

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
REBUILDING PLANS

Dr. Michael O'Farrell (Southwest Fisheries Science Center) and Dr. Jim Seger briefed the Scientific and Statistical Committee (SSC) about the salmon rebuilding plans. The only changes to the Chinook rebuilding plans were editorial in nature. The SSC focused its discussion on the coho rebuilding projections and the coho economic analysis. The SSC endorses the future abundance projections and the economic analysis in the three coho rebuilding plans and supports releasing these plans for public review.

The model structure used to simulate pre-fishery coho ocean abundance is the same as that used for Klamath River and Sacramento River Fall Chinook. There was little difference in the time to rebuild between the status quo (Alternative 1) and a reduced exploitation rate (Alternative 2). The Queets and Snohomish coho are expected to rebuild at a 50% probability under both alternatives in two and three years, respectively. The Strait of Juan de Fuca coho rebuild times at a 50% probability were six years for Alternative 1 and five years for Alternate 2.

The SSC Economics Subcommittee held a webinar on June 4, 2019 to discuss the economic analysis presented in the three coho plans (the Economics Subcommittee report is appended to this report). The methods for projecting economic impacts are the same for all three plans. It is important to note that impacts are not additive across stocks as the impact in any given year depends on the most constraining salmon stock(s). Overall, the approach taken to estimate and discuss potential economic impacts is sufficient for the purpose of these rebuilding plans.

REPORT OF THE SSC ECONOMICS SUBCOMMITTEE ON
SOCIOECONOMIC IMPACT OF MANAGEMENT STRATEGY ALTERNATIVES IN
THREE DRAFT COHO REBUILDING PLANS

The Scientific and Statistical Committee's (SSC) Economics Subcommittee held a webinar on June 4, 2019 to review the analysis of socioeconomic impacts in three draft coho salmon rebuilding plans. The discussion focused primarily on Section 5 (Socioeconomic Impact of Management Strategy Alternatives) in each of the draft rebuilding plans for three coho salmon stocks: Strait of Juan de Fuca Natural Coho, Snohomish River Natural Coho, and Queets River Natural Coho. Michael O'Farrell (Salmon Technical Team Chair) briefly described the management alternatives and reviewed the projection models that informed the socioeconomic analysis. Jim Seger (Pacific Fishery Management Council staff) presented the socioeconomic analysis. This report is intended to provide recommendations to the analysts as they revise the draft rebuilding plans and inform the SSC's discussion as it reviews the full rebuilding plans at its June 2019 meeting.

The methods for projecting economic impacts are the same for each of three plans. The average personal income impacts from 2004-2016 for port areas north of Cape Falcon (taken from the Review of 2017 Ocean Salmon Fisheries) are used as a "benchmark" value. The impact of each of the two rebuilding alternatives and the T_{MIN} scenario is assumed to be directly proportional to the change in projected average exploitation rate in each case. The change in exploitation rate is calculated as the percentage change from the average exploitation rate from 2004-2016 to the projected exploitation rate from the rebuilding analysis Section 4. The dollar impacts per year are then summed across the number of years the fishery is expected to be affected by the rebuilding plan. The length of this time period for each of the two rebuilding alternatives and the T_{MIN} scenario is the number of years until the probability of achieving rebuilt status (three year geometric mean escapement $>S_{MSY}$) exceeds 0.5. It is important to note that these estimates include impacts on ocean recreation and non-tribal commercial fisheries only. It is also important to note that the impacts are not additive across stocks. Total impacts in any given year would be equal to the impacts associated with the most constraining stocks (e.g. with the greatest required reduction in exploitation rate).

The quantitative estimates are put into context by additional qualitative analysis, including discussion of constraining stock status from 2004-2019, possible fishery and employment substitution patterns by fishers affected by reduced fishing opportunity, and possible effects in in-river and non-tribal fisheries that were not quantified. A number of caveats that could cause the projected economic impacts to be under- or over-estimated were discussed. Perhaps the most important of these is the probability that the fishery will be constrained by a stock other than the focal stock such that no change in economic impacts could be attributed to the rebuilding plan. The probability that the focal stock is constraining appears higher for the Queets River stock than the Juan de Fuca or Snohomish Rivers stocks based on recent experience. The probability that one of the three stocks subject to rebuilding is constraining would be higher and this should be addressed in the cumulative analysis.

Overall, the approach taken to estimate and discuss potential economic impacts is sufficient for the purposes of these rebuilding plans. The subcommittee has the following recommendations for changes to the report.

1. The quantitative and qualitative portions of the analysis should be more distinct. The current draft of the document combines these two portions in a way that makes it difficult to follow the methods used. One option is to describe the quantitative analysis (i.e., historical “benchmark” personal income reduced by the forecasted percentage change in exploitation rates) then list specific qualifiers to the analysis, including how each factor might be expected to adjust the impacts up or down, in the concluding section.
2. The clarity and transparency of Section 5 can be improved. It would be helpful to add a table showing allowed historical exploitation rate, the projected exploitation rate under Alternative II, and the percent difference so that it is clear how the quantitative impact estimates are calculated. This table could be similar to Table 5.3.a in the Sacramento River Fall Chinook rebuilding plan ([Agenda Item G.1, Attachment 2, June 2019](#)). Also, the table summarizing economic impacts of the rebuilding alternatives and the T_{MIN} scenario (Table 5.5.a) should include only the quantitative results. Text qualifiers should be moved to the summary text and discussed. The table should include estimated rebuilding time, the probability that rebuilding occurs at the end of the estimated rebuilding time, economic impacts per year, and total economic impacts across the entire rebuilding period for each rebuilding alternative and the T_{MIN} scenario.
3. The discussion of uncertainty in the quantitative impact estimates should be expanded. These are derived from differences in average values. However, these values are unlikely to be observed in any given year. It would be useful to develop some way of reporting the uncertainty around the estimated impacts. One way would be to generate upper and low bounds around the values. Lower bounds would likely be zero since the any given stock may not be the constraining stock in any year. Upper bounds would be the maximum reduction in exploitation rate under the new control rule.

The SSC should take note of the following additional points.

1. The estimated impacts of the three coho plans are not cumulative. Only a limited subset of stocks will be constraining in any given year. The limiting stocks for a particular year may not include the focal stock for a given rebuilding plan, or even any of the rebuilding stocks, though it is more likely the rebuilding stocks will be constraining in the near future. So, for example, it is possible that the strongest constraint will be due to Puget Sound Chinook as appears to have been the case in 2019 (see Table 5.3.a in the Juan de Fuca rebuilding plan [Agenda Item G.1, Attachment 3, June 2019](#)). The allowable exploitation rate due to constraining stocks will determine the total economic impacts to the salmon fishery.
2. Only ocean recreation and non-tribal commercial impacts are estimated quantitatively.

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