

Overview of Integrated Analysis of Chehalis Salmon and Steelhead Limiting Factors

Salmon and steelhead have been severely impacted by a complex of factors including freshwater and marine habitat, harvest, hatcheries, hydropower/dams and other species including predators. The Chehalis Basin Board expressed interest in developing an integrated fisheries plan for the Chehalis Basin to assist the board in understanding and supporting actions that may affect the success of aquatic species habitat restoration actions. In response to this interest, the Washington Department of Fish and Wildlife initiated a comprehensive assessment of factors currently limiting Chehalis Basin salmon and steelhead. This work will inform the understanding, development and communication of coordinated management efforts for conservation and restoration of Chehalis salmon and steelhead.

The integrated analysis is, in effect, a dial-turning exercise which examines how fish numbers are limited by and respond to changes in one or more dials reflecting habitat, harvest, hatcheries, hydropower, predation, and potential climate effects. Where past planning efforts have often focused on individual factors (freshwater habitat restoration for instance), the integrated analysis considers the individual and combined effects of all factors.

This analysis is facilitated by the interactive “Salmon Slider Tool” which allows interested parties to examine high-level strategies for salmon restoration. The Salmon Slider is a simple salmon life cycle computer model which relates fish numbers to changes in impacts of potentially manageable limiting factors. Impacts are defined as a percentage reduction in fish productivity or survival based on the best available science for each factor. These estimates also provide a common currency for comparing the relative significance of each factor. This approach and tool were previously used by the Washington Lower Columbia Fisheries Recovery Board’s ESA Recovery Plan and the National Marine Fisheries Service’s Columbia Basin Partnership Initiative.

The Salmon Slider format is easily accessible in an Excel format (note, macros must be enabled) that allows for users to “slide” the limiting factors, including freshwater habitat, estuary habitat, dams, predation, fishery, hatchery, and future conditions, up or down and see how increased or decreased impact levels change salmon and steelhead abundance for different runs of fish (coho, chum, Chinook and steelhead). Additionally, the Salmon Slider includes check boxes for different scenarios or sensitivities, such as fixing all freshwater habitat and ASRP restoration scenarios with associated time scales for future conditions. The Salmon Slider illustrates potential changes in salmon and steelhead abundance based on the relevance of various limiting factors in the Chehalis Basin and provides an example of how changes to one or more limiting factors can have a positive or negative affect on outcomes for fish.