

# Pacific Lamprey 2017 Regional Implementation Plan *for the* Snake River Region: Lower Snake, Clearwater and Salmon Regional Management Units



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Projects proposed and discussed within this Regional Implementation Plan are in accordance with direction provided within the *Conservation Agreement for Pacific Lamprey in the States of Alaska, Washington, Idaho, Oregon and California, 2012*. Cooperative efforts through the Agreement intend to: a) develop regional implementation plans derived from existing information and plans; b) implement conservation actions; c) promote scientific research; and d) monitor and evaluate the effectiveness of those actions.

Projects identified in this Regional Implementation Plan do not imply or intend a funding obligation or any related activity from any of the government agencies, tribes or non-governmental entities discussed within this document.

## **I. Status and Distribution of Pacific Lamprey in the RMU**

### **A. General Description of the RMU**

The Snake River Region includes the Snake River and all waters draining into it downstream of Hells Canyon Dam (river km 397) to its confluence with the Columbia River (Figure 1). There are three Regional Management Units (RMUs): the Lower Snake Basin (Figure 2), the Clearwater River Basin (Figure 3), and the Salmon River Basin (Figure 4) with five major tributaries: Imnaha, Salmon, Grande Ronde, Clearwater, and Tucannon rivers. Within these RMUs there are 23 Hydrologic Unit Code (HUC) 4 subbasins. The watersheds within this region that are still accessible to Pacific Lamprey range in size from 552-6,242 km<sup>2</sup>.

The HUC 4 subbasins include: Lower Clearwater (317060306), Middle Fork Clearwater (#17060304), South Fork Clearwater (#17060305), Lochsa (#17060303), Lower Selway (#17060302), Upper Selway (#17060301). Lower Salmon (#17060209), Little Salmon (#17060210), South Fork Salmon (#17060208). Middle Salmon-Chamberlain (#17060207), Lower Middle Fork Salmon (#17060206), Upper Middle Fork Salmon (#17030505), Middle Salmon-Panther (#17060203), Lemhi (#17060204), Pahsimeroi (#17060202), Upper Salmon (#17060201); Lower Snake-Asotin (17060103), Lower Grande Ronde (#170602105), Upper Grande Ronde (#170160104), Wallowa (#17060105), Mainstem Snake Hells Canyon (#17060101), and Lower Snake Tucannon (#17060107).

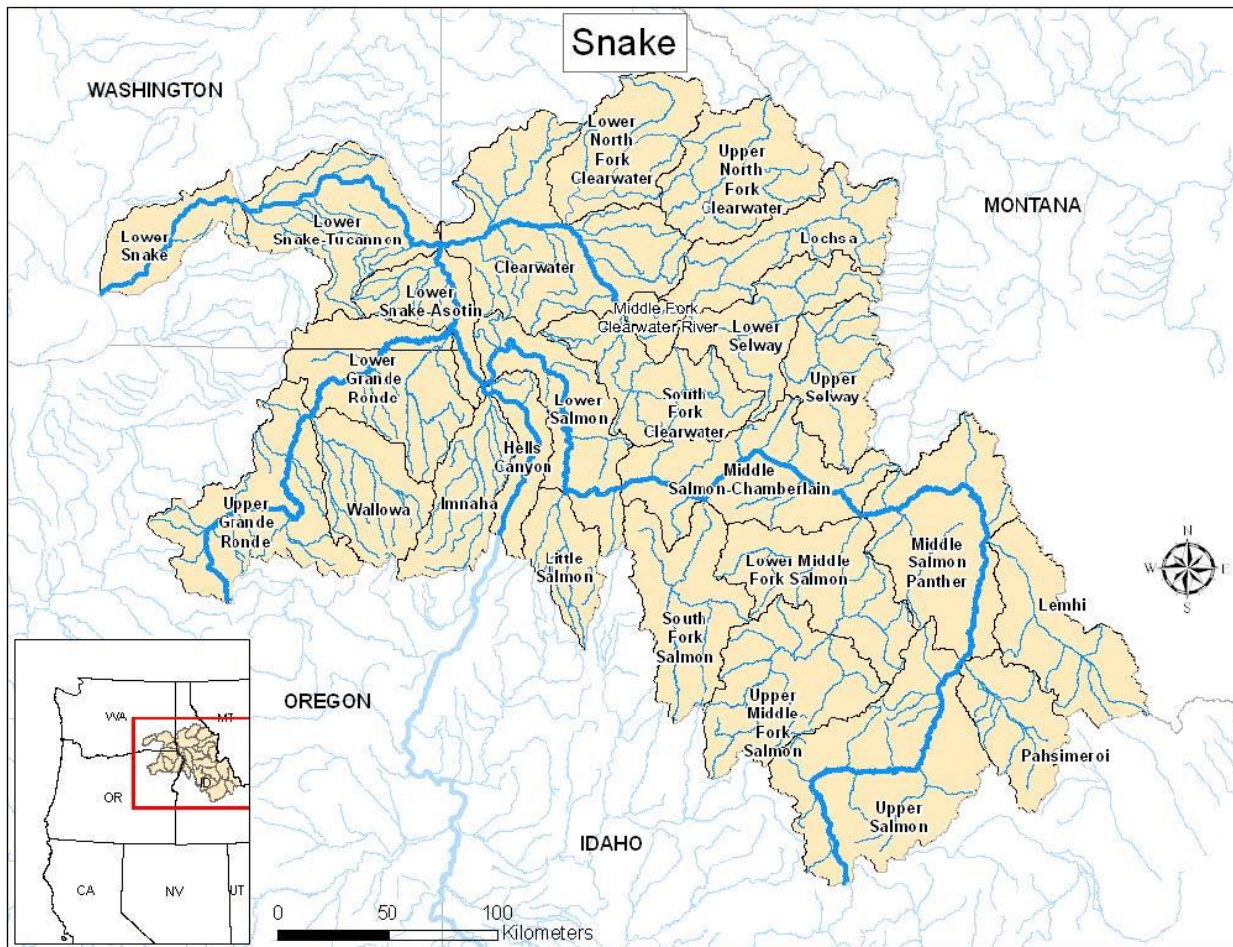


Figure 1. Map of watersheds within the Snake River Region (taken directly from the USFWS Conservation Assessment, Luzier et al. 2011).

## B. Status of Species

### Conservation Assessment and New Updates

During the development of the USFWS Conservation Assessment (Luzier et al. 2011), there was a high level of uncertainty in population status. Historic occupancy is believed to have been extensive in all watersheds depicted in Figures 2 through 4, as well as the Snake River up to Shoshone Falls, and all major tributaries between the Hells Canyon Dam Complex and Shoshone Falls (Weiser River, Payette River, Bruneau River). Current population size is still unknown in most areas of historic occupancy, but the current distribution was assessed to be reduced from historic ranges (see table 8-2 of Luzier et al. 2011). Recently changes to known presence of lamprey in the Snake River have been significantly affected by an active supplementation program ongoing by the Nez Perce Tribe whereby adult lamprey collected from locations downstream in the Columbia River are released into Snake basin tributaries. The present state of knowledge on information describing known occurrences of Pacific Lamprey are displayed in Figures 2 through 4, which are products of the USFWS data Clearinghouse (<http://www.fws.gov/pacific/fisheries/sphabcon/lamprey/lampreyCI.html>).



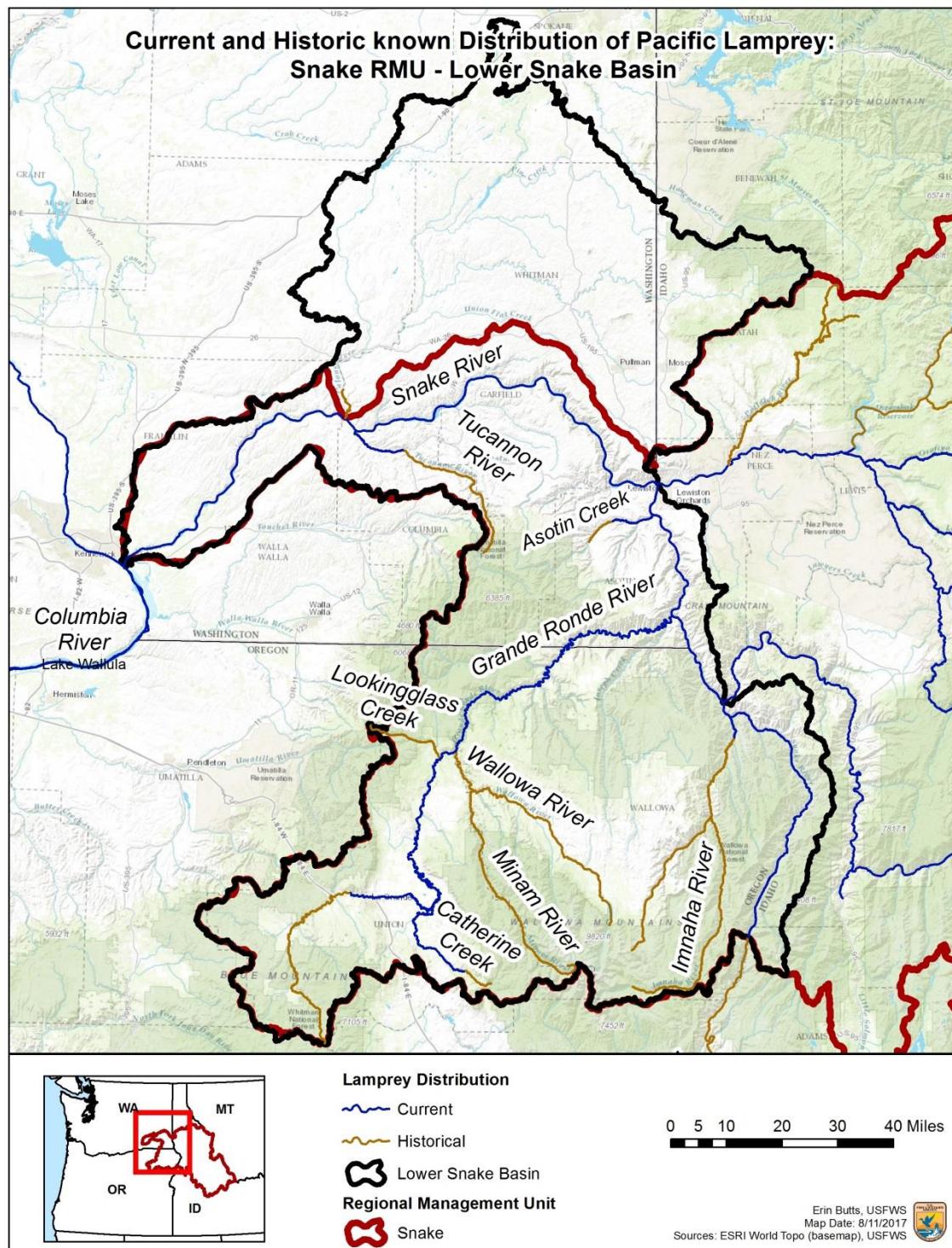


Figure 2. Current and historic known distribution for Pacific Lamprey: Lower Snake River Regional Management Unit (USFWS Data Clearinghouse 2017).



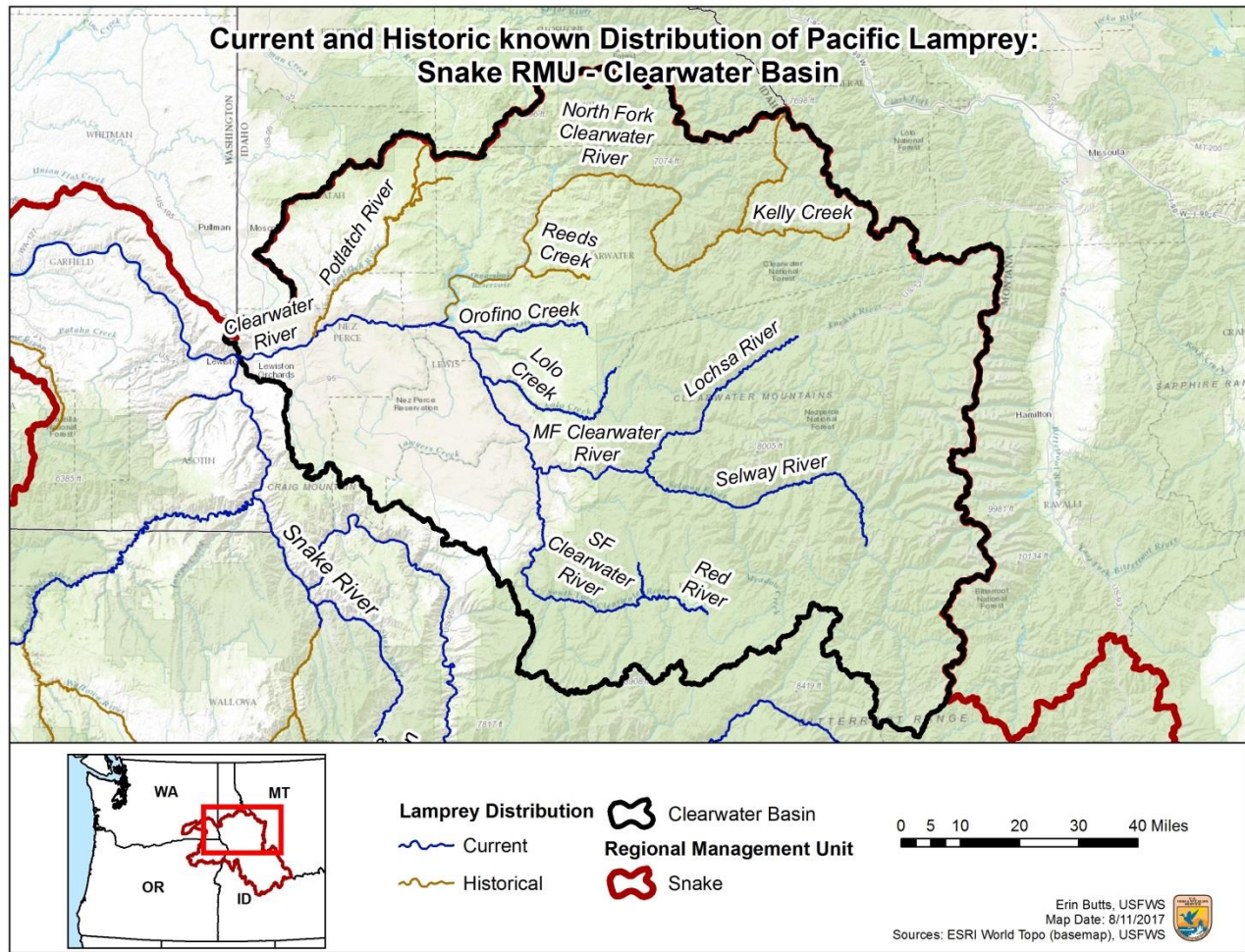


Figure 3. Current and historic known distribution for Pacific Lamprey: Clearwater Basin Regional Management Unit (USFWS Data Clearinghouse 2017).

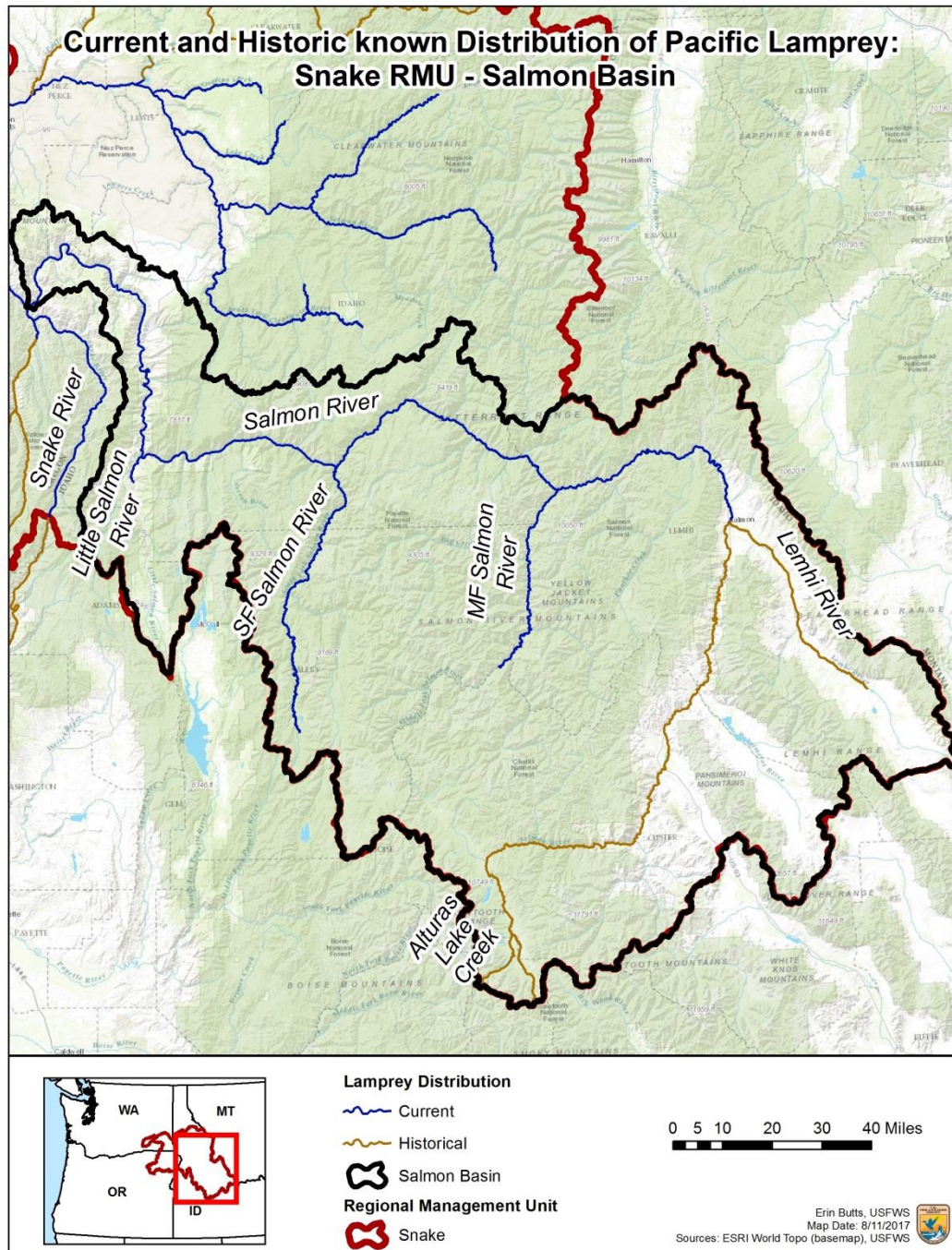


Figure 4. Current and historic known distribution for Pacific Lamprey: Salmon Basin Regional Management Unit (USFWS Data Clearinghouse 2017).

### Distribution and Connectivity

Passage to the Snake River Region is restricted downstream by four Federal Columbia River Power System (FCRPS) dams in the mainstem Columbia River (Bonneville, Dalles, John Day and McNary).



Within the Snake River Region another four FCRPS dams on the mainstem Snake River impede passage in the lower portion (Ice Harbor, Lower Monumental, Little Goose and Lower Granite). The Hells Canyon Complex (Brownlee, Oxbow and Hells Canyon) on the Snake River as well as Dworshak Dam on the North Fork Clearwater River have permanently blocked upstream access for all native aquatic species. Culverts, irrigation diversions and smaller dams are widespread throughout the watersheds of the Snake River Region.

The combined impacts from this series of passage impediments are the most significant impact on the natural distribution and connectivity for Pacific lamprey in most of the HUCs. Recent (since 1996) annual counts of adult lamprey at Ice Harbor Dam are low, ranging from 5 to 1,702, with even fewer adults seen at Lower Granite Dam (Figure 5).

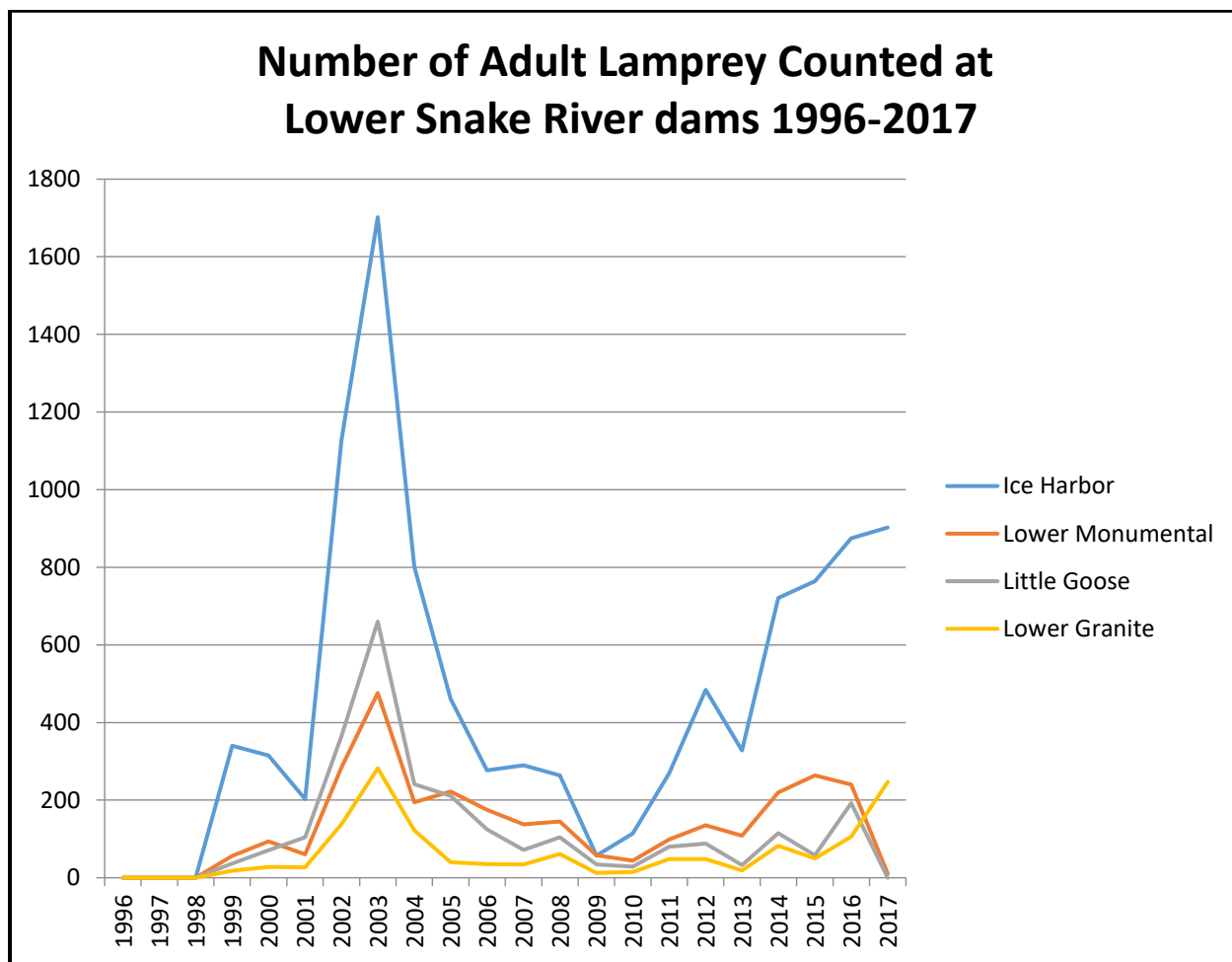


Figure 5. Number of adult Pacific Lamprey counted at Lower Snake River Dams, 1996-2017. Data obtained from <http://www.cbr.washington.edu/dart> on August 10, 2017.

Stream surveys conducted in the Clearwater River 2000 to 2002 (Cochnauer and Claire 2009) reported larval Pacific lamprey were present in the mainstem and Middle Fork Clearwater River up to and including the Lochsa and Selway rivers, in the South Fork Clearwater River and in the Red River but not American or other tributaries of the South Fork Clearwater River. Similar surveys conducted



in the Salmon River 2006 confirmed the presence of larval Pacific lamprey in the mainstem Salmon River downstream of the North Fork Salmon River and in the lower segment of the Middle Fork Salmon River but in no other tributaries or segments of the Salmon River upstream of the North Fork (IDFG 2011). Recent (2015) surveys have confirmed the continued presence of larval lamprey in the Mainstem, Middle and South forks of the Clearwater River and Lochsa and Selway rivers but lamprey are no longer present in the Red River of the South Fork Clearwater River (C. Peery, USFWS, pers. com.). In eastern Oregon, larval Pacific lamprey were found in the Minam and Wallowa rivers during 2015 surveys (C. Peery, USFWS, pers. com.).

Beginning in 2007, biologists with the Nez Perce Tribe began releasing adult Pacific lamprey, collected from downstream areas in the Columbia River, into tributaries of the Snake River as a means to supplement natural production (see Ward et al. 2012). Subsequent stream surveys confirmed the presence of larval lamprey in locations receiving adult lamprey but had previously not contained larval or juvenile lamprey in recent years. These sites include Lolo, Orofino, and Newsome creeks in the Clearwater River, Asotin Creek, the South Fork Salmon River and Wallowa River, among others.

## **C. Threats**

### **Summary of Major Treats**

The following table summarizes the known key threats within the Snake River Region tributaries (H – High, M – Medium, L – Low, I – Insignificant). The highest priority threat in the Snake River Region is the Federal Columbia River Power System dams on the mainstem Snake and Columbia rivers, which results in small effective population size in each of the watersheds still accessible to Pacific Lamprey (USFWS Assessment Luzier et al. 2011, and has not been fully vetted by the RMU – Team.) The Supplement to the Mainstem Lower Columbia River and Columbia River Estuary Subbasin Plan (NPCC 2004) in Strategy to Protect and Restore Habitat; also recommends to improve dam passage for Pacific lamprey.

Table 2. Summary of the assessment results for the key threats of the Snake River Region, by RMU and Watershed (Luzier et al. 2011).

<b>RMU/Watershed</b>	<b>Tributary Passage</b>	<b>Dewatering and Flow Management</b>	<b>Stream and Floodplain Degradation</b>	<b>Water Quality</b>	<b>Mainstem Passage</b>	<b>Small Population Size</b>
<b>Lower Snake RMU</b>	M	L	M	L	H	H
Lower Snake-Asotin	L	L	M	L/M	H	H
Lower Grande Ronde	L	I	L	L	H	H
Upper Grande Ronde	L/M	M	M/H	M	H	H
Imnaha	M	M	L	L	H	H
Wallowa	M	M	M	L/M	H	H
Lower Snake-Hells Canyon	M	H	L/M	I	H	H
Lower Snake-Tucannon	M	I	M	L/M	H	H
<b>Clearwater RMU</b>	L	L	M	L	H	H
Lower Clearwater	L/M	L/M	M	M	H	H
Middle Fork Clearwater	L	L	M	L	H	H
South Fork Clearwater	M	L	M/H	M	H	H
Lochsa	L	I	L	I	H	H
Lower Selway	I	I	L	I	H	H
Upper Selway	I	I	I	I	H	H
<b>Salmon RMU</b>					H	H
Lower Salmon	L	L	L	L	H	H
Little Salmon	L	L/M	L/M	M	H	H
South Fork Salmon	L	I	L/M	L/MI	H	H
Middle Salmon-Chamberlain	I	I	L	L	H	H
Lower Middle Fork Salmon	I	I	I	I	H	H
Upper Middle Fork Salmon	I	I	I	I	H	H
Middle Salmon-Panther	M	M/H	M	L/M	H	H
Lemhi	H	H	M	L/M	H	H
Pahsimeroi	H	H	M/H	L/M	H	H
Upper Salmon	L/M	L/M	M	L	H	H

## **New Threats**

The RMU needs to meet in order to determine if there are newly identified threats since the Luzier et al. 2011 assessment.

## **D. Restoration Actions**

Ongoing or planned restoration efforts in the Snake Basin are primarily intended to improve anadromous salmonid production and connectivity. These projects will also benefit Pacific lamprey but as lamprey production is primarily limited by low escapement, habitat improvement projects will have limited effect on Snake River lamprey population in the near future. As such, recovery of Pacific lamprey in the Snake River will depend heavily on actions taken within the Columbia and Snake rivers mainstem regional implementation plans. In the near term, translocation of adult Pacific lamprey into Snake River sub-basins and coordinated stream monitoring for larval lamprey coupled with target restoration efforts will make up the bulk of restoration actions.

## **E. High Priority Proposed, Implemented or Funded Project Information:**

### **Prioritization Process**

The highest priority threat for Snake River Region RMU's is mainstem passage in the Snake and Columbia rivers. The three proposed projects above are stakeholder priorities, as they are beneficial to, and increase our understanding of, populations. There has not been an attempt to prioritize one over the other.

### **1. Proposed: Translocating Adult Lamprey Past Mainstem Dams to Snake Basin Streams**

#### **Project Description: Nez Perce Tribe Adult Pacific Lamprey Translocation and Assessment**

In response to the dire status and extirpation trend of Pacific lamprey in the Snake Basin, and the association of this downturn to passage at mainstem Columbia/Snake River Dams, the Nez Perce Tribe Department of Fisheries Resources Management (NPTDFRM) began an adult Pacific lamprey translocation initiative in 2006. The NPTDFRM translocation effort consists of obtaining adult lamprey from the lower Columbia River dams (Bonneville, The Dalles and John Day) and transporting them upstream past the dams to the Nez Perce Tribal Hatchery (NPTH), located on the Nez Perce Reservation within the Clearwater Subbasin of the Snake River. The adult lamprey overwinter at NPTH and are released the following spring, typically mid- to late-May, into Snake Basin streams.

Translocation is specifically identified in the Columbia River Inter-Tribal Fish Commission (CRITFC) Tribal Pacific Lamprey Restoration Plan (2011). The NPT considers adult translocation an emergency stop-gap measure, and perhaps the only immediately available management tool, to



partially address the limiting factor of adult mainstem passage and the threat to their continued existence that the mainstem dams pose.

The purposes of the translocation initiative are to:

- Maintain some level of production in the Snake Basin until mainstem passage improves
- Thwart further local extirpations
- Prevent loss of pheromone migration cues to migrating adults from larval lamprey
- Restore lamprey related ecosystem values to promote diversity, productivity and ecosystem health
- Preserve cultural values associated with lamprey.

Larval (ammocoete) and juvenile (macrophthalmia) are sampled in translocation and non-translocation streams to gauge effectiveness of the translocation actions. In coordination with the CRITFC Hagerman Genetics Laboratory, Hagerman, Idaho, parentage analysis is conducted for samples collected via electro-fishing and rotary screw trapping.

- **HUC 5 Location:**

- Clearwater (#17060306) HUC 4 Subbasin
- Middle Fork Clearwater (#17060304) HUC 4 Subbasin
- Lower Selway (#17060302) HUC 4 Subbasin
- Lochsa (#17060303) HUC 4 Subbasin
- Lower Salmon (#17060209) HUC 4 Subbasin
- South Fork Salmon (#17060208) HUC 4 Subbasin
- Lower Middle Fork Salmon (#17060206) HUC 4 Subbasin
- Lower Snake (#17060107) HUC 4 Subbasin
- Lower Snake-Asotin (#17060103) HUC 4 Subbasin
- Hells Canyon (#17060101) HUC 4 Subbasin
- Imnaha (#17060102) HUC 4 Subbasin
- Wallowa (#17060105) HUC 4 Subbasin
- Lower Grande Ronde (#17060106) Subbasin
- Upper Grande Ronde (#17060104) Subbasin
- Middle Columbia-Hood (#17070105) Subbasin
- Middle Columbia-Lake Wallula (#17070101) Subbasin

- **Facilities ownership:**

The Columbia River mainstem dams (Bonneville, The Dalles and John Day) from which adult Pacific lamprey will be collected and transported for translocation are owned by the Federal government, U.S. Army Corps of Engineers.

The Nez Perce Tribal Hatchery, Lenore, Idaho, where the translocated lamprey overwinter, is owned by the Nez Perce Tribe.

In Idaho, streams to which adult lamprey will be translocated are located primarily within National Forests. In Oregon and Washington, streams to which adult lamprey will be translocated primarily cross private lands.

- ***Rationale and linkage to the watershed (How threat impacts Pacific lamprey):***

Pacific Lamprey are at risk throughout the Columbia Basin, however risk increases moving upstream. The majority of watersheds in Upper Columbia and Snake Basins are considered possibly or presumed extirpated, with the remainder ranked as critically imperiled. Eight mainstem dams seriously hamper migration through the Columbia/Snake mainstem system. Moser et al. (2002) documented an upstream passage efficiency of less than 50% for Pacific lamprey adults tagged below Bonneville Dam. Of those tagged below Bonneville Dam only 3% were documented above John Day Dam. Adult Pacific lamprey counts at Lower Granite Dam, the upstream-most dam that adult lamprey must pass to gain access to quality Snake Basin spawning and rearing habitat, are generally less than 1% of the Bonneville count. Mainstem passage has been identified as the most serious limiting factor affecting Pacific lamprey in the Snake Basin, with mainstem dams being the most serious threat (Luzier et al. 2011).

- ***Expected outcome (How proposed project will address threat):***

The NPTDFRM has been releasing translocated adult lamprey into Snake Basin streams since 2007. Successful spawning of translocated lamprey has been verified by parentage analysis for all translocation streams. Parentage analyses has also provided valuable life history data, such as lengths at age, ages of ammocoetes and macrophthalmia, and age at emigration from the natal stream. Translocation into Snake Basin streams is expected to continue, adding new translocation streams within the Snake Basin, with broader and more intensive larval assessments of translocation and non-translocation streams. This will further the goals of augmenting Pacific lamprey production until such time as volitional migration through the mainstem substantively improves, thwart further local extirpations, prevent loss of pheromone migration cues to migrating adults from larval lamprey, add to the distribution data base, and restore lamprey related ecosystem values to promote diversity, productivity and ecosystem health

- ***Identification and coordination with relevant stake holders:***

Coordination with relevant stakeholders has been and is expected to continue to be very good. Partners include: the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, CRITFC, Bonneville Power Administration, University of Idaho, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife and Asotin County Public Utility District.

- ***Feasibility and expected timeframes:***

Based on experience with Adult Pacific Translocation and Assessments, it is totally feasible for project implementation to proceed in the upcoming year.

The project will be needed to continue until adult Pacific lamprey can volitionally migrate into the Snake Basin in numbers that consistently support the goals of the Tribe's Pacific lamprey initiative.

- ***Proponent Role and Responsibilities:***

The NPTDFRM would coordinate, plan and conduct all elements of the Nez Perce Tribe Adult Pacific Lamprey Translocation and Assessment, taking advantage of cooperative, supportive and leveraging opportunities as they may arise.

- ***Budget and identification of potential funding source:***

Estimated annual costs for the translocation and assessment phases of the project, as well as infrastructure maintenance and modifications for efficiency and reliability of the Nez Perce Tribal Hatchery adult over-wintering facility, are \$300,000.

A primary potential funding source is the Bonneville Power Administration, via the Northwest Power and Conservation Council Fish and Wildlife Program, with lesser support funding from the Nez Perce Tribe, CRITFC and the U.S. Fish and Wildlife Service

## **2. Proposed: Starbuck Diversion Passage**

Project Description: Assess the Starbuck Diversion for efficacy of lamprey passage.

Rationale: The Starbuck Diversion was built for fish passage in the late 90's following damage to the original structure in 1996-97 flooding. Built passage of native salmonids, it does block small mouth bass from further migration upstream. It is unknown whether lamprey can pass it, and stakeholders would like to conduct an assessment.

Ongoing Activities: There is a lot of restoration work being conducted in the Tucannon watershed improving floodplain connectivity and channel complexity. Snake River Spring Chinook are the target species but other species will benefit. Goals are to restore channel complexity, temperature, flow and floodplain connectivity. This approach best buffers the watershed from climate change, improves habitat for the greatest number of native species, and over the long run will be the most cost effective. For Pacific Lamprey, habitat can be improved but low seeding will continue to be a primary factor in population trends.

## **3. Proposed and ongoing: Stream Surveys for Larval Lamprey**

Associated with the adult translocated program, stream surveys have been conducted to document the presence of larval lamprey in both the streams that have received adult lamprey and nearby streams that would presumably contain only natural production. Surveys are being jointly conducted by the Nez Perce Tribe and the U.S. Fish and Wildlife Service. The Idaho Department of Fish and Game have also conducted surveys in the Selway, Lochsa and Middle Fork Salmon drainages. To date, surveys have been conducted in the Clearwater, Salmon and Grande Ronde rivers and tributaries of the lower Snake River (see Figures 2, 3 and 4 for current presence data). Information is added to the regional database tracking lamprey distribution and abundance.

The mainstem Snake River and mouth of the Clearwater around Lewiston, Idaho and Clarkston, Washington have been sampled using deep water electrofishing equipment. Two ammocoetes were found just inside the mouth of the Clearwater River. This sampling did not add anything to known distribution.

Project Description: Develop eDNA sampling and processing methods and protocol to facilitate low-cost observations of lamprey distribution.



#### **4. Ongoing and Completed activities, Clearwater Watershed:**

American River AOP – project completed, improved access to 10+ miles of potential lamprey habitat. (SF Clearwater)

Newsome Creek Channel Reconstruction – project currently being implemented. Includes 3+ miles of channel reconstruction and riparian restoration through a dredge mined section of stream and addition of large wood (SF Clearwater).

Red River Channel Reconstruction – project completed, improved stream channel and riparian conditions in a past dredge mined section of stream. About 3 miles of stream and riparian area were improved. Included addition of large wood. (SF Clearwater)

Collette Mine Restoration – project currently being implemented. Includes 1 mile of channel reconstruction and floodplain/riparian restoration in mainstem Lolo Creek (Lower Clearwater).

Crooked River Riparian and Channel Restoration – project currently being implemented. Includes 3+ miles of channel reconstruction and riparian restoration through stream reaches affected by past dredge mining, to the extreme. (SF Clearwater)

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