Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Memorandum (ISRP 2009-45) **November 20, 2009**

To: W. Bill Booth, Chair, Northwest Power and Conservation Council

From: Eric Loudenslager, ISRP Chair

Subject: Final Review of the Accord Proposal, Determine Status and Limiting Factors of Pacific Lamprey in Fifteenmile Creek and Hood River subbasins, Oregon, #2007-007-00

Background

At the Council's November 2008 request, the ISRP began a review of the Confederated Tribes of the Warm Springs Reservation of Oregon's Accord proposal, Determine Status and Limiting Factors of Pacific Lamprey in Fifteenmile Creek and Hood River subbasins, Oregon, #2007-007-00. This project is intended to monitor the status of lamprey, at a variety of life stages, in the Fifteenmile Creek and Hood River basins. Project funds will also be used to identify factors limiting production and work cooperatively with interested parties to restore lamprey populations.

On December 15, 2008 the ISRP provided its initial review (attached) and recommended "Response Requested - Meets Scientific Criteria (Qualified)" and requested additional information:

> "The ISRP qualifies the recommendation identifying that additional effort and responses be given to: 1) adding a water quality monitoring component to detect the presence of potentially harmful chemicals, 2) detailing the juvenile lamprey sampling program, 3) examining the objectives for, and statistical basis of, applying 100 PIT tags to adult lamprey in Fifteenmile Creek, 4) describing results from (Project # 200201600 "Evaluate the Status of Pacific Lamprey in the Deschutes Basin" - initiated in 2002) to ensure that study protocols from the latter project are complementary as possible, avoiding any duplication in methods development."

On October 20, 2009, the Council provided the Warm Springs Tribes' response to the qualification. Our review follows below.

ISRP Recommendation

Meets Scientific Review Criteria (Qualified)

Qualification 1: In its initial review, the ISRP recommended that the proponents add a water quality/contaminant element to their study proposal. They responded that this was beyond the scope of their study. While this may be true, the ISRP believes that because of their long developmental stage in the silt and gravels of their native streams Pacific lamprey are quite vulnerable to the presence of contaminants. Thus, the ISRP strongly recommends that a contaminant monitoring study element be added in the future to this project or development of a separate companion study be proposed and added. Further details on a suggested program are given below.

Qualification 2: Regarding issues raised regarding sample size in our initial review, the proponents indicated that they could not estimate the appropriate PIT tags to apply because they had no knowledge of the population size of lamprey in Fifteen Mile Creek. Rather than picking a "random number" such as 100, the proponents could have used abundance data from the nearby Deschutes River lamprey surveys and scaled to Fifteen Mile Creek to come up with a hypothetical statistical basis for selecting number of PIT tags to use. This qualification can be dealt with in further development of the study protocols.

These qualifications can be addressed without additional ISRP review.

Specific Comments on 2008 Review Qualifications

ISRP 2008 Response Request 1. Add a water quality monitoring component to detect the presence of potentially harmful chemicals

Final ISRP 2009 Comment: A holistic study of contaminants is recommended for lampreys in the Fifteen Mile and Hood River subbasins, and the ISRP suggests the following study design. An analysis of a few adult lamprey and/or unlaid eggs for a series of contaminants can provide some information on contaminants coming back into the freshwater system from the ocean. Then, evaluating ammocoetes of various sizes for selected contaminant residues and brain cholinesterase activity (for the cholinesterase inhibiting contaminants) would quickly provide a measure of exposure. The brain samples would need control (reference values) from an uncontaminated location for comparisons.

Although the proponents may not have the expertise to conduct the work, partners with required capability were mentioned in the response. The ISRP strongly suggests the proponents develop the required working relationships to conduct this specialized but very important part of the project. The ISRP also suggests the proponents closely coordinate their work with studies on contaminants in lamprey being done by the Siletz group in the Willamette Basin (draft tribal lamprey plan, CRITFC, 2009).

A 28-page paper on contaminants in the European eel just came out and has application in North America. The reference is: Geeraerts, C. and C. Belpaire. 2009. The effects of contaminants in European eel: A review. Ecotoxicology DOI 10.1007/s10646-009-0424-0.

ISRP 2008 Response Request 2. Detail the juvenile lamprey sampling program

Final ISRP 2009 Comment: Additional details were provided on sampling methods for juvenile lamprey. However, the ISRP still has concerns about sampling methods. The proponents state, "Sampling locations for ammocoete habitat associations will be randomly selected within the known ammocoete distribution. A hierarchical, random, stratified sampling design will be implemented, similar to a study conducted by Torgersen and Close (2000) in the John Day River."

However, Torgersen and Close (2000) are not cited in the response. The ISRP recommends that the proponents consider probabilistic sampling methods (e.g., EMAP) which are well grounded in statistical science and being used with success for other ecological surveys in the Basin.

The proponents should also make sure their sampling methods for juvenile lamprey are the same as those used by others sampling lamprey in the Basin.

ISRP 2008 Response Request 3. Examine the objectives for, and statistical basis of, applying 100 PIT tags to adult lamprey in Fifteenmile Creek

Final ISRP 2009 Comment: See ISRP Recommendation, comment under Qualification 2.

ISRP 2008 Response Request 4. Describe results from (Project # 200201600 "Evaluate the Status of Pacific Lamprey in the Deschutes Basin" - initiated in 2002) to ensure that study protocols from the latter project are complementary as possible, avoiding any duplication in methods development.

Final ISRP 2009 Comment: Adequately addressed.

Other 2008 Comments Addressed

Final ISRP 2009 Comment: The title was changed to more adequately reflect the scope of the project (including work in the Hood River). A nicely detailed summary of the Pacific lamprey life history and habitat requirements was added.

The ISRP assumes the Warm Springs group will be following study strategies and protocols that will be developed under the CRITFC lamprey restoration plan involving four tribal groups (CRITFC 2009). It will be important to build up a data base that can be shared effectively. In the longer term, it will be necessary to study other components of lamprey life history, including ocean and estuarine phases, to determine key limiting factors for lamprey in the Columbia River Basin (see ISAB 2008-5).

Attachment: December 15, 2008 ISRP Comments

200700700 - Determine Status and Limiting Factors of Pacific Lamprey in Fifteenmile Subbasin, Oregon

ISRP Recommendation: Response Requested - Meets Scientific Criteria (Qualified)

The ISRP qualifies the recommendation identifying that additional effort and responses be given to: 1) adding a water quality monitoring component to detect the presence of potentially harmful chemicals, 2) detailing the juvenile lamprey sampling program, 3) examining the objectives for, and statistical basis of, applying 100 PIT tags to adult lamprey in Fifteenmile Creek, 4) describing results from (Project # 200201600 "Evaluate the Status of Pacific Lamprey in the Deschutes Basin" - initiated in 2002) to ensure that study protocols from the latter project are complementary as possible, avoiding any duplication in methods development.

ISRP Comments:
1. Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)

In general, the technical justification and scientific background were adequately presented and made a good case for studying Pacific lamprey in Fifteenmile Creek and the Hood River. The title of the project should reflect that nearly half of the project's effort would be in the Hood River. The technical background would also be improved with a summary of Pacific lamprey life history and habitat requirements, even if this is not a very well-understood fish. For example, it would help to communicate that non-parasitic ammocoetes spend up to six years in fresh water, where they feed on organic detritus in fine-grained substrates in streams and rivers, prior to spending up to two years at sea in the maturing parasitic life stage. The extended freshwater residence suggests that Pacific lamprey are especially vulnerable to a variety of disturbances during the larval stage, but apart from the mention of a known loss of lamprey related to an episode of chemical spill induced mortality, the contaminant problem is not mentioned. It would also have been helpful to have summarized at least some data on lamprey escapement trends (see http://www.fpc.org/lamprey/lamprey_home.html) elsewhere in the Columbia Basin to provide scope and justification for the study.

Another strong justification for this project is the opportunity to learn if Pacific lamprey will become re-established upstream in the Hood River after removal of Powerdale Dam.

The closely related Project # 200201600 "Evaluate the Status of Pacific Lamprey in the Deschutes Basin" is briefly mentioned, and the proposal indicates that survey methods developed for that project will be modified for use in this study. Results from that project (which was initiated in 2002) should be included because this proposal is so closely patterned after the Deschutes lamprey project. Relationships to other locally related FWP projects are also briefly described, and some collaboration/coordination activities are mentioned.

Limiting factors downstream from the Fifteenmile and Hood River basins, notably upstream passage of adults over the mainstem Columbia River dams (see ISAB 2008-5), also need attention in any management plan to restore lamprey.

2. Objectives, Work Elements, and Methods (section F)

The objectives, work elements, and methods for enumerating Pacific lamprey adults were well described, and the project's sponsor has had field experience with this species in other parts of the Columbia Basin. A rationale for PIT-tagging 100 lamprey adults in Fifteenmile Creek (page 10) was not presented. The ISRP concluded this was too few PIT-tagged individuals for meaningful results and the sponsors are strongly encouraged to re examine the statistical basis for this target. Communication with scientists working with PIT tagged salmon would be helpful in this regard.

It was not clear from the project description how lamprey redds (Objective 4, page 11) would be distinguished from the redds of other fishes during the spring, especially redds not occupied by actively spawning adults. What is the probability that a redd could be misclassified, and what steps will be taken to correct for misclassification?

With respect to Objective 5 – Describe redd characteristics and habitat in stream reaches in Fifteenmile and Hood River subbasins – the primary goal seems to be to identify preferred spawning locations within the two drainages, assuming that redd density will be highest where preferred spawning habitat is most plentiful. As currently written, the project description assumes equal access to all available areas. That could be incorrect if there is a partial barrier to adult migration such as a culvert or some natural barrier that hinders adult access. The goal of establishing adult distribution is definitely worthwhile, but it will be difficult to characterize *preferred* spawning reaches in the subbasins if there are partial migration blocks.

The approach to determining larval lamprey distribution based on a hierarchical stratified sampling technique seems sound. However, the project description does not state what time of year (or how often per year) the juvenile lamprey surveys would take place. This could be quite important if any seasonal redistribution of ammocoetes occurs over time. Also, the project description does not mention if river lampreys or western brook lampreys are present in these subbasins, and if so how ammocoetes of each species will be identified. Despite these questions, however, the sampling methods for juveniles appear to be grounded in experience with this species.

The Hood River part of the proposal should establish more explicitly a before and after design to evaluate changes in the abundance and distribution of lamprey after the Powerdale Dam removal. If the status and habitat use of Pacific lamprey is determined in the 7 km below the dam prior to removal in 2010, then future distribution and habitat use after removal could show whether or not significant changes occurred.

3. M&E (section G, and F)

The limiting factor analysis is based on general stream habitat survey data, which will not be able to detect the presence of agricultural or other pollutants that could cause significant mortality (ref. the oxyfluorfen spill and extensive lamprey mortality noted on page 3 of the project description). It would be prudent to add a monitoring component that could detect the presence of persistent organic pollutants in these two subbasins.

Tissue analysis of juvenile lamprey for harmful chemicals would be important, especially since the ammocoetes have an extended freshwater residence. Brain cholinesterase activity should be evaluated to assess effects of some of the modern pesticides, with stomach contents analyzed for a series of pesticides used in the area. The timing of the collections for analyses would depend upon the spray seasons in the area. Ideally, this type of contaminant evaluation should have a comparative aspect to it, i.e., compare multiple locations or river systems (issue may be broader than Fifteenmile subbasin).

It would also help to add a check of irrigation screens for dead lamprey, as screen-related mortality has been documented in other areas.

4. Overall Comments - Benefit to F&W (all proposal)

This project has the potential to evaluate the status of lamprey in two lower Columbia River tributaries and learn something about their habitat preferences and limiting factors in these lotic systems. If successful rehabilitation can begin for this species, cultural and ecosystem values may begin to be restored in these subbasins. The project has very high potential benefits. The sponsors should consider the contaminant component (see above) which could trump many other relationships.