



Authorizations and Permits for Protected Species (APPS)

File #: 21221
Title: Lamprey RME

Applicant Information

Name: Daniel Deng
Affiliation: Pacific Northwest National Laboratory
City,State,Zip: Richland, WA 99352
Email: zhiqun.deng@pnnl.gov

Project Information

File Number: 21221
Application Status: **Draft**
Project Title: Lamprey RME
Project Status: New
Previous Federal or State Permit:
Permit Requested:

- Oregon Scientific Taking Permit for Fish and Marine and Freshwater Invertebrates

Where will activities occur? Oregon (including Columbia River and offshore waters)
State department of fish and game/wildlife: N/A
Research Timeframe: **Start:** 03/15/2017 **End:** 06/30/2017
Sampling Season/Project Duration: Spring 2017
Project Type: Management/Applied Research

Project Description

Purpose: The goal of this project is to develop a Research, Monitoring, and Evaluation (RME) Plan to inform planning and prioritization for future juvenile lamprey passage investigations. The RME Plan developed under this project will identify information gaps, facilitate discussions among regional managers, ensure that limited resources are applied effectively to inform specific management decisions, and facilitate coordination of USACE efforts with regional lamprey conservation actions.

Regional lamprey workgroups have identified a need for better understanding of FCRPS impacts on all larval and juvenile lamprey life stages. Management considerations include understanding the timing and magnitude of juvenile Pacific lamprey outmigration, spatial distribution and behavior near dams, passage route use and survival at dams, and determining impacts of FCRPS operations on lamprey that may be rearing in mainstem habitats.

Objectives:

- Primary objective: Validate the functionality and evaluate the performance of the new transmitter in field environments
- Secondary objective: Prepare for future studies by gathering information on lamprey collection, tagging, releases, preliminary horizontal and vertical distribution in reservoir or forebay, and detection probabilities of the tagged lamprey.

Description: This study will use acoustic telemetry technology to estimate survival and passage metrics of juvenile Pacific lamprey. It will be similar to other studies that have been conducted throughout the Snake and Columbia rivers on juvenile salmonids. As part of this project, PNNL will conduct a preliminary field trial to verify the performance of the newly developed juvenile lamprey tag in the field and determine future sample size requirements and detection array design for studies that evaluate the distribution of test fish and estimate survival of juvenile lamprey through dams.

With funding from DOE Water Power Technologies Office and USACE, PNNL just completed the design of an acoustic micro-transmitter that can be used to study the behavior and survival of juvenile eel and lamprey. It is 2 mm in diameter and 12 mm in length and weighs 0.08 g in air. The prototype tag remains operational 20 to 30 days at 5-second pulse rate interval (PRI). Its source level is 147 dB re 1 μ Pa at 1-m. Other features include configurable PRI and tag code, optional temperature measurement alternating, and hibernation mode.

The biological tagging results from implanting juvenile Pacific lamprey showed that implantation is not likely to have an adverse impact on fish survival over a 28-day holding period. Additionally, there was minimal tag loss due to shedding for fish greater than 130 mm in length. The surgical procedure was effective at placing tags within the body cavity without causing significant hemorrhaging or fungal infections at the tagging site. The sustained swimming tests showed no significant differences in swimming ability when comparing implanted fish to control fish for all size classes tested (120–160 mm).

Supplemental Information

Methods:

Fish Collection and Handling:

About 100 juvenile Pacific lamprey will be tagged and released from mid-March through April, 2017. The preferred collection site/method is to collect juvenile lamprey in collaboration with the Umatilla Tribe in their screw trap near the mouth of the Umatilla River as part of their routine monitoring program. If not enough lamprey can be obtained in that way, the first alternative is to collect at McNary Dam and the second alternative is to collect at John Day Dam. The two alternative collection sites/methods are the subject of this Scientific Taking Permit application.

The project proposes to collect up to 120 fish of appropriate size (>140 mm) and in good condition. The collection will be accomplished over several days with about 30 to 40 fish collected each day. Five extra fish will be collected each day as a buffer to account for pre-tagging mortalities or to exclude fish not deemed suitable for tagging due to condition.

During collection at either McNary Dam or John Day Dam, PNNL staff will be present while the JFF staff conduct their routine sampling, which involves the removal of juvenile lamprey from the sampling trough, counting, estimating length, and then placing them in a transport container. At that point, the transport container would be transferred to PNNL staff. The impacts to staff at the JFF should be minimal. Once in the care of PNNL staff, lamprey will be transported to a field site tagging trailer.

Tagging:

- Acoustic tag only (No PIT tag).
- 25-35 fish tagged per day (3 or 4 tagging days).
- Anesthetize fish using buffered 250 mg/L MS-222.
- Anesthetized fish will be assigned a tag with a unique tag code, weighed, measured, and placed on their right side on a moistened piece of foam saturated with Poly Aqua.
- A 2-3 mm incision will be made using a new scalpel ~20 mm posterior to the gill pores, along the left side of the body according to methodologies described in Mesa et al. (2012) and Mueller et al (2006).
- Will take some photos to show the process but not each fish.
- Once tagged fish will be placed in a recovery bucket of aerated river water until they regain equilibrium.
- 5 to 10 individuals will be placed in each bucket for post-surgery holding.

Fish Releases:

- Hold fish for 16-24 hours post-surgery in aerated buckets/tanks.
- Prior to leaving the tagging location, buckets will be scanned to confirm that all transmitters are functioning and fish are recorded in the correct bucket.
- 30-40 min transportation time. No need for big transportation truck but will monitor dissolved oxygen and temperature and use an air bubbler during transport.
- Buckets will be divided approximately evenly for release at three points along a transect of the river.
- At the release points, a bucket of fish will be partially submerged in the water, and gently tilted to allow fish to swim out of the bucket.
- Fish will be released over approximately three days. All releases will take place at the same time of day (close to dusk as lamprey are more active at night).

Lethal Take: Not Applicable

Anticipated Effects on Animals:

Measures to Minimize Effects: Fish handling and surgical procedures will be based on established protocols to minimize impacts and stress to fish. Fish will be anesthetized for tag implantation. Fish collection and handling will be done in accordance with Battelle Institutional Animal Care and Use Committee (IACUC) and federal procedures for animal care and humane treatment of vertebrate animals.

Disposition of Tissues: Not Applicable

Public Availability of Product/Publications: Information acquired during the proposed work will be transferred in the form of a technical document detailing the methods and preliminary results at the Annual Anadromous Fish Evaluation Program meeting. A draft and final report will also be prepared and delivered. In addition, results could be presented at regional or annual American Fisheries Society Meetings, at another related domestic conferences, or submitted to peer-reviewed journals.

Biologist Comments

This section is currently empty.

Federal Information

Federal Authorizations/Comments:

Federal Agency: U.S. Army Corps of Engineers (Corps)
Type: Funding

Authorization Number and Title: LMP-S-16-1
Date Signed:
Expiration Date:
Listing Units/Stocks Covered: N/A
Comments: Corps Technical Contacts are Ricardo Walker and Steve Juhnke

Location/Take Information

Freshwater Location

Research Area: Pacific Ocean **State:** OR
Sub Basin (4th Field HUC): Middle Columbia-Lake Wallula
Waterbody Name: Columbia River
Sale in Oregon of species taken: None
Location Description: McNary Dam Juvenile Fish Facility or John Day Dam Juvenile Fish Facility.

Take Information

* **Line Number:** 1
Species: Lamprey, Pacific
Listing Unit/Stock: NA
Production/Origin: Natural
Lifestage: Juvenile
Sex: Male and Female
Expected Take: 120
Indirect Mortality: 12
Takes Per Animal:
Take Action: Capture/Mark, Tag, Sample Tissue/Release Live Animal
Observe/Collect Method: Dam bypass, gatewell, orifice, etc. (only if associated with fish handling)
Procedure: Anesthetize; Tag, Acoustic or Sonic
Run: N/A
Transport: N/A
Begin Date: 03/15/2017
End Date: 06/30/2017

Freshwater Location

Research Area: Pacific Ocean **State:** OR

Sub Basin (4th Field HUC): Middle Columbia-Lake Wallula

Waterbody Name: Columbia River

Sale in Oregon of species taken: None

Location Description: This location/take table is to document transport authorization from either McNary Dam JFF or John Day Dam JFF to release location (Columbia R. approximately 1.75 miles downstream of Umatilla R.). The total number of lamprey to collect will not exceed 120

Take Information

* **Line Number:** 1
Species: Lamprey, Pacific
Listing Unit/Stock: NA
Production/Origin: Natural
Lifestage: Juvenile
Sex: Male and Female
Expected Take: 120
Indirect Mortality: 12
Takes Per Animal:
Take Action: Collect, Sample, and Transport Live Animal
Observe/Collect Method: Dam bypass, gatewell, orifice, etc. (only if associated with fish handling)
Procedure:
Run: N/A
Transport: 1
Begin Date: 03/15/2017
End Date: 06/30/2017

Transport Information

- Facility Title:** Columbia River; approximately 1.75 miles downstream of mouth of Umatilla River
Facility Affiliation/Organization:
Address: Umatilla, WA UNITED STATES
Phone Number:
Containment Method: N/A

Final Disposition:

Tagged Pacific lamprey will be released into the Columbia River.

Project Contacts

Primary Contact: Kristine Hand

Principal Investigator: Daniel Deng

Other Personnel:

Name	Role(s)
Alison Colotelo	Co-Investigator
Robert Mueller	Co-Investigator

Attachments

Project Description - P21221T1juvlampreytaggingproposal.pdf (Added Feb 23, 2017)

Project Description - P21221T1Lamprey_Pilot_Field_Trial_study_design_02202017_AHC.docx (Added Feb 23, 2017)

Status

Application Status: Draft

Last Date Archived: February 22, 2017

• Oregon Scientific Taking Permit for Fish and Marine and Freshwater Invertebrates

Current Status: N/A **Status Date:** February 21, 2017

Expire Date: