

DRAFT Pacific Lamprey

2018 Regional Implementation Plan

for the

Lower Columbia/Willamette

Regional Management Unit

Willamette Sub-Unit



Submitted to the Conservation Team August 6, 2018

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I. Status and Distribution of Pacific Lamprey in the RMU

A. General Description of the RMU

Willamette River Sub-Unit

The Willamette Sub-Unit of the Lower Columbia River/Willamette Regional Management Unit is comprised of twelve 4th field HUCs that are situated within three Environmental Protection Agency (EPA) Level III Ecoregions: Coast Range, Willamette Valley and Cascades ([Figure 1](#), Table 1).



Figure 1. Map of watersheds within the Lower Columbia River/Willamette Regional Management Unit.

Table 1. Drainage Size and Level III Ecoregions of the 4th Field Hydrologic Unit Code (HUC) Watersheds located within the Willamette Sub-Unit.

Watershed	HUC Number	Drainage Size (km2)	Level III Ecoregion(s)
Middle Fork	17090001	3,540	Willamette Valley
Coast Fork Willamette	17090002	1,726	Coast Range
Upper Willamette	17090003	4,850	Willamette Valley
McKenzie	17090004	3,468	Willamette Valley, Cascades
North Santiam	17090005	1,979	Willamette Valley, Cascades
South Santiam	17090006	2,696	Willamette Valley, Cascades
Middle Willamette	17090007	1,841	Willamette Valley
Yamhill	17090008	1,999	Coast Range
Molalla-Pudding	17090009	2,267	Willamette Valley, Cascades
Tualatin	17090010	1,836	Coast Range, Willamette Valley
Clackamas	17090011	2,442	Willamette Valley, Cascades
Lower Willamette	17090012	1,668	Willamette Valley

B. Status of Species

Conservation Assessment and New Updates

Increased attention on Pacific Lamprey has increased our understanding of this species in the Willamette Basin. Monitoring efforts, in which lamprey are either the target species or information is collected during other species' monitoring, have expanded the amount of information available and the quality of this information.

Previous studies have suggested a lack of genetic population structure (e.g., Goodman et al. 2008; Spice et al. 2012). However, these studies have focused on large geographical areas and have not controlled for time. Recently, two independent studies on adult Pacific Lamprey, conducted in different years and utilizing different genetic tools have reported evidence for some genetic differentiation among a relatively small body size, early migrating run, and a larger, later migrating run of adult Pacific Lamprey at Willamette Falls (Hess et al. 2015; Clemens et al. 2017a). Moderate genetic differentiation of adult Pacific Lamprey also occurred across years in the Willamette River Basin (Clemens et al. 2017a).

Abundance, Distribution and Connectivity

Since 2010, the Confederated Tribes of Warm Springs Reservation of Oregon have collected information to estimate the abundance of Pacific Lamprey adults at Willamette Falls (Falls) and the number passing the Falls through the fishways. Average estimates for this six year period are 182,224 adults (abundance at the Falls) and 65,446 adults (passing above the Falls; Table 2).

Historical occupancy of Pacific Lamprey was extensive throughout the Lower Columbia/Willamette RMU. From the previous threats assessment, Luzier et al. (2011) estimated that the current distribution was reduced 50-70% from historical ranges. Current distribution of lamprey in the Willamette Sub-Unit is strongly related to physical migration barriers. Twenty large dams are present within the Willamette Sub-Unit; 13 are owned and operated by the U.S. Army Corps of Engineers' (Corps or USACE) and collectively referred to as the Willamette Valley Project; at this time, none have successful upstream lamprey passage.

Other large dams are for either non-federal hydropower production or water supply. See “Passage” for more discussion on dam passage.

Of the estimated 371 dams present in the Willamette Basin, approximately 148 are privately owned and used primarily for the purposes of irrigation. The greatest concentration of dams can be found in the Tualatin (82) and Yamhill (65) watersheds (Hulse et al. 2002). Culverts are also widespread throughout the watersheds of the Willamette Sub-Region and impact Pacific Lamprey distribution to an unknown extent.

Recent information collected during the 2017 Threats Assessment and Regional Implementation Plan meetings will be used to determine the percentage of historical distribution still currently occupied. The intrinsic potential historical distribution for Winter Steelhead or Spring Chinook was used as a surrogate for Pacific Lamprey historical distribution.

Table 2. Estimated Pacific Lamprey adult abundance, and numbers passing Willamette Falls and Bonneville Dam, 2010-2017, percent of total that were harvested, percent of total numbers that passed Willamette Falls (Baker and McVay 2018).

Year	Total Abundance At Willamette Falls	Percent Harvested	Numbers Passing Willamette Falls Fishway	Percentage Passing
2010	64,388	2.5%	27,043	42%
2011	107,383	4.0%	46,819	44%
2012	243,048	2.7%	111,559	46%
2013	173,821	4.3%	49,365	28%
2014	336,305	1.1%	125,778	37%
2015	168,398	1.3%	32,112	19%
2016	115,682	2.3%	32,148	28%
2017	277,577	2.3%	80,848	29%
Average	185,825	2.6%	63,209	34%

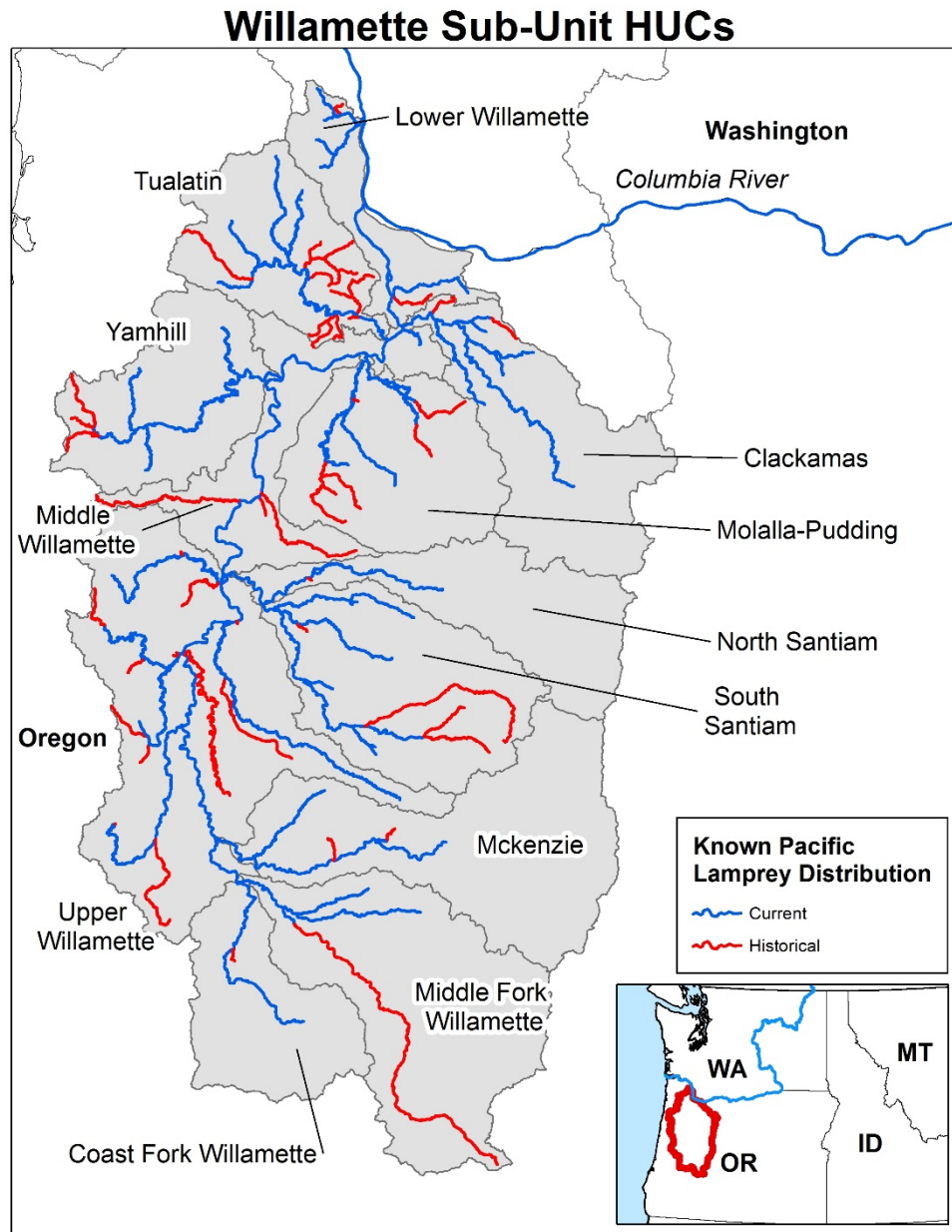


Figure 2. Current and historical distribution for Pacific Lamprey (based on known observation data): Lower Columbia and Willamette Regional Management Unit (USFWS Data Clearinghouse 2018).

C. Summary of Major Threats

The key threats within the Willamette Sub-Unit were identified by RMU participants during the 2017 Risk Assessment revision meeting in February 2017 (Table 3), to update the 2011 Risk Assessment. Key threats are defined as those threats in which the average scope and severity across all HUCs was greater than 2.5 on a scale from 1- 4 (>3.5 = High, 2.5- 3.49 =Moderate, 1.5- 2.49=Low and <1.5= Insignificant; U=Unknown). Risk Assessments are revised approximately every 5 years.

Stream and floodplain degradation (non-dam), water quality (non-dam) and dam-related flow alterations¹ are the highest priority threats in the Willamette Sub-Unit, followed by dam-related stream and floodplain degradation and dam-related passage (Table 3). The “dam-related” threats refer to those threats primarily caused by large dams, which affect multiple parameters (passage, water quality, seasonal baseflows and flood flows (timing, magnitude and duration), floodplain dynamics, habitat (e.g. inundation of habitat, loss of coarse sediment supply), and species composition (e.g. habitat suitability, predator/prey dynamics). Given the prevalence of large dams in the Sub-Unit, this distinction was made to better identify the cause of the threats, and ensure some threats were not masked by the presence of these dams.

Stream and Floodplain Degradation.—Nearly 70 percent of Oregon’s population resides in and around the Willamette Basin. Human settlement and development has greatly altered the physical habitat and hydrology of the Sub-Unit. In upland areas, forestry is the predominant land use. Fire suppression and timber harvest practices have altered the diversity and age/size composition of riparian vegetation. Many watersheds in the Willamette Sub-Unit are lacking mature conifers that play a pivotal role in bank stability, water quality protection, thermal cover, and the provision of large woody debris. In the valley, extensive agriculture and urban development have reduced the quality and complexity of aquatic and riparian habitats. Efforts to reduce flooding (dikes, levees, riprap, dams) and improve navigation (dredging, large wood clearing), have straightened and scoured streambeds, eliminated side channels and cut off flood plains. Cultivation, riparian clearing and conversion of land for crops, pastures, vineyards and development have filled and/or drained wetlands, increased soil erosion and sedimentation, and promoted the establishment and spread of invasive plant species. Simplification of the river channel and flow regulation and simplification of the mainstem Willamette have been hypothesized to be a cause of the decreased numbers of adult Pacific Lamprey harvested by Tribal members at Willamette Falls (Clemens et al. 2017b).

Water Quality.—Elevated water temperature, low dissolved oxygen, bacteria, and toxic pollutants such as herbicides, pesticides, heavy metals and flame retardants, are some of the water quality concerns in the Willamette Sub-Unit. These threats may be attributable to a number of human activities including riparian clearing, water withdrawals, failing septic systems, sewer overflow, and urban and agricultural run-off. Warm summertime temperatures (greater than or equal to 20°C) during July-August may prevent adult Pacific Lamprey from surviving, reproducing, or migrating far up into the Willamette Basin (Clemens 2017; Clemens et al. 2016; Clemens et al. 2012a; Clemens et al. 2009). These summertime temperatures have resulted in large die-offs, skewed sex ratios, documented testicular atresia (damaged testes) in

¹ “Flow Alterations” were formerly referred to as “Dewatering and Flow Management” in Luzier et al. (2011).

males, and faster maturation rates. Toxins may be particularly harmful to Pacific Lamprey because larvae burrow and feed in mud and fine substrates where toxins accumulate (Nilsen et al. 2015; Clemens et al. 2017b). Monitoring efforts to improve and protect water quality for fish, wildlife, and human health are ongoing in the Willamette Sub-Unit.

Flow Alterations – (formerly “Dewatering and Flow Management”). —Flow alterations were ranked as a Moderate key threat. Low flow conditions occur naturally in many watersheds of the Willamette Sub-Unit during summer months. These conditions may be aggravated by water withdrawals for municipal, industrial, commercial and agricultural use. In several tributaries, the large storage dams augment seasonal low flows, and some alter natural temperature and flow regimes. Water releases from thermally stratified reservoirs generally result in cooler water temperatures downstream of the dam in summer and warmer water temperatures in fall and winter. Abnormal seasonal temperature fluctuations may impact the behavior, development, and fitness of adult and juvenile lamprey. In 2005, the USACE completed a water temperature control tower at Cougar Dam on the South Fork McKenzie River, which has alleviated much of the dam-induced seasonal abnormalities in the McKenzie River. Such temperature control structures are still needed elsewhere in the Willamette Basin to return to more normative temperature regimes (e.g. North Santiam River, the Middle Fork Willamette).

Water diversions and impoundments alter the quantity and timing of flow events, which may impact adult and juvenile lamprey migration cues, decrease spawning habitat availability, prevent access to backwater or side channel habitats, create low water barriers, and contribute to mortality if incubating eggs or burrowing larvae are dewatered or exposed to a high temperature or low oxygen environment (Clemens et al. 2017b). Some improvements to flow regimes have occurred in the Willamette Basin. Since 2002, the USACE has largely operated their Willamette Valley Project dams according to minimum flows and ramping rates that were formalized under the Willamette Project Biological Opinion issued by the National Marine Fisheries Service (NMFS 2008) for the protection of anadromous salmonids. Further, through the Willamette Valley Sustainable River Project, The Nature Conservancy and the USACE and numerous other agencies and organizations are working to ensure that Willamette River flows are managed to benefit fish and wildlife habitats as well as local communities (<https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/oregon/placesweprotect/wv-fact-sheet.pdf?redirect=https-301>).

Table 3. Summary of the assessment results for the main threats of the Willamette Sub-Unit. Key Threats are those that rank Moderate or High (2.5 or greater). Threats ranked less than 2.5 are not listed.

Watershed	Dam-Related Passage		Dam-Related Flow Alterations		Dam-Related Stream & Floodplain Degradation		Dam-Related Water Quality		Dam-Related Predation	
	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity
Willamette Sub-Unit										
<i>Middle Fork Willamette</i>	4	4	4	4	4	4	4	4	3	3
<i>Coast Fork Willamette</i>	4	4	4	4	4	4	4	4	2.5	2.5
<i>Upper Willamette</i>	2	4	4	4	3	4	3	4	2	4
<i>McKenzie</i>	3	3	3	3	3	3	3	3	2	2
<i>North Santiam</i>	4	4	4	4	4	4	3	3	1	1
<i>South Santiam</i>	4	4	4	4	4	4	4	4	2	4
<i>Middle Willamette</i>	2	4	4	4	4	4	3	3	1	U
<i>Yamhill</i>	2	2	2.5	2.5	2	2	2.5	2.5	1	1
<i>Molalla-Pudding</i>	2.5	2.5	2.5	2.5	2	2	2.5	2.5	3	3
<i>Tualatin</i>	2.5	2.5	2	2	2	2	2	2	3	3
<i>Clackamas</i>	3	3	1	2	1	1	1	1	3	U
<i>Lower Willamette</i>	1	2	3	3	4	4	4	4	4	4
<i>Average Scope/Severity</i>	2.8	3.3	3.2	3.3	3.1	3.2	3.0	3.1	2.3	2.8
Rank	M	M	M	M	M	M	M	M	L	M
<i>Mean</i>	3.0		3.2		3.1		3.0		2.5	
Overall Threat Rank	M		M		M		M		M	

Table 3 (continued). Summary of the assessment results for the main threats of the Willamette Sub-Unit. Key Threats are those that rank Moderate or High (2.5 or greater). Threats ranked less than 2.5 are not listed.

Watershed	Flow Alterations (non-dam)		Stream & Floodplain Degradation (non-dam)		Water Quality (non-dam)		Predation (non-dam)	
	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity
Willamette Sub-Unit								
<i>Middle Fork Willamette</i>	1	1	3.5	3	2	2	1	1
<i>Coast Fork Willamette</i>	3	2.5	2.5	2.5	3	3	2.5	2.5
<i>Upper Willamette</i>	3.5	3	4	3.5	4	3.5	1.5	U
<i>McKenzie</i>	2	2	3	3	2	1	1	1
<i>North Santiam</i>	3	3	2.5	3	2	3	1.5	3
<i>South Santiam</i>	3.5	3	3	3	3	3	1	U
<i>Middle Willamette</i>	3.5	3	4	4	3.5	4	4	U
<i>Yamhill</i>	3	3	4	4	4	4	3	3
<i>Molalla-Pudding</i>	4	4	4	4	4	4	3	3
<i>Tualatin</i>	2.5	2.5	4	4	4	4	3	3
<i>Clackamas</i>	1	2	3	3	3	3	3	U
<i>Lower Willamette</i>	2.5	2.5	4	4	4	4	4	4
<i>Average Scope/Severity</i>	2.7	2.6	3.5	3.4	3.2	3.2	2.4	2.6
Rank	M	M	H	M	M	M	L	M
<i>Mean</i>		2.7		3.4		3.2		2.5
Overall Threat Rank		M		M		M		M

Passage- The current distribution of Pacific Lamprey is largely determined by the many large dams throughout the Willamette Basin that do not provide passage (Clemens et al. 2012b; Schultz et al. 2014; Table 4). The USACE Willamette Valley Project dams were primarily built to reduce flood risks, but also generate electricity and provide water storage for irrigation, recreation and drinking water. The structures range in size from 49 feet (Fern Ridge) to 519 feet (Cougar) tall and provide little or no fish passage for Pacific Lamprey. Largely constructed in the early 1960s, the USACE dams block hundreds of miles of historical, anadromous spawning and rearing habitat and have adversely affected native fish populations in the basin. Consequently, the Willamette Valley Project Biological Opinion, issued by the National Marine Fisheries Service (NMFS 2008), requires the Corps to improve adult and juvenile salmonid passage at several high priority dams.

USACE's adult fish trap and haul facilities located at the base of these dams are primarily designed for anadromous salmonids, which are trapped and transported by truck and released upstream of the dams. Some of the recent upgrades include features (e.g. rounded walls at fishway entrances and orifices) that may increase the ability to capture and haul adult lamprey if additional infrastructure (such as ramps and collection boxes) was added. Work to date has included the construction or upgrade of adult fish collection facilities at Cougar, Detroit (Minto), Foster, Dexter and Fall Creek Dams to improve trap and haul conditions for salmonids (i.e., improved attractant flows, larger holding areas, less direct handling of fish). At this time, Fall Creek Dam has the only experimental ramps for upstream lamprey passage at these USACE dams.

Downstream fish passage solutions for salmonids at the USACE dams are still under evaluation. No permanent downstream fish passage collection facilities for any of the USACE dams have been completed. Juvenile fish (all species) must pass through turbines, spillway gates, or other routes of water passage as they migrate downstream. USACE has tested a small, experimental, floating surface collector at Cougar Dam for downstream passage of salmonids. Other studies to determine downstream passage solutions at Detroit and Lookout Point Dams continue. It is unclear if passage improvement measures will ultimately restore access to the habitat above these dams for Pacific Lamprey.

Although most passage projects in the Willamette Sub-Unit are focused on improving conditions for ESA-threatened spring Chinook salmon and winter steelhead, a growing number of projects are providing passage for Pacific Lamprey. In conjunction with Federal Energy Regulatory Commission relicensing, Portland General Electric (PGE) has installed three lamprey passage structures at Willamette Falls Hydroelectric Project (Lower Willamette River), rebuilt the existing fish ladder at River Mill Dam (Clackamas River) and made modifications to the fishway that traverses the Faraday and North Fork Dams (Clackamas River) to improve upstream passage of adult Pacific Lamprey. PGE is also monitoring the downstream migration of juvenile lamprey with two, new surface collectors at River Mill and North Fork Dams. These facilities are collecting and enumerating lamprey outmigrants. The collection efficiency of the downstream passage structures are unknown, but thousands of ammocoetes and macrophthalmia have been collected each year since construction. PGE is also trapping and hauling adult Pacific Lamprey into the Clackamas above North Fork Dam to increase larval production (and the pheromones they produce) in the upper basin in an effort to increase adult attraction to this area. In the future, PGE will perform a multi-year radio telemetry study that will assess migration and

passage success of adult Pacific Lamprey through the fish ladder at North Fork Dam.

Table 4. Passage conditions at most large dams located in the Willamette Sub-Unit.

Dam / Ownership	River	Passage Conditions for Pacific Lamprey
Dexter, Lookout Point, and Hills Creek <i>USACE</i>	Middle Fork Willamette	A trap and haul facility for anadromous salmonids occurs below Dexter Dam, the lower-most dam on the Middle Fork Willamette. Future upgrades may increase the ability to capture and haul adult lamprey upstream of these dams. Permanent downstream passage facilities are not present.
Fall Creek Dam <i>USACE</i>	Tributary to Middle Fork Willamette below Dexter Dam	A trap and haul facility for anadromous salmonids occurs below Fall Creek Dam, and USACE has installed a ramp/collection box specific for lamprey. Future upgrades may increase the ability to capture and haul adult lamprey upstream of these dams. CTGR are conducting a reintroduction/translocation of adults captured at Willamette Falls above this dam. Downstream passage facilities are not present; “passage” for downstream migrant salmonids is provided by annual 1-2 week drawdown of the reservoir- typically in December or January each year.
Dorena Dam <i>USACE</i>	Row River- Tributary to Coast Fork	No fish passage facilities are present or planned at this dam.
Cottage Grove Dam <i>USACE</i>	Coast Fork Willamette River	No fish passage facilities are present or planned at this dam.
Fern Ridge Dam <i>USACE</i>	Long Tom River	No fish passage facilities are present or planned at this dam.
Leaburg Dam <i>EWEB</i>	McKenzie River	Two upstream fishways are located at Leaburg Dam (~10 feet tall). Lamprey passage efficiency is unknown, but Pacific Lamprey are found above this dam. EWEB’s diversions are screened to NMFS criteria, which are adequate for larger outmigrants, but may allow the smallest larvae to pass through the screen, and intermediate sized larvae may become impinged or wedged in the gaps of the screen material.
Cougar Dam <i>USACE</i>	South Fork McKenzie River	A trap and haul facility for anadromous salmonids occurs below Cougar Dam; recent upgrades may increase the ability to capture and haul adult lamprey upstream if additional infrastructure was added. Permanent downstream passage facilities are only in the design phase, but may be installed in 2020.
Blue River Dam <i>USACE</i>	Blue River (tributary to McKenzie	No fish passage facilities are present or planned at this dam.

River)

Table 4 continued.

Dam / Ownership	River	Passage Conditions for Pacific Lamprey
Trail Bridge Dam <i>EWEB</i>	McKenzie River	No fish passage facilities are present at this dam. Future upgrades in the next ~5 years will include a trap and haul facility that includes design considerations for trap and haul of adult Pacific Lamprey. Downstream passage will be provided by spill and powerhouse shut-down, which will occur year-round.
Minto, Big Cliff and Detroit Dams <i>USACE</i>	North Santiam	A trap and haul facility for anadromous salmonids occurs below Big Cliff Dam, the lower-most dam, at Minto. Recent upgrades may increase the ability to capture and haul adult lamprey upstream if additional infrastructure was added. Permanent downstream passage facilities are not present.
Foster and Green Peter Dams <i>USACE</i>	South Santiam	A trap and haul facility for anadromous salmonids occurs below Foster Dam, the lower-most dam. Recent upgrades may increase the ability to capture and haul adult lamprey upstream if additional infrastructure was added. Permanent downstream passage facilities are not present.
Scoggins Dam <i>BLM</i>	Tualatin River	No fish passage facilities are present or planned at this dam.
River Mill, Faraday, and North Fork Dams <i>PGE</i>	Clackamas River	A new fishway at the lower-most River Mill Dam was constructed in 2006 and provides 90% passage efficiency for Pacific Lamprey. PGE has recently modified the North Fork Fishway, which traverses both Faraday and North Fork dams, and is currently evaluating passage here. Permanent downstream passage facilities, which are collecting and enumerating lamprey outmigrants, are at North Fork and River Mill dams. The collection efficiency is unknown, but thousands of ammocoetes and macropthalmia have been collected each year since construction.
Willamette Falls Dam <i>PGE</i>	Willamette River	Modifications to the existing fishway to improve lamprey passage have been completed. Additionally, seasonal lamprey ramps are installed annually to provide upstream egress for lamprey upstream passage. Modifications to improve downstream salmonid passage have been completed, including improved spill conditions, which are likely to improve passage conditions for lamprey.

Predation. Predation (both dam-related and not dam-related) was ranked as a moderate threat to lamprey. Predation on lamprey likely occurs throughout the Willamette Basin: sea lion and white sturgeon activity is commonly seen immediately below Willamette Falls, and many warm-water predatory fish species are common throughout the basin in the large reservoirs and lower

tributaries of the Willamette. These non-native fish are able to overwinter and survive in the basin largely because of large reservoirs or other modified habitats. At this time, there is very little direct study of predation in the Willamette Basin; thus, while there may be many potential predators of lamprey present, in many areas it is uncertain what the severity of such predation is to the lamprey population.

Other.—Predicted trends in human population growth, increased development, and anticipated effects of climate change (i.e., elevated water temperatures, increased demand for consumptive surface water use, altered flow regimes) will likely compound existing threats to Pacific Lamprey throughout the Willamette Sub-Unit.

2017 Nature Serve Values:

Based on the scores provided above, the following rankings were determined using a modified NatureServe ranking model to assess the current threats and extinction risk to Pacific Lamprey. The use of the NatureServe model is described in Luzier et al. 2011, and the following updated ranks will be further detailed in the 2018 update to that document (*Pacific Lamprey Assessment and Template for Conservation Measures*), expected to be completed in summer 2018.

Table 5. NatureServe Rankings by HUC. S1 = Critically imperiled in the jurisdiction because of extreme rarity or because of some factors such as very steep declines making it especially vulnerable to extirpation; S2 = imperiled in the jurisdiction because of rarity due to very restricted range, very few occurrences, steep declines, or other factors making it vulnerable steep declines making it especially very vulnerable to extirpation; S3 = vulnerable in the jurisdiction due to restricted range, relatively few occurrences, recent and widespread declines, or other factors making it vulnerable to extirpation.

NatureServe Ranking	HUC
S1- Critically Imperiled	Middle Fork Willamette
S1- Critically Imperiled	Coast Fork Willamette
S1- Critically Imperiled	Upper Willamette
S2 – Imperiled	McKenzie
S1- Critically Imperiled	North Santiam
S1- Critically Imperiled	South Santiam
S1- Critically Imperiled	Middle Willamette
S1- Critically Imperiled	Yamhill
S1- Critically Imperiled	Molalla-Pudding
S1- Critically Imperiled	Tualatin
S3- Vulnerable	Clackamas
S1- Critically Imperiled	Lower Willamette

Restoration Actions

The following work was recently completed or is actively occurring in the Willamette Sub-Unit. Additional detail is provided in the Willamette Sub-Unit Meeting Notes for the Pacific Lamprey Threats Assessment and RIP meeting (see Appendix A to this document).

- Clackamas Watershed
 - Two new surface collectors for downstream fish passage have been completed by PGE at the River Mill and North Fork Dams over the past few years. Both are collecting many juvenile lamprey outmigrants; however, the collection efficiency of these facilities for lamprey is unknown.
 - PGE began Trap and Haul efforts to transfer adult lamprey above North Fork Dam in 2017, and plan to continue through 2025.
 - Multiple habitat restoration efforts have occurred in the Clackamas Basin (PGE, Metro and others), including the ongoing “Shade Our Streams” efforts by the Clackamas River Basin Council and PGE.
- Fall Creek (Middle Fork Willamette)
 - The Confederated Tribes of the Grand Ronde is leading a multi-year lamprey translocation study on Fall Creek (2012- present).
 - The USACE has completed the newly constructed Fall Creek Adult Fish Collection Facility; it is on line and in process of commissioning. No signs of lamprey at the new adult collection facility yet. The facility was designed with lamprey passage in the ladder in mind, may ultimately assist with a trap and haul program for Pacific Lamprey. USACE hopes to place fyke traps in and around the waterways of the facility this year.
- The Confederated Tribes of Warm Springs Reservation of Oregon continues to assess passage and abundance of adult Pacific Lamprey at Willamette Falls.
- McKenzie
 - In 2018, a current large-scale project is underway to restore floodplain connectivity and function on over 500 acres of historical alluvial delta at the confluence of the South Fork McKenzie River. Project will remove approx. 40 acres of levees and augment sediment (over 200,000 cubic yards) and large wood (3,000-4,000 pieces) on 4.5 miles of the South Fork below Cougar Dam, resulting in 5-10 miles of secondary channel reconnection (up to 400% increase), and improving spawning and rearing habitats for Pacific Lamprey. Implementation of Phase I was partially funded through the RIP process with BPA cost savings funds. Phase I includes restoration of the lower 2.0 miles of the project area (400 acres of floodplain). Project leads: USFS (Kate Meyer), McKenzie Watershed Council (Jared Weybright).
- State-wide

- Ben Clemens (ODFW) reported that he is working on a **Lamprey Conservation Plan** for the state of Oregon, which will cover 4 species (Western River, Western Brook, Pacific and Pacific Brook lamprey). The status and limiting factors rankings in this plan are being cross-walked with those from the USFWS, is to be consistent with the PLCI. The plan is expected to be completed in 2019.

Selection of Priority Actions

A. Prioritization Process

The highest priority threat in the Willamette Sub-Unit is stream and floodplain degradation (score = 3.4). Several other factors ranked above 3.0: dam-related passage, dam-related flow alteration and water quality. Priority projects identified by participating members of the Willamette Sub-Unit RMU addressed threats to passage, stream and floodplain degradation and uncertainties in Pacific Lamprey distribution and enumeration.

B. High Priority Proposed Project Information

PROJECT: Improving counts of Pacific Lamprey in the McKenzie River (Leaburg Dam)

Project Lead Contact: Katherine Nordholm (ODFW)

Threat addressed by project: Lack of information on the Status of Pacific Lamprey

Project Description:

This project addresses the deficiency of information on the status of Pacific Lamprey in the McKenzie River Basin. Currently, reliable estimates of population abundance or population trends are lacking. Having unknown population parameters is common throughout Pacific Lamprey distribution and most population and trend estimates are based on counts from Willamette Falls.

Video cameras in Leaburg Dam's fish ladders have recorded fish passage since 1993. Pacific Lamprey are observed in these videos; however, the counts do not completely capture the Pacific Lamprey population. Lamprey have been observed passing over the fish ladder without being captured on video. Thus, the counts of Pacific Lamprey at Leaburg Dam cannot be used for population estimates or population trend monitoring. In addition, Pacific Lamprey may be able to pass upstream of the dam through the auxiliary water supplies for the fish ladders or other routes where water is flowing over smooth surfaces.

The objective of this project is to develop the methodology to provide an accurate annual count of Pacific Lamprey passing Leaburg Dam. With infrastructure already in place at Leaburg Dam, there is an opportunity to start a long-term Pacific Lamprey population monitoring project. Upgrading the video equipment in both fish ladders at Leaburg Dam will allow a complete count of Pacific Lamprey passing over the ladders. Additionally, a telemetry study will be conducted to determine the potential for Pacific Lamprey to navigate upstream of the dam without using the fish ladders.

HUC 5 Location: McKenzie River, Oregon (#17090004)

Facilities ownership: Eugene Water and Electric Board (EWEB)

Rationale and linkage to the watershed:

Long term dam counts of fish passing over Leaburg Dam are not an accurate record of the total number of Pacific Lamprey that pass over the fish ladder. Upgrading the video monitoring equipment in the Leaburg Dam fish ladder will allow complete counts of passing Pacific Lamprey. The addition of a telemetry study will determine if Pacific Lamprey are able to navigate upstream of Leaburg Dam without passing through the fish ladders.

Expected outcome (threats addressed):

Upgrade the video equipment at Leaburg Dam to accurately monitor population abundance and trends over time. Begin building a long-term data set on Pacific Lamprey migration in the McKenzie River.

Identification and coordination with relevant stake holders:

ODFW, EWEB, USACE, Tribal interests

Feasibility and expected timeframes:

Feasibility is high. Project planning and implementation could start immediately.

Proponent Role and Responsibilities:

Install additional video cameras in the Leaburg Dam fish ladders. Fund a position to enumerate fish caught passing the fish ladder. Trap lamprey at the base of Leaburg dam. Tag lamprey with RFID PIT tags, and tag a subset with radio telemetry tags. Fund a position for tracking the telemetry tagged fish and for monitoring and evaluating PIT tag project.

Budget and identification of potential funding source:

ODFW, EWEB, USACE, USFS. Estimated costs can vary; a more detailed breakdown of cost can be provided later.

Camera equipment and setup: \$7,500

Personnel: Four to eight months: \$12,000 to \$24,000

Telemetry Equipment: \$8,000 - \$20,000

Total: \$27,500 to \$51,500

PROJECT: Estimate N_e Above North Fork Dam on the Clackamas River

Project Lead Contact: Nick Ackerman (PGE)

Threat addressed by project: Small Effective Population Size

Project Description: Estimate N_e Above North Fork Dam on the Clackamas River:

Our objective is to determine the effective population size (N_e) of Pacific Lamprey above North Fork Dam on the Clackamas River. This will be accomplished through genetic sampling of juvenile Pacific Lamprey collected at Portland General Electric's (PGE) downstream migrant sampling facility in 2017. Our estimate of N_e will be representative of adults from brood years 2009 – 2014.

HUC 5 Location: Clackamas: 17090011

Facilities ownership: Portland General Electric

Rationale and linkage to the watershed:

Historically, passage at North Fork Dam has been assumed to be poor (Ackerman et al. 2016). From 2017-2025 PGE will be conducting a trap-and-haul program to improve Pacific Lamprey passage around North Fork Dam (Ackerman 2017). The intent of the program is to haul approximately 250 adults per year from River Mill Dam to upstream of North Fork Dam. However, it is unknown how this number compares to the current adult abundance upstream of the dam. Until 2013 there was no means for trapping or counting Pacific Lamprey on the North Fork Ladder, and even after 2013 a newly installed lamprey trap was proven to be ineffective as it was found that lamprey were able to successfully bypass the trap (Ackerman et al. 2016). Therefore, while passage rates through the ladder have been low, an unknown number of lamprey have annually passed through the ladder into the upper basin. A better understanding of the pre trap-and-haul program N_e upstream of North Fork Dam may help refine the trap and haul program and provide valuable baseline information in assessing the effectiveness of the program.

Expected outcome (threats addressed):

Estimate recent effective population size of Pacific Lamprey in the upper Clackamas Basin prior to implementation of a significant trap-and-haul program.

Identification and coordination with relevant stake holders:

PGE, Quantitative Consultants, Inc., and Columbia River Inter-Tribal fish Commission (CRITFC)

Feasibility and expected timeframes:

Feasibility is high. Genetic samples were collected from macrophthalmia in the winter of 2017/2018. Genetic analysis could be run as soon as funds are available.

Proponent Role and Responsibilities:

Nick Ackerman of PGE will be the main proponent of the project. PGE will collect the genetic samples and provide them to the CRITFC genetics laboratory in Hagerman, ID for genotyping. Estimates of N_e will be made by Quantitative Consultants, Inc., using sibship-based estimators (reviewed in Ackerman et al. 2016b).

Budget and identification of potential funding source:

We estimate the project budget (including the genotyping of up to 500 juvenile lamprey samples, data analysis, and a project report) to cost \$40,000.

PGE will provide \$10,000 of the \$40,000 project cost and the labor to collect the samples for the project at no cost. PGE operates and maintains the juvenile sampling facilities used for the evaluation at no cost to the project. An itemized budget is available upon request.

PROJECT: S. Fork Pedee Passage and Instream Habitat Enhancement

Project Lead Contact: Luckiamute Watershed Council

Type of threat addressed by project: Stream and floodplain degradation (non-dam) and water quality (non-dam, elevated water temperature)

Project Description:

The project will replace an undersized culvert with a bridge. The culvert is currently installed with 3.5% gradient sheet flow within the pipe and is a potential velocity barrier. The project includes placement of at least 11 large wood structures along the 2.3 mile stretch to retain and aggrade bedload and facilitate reconnection to the floodplain. In addition, conifers will be added to the riparian corridor where appropriate to establish conifers for future large wood recruitment. A small section of private property (along about .35 miles) will also benefit from invasive weed control and riparian revegetation.

Project location is S. Fork Pedee Creek. Pedee Creek is a tributary to the Luckiamute River in Polk County. This reach of S. Fork Pedee Creek was identified as a priority project reach through an extensive modeling analysis using the NetMap assessment tool in ArcGIS. Geomorphic properties identify this reach to have limited incision, appropriate slope and access to wide floodplains. Intervention through large wood placement and plantings have high likelihood of success based on stream characteristics.

HUC 5 Location: Luckiamute watershed 1709000306 (within Upper Willamette HUC 4)

Facilities ownership:

The stream crossing location is privately owned (Starker Forests, Inc.). The project reach spans private ownership (Starker Forests, Inc. and Hancock Forest Management and one residential private landowner), nonprofit (Forests Forever), and public (BLM). All landowners are engaged and onboard with the project.

Rationale and linkage to the watershed:

The project would address threats of stream and floodplain degradation and water quality. Degraded instream habitats lack coarse material and habitat complexity. Elevated water temperatures also threaten lamprey across the system. Passage may be impeded by the undersized culvert – limiting access to habitat above the crossing.

Expected outcome (threats addressed): By adding large wood and planting conifers, the project will increase complexity of aquatic and riparian habitats, reconnect the stream to the floodplain, and increase conifers for future large wood recruitment. By aggrading bedload and addressing the exposed bedrock, the project will increase hyporheic exchange. This exchange will help address the water quality threat of elevated water temperature. The project will also add conifers and implement riparian revegetation in a stretch of the creek that is currently lacking shade.

Identification and coordination with relevant stakeholders:

The Luckiamute Watershed Council currently has funding for the design of the new bridge crossing to replace the existing undersized culvert. All landowners are engaged and supportive of the project. The two private timber companies and BLM are active partners that will contribute cash and in-kind resources to project implementation, once a budget is determined based on the results of the design (expected, summer 2018).

Feasibility and expected timeframes:

The project is highly feasible. The crossing design is underway. Once the design and cost estimates for the bridge are available, partners will determine their contributions and identify the funding gap. We are targeting bridge construction and large wood placement implementation for the in-water work season (July – October) of 2019 or 2020, depending on funding availability.

Proponent Role and Responsibilities:

The Luckiamute Watershed Council is convening the partners, managing the design process, and will assist partners in securing needed funds to fill the budget for project implementation.

Budget and identification of potential funding source:

Starker, Hancock and BLM will contribute cash and / or in-kind resources to the project. Contributions will take the form of logs, contractors, large wood placement design, permitting assistance and other materials towards the crossing (e.g. rock). The discussions to finalize the specific contributions and amounts will occur in summer 2018 after the bridge design and budget is available. Once the funding gap is identified, the LWC will assist partners in identifying sources and pursuing grant dollars. Funding options include Oregon Watershed Enhancement Board (OWEB) restoration grant, Drinking Water Providers Partnership, Spirit Mountain Community Fund, and others.

PROJECT: Upper Luckiamute Mainstem Habitat Enhancement

Project Lead Contact: Luckiamute Watershed Council

Type of threat addressed by project: Stream and floodplain degradation (non-dam) and water quality (non-dam, elevated water temperature)

Project Description: Upper Luckiamute Mainstem Habitat Enhancement

The project includes placement of at 24 large wood structures along the 1.4 mile project reach to retain and aggrade bedload and facilitate reconnection to the floodplain. In addition, conifers will be added to the riparian corridor where appropriate for future large wood recruitment.

Project location is along 1.4 miles of the upper Luckiamute River in Polk County. This reach was identified as the top priority project reach through an extensive modeling analysis using the NetMap assessment tool in ArcGIS. Geomorphic properties identify this reach to have limited incision, appropriate slope and access to wide floodplains. Intervention through large wood placement and conifer plantings have high likelihood of success based on stream characteristics.

HUC 5 Location: Luckiamute watershed 1709000306 (within Upper Willamette HUC 4)

Facilities ownership:

The project is owned by private timber interests and managed by Hancock Forest Management.

Rationale and linkage to the watershed:

The project would address threats of stream and floodplain degradation and water quality. Degraded instream habitats lack coarse material and habitat complexity. Elevated water temperatures also threaten lamprey across the system.

Expected outcome (threats addressed): By adding large wood and planting conifers, the project will increase complexity of aquatic and riparian habitats, reconnect the stream to the floodplain, and increase conifers for future large wood recruitment. By aggrading bedload and addressing the exposed bedrock, the project will increase hyporheic exchange. This exchange will help address the water quality threat of elevated water temperature.

Identification and coordination with relevant stakeholders:

The LWC is in discussion with the landowner about the project and project timeline. The landowner is engaged and supportive of the project. The LWC and Hancock Forest Management are implementing a large wood placement project on upper Ritner Creek through OWEB funding in 2018. In the past, Hancock Forest Management has partnered on other restoration projects, contributing resources such as rock, logs, and permitting assistance. BLM is also a partner on the project. BLM has properties in the vicinity and may be able to contribute logs for the project.

Feasibility and expected timeframes:

The project is highly feasible. Draft designs are already available based on initial field surveys. Implementation would be in summer 2019 or 2020, depending on funding availability.

Proponent Role and Responsibilities:

The Luckiamute Watershed Council is convening the landowner and technical partners, managing the design process, and will assist in securing needed funds to fill the budget for project implementation.

Budget and identification of potential funding source:

The LWC will assist in identifying sources and pursuing grant dollars. Funding options include Oregon Watershed Enhancement Board (OWEB) restoration grant, Drinking Water Providers Partnership, Spirit Mountain Community Fund, and others.

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MEETING NOTES

WILLAMETTE RMU- Pacific Lamprey Threats Assessment and RIP Annual Meeting May 2, 2018

Conference call attendees:

ODFW: Ben Clemens, Katherine Nordholm, Jeff Ziller, Alex Farrand,
Ben Walczak, Jeremy Romer

ODEQ: Priscella Woolverton

PGE: Nick Ackerman

McKenzie Watershed Council: Jared Weybright

Molalla River Watch: Asako Yamauro

CTGR: Lawrence Schwabe, Torey Wakeland

CRITFC: Brian McIlraith

USFWS: Ann Gray, Jen Poirier

Agenda-2018 Annual Pacific Lamprey Meeting for the Willamette RMU

Introductions

Conservation Initiative- Framework and Updates

Assessment Ranks/Results

2017 Implementation Plan –overview/ review

2017 Priority Projects

BPA Cost Savings fund

2018 Priority Projects

Partner Updates/ Information Sharing

MEETING NOTES

Conservation Initiative- Framework

This meeting is for the Pacific lamprey Willamette Regional Management Unit Team, and one of many that occur under the Pacific Lamprey Conservation Initiative (PLCI). There are 4 “levels” of teams:

- Policy Team (meets 1 year- upper level managers/directors and Tribal elders)
- Conservation Team (meets 2x year- mid-level group; interface between the Policy Team and all other groups)
- Pacific Lamprey Technical Working Group (meets 2x year- subgroups meet as needed to accomplish goals).
 - Multiple subgroups for various issues (passage, dredging, engineering, habitat restoration, ocean phase, genetics, tagging etc): These groups are tasked with responding to information requests and developing products as directed by the Conservation Team)
- Multiple Regional Management Unit (RMU) Teams (see map in ppt pdf)
 - Regions all up and down the coast and Pacific Northwest, includes Alaska.
 - Goals are to
 - Access local knowledge on threats and ongoing restoration, monitoring and research, which is documented annually
 - Identify and prioritize information needs and restoration projects for potential funding and

- provide a forum for coordination, collaboration at a local level
- New RMU this year: Ocean.
- -- ***YOU'RE INVITED TO PARTICIPATE IN ANY and ALL of these-***
 - let Ann know what you want to participate in.

Conservation Initiative Updates:

USFWS continues to **maintain and update website:**

<https://www.fws.gov/pacificlamprey/mainpage.cfm>

- Technical documents (Passage, Best Management Practices)
- Updated Distribution Maps
- Regional Implementation Plans for each RMU
- Data Clearinghouse
- Outreach/Education materials
 - **Story Map** (new for 2017- check it out:
<https://fws.maps.arcgis.com/apps/MapJournal/index.html?appid=34d16fcc9e5d444c87eeab169c829dde>)
 - Curriculum

Conservation Team successfully gained membership into the **National Fish Habitat Partnership** (NFHP): <http://www.fishhabitat.org/the-partnerships/pacific-lamprey-partnership>.

There are about 20 groups within this Partnership and it has the potential to be a source of funding in the future. Bob Rose (Yakima Nation and co-chair of the Conservation Team) recently attended a NFHP meeting and , based on discussions there, is optimistic about the potential to receive administrative support funds in the near future.

In December 2017, the Conservation Team organized and hosted **the 2017 Lamprey Summit:** a policy meeting that is to occur every five years to reaffirm commitments to the Pacific Lamprey Conservation Agreement (<https://www.fws.gov/pacificlamprey/AgreementMainpage.cfm>). All parties reaffirmed their commitment; praise was provided to the amount of work and organization that had been done to date, but some emphasis was placed on getting more on-the-ground benefits to lamprey restoration, including funding.

The Conservation Team was also successful in receiving BPA's approval to for the PLCI to receive funding under **BPA's Cost Saving Funds**, which will be put towards lamprey restoration projects in the Columbia River Basin. Projects will be selected from the proposals in the Regional Implementation Plans (RIPs). ~\$200K was made available for spending in 2018; BPA requirements for 2018 funds were that the project was "shovel-ready", funds to spent in FY 2018 (so before October 2018), and be an "on-the-ground" restoration (not monitoring, not research). These criteria eliminated many projects; however, the South Fork McKenzie Floodplain Restoration (Phase 1) was provided some funding (\$110K). This year was considered a pilot year for this exchange, but we are hoping funds will continue to be provided in future years, and that funding is expanded to include monitoring and research needs- as much of what we need for lamprey right now is in these categories.

The Lamprey Technical Workgroup completed the “**Practical Guidelines for Incorporating Adult Pacific Lamprey Passage at Fishways**” available online at

<https://www.fws.gov/pacificlamprey/Documents/2017.06.20%20LampreyPsgFINAL.pdf>

If you have questions or feedback, please contact Ann Gray- Also – if you have a case study that would be appropriate to append to this document, please contact Ann.

Collaboration: **Drawdown Study at Leaburg Reservoir** on McKenzie in March 2018 to examine the effects of drawdown on larval lamprey (ramping rate ~1.8 inches per hour). Study design was developed by USFWS-Vancouver Fisheries office (Joe Skalicky, Judith Barkstedt, and Julie Harris) and ODFW (Ben Clemens). Pre- and post-drawdown sampling/population estimates of larvae were completed using a deep water electrofishing boat (Thanks, Joe and Judith!). During drawdown, 3 different techniques were effectively used to enumerate lamprey from the sediments: observation, dry shocking, sediment removal. One technique (liquefaction) was planned but not used because the water pressure was too forceful; however, modification of the pump could potentially make it more useful. Results will be written up and distributed at a future date. While it's difficult to conclude much from initial results at this time, some are provided below:

- Pre-draw down larvae counts: ~11.4 fish/square meter (or ~13,000 fish)
- Post-drawdown larvae counts: ~2.5 fish/ square meter
 - Counts went down, but cannot say why (they left?, they died? unknown)
- Not all larvae are coming out of the sediment even under slow drawdown conditions. Short video (provided by Patrick Cooney of Smith Root): <https://smith-root.wistia.com/medias/k3dr0z7f8n#>

ODFW (Ben Clemens) and Ralph Lampman (Yakima Nation) hosted a free **Lamprey Identification Workshop** in March 2018 in the Dalles. Ralph was able to provide live lamprey of both Western Brook and Pacific lamprey in many sizes and life stages. ODFW hopes to be able to host more similar workshops in the future. Another short video (provided by Patrick Cooney of Smith Root): <https://smith-root.wistia.com/medias/25dlyxydv9#>

Lamprey Assessment- NatureServe Ranks/Results

Based on the data collected at last year's meeting, new distribution maps have been completed, the NatureServe model was updated and a new draft Assessment is in internal review at the USFWS. The greatest threats to lamprey in the Willamette RMU are:

- Stream & floodplain degradation
- Flow alterations
- Water quality
- Passage

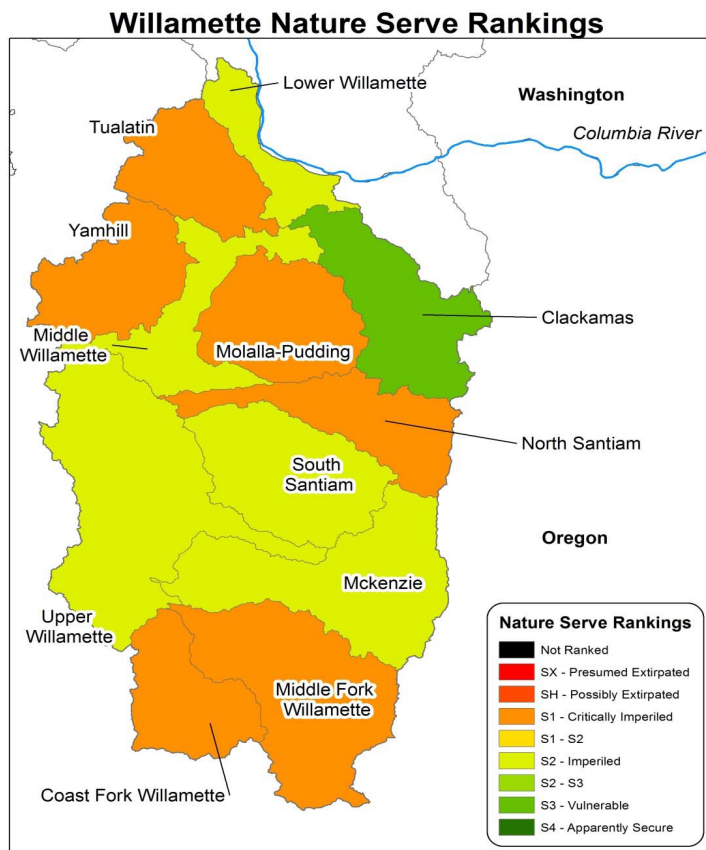
NatureServe model used in 2011 to assess risks to lamprey populations across the range in the Pacific Northwest was updated, as agreed to in the Conservation Agreement. This update is to occur ~ every 5 years. The model uses several parameters:

- Range Extent
- Occupancy (current: historical)
- Adult population size
- Short-term population trend (~30 years)

- Threat- the most significant (scope & severity)

These are the rankings based on information summarized in the 2017 meeting minutes, which are an appendix to the Final 2017 Willamette Regional Implementation Plan (emailed April 27, 2018), and available online at

https://www.fws.gov/pacificlamprey/Documents/RIPs/2017%20Revised%20Willamette%20RIP_appendices.pdf



The updated 2018 Assessment (based on the results of those who participated in the 2017 meeting; now in internal review in internal review) will be available in a couple of months or so, and details the NatureServe model, as well as changes in the rankings for all HUCs in all RMUs. If you have any questions in the meantime, feel free to contact Ann or Jen.

Priority Project Proposals

Regional Implementation Plans (RIP) for each RMU are to be revisited on an annual basis to highlight:

- key threats identified in the Threats Assessment (which is only once every 5 years),
- recent restoration/conservation benefits to lamprey that have been accomplished in that RMU, and
- restoration/research/monitoring projects for lamprey that address the key threats and research needs that are subsequently submitted for funding.

Submitted in 2017:

- PGE Effective Population Size
- ODFW Leaburg Ladder Monitoring Improvement
- SF McKenzie Floodplain Restoration (funded partially Phase 1 with BPA Cost Savings)

To submit a project for 2018, please fill in the Priority Project Template with your proposed project information and provide to Ann Gray by May 31, 2018. We hope that we are able to fund some projects with the BPA cost-savings funds later this year, and as well as other monies that have been available periodically and used to fund projects in the past. Individuals from the Willamette RMU can put forth any number of projects that are “ready to go” and will address key threats or uncertainties as identified in the Threats Assessment. If there are more than 5 projects, the Willamette RMU team (team) will then prioritize those projects felt best to be put forward for funding requests. The projects can be for restoration or research, address a critical threat or information need, and could be opportunistic.

At the time of the meeting, these were the restoration projects proposed so far for 2018:

- Improve counting stations for lamprey at Leaburg Dam (McKenzie River- carried over from 2017),
- Genetic pedigree to determine population size (Clackamas- carried over from 2017),
- S. Fork Pedee Passage (culvert to bridge) and Instream Habitat Enhancement (LWC),
- Upper Luckiamute Mainstem Habitat Enhancement (LWC).

Other potential projects could be (such as Fall Creek passage, drawdown, translocation, distribution studies, passage studies); however, no one on the call championed any project; others could come in over the next month.

Next Steps: For the 2018 RIP, the goal is to include up to 5 proposals, which are then ranked by the Conservation Team relative to all other RMU projects and selected as funding becomes available. Currently, the BPA cost-saving funds are the only available \$\$ specific to the PLC Initiative. **Other potential funding sources are listed** in the Table at the end of this document. Take a look and see where your project might fit in best.

Persons who want to submit a project for consideration by the team should submit a Priority Project description and send it to Ann Gray by May 31, 2018. If there are more than 5 proposals, there will be a future conference call/webex to rank /prioritize projects and determine which ones will be included in the 2018 Willamette RIP. If 5 or less proposals, all will be included in the RIP. Shortly after the team completes the prioritization process (if needed), a draft RIP will be out to the team for review. After the review period, Ann will finalize the RIP and submit it to the Conservation Team.

ROUND TABLE DISCUSSION: **ONGOING CONSERVATION MEASURES/ UPDATES**

Torey Wakefield: The **Confederated Tribes of the Grand Ronde** continue the **Fall Creek Translocation** of adults from Willamette Falls to above Fall Creek. ~240 adults have been transferred above Fall Creek Dam since 2012, and are planned to occur for through 2020. Redd

surveys since translocation began have found that these fish are spawning in these reaches. Electrofishing has detected ammocoetes, and in fall 2017, several macrophthalmia were collected in the screw trap below the dam.

Nick Ackerman: **PGE** has begun a **trap and haul program** this year that will transfer ~250 adult lamprey above **North Fork Dam on the Clackamas**; efforts will continue until 2025; intent is to increase larval population /pheromone attraction for adults, and as a stop-gap measure as lamprey passage is improved at the North Fork fishway.

Nick Ackerman also reported that the **PGE surface collectors at North Fork and River Mill** dams are collecting juvenile lamprey in good numbers, both ammocoetes and macrophthalmia. Often a pulse of lamprey juveniles come through during freshets (water is turbid). While the collection efficiency is unknown, it is somewhat surprising the numbers of lamprey collected at these surface collectors, especially at times outside freshets when the water is clear.

Ben Clemens (ODFW) reported that he is working on a **Lamprey Conservation Plan** for the state of Oregon, which will cover 4 species (Western River, Western Brook, Pacific and Pacific Brook lamprey). The status and limiting factors rankings in this plan are being cross-walked with those from the USFWS, is to be consistent with the PLCI. The plan is expected to be completed in 2019.

Lawrence Schwabe (CTGR) inquired about lamprey passage efficiency at the **Bennett Dams on the North Santiam**. Ben Clemens and Alex Farrand (ODFW) indicated that Upper Bennet Dam has video counts year-round and lower Bennett has video counts but for 3-4 months out of the year (winter months)- see graph below from Ben. Counts should be considered as relative indices and not full counts, as lamprey may be able to pass undetected by the video. This is also true of the Leaburg Dam fishways.

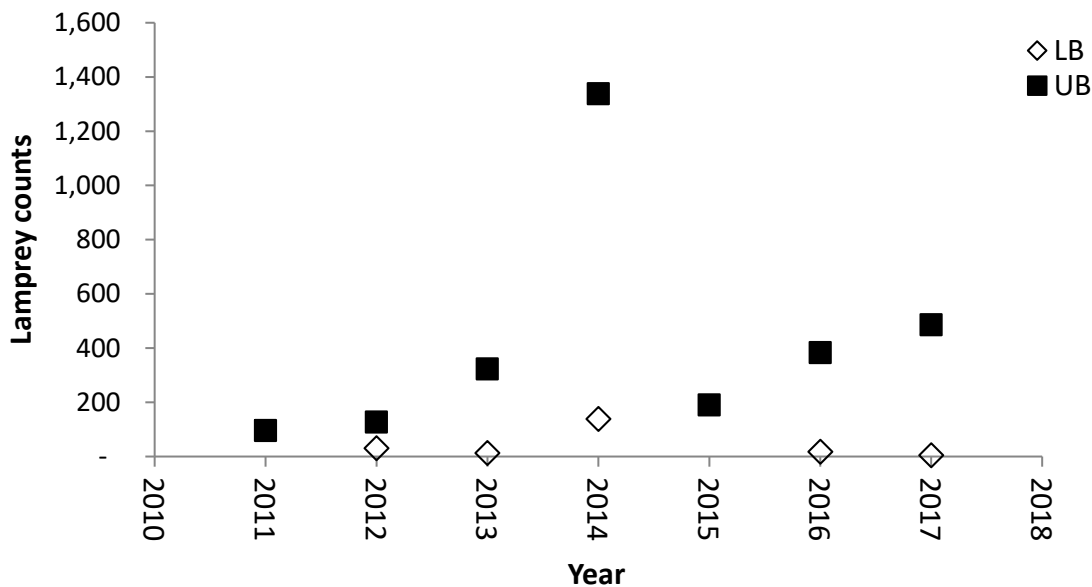


Figure 1. Counts of adult Pacific Lamprey at two low-head dams in the North Santiam River: Lower Bennett Dam (“LB”) and Upper Bennett Dam (“UB”). Counts occurred 2011 – 2017.

Fall Creek Passage (not discussed at the meeting- information from Doug Garletts, USACE): USACE continues to upgrade their adult fish collection facilities associated with the USACE's Willamette Valley Project. The **newly constructed Fall Creek Adult Fish Collection Facility** is on line and in process of commissioning. No lamprey news at the new adult collection facility yet. We have been hauling winter steelhead (16) and one Chinook plus some other native fish, but no signs of lamprey. The facility was designed with lamprey passage in the ladder in mind and we hope to place our fyke traps in and around the waterways of the facility soon and also to go out with the Grand Ronde and help with the translocation from Willamette Falls effort this year.

Willamette Falls Estimates (not discussed at the meeting- information from Cyndi Baker and Carson McVay, CTWS)

Continued evaluation of **lamprey population estimates** by CTWS will occur in 2018. Currently the fish are running late. There was a short period of warmer weather when some movement happened, but then it cooled down again and upstream migrants stopped. In 2017, there were 277,577 adult lamprey at Willamette Falls; of those, 80,848 passed (29%).

More Resources:

- **USFWS Lamprey Conservation Initiative:**
www.fws.gov/pacific/Fisheries/sphabcon/Lamprey/
- **2017 Regional Implementation Plans**
https://www.fws.gov/pacificlamprey/PLCI_RIPs.cfm
- **Distribution Maps** <https://www.fws.gov/pacificlamprey/Maps.cfm>
- **Data Clearinghouse**
<https://www.sciencebase.gov/catalog/item/53ad8d9de4b0729c15418232>
- Ann_E_Gray@fws.gov; 503-231-6909
- Jennifer_Poirier@fws.gov; 360-604-2500
- Erin_Butts@fws.gov; Contact for mapping information (corrections, etc.), data clearinghouse and webpage questions

Meeting Adjourned

DRAFT Pacific Lamprey Conservation Initiative: identification of program types and funding. Compiled April 24, 2018.

Agency Program	Funding Source Title	Types of projects and applicants	Current / Recent Application to Pacific Lamprey	Average / Range of Available Funds	Application process and deadlines
US Fish and Wildlife Service	Pacific Northwest Funds	Region 1 funds available for Passage, Habitat restoration, and Monitoring and evaluation	Example Projects: Yakima River adult lamprey passage study and structure development. Warm Springs hatchery adult lamprey passage structure. Umatilla River adult lamprey passage structure at 3-mile dam and Westland diversion dam	\$50-60K per project. Approximately \$100-150k per year	Work with the four Fish and Wildlife Conservation offices in Region1 to develop project proposals. Sponsors are asked to develop proposals from Regional Implementation Plan high priority project lists.
US Fish and Wildlife Service	National Fish Passage	Region 1 funds available for fish habitat restoration	Necanicum River dam passage modification and habitat restoration 2012	\$50-100K per project. Approximately \$900K per year for projects 130K per year for engineering	Work with the four Fish and Wildlife Conservation offices in Region1 to develop project proposals. Sponsors are asked to develop proposals from Regional Implementation Plan high priority project lists. NFP projects for other species are instructed to consider lamprey friendly passage criteria.
US Fish and Wildlife Service	Tribal Grant Program	Regions 1,7,and 8 Development of restoration plans, fish habitat restoration	<p>Example projects:</p> <ul style="list-style-type: none"> • Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians received \$96,635 in 2016 for the Tenmile Lakes Basin Lamprey Conservation Project. • Lower Elwha Klallam Tribe awarded \$187,125 in 2016 to study and document Lamprey re-colonization of the Elwha River post dam removal. • Cow Creek Band of Indians 2012 \$200,000 Lamprey Conservation in the Umpqua Basin Project • Wiyot Tribe in 2011 \$200,000 Eel River lamprey evaluation and restoration plan • Confederated Tribes of the Grand Ronde Reservation 2010 Lamprey Upstream Migration in the Willamette Valley • 	As a reminder, Tribal Wildlife grants are competitive within each region and the project is limited to \$200,000. In 2016 \$964,163 was awarded to tribes in Oregon, Washington and Idaho.	We will provide a webinar about the application process on June 7th. Nathan Dexter will have more details available on the Region 1 tribal website and via outreach as we get nearer to that date. Questions may be directed to Nathan at (503) 736-4774 or nathan_dexter@fws.gov . https://www.fws.gov/nativeamerican/grants.html

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US Fish and Wildlife Service	National Fish Habitat Partnership	Region 1,7, 8 potential future funds for Habitat restoration, and Monitoring and evaluation, operational support		No funds available for Pacific Lamprey Fish Habitat Partnership available at this time.	
OWEB	Small Grant Program	Improve instream habitat (e.g. place large wood or boulders, manage erosion, control invasive species), fish passage (remove or replace irrigation or push-up dams, culverts or stream crossings)	Potential future funding source for lamprey conservation work in Oregon.	<ul style="list-style-type: none"> Up to \$15,000 Must secure 25% match funding <u>Applicant:</u> Watershed council, Soil & Water Conservation District or Tribe <u>Project Host:</u> local, state, or federal agency, etc.	Apply online - local small grant team sets its own application deadline and review period. See http://www.oregon.gov/oweb/pages/index.aspx
OWEB	Monitoring Grant	<ul style="list-style-type: none"> Monitoring/surveys to determine long-term patterns (status and trend) targeting habitat, juvenile fish, adult fish, water quantity, water quality, etc. Monitoring/surveys to determine effectiveness of restoration project in meeting biological objective. 	Potential future funding source for lamprey conservation work in Oregon.		Apply online in the fall. See http://www.oregon.gov/oweb/pages/index.aspx
OWEB	Restoration Grant	<ul style="list-style-type: none"> Instream habitat restoration including: bank stabilization, fish passage improvement, fish screening, flow, habitat restoration 	Potential future funding source for lamprey conservation work in Oregon.		Apply online in the spring or fall. See http://www.oregon.gov/oweb/pages/index.aspx
OWEB	Technical Assistance Grants	<ul style="list-style-type: none"> TA-1: Technical Design – development of a technical design for a restoration project TA-2: Technical Planning – development of an implementation plan for restoration activities 	Potential future funding source for lamprey conservation work in Oregon.		Apply online in the spring or fall See http://www.oregon.gov/oweb/pages/index.aspx
USGS	Science Support Partnership Program	Research & technical assistance USGS partners with the USFWS	Potential future funding source for lamprey conservation work in Region 1	≈\$178,000 available in FY2019 for new projects in Region 1	FY2019 application due Friday June 15 th , 2018

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Bonneville Power Administration	Northwest Power & Conservation Council's Cost Savings Program	High priority lamprey monitoring and restoration actions identified in Columbia basin RMU Regional Implementation Plans. Highest priority will be given to on-the-ground restoration projects (e.g., habitat restoration, passage improvements, supplementation), then to monitoring and evaluation projects, and then to inventory projects.	<p>Example Projects:</p> <ul style="list-style-type: none"> McKenzie Watershed Alliance received \$150,000 for floodplain restoration project on lower South Fork McKenzie River (Willamette RMU). US Bureau of Reclamation and Yakama Nation Fisheries received \$40,000 for the installation of 2 VWW passage structures at Prosser Dam in the Yakima subbasin. The Nez Perce Tribe received \$30,000 to upgrade infrastructure used to trap, haul and overwinter adult lamprey captured in lower Columbia River for translocation past mainstem dams in Snake Basin. 	\$100,000 maximum per year	Proposals due to Regional Implementation Plan in late August
US Army Corps of Engineers					
US Bureau of Reclamation	Science and Technology Project	Research proposals, typically for developing innovative ideas or methods that could be applicable to Reclamation.	Any lamprey issue related to Reclamation project. Must be led by a Reclamation staff.	\$100,000	Annual call for proposals in April with Deadline in July. Amount that is funded with each proposal varies \$80,000 – \$100,000
US Forest Service					
NOAA Fisheries	Pacific Coastal Salmon Restoration Fund	NOAA Competitive grant program funding salmon and steelhead habitat restoration, etc.	No projects are specifically targeted to Pacific lamprey, however, many of the PCSRF salmonid habitat restoration projects and fish passage projects (e.g., culverts) would also benefit lamprey	Approximately \$65 million annually based on FY14-FY16	Eligible entities include the states of CA, OR, WA, ID, AK, as well as Pacific tribes.
Oregon Wildlife Foundation		<ul style="list-style-type: none"> Habitat restoration Natural resource/outdoor education Invasive species removal/control Studies that support improved fish/wildlife management 	Potential future funding source for lamprey conservation work.	\$5,000 or less	<p>2018 application deadlines: 4/17, 8/6, 10/29</p> <p>http://www.myowf.org/grants</p>
National Fish and Wildlife Foundation	Bring Back the Natives Program	Restoration activities that address key limiting factors for focal species (e.g. salmon, steelhead, Pacific Lamprey)	Potential future funding source for lamprey conservation work	<p>Grants range in size from \$25,000 to \$100,000</p> <p>Must provide non-federal match of at least \$1 for every \$1 of grant funds requested.</p>	<p>Annual call for proposals in spring</p> <p>http://www.nfwf.org/bnb/Pages/home.aspx</p>

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Oregon Department of Fish and Wildlife	Restoration and Enhancement Program	<ul style="list-style-type: none"> Projects that increase recreational angling opportunities, access to the fish resource, or improve fish management capabilities (e.g. new fishways and screens, improvements to fish habitat that benefit fish (e.g. fish passage or habitat modifications). Aquatic inventories that characterize populations, habitat or the effectiveness of other projects. Public outreach/education 	Potential future funding source for lamprey conservation work	Grants range in size	2018 Application deadlines: July 9 th , 2018 October 26 th , 2018 https://www.dfw.state.or.us/fish/re/2016_revamp/how.asp
Wildlife Conservation Society	Climate Adaption Fund	1-2 year projects that implement on-the-ground actions that assist wildlife and ecosystems to adapt to climate change at a landscape scale	Potential future funding source for lamprey conservation work	\$50,000 to \$250,000 per project	https://www.wcsclimateadaptationfund.org/program-information/