Chehalis Basin Strategy
Programmatic SEPA Draft EIS
The Chehalis Basin
History of Flooding

- Five largest flood events occurred since 1986
History of Habitat Degradation

• Harvest has been limited by poor runs over the last 30 years
• Habitat productivity has been degraded by up to 87%
Evaluating Options

- Programmatic Environmental Impact Statement (EIS)
- Evaluates potential effects – positive and negative
- Programmatic EIS differs from project level EIS
The Chehalis Basin suffers from both flooding and degradation of aquatic species.

The Chehalis Basin Strategy will provide a long-term, integrated approach to substantially reduce damages from major floods and restore degraded aquatic species habitat in the Basin.
Objectives

Reduce the following conditions caused by a major flood:

1. Threats to human health and safety, including access to critical medical facilities
2. Flood damage to commercial and residential properties
3. Flood damage to agricultural properties, livestock and crops
4. Disruption in transportation systems, including closures of Interstate 5 and local and regional transportation systems
5. Disruption to industry, commercial businesses, and public services
Objectives

Protect and restore aquatic species habitat function to:

1. Improve resiliency of natural floodplain processes and ecosystems from the effects of climate change, including warming stream temperatures, low flows, and other effects
2. Increase abundance of native aquatic species, including increased populations of healthy and harvestable salmon and steelhead
3. Reduce the potential for future Endangered Species Act listings
4. Enhance tribal and non-tribal fisheries
Actions Being Considered

- Flood Damage Reduction
- Habitat Restoration
Local-scale Flood Damage Reduction Actions

- Raising structures, building walls
- Farm Pads

- Local Projects
Local-scale Flood Damage Reduction Actions

- Land use management improvements
- Early warning system improvements
Large-scale Actions

• I-5 projects
• Walls and Levees
Large-scale Actions

Restorative Flood Protection -
• Re-establish the natural flood storage capacity by reversing landscape changes that contribute to downstream flooding and erosion
Restorative Flood Protection

CHEHALIS RIVER MILE 97.49.

HISTORICAL 2-YEAR FLOOD

CURRENT 2-YEAR FLOOD

CURRENT 100-YEAR FLOOD

67.00
Do bottom land of Chehalis river, this bottom is subject to inundation from 3 to 5 feet in depth in the winter season.
Large-scale Actions

- Flood Retention Only (FRO)
- Flood Retention and Flow Augmentation (FRFA)
• Reduce flood damages
• Maintain stream processes
• Maintain slope stability in reservoir
• Provide winter storage for summer flow augmentation and temperature moderation (FRFA)
• Design for debris management in reservoir
• Maintain fish passage to the extent possible
Aquatic Species Habitat Actions

- Basin-wide scale: Unprecedented Level of Effort
Impacts/Mitigation Analysis

• **Surface Water Quality**

• **Surface Water Quantity**

• **Groundwater Quantity and Quality**
Impacts/Mitigation Analysis

- **Geology**
  - Preliminary Desktop Landslide Evaluation (Shannon & Wilson 2014a)
  - Quarry Rock Desktop Study (Shannon & Wilson 2014b)
  - Landslide Reconnaissance Evaluation of the Chehalis Dam Reservoir (Shannon & Wilson 2015b)
  - Phase 1 Site Characterization Technical Memorandum (HDR and Shannon & Wilson 2015)
  - Phase 2 Site Characterization Technical Memorandum (HDR and Shannon & Wilson 2016)

- **Geomorphology**
  - Geomorphology and Sediment Transport Draft Technical Memorandum (Watershed GeoDynamics and Anchor QEA 2014)
  - Draft: Summary of the Effects on the Chehalis Flood Retention Only (FRO) Reservoir Operations on Aquatic Habitat in the Reservoir Area (Dubé 2016)
  - Geomorphology, Sediment Transport, and Large Woody Material (Watershed GeoDynamics and Anchor QEA 2016)
Impacts/Mitigation Analysis

- **Fish and Wildlife**
  - Species and Habitat Studies (refer to workshop agenda)
  - Ecosystem Diagnosis and Treatment (EDT) model (ICF 2016)
  - Effects of Temperature Reduction and Flow Augmentation on Spring-run Chinook Salmon Memorandum
  - Flood Retention Facility Pre-construction Vegetation Management Plan
  - Fish Passage Scenarios (In Development)
  - U.S. Fish and Wildlife Service 2011. The Fish Files: Pacific Lamprey Redd Surveys in the Chehalis and Willapa River Basins
  - Physical Habitat Simulation (PHABSIM) model
  - Water quality, geomorphology and wetlands and vegetation evaluation results

- **Climate Change**
  - Effects of Climate Change on the Hydrology of the Chehalis River Basin (Mauger et. al 2016)
Impacts/Mitigation Analysis

• Other
  o Quinault Indian Nation letters to Ecology, regarding:
    • Quinault Indian Nation Fisheries in the Grays Harbor Area (2015)
    • Chehalis Basin Strategy Programmatic Environmental Impact Statement, Quinault Indian Nation Preliminary Comments and Information (2016)
  o DAHP’s *Washington Information System for Architectural and Archaeological Records Data*
  o Washington Statewide Archaeological Predictive Model (WSAPM)
  o Chehalis Basin Flood Authority staff and website (Local Projects)
  o Communication with local government planning staff
  o Communication with West Consultants (Flood Warning System)
Alternatives

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<tbody>
<tr>
<td>Dam and Associated Reservoir</td>
<td>Airport Levee Improvements</td>
<td>I-5 Projects</td>
<td>Aberdeen/Hoquiam North Shore Levee</td>
<td>Restorative Flood Protection</td>
</tr>
</tbody>
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Local-scale Flood Damage Reduction Actions

High Scenario

- Aquatic Species Habitat Actions
  - Low Scenario
No Action Alternative

• Increased peak flows and frequency of winter storms = more frequent and greater flood damage
• Sea level rise = increased flooding in lower basin
• Built Environment:
  o Land Use
  o Recreation
  o Transportation
  o Public Services and Utilities
  o Environmental Health and Safety
• Historic, Cultural, and Tribal Resources
## No Action Alternative

### Potential Response in Salmon Abundance in the Chehalis Basin to Climate Change

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>CHANGE FROM CURRENT CONDITION (PERCENT)</th>
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<tbody>
<tr>
<td>Coho salmon (40,642)</td>
<td>-55%</td>
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<tr>
<td>Fall-run Chinook salmon (25,844)</td>
<td>-27%</td>
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<tr>
<td>Winter/fall-run chum salmon (190,550)</td>
<td>-4%</td>
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<tr>
<td>Spring-run Chinook salmon (2,146)</td>
<td>-87%</td>
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<tr>
<td>Winter-run steelhead (6,800)</td>
<td>-55%</td>
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Alternative 1

• Water Quality
  o Within the reservoir
  o Downstream of the dam

• Geology and Geomorphology

• Wetlands and Vegetation

• Fish and Wildlife

• Historic, Cultural, and Tribal Resources
Alternative 1

Potential Mitigation

• Reservoir Operations and Management Plan
  o Wood and sediment management
  o Water quality and flow moderation
• Reservoir drawdown rates that avoid or minimize landslide occurrences
• Design to withstand the effects of earthquakes and shaking on the CSZ and other nearby faults
• Compensatory wetland mitigation
• Pre-and Post-construction Vegetation Management Plan
• Fisheries Management Plan (fish passage)
Alternative 2

Impacts
• Water quantity
• Geology and Geomorphology
• Wetlands and Vegetation
• Historic, Cultural, and Tribal Resources

Potential Mitigation
• Compensatory wetland mitigation
Alternative 3

• No significant adverse impacts
  • Historic, Cultural, and Tribal Resources
Alternative 4

- Water quantity
- Wetlands and Vegetation
- Fish and Wildlife
- Land Use
- Transportation
- Environmental Health and Safety
- Public Services and Utilities
- Historic, Cultural, and Tribal Resources
Potential Mitigation

• Avoid treatments where most significant impacts would occur and in areas with little downstream benefit

• Avoid and minimize wetland and vegetation impacts in conversion areas

• Adaptation support

• Decommission and floodproof
Next Steps

• Draft Programmatic EIS released September 29, 2016
• Open House & Hearings other outreach
• Governor Inslee and legislature will recommend actions to move forward at the end of the year
• Final EIS in 2017