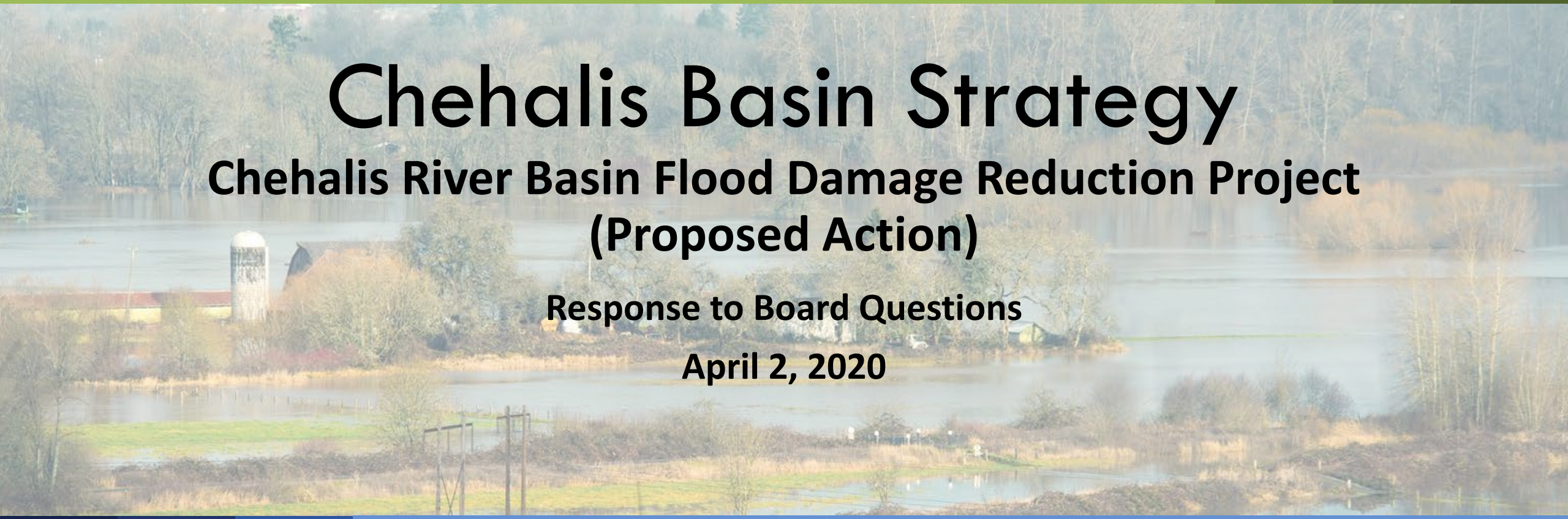


Chehalis Basin Strategy

Chehalis River Basin Flood Damage Reduction Project (Proposed Action)

Response to Board Questions

April 2, 2020

Board Questions

1. **Flood events** used to inform Draft SEPA EIS analysis, and rationale for using selected flood events
2. **Potential benefits** of Proposed Project compared to No Action Alternative
3. **Discrete impacts** on salmonid populations from flood retention facility separate from No Action Alternative with climate change (*ie.*, the "delta")
4. **Factors determining moderate adverse impact** of Proposed Project on Southern Resident killer whales
5. **Flood-related turbidity** of No Action Alternative compared to Proposed Project
6. **Water temperature** projections for No Action compared to Proposed Project
7. **Flood-related erosion** projections for No Action compared to Proposed Project
8. **Air quality** assumptions under No Action compared to the Proposed Project

Background

- Q&As in memo were identified by Board as important for consideration as part of Long-Term Strategy recommendation
- Data in memo is directly from Draft SEPA EIS and associated technical Discipline Reports (EIS Appendices)
- Additional information like Programmatic EIS & ASRP used where necessary to answer Board's questions
- Memo is not a supplement or addendum to the Draft SEPA EIS, and not a public comment on the EIS

1. Flood Events – Definitions

Major flood:

Water flow rate of 38,800 cubic ft per second (cfs) or greater at Grand Mound

Catastrophic flood:

Water flow rate of 75,100 cfs or greater at Grand Mound

Recurring flood:

A major flood or greater that occurs in each of 3 consecutive years

Draft SEPA EIS assumes peak flows will increase by 12% in mid century and by 26% percent in late century due to climate change

Flood Events – Rationale & Comparison to 2007 Flood

- Flood District's proposal is to reduce damage during **catastrophic flood**.
- Draft SEPA EIS modeled major and catastrophic floods based on statistical peak flows distributed in all areas of the basin.
- Modeled catastrophic flood and 2007 flood had similar flows at Grand Mound but different distributions across other areas of the basin.
- Previous analysis predicted the Project could retain the 2007 flood flow, but this did not use updated climate information.
- Draft SEPA EIS says temporary reservoir would be able to hold all water expected with catastrophic flood. Larger flows above reservoir's design capacity would spill excess over the top using spillway.

2. Flood Damage Reduction Benefits (Transportation)

LOCATION	CATASTROPHIC FLOOD					
	MID-CENTURY			LATE-CENTURY		
	NO ACTION	PROPOSED ACTION	DIFFERENCE	NO ACTION	PROPOSED ACTION	DIFFERENCE
INTERSTATE 5	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)
I-5 at 13th Street Interchange	0.2	**0.0**	-0.2	0.5	**0.0**	-0.5
I-5 north of SW 13th Street Interchange (Exit 76)	1.8	0.7	-1.1	2.3	1.4	-0.9
I-5 at SR 6 Interchange	0.8	**0.0**	-0.8	1.2	0.5	-0.8
I-5 Interchange at NW Chamber of Commerce Way [6]	7.0	0.4	-6.6	8.4	4.7	-3.8
I-5 at Salzer Creek	1.1	**0.0**	-1.1	2.6	0.1	-2.4
I-5 at Mile Post 81	1.9	**0.0**	-1.9	3.2	0.3	-2.9

Flood Damage Reduction Benefits

Flood levels in Draft SEPA EIS are different from Programmatic EIS because:

- Draft SEPA EIS included updated climate change predictions for more rain and bigger peak flows
- Draft SEPA EIS used a more detailed and precise model
- Programmatic EIS assumed additional walls and levees along east side of I-5 to add more protection of freeway as part of Alternative 1, where these have not been proposed by the Applicant
- Projects completed after the Programmatic EIS are included in Draft SEPA EIS, including new airport pumps and culverts.

Flood Damage Reduction Benefits (Structures)

Total structures of value predicted to flood in late-century catastrophic flood 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 (inc. 500-600 acres & many residential areas 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

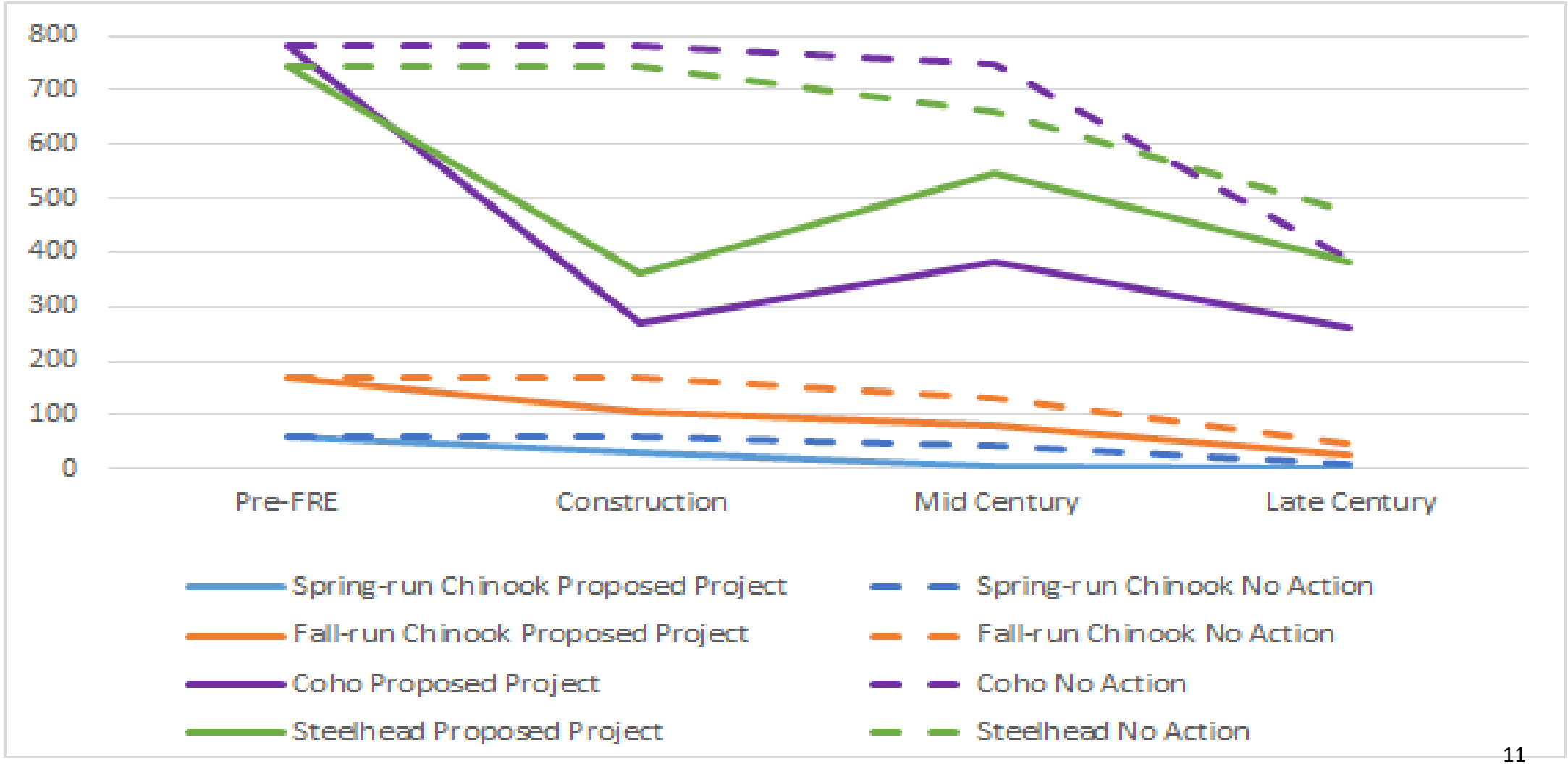
Under both late-century major and catastrophic floods:

- Many residential areas within City of Centralia that include environmental justice populations would be protected from flooding
- Many residential areas within City of Chehalis that include environmental justice populations would have reduced flooding

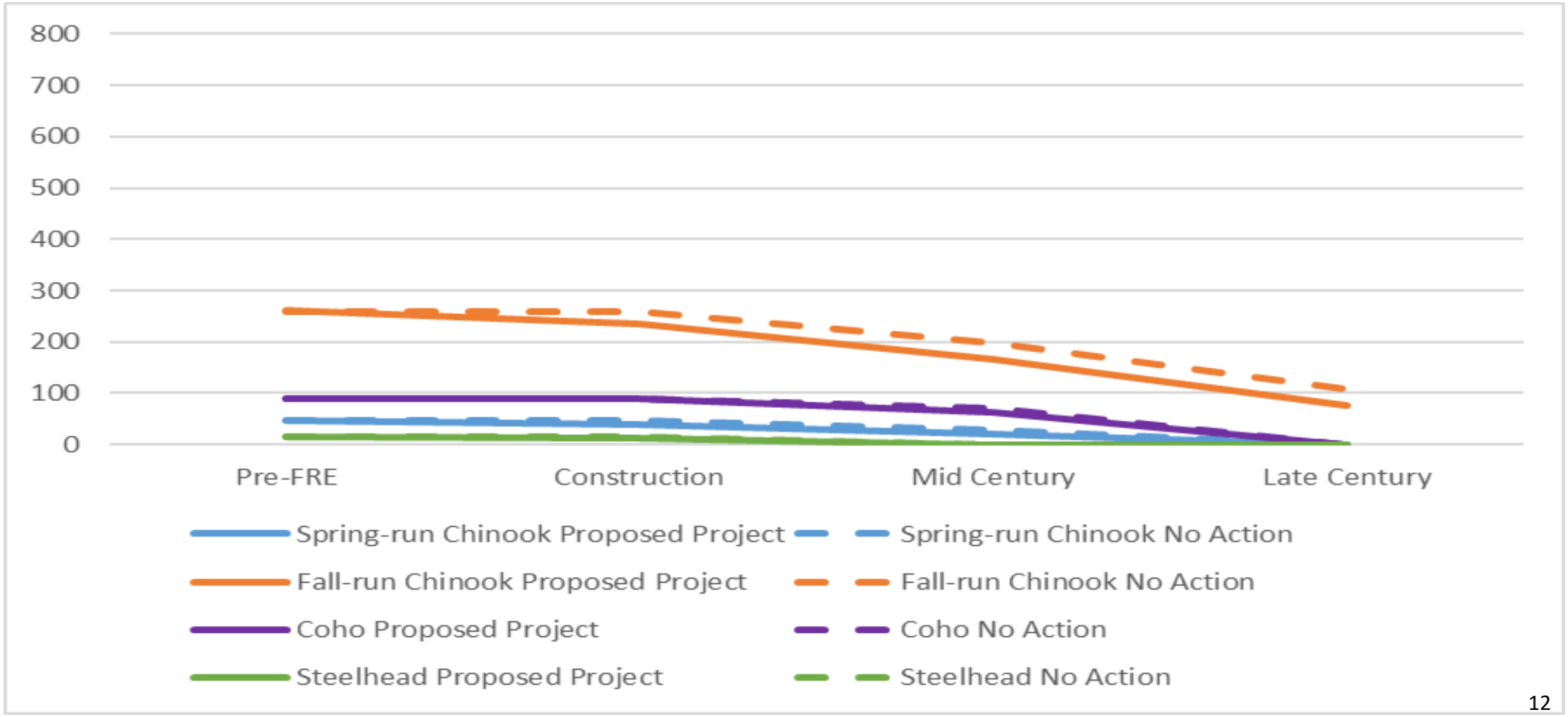
3. Impacts to Salmonids

- Draft SEPA EIS analysis of fish impacts did not include effects of ASRP or results of mitigation
- Relationship between Project impacts, ASRP, and mitigation will be evaluated in summer/fall 2020 for Board's Long-Term Strategy
- Draft SEPA EIS used to two models to estimate impacts in two areas
  - Above Project (Above Crim Creek) and below (Crim Creek to Rainbow Falls)
- Four parameters were evaluated
  - Abundance, Spatial Structure, Productivity and Diversity
- The following slides show results from the integrated model, which simulated effects of a worse-case scenario of Recurring Floods

Impacts to Salmonids (above Project)



Impacts to Salmonids (below Project, Crim to Rainbow Falls)



Impacts to Salmonids

SPECIES	Above Crim Creek				Crim Creek to Rainbow Falls			
	Mid	Mid	Late	Late	Mid	Mid	Late	Late
	Project	No Action	Project	No Action	Project	No Action	Project	No Action
Spring-run Chinook salmon	-95%	-28%	-97%	-87%	-55%	-38%	-100%	-100%
Fall-run Chinook salmon	-51%	-22%	-83%	-71%	-36%	-24%	-71%	-59%
Coho salmon	-51%	-4%	-66%	-51%	-31%	-22%	-100%	-100%
Steelhead	-27%	-11%	-49%	-36%	-100%	-100%	-100%	-100%

Abundance Difference ("delta") Project vs. No Action

SPECIES	ABOVE CRIM CREEK		RAINBOW FALLS TO CRIM CREEK	
	MID-CENTURY	LATE-CENTURY	MID-CENTURY	LATE-CENTURY
Spring-run Chinook salmon	-67%	-10%	-17%	0%
Fall-run Chinook salmon	-29%	-12%	-12%	-12%
Coho salmon	-47%	-15%	-9%	0%
Steelhead	-16%	-13%	0%	0%

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 (Productivity)

Productivity for Spring Chinook

FLOW SCENARIO	NO ACTION ALTERNATIVE (LATE-CENTURY)		PROPOSED ACTION (LATE-CENTURY)	
	RAINBOW FALLS TO CRIM CREEK	ABOVE CRIM CREEK	RAINBOW FALLS TO CRIM CREEK	ABOVE CRIM CREEK
Typical seasonal flood	0.10	2.01	0.00	0.02
Major flood	0.10	2.01	0.00	0.00
Catastrophic flood	0.10	2.01	0.00	0.00

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

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.

Impacts to Salmonids, cont.

- A number of uncertainties exist regarding the modeled effects of future climate change and the Proposed Project

- Draft SEPA EIS used information Ecology determined to be the best available science, and acknowledged the areas of uncertainty

Southern Resident killer whales

- Southern Resident killer whales feed outside of Grays Harbor during fall/winter/spring
- Southern Residents prey on abundant and mixed salmon stocks from Columbia/Snake/Central Valley CA
- Predation on Chehalis River stocks hasn’t been recorded but is assumed
- NOAA lists Chehalis River stocks as one of the important runs for Southern Resident whales
- Cumulative impacts from the reduction in Chehalis salmon was used to determine moderate adverse impact

Questions?