Update and New Information for Avoidance, Minimization and Mitigation

Chehalis River Basin Flood Control Zone District

September 3, 2020

Purpose

To provide new information since the release of the SEPA DEIS on aquatic, terrestrial and wetland mitigation opportunities and progress made on avoidance and minimization plans

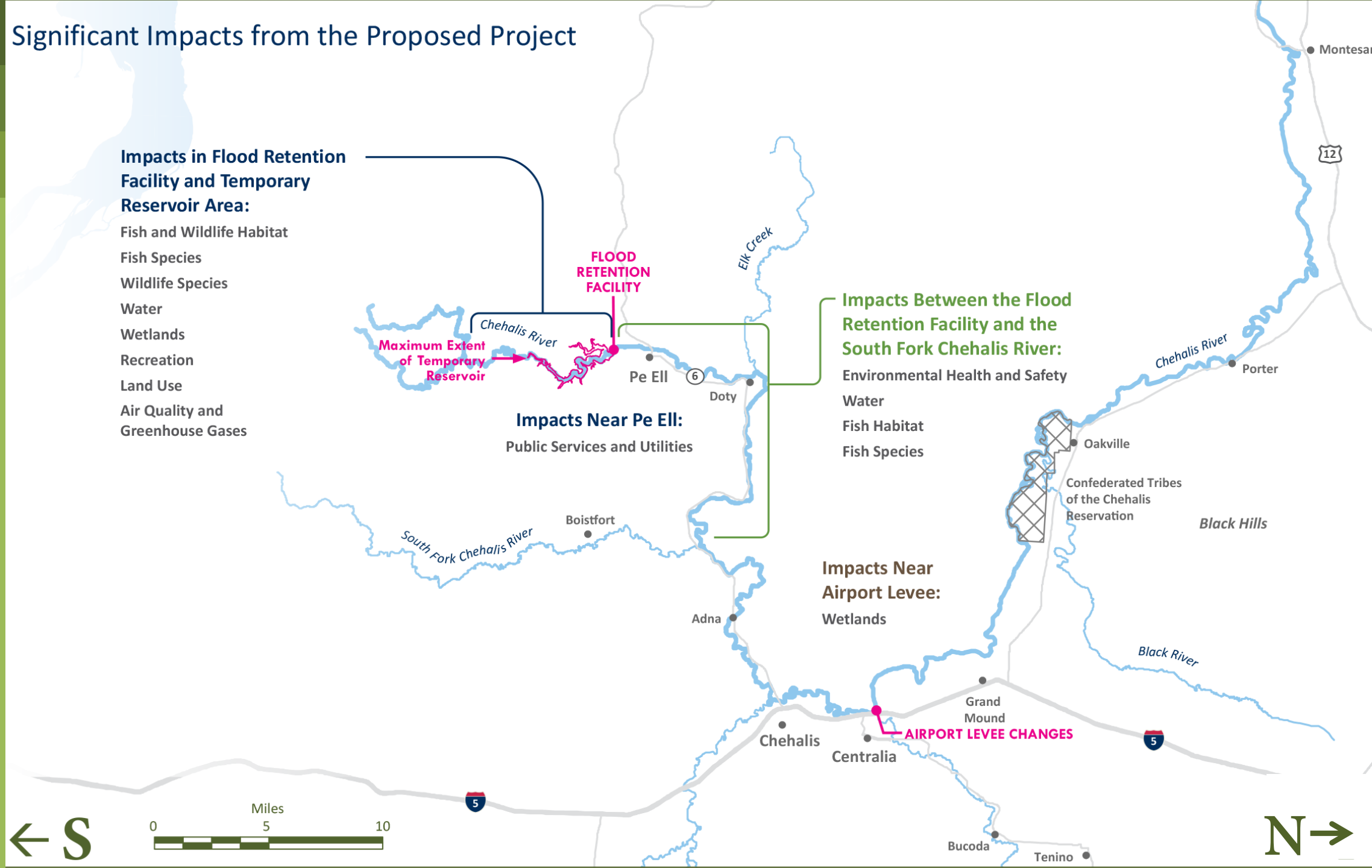
Mitigation Process Overview

- SEPA EIS identified significant unavoidable impacts that will require mitigation
- Can impacts be mitigated? Proof of concept
- If the project advances, final project design and permitting proceed concurrently
- Mitigation plan is developed and negotiated during permitting process
- Mitigation requirements are enforceable as permit conditions

Mitigation Opportunities Assessment

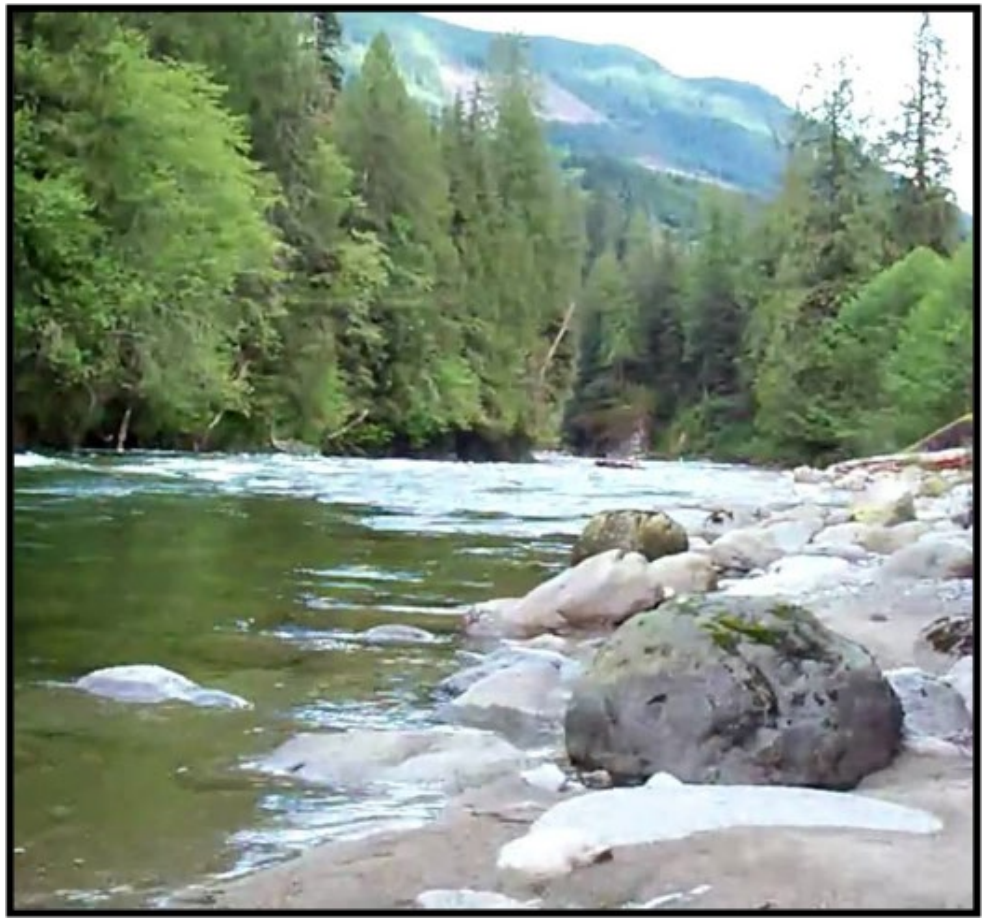
- What are the types, locations, and quantities of mitigation likely to be required to address project impacts?
- Are there sufficient mitigation opportunities available to address the anticipated mitigation requirements?
- What is the approximate mitigation cost?

Significant Impacts from the Proposed Project



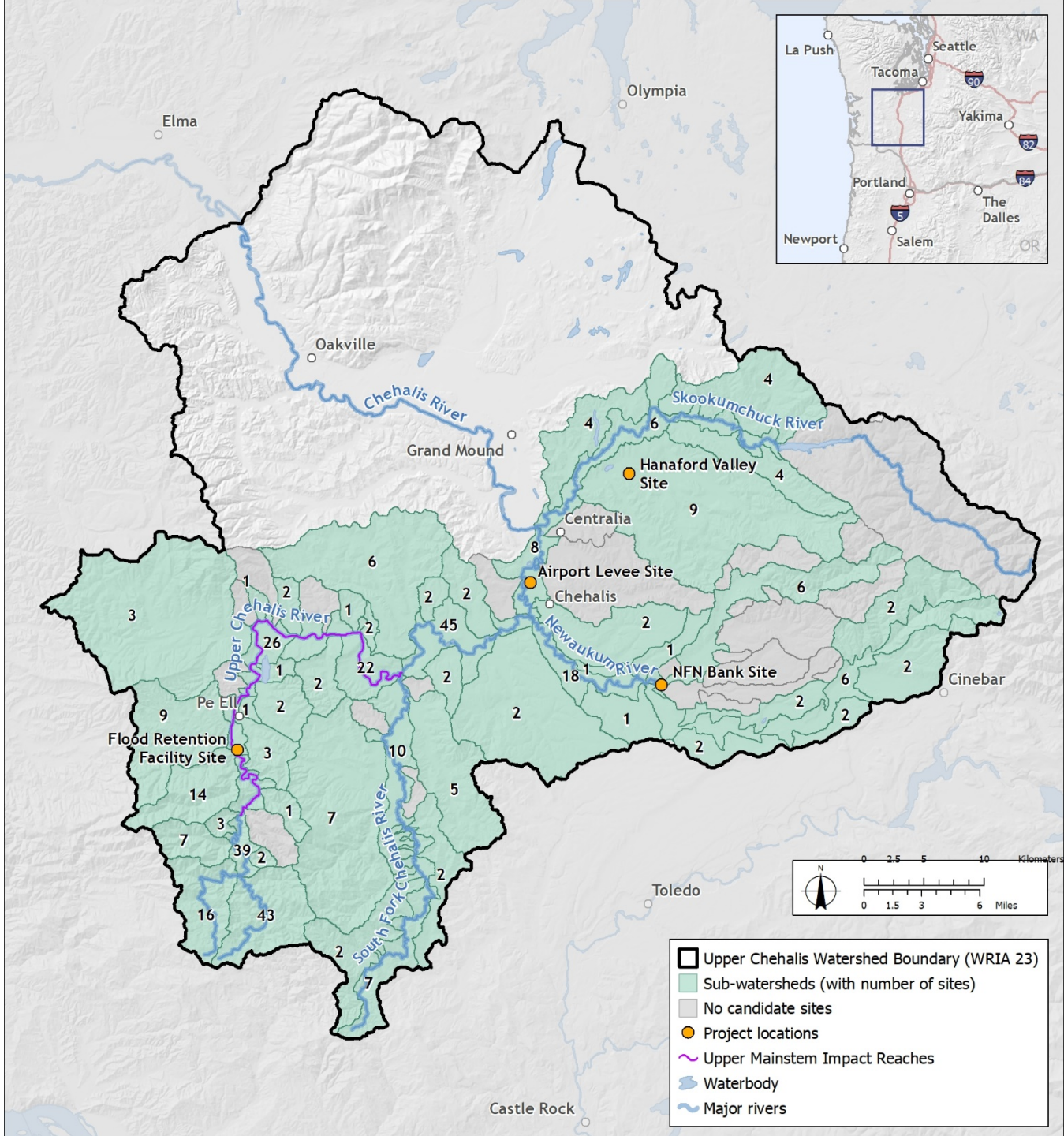
Major Aquatic Impacts that Require Mitigation

- Water Quality
  - Temperature
  - Turbidity
- Habitat Loss
  - Direct elimination
  - Altered natural processes
  - Fish Passage



Mitigation Locations

- WRIA 23 Upper Chehalis Basin
- Upstream of Skookumchuck River confluence for aquatic habitat
- Priority will be given to impacted areas including the temporary reservoir, the FRE site, and the 20-mile Chehalis River reach between the FRE site and the SF Chehalis River confluence
  - Focuses on areas of impact (without excluding other sites)
  - Considers ASRP priority areas to maximize complementary benefits to the overall Basin Strategy
- Wetland mitigation areas
  - Integrated with aquatic habitat floodplain projects
  - Mitigation bank credit purchase



Mitigation Types

MITIGATION ACTION TYPES	DESCRIPTION
Riparian Buffer Expansion	Expand riparian buffer beyond forest practices requirements, establish forest vegetation along channel margins
Hyporheic Exchange Enhancements	Instream and bank modifications to enhance the exchange between surface water and shallow groundwater to create or expand cool water pockets for thermal refugia. Several types are proposed based on different landforms.
Cold Water Retention Structures	Off-channel features including floodplain channels and backwater alcoves positioned to intercept colder groundwater or hyporheic flow and maintain a cool water pocket to provide thermal refugia.
Instream Modifications	Construction of habitat features within the perennial wetted channel for several purposes such as habitat complexity, creation of cold-water refuge pockets, and spawning gravel retention.
Off-channel Modifications	Off-channel habitat enhancements including side channel and floodplain actions to reconnect, enhance, and expand off-channel habitat.
Gravel Retention Jams	Larger instream structures composed of large wood pieces and rock located and designed to provide hydraulic roughness and promote accumulation and retention of salmonid spawning gravels. These structures may include gravel augmentation in areas with limited gravel budgets.
Fish Passage	Fish passage improvements including removal of small dams and replacing fish passage barrier culverts with passable crossings.
Wetland Enhancement	Enhancement, restoration, or expansion of wetlands to benefit wildlife species.
Upland Conservation and Enhancement	Conservation and enhancement of specific habitats matching the requirements of focal wildlife species.

Chehalis Mitigation Conceptual Design - #2

Main Stem - Chehalis River *Lewis County, WA*

0 300 600 Feet

1 inch = 300 feet

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Preliminary Estimated Quantities – Aquatic & Terrestrial

MITIGATION ACTION TYPES	PRELIMINARY ESTIMATED NEED	IDENTIFIED OPPORTUNITIES
Riparian Buffer Expansion	17 miles	53 miles
Hyporheic Exchange Enhancements	9,000 ft	28,500 ft
Cold-water Retention Structures	1,000 ft	18,000 ft
Instream Modifications	17,500 ft	89,000 ft
Off-channel Modifications	8,000 ft	220,000 ft
Gravel Retention Jams	13,500 ft	18,000 ft
Fish Passage	5 barriers	23 barriers
Wetland Enhancement	1 location (3 acres)	34 locations
Upland Conservation and Enhancement	2 locations (50 acres each)	10 locations (variable size >50 acres)

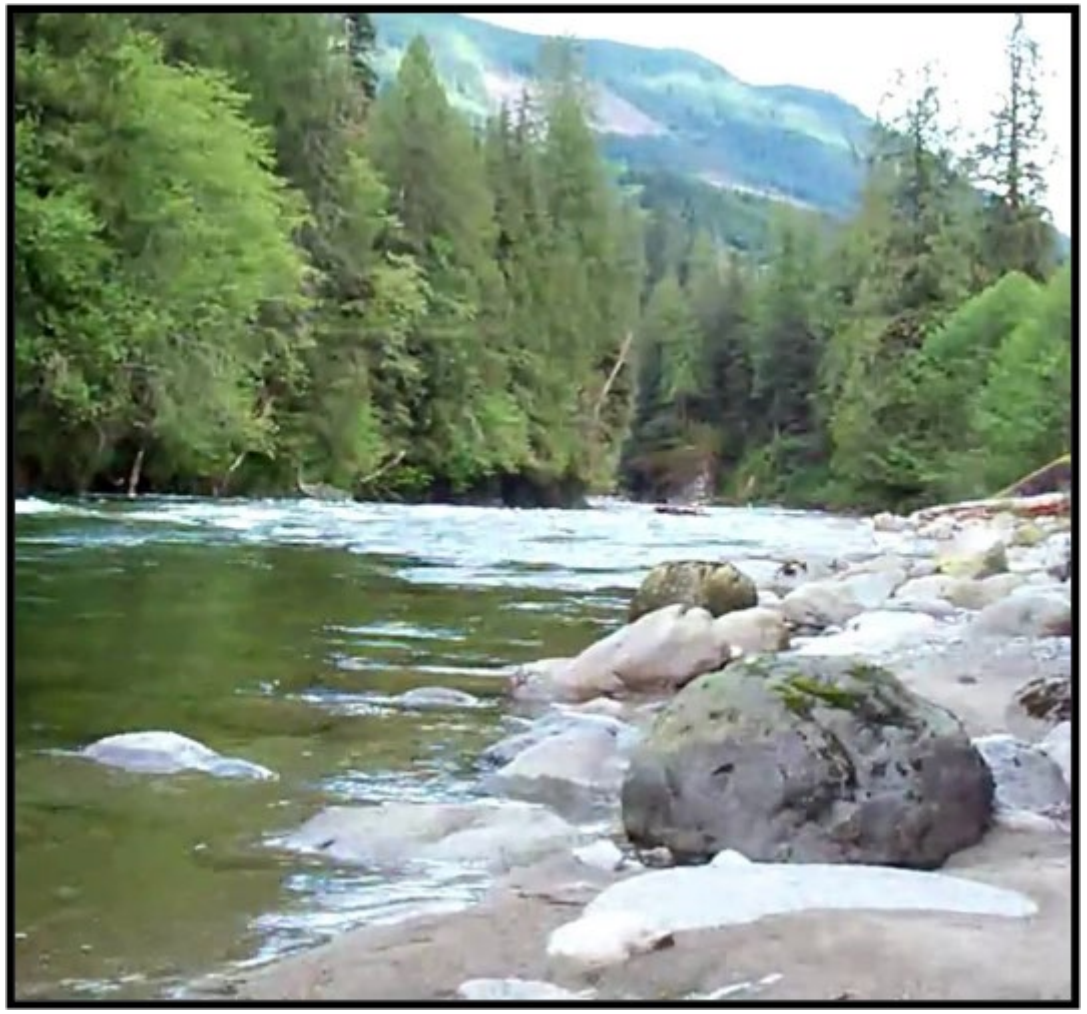
Estimated Quantities -Wetlands

- Wetland impacts
  - Quantity (acres) and duration
    - Temporary – construction and operations
    - Permanent – loss due to infrastructure
  - Wetland categories
    - Impacts to Category II, III, and IV wetlands
- Estimated mitigation needed
  - Temporary (construction) – 5.2 acres
  - Permanent – purchase .99 acre of credits or build 1.98 acres of mitigation
  - Temporary (operations) – up to 11.56 acres

Estimating Preliminary Mitigation Costs

Approach

1. Develop example conceptual mitigation designs
2. Build unit prices for cost elements
3. Develop typical unit cost for representative application for each mitigation action type
4. Apply typical costs to estimated mitigation need



Preliminary Mitigation Cost Estimate

- Aquatic and Terrestrial Habitat Mitigation: $43 to 86 million
- Wetland mitigation: $2.5 to 4.5 million

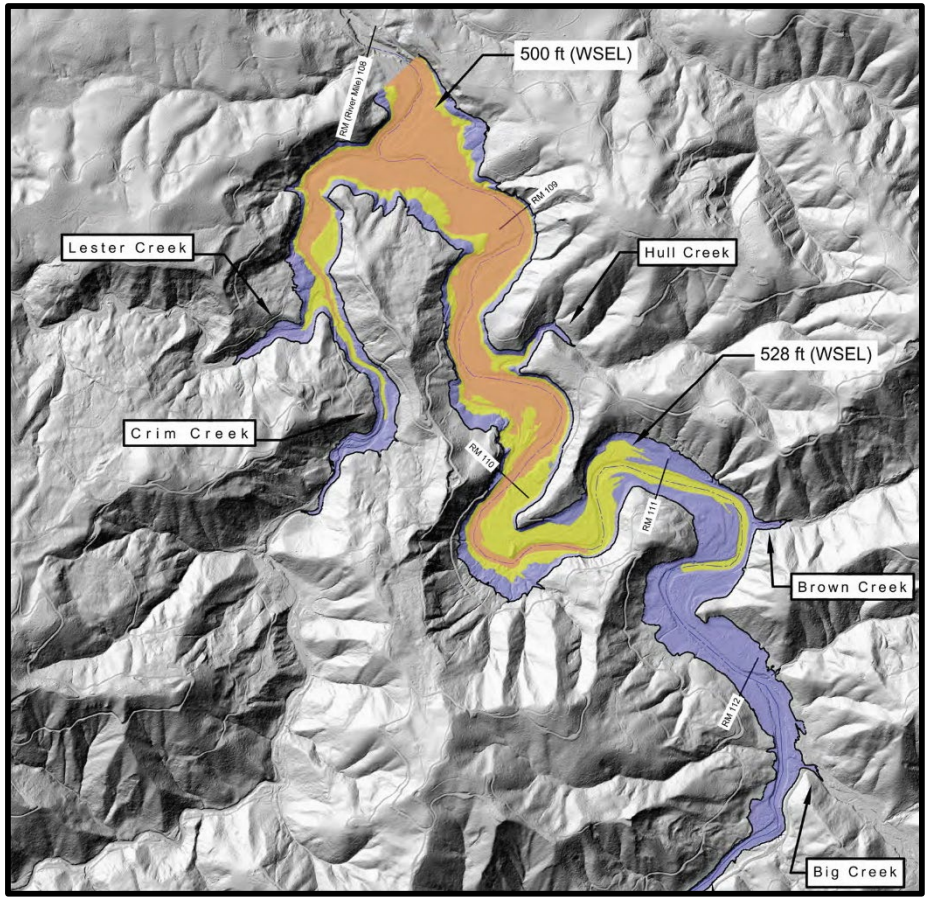
Avoidance and Minimization Progress

- District continues to develop and evaluate means to avoid and minimize project impacts
  - **Inundation Analysis**
  - **Vegetation Management Plan**
  - **Air Quality Impact Analysis**
  - Draft Biological Assessment
  - Pe Ell Water Supply System
  - Construction/Operations Phase BMPs
  - Fish Passage During Construction

Avoiding and Minimizing Impacts to Water Quality and Aquatic Habitat

Inundation Analysis

- Prepared by HDR - Calculates the probability, extent and duration of potential inundation events based on project flood events
- Refines the understanding of potential impacts to various vegetation species and habitat within the inundation zone
- Input to the Vegetation Management Plan



10 year event inundation for FRE

Avoiding and Minimizing Impacts to Water Quality and Aquatic Habitat

Vegetation Management Plan

- Currently being refined – draft to be completed in September
- Refines mapping of vegetation species within the inundation zone
- Proposes program for initial vegetation removal/replacement based on susceptibility to inundation/duration
- Proposes an adaptive management program
  - Maximizes long term habitat function related to water temperature, sedimentation, endangered species habitat, etc.

Additional Avoidance and Minimization Measures

Air Quality Impacts

- District reviewed assumptions for the disposal of harvested vegetation in the inundation zone made in the SEPA Draft EIS analysis
- Commitment not to burn harvested vegetation but to re-use as appropriate has been communicated to the USACE for recognition in the NEPA Draft EIS

Current Understanding

- Sufficient opportunities for aquatic and wetland mitigation exist
- Adaptive management and durable mitigation are needed
- Preliminary estimated mitigation cost range is $45 – 90 million
- Impact avoidance and minimization will reduce both impacts and costs

Next Steps

- District will make future progress updates to the Board at upcoming monthly meetings
- Continue work on avoidance and minimization efforts
- OCB and District will broadly distribute Mitigation Opportunities Assessment reports for feedback
- Corps will issue draft NEPA EIS in September

Reserve Slides for Q&A

Estimated Quantities -Wetlands

ACTIVITY (FILL, DRAIN, EXCAVATE, FLOOD, ETC.)	WETLAND TYPE[2] AND RATING CATEGORY[3]	IMPACT AREA	DURATION OF IMPACT	ESTIMATED MITIGATION NEEDED
FRE Facility, and Construction Access and Staging – excavation and fill	PSS/PEM; III	0.18 acres	5 years	Restore temporary impacts – 0.18 acres
FRE Facility Construction Spoil Areas – fill	PFO/PSS/PEM; III	0.41 acres	Permanent	Purchase 0.41 bank credits *or* Build 0.82 acres permittee responsible mitigation
FRE and CHTR permanent footprint – excavation and fill	PSS/PEM; III	0.58 acres	Permanent	Purchase 0.58 bank credits *or* Build 1.16 acres permittee responsible mitigation
FRE Debris Management Sorting Yard – clearing and grubbing	PEM/PFO/PSS/PEM; III, II	0.10 acres	Up to 30 days	Restore temporary impacts – 0.10 acres
Pe Ell Water Transmission Line – temporary clearing, grubbing, and excavation	PSS/PEM; III	0.40 acres	3 years	Restore temporary impacts – 0.40 acres
Airport Levee – temporary trimming of vegetation	PSS, PEM, and PUB; II, III	4.50 acres	One year	Restore temporary impacts – 4.5 acres
Episodic temporary inundation within temporary reservoir	PEM, PFO, PSS; III, II	11.56 acres	Episodic and temporary - variable duration and recurrence	Purchase bank credits *or* Build permittee responsible mitigation *Quantities TBD*

Draft Biological Assessment

- Evaluation of potential project effects to threatened and endangered species and Essential Fish Habitat (EFH).
- Identifies avoidance, minimization and mitigation measures related to effects on ESA species and EFH
- Submitting Draft BA to USACE in September

Additional Avoidance and Minimization Measures

Pe Ell Water Supply System

- Potential impacts to Pe Ell water supply pipeline that crosses the inundation zone have been identified
- Commitment to undertake an engineering study to assess pipeline upgrades and relocation to avoid any impacts from FRE operation of disruption to service during construction
- Commitment has been communicated to the USACE for recognition in the NEPA Draft EIS

Construction/Operation Phase BMPs

- Protective Best Management Practices incorporated into construction and operations phases for inclusion in the following documents:
  - Department of the Army Permit application – Must be submitted prior to public release of the NEPA Draft EIS by USACE
  - Biological Assessment (BA) – Evaluation of potential project effects to threatened and endangered species and essential fish habitat.
    - Submitting Draft BA to USACE in September

Fish Passage During Construction

- Reinitiating work on conceptual design of fish passage facilities during construction
- State (WDFW) and Federal (USFWS, NOAA) fish passage criteria