



## Independent Scientific Review Panel

for the Northwest Power & Conservation Council  
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**Memorandum (ISRP 2011-6)**

**March 2, 2011**

**To:** Bruce Measure, Chair, Northwest Power and Conservation Council

**From:** Eric Loudenslager, ISRP Chair

**Subject:** Review of Accord Proposal, Willamette Falls Lamprey Escapement Estimate (2008-308-00)

### **Background**

At the Council's January 28, 2011 request, the ISRP reviewed a response for the Confederated Tribes of the Warm Springs Reservation of Oregon's Columbia River Basin Fish Accord proposal, *Willamette Falls Lamprey Escapement Estimate*, BPA project #2008-308-00. The project intends to develop quantitative measures for indices of abundance and escapement estimates for adult Pacific lamprey at Willamette Falls. Proposed objectives will address the lack of population information in the Willamette River and address how lamprey behavior and vulnerability to predation may affect abundance estimates.

The proponents' submittal is intended to address the issues raised in our previous review ([ISRP 2009-23](#)) in which we requested a response for Objective 1 (i.e., *Investigate the performance of a half-duplex PIT tag interrogator at the Sullivan Plant at Willamette Falls to detect PIT tagged Pacific lamprey for a population estimate*) and Objective 2 (i.e., *Develop a protocol for long-term monitoring and index of abundance of adult Pacific lamprey at Willamette Falls*).

Specifically, we recommended:

The project proponents initially should undertake the work at one or two passage locations to resolve uncertainties, as detailed below, unless they can present a good rationale for implementing a full-scale project (five locations) at this time. Specifically, more details are requested on the methods that will be employed to investigate the feasibility of the half-duplex PIT tag census technique and the development of a protocol for monitoring and indexing abundance. This should include a statistical estimate of how many lampreys would have to be tagged to obtain a valid escapement estimate.

Our review follows below.

## Recommendation

### *Meets Scientific Review Criteria (Qualified)*

The first qualification is that upon completion the full-scale project design be reviewed. The project design should demonstrate clear evidence of the effectiveness of the technologies to meet project objectives: the long-term monitoring protocol(s) and an index of abundance for adult Pacific lamprey at Willamette Falls. This should include a statistical estimate of how many lampreys would have to be tagged to obtain valid abundance estimates.

The second qualification is that the ISRP review a progress report at the end of 2011 or early 2012 on two key uncertainties that have not been completely resolved: can PIT-tagged lamprey be successfully detected at passage locations and can lamprey be reliably counted by underwater cameras. The proponents expect to make significant progress toward addressing these uncertainties in 2011.

## Comments

The proponents made reasonable progress in addressing the ISRP's specific questions. In response to the question "(1) *Can enough lamprey be caught and PIT tagged to provide reliable estimates of abundance?*" initial efforts indicate yes. In response to the critical question "(2) *Can PIT tags be successfully detected (detection rate) at the passage locations?*" the answer remains unknown. In response to "(3) *Can lamprey be reliably counted by the underwater cameras at the passage locations?*" initial results show a fair degree of promise. In response to "(4) *Can issues related to fallback and multiple counts of the same individuals be resolved?*" the answer remains unknown. In response to "(5) *Can mortality of lamprey due to predation below the Falls be estimated successfully?*" the proponents indicate that such an estimate would be very difficult but not impossible to obtain.

### *Objective 1 – Investigate the performance of a half-duplex PIT tag interrogator at the Sullivan Plant at Willamette Falls to detect PIT tagged Pacific lamprey for a population estimate*

This project is logistically and technologically complex. The proponents have made meaningful progress in developing a stepwise demonstration project to determine the feasibility of monitoring up-river passage of adult Pacific lamprey past a major barrier (hydroelectric dam) with half-duplex PIT tags. If the proponents can demonstrate how to deal effectively with these complexities estimating adult lamprey returns to the Willamette River above Willamette Falls, the benefits for lamprey in the Willamette, and potentially elsewhere, would be substantial, through demonstration of new population estimation procedures.

Significant uncertainties remain, however, regarding the effectiveness of the HDX tags in this application. The activities identified in the response and the uncertainty of why various failures occurred suggests that additional expertise and/or experience to efficiently install and evaluate the electronic tagging and video system may be beneficial. We suggest that the role of the proponents in installing this system should be mainly advisory as to biological/ecological needs of the project. The actual installation and engineering plan, initial testing, and working out of

the “bugs” of the system should perhaps be predominantly the responsibility of specialists in this technology. The ISRP is under the impression that electronic tag suppliers and related companies typically do not just sell the equipment but, to ensure success, typically offer “installation packages” whereby their experts spend the time and effort necessary to ensure the system is operating effectively. Involvement by the tag supplier may have occurred in this project, but in reading the response, it is not clear to the ISRP that sufficient specialized expertise has been brought to bear on the problems related to Objective 1. It is not expected that the proponents would have this expertise, and certainly not in the initial phases of the proposed project. In the initial phases of this work, it might be more efficient to make continuation of the work beyond 2011 contingent upon a successful installation of the monitoring HDX system in 2011. Most of the effort at this point would be by the contractors charged with the installation. After 2011, the ISRP might review progress and evaluate whether sufficient progress has been made to continue along these lines or whether alternative approaches should be considered.

A realistic assessment of the combined HDX and video system is essential to avoid protracted exploration of an ultimately ineffective technology. At this point, the efficacy of both the HDX technology and the video for this application to lamprey population estimation remains unclear.

*Objective 2 – Develop a protocol for long-term monitoring and index of abundance of adult Pacific lamprey at Willamette Falls)*

Until critical uncertainties surrounding the abundance estimation procedure are successfully resolved (Objective 1), it is premature to develop a long-term monitoring protocol and index of abundance for adult lamprey at Willamette Falls. The ISRP should review this plan after it is drafted.

It seems clear that large numbers of lampreys can be tagged. It is less clear that sufficient numbers can be recaptured. The ISRP has suggested that catch data may contribute to an index of abundance. The proponents suggest that catches are not a good index of abundance because a range of factors related to inadequate creel census, changes in regulations, and related factors that may have fairly straightforward remedies. It is not immediately clear that a cheaper or more cost effective way can be developed to estimate abundance than catches or catch per unit effort (quantified) from a carefully controlled and monitored fishery. It would seem prudent to evaluate the use of the catch per effort data as an index of abundance (and changes in the fishery and creel/monitoring effort as well) before this method for assessing abundance is abandoned. A well-designed and effective catch-monitoring program could also be a good backup or complementary method to proposed mark-recapture data.

The ISRP continues to raise statistical concerns relevant to both objectives, while recognizing the progress in addressing statistical issues identified by the ISRP. With additional data from 2011, the proponents should be able to more fully respond to ISRP concerns about sample size for meaningful escapement estimation; magnitude of effects of tag loss and predation on estimation; and methods to accommodate tag detection uncertainties and visibility challenges.