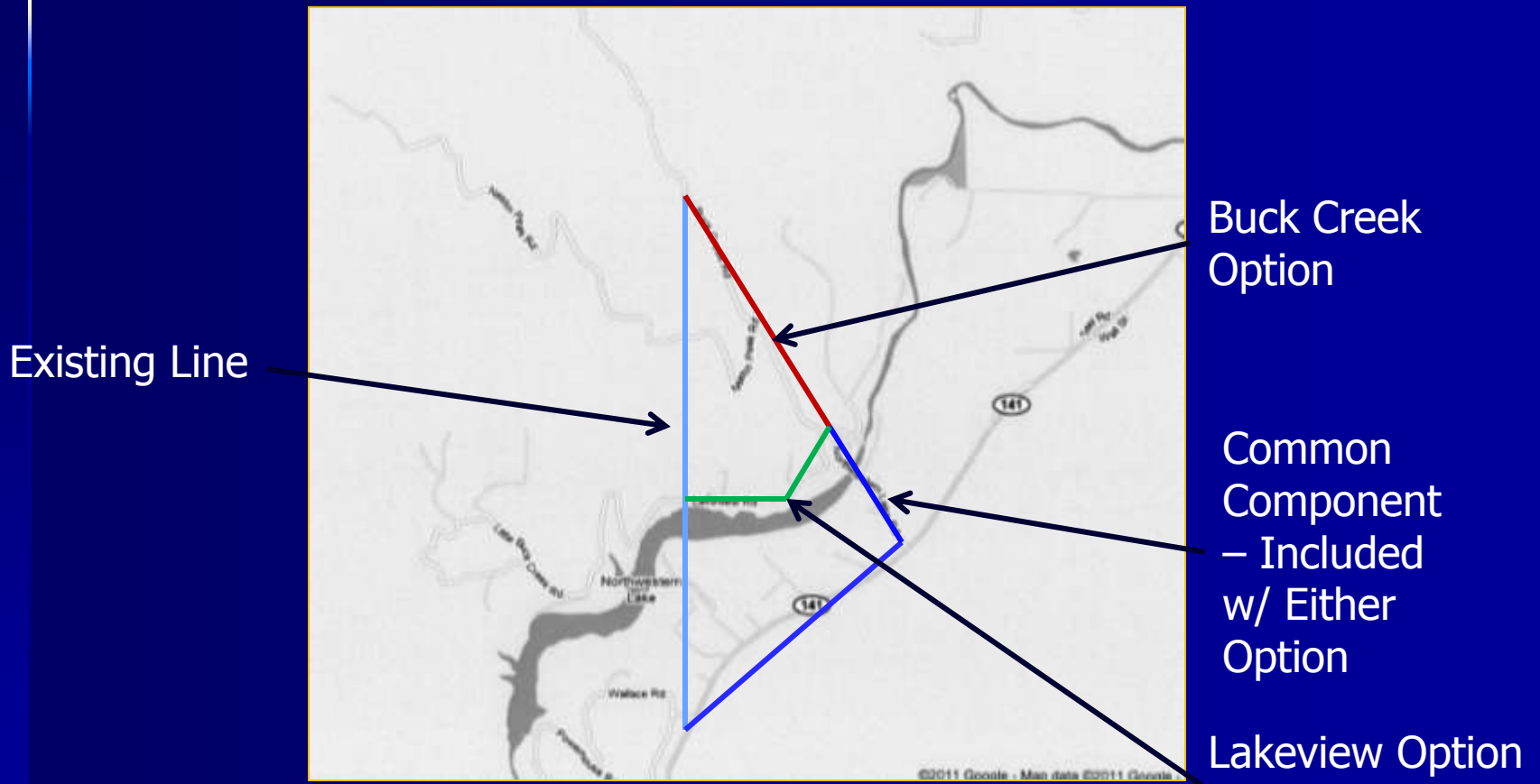
FIGURE:  
**5**

# City of White Salmon Waterline

- Construct 11,000 to 14,000 foot new waterline to cross at bridge
- Completion needed prior to dam breach
  - Per agreement, city to manage construction
  - Construction May – October



# City of White Salmon Waterline



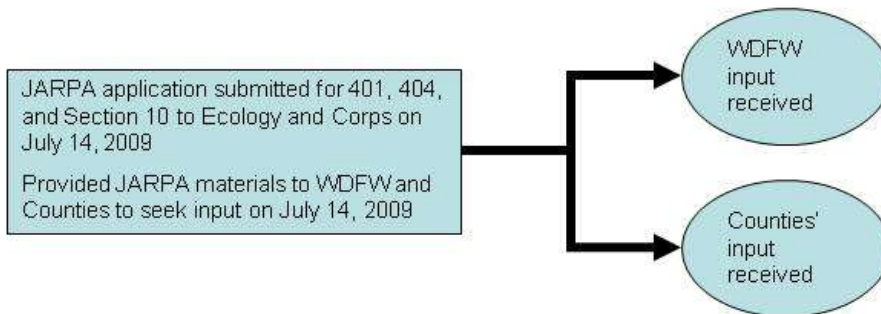
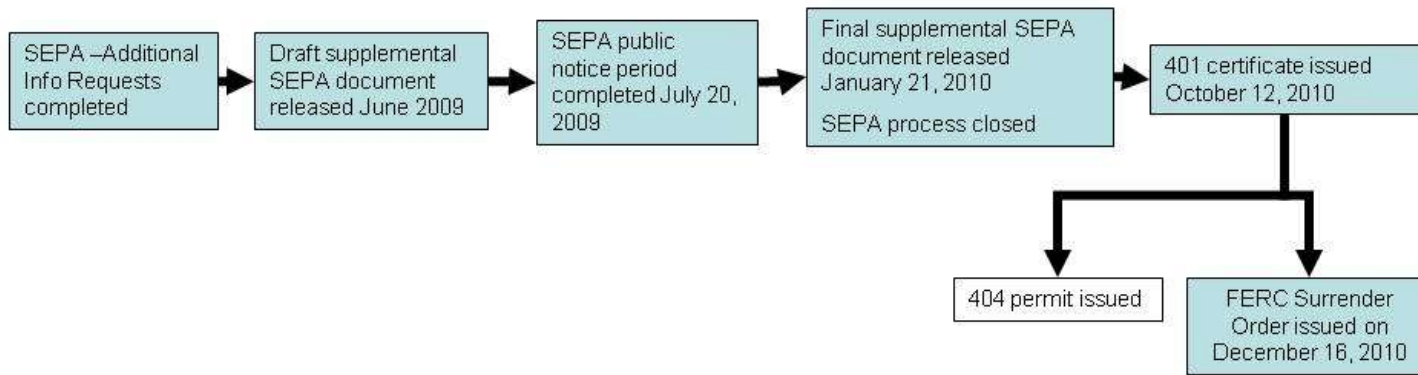
# Management Plans

- Project Removal Design Report
- Aquatic Resource Protection Plan
- Dust Control Plan
- Environmental Monitoring Plan
- Erosion Control Plan
- Historic Properties Management Plan
- Public Safety and Traffic Control Plan
- Quality Control and Inspection Plan
- Recreation Facility Removal and Improvement Plan
- Revegetation and Wetlands Management Plan
- Sediment Assessment, Stabilization, and Management Plan
- Spill Prevention, Control and Countermeasure Plan (SPCC Plan)
- Woody Debris Management Plan

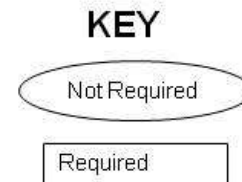
# Regulatory Pathway

## CONDIT PERMITTING SCHEDULE

2/16/2011



SEPA – State Environmental Policy Act  
 JARPA – Joint Aquatic Resource Permit Application  
 WDFW – Washington Department of Fish and Wildlife  
 FERC – Federal Energy Regulatory Commission



Shaded = Complete



# Clean Water Act Section 401

- Clean Water Act § 401 prohibits federal agencies (*e.g.*, FERC) from approving dam removal unless Washington State certifies that the removal will comply with its EPA approved water quality standards
- Washington certified the decommissioning project based on a compliance schedule that can last for a 10-year period
- A compliance schedule is an enforceable sequence of measures to bring an activity into compliance with a legal requirement by a specified date

# FERC Surrender Order

- Provides for the decommissioning as proposed by the Settlement Agreement
- Establishes consultation requirements with certain parties and FERC
- Requires FERC approval prior to start of work
- Waived Ecology's 401 and associated water quality requirements
- Cease generation no later than October 1, 2011
- Limited in-water work period to Oct/Nov and July/Aug
- Sediment management plan
- Sediment mapping and testing
- Develop plan and protect natural gas pipeline
- Additional plans, drawings, and specifications
- Establish fish protective pockets in drain tunnel
- Monthly progress reports

# U.S. Army Corps of Engineers §404 and §10 Permits

## Expected conditions:

- Implement the project management plans
- Pre-demolition coordination
- Bathymetric surveys of mouth of White Salmon River
- Establish “private aids to navigation” in expected delta area
- If delta is significant and is likely to impact the federal navigation channel of the Columbia River, PacifiCorp will be responsible to dredge
- Bathymetric survey of forebay of Bonneville Dam near the fish ladder intakes. If significant deposition occurs, PacifiCorp will be responsible to dredge

# Status

- U.S. Army Corps of Engineers 404 Permit - Pending
- Final FERC Surrender Order - Pending
- Consultation with stakeholders on management plans - Ongoing
- FERC approval of management plans expected in Spring 2011
- Waterline Construction begins in May 2011
- Bridge Construction begins in June 2011
- Project Removal starts in August 2011

# **Powerdale Decommissioning**

# Powerhouse and Surge Tank



# Powerdale Dam



# ODFW Fish Ladder





# ODFW Fish Facility



# Powerdale Dam - Work Area



# APRIL 2010

- Mobilize to the project
- Water Conveyance System Demolition
- Cofferdam Materials Fabrication

# Water Conveyance Demolition



# Water Conveyance Demolition



# Water Conveyance Demolition



# MAY 2010

- Surge Tank Removal
- Powerhouse Components Removal
- Cofferdam Materials Fabrication Continued

# Powerhouse – Removing the Surge Tank





# Powerhouse – Removing the Generator



# JUNE 2010

- Final Grading at Powerhouse
- Continued Fabrication of the Cofferdam Materials
- Fabrication of Temporary Fish Passage Systems

# Powerhouse – Grading the Top Soil



# Box Flume from the Canal – Re-used for Fish Ladder



# Building the Bypass Channel



# Building the Bypass Channel



# Building the Bypass Channel

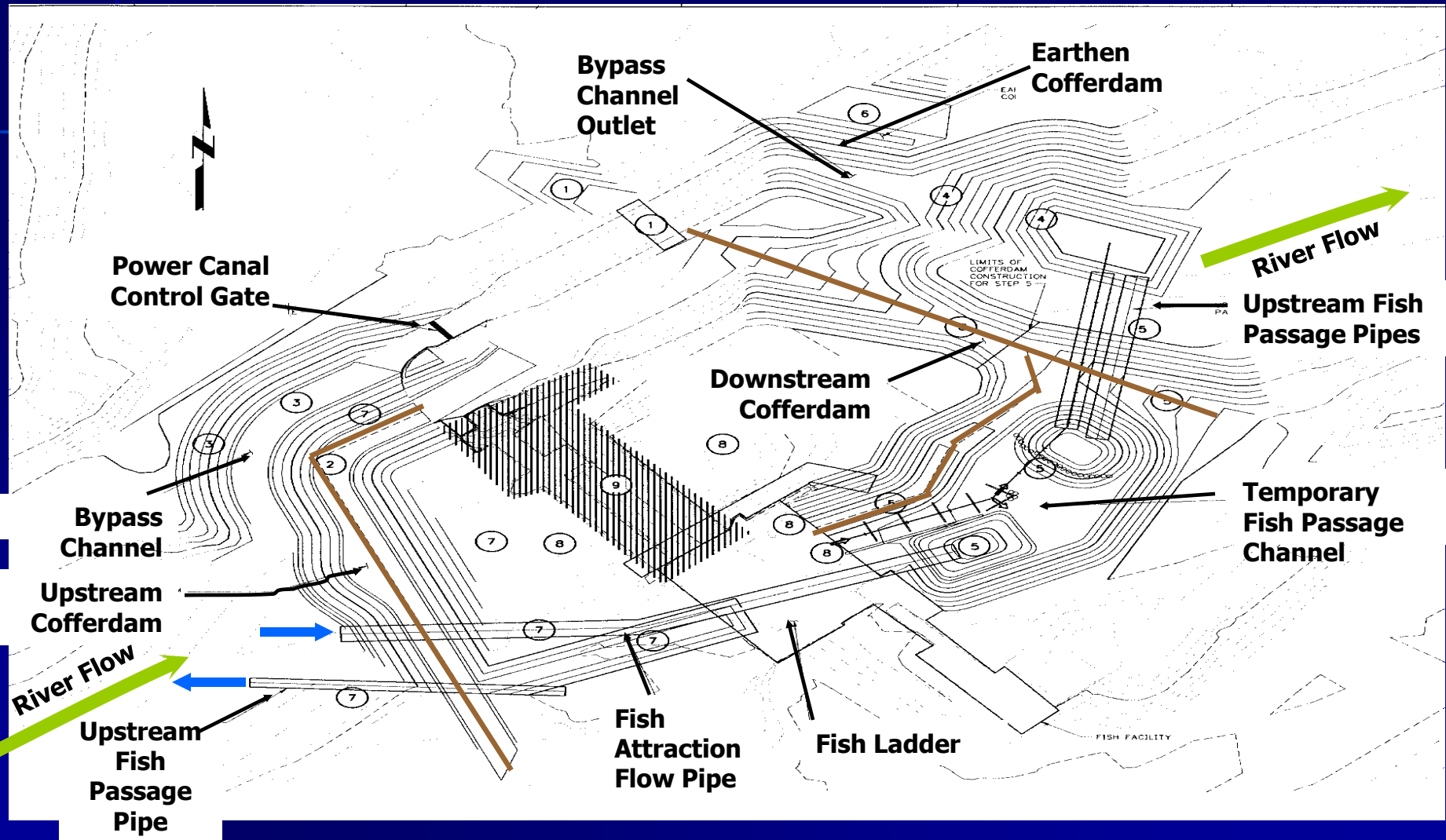


# JULY 2010

- In-water Work Begins
- Cofferdam Construction
- Fish Bypass System Construction



# Fish Passage During Dam Removal



# Constructing Lower Cofferddam



# Constructing Lower Cofferdam



# Upstream Fish Passage Construction



# Upstream Fish Passage; Lower Cofferdam; Bypass Channel



# Upstream Ladder & Attraction Flow Pipe Construction



# Upstream Ladder Construction



# Upstream Fish Ladder & Attraction Flow





# Downstream Work Complete



# Upstream Cofferdam Work Begins



# Upstream Cofferdam Work



# Upstream Cofferdam Work



# AUGUST 2010

- Powerdale Dam Demolition
- ODFW/BPA Fish Facility Removal
- Fish Salvage Efforts Continued

# Fish Salvage Crew



# Dam Demolition



# Dam Demolition





# Dam Demolition



# Dam Demolition



# Cutting the Roller Gates



# Dam Demolition



# Dam Demolition – Looking Downstream



# Dam Demolition



# Dam Demolition



# Dam Demolition





# Dam Demolition



# Dam Demolition



# SEPTEMBER 2010

- Cofferdam Removal
- Fish Ladder Demolition

# Upstream Cofferdam



# Upstream Cofferdam – Powerdale Dam Removed



# Removing Upper Cofferdam



# The River Runs Through the Work Site



# The River Runs Through the Work Site





# OCTOBER 2010

- Final Grading
- Re-vegetation and Planting

# Final Grading



# Final Grading



# Planting



- Removal Activities completed on October 29, 2010.









# Post high Flow event



# Web Addresses

<http://www.pacificorp.com/es/hydro/hl/condit.html>

<http://www.pacificorp.com/es/hydro/hl/twgms.html>