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April 26, 2006

MEMORANDUM

TO: **Council Members**

FROM: **Nancy Huntly, ISAB Chair; Erik Merrill, ISAB Project Manager; and Steve Waste, ISAB Ex Officio**

SUBJECT: **Independent Scientific Advisory Board (ISAB) Assignment Update -- Human Development Impacts and Climate Change Reviews**

Summary

This item is included on the Council's agenda to update the Council on two proposed ISAB assignments: 1) Potential Impact of Human Development Patterns on Fish and Wildlife Populations, and 2) Impacts of Climate Change on Fish and Wildlife Restoration. Council discussion of the ISAB assignments is intended to aid Chairman Karier in his deliberations on the ISAB's Administrative Oversight Panel. The ISAB is seeking Council feedback on the proposed review strategies and subsequently will seek Oversight Panel approval to begin the assignments.

ISAB Assignment Procedures

The eleven-member ISAB serves the Council, the National Marine Fisheries Service, and the Columbia River Basin Indian Tribes by providing independent scientific advice and recommendations regarding scientific issues that relate to the respective agencies' fish and wildlife programs. The ISAB is governed by an Administrative Oversight Panel consisting of the Council Chair, a senior representative of the Columbia Basin Indian Tribes (Olney Patt Jr.), and the Regional Administrator of the National Marine Fisheries Service (D. Robert Lohn) and the Director of the Northwest Fishery Science Center (Usha Varanasi) as joint participants. The Oversight Panel's primary responsibilities are to appoint ISAB members and approve the ISAB's work plan.

The ISAB has terms of reference and review protocols that establish how ISAB assignments are generated and conducted. Generally, the Council, Fisheries Service, or Tribes request reviews. In addition, regional entities can make requests, and the ISAB can self-generate assignments.

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Review strategies and questions are developed in an iterative process between the ISAB and Ex Officio representatives from the Council, Fisheries Service, and Tribes. The Oversight Panel has final approval on assignments.

The two assignments for discussion were previously supported by the Council and approved by the Oversight Panel in 2002. These reviews were postponed to allow the ISAB to focus efforts on completing reviews of salmon supplementation, subbasin plans, harvest management, and numerous time-sensitive reviews related to fish passage and recovery planning. Enough time has passed since the assignments were originally developed that the ISAB wants to ensure that the Council and Oversight Panel are fully apprised of the ISAB's current strategy for completing the assignments. The ISAB's proposed review strategies and questions are described below. Any comments or additional questions for the ISAB to consider are welcomed. It is the ISAB's understanding that the Fisheries Service and Tribes are generally supportive of these reviews.

In addition to these assignments, the ISAB will continue to be available to conduct scientific reviews on pressing fish passage, biological opinion development, and recovery planning issues. These reviews might include a review of the Bonneville Dam to ocean to Bonneville Dam component of the COMPASS model, if so requested. To ensure that the human development and climate change reviews do not interfere with the ISAB's ability to effectively conduct more time-sensitive reviews on such topics as fish passage analysis and modeling, the ISAB will name subcommittees for each review topic with little overlap between subcommittee members. In addition, the ISAB plans to use ad hoc members, including past members, to augment its expertise and work base. The recently re-configured ISAB is better positioned than the previous ISAB to complete these reviews while maintaining availability for urgent projects for the following reasons: 1) the ISAB is not assigned any other long-term "state of the science" reviews, 2) there is a natural division of interest among ISAB members on human development, climate change, and fish passage issues, 3) there are less joint ISRP/ISAB members responsible for time-consuming ISRP reviews and 4) the ISAB has access to past members with significant expertise and interest in fish passage issues.

Finally, the ISAB is on schedule to complete its current review of the Council's draft monitoring and evaluation guidance document by June 2, 2006.

Significance

One of the ISAB's primary functions has been to conduct "state of the science" reviews. When the ISAB completed its review of harvest management in 2005, it essentially had completed major reviews of the key scientific issues that Columbia River Basin programs have focused on. In addition to the harvest review (ISAB 2005-4), the ISAB has completed comprehensive reviews of the potential effects of supplementation practices on salmon recovery (ISAB 2003-3), tributary habitat recovery strategies (ISAB 2003-2), flow augmentation (ISAB 2003-1, 2004-2), salmon recovery strategies/plans (ISRP/ISAB 2004-13, ISAB 2001-7), and mathematical modeling and analytical tools (ISAB 2001-1). Human development and climate change issues cut across all elements of the salmon lifecycle and fish and wildlife management. The ISAB reviews should tie together past ISAB reports and spur further analyses of these lesser covered but critically important issues.

The completion of subbasin planning, the increasing emphasis on ecosystem-based management, and the need to develop effective operational definitions of resource sustainability all make this a good time to address the question of human development patterns and climate change. The incorporation of human development and climate change issues into fish and wildlife planning will help the region frame recovery actions in a broader context. This will also assist in the identification of the types, location, and intensity of potential impacts on fish and wildlife. In sum, the ISAB reviews should usefully inform the Council's efforts in selecting projects, implementing the research plan, providing monitoring and evaluation guidance, and continuing the development of subbasin plans and provincial objectives. The reviews should also be applicable to the Fisheries Service's and Tribes' management and planning efforts.

Budgetary Impacts

The ISAB operates on an annual budget, independent of the Council's budget, funded by the Bonneville Power Administration through the Fish and Wildlife Program. Costs associated with ISAB and ad hoc member services and travel to complete the reviews will be covered under the ISAB's existing budget of $547,000 for Fiscal Year 2006. In the event, the reviews are not complete by September 30, 2006, costs will be covered under the ISAB's Fiscal Year 2007 budget. No additional funds are requested. Based on similar past projects, the estimated costs are $40,000 for the human development review and $30,000 for the climate change review.

Potential Impact of Human Development Patterns on Fish and Wildlife Populations

The impact of human settlement in the Columbia River Basin is rarely incorporated into fish and wildlife planning. The Fish and Wildlife Program implicitly assumes a level base case of human development, and demographic issues are only infrequently addressed in subbasin plans. However, several dimensions of human development patterns are changing. Regional population is increasing, the spatial use of natural resources is changing, and the economic base is shifting. These trends have unevenly distributed impacts throughout the basin with direct implications for fish and wildlife conservation, mitigation and recovery.

In 2002 the Council asked the ISAB to analyze projected trends and patterns in human development in the Columbia River Basin with regard to how they might affect the success and direction of the fish and wildlife program. The Council requested that the ISAB:

- Review population patterns and projections for growth
- Discuss how these changes might affect fish and wildlife habitats
- Assess the implication of changing economic patterns on habitat impacts
- Suggest methods for incorporating human impacts into fish and wildlife planning

The ISAB proposes to address this review in five steps:

1. Synthesize existing information on human development patterns in the Columbia River Basin. This includes information on population growth and density, economic trends, land use patterns and other development variables available through various regional planning entities. Information on these factors exists in various locations, but has not been synthesized from the perspective of fish and wildlife resources.
2. Synthesize available projections of trends in these human development variables.

3. Assess and describe the available data and methods used to project human development outcomes and their potential impact on fish and wildlife.
4. Analyze the potential impacts of projected human development trends on fish and wildlife conservation and recovery. Models for this approach include the alternative futures "scenario development" approach used by the Willamette River Basin Project and the Coastal Landscape Analysis and Modeling Study (CLAMS) Project.
5. Recommend framework approaches for effective incorporation of demographic and economic trends in resource planning and restoration actions.

The ISAB envisions this effort to be of 3-4 months duration, resulting in a concise summary report (20-30pp) outlining the broad issues identified in items 1-5 above. The report will synthesize existing demographic and economic information, discuss why this information is relevant to fish and wildlife in the Columbia River Basin and provide examples of how the information may be effectively incorporated into subbasin planning and project design. In addition, the ISAB intends to identify additional actions and potential strategies (within the purview of the Fish and Wildlife Program) to address the potential impact of changing human development patterns. The ISAB may find it useful to work with an ad hoc member with experience in this area, for example someone from the Willamette Subbasin plan team or the CLAMS project.

Impacts of Climate Change on Fish and Wildlife Restoration

The Council's 2002 Request

The potential impacts of climate change are recognized at national and international levels. In addition, the impacts of short and longer-term climate variation and ocean conditions are now recognized as major contributors to fluctuations and trends in salmon abundance coast-wide. While a widely recognized phenomenon, the impacts of climate change are rarely incorporated into natural resource planning. The ISAB noted that the Council's fish and wildlife program and the NOAA Fisheries recovery strategies do not consider the impacts of climate change and implicitly assume a level base case. However, the changes in regional snow pack and stream flows in the Columbia Basin projected by many climate models could have a profound impact on the success of restoration efforts and the status of Columbia River fish and wildlife populations.

In April 2002, the Council asked the ISAB to review the potential impacts of climate change on the success and direction of the Council's fish and wildlife program and on fish and wildlife restoration in the Columbia Basin. The Council asked that the ISAB: 1) review projections of climate change and synthesize the current scientific understanding of climate trends in the Pacific Northwest and how these affect biologically important parameters such as marine conditions, stream flow, temperatures, and species ranges, and 2) focus on how these trends could impact the success of restoration efforts and suggest how consideration of these trends might impact the direction of the Council's program and how the region should incorporate knowledge of climate trends in fish and wildlife planning and management.

The ISAB Approach

The ISAB has partially addressed this review request in its harvest and tributary habitat reports, but the climate change content of those reports was very limited and was not at the level to motivate specific informed action by the Council. The ISAB remains interested in exploring a

potential more in-depth review. Short and medium cyclic climate variation (El Nino/La Nina and Pacific Decadal Oscillations) as well as longer trends in climate change are likely to impact the efficacy of choices for restoration and preservation of fish and wildlife habitats under the Council's Fish and Wildlife Program.

The Council requested that the climate change review address two distinct areas of concern: 1) the ocean environment and 2) the freshwater environment. In 2004, the ISAB bifurcated the review to address first the effect of climate variability on the ocean environment. The ISAB incorporated a section on climate and ocean change in its harvest report. This approach allowed the ISAB to explore the relationship between varying ocean regimes, hatchery production, and harvest rates. In addition, the ISAB considered the Council's question of how climate change may affect the frequency of short-term variation in oceanic conditions such as El Nino events as well as longer term overall marine productivity. Regarding the freshwater component of the review, the ISAB included climate change considerations throughout its tributary habitat report. However, the tributary habitat report did not explicitly address climate change, and the ISAB believes a more complete review is warranted.

Since the Council first requested this review, significant scientific effort has been applied to issues related to the potential impact of climate change in the Pacific Northwest on the freshwater environment including changes to snow pack, stream flow, and species distribution. In September 2004, a regional conference directly relevant to the ISAB assignment was held, "Climate Impacts on Salmon Management and Recovery in the Columbia River Basin." Consequently, the ISAB will need to scope the literature and analyses currently available to the region to determine what level of an ISAB review would add value. If necessary, the ISAB will synthesize literature from these recent efforts and focus on describing the potential scale of the impacts of climate change on the success of ongoing restoration efforts and how the uncertainty of impacts could be best incorporated into fish and wildlife planning and management. Thus, the review should be useful in informing future program amendments and recovery planning. The ISAB understands that Council staff from the power and fish and wildlife divisions intends to refine existing models to better incorporate climate impacts. The ISAB will coordinate its efforts with those of the Council to ensure added value.

The ISAB review should take approximately four to six months. Based on similar past projects, the estimated cost for completion is $30,000. It is important to note that soon after the climate change review was assigned, the ISAB's foremost experts on climate change, Drs. Dennis Lettenmaier and Daniel Schindler, resigned due to other time commitments. Consequently, the ISAB's ability to conduct the reviews in a short time frame was significantly diminished. For both components of the review, the ISAB intends to request briefings and enlist ad hoc members to augment its expertise.
