Northwest Power and Conservation Council

April 26, 2012

MEMORANDUM

TO: Council Members

FROM: Patty O'Toole, Fish and Wildlife Program Implementation Manager

SUBJECT: Committee Recommendation for Ocean Projects

INTRODUCTION

At the Council's April meeting in Skamania, the Fish and Wildlife Committee supported the staff's recommendation to take more time to redefine the scope of ocean research funded under the Council's Fish and Wildlife Program, guided by the new ocean research synthesis and the ISRP's review of the synthesis report. This recommendation includes continuing to support the two ocean research projects (NOAA's Ocean Survival of Salmonids, # 1998-014-00; and DFO's, Salmon Shelf Survival Study, # 2003-009-00) while the staff works with the project sponsors, Bonneville and others in the region to redefine the scope of the research as described below. The staff will return to the Council later in the year for final review and decision on longer term funding.

The discussion with the Committee resulted in a few modifications to the wording of the recommendation in the staff memorandum to the Committee. These modifications are included in the revised recommendation to the Council on the following page. Last month's staff memorandum to the Committee is attached for background describing why the staff and Committee came to this recommendation. This document was revised in April to include a brief summary of public comments.

Because the Committee and staff recommendation is to take more time to redefine the scope of the ocean research, the staff is not asking for a formal decision at this time from the full Council. The purpose of the discussion at the May meeting is to inform the full Council of these developments and to seek informal approval and guidance. But if the Council desires to pursue a formal motion and decision at the May meeting, we can prepare the appropriate motion.

RECOMMENDATION FOR NEXT STEPS IN REDEFINING OCEAN RESEARCH UNDER THE FISH AND WILDLIFE PROGRAM

The staff and the Committee recommend that the staff continue to work with the sponsors of the two key ocean research projects (NOAA, Ocean Survival of Salmonids, # 1998-014-00; and DFO, Salmon Shelf Survival Study, # 2003-009-00), Bonneville, the state and tribal fisheries managers, and others in a collaborative process to use new information produced through the development of the ocean synthesis report and subsequent ISRP review to re-focus the Program's ocean research. The Council will look to Bonneville and the project sponsors to enhance how the ocean research benefits fish affected by the FCRPS through: 1) improving the linkages to potential management applications associated with hatcheries, habitat, hydropower operations, and essential survival calculations; 2) emphasizing research related to the Columbia River plume, the near shore ocean and estuary areas; 3) exploring the feasibility of collecting information on other species of concern; and 4) contributing to the development and tracking of High Level Indicators adopted by the Council. The reshaped research plan should assess how the projects are relevant to and assist in the achievement of the Council's current Fish and Wildlife Program objectives, 2008 Biological Opinion requirements and ISRP guidance.

Staff anticipates it will take at least six months to complete the reshaping of the research projects to present to the Council and Bonneville for final review. Bonneville is prepared to work with this uncertainty in the interim, likely by extending the contracts for the two projects temporarily while we redefine the scope of the ocean research and return to the Council for review and a final recommendation to Bonneville. During this interim time Bonneville should not contract new research objectives.

As contracts are developed for any future work, the Council encourages Bonneville to look for opportunities to improve project efficiency and savings. Actual spending by Bonneville for each project should be sufficient to maintain project integrity. The Council appreciates the sponsors' continued provision of cost-share funds.

Northwest Power and Conservation Council

March 29, 2012 (revised April 26, 2012)

MEMORANDUM

TO: Fish and Wildlife Committee members

FROM: Patty O'Toole, Fish and Wildlife Program Implementation Manager

SUBJECT: Next steps regarding ocean research following the ISRP review of the ocean synthesis report

INTRODUCTION -- PROPOSED NEXT STEPS

In the Council's July 2011 decision for research, monitoring and evaluation (RM&E) projects, the Council recommended that the project sponsors involved in ocean research should jointly complete a comprehensive synthesis report on the ocean research. They produced that report, in January 2012. The ISRP then reviewed the synthesis report at our direction, producing a review report in February. Both the synthesis report and the ISRP's review may be found at http://www.nwcouncil.org/library/report.asp?docid=664. We have been working with the researchers and relevant agency personnel since then to understand the implications of the synthesis report and ISRP review for the future of ocean research under the program.

Based on all of this information and discussions we believe strongly that there is value in continuing ocean research under the Fish and Wildlife Program. Additional information remains valuable for better understanding the ocean component of survival for species important to the program (which then will allow us to better understand how freshwater survival changes in response to actions); for improving forecasting of adult returns; for improving our understanding as to how management actions might affect conditions in the estuary and near-shore plume and thus affect survival of all anadromous fish runs; and in general to understand better the ocean portion of the life-cycle of Columbia River salmonids, which can account for well over half of their lives.

Staff also believes that simply deciding to fund the two existing projects as proposed back in 2010 is not preferred, given all that we have learned with the synthesis report and the subsequent review by the ISRP. We believe that more time in needed to reshape the ocean research projects to reflect the information we now have and realize the potential value.

On that basis, staff recommends for the next steps that the Council work with the sponsors of the two key ocean research projects (NOAA, Ocean Survival of Salmonids, # 1998-014-00; and DFO, Salmon Shelf Survival Study, # 2003-009-00, (see table 1 for project detail)), the Action Agencies, the state and tribal fisheries managers and others to use the new information to re-focus the research especially to: 1) improve the linkages to potential management applications and essential survival calculations; 2) consider an emphasis for monitoring efforts in the Columbia River plume, the near shore ocean and estuary areas; and 3) discuss the feasibility of collecting information on other species. We expect it will take upwards of six months to complete the reshaping of the research projects to present to the Council and Bonneville. Bonneville is prepared to work with this uncertainty in the interim, as the Committee will hear at the April meeting.

The public comment period on the ISRP report was still open when the packet was prepared, so the recommendations here are preliminary. We will report on any comment received at the meeting.

BACKGROUND

In the Council's July 2011 decision for research, monitoring and evaluation (RM&E) projects, the Council recommended that the project sponsors involved in ocean research should jointly complete a comprehensive synthesis report on the ocean research. This recommendation was made out of concern that:

1. The work lacked an overarching plan for the ocean research and there was concern about a potential lack of coordination among the ocean projects and with the estuary projects also attempting to estimate juvenile salmon survival.
2. It was unclear how the projects collectively are addressing the ocean strategies identified in the 2009 Fish and Wildlife Program and thus how the information obtained will help us distinguish the effects of ocean conditions from other effects and help us with management actions in freshwater under variable ocean conditions.

Under this backdrop, the Council recommended funding for the ocean research projects through FY 2012 and called for completion of a synthesis report and to allow for subsequent ISRP review and a Council recommendation on future implementation and funding.

The recommendation further stated that the Council and Bonneville would decide on additional funding for these projects in the out years depending on the production and review of the synthesis report, and then on how the project sponsors propose to re-shape the research projects consistent with the Council's recommendation and the outcome of the synthesis report review.

The Gorton Amendment to the Northwest Power Act was enacted in 1996 and instructed the Council to "*consider the impact of ocean on fish and wildlife populations when making recommendations to Bonneville regarding projects to be funded*." The Council developed an issue paper in response to this amendment. The paper introduced three basic principles that are still evident in the Fish and Wildlife Program today. These principles are:

- The Council views the estuary, plume, and nearshore ocean environments as part of an ecosystem that includes the Columbia River.

- Salmon and steelhead accommodate ocean mortality and environmental variability through a sufficient level of productivity and a wide range of biological diversity.
- The Columbia River estuary and plume are important features that have been and continue to be impacted by upriver management actions and local habitat change.

The strategies in the 2009 Fish and Wildlife Program are:

- Identify the effects of ocean conditions on anadromous fish survival and use this information to evaluate and adjust inland management actions.
- Manage for variability – strive to help anadromous and other species accommodate ocean variability by providing a wide range of life history strategies and diversity.
- Distinguish ocean effects from other effects – try to separate the effects of ocean-related mortality from that caused in the freshwater part of the life cycle.

To assist in developing the options presented before the Committee several sources of information were considered, including the Synthesis report, the ISRP review, the ISAB food web report, the FCRPS Biological Opinion, the Council's research plan and public comments. A summary of the pertinent information from each of the sources currently available is provided below.

A. Synthesis report: The ocean projects synthesis report recongnized that analysis of management implications has not been an emphasis in the scope of work for the ocean projects. Instead, the projects have focused on improving the understanding of juvenile salmon ecology during early marine residency, distribution and the mechanisms linking ocean conditions to juvenile salmon survival, to inform rather than direct management efforts. The research efforts have lead to a time series of information from which a suite of ocean productivity indicates has been built. Future work could include interactions with management and policy communities to discuss the results of the research and maximize the use of the research effort. Potential future actions could include:
   - A series of workshops to share results and discuss implications with managers
   - Improve recruitment/return forecasting
   - Status and trend monitoring in the ocean
   - Learn and apply weighting factor to ocean productivity indicators.
   - Estuary-ocean linkages

A. ISRP: The review of the synthesis report by the Independent Scientific Review Panel (ISRP) was generally positive about the synthesis and the research performed by the ocean projects. The ISRP stated that the synthesis adequately addressed the points emphasized by the Council in its recommendation and the research was consistent with the strategies in the 2009 Fish and Wildlife Program. The ISRP noted that the ocean research projects are making important contributions to the Fish and Wildlife Program. The ISRP agreed that "periods of high or low ocean productivity can mask underlying trends in freshwater habitat productivity and could lead to a misinterpretation of the proximate cause of the trend." The ISRP recommended making a stronger link between studies of marine ecological process and salmon survival estimates, and additional work between ocean researchers and freshwater managers to strengthen and validate the potential management implications from the research.

The ISRP also noted that density-dependence in nearshore areas may be an issue for Columbia River salmonids. Researchers in British Columbia and Alaska are showing that Chinook productivity can be negatively affected by the presence of large numbers of hatchery fish. The ISRP believes this issue is worth evaluating given the large numbers of hatchery fish released in the Columbia River, BC, Alaska and elsewhere.

B. ISAB: The Columbia River Food Webs report notes that the estuary and plume are critical, that prey and predators congregate in the plume and conditions in the plume can have a significant effect on the survival of salmonids emigrating from the Columbia River.

   The ISAB also states in the food web report: "The critical importance of early ocean survival on returns of salmonids to the Columbia River, argues that research should continue on the ecology of juvenile salmon as they exit fresh water and the estuary into the plume and coastal ocean. We [ISAB] recommend continued research on the availability of food for growth and the impact of predation on survival of both in-river and transported smolts in these waters, and on how these factors relate to river flows, plume structure and ocean conditions. This research is vital to understanding and predicting adult returns and smolt-to-adult survival rates. We [ISAB] recommend that long term monitoring of the plume and estuary be continued and managed as systems connected to the Columbia River Basin."

C. The FCRPS Biological Opinion: NOAA indicates that this work is meeting the needs of the FCRPS Biological Opinion to monitor juvenile survival, growth rates and life histories. Work on density dependence issues relating to hatchery fish in the ocean is an area of growing interest. NOAA modeling indicates that ocean variability may drive the variability in population abundance and is using the information collected from these research projects to help forecast ocean conditions for salmonids and the likely effects on the population abundance. The indicator under development is an assessment that includes smolt-to-adult survival, sibling regression models, and ocean indicators. These projects address FCRPS Biological Opinion RPAs 58, 59 and 61.

D. Council's Research Plan – Critical Uncertainties
   - Can stock-specific data on ocean abundance, distribution, density-dependent growth and survival, and migration of salmonids, both hatchery and wild, be used to evaluate and adjust marine fishery interceptions1, harvest, and hatchery production in order to optimize harvests and ecological benefits within the Columbia River Basin?
   - Can monitoring of ocean conditions and abundance of salmon and steelhead during their first weeks or months at sea improve our ability to predict interannual fluctuations in the production of Columbia Basin Evolutionarily Significant Units (ESUs) or populations to enable appropriate changes to harvest levels?
   - How can interannual and interdecadal changes in ocean conditions be incorporated into management decisions relating to hydrosystem operations, the numbers and timing of hatchery releases, and harvest levels to enhance survival rates, diversity, and viability of ESA-listed salmonids?
   - What are the effects of commercial and sport fishing on ocean food webs?

E. Public comment

Four written public comments were received:

- Bert Bowler – Snake River Salmon Solutions: complimented NOAA and DFO on the ocean work, expressed concern over a major deficit in the synthesis report: the delayed mortality conclusions in the synthesis report lacked coordination with the USFWS, the FPC and basin fish mangers. It ignored published and unpublished data.
- Fish Passage Center: synthesis report did not include significant data and analyses that indicate fresh water passage experience affects first year ocean survival and adult returns. Also questioned the applicability of ocean research data to management actions because the recognized relationships between juvenile freshwater life cycle experience and early ocean survival/adult return have not been addressed. Large survival and sampling biases are clearly evident in the data from the COAST study.
- Public Power Council (also oral comment in April): current spending on RM&E in the program is too high. The cost of ocean research should not be borne primarily by BPA customers when the relationship between the research and FCRPS management is not clear. Phase out if there is no FCRPS linkage.
- Northwest RiverPartners (Also oral comment in April): Terminate the COAST project by 2013, phase out funding of other projects on a reasonable schedule. If the Council recommends continued funding, require cost share of 50 percent or more. Recommend establishing an overarching budget policy and level for RM&E in the Program. Ensure that new RM&E expenditures are only undertaken when they are related to the impacts of the FCRPS but also where there are legitimate sources of scientific uncertain y that present high risks to fish and wildlife.

The Council's programmatic recommendation for ocean research included a request that the synthesis report include consideration of potential salmon management implications, and if possible recommendations for management based on the information collected and evaluated. Information from the research should either improve and correct our knowledge of ocean survival so we can better understand the dynamics and changes in freshwater survival or give us information we can use in freshwater management to improve the chances of ocean survival. The management implications can be organized into four categories:

Salmonid life-cycle context: It is important to have a basic understanding of ocean survival in order to better understand freshwater survival. Understanding how, where and which salmonids experience mortality in the ocean can provide insights to freshwater management and can test commonly held assumptions about the river conditions for fish. If a particular stock is demonstrating strong abundance, is it due to freshwater habitat restoration actions or specific ocean conditions? A thorough evaluation of the success of freshwater management actions requires that we know the effects of the ocean on Columbia River salmonids, in order to evaluate the success of habitat and other actions in freshwater. This is consistent with the first Fish and Wildlife Program principle mentioned above; i.e., that the Council views the estuary, plume, and nearshore ocean environments as part of an ecosystem that includes the Columbia River.

Forecasting adult returns: Through the ocean research, project sponsors have explored using their data to help improve forecasting of adult returns. Fisheries managers have several methods for forecasting adult returns (e.g., age structure models, stock-recruit models, ocean indicators). Research is demonstrating that ocean condition indicators may provide helpful information that could be utilized to improve run forecasting accuracy in run forecasting. Forecasting of adult

returns can be utilized to trigger conservation actions, set broodstock collection expectations and harvest seasons. In river forecasters typically use a sibling regression for forecasting annual adult returns. Until about ten years ago, this methodology was reasonably accurate for Chinook salmon. Recently, however, this methodology has not been as reliable. Researchers believe that changes in the age structure (age at maturation) of Chinook salmon may be behind the change. Managers are beginning to utilize other methods, often in combination, to more accurately predict adult returns. The NOAA and DFO ocean indicators (stop light chart), developed and populated with data from the two ocean research projects, are being used to further improve run forecasting.

Potential changes to freshwater management: The Council has been interested for some time in ways in which managers can use the results of the ocean research to change freshwater habitat and production management to improve survival. It has been suggested that there may be applications such as changing the timing of hatchery releases or changing migration methods to take better advantage of optimal plume or ocean conditions and subsequently, to see improved survival for these fish. Hatchery fish release timing is set by hatchery managers that are considering water temperature, readiness of the fish to migrate and to take advantage of in river flow. It is unclear, however, if potential management strategies are realistic or practical and if the potential survival benefits would outweigh other risks. Further discussions are warranted between researchers and freshwater fisheries and hatchery managers to explore the practical potential of these concepts. There are specific experiments that can be conducted using individual hatcheries that are already investigating variable release timing. Stock-specific information about growth and survival in the ocean could be better linked to stock management in the freshwater.

Direct affects of freshwater management: Management of the Columbia River Basin hydropower system directly affects the ocean environment in two primary ways: the changes in the natural hydrograph from development of the hydro-system that have resulted in changes in the estuary and plume habitat and changes in timing and quantity of natural flows. Releases of large numbers of hatchery fish from Columbia River hatcheries could trigger density dependent effects in the plume and ocean. There is more to be learned about these effects to improve conditions and thus survival for fish in the estuary and plume, and about how the release of millions of hatchery fish may be affecting ocean conditions for wild fish.

ANALYSIS

Staff believe, based on the sources of information reviewed, there continues to be value in supporting research activities in the marine environment. Staff also believes that it is appropriate to work with the project sponsors, the Action Agencies, fisheries managers, hatchery mangers, NOAA and others to re-focus the research to: 1) improve the linkages to potential management applications and to key survival estimates; 2) emphasize the Columbia River plume, the near shore ocean and estuary areas; and 3) discuss the feasibility of collecting information on other species, such as steelhead.

The next steps proposed by staff will address these needs 1-3 above by recommending that the Council facilitate discussions between the various entities to reshape the projects in the next six months. Staff will develop a schedule that will include one or more workshops, topics, participant lists, and decision timeframes.

ALTERNATIVES

If the Committee (and the full Council) agrees with the next steps proposed by the staff, a formal decision by the Committee and the Council is not needed at this time. Two alternatives to the path recommended by staff are included below, both of which would require a formal recommendation from the Committee at this point and then a formal decision by the Council next month:

- Continued existing project approach: This alternative would continue to provide support for ocean research at a scale similar to FY 2011.

- Phase out funding for all the ocean research projects. This alternative would phase out ocean research under the Council's Fish and Wildlife Program. Although NOAA does provide significant cost share for this research, it is primarily an in-kind salary cost share. The NOAA funding contribution does not include funds for ship time for collecting information on Columbia River salmonids off the Oregon and Washington coast. Bonneville funds have been used for this purpose. Similarly, Bonneville funds associated with the DFO project provide ship time and some analysis for a summer survey that targets Columbia River stocks present off the coast of British Columbia in the summer months in strong numbers. DFO directly funds winter and fall surveys when Columbia River stocks are still present, but in lower numbers.

  Phasing out funding of all these projects would cease ocean research associated with Columbia River stocks off the coast of Oregon, Washington and British Columbia. It is possible that Bonneville may decide that it needs to fund this research despite the Council recommendation if they believe that these projects are necessary to meet its FCRPS BiOp obligations.

Table 1. Ocean research project information:

Project Title	**Sponsor**	**FY 2011 (contracted amount)**	**Cost-Share FY 2011**	**Funding requested (2012-2014 average)**
Ocean Survival of Salmonids	NOAA	$2,550,043	$2,185,000	$2,720,691
Canada-USA Shelf Survival Study	Canada Department of Fisheries and Oceans	$444,850	$776,000	$511,800
Totals:		**$2,994,893**	**$2,961,000**	**$3,232,491**