

An aerial photograph of a rural landscape. In the foreground, there are large, vibrant green agricultural fields. A small farmstead with several buildings and a barn is visible. A winding river or stream flows through the landscape, bordered by trees and fields. In the background, there are more fields, some residential areas, and a line of trees. The sky is clear and blue. The image is framed by a green bar at the top and a blue bar at the bottom.

Chehalis Basin Aquatic Species Restoration Plan

November 2nd, 2017

This Presentation

- Update on Phase 1 development
- Preview initial expected outcomes and costs
- Next steps for the ASRP



ASRP Development

- Phase 1 draft – November 30th
- Review the draft ASRP in December and January
 - o Chehalis Board
 - o Tribal Councils
 - o WDFW
- Provide feedback by the end of January
- Recommend any adjustments or refinements



ASRP Development

- Phase 1 document: *November 30th*
 - o Basin-wide analysis of restoration potential
 - o Expected outcomes
 - o Range of investment
- Phase 2 document – *Spring/Summer 2018*
 - o Reach-scale analysis of restoration potential
 - o Refinements to outcomes
 - o Cost efficiencies
 - o Adaptive management
 - o Phasing and planning for implementation

Summary of Results

- Expected Outcomes:
 - o 300% - 570% increase for Spring Chinook by end of century
 - o 119% - 180% increase for Coho by end of century
 - o Dramatic losses if no action is taken
- Costs:
 - o Moderate Restoration Option
 - \$400M - \$800M
 - o High Restoration Option
 - \$700M - \$1.3B

Summary of Modeled Options

- Future No Action
- Moderate Restoration
 - o 164 miles restored outside managed forests
 - o 130 miles restored inside managed forests
 - o 294 miles restored total*
- High Restoration
 - o 348 miles restored outside managed forests
 - o 130 miles restored inside managed forests
 - o 478 miles restored total*

Modeling Considerations

- Based upon current conditions with no additional degradation outside of climate change
- Natural variability of ocean conditions, as well as the effects of climate change on the oceans, will affect results
- Timing and magnitude of outcomes will change depending on sequencing and pace of implementation
- Based on average salmon run sizes over the last 10 years
- Abundance of salmon is highly variable from year to year

Actions for Selected Reaches

- Based on concurrence from the Science and Review Team on what is needed to restore ecological processes
- Treatments modeled for 294 - 478 miles
- Actions that were modeled include:
 - o Large wood placement
 - o Riparian restoration
 - o Floodplain reconnection
 - o Land acquisition
 - o Fish passage barriers



Action – Large Wood Placement

- Large Wood Placement
 - o Placement rate for engineered log jams is 2 per mile for large rivers, 3 per mile for medium rivers
 - o Also includes placement of additional large wood at a rate of 65 pieces per mile for large and medium rivers, 175 pieces per mile for small streams



Action – Riparian Restoration

- Riparian and Wetland Restoration
 - o 150 – 350 miles of riparian restoration on selected reaches
 - o Involves removing invasive vegetation, installing native plants, and maintaining for one year
 - o Average corridor widths for restoration in unmanaged forest areas consistent conceptually with the Forest Practices Act, and varies by stream size



Action – Riparian Restoration

- Riparian and Wetland Restoration
 - o Assumes either an acquisition or easement accompanies restoration
 - o Requires ongoing stewardship, the costs of which have been incorporated into estimates
 - o Structure relocation/removal where appropriate, the costs of which have been incorporated into estimates

Action – Floodplain Reconnection

- Reconnect Side Channels and Oxbows
 - Assumes 1 off-channel restoration site per 2 miles in restored areas
- Reconnect Floodplain Wetlands
 - Assumes 1 wetland restoration site per 2 miles in restored areas



Action – Land Acquisition

- Easements
 - o Assumes easement is purchased at 75% of land value
 - o Includes due diligence (appraisals, surveys, and recording fees)
 - o For acres to be acquired, 67% would be easements
- Land Purchase
 - o Higher cost for residential or urban floodplain areas or for projects that will relocate/remove structures
 - o For acres to be acquired, 33% would be purchased

Action – Fish Passage Barriers

- Barrier Replacements/Corrections
 - o Approximately 300 culverts to be removed or replaced



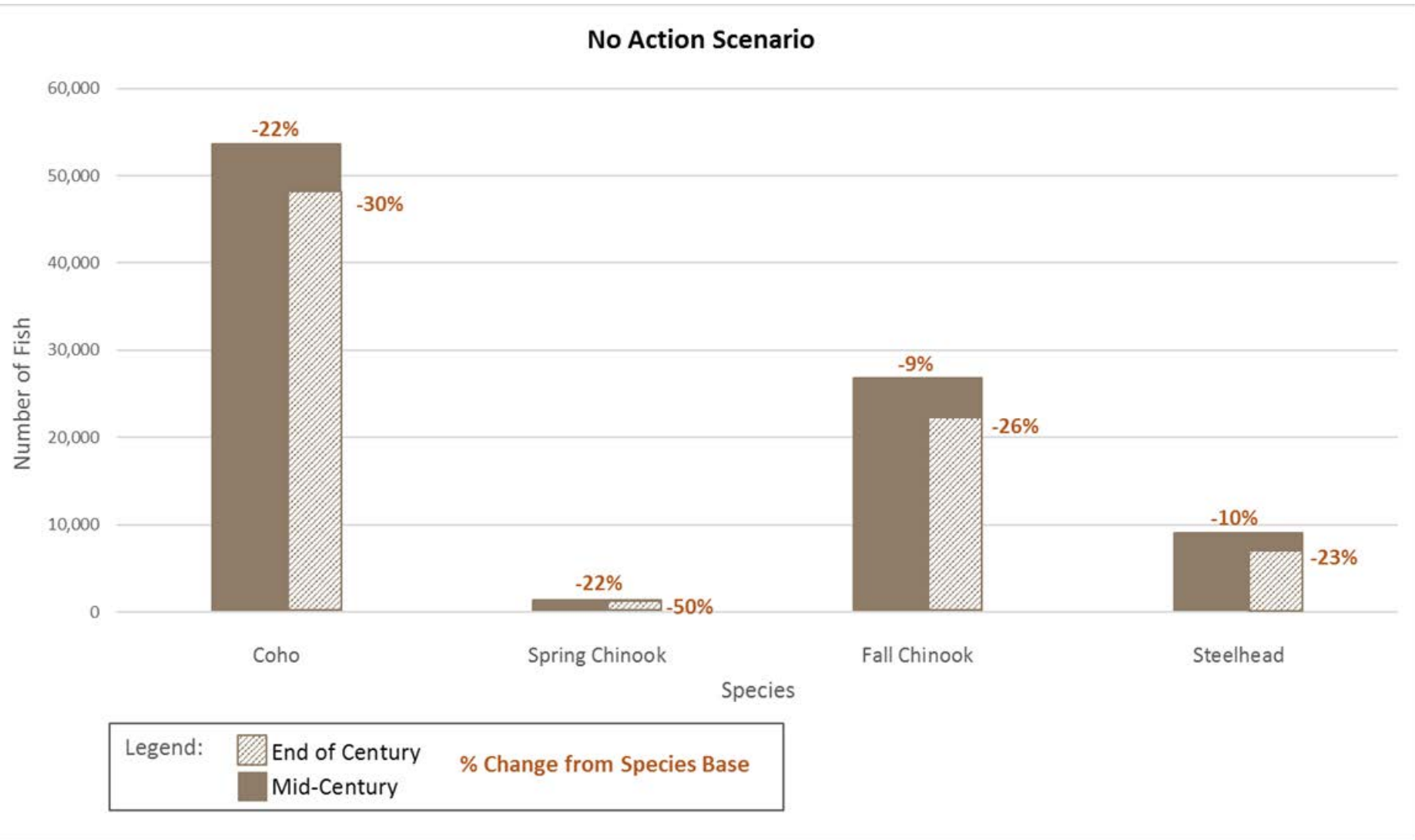
Expected Outcomes

- Future No Action
- Moderate Restoration
- High Restoration

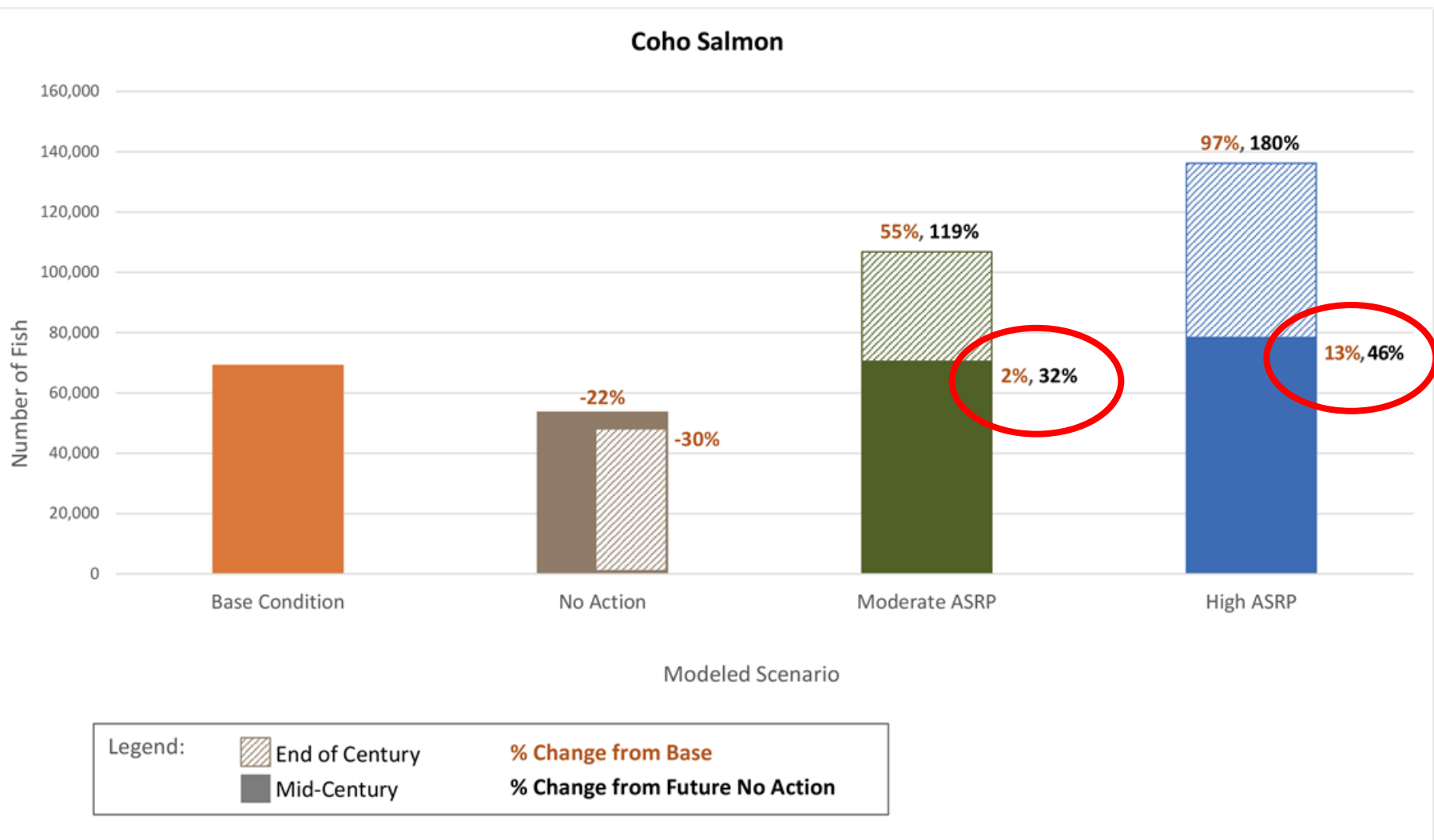
All options assume:

- o Benefit from the maturation of riparian forests
- o Impacts from climate change
- o No additional degradation from other human activities

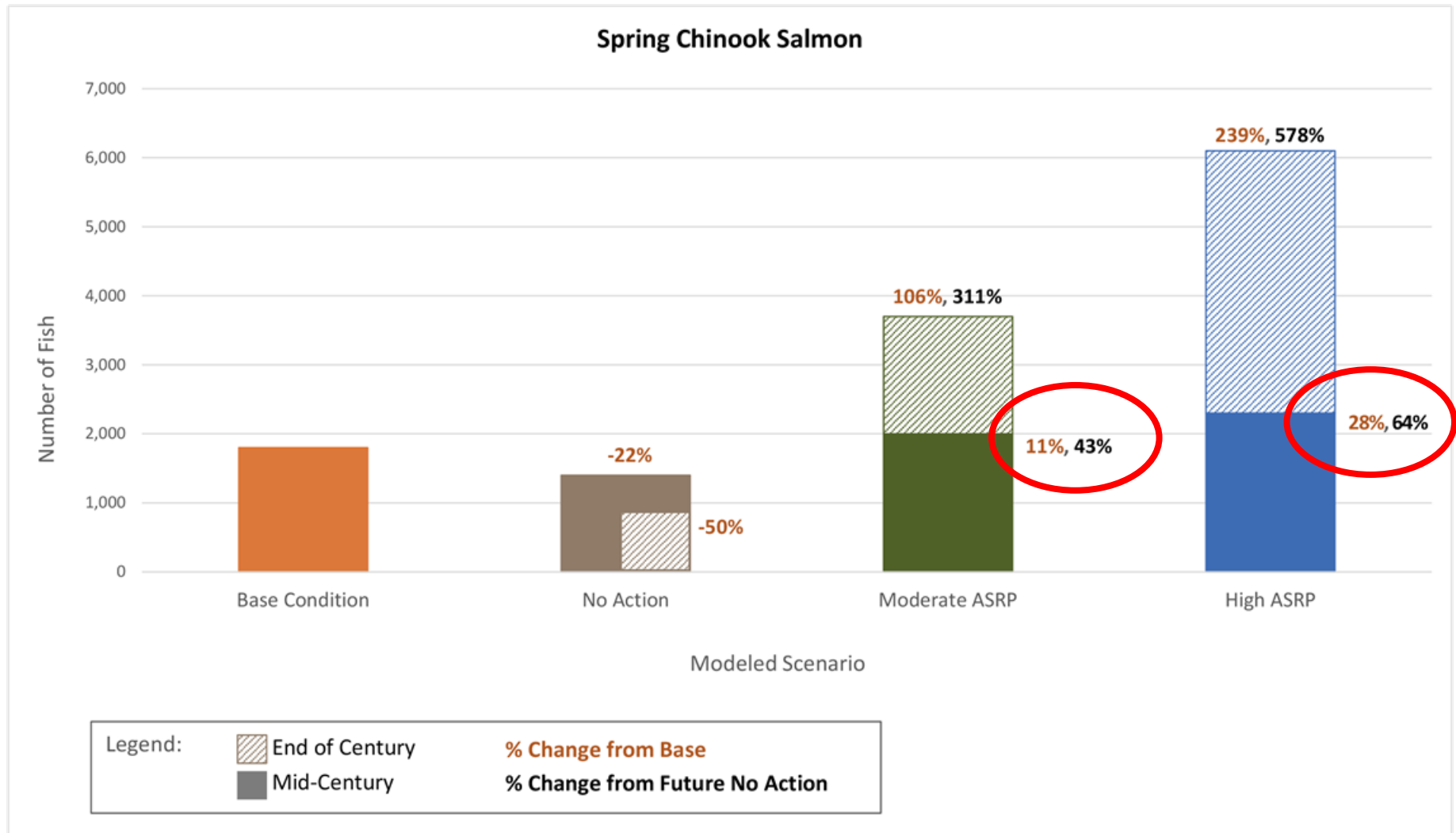
Expected Outcomes - Future No Action



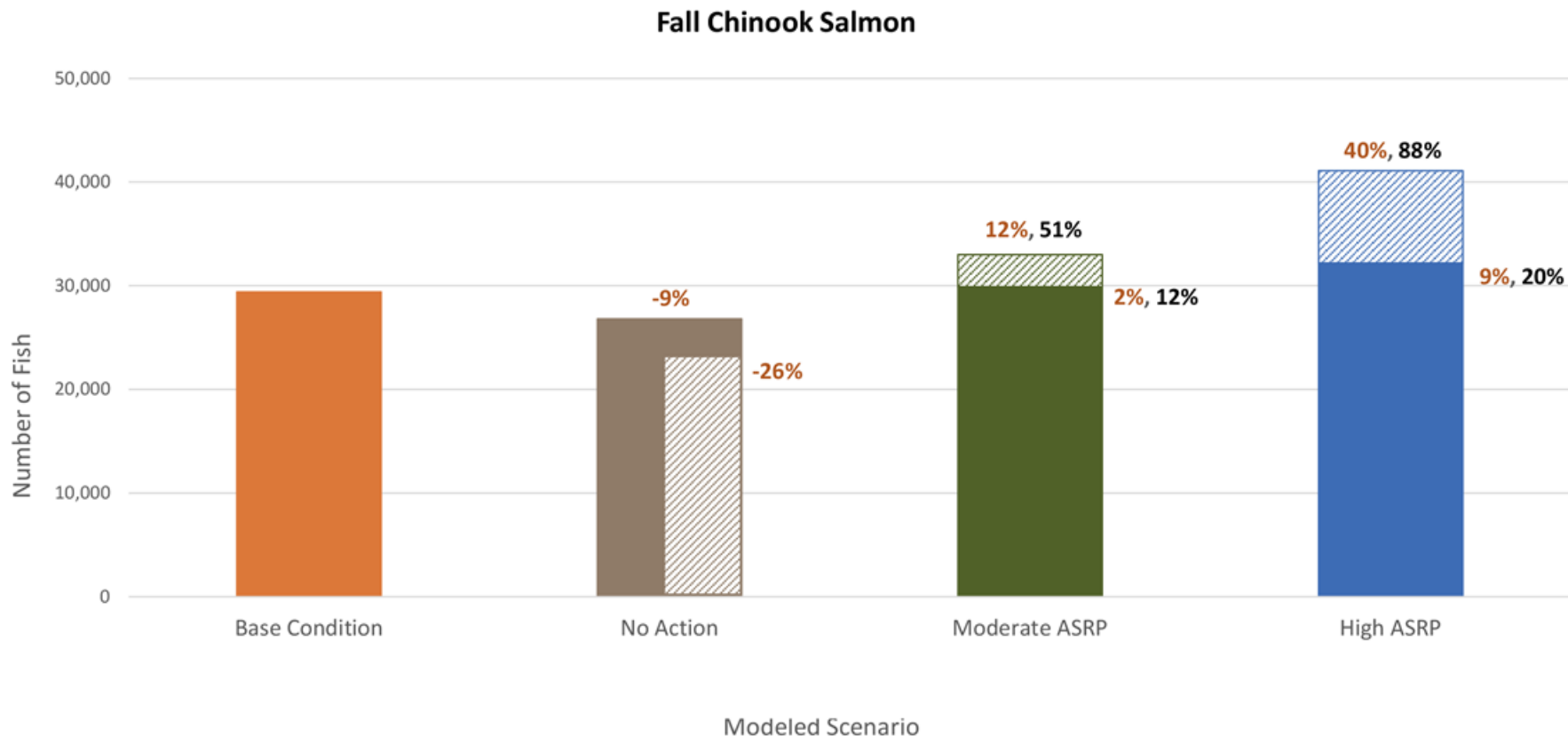
Expected Outcomes - Coho



Expected Outcomes – Spring Chinook



Expected Outcomes – Fall Chinook



Legend:



End of Century

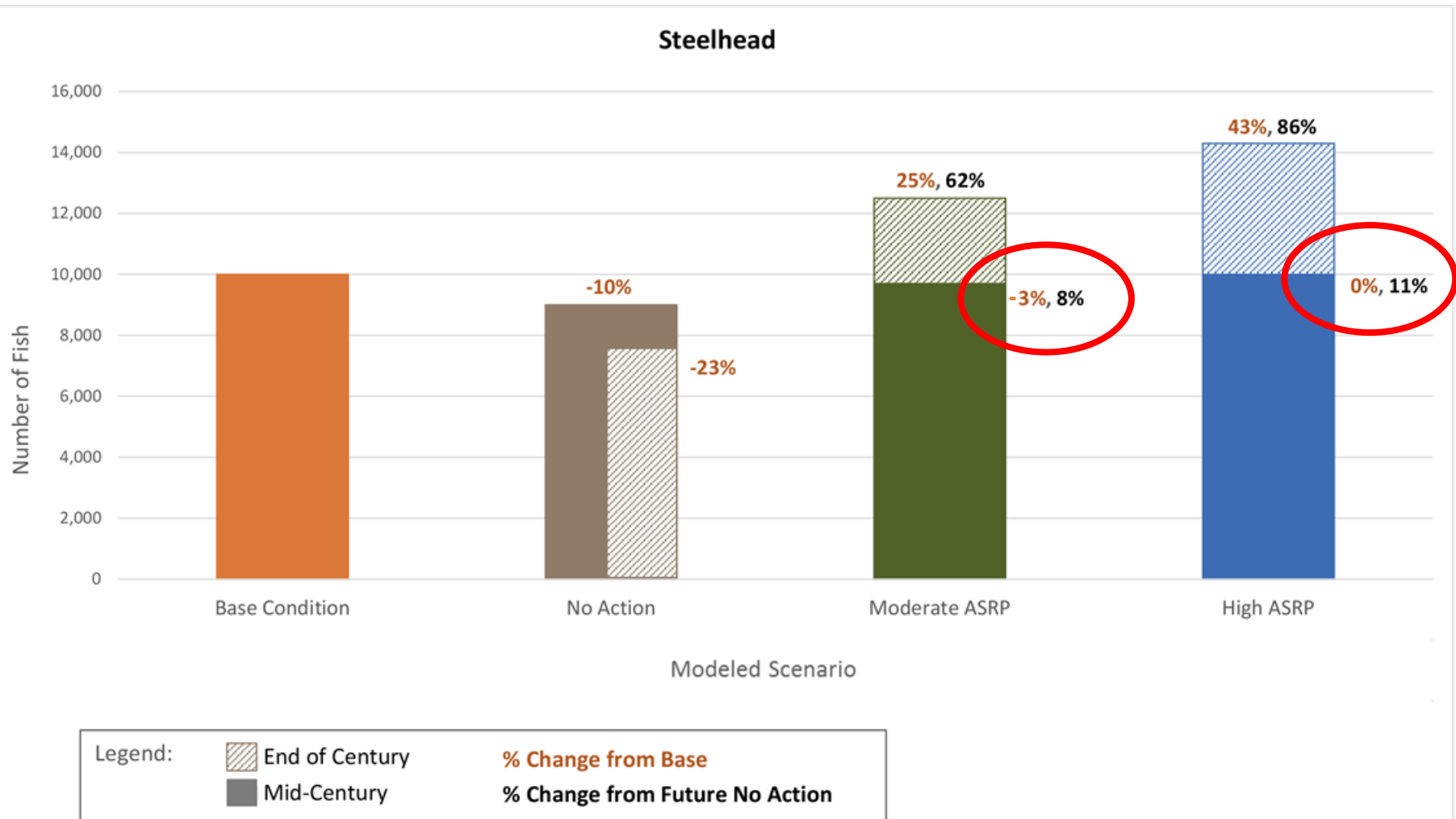


Mid-Century

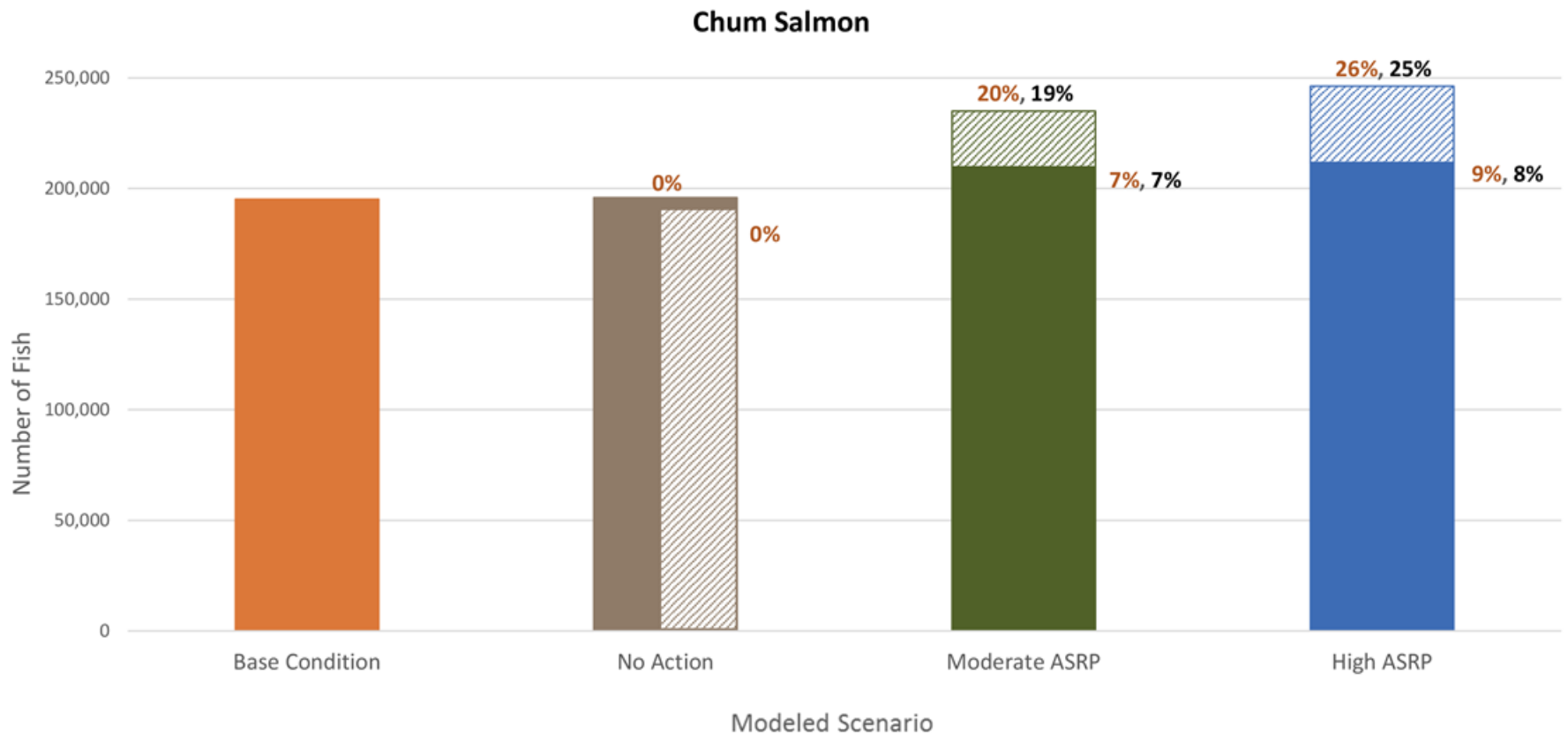
% Change from Base

% Change from Future No Action

Expected Outcomes - Steelhead



Expected Outcomes - Chum



Legend:

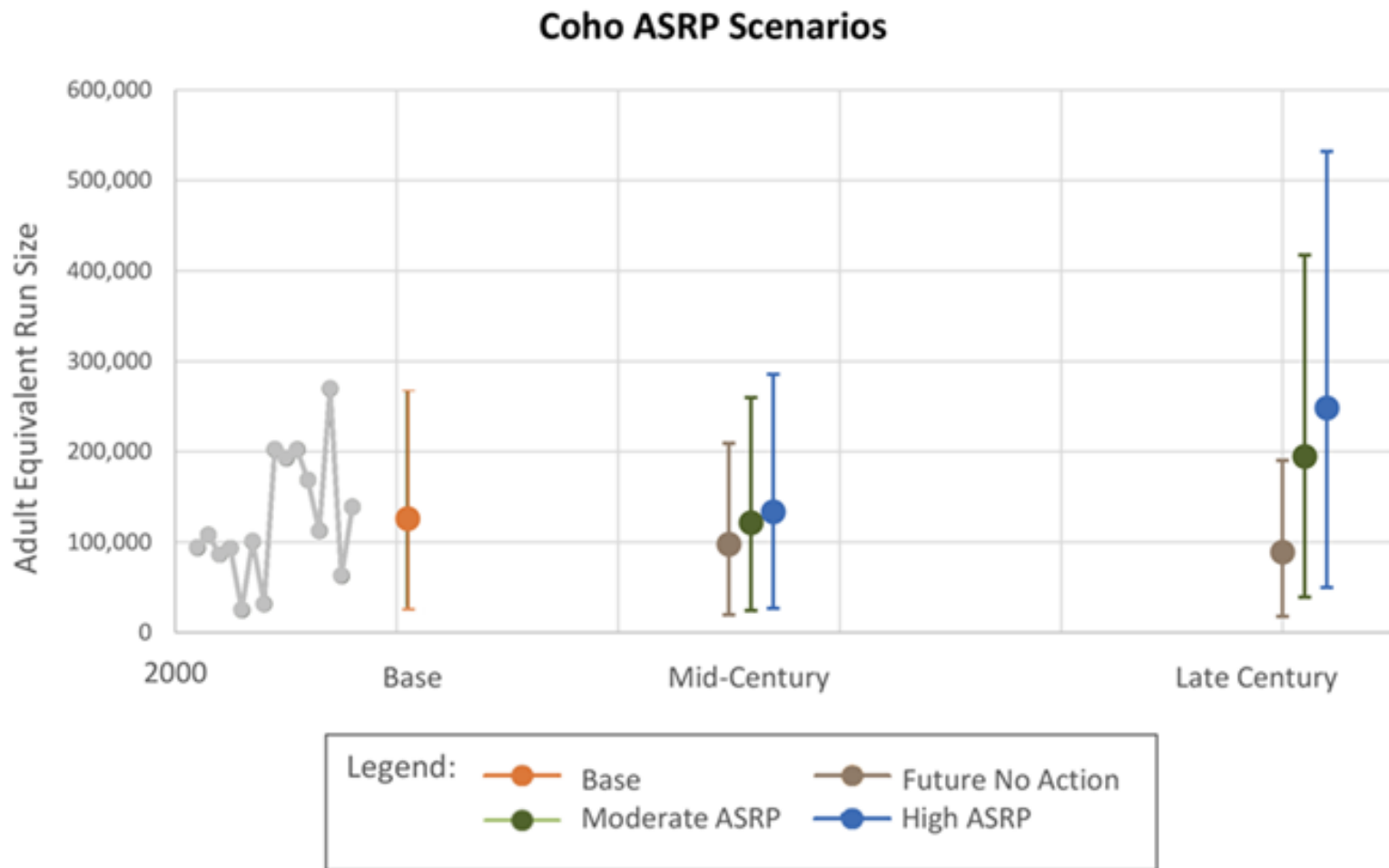
End of Century

Mid-Century

% Change from Base

% Change from Future No Action

Variability in Salmon Abundance



Summary of Expected Outcomes

Salmon Abundance by Mid Century

Effects of Climate Change included in Moderate and High Scenarios

	No Action	Moderate		High	
		Change from Current	Change from No Action	Change from Current	Change from No Action
Coho	-22%	2%	32%	13%	46%
Spring Chinook	-22%	11%	43%	28%	64%
Fall Chinook	-9%	2%	12%	10%	20%
Steelhead	-10%	-3%	8%	0%	11%
Chum	0%	7%	7%	9%	8%

Summary of Expected Outcomes

Salmon Abundance by End of Century Effects of Climate Change included in Moderate and High Scenarios					
		Moderate		High	
	No Action	Change from Current	Change from No Action	Change from Current	Change from No Action
Coho	-30%	55%	119%	97%	180%
Spring Chinook	-50%	106%	311%	239%	570%
Fall Chinook	-26%	12%	51%	40%	88%
Steelhead	-23%	25%	62%	43%	86%
Chum	0%	20%	19%	26%	25%

Anticipated Cost Ranges

- Moderate Restoration Option
 - o \$400M - \$800M
- High Restoration Option
 - o \$700M - \$1.3B



Cost Drivers

- Riparian restoration (land acquisition, planting, land management) is the primary driver of cost
 - o Largest cost is compensating willing landowners for a change in their property:
 - Approximately 11,000 acres for the moderate scenario
 - Approximately 20,000 acres for the high scenario
- The number of river miles treated is the driver of costs between scenarios
- Density of treatments were determined by the Science and Review Team and affect cost per mile

Key Considerations

- Moderate Restoration
 - Model does not incorporate impacts from a potential dam or benefits from Restorative Flood Protection alternative
 - Implementation may take some time, reducing certainty of benefit
 - Mid-century impacts as modeled show a decline for some species from current
 - Aggressive restoration decreases chances of a listing for Spring Chinook
- High Restoration
 - May not have sufficient landowner interest to achieve high option
 - Achieving high level of restoration in a short time frame may be difficult
 - Funding need is substantial

Guidance Needed

- Phase 1 draft – November 30th
- Review the draft ASRP in December and January
 - o Chehalis Board
 - o Tribal Councils
 - o WDFW
- Provide feedback by the end of January
- Recommend any adjustments or refinements
- Phase 2 will incorporate recommendations

