Chehalis Salmon and Steelhead Integrated Analysis (aka Salmon Slider Tool)

Chehalis Basin Board Meeting

December 1, 2022

CHEHALIS BASIN STRATEGY

DEPARTMENT OF ECOLOGY
State of Washington
OFFICE OF CHEHALIS BASIN

CHEHALIS SALMON AND STEELHEAD INTEGRATED ANALYSIS

Problem Statement:

Salmon and steelhead are impacted by a complex of factors throughout their life cycle including tributary, estuary and ocean habitats, fisheries, hatcheries, dams and other species including predators.

A comprehensive understanding of the magnitude and interactions of all factors is essential to implementation of effective restoration strategies.

CHEHALIS SALMON AND STEELHEAD INTEGRATED ANALYSIS

Related questions include:

- What are the primary causes of decline across the salmon and steelhead life cycle?
- How much improvement will be required to get where we need to be or want to go?
- Are restoration efforts focusing on the right factors?
- What strategies produce the biggest bang for the buck?
- Are habitat improvements alone enough?
- Is habitat use currently constrained by fish harvest levels?
- How much would harvest need to change to realize improvements?
- To what degree is predation a problem?
- Are hatchery reforms consistent with restoration needs?

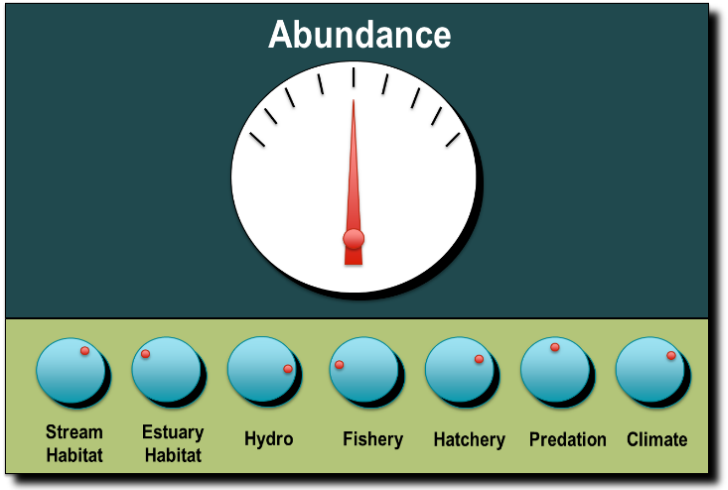
The Salmon Slider Tool isn't intended to answer all of these questions, but it can help us better understand the relationship of the factors impacting salmon and steelhead.

CHEHALIS SALMON AND STEELHEAD INTEGRATED ANALYSIS

Objectives:

1. Identify the relative significance of all human-related and/or potentially-manageable factors which limit natural-production of Chehalis salmon and steelhead.

2. Evaluate limitations and potential for increasing fish numbers based on scenarios targeting key factors.



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CHEHALIS SALMON AND STEELHEAD INTEGRATED ANALYSIS

A key component includes a **Limiting Factor Analysis**

- Quantifies the impacts of human-related or potentially manageable factors affecting salmon and steelhead populations.
- Results can be summarized in the form of “heat maps” where colors are used to categorize impacts in order to identify, at a glance, which impacts are more or less severe.

Heat Map of Limiting Factors

	Stock	Tributary Habitat	Estuary	Hydro/ Mainstem	Hydro/ Latent	Hydro/ Blocked	Predation	Fishery	Hatchery
Lower Columbia	Spr Chinook	85	17	0	0	30	14	17	29
	Fall (tule) Chinook	70	21	0	0	15	11	33	25
	Fall (bright) Chinook	10	21	0	0	40	11	47	0
	Chum	95	50	5	0	0	2	1	10
	Coho	80	11	0	0	5	13	17	22
	Sumr Steelhead	65	28	4	0	40	19	5	8
	Win Steelhead SWW	60	28	0	0	0	19	5	17
	Win Steelhead LCR	65	28	0	0	10	19	5	9

<5%	5-20%	21-30%	31-50%	>50%

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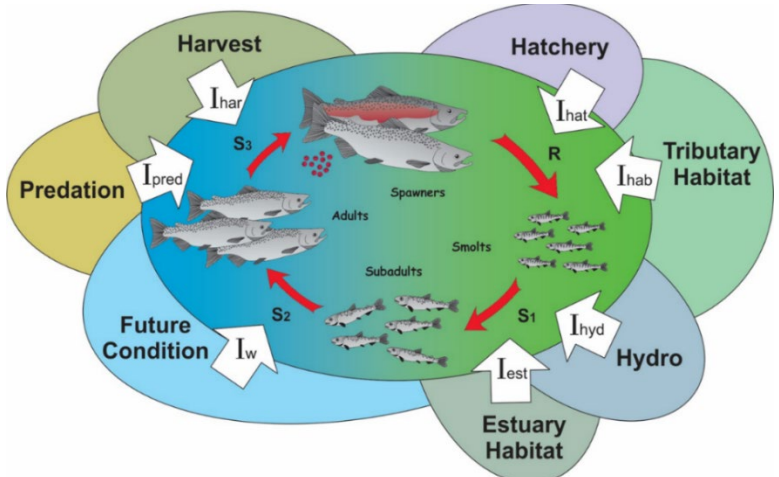
CHEHALIS SALMON AND STEELHEAD INTEGRATED ANALYSIS

A key component includes a **Life Cycle Analysis**

- Examines, at a coarse scale, the individual and combined impacts of limiting factors based on a simple life cycle model which relates fish numbers to productivity or survival at each life stage.
- The "Salmon Analyzer" tool connects the life cycle model to an interface allowing users to “slide” impacts in various threat categories up or down to examine how abundance changes in response.



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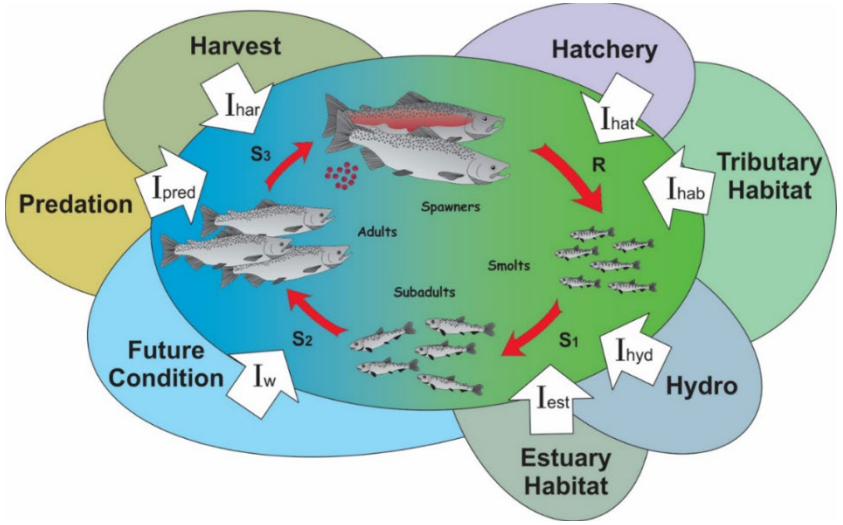
FUTURE SCENARIOS FOR CHEHALIS SALMON AND STEELHEAD

Board input needed to help define a suite of scenarios for evaluation with the salmon slider

A scenario is a potential alternative future involving a combination of changes in factors limiting salmon and steelhead populations. Factor categories include:

- Habitat (tributary, estuary and ocean),
- Harvest,
- Hatcheries,
- Hydropower, and
- Other species including predators.



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FUTURE SCENARIOS FOR CHEHALIS SALMON AND STEELHEAD

Scenarios are changes in the current condition for each factor category.

- Changes might be positive (improvements) or negative (deteriorations).
- Changes can be described by specific percentages, as low, moderate or high levels of effect; or tied to a particular strategy or action.
- Changes may reflect near, medium, or long-term improvement identified in restoration plans, projected changes from future development, or simply an expected or desired future condition.
- Changes may be specific to a particular salmon or steelhead population or more generally applicable to multiple species and populations.

FUTURE SCENARIOS FOR CHEHALIS SALMON AND STEELHEAD

Example Scenario "Shared Moderate Improvements"

- ✓ **20% improvement in tributary habitat conditions as a result of restoration projects.**
- ✓ **Reductions in harvest by further restriction of ocean or freshwater fisheries.**
- ✓ **Significant benefits for wild fish as a result of fully-realized benefits of hatchery reforms.**
- ✓ **No significant hydropower/dam effects relative to existing conditions.**
- ✓ **Implementation of limited predator control efforts.**
- ✓ **No significant impact of climate change in the near term.**

FUTURE SCENARIOS FOR CHEHALIS SALMON AND STEELHEAD

Scenario ideas for discussion:

- ASRP Scenario 3 – 550+ miles of river restored and other goals
- Other ASRP scenarios
- High level of predation or low level of predation
- High abundance of spring-run Chinook salmon and/or other species such as steelhead
- Dam removal on the Skookumchuck River

- Other ideas?

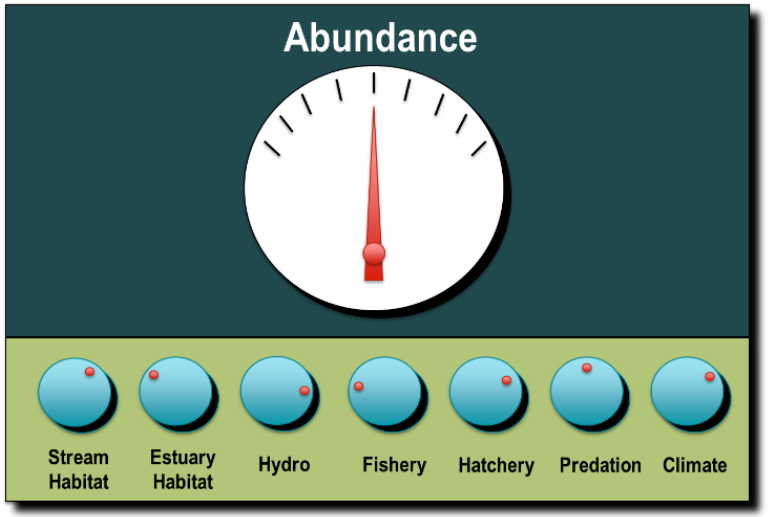
FUTURE SCENARIOS FOR CHEHALIS SALMON AND STEELHEAD

Outcomes:

Board input into the analysis that will illustrate the net effect of changes in factors on expected future fish abundance.

A slider tool that facilitates exploration of broad hypotheses and strategies through interactive learning (i.e., turning the dials).

An opportunity to interact directly with the salmon slider tool in February 2023.



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QUESTIONS AND NEXT STEPS FOR BOARD MEMBERS

- **What "scenarios" and "changes" would you like to see reflected in this analysis?**

- **Next steps:**
  - Discuss this topic further at the Dec. 16 ASRP Board Sub-committee meeting

QUESTIONS AND DISCUSSION