

August 22, 2012

Dr. Ray Hilborn (Chair)
Dr. Sean Cox
Dr. Francis Gulland
Dr. David Hankin
Dr. Tom Hobbs
Dr. Daniel Schindler
Dr. Andrew Trites

Dear members of the Independent Science Panel,

As co-chairs of the Steering Committee established by the National Marine Fisheries Service (NOAA Fisheries) and Fisheries and Oceans Canada (DFO) to oversee the scientific workshop process to evaluate the effects of salmon fisheries on Southern Resident Killer Whales (SRKW), let us express our sincere appreciation for the work the Panel has done so far.

As we enter the final phase of the workshop process, we want to offer some observations and a few suggestions intended to maximize the utility of your final report to our respective agencies. The Panel helped design and participated in two very successful three-day scientific workshops during which a great deal of scientific information was presented and discussed by the Panel and nearly a hundred other scientists. The Panel met on additional occasions to consider, evaluate and synthesize this information, and issued its draft report on-schedule last May. The draft report sets forth the Panel's views on the state of the science and its preliminary conclusions regarding the extent to which salmon fisheries may affect SRKW by reducing the abundance of their prey. It addresses most of the questions identified by the steering committee at the onset of the process. The report was made available for public comment, and now those comments and the draft report will form the basis of the agenda being developed for the third and final workshop scheduled next month in Seattle.

Our agencies' respective science branches have provided detailed scientific comments on the draft report during the public comment period. We generally will not repeat those comments here, but urge the Panel to give them careful consideration because they are reflective of the scientific issues our agencies confront as we make management decisions relating to salmon fisheries and implementation of our respective SRKW recovery plans.

We would like to bring to the Panel's attention certain of the original questions posed by the steering committee that we feel were overlooked or could be answered with greater clarity; they are appended at the end of this letter. Additionally, we would like to highlight several issues that are especially important to us from a management perspective, issues that emerge from our reading of the report and the comments received from reviewers. Our intent in bringing these original questions and particular issues to the Panel's attention now is to increase the likelihood that they are addressed in the final version of the Panel's report, due to be finished in November.

Status of the SRKW population. Some confusion – or at least differences of scientific opinion – exists as to the current trend in the status of the SRKW population. The Panel states in its draft report that the population is not declining, yet several comments from reviewers point out that conclusions as to whether the population is declining, stable or growing depend largely on the time period over which the population is measured. Discrepancies in the known maximum number of

whales cited in the draft report also have been identified. An accurate assessment and characterization of the current status of the population is fundamental to recovery efforts and management decisions, but also to the wider community's sense of urgency and importance regarding those efforts. It would be helpful if the Panel would revisit and clarify its views with respect to this issue.

Causation vs. correlation and the effect of fisheries adjustments. The questions of whether there exists a cause and effect relationship between Chinook abundance and SRKW vital rates, and the extent to which fisheries adjustments might affect abundance of prey available to SRKW have figured prominently throughout this process. They are raised in a variety of instances in the draft report and in many of the comments from reviewers. In its draft report, the Panel cautions that one should not assume a causal relationship between indices of Chinook abundance and SRKW vital rates based only on the correlation studies, and cites evidence both supporting and refuting causation. The Panel recommends additional correlation studies focused on indices of ocean productivity, yet these seem further removed from the known ecology of SRKW. (It is noteworthy that while the panel recognizes a common causal factor correlating NRKW and SRKW dynamics, no alternative mechanism for controlling SRKW vital rates has been postulated.) In several instances the Panel recommends additional analyses overtly premised on the assumption of a causal relationship.

The Panel also has recommended a competing risk of death framework for examining in a more comprehensive manner the effects of reducing Chinook harvest on the abundance of prey available for whales. While we appreciate the value of such a framework, there exists at the present time insufficient time series of empirical data to populate such models, a situation likely to continue for some time. Recognizing the uncertainties and cautions involved – and the likely fact that we always will be limited to data from opportunistic observations rather than from controlled experiments – it would be helpful to get advice from the Panel regarding additional information or criteria that would contribute to our evaluation of the likelihood of a cause and effect relationship between Chinook abundance and SRKW vital rates. Achieving a scientifically defensible level of confidence regarding these questions will be crucial to our management decisions going forward.

Chinook abundance metrics. The issue of which measures of Chinook abundance have the highest confidence and greatest utility for evaluating the potential effects of fishing on SRKW growth rates also has been raised and discussed at length. On the one hand, certain indices of Chinook aggregate abundance are prospectively estimated and used to plan and shape fisheries annually using the PSC Chinook model and FRAM. On the other hand, the indices of abundance of selected Chinook stock groupings that Ward used to estimate the effects of fishing on SRKW growth rates are based on Chinook run size reconstructions by Parken and Kope. While more empirical in their origin compared to the CTC and FRAM indices, the Parken-Kope indices are based on different stock aggregations and lack spatial and temporal distinctions. Ward estimated the maximum potential increase in abundance that could result from closing fisheries on particular stock groups (absent consideration of other sources of mortality, such as competing predators). Is it scientifically appropriate to use FRAM to estimate the reduction in prey and scale those reductions to represent a change in SRKW growth rates as estimated by Ward using the Parken-Kope indices? If not, what advice can the Panel offer regarding scientifically defensible and practical methods of linking Chinook abundance metrics used for fisheries to indices that are meaningful to SRKW? Recognizing that Chinook abundance estimates currently are expressed as indices or are a biased underestimate of total available numbers, does the Panel have any advice to offer regarding improving Chinook abundance estimates for evaluating the effects of fishing on SRKW?

Performance criteria. The Panel’s draft report focuses on Ward’s model relating Chinook abundance and SRKW population growth rates, but points out several shortcomings associated with the 2.3% growth rate criterion and advises that it be reassessed as a downlisting criterion. The Panel further recommends that an abundance-based metric might be a more reliable measure of SRKW status due to its measurability, provided a defensible number of whales can be established as the basis for downlisting. The biological opinions issued by NOAA Fisheries examined the effects of fisheries on a number of different performance metrics including: ratios of prey available to estimated energetic requirements of SRKW; changes in annual SRKW growth rates; predicted changes in SRKW abundance over time, etc., some of which were commented on by the Panel. NOAA also provided examples of performance metrics it uses to evaluate effects of fishing on other species, e.g., recovery exploitation rates for listed salmon, potential biological removals (PBR) for marine mammals (which is not mentioned in the draft report); and negligible impact analyses. In contrast to the more-common applications of PBR which focus on numbers of living animals killed by an action, NOAA fisheries’ biological opinions focused on estimated numbers of SRKW not born because of fishery harvest. It would be helpful to receive the Panel’s advice on the utility of this approach, and any other suggestions about metrics for evaluating the effect of actions on SRKW.

Alternative fishery Scenarios.

In its biological opinion on the Puget Sound Chinook Management Plan, NOAA Fisheries obligated itself to formulate and analyze alternative fishery regimes to assess their relative impact on SRKW, and to submit these to the Panel and workshop process for discussion. It was thought that sensitivity analyses of the effects of alternative fishing regimes on SRKW vital rates would be informative in that they would provide outcomes with useful contrast to the several broad-scale alternatives analyzed in the opinion, i.e., no U.S. fishing, no Canadian fishing, no fishing anywhere, and so forth. However, in light of what has been learned during the workshop process, NOAA Fisheries does not now believe that much additional information can be gleaned from such analyses. Analyses conducted in connection with the workshop process and at the request of the Panel have provided estimates of the effects on SRKW growth rates under the scenario that all fisheries that affect Chinook are closed. These analyses were based on the assumptions that all the “saved” Chinook become available to SRKW and there exists a causal relationship between Chinook abundance and SRKW growth rates. The former assumption is clearly tenuous; the fate of many of the Chinook that would be saved by fishery adjustments clearly would not benefit SRKW. However, following the second workshop, the Panel requested an analysis of adjusting fisheries only in years when Chinook abundance is less than average, again based on certain assumptions. This analysis has been completed, and will be presented and discussed at the third workshop. NOAA Fisheries and DFO look forward to the Panel’s critique of this analysis.

This concludes the agencies’ comments to the Panel in advance of the third workshop. Again, on behalf of the Steering Committee, we wish to express our sincerest appreciation for the work of the Panel.

Sincerely,

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NOAA Fisheries

Paul Macgillivray
Fisheries and Oceans Canada

cc: Dave Marmorek, Alex Hall; ESSA

Agency requests for expert opinion from the Panel

A number of the original questions posed by the Steering Committee requested that the Panel provide both its expert opinion about a topic and the level of confidence associated with particular assumptions, analyses, and conclusions. Several of the questions were not addressed in the draft report. In other cases, the level of confidence – and how it was determined – is not clear. Where expert opinion is provided by the Panel, it would be helpful to see what criteria the Panel used to assign confidence levels (e.g., very low, low, medium, etc.). These questions are identified below by section of the report.

Section 4.0 Feeding Habits and Energetic Needs

- Based on your expert opinion, what level of confidence would you assign to the estimate of the distribution of age 3, 4, and 5 Chinook in the SRKW diet (May-September, Salish Sea)?
- Based on your expert opinion, what level of confidence would you assign to the conclusion that the SRKW's coastal diet largely consists of salmon? Of Chinook salmon?
- Based on your expert opinion, what level of confidence would you assign to the conclusion that the SRKW exhibits signs of nutritional stress? Of cumulative effects that include lower than optimal nutrition?
- Based on your expert opinion, what level of confidence would you assign to the conclusion that SRKW prey energy requirements are within the range of Chinook kilocalories or numbers of Chinook estimated by NMFS and DFO?

Section 6.0 Projected Future Status and Recovery

- Based on your expert opinion, what level of confidence would you assign to the conclusion that predicted changes in Chinook salmon abundance caused by fisheries affect the population growth rate of the SRKW?
- Based on your expert opinion, what level of confidence would you assign to the conclusion that predicted changes in Chinook salmon abundance caused by fisheries increases the risk of extinction of the SRKW population?