LONG-TERM STRATEGY STATUS AND NEXT STEPS

Chehalis Basin Board Meeting Presentation

February 18, 2021

PRESENTATION OBJECTIVES AND STRUCTURE

Objectives

- Provide the Board with current status and potential next steps
- Receive feedback on potential changes to description of status and potential next steps for public input

Structure of Presentation

- Progress over time by Board, OCB, and Partners
- Crosscutting Issues: Status of Flood Actions, Flood Event, Skookumchuck Dam
- ASRP Options and Next Steps
- Flood Retention Facility Current Understanding and Potential Next Steps
- Local Actions Program Current Understanding and Potential Next Steps
- Land Use Current Understanding and Potential Next Steps
- Process for 21-23 Biennium Budget

CHEHALIS BASIN STRATEGY TIMELINE

Feb 18 Board Meeting

- Board to hear more details about & provide feedback on:
  - Updated project phasing, milestones, and cost estimates for ASRP
  - Local flood damage reduction options from Advisory Group process
  - New water temperature information from Flood District's dam impact mitigation work
  - Potential approaches to emerging cross-cutting issues

March 9 Evening Public Meeting

- OCB to receive public input on options

March 4, 18, and 24 Board Meetings

- Board to consider options, receive public comment, and seek consensus

OCB MISSION


To aggressively pursue an integrated strategy & funding for:
• Long-term flood damage reduction
• Aquatic species habitat restoration

SIGNIFICANT PROGRESS – 2012 TO PRESENT

Long arc of collaboration and results

- Scientific understanding of freshwater environment, aquatic species, and impacts of climate change
- Comprehensive restoration plan (ASRP) and projects
- Technical understanding of flood flows, floodplain, and impacts to communities
- Assessment and solutions for sea level rise damage in Aberdeen/Hoquiam
- Protection of critical infrastructure, livestock and farm equipment, and homes
- Since 2012, over $75 million has been invested across nearly 100 projects that benefit both people and aquatic species

CHEHALIS BASIN AQUATIC SPECIES: HISTORICAL TO CURRENT

- **Land Use Changes** - 150 years of modification from farming and human development
- **Limited funding** – minimal restoration and scientific studies
- **Data poor** – limited understanding of biological and ecological systems

Now comprehensive scientific foundation for decision-making

NUMBER OF RESTORATION PROJECTS INCREASED

- Correcting 54 fish passage barriers, opening or improving access to more than 160 miles of stream habitat for migrating salmon and steelhead
- Restoring riparian function, improving water quality, and reconnecting one river channel
- Initiating five reach-scale habitat restoration projects

UNDERSTANDING FLOODS

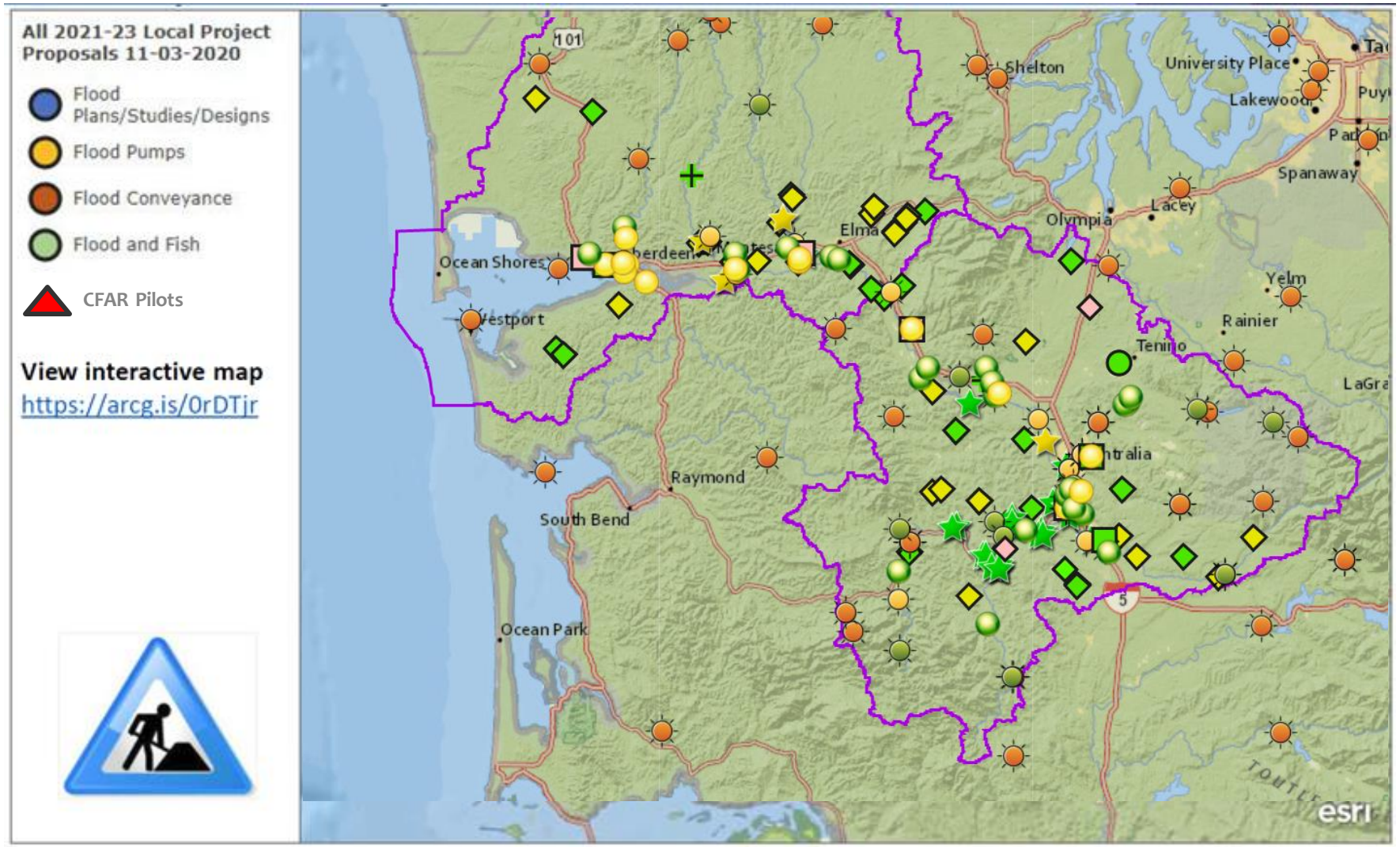
- Mainstem model and ability to predict flood damage on major tributaries
- Latest modeling of climate change and estimates for flows and flooding
- Programmatic environmental evaluation of alternatives
- Draft environmental evaluation of Flood Retention Facility and initial assessment of potential mitigation
- Review of alternatives for flood damage actions
- Initial investigation of new options

FLOOD PROJECTS COMPLETED

70+ local flood damage protection projects, including

- 25+ raised farm pads, elevated earthen berms where farmers can move their livestock & equipment during flood events
- 9 local road & public infrastructure protection projects
- 11 homes installed w/ flood vents to lower flood insurance & protect property

FLOOD AUTHORITY & CFAR PROJECTS



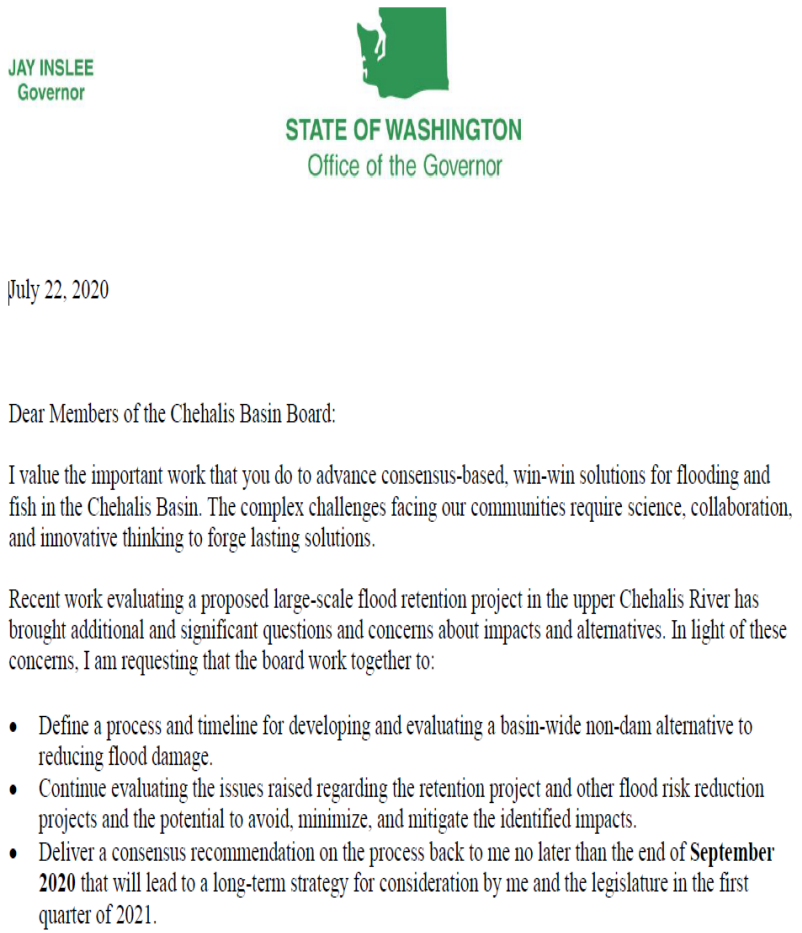
COMPREHENSIVE SUITE OF ACTIONS NEEDED

There is no single, simple solution to meet the dual goals of improving aquatic species habitat and reducing damage from major flooding disasters. The Chehalis Basin Strategy must employ multiple reinforcing actions to meet the needs of our communities and the natural environment.

MAJOR PROCESS ADJUSTMENT IN 2020

- SEPA EIS provided evaluation of flood retention facility and did not separate the impacts of the project from the ongoing impacts of climate change.
- Tribes opposed the flood retention facility based on impacts in the Draft SEPA EIS and their assessment that impacts would be greater than estimated in the Draft SEPA EIS
- The project proponent (Flood District) views SEPA EIS findings were conservative in that they did not consider avoidance, minimization, or mitigation measures
- Governor engaged in response to tribal concerns and requested additional evaluation of the overall strategy

GOVERNOR'S JULY 2020 LETTER TO BOARD



JAY INSLEE
Governor

STATE OF WASHINGTON
Office of the Governor

July 22, 2020

Dear Members of the Chehalis Basin Board:

I value the important work that you do to advance consensus-based, win-win solutions for flooding and fish in the Chehalis Basin. The complex challenges facing our communities require science, collaboration, and innovative thinking to forge lasting solutions.

Recent work evaluating a proposed large-scale flood retention project in the upper Chehalis River has brought additional and significant questions and concerns about impacts and alternatives. In light of these concerns, I am requesting that the board work together to:

- Define a process and timeline for developing and evaluating a basin-wide non-dam alternative to reducing flood damage.
- Continue evaluating the issues raised regarding the retention project and other flood risk reduction projects and the potential to avoid, minimize, and mitigate the identified impacts.
- Deliver a consensus recommendation on the process back to me no later than the end of **September 2020** that will lead to a long-term strategy for consideration by me and the legislature in the first quarter of 2021.

- Define process & timeline for developing & evaluating a basin-wide non-dam alternative to reducing flood damage
- Continue evaluating ability to avoid, minimize and mitigate dam impacts
- By March 2021, recommend next steps for Chehalis Basin Strategy

BOARD OBJECTIVES (SEP 2020 – MAR 2021)

Determine:

1. Potential for flood damage reduction through Local Actions Program, CFAR, local projects, etc., with and without dam (including estimated costs)

2. Potential to avoid, minimize and/or mitigate aquatic habitat and species impacts of dam (including estimated costs)

3. Magnitude, priority and sequence of ASRP actions necessary to protect and restore freshwater habitat and the abundance and resilience of aquatic species (including estimated costs)

BOARD OBJECTIVES (SEP 2020 - MAR 2021) *CONTINUED*

1. Which actions are ready to be implemented as part of long-term strategy
2. Which need more evaluation before determining whether they should be implemented
3. Which should not move forward
4. Next steps & resources needed to advance long-term strategy over next 4-6 years
5. 2021-2023 biennial capital budget request

Increase awareness & support for strategy across basin and with key interest groups & decision-makers statewide.

APPROVED PLANNING ASSUMPTIONS FOR LOCAL ACTIONS PROGRAM

The Board will:

1. Consider a timeframe of up to 30 years to implement the actions necessary to achieve outcomes.

2. Utilize future flood conditions that are predicted for the 100-year flood in 2080.

3. Require projects funded through the Local Actions Program to be designed, implemented, and mitigated to avoid making flood damage worse in other areas.

APPROVED MEASURABLE FLOOD DAMAGE REDUCTION OUTCOMES

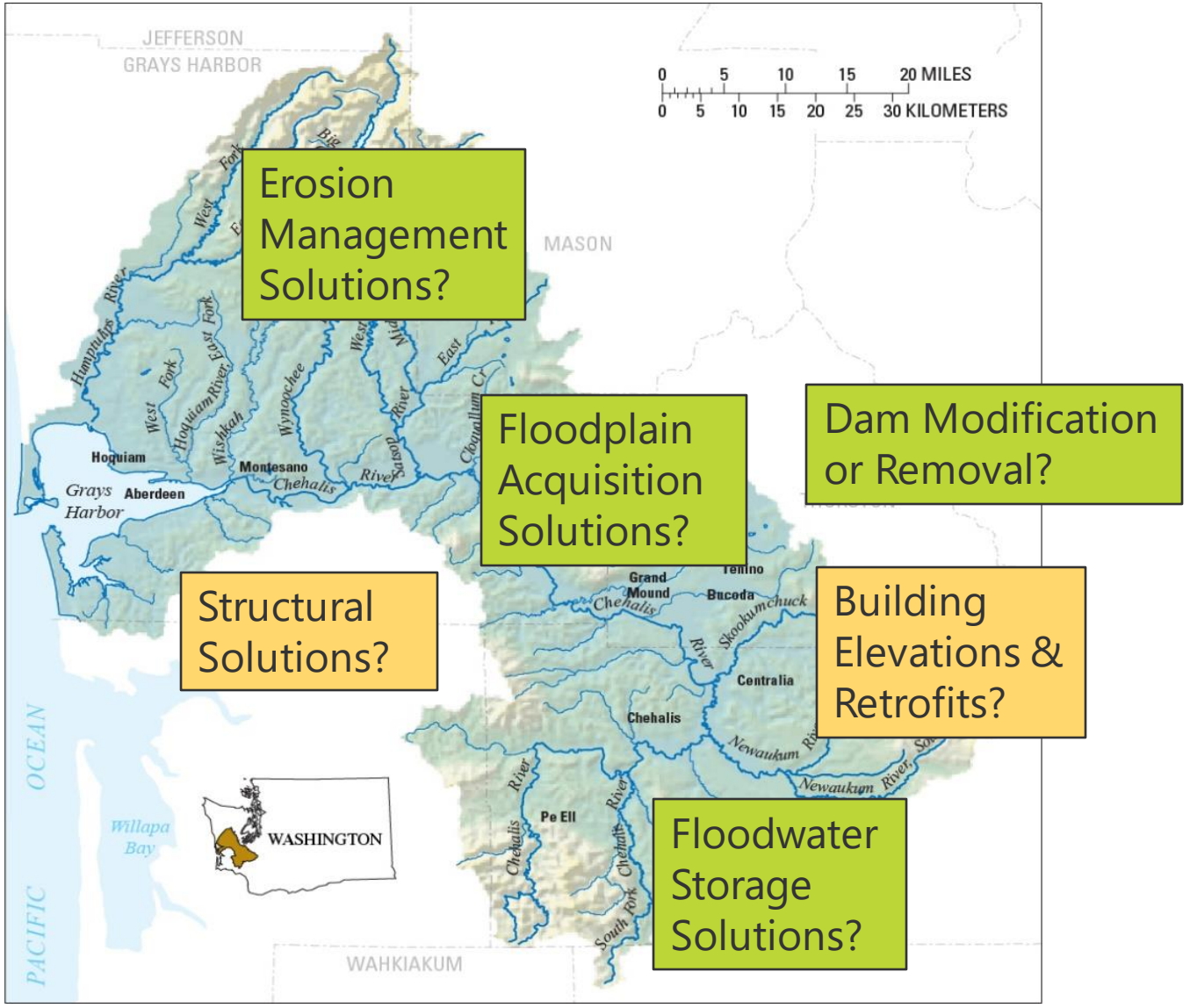
1. Valuable structures protected from mainstem, catastrophic flooding
2. Homes & businesses protected from seasonal urban flooding
3. Lower basin properties & businesses protected from coastal storm surges
4. Farmland and rural structures protected
5. Critical facilities protected
6. Transportation routes protected
7. Environmental justice advanced
8. Prevent new at-risk development

LOCAL ACTIONS PROGRAM ADVISORY GROUP'S WORK COMPLETED TO DATE

- Updated climate change predictions
- Evaluated opportunities to increase floodplain storage
- Identified potential ways to address damage from accelerated bank erosion
- Identified potential approaches to determine the feasibility to protect high value structures and critical infrastructure in high priority areas
- Identified potential opportunities to determine the feasibility to protect structures through retrofits, acquisitions, and/or relocation
- Continuing to evaluate other opportunities

MAJOR CROSS-CUTTING ISSUES

- Current level of analyses and need for additional information to determine long-term actions for aquatic species restoration and flood damage reduction
- Focus on planning assumptions for flood events and damage
- Additional evaluation of Skookumchuck dam (and possibly Wynoochee dam) for potential benefits for aquatic species and flood damage reduction
- Floodplain acquisition opportunities
- Community outreach and engagement


JEFFERSON
GRAYS HARBOR
MASON
WAHKIAKUM
PACIFIC OCEAN
Willapa Bay
WASHINGTON
0 5 10 15 20 MILES
0 5 10 15 20 25 30 KILOMETERS
Hoquiam
Aberdeen
Grays Harbor
Montesano
Chehalis
Grand Mound
Bucoda
Centralia
Pe Ell
Erosion Management Solutions?
Floodplain Acquisition Solutions?
Dam Modification or Removal?
Structural Solutions?
Building Elevations & Retrofits?
Floodwater Storage Solutions?

CROSSCUTTING ISSUE

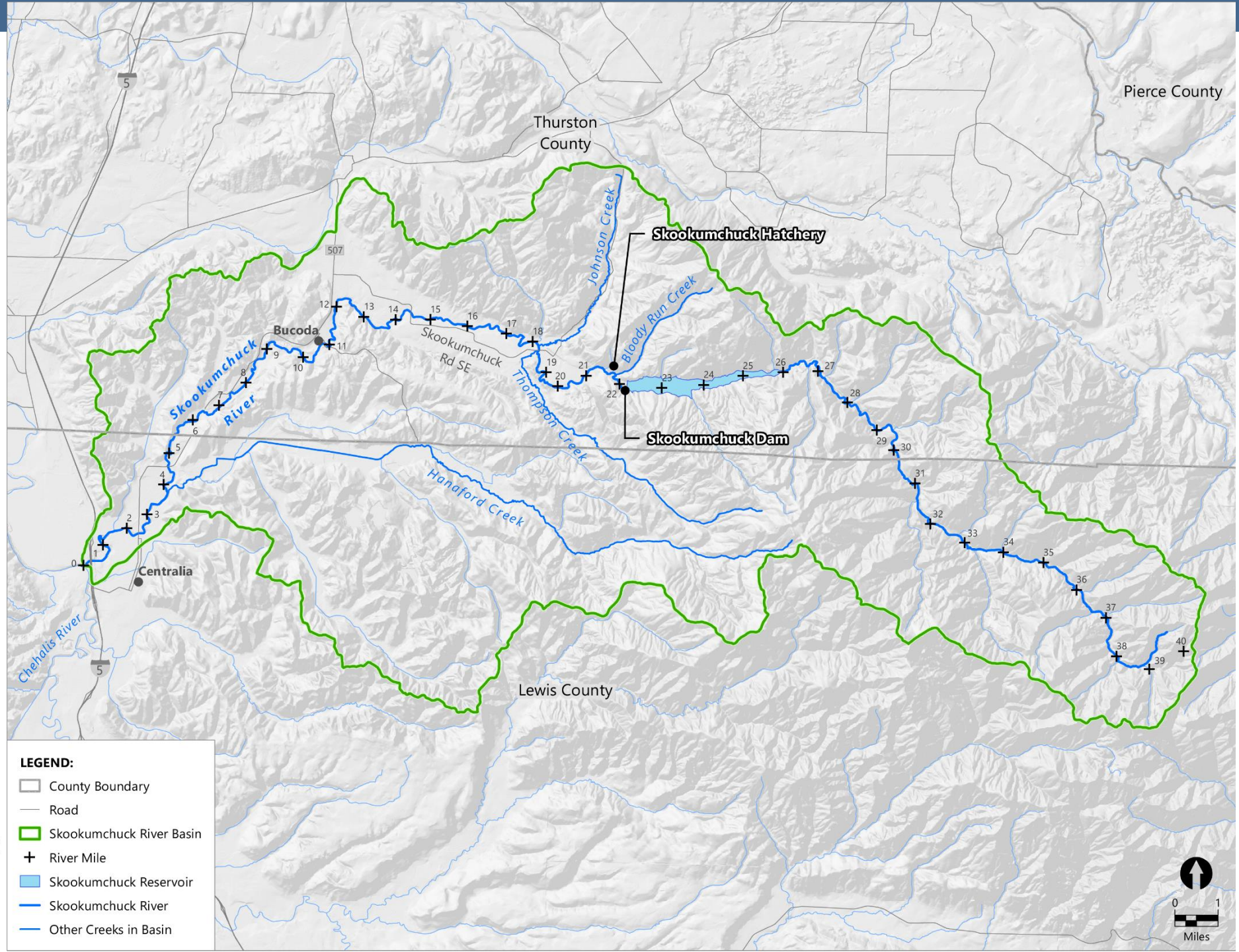
Current level of analyses and need for additional information to determine long-term actions for flood damage reduction

- Information is not sufficient at this time to determine if local actions with or without a dam can meet the Board outcomes
- Potential next steps are highlighted in the sections following the presentation and discussion of the ASRP

FOCUS FOR FLOOD EVENTS AND DAMAGE

- Board direction to evaluate 2080 flood estimates for 26 and 50 percent increases in flows from climate change
- Issues have been raised about the ability to feasibly address future flows by some alternatives
- Technical Advisory Group additional recommendations to look at damage from more frequent events
- Implementation Advisory Group recommend using different standards for regulation versus planning

SKOOKUMCHUCK DAM CONSIDERATION



DEPARTMENT OF ECOLOGY
State of Washington
OFFICE OF CHEHALIS BASIN

BACKGROUND

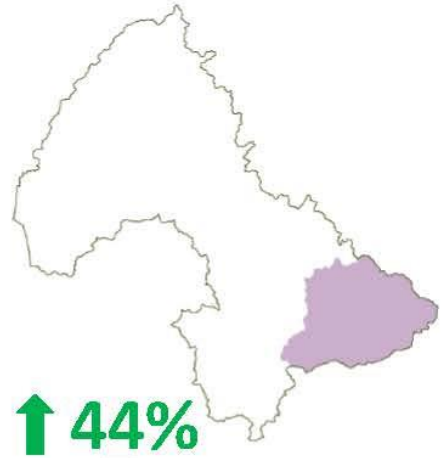
- Skookumchuck Dam construction completed in 1970 by consortium of utilities (Pacific Power and others) to store water to augment flow for water withdrawal at RM 7 for the Centralia Steam Plant
- Water right of 51.6 cfs and 28,033 acre-feet per year for industrial use
- TransAlta purchased in 2000
- Dam currently blocks all anadromous fish access to upper watershed; operating under 1998 mitigation agreement with WDFW; hatchery produces coho salmon and steelhead trout
- Dam is part of overall Centralia Steam Plant FERC license, small hydropower at dam (1 MW) exempt from FERC licensing

UPSTREAM WATERSHED

- Reservoir extends approximately 4.4 miles and 550 acres
- 1996 watershed analysis by Weyerhaeuser identified up to 38.4 miles of fish-bearing streams above the dam, with 21 miles of habitat for steelhead trout, up to 8 miles of habitat for coho salmon, and up to 4 miles of habitat for Chinook salmon
- Resident cutthroat and rainbow trout present upstream of the dam
- When dam was permitted, WDF identified that 500 spring Chinook, 371 fall Chinook, 1,800 coho salmon, and 700 steelhead adults may have spawned upstream of the dam
- Reservoir eliminated 550 acres of elk, deer, and other wildlife habitat; mitigation with 960-acre wildlife area

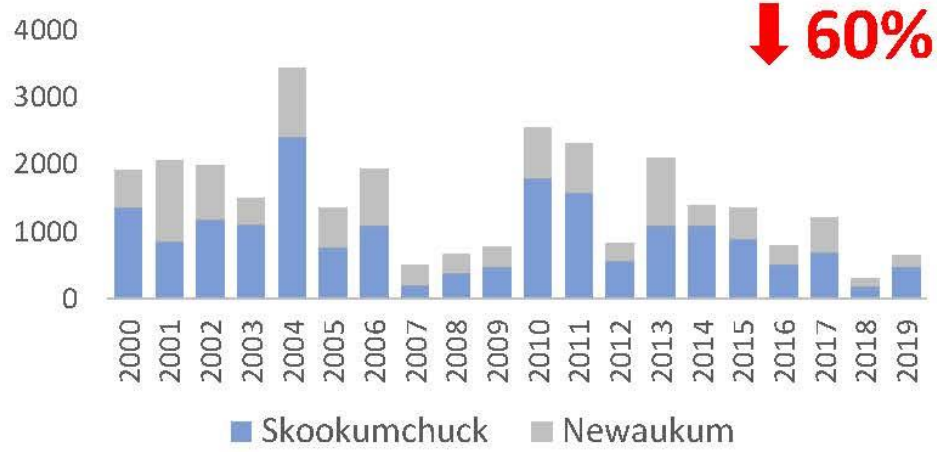
2. Cascade Mountains

Restoration Potential – **HIGH**
Protection Potential – **MODERATE**



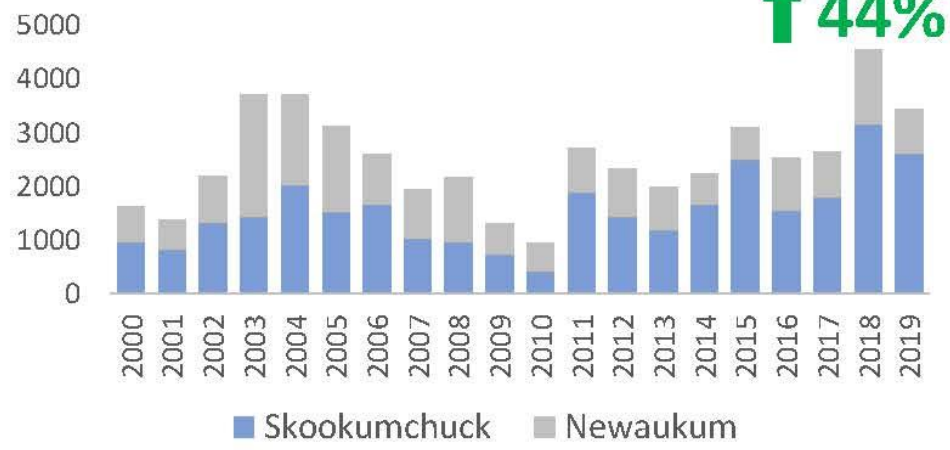
SPRING CHINOOK

⬇ 60%



FALL CHINOOK

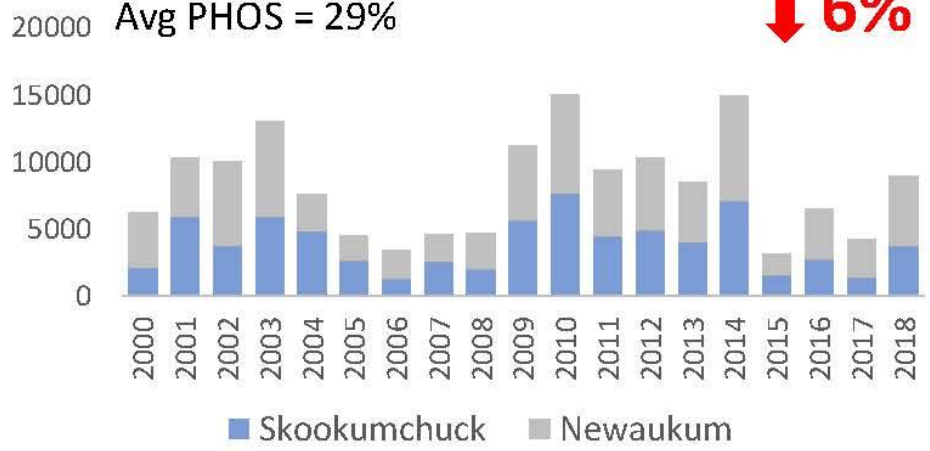
⬆ 44%



COHO

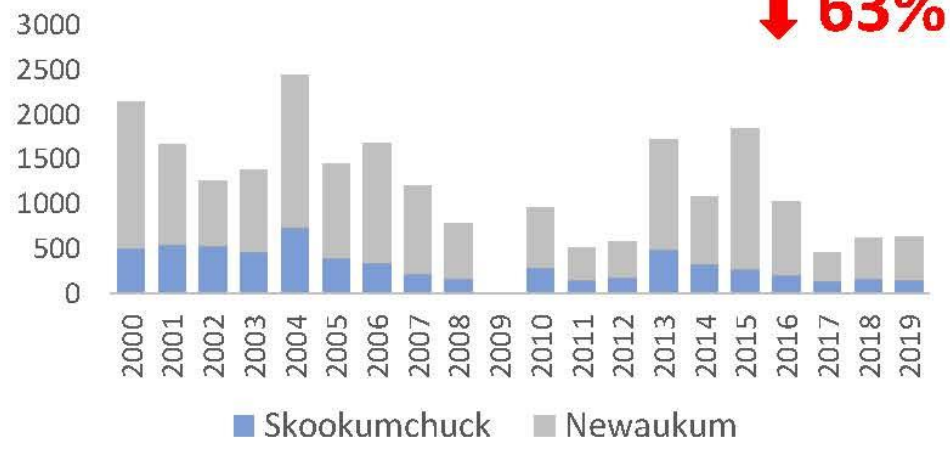
Avg PHOS = 29%

⬇ 6%



STEELHEAD

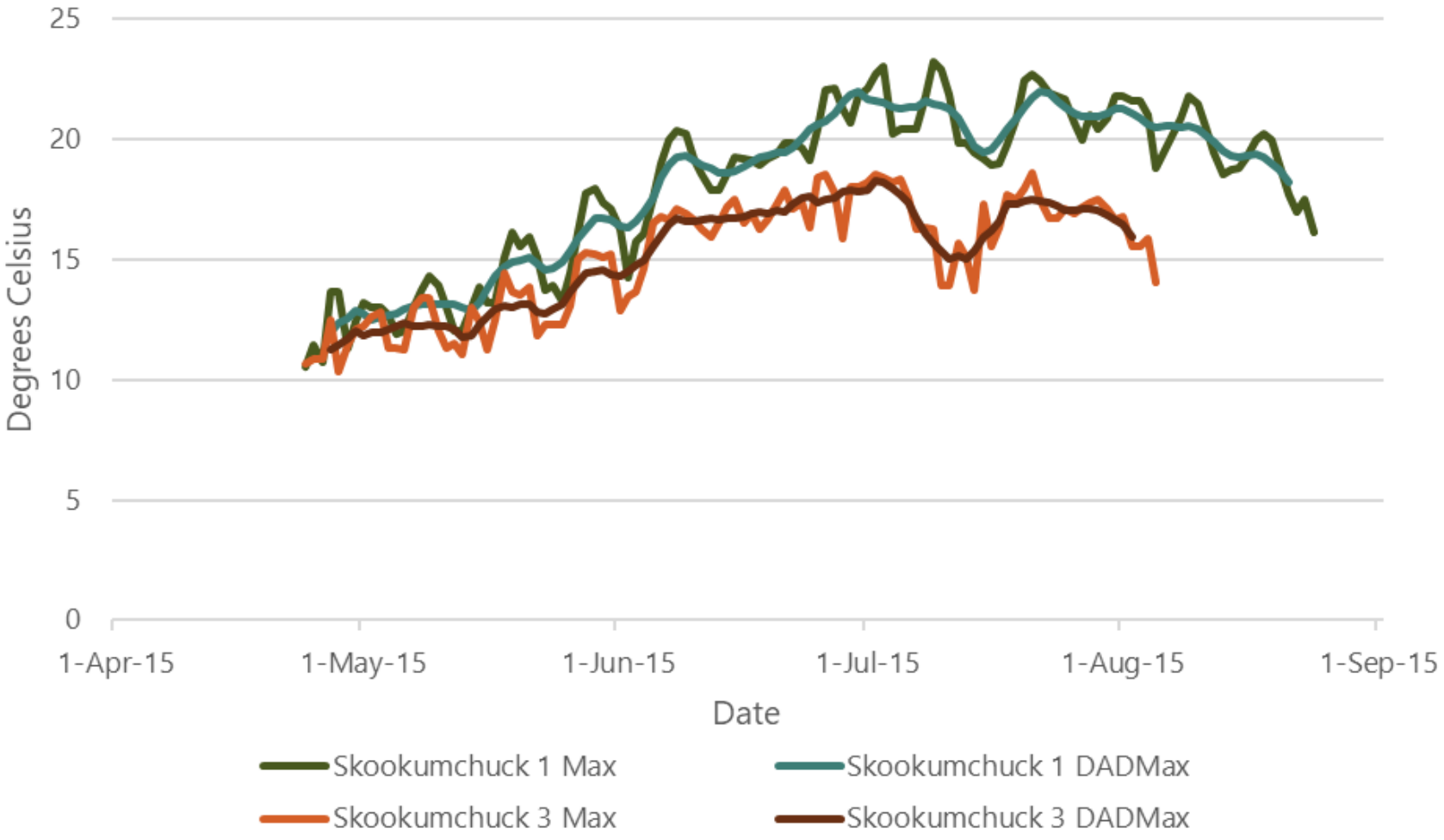
⬇ 63%



MODELED ESTIMATES BASED ON HABITAT ASSUMPTIONS NOT FIELD DATA

	Basin-wide Increase		Skookumchuck Subbasin Increase	
Coho	820	1%	832	17%
Fall Chinook	472	1%	(1)	0%
Spring Chinook	221	10%	211	37%
Steelhead	794	4%	797	399%

DAM RELEASES AUGMENT FLOW AND PROVIDE COLD WATER



POTENTIAL FLOOD STORAGE AT SKOOKUMCHUCK DAM

- Corps evaluated 11,000 and 20,000 acre-feet of storage – analysis assumed that maintaining current flow augmentation was required; reduced flood stage in Centralia by 1 foot during 100-year flood (as modeled in 2003)
- 11,000 acre-feet could require modification to low-level outlets; 20,000 acre-feet required modifying spillway to accommodate reservoir height up to 492 feet elevation (current spillway at 477 feet elevation)
- Additional storage space could be considered below 455 feet, but would reduce certainty of refill to augment flows (storage of 30,000 to 35,000 acre-feet)
- Still questions on seismic stability of dam

POTENTIAL OPTIONS FOR ANALYSES

1. Existing Dam + Operational Modifications.
2. Modified Dam + Operational Modifications.
3. Dam Removal

NEXT STEPS

What more information does the Board need to decide to provide direction for staff to develop a work plan and budget assessing the Skookumchuck?

QUESTIONS/COMMENTS

ASRP PRESENTATION

SUMMARY OF ASRP INFORMATION TO SUPPORT LONG TERM STRATEGY

- Three program options for Board consideration
  - Benefits, key outcomes & uncertainties
  - Cost estimates
  - 5-year strategies for pace of implementation
- 2021-2023 ASRP budget recommendations
- Implementation phasing and key milestones for evaluation by Board
- ASRP's relationship to harvest, hatcheries, predation
- Process for future biennia cost refinements

OUTLINE

- Preview of ASRP information Steering Committee plans to provide the Board to support the Long-Term Strategy
  - ASRP program options
  - 3 near-term funding strategies
  - Key milestones for program evaluation

PROGRAM OPTIONS

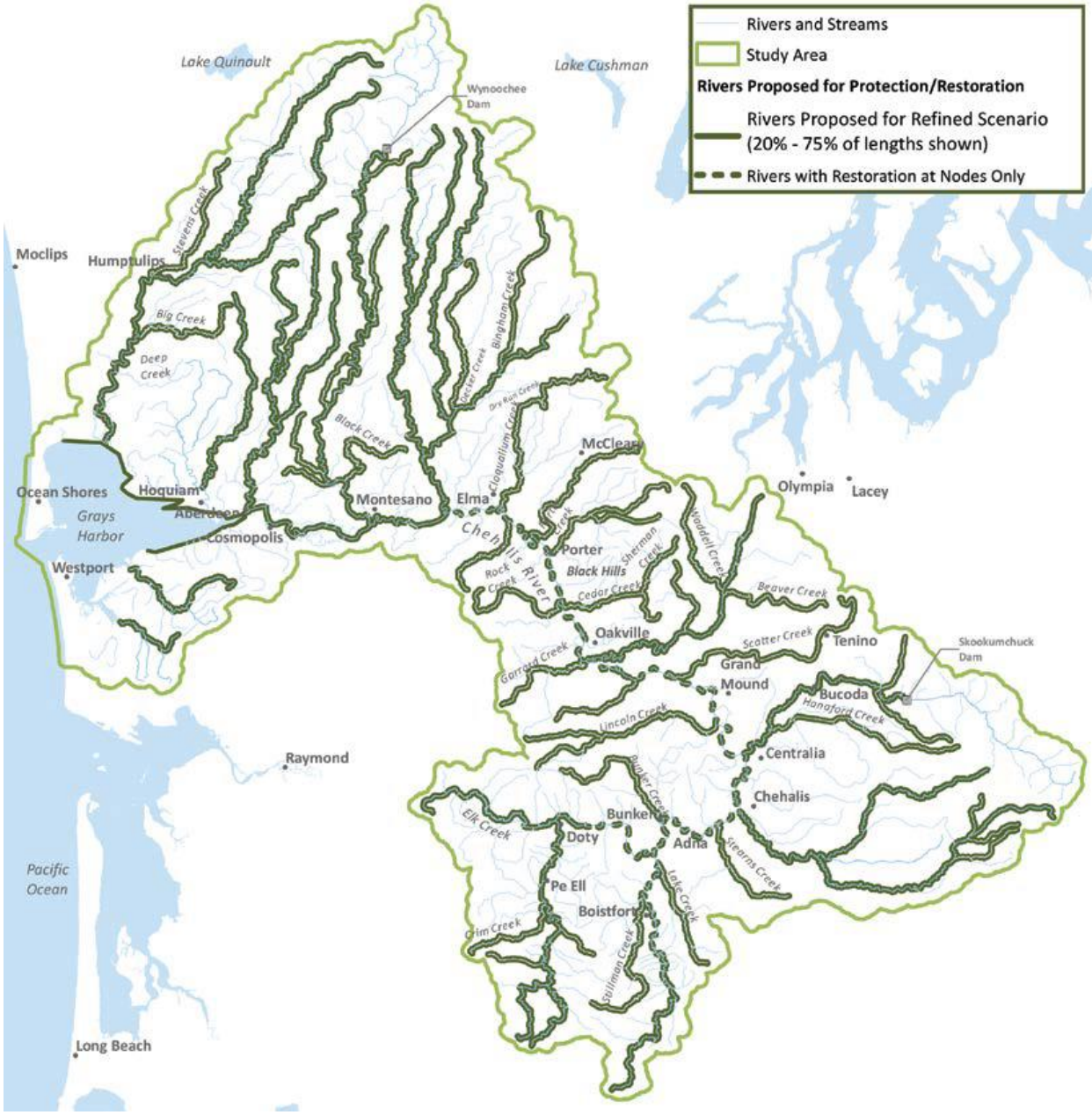
FULL-LEVEL OPTION

Description: Revised Scenario 3 level of action, totaling 550 miles of habitat restoration in priority rivers and streams

Estimated cost: $610 million to $1.3 billion

Implementation Period: 30 years

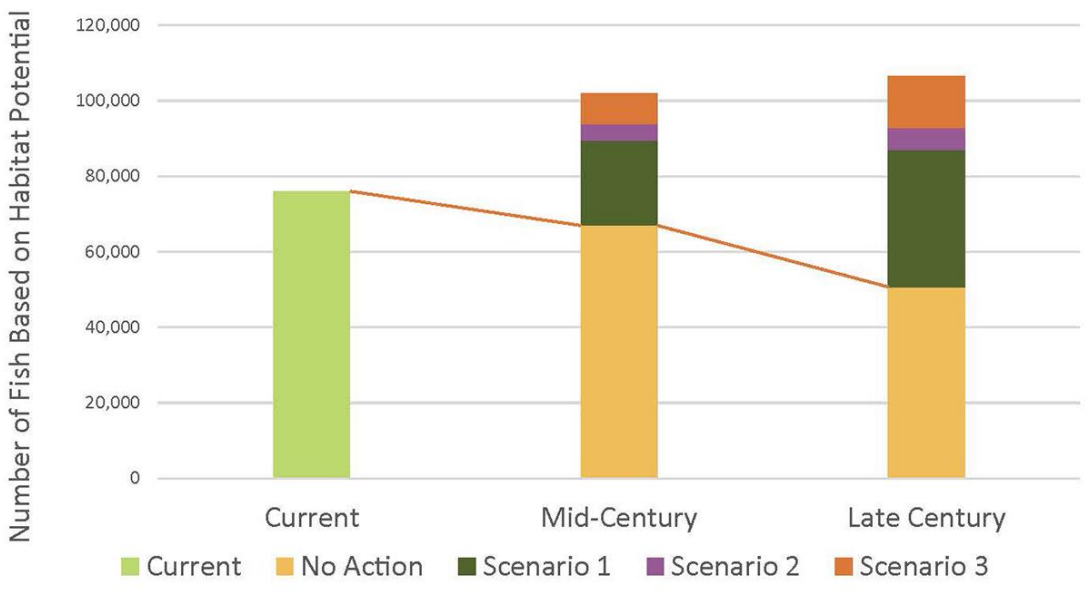
DEPARTMENT OF ECOLOGY
State of Washington
OFFICE OF CHEHALIS BASIN



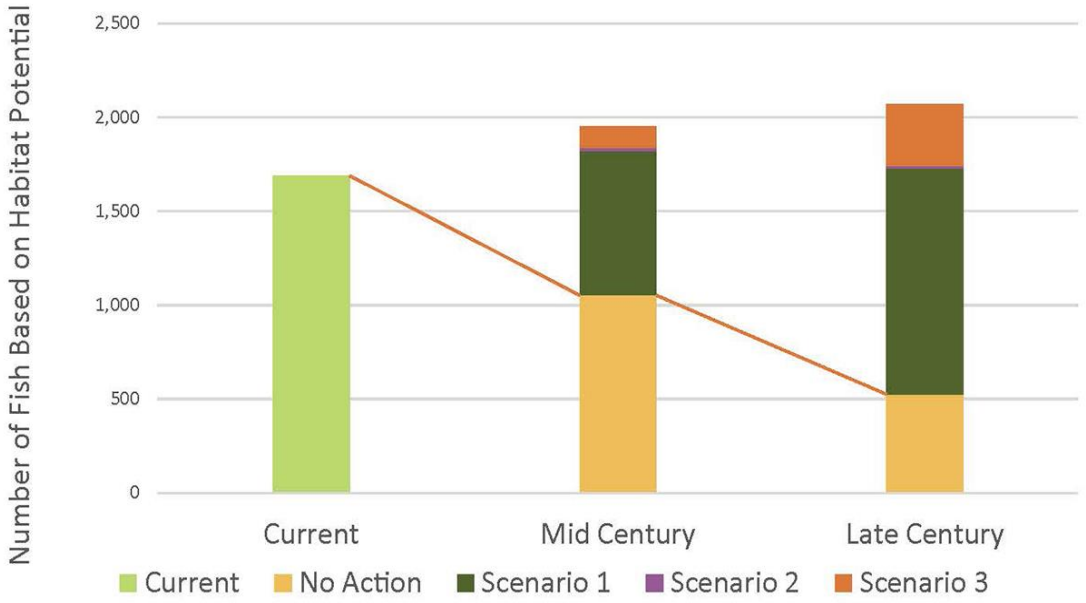
Revised Scenario 3

FULL-LEVEL OPTION

ASRP Phase 1 Scenario Results: Coho



ASRP Phase 1 Scenario Results: Spring Chinook

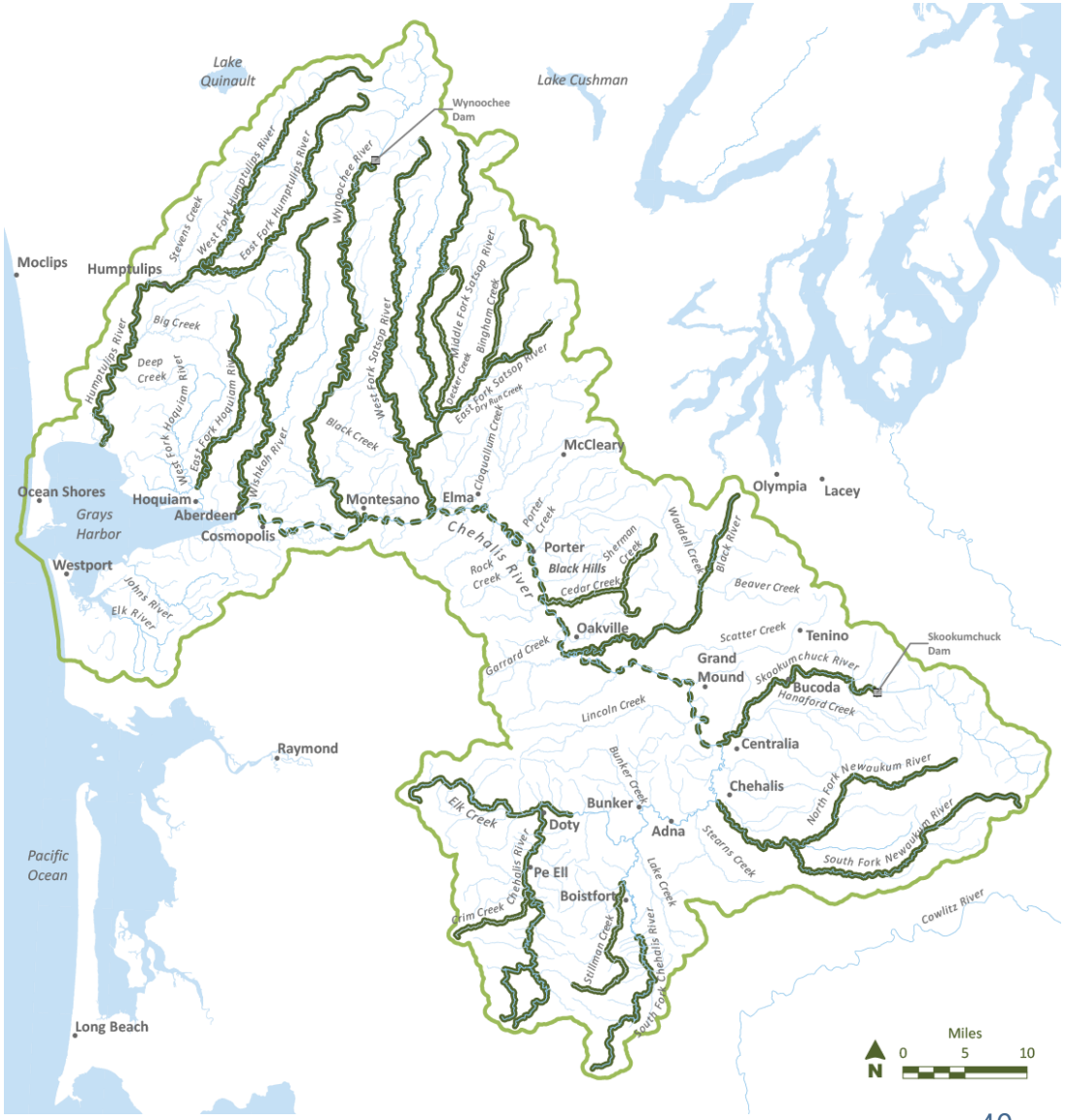


MID-LEVEL OPTION

Description: Scenario 1 level of action, totaling 230 miles of habitat restoration in priority rivers and streams

Estimated cost: $300-600 million

Implementation Period: 30 years

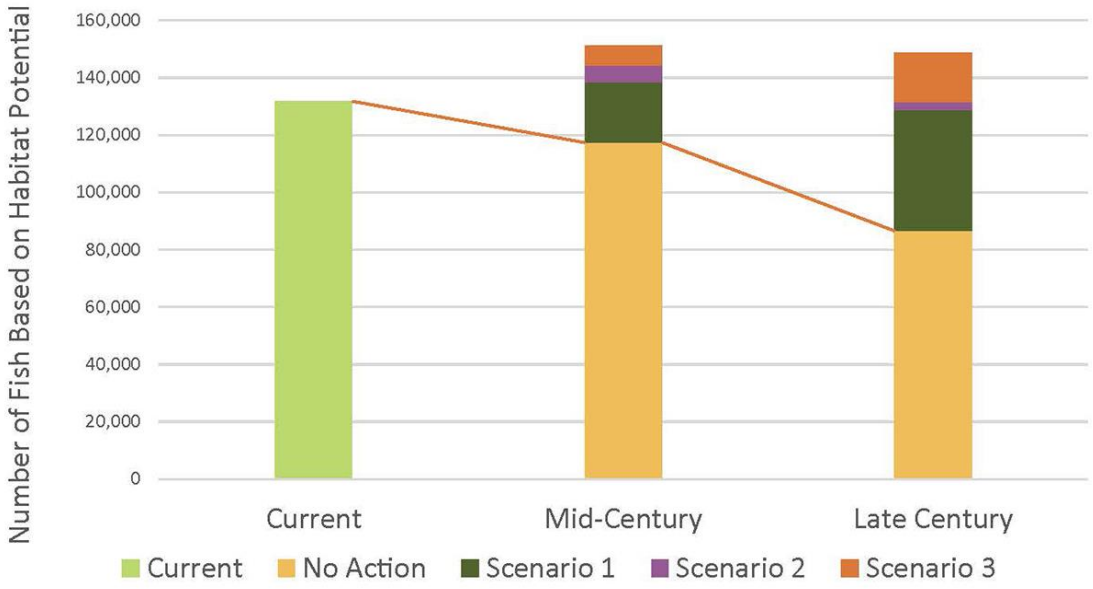


Phase 1 ASRP: Scenario 1

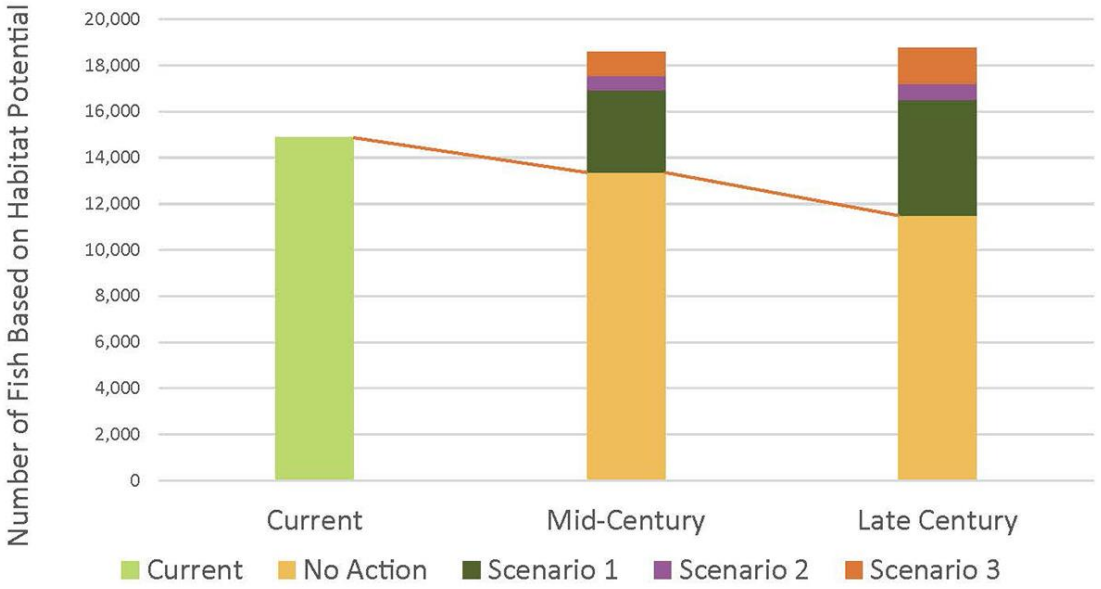
DEPARTMENT OF ECOLOGY
State of Washington
OFFICE OF CHEHALIS BASIN

MID-LEVEL OPTION

ASRP Restoration Scenario Results: Chum



ASRP Restoration Scenario Results: Steelhead



NEAR TERM ASRP FUNDING STRATEGIES

OVERVIEW

- 3 6-year funding strategies
  - 3 biennia
  - 2021-2027
  - 5–year program evaluation (2025)

- Recommended 2021-23 budget of $33M is consistent across all strategies

LEVEL IMPLEMENTATION

	2021-23 BUDGET	2023-25 BUDGET	2025-27 BUDGET	TOTAL 6-YEAR SPENDING
Level Implementation	$33M	$33M	$33M	$100M

Deep pool creation and enhancement will provide fish cold water to escape summer high temperatures

LEVEL IMPLEMENTATION

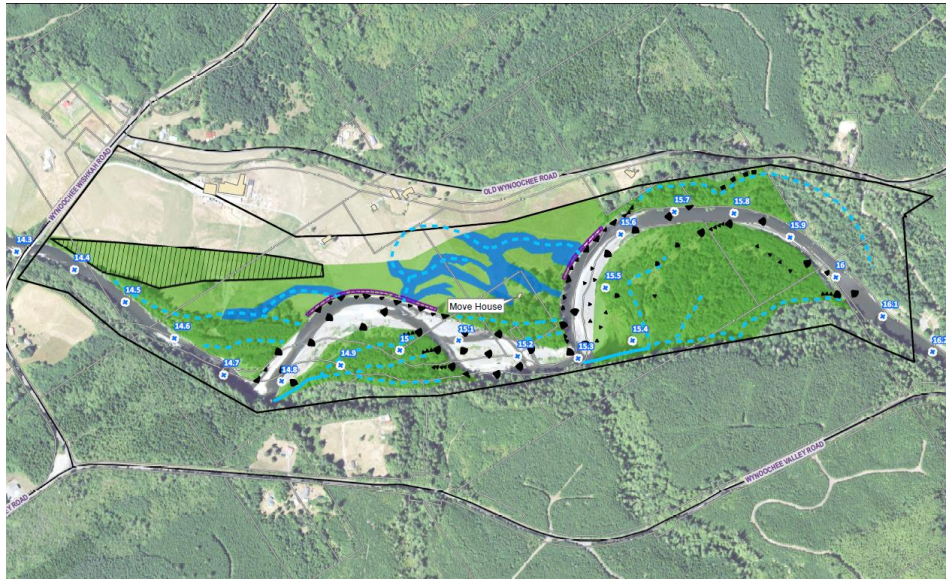
- **Key outcomes:**
  - Up to 40 miles of currently occupied core habitats enhanced
    - Critical existing Spring Chinook holding and spawning habitats
  - Up to 3,600 acres of riparian and floodplain restored and protected

Protection and enhancement of floodplains like the Sonnier property will provide quality habitat for species into the future

- **Key considerations:**
  - Significant benefit beyond no action or reduction in funding
  - 6-year implementation would not be focused on increasing spatial or life history diversity

SLOW RAMP UP

	2021-23 BUDGET	2023-25 BUDGET	2025-27 BUDGET	TOTAL 6-YEAR SPENDING
Slow Ramp-Up	$33M	$40M	$50M	$125M



Floodplain reconnection will cool water, provide habitat for amphibian breeding and juvenile fish to escape winter high flows

SLOW RAMP UP

- **Key outcomes:**
  - Up to 50 miles of currently occupied core habitats enhanced
    - Increased opportunities for breeding and rearing
  - Up to 4,200 acres of riparian and floodplain restored and protected
- **Key considerations:**
  - Incremental funding increases allow for strategic scaling of capacity
  - Better chances of long-term resiliency of habitats and species by increasing early implementation
  - Scaling up will rely on new implementation processes to be successful

Wood and mature riparian areas throughout the Cascade Mountain Ecological Region and are a focus for early implementation

FAST RAMP UP

	2021-23 BUDGET	2023-25 BUDGET	2025-27 BUDGET	TOTAL 6-YEAR SPENDING
Fast Ramp-Up	$33M	$50M	$70M	$150M

Wood loading on the Skookumchuck and Newaukum will provide new spawning habitat for Spring Chinook and other salmon species

FAST RAMP UP

- **Key outcomes:**
  - Up to 65 miles of currently occupied enhanced and new habitat features created
    - Increased spawning habitat for Spring Chinook
  - Up to 5,100 acres of riparian and floodplain restored and protected

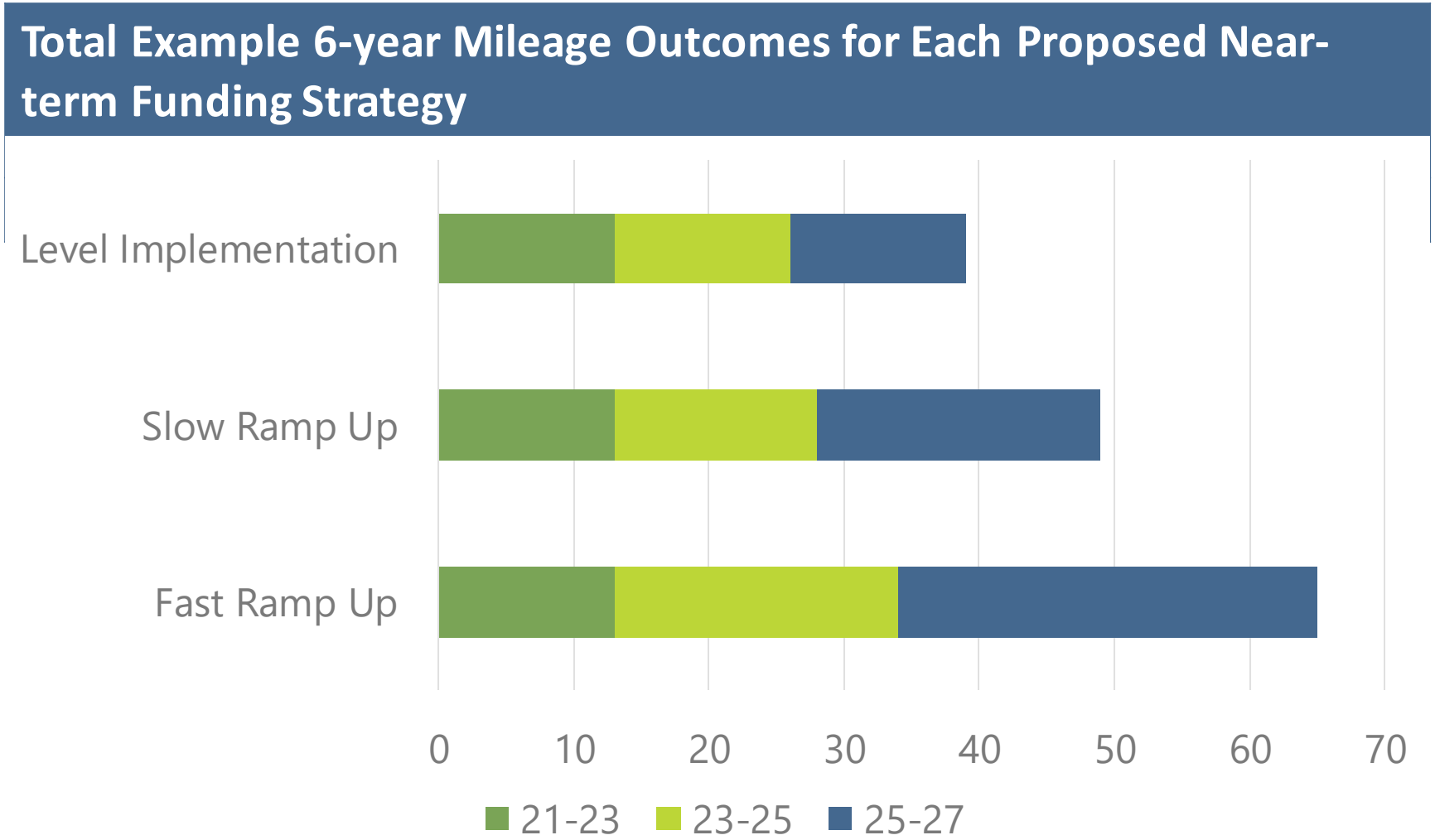
Amphibian habitat will be protected and enhanced in the Black River and Upper Chehalis tributaries

- **Key considerations:**
  - Significant funding increases incentivize rapid scaling of capacity and project execution
  - More certainty of higher long-term benefits and resiliency of habitats and species through increased early implementation of program
  - Will rely on new implementation processes and successful partnerships to be successful

NEAR TERM FUNDING STRATEGIES

FUNDING STRATEGY	2021-23 BUDGET	2023-25 BUDGET	2025-27 BUDGET	TOTAL 6-YEAR SPENDING
Level Implementation	$33M	$33M	$33M	$100M
Slow Ramp-Up	$33M	$40M	$50M	$125M
Fast Ramp-Up	$33M	$50M	$70M	$150M

NEAR TERM FUNDING STRATEGIES



PROGRAM EVALUATION

RECOMMENDED PROGRAM EVALUATIONS

- Board evaluation of ASRP program implementation at suggested frequency:
  - 5 years (2026)
  - 10 years (2031)

  Mid-biennium program evaluations allow for adjustments to next biennium budget

- Metrics will differ depending on the timeline for evaluation and information gathered

PROGRAM EVALUATION METRICS

Example metrics:

- **Landowner willingness outcomes (5 & 10 year evaluations)**
  - Tracking successful partnerships with landowners in comparison to outreach efforts in focal sub-basins
  - Landowner experiences partnering on restoration projects
- **Project implementation pace (5 & 10 year evaluations)**
  - Rate at which projects are developed, designs and constructed in comparison to planned project timelines
- **Project actual costs compared to projected costs (5 & 10 year evaluations)**
  - Real project costs will be tracked and compared to projected costs each biennium

PROGRAM EVALUATION METRICS

Example metrics:

- **Project effectiveness monitoring outcomes (5 & 10 year evaluations)**
  - Physical outcomes of habitat treatments
    - Ex: water temperature response from treatments intended to create cold water pools

- **Status and trends monitoring outcomes (10 year evaluation)**
  - Biological trends in response to habitat improvements throughout the basin
    - Ex: species population trends in focal sub-basins for project implementation

NEXT MEETING

- Discussion with Steering Committee members on near term funding strategies

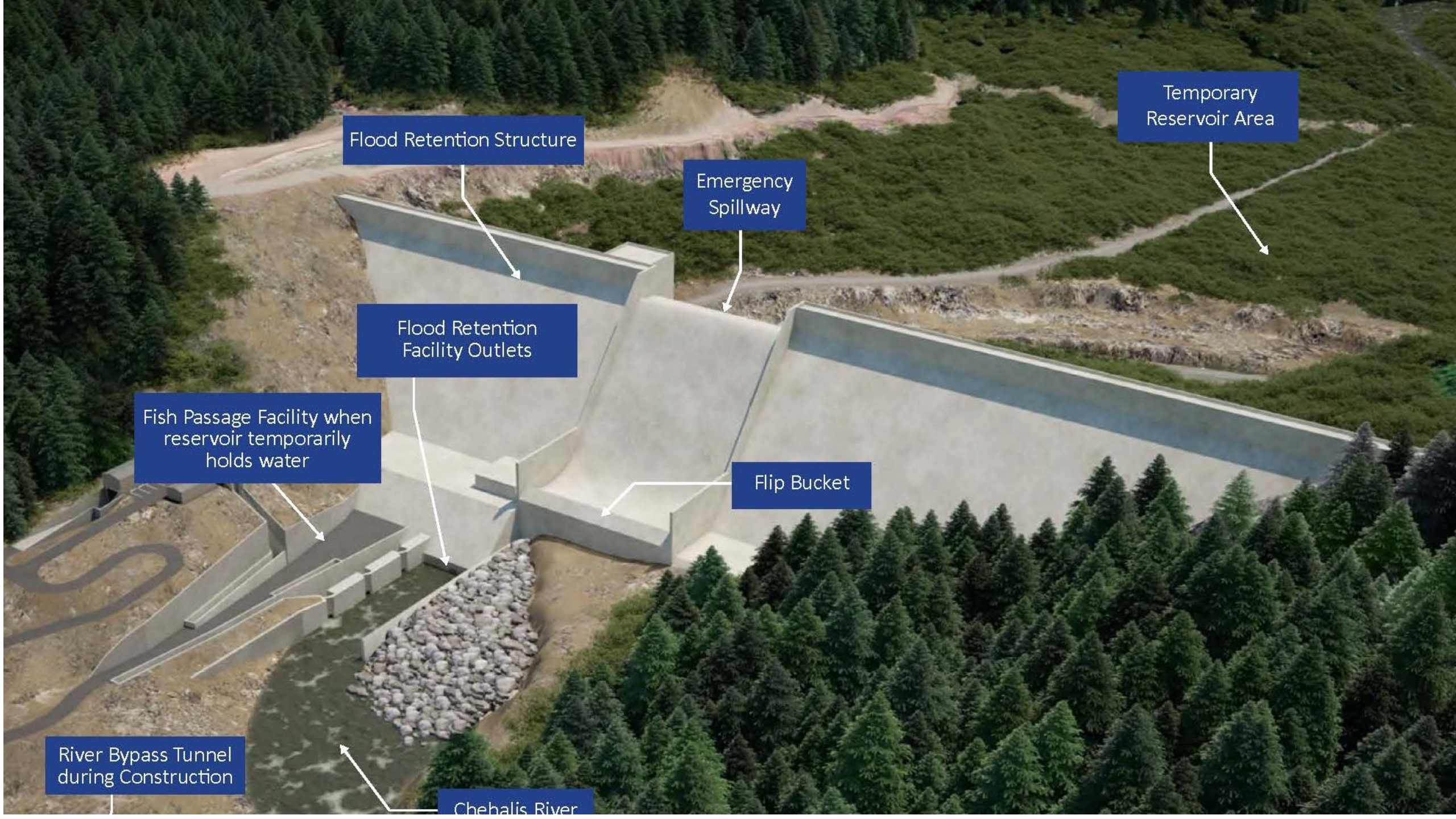
- Proposed process for future biennium ASRP budget refinements

- Additional information based on Board guidance and reactions to information shared today:
  - Near term funding strategies
  - Metrics for program evaluation

QUESTIONS AND DISCUSSION

For more information contact Emelie McKain, WDFW
Emelie.McKain@dfw.wa.gov

FLOOD RETENTION FACILITY AND AIRPORT LEVEE IMPROVEMENTS


Temporary Reservoir Area
Flood Retention Structure
Emergency Spillway
Flood Retention Facility Outlets
Fish Passage Facility when reservoir temporarily holds water
Flip Bucket
River Bypass Tunnel during Construction
Chehalis River

BENEFITS OF THE PROPOSAL

- Reduction in flooding in the upper Chehalis Basin
- Protection of homes, businesses, and schools
- Elimination of flooding and reduced closures at key locations along State Route 6 and Interstate 5

FLOOD DAMAGE REDUCTION BENEFITS (STRUCTURES)

Total structures of value predicted to flood in late-century catastrophic flood along mainstem and upper basin lower tributaries under No Action Alternative:

- Programmatic EIS: ~1,400 structures
- Draft SEPA EIS: ~3,000 structures

Draft SEPA EIS predicts Proposed Project would eliminate inundation in late-century catastrophic floods for:

- ~1,300 valuable structures
- ~3,800 acres (including 500-600 acres in Centralia)

FLOOD DAMAGE REDUCTION BENEFITS (ENVIRONMENTAL JUSTICE POPULATIONS)

Areas that include environmental justice populations that would no longer be inundated under late-century major flood:

- Largely in Centralia, west of Fort Borst Park
- Smaller areas downstream to Oakville

Under both late-century major and catastrophic floods:

- Many residential areas within City of Centralia
- Many residential areas within City of Chehalis

MAJOR CATEGORIES OF IMPACTS

- Tribal Historic and Cultural Resources
- Wildlife Species and Habitat
- Aquatic Species and Habitat

SEPA EIS combined the impacts of the Flood Retention Facility and climate change for impacts to aquatic species. NEPA separated impacts from Flood Retention Facility and climate change.

IMPACTS TO SALMONIDS

Major causes of Proposed Project's impacts are:

- **Inundation of reservoir area** in years when FRE holds floodwater

- **Habitat degradation in reservoir area** caused by removal of vegetation in reservoir footprint and from flood retention events

- **Decreased adult fish passage survival during construction** based on assumptions about effectiveness of temporary trap and haul facilities, especially for Coho salmon and steelhead

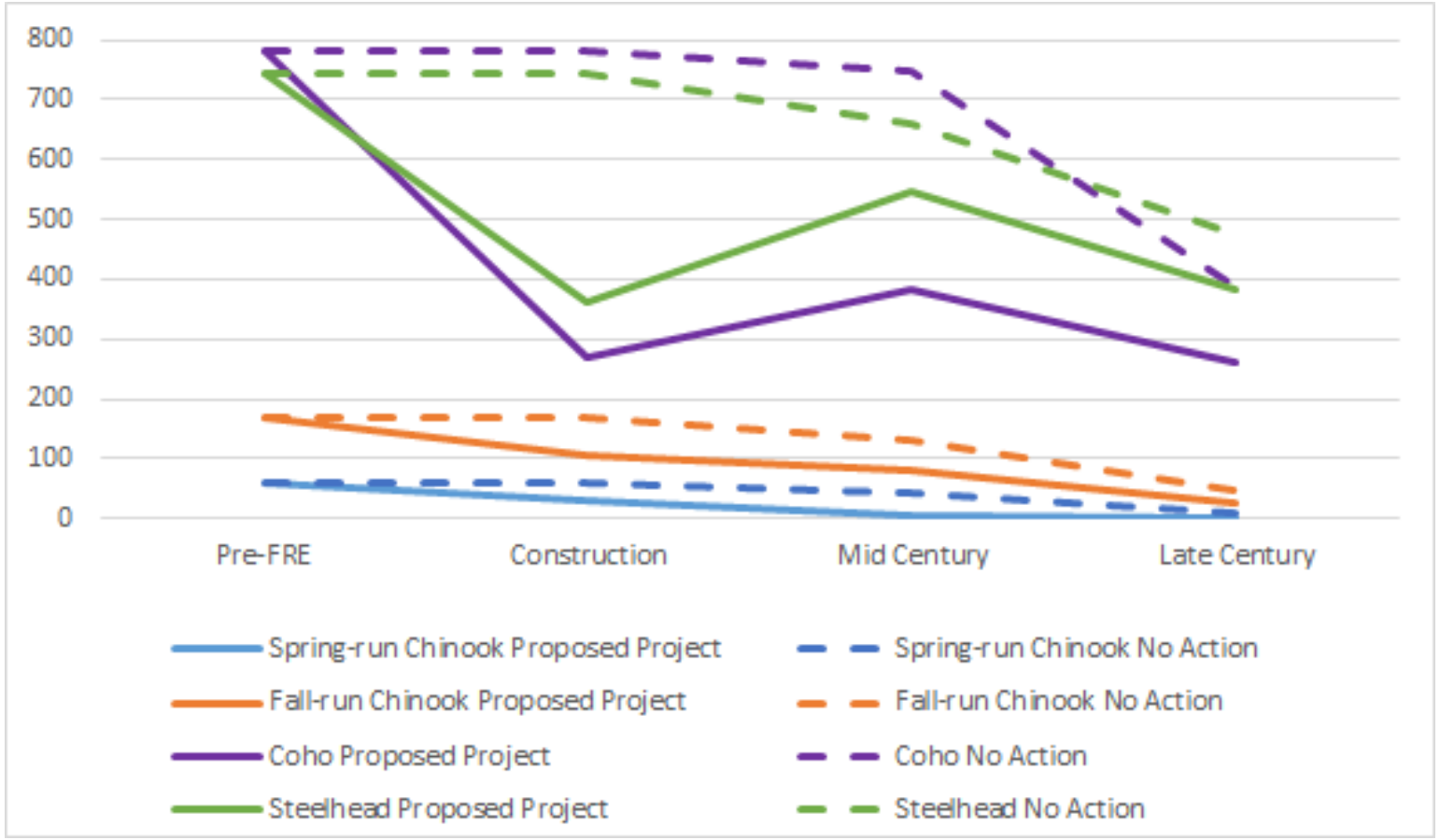
SALMONID IMPACTS (CONSTRUCTION)

- Above Crim Creek
  - Reduced fish passage survival
  - Degradation of habitat conditions within the temporary reservoir inundation area
- Rainbow Falls to Crim Creek area
  - Increased water temperature associated with vegetation removal within the reservoir area

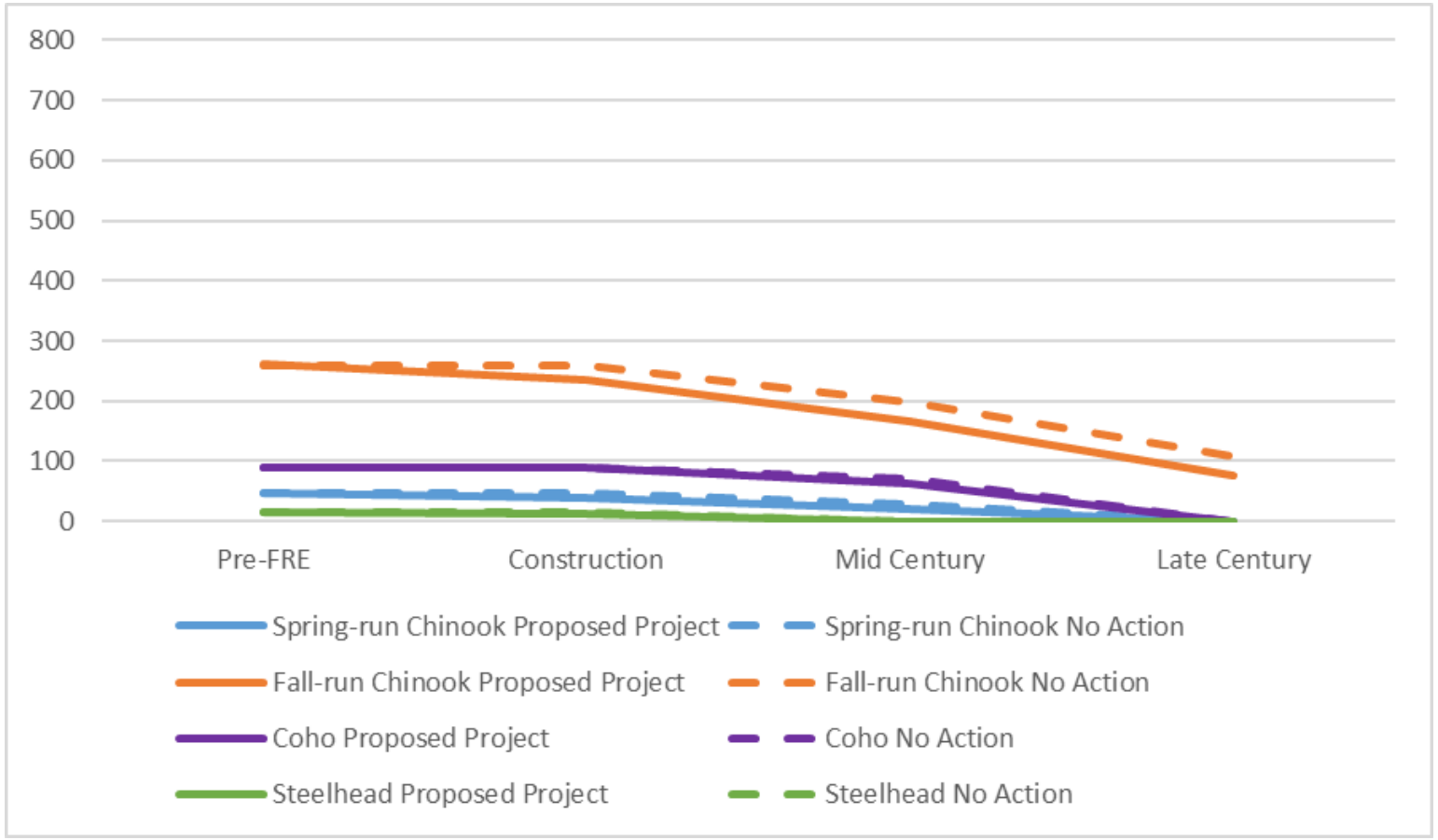
SALMONID IMPACTS (OPERATION)

- Above Crim Creek (Dam Location)
  - Reduced fish passage survival
  - Degradation of habitat conditions due to recurring floods and ongoing vegetation management
- Rainbow Falls to Crim Creek area
  - Reduced substrate immediately downstream of the FRE
  - Reduced large woody material
  - Increased water temperature
- For SEPA, impacts are also driven by climate change

IMPACTS TO SALMONIDS (ABOVE PROJECT)

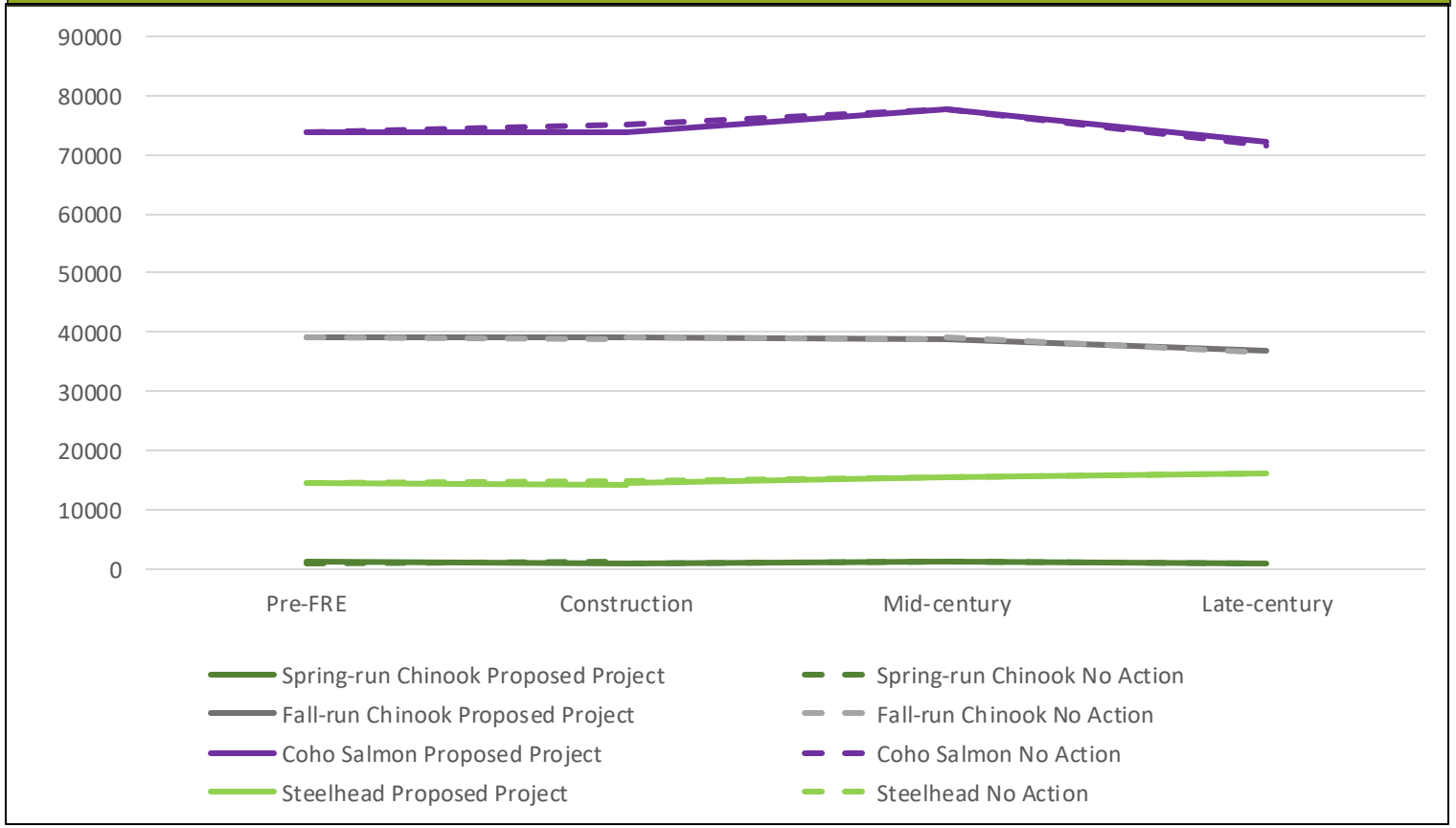


IMPACTS TO SALMONIDS (BELOW PROJECT, CRIM TO RAINBOW FALLS)



ESTIMATED ABUNDANCE IMPACTS (NEPA EIS)

Estimated Abundance Impacts Basin-wide from Proposed Action and No Action Alternative



Data source: NEPA DEIS Appendix K, Figures 6.4-9, 6.4-10, 6.4-11, and 6.4-12.

IMPACTS TO SALMONIDS (SPATIAL STRUCTURE)

Spatial Structure = pattern of estimated fish abundance across basin

- Significant portion of steelhead and salmon in study area spawn above Proposed Project
- Project significant decrease during construction and mid-century.
- Project and No Action would decrease spatial structure of populations by late century
- Decline in Spring Chinook most significant

IMPACTS TO SALMONIDS (DIVERSITY)

Upper Chehalis Basin is warmer, geographically and hydrologically distinct

- Reduction in salmon and steelhead by the Project and climate change would impact genetic, physiological and behavioral diversity
- Impacts on diversity from Project are most significant during construction and mid-century

AVOIDANCE, MINIMIZATION, MITIGATION

New analyses since the Draft EISs completed and in process

- Temporary reservoir inundation analysis
- Refined vegetation management plan
- Identification of aquatic, terrestrial, and wetland mitigation opportunities
- Water quality
- Cultural resources and areas of spiritual significance
- Vegetation Management Plan
- Air quality impact analysis
- Draft biological assessment
- Pe Ell water supply system
- Construction/Operations Phase BMP
- Fish passage during construction

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?
- Review by agencies/tribes
- Ultimately requires approval by regulatory agencies

DISTRICT'S CURRENT PERSPECTIVE

- Sufficient opportunities for aquatic and wetland mitigation exist
- Adaptive management and durable mitigation are needed
- Impact avoidance and minimization will reduce both impacts and costs

WATER QUALITY MODELING

Sensitivity Analysis

OVERVIEW

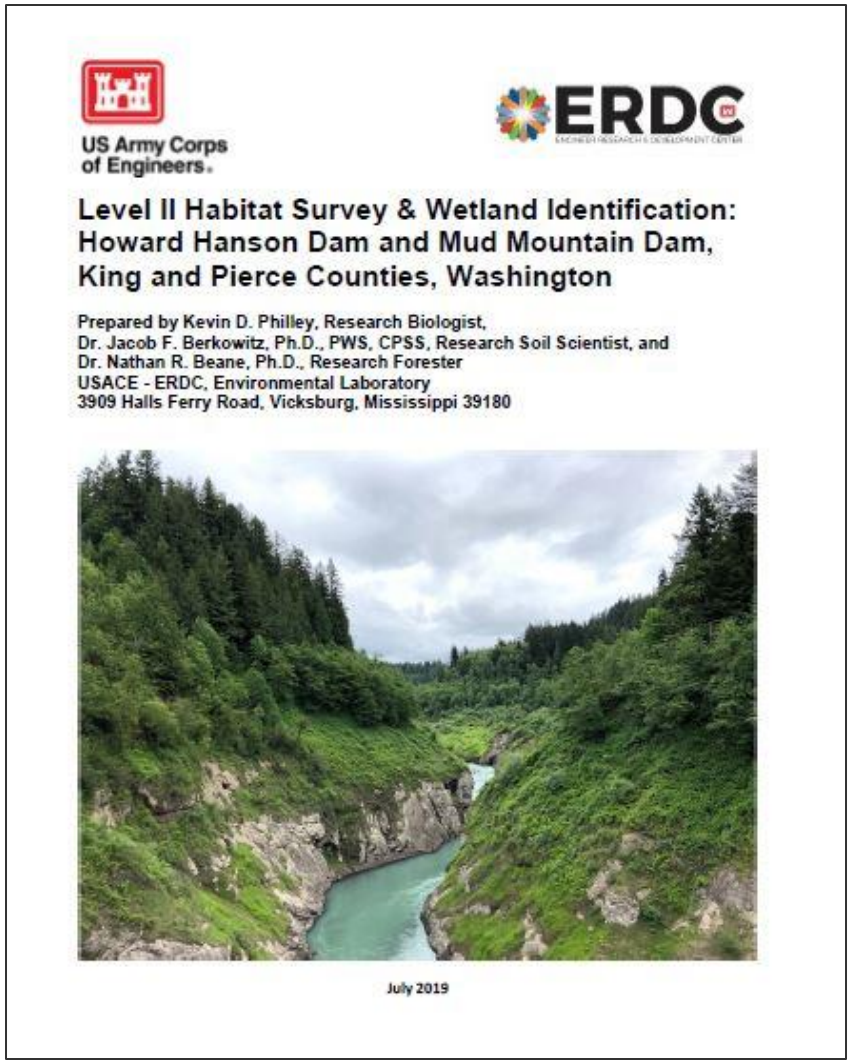
- Modeling was performed to assess the sensitivity of water temperature changes to vegetation management
- Vegetation is represented in the model by tree height and canopy for each model segment and left/right banks
- Model version and inputs were the same as those used in the analysis for the SEPA and NEPA EIS

VEGETATION SCENARIOS

- Prior modeling vegetation scenarios
  - Existing conditions used an estimated vegetation height based on downstream vegetation
  - Future conditions used a mostly uniform 2-meter vegetation height
- Sensitivity modeling includes an update of the existing vegetation and two vegetation management scenarios
  - Low vegetation (Volunteer Willows)
  - High vegetation (Vegetation Management Plan [VMP])
  - Mud Mountain Dam reviewed to inform VMP

MUD MOUNTAIN EXAMPLE

- Mud Mountain Dam and Reservoir were used as an example to inform the Vegetation Management Plan
  - Originally constructed in 1947
  - Reservoir was cleared of vegetation prior to dam operation; no replanting
  - Debris and sediment management is ongoing
- USACE Study (July 2019)
  - Flooding and inundation data
  - Vegetation mapping in reservoir


US Army Corps of Engineers

ERDC

Level II Habitat Survey & Wetland Identification: Howard Hanson Dam and Mud Mountain Dam, King and Pierce Counties, Washington

Prepared by Kevin D. Philley, Research Biologist,
Dr. Jacob F. Berkowitz, Ph.D., PWS, CPSS, Research Soil Scientist, and
Dr. Nathan R. Beane, Ph.D., Research Forester
USACE - ERDC, Environmental Laboratory
3909 Halls Ferry Road, Vicksburg, Mississippi 39180

July 2019

PRELIMINARY RESULTS, FINDINGS AND NEXT STEPS

- Vegetation Scenarios under Existing Conditions
  - Summer (June – September) at the dam
    - High vegetation (Vegetation Management Plan) approximately ±0.2 to 0.4 C increase
    - Low vegetation (Volunteer Willows) approximately ±0.7 to 1.1 C increase
- Vegetation Scenarios under Climate Change
  - Summer (June – September) at the dam
    - High vegetation (Vegetation Management Plan) approximately ±0.1 to 0.3 C increase
    - Low vegetation (Volunteer Willows) approximately ±0.7 to 1.0 C increase
- Next steps
  - Continue working to investigate influences on water temperatures

AGENCY/TRIBAL PERSPECTIVES ON IMPACTS AND MITIGATION

- Impacts may be greater than what was reported and/or with more frequent use of the facility to address climate change
- Amount of mitigation would require higher ratios than initial estimates
- Modeling assumptions are under review
- More detail is needed on relationship of mitigation linked to species and life stages, functions and values, and address limiting factors for species such as spring Chinook salmon
- More detail needed on adaptive management and monitoring

POTENTIAL PATHWAY FOR ADDITIONAL EVALUATION

1. District develops and refines avoidance, minimization and mitigation (AMM) analyses in collaborative process with agencies and tribes
2. SEPA and NEPA EISs finalized with new information from District and additional technical studies, addresses tribal and public comments
3. District prepares preliminary permit application materials and supporting plans, e.g., finalize draft HPA/Aquatic Species Mitigation Plan for permitting, finalize draft Wetlands Mitigation Plan, develop draft AMM plans for recreation, land use, cultural resources, etc.

BOARD FEEDBACK

What additional information does the Board need to evaluate potential next steps for Flood Retention Facility?

LOCAL FLOOD DAMAGE REDUCTION ACTIONS

POTENTIAL WAYS TO ADDRESS DAMAGE FROM ACCELERATED BANK EROSION

ADDRESS BANK EROSION DAMAGE

- Ways to address damage from accelerated bank erosion
  - Developing initial maps for up to 100 miles of high priority areas
  - Developing an erosion management approach to evaluate reach-scale opportunities for reducing erosion damages while protecting and enhancing habitats and ecological processes
- Long-term option
  - Identifying one or more pilot subbasins to outline how to develop a pilot technical assistance program for landowners with relative cost and staffing needed for a program (in coordination with staff from OCB and WDFW)
  - Potential to complete CMZ delineations in high priority areas

UPDATED EROSION MANAGEMENT STRATEGY

- Channel migration and bank erosion are natural processes that form and maintain habitats. However, erosion rates can become accelerated above natural rates due to land uses, facilities, hard bank protection or other factors.
- Recommend that erosion management projects should be developed and implemented in the context of reach-scale conditions and geomorphic processes…and promote the use of bioengineering techniques.
- Recommend that erosion management projects included within the Chehalis Basin Strategy occur only where they can be combined with habitat enhancement or where critical infrastructure is present and threatened and an expanded reach-scale project can be pursued that benefits both public and private landowners and enhances habitat.

NEXT STEPS

In March, the analysis of the 100 miles of erosion areas will be available for Board consideration in determining the potential magnitude of an erosion program, priorities, and potential projects and focus areas.

POTENTIAL APPROACHES TO PROTECT HIGH VALUE STRUCTURES AND CRITICAL INFRASTRUCTURE IN HIGH PRIORITY AREAS

PRIORITY AREAS FOR CONSIDERATION

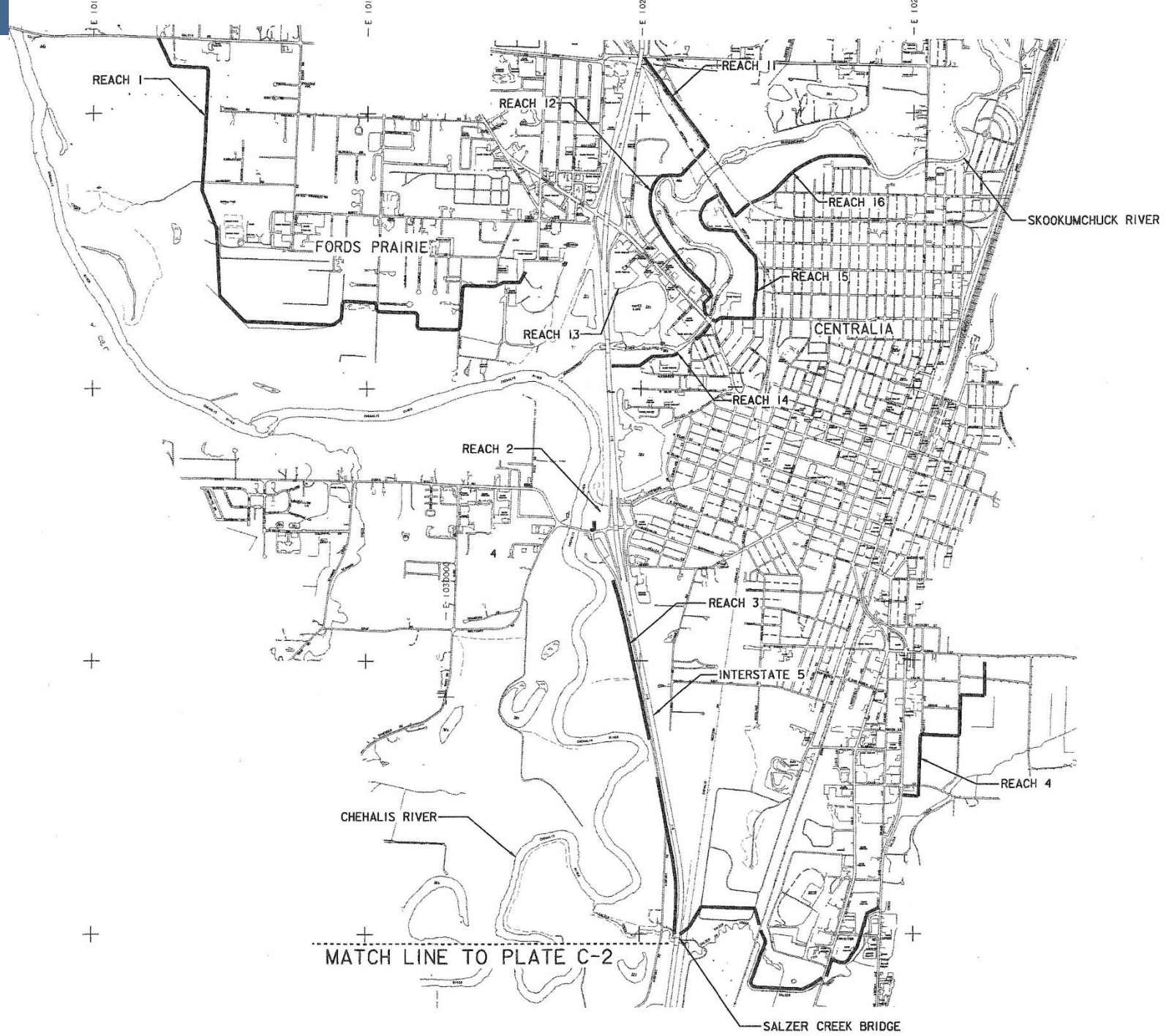
1. Adna
2. Lower Newaukum
3. Airport Levee/Chehalis
4. Centralia
5. West Centralia
6. Military Road
7. Galvin
8. Independence Road and north floodplain
9. Oakville
10. Elma (south and west, Monte-Elma Road)
11. South Aberdeen Levee Area
12. East Aberdeen
13. Bucoda
14. Grand Mound

RANKING ELEMENTS FOR PRIORITY AREAS

1. Structures could potentially protected?
2. Any major infrastructure or critical infrastructure present?
3. Number of structures protected per mile?
4. Number of structures negatively impacted by a local flood protection facility, and would need floodproofing or relocation?
5. Potential adverse impacts to wetlands, waterbodies or other natural habitats?

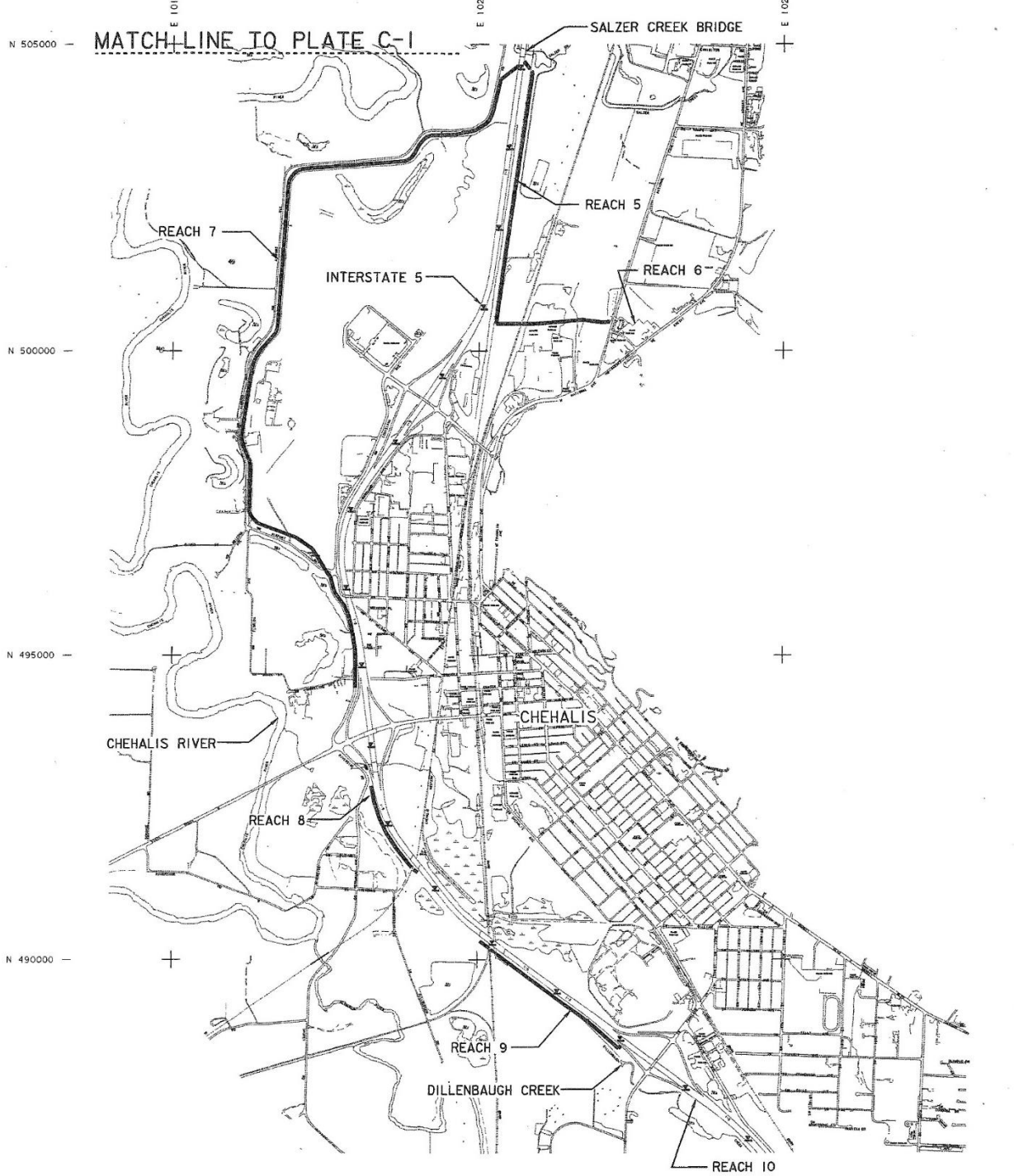
LOCATION	NUMBER OF STRUCTURES IN SELECTED AREA[1]	MAJOR/CRITICAL INFRASTRUCTURE PRESENT IN MODELED 2080 FLOODPLAIN?[2]	STRUCTURES AFFECTED OUTSIDE PROTECTED AREA	IMPACTS TO NATURAL ENVIRONMENT	RELATIVE BENEFIT PER MILE OF FACILITY	RATING
3. Airport Levee and Chehalis	High (215)	I-5, airport Washington State Patrol	High (>100)	Medium (wetlands, Dillenbaugh Cr.)	High (~4 miles [>1 mile existing])	**High**
4. Centralia	High (5,527)	Radio stations Valley View Health Center Washington Elementary School Centralia Community College Centralia Police Centralia City Light BPA Power Plant	High (>100)	High (wetlands, Skookumchuck and Salzer riparian)	High (~5 miles)	**High**
5. West Centralia	642 (High)	Centralia High School	Medium (>25)	Low (agricultural, park)	High (~2 miles)	**High**
11. South Aberdeen	High (1,203)	Stevens Elementary School	Low (<20)	Low (existing levee raise, pump station)	High (~2 miles existing)	**High**
13. Bucoda	High (260)	Water supply infrastructure	Low (<20)	Medium (Skookumchuck riparian)	High (~1 mile)	**High**
1. Adna	Medium (83)	High school Lewis County special education Highway 6	Low (<20)	Medium (Chehalis riparian)	Medium (~1.5 miles)	**Medium**
7. Galvin	Medium (87)	None identified	Medium (>25)	Low (agricultural, residential)	Medium (~1.5 miles)	**Medium**
9. Oakville	Medium (172)	None identified	Low (<20)	Low (residential)	Medium (~1 mile)	**Medium**
10. West Elma	Medium (148)	Highway 8 Elma High School	Low (<20)	Low (highway raise)	Medium (~2 miles)	**Medium**
12. East Aberdeen	Low (4; all commercial)	Highway 101	Low (<20)	Medium (Estuary shoreline)	Medium (~1 mile)	**Medium**
14. Grand Mound	Medium (168)	None identified	Low (<20)	High (wetlands, oxbows)	Medium (~2 miles)	**Medium**
2. Lower Newaukum	Low (20)	None identified	Low (<20)	Low (agricultural, residential)	Low (~1 mile)	**Low**
6. Military Road	Low (34)	Providence Centralia Hospital Valley View Health Center	Medium (>25)	Low (residential)	Low (~2 miles)	**Low**
8. Independence Road / north	High (206)	Highway 12	High (>100)	High (wetlands, oxbows)	Medium (~4 miles)	**Low**

USACE PROPOSED PLAN FOR I-5 CENTRALIA, CHEHALIS

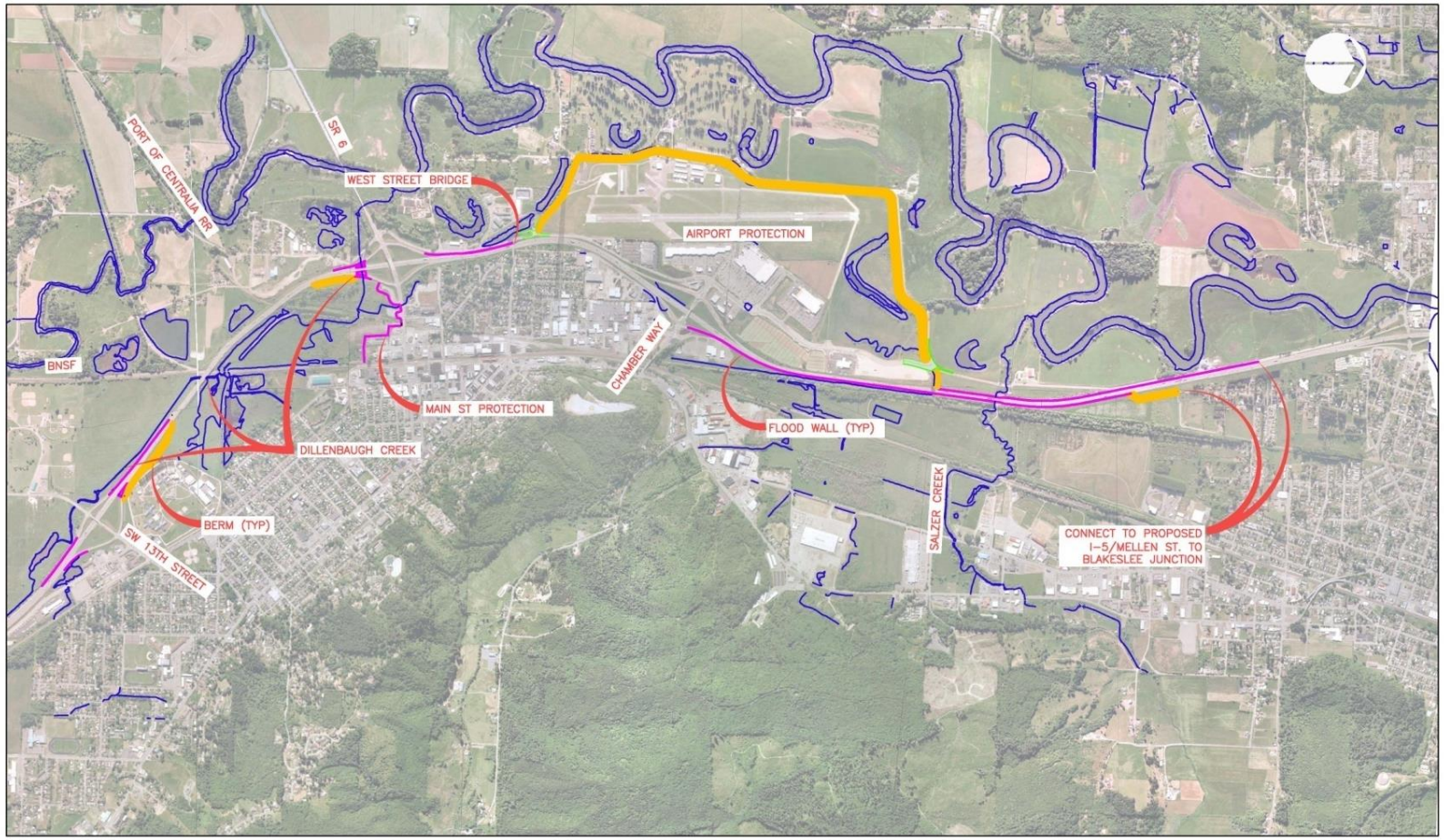


DEPARTMENT OF ECOLOGY
State of Washington
OFFICE OF CHEHALIS BASIN

USACE PROPOSED PLAN



WSDOT PROTECT I-5 WITH FLOOD WALLS AND LEVEES CONSIDERATION



BOARD FEEDBACK

What additional information does the Board need to consider whether to support additional evaluation of structural analyses for top tier of priority areas including levees/walls to protect I-5, Centralia and Chehalis?

FLOODPLAIN ACQUISITION PROGRAM

ACQUISITION PROGRAM – POTENTIAL PURPOSES

- Protection of aquatic species habitat and restoration opportunities
- Support retention of rural zoning and address pre-existing lots
- Compensation to landowner for removal floodprone property/structures
- Relocation of homes and businesses

DIFFERENT STRATEGIES FOR ACQUISITION PROGRAMS TO ADDRESS FLOODPRONE HOMES AND BUSINESS

- Whether an acquisition program approach proactively seeks acquisitions and relocation to reduce all or most at-risk structures in certain strategic areas and/or…
- Responds to acquisition requests across a dispersed area.

ACQUISITION PROGRAM - IMPLEMENTATION GROUP FEEDBACK

- Program that is responsive to interest across the Basin - one of the tools in the toolbox (CFAR)
- Relocation of major portion of community in specific areas challenged by available locations, interest, and potential economic/social equity issues
- Determination of feasibility requires significant advanced work (master planning and outreach)

ACQUISITION PROGRAM FOR FLOODPRONE HOMES AND BUSINESSES – BOARD CONSIDERATIONS

- Floodplain acquisition could be one tool in broader flood damage reduction toolbox
- Board could be open to acquisition opportunities with willing landowners, especially in strategic locations or areas that can offer multiple benefits
- Board could consider structure retrofits (e.g., elevations) where acquisition is less feasible
- Board could consider initial master planning work or feasibility evaluations in strategic areas with potential relocation opportunities (e.g., Davis Hill in Centralia)

ACQUISITION PROGRAM FOR ASRP AND LAND USE CONCERNS – BOARD FEEDBACK

Should staff develop a work plan and budget to design an acquisition program for Board consideration? Are there specific objectives or priorities that should be considered?

LAND USE MANAGEMENT

FLOODPLAIN MANAGEMENT LAND USE RECOMMENDATIONS – PROPOSED FOR DISCUSSION

- Two-pronged approach for using floodplain data:
  - Use the flood of record or modeled current 100-year floodplain (whichever higher) for *regulating* the floodplain extent & depth
  - Use the 500-year floodplain or the 2080 (100-year) floodplain for *planning and outreach purposes* (e.g., future zoning, technical assistance and advice to property owners)
- Support continuation of subdivision regulations for rural areas to prevent new lots wholly in floodplain
- Discourage upzones or urban growth area (UGA) expansion into flood-prone areas
- Provide guidance to standardize implementation of zero rise policy and compensatory storage requirements
- Establish an acquisition program to acquire development rights and/or use other incentives to discourage expansion of high-density zoning, maintain low-density zoning in rural areas, and prevent environmental damage
- Chehalis basin jurisdictions should consider implementing the other past floodplain management recommendations (CRBFA 2010 and French Assoc 2016) as appropriate for their jurisdictions

BOARD FEEDBACK

- Does the Board believe these recommendations have the potential to achieve the Board's outcome to prevent new development in floodprone areas? If not, what additional actions may be needed?

2021-2023 BIENNIUM BUDGET PROCESS