

A Bilateral Scientific Workshop Process to Evaluate Effects of Salmon Fisheries on Southern Resident Killer Whales

NOAA Fisheries

Southern Resident killer whales (*Orcinus orca*) are listed as an endangered species under both the U.S. Endangered Species Act (ESA) and Canada's Species at Risk Act (SARA). The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) and Fisheries and Oceans Canada (DFO) have developed and adopted recovery plans as required by the ESA and SARA. The plans are substantially similar; both describe the biological status of the population and specific threats and factors potentially limiting recovery. The plans establish interim recovery objectives, identify critical uncertainties and data gaps, and call for research to address the uncertainties and data gaps.

Several threats to killer whales have been identified: environmental contaminants, insufficient abundance of prey, physical disturbances by vessels, noise pollution, oil spills, diseases, climate change, small population size, and cumulative effects. Due to information gaps, the recovery plans generally do not characterize the absolute or relative importance of these threats. The multi-faceted nature of the threats to the whales requires an ecosystem approach to recovery. NOAA Fisheries and DFO have continued existing research and undertaken or supported new research to better understand threats to their recovery. They have initiated and continue to support a wide range of management actions to address identified threats. For example, they utilize their authorities and resources to support efforts to protect and restore salmon habitat to improve the abundance of salmon. They have adopted regulations designed to limit physical disturbance of whales by vessels and to limit noise pollution in areas frequented by the whales. The agencies review proposed actions within their respective jurisdictions for potential negative effects on killer whales and use their authorities to prescribe measures to mitigate such effects. The workshop process described herein is a response to one such proposed action – the adoption of a Chinook salmon fishing plan for Puget Sound, and is intended to evaluate the effects of salmon fisheries on the whales. This workshop process is not intended or designed to undertake a comprehensive review of all threats to killer whales; its focus on fishing is intended to be one component of a broader ecosystem approach to their conservation and recovery.

In addition to the development of recovery plans, the listing of a species under the ESA or SARA requires the applicable U.S. or Canadian federal agency to consider the potential effects of various management actions on that listed species. In the case of the ESA, the purpose of NOAA Fisheries' evaluation – set forth in a "biological opinion" – is to determine whether the proposed action will jeopardize a listed species or result in the adverse modification or destruction of its critical habitat. Because the Southern Resident killer whales are known to rely heavily on Chinook salmon as their preferred prey, NOAA Fisheries must consider whether the reduction in available prey resulting from the fishery will jeopardize the survival and recovery of the whales.

Pursuant to requirements of the ESA, NOAA Fisheries conducted an evaluation of new fishing regimes recommended in 2008 by the Pacific Salmon Commission for U.S. and Canadian fisheries covered by the Pacific Salmon Treaty. That consultation examined the estimated reduction in Chinook salmon available to the whales from the proposed fisheries in relation to the whales' estimated prey requirements. Using the best scientific information then available, NOAA Fisheries concluded that the proposed regimes would reduce prey available to the killer whales, but would not jeopardize their survival and recovery or adversely modify their critical habitat. It was noted that new scientific information would continue to emerge to help inform future consultations.

In 2010, the Washington Department of Fish and Wildlife and the Puget Sound treaty Indian tribes submitted a proposed new fishing plan that would govern their Chinook salmon fisheries in Puget Sound for the next several years. NOAA Fisheries again evaluated the effects of fishing on the abundance of prey available to the killer whales using a similar approach to the 2008 analysis, but incorporating new scientific information available since 2008. This newer analysis suggests that the amount of Chinook available to the whales in comparison to their metabolic requirements may be less than what was estimated in 2008. This change results from several factors, including but not limited to revised estimates of the metabolic requirements of the whales, their selective preference for larger Chinook salmon and inclusion of a broader range of years to represent expected variations in the annual abundance of Chinook salmon. In addition, NOAA Fisheries developed new analyses regarding the relationship between Chinook salmon abundance and Southern Resident killer whale population growth.

NOAA Fisheries and DFO are mindful of the potential significance of this new information to fisheries and other activities that affect the abundance of Chinook salmon available to the killer whales. For this reason, NOAA Fisheries and DFO want to ensure that the scientific data and analyses are carefully reviewed in an open and scientifically rigorous process. The bilateral workshop process described here was conceived and designed with these purposes in mind. It will provide a structured and focused scientific forum wherein NOAA and DFO scientists and other invited experts can interact with an independent science panel to review the best available scientific information on the effects that salmon fisheries may have on Southern Resident Killer Whales by reducing their prey. The panel and workshop participants will review the ecology of the whales and their feeding preferences and energy requirements. They will examine the extent to which various salmon fisheries may reduce prey available to the whales, and the potential consequences to their survival and recovery. This focus on the effect of fisheries does not suggest that fisheries are believed to be the primary cause of the whale population's depleted status or that fisheries are the only actions affecting salmon abundance. Rather, it is intended to shed light on the extent to which prey scarcity may be limiting recovery of the whales and the role that salmon fisheries may have in contributing to that scarcity.

By addressing one of the identified threats to killer whale recovery, this process will contribute to the broader recovery programs for Southern Resident killer whales. A rigorous scientific investigation of the effects of fishing on the whales when placed in the broader context of all the factors affecting the whales will better inform future fishery management decisions by NOAA and DFO. Note that this workshop process and the resulting report of the panel are not intended to establish policy or make management recommendations or decisions.

Key question: To what extent are salmon fisheries affecting recovery of Southern Resident killer whales by reducing the abundance of their prey, and what are the consequences of this reduction to their survival and recovery?

Overall approach: NOAA and DFO have established an independent science panel to oversee the scientific deliberations and produce a report at the conclusion of the process. Three workshops will be convened to present, discuss, and refine scientific information relevant to the key question. The first workshop occurred on September 21-23, 2011 in Seattle. The second will be March 13-15, 2012, in British Columbia, and the third will be September 18-20, 2012 in the Seattle area. The specific objectives of each of the workshops are detailed below. To keep the workshops to a manageable size and foster productive scientific discussion, attendance will be limited to the science panel, scientific presenters and other experts invited to engage in the discussions and help perform a scientific peer review function. A limited number of observers representing the public and stakeholders also will be invited, but generally will not participate in the scientific discussions.

Independent Science Panel: A seven-member science panel has been established to oversee the workshop proceedings, participate in workshop discussions, challenge and critique presentations and analyses, and provide expert feedback. The members of the panel were selected based on their expertise in salmon management, marine mammals (killer whales) and predator-prey dynamics. Through a structured process and iterative dialog with invited experts, the panel will help sharpen scientific understanding of the effects of fishing on southern resident killer whales. At the conclusion of the process, the panel will produce a report that:

- identifies the extent to which salmon fisheries in specific locations and times, in combination or in the aggregate, or as a function of annual prey abundance, may be affecting the well-being of Southern Resident Killer Whales by reducing their prey;
- describes the nature of those effects (e.g., through a reduction in whale survival, growth rates, fecundity, or some other mechanism);
- discusses the consequences to survival and recovery of the killer whales; and,
- identifies assumptions, critical uncertainties and data gaps and potential research to reduce uncertainties.

Members of the Independent Science Panel: The panel consists of the following individuals:

Dr. Ray Hilborn (Chair), School of Aquatic and Fishery Science, University of Washington, Seattle, WA;

Dr. Sean Cox, School of Resource & Environmental Management – Simon Fraser University; Vancouver, BC;

Dr. Francis Gulland, Marine Mammal Commission; Marine Mammal Center, Sausalito, CA;

Dr. David Hankin, Department of Fisheries Biology, Humboldt State University, Arcata, CA;

Dr. Tom Hobbs, Natural Resource Ecology Lab., Colorado State University, Fort Collins, CO;

Dr. Daniel Schindler, School of Aquatic and Fishery Science, University of Washington; and

Dr. Andrew Trites, Marine Mammal Research Unit, University of British Columbia, Vancouver, BC.

Science Facilitator. A scientific consulting firm with demonstrated experience in resource management problem-solving processes, ESSA Technologies, Ltd. has been retained to provide facilitation services. Its president, David Marmorek will help plan and conduct the workshops and assist the panel in producing its report.

Presentations. Most of the workshop presentations will be by NOAA and DFO scientists who conduct research on killer whales, manage salmon fisheries or have performed analyses in connection with the agencies' management of listed species. Additional speakers will be invited based on their expertise and/or research on matters pertinent to the workshop purposes.

Public Input. NOAA will establish a web site where workshop and other relevant materials will be posted for access by the public. Between the second and third workshops, a draft of the scientific panel report will be made available for public review and comment. The comments will be considered by the panel as it develops its final report.

The Workshop process and schedule:

Workshop 1: September 21-23, 2011 (Crowne Plaza Hotel, Seattle, WA)

Process. The first workshop took much time and advance preparation because all attendees were asked to come to the process familiar with recovery plans, biological opinions, and scientific publications relevant to proceedings as appropriate to the nature of their participation. To facilitate informed discussion at the workshop, presenters made their study results, data and/or analysis available prior to the workshop.

Purposes. Workshop 1 was designed to serve these four primary purposes:

1. Identify what we know about Southern Resident killer whales, their feeding habits, and prey abundance.
2. Present and discuss NOAA, DFO and others' research and analyses relating salmon abundance and fishing to killer whales.
3. Identify and discuss key assumptions and uncertainties and the potentials for reducing them.
4. Begin formulating specific follow-up tasks for completion and presentation at Workshop 2.

Time period between Workshops 1 and 2

1. Soon after the first workshop, the science panel began deliberating on the presentations and analyses to identify alternative or additional analysis that should occur.
2. Workshop 1 presenters will refine their analyses based on workshop discussions and feedback received from the science panel subsequent to Workshop 1.
3. Other scientists may prepare analyses in response to Workshop 1 proceedings for presentation at Workshop 2.
4. Additional information will be compiled for presentation to the workshop process (e.g., biological performance criteria applicable to salmon and marine mammals) for consideration by the science panel.
5. The science panel and facilitator begin to outline the draft report (sans conclusions for matters still under consideration)
6. The Chair and facilitator will prepare and distribute an agenda for Workshop 2.

Workshop 2: March 13-15, 2012 (at a place TBD in British Columbia)

Purposes. The primary purposes of Workshop 2 are as follows:

1. Workshop 1 presenters will summarize the results of their updated/refined analyses prepared in response to discussion and feedback from Workshop 1 and the science panel.
2. Other scientists (e.g., state, tribal, NGO) may make presentations in response to matters presented at Workshop 1.
3. The science panel and participants will discuss the new information, ideas and analysis identified in Workshop 2.
4. The science panel begins to formulate tentative conclusions and identify key uncertainties in discussions with workshop participants.
5. The science panel and facilitator may meet at the conclusion of the workshop to begin synthesizing the information and assign writing responsibilities for sections of a draft report.

Time period between W2 and W3.

1. The science panel writes its draft report.
2. The science panel's draft report is circulated for public review and comment.
3. The agencies receive and collate public comments on the report for consideration at Workshop 3.
4. The Chair and facilitator prepare and distribute an agenda for Workshop 3.

Workshop 3: September 18-20, 2012 (at a place TBD in Washington State)

1. Workshop participants meet to review and discuss:
 - a. the scientific findings and conclusions of the science panel's draft report;
 - b. public comments received on the draft report;
 - c. the methods employed to estimate effects of alternative fishery scenarios on prey availability;
 - d. major findings and conclusions that can be reached based on workshop proceedings;
2. The science panel identifies additional information it needs to inform its final report and how to obtain it.

Following Workshop 3, the science panel and facilitator will produce its final report by November 30, 2012. NOAA Fisheries and DFO will consider the report of the science panel as they conduct future consultations on fisheries and other actions affecting prey available to killer whales. Additionally, the panel's findings regarding additional research will be considered and likely given substantial weight as the agencies develop their research priorities.