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October 29, 2009

## DECISION MEMORANDUM

**TO:** Council Members

**FROM:** Jim Ruff -- Manager, Mainstem Passage and River Operations

**SUBJECT:** ISRP review of *Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics*, a component of a Corps' Anadromous Fish Evaluation Program (AFEP) project

### PROPOSED ACTION

Council staff recommends the Council support the study design as reviewed by the ISRP ([ISRP document 2009-43](#)).

### BUDGETARY/ECONOMIC IMPACTS

The total amount associated with this two-year survival evaluation as part of the Corps' Anadromous Fish Evaluation Program (AFEP) will be approximately \$30 million in reimbursable expense funds for Fiscal Years 2010 through 2011.<sup>1</sup>

### BACKGROUND

At the U.S. Army Corps of Engineers' (Corps) and Council's request, the Independent Scientific Review Panel (ISRP) reviewed the document "*Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics*." This document is the experimental design plan for the overall project entitled *Acoustic Telemetry Evaluation of Dam Passage Survival and Associated Metrics at John Day, The Dalles and Bonneville Dams, 2010*. This project is proposed for implementation through the Corps' Columbia River Fisheries Mitigation (CRFM) Program, specifically under the Corps' AFEP. ISRP review of projects under this program was directed in 1998 by U.S. Congress Senate-House conference report for the fiscal year 1999 Energy and Water Development Appropriations bill. The ISRP's review responsibilities are also incorporated in the Council's 2009 Fish and Wildlife Program.

The Corps and Council staff identified this proposal for ISRP review because the proposed survival model and experimental design will be used to measure dam passage survival in

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<sup>1</sup> This is in addition to a separate AFEP project that will evaluate survival below Bonneville Dam at \$1,950,000 per year (Project #135993, Estuary survival (post-FCRPS passage). Corps AFEP projects are reimbursed to Bonneville at the power share.

accordance with the NOAA Fisheries 2008 Federal Columbia River Power System Biological Opinion (2008 FCRPS BiOp) and to assure compliance with the Columbia Basin Fish Accords. This is the first such science review of an AFEP project since the ISRP completed a programmatic review of the AFEP program in April 2004 (ISRP 2004-8). Council staff is working with Corps staff to identify other AFEP studies for future ISRP review.

The essence of this study is to use acoustic transmitters implanted in salmon and steelhead smolts, tracked in great detail by large arrays of receivers deployed in strategic places, thus allowing for close tracking of the migratory paths of the fish. The goal of the project is to evaluate the overall performance of structural and operational improvements designed to benefit juvenile salmonids by estimating dam passage survival and associated passage metrics for yearling and subyearling Chinook salmon and steelhead and to compare these estimates against the 2008 BiOp performance standards for John Day, The Dalles, and Bonneville dams (i.e., 96% survival for spring migrants and 93% survival for subyearling (summer) migrants).<sup>2</sup> The information can also be used to identify problem areas or conditions that might be improved to help meet performance standards.

On September 19, 2009, the Council received a letter from the Corps requesting ISRP review of the study design. The documents were submitted to the ISRP for review, and on October 16, 2009 the Council received the completed review (ISRP document 2009-43). The ISRP found that the study design meets “*Meets Scientific Review Criteria.*”

#### **BACKGROUND AND PURPOSE OF THE CORPS’ AFEP**

Since the 1950s, the Corps’ Northwestern Division has sponsored biological studies concerning anadromous fish passage on the Columbia and lower Snake rivers. This program is intended to enhance understanding and improve anadromous fish passage conditions and survival at federal mainstem multi-purpose projects in Oregon and Washington. These research, monitoring, and evaluation studies are managed under the AFEP, and are reviewed and coordinated with Federal, State, and Tribal fish agencies throughout the region. These agencies, in turn, provide both scientific/technical and policy-level input to the Corps on study objectives, experimental designs and methodologies.

Most mainstem fish passage facilities and river operations have been developed and refined in response to AFEP studies. The AFEP studies evaluate passage success, survival, and fish condition for surface bypass technologies, transportation, conventional screening and bypass systems, spill, total dissolved gas, adult migration/passage, in-river passage, and turbine passage.

The main purpose of AFEP is to produce scientific information to assist the Corps in making informed system configuration and operational decisions for the eight Columbia and Snake River hydropower projects to provide safe and efficient passage through the mainstem migration corridor. Each mainstem hydro project has multiple authorized purposes and uses, including migratory fish passage, and is affected by several environmental and project operating statutes. These include the Endangered Species Act (ESA), Clean Water Act, National Environmental Policy Act, Northwest Power Planning Act, and Fish and Wildlife Coordination Act.

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<sup>2</sup> These performance standards are incorporated by reference into the Council’s 2009 Fish and Wildlife Program.

## ANALYSIS

The ISRP found the study proposal meets scientific review criteria of sound science, benefits to fish and wildlife, clearly defined objectives and outcomes, and provisions for monitoring and evaluation of study results. The review states the proposal is a thoughtfully prepared plan to evaluate how well the structural and operational improvements mandated for the Lower Columbia River projects (John Day, The Dalles and Bonneville dams) are meeting the 2008 FCRPS BiOp survival targets for yearling and subyearling Chinook salmon and steelhead.

The ISRP found the objectives and experimental design for this project to be well reasoned, justified and described. In addition, the scientists indicate the supporting material, providing details of the statistical design and analysis, to be comprehensive and useful. Moreover, the survival model is grounded in standard statistical methods and uses advances that have recently appeared in the scientific literature. It was noted the study authors have sought outside advice, have done preliminary experiments using the tagging technology, have learned from those experiments, and adjusted the protocols to reflect that experience.

The ISRP did provide some comments intended to strengthen the integrity of the project as a whole. These comments addressed (1) the importance of the sample size to estimate true survival rates and (2) the benefit that the collected information and data could provide for regional decision makers in improving our understanding of the potential survival benefits of various structural changes at the dams.<sup>3</sup> The ISRP also commented that contingency planning for the project should take alternative flow scenarios into consideration.

Based on the ISRP review, the Council staff recommends that the Council support this AFEP study design for implementation in FY 2010 and FY 2011.

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<sup>3</sup> For example, the study design will provide information on survival of juvenile migrants passing the dams by different routes (spillway, powerhouse and bypass systems) under various flow and operating conditions. This information will be useful in identifying problem areas or conditions that could be improved to help achieve the dam passage performance standards.