Pacific Lamprey

2018 Regional Implementation Plan

for the

Oregon Coast

Regional Management Unit

South Coast Sub-Region

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I. Status and Distribution of Pacific Lamprey in the RMU

A. General Description of the RMU

South Oregon Coast Sub-Region

The Oregon Coast Regional Management Unit is separated into two sub-regions equivalent to the USGS hydrologic unit accounting units 171002 (Northern Oregon Coastal) and 171003 (Southern Oregon Coastal). The South Oregon Coast sub-region includes all rivers that drain into the Pacific Ocean from the Umpqua River basin south to the Smith River boundary in California. It is comprised of twelve 4th field HUCs ranging in size from 1,216 to 4,662 km^2 (Table 1).Watersheds within the South Oregon Coast sub-region include the North and South Umpqua, Umpqua, Coos, Coquille, Sixes, Upper, Middle and Lower Rogue, Applegate, Illinois and Chetco (Figure 1).

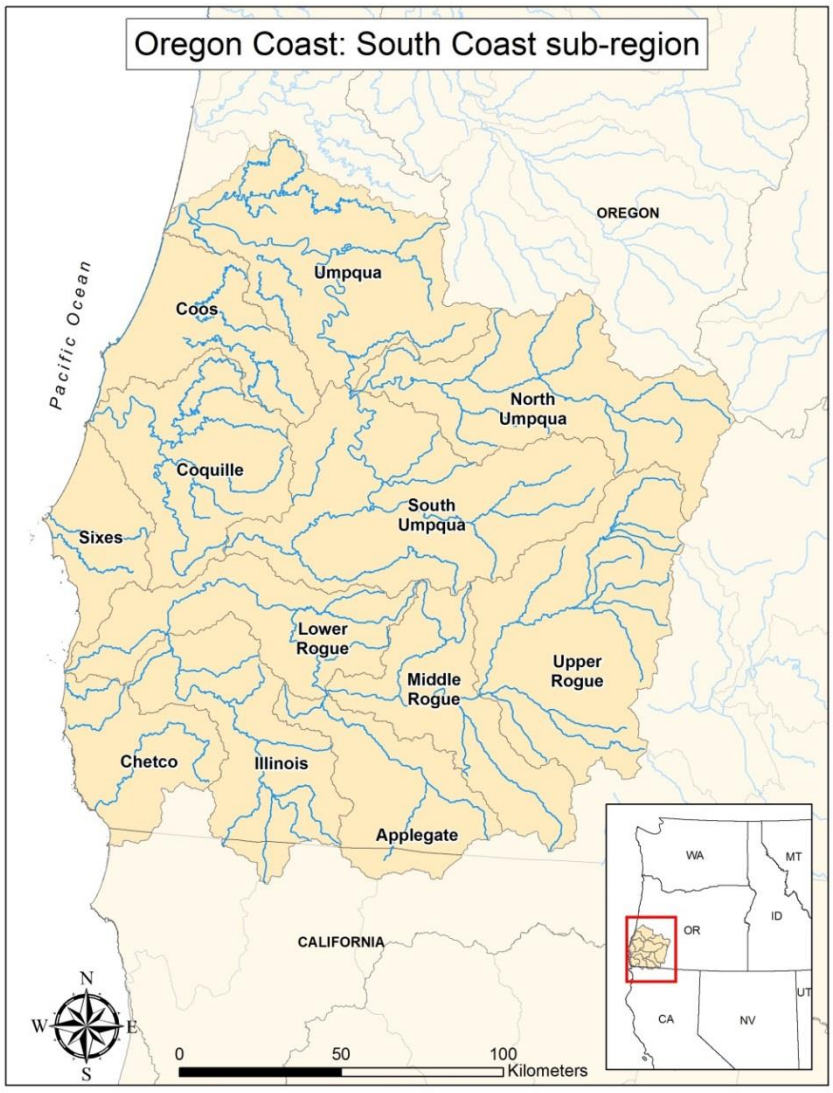


Figure 1. Map of watersheds within the Oregon Coast RMU, South Coast sub-region.

Table 1. Drainage Size and Level III Ecoregions of the 4th Field Hydrologic Unit Code (HUC) Watersheds located within the South Oregon Coast sub-region.

Watershed	HUC Number	Drainage Size (km^2)	Level III Ecoregion(s)
North Umpqua	17100301	3,544	Cascades, Klamath Mountains
South Umpqua	17100302	4,662	Coast Range, Cascades, Klamath Mountains
Umpqua	17100303	3,918	Coast Range, Cascades, Willamette Valley, Klamath Mountains
Coos	17100304	1,909	Coast Range
Coquille	17100305	2,736	Coast Range, Klamath Mountains
Sixes	17100306	1,216	Coast Range
Upper Rogue	17100307	4,180	Cascades, Klamath Mountains, Eastern Cascades Slopes and Foothills
Middle Rogue	17100308	2,283	Cascades, Klamath Mountains
Applegate	17100309	2,005	Klamath Mountains
Lower Rogue	17100310	2,347	Coast Range, Klamath Mountains
Illinois	17100311	2,580	Klamath Mountains
Chetco	17100312	1,654	Coast Range, Klamath Mountains

B. Status of Species

Conservation Assessment and New Updates

Current Pacific Lamprey distribution in the South Coast sub-region is greatly reduced from historical range (Table 2). The 2017 Assessment ranking of current distribution was reduced from 2011 rankings in all HUCs except the Umpqua, Coquille, and Middle Rogue. The decline of the rankings in these areas is a result of more accurately calculating the numeric area of occupancy (versus using a visual estimate), rather than a decline in Pacific Lamprey range (cite 2017 Assessment when complete). Overall, current understanding of Pacific Lamprey distribution has expanded in many watersheds due to increased sampling effort (e.g., smolt trapping, redd surveys, occupancy sampling), and improved recognition of lamprey redds. Distribution information is still limited in the Lower Rogue and Chetco River.

Population abundance was updated in the North Umpqua, Umpqua, Coos, Sixes, and Applegate River using new information from Oregon Department of Fish and Wildlife (ODFW) to estimate a range of Pacific Lamprey population abundance using available redd counts. As part of the monitoring for winter steelhead spawning populations, the Oregon Adult Salmonid Inventory and Sampling (OASIS) field crews record data on lamprey spawners and redds. These estimates are considered minimum population numbers, as the surveys are focused on steelhead, and end before the completion of Pacific Lamprey spawning (see Jacobsen et al. 2014; Jacobsen et al. 2015; Brown et al. 2017). Adult Pacific Lamprey abundance is unknown in the Upper Rogue, Middle Rogue, Lower Rogue, Illinois, and Chetco Rivers

Short-term population trend (defined as the degree of change in population size over 3 lamprey generations or 27 years), was ranked as stable in most watersheds with available abundance information (see above). The only ongoing long-term record of lamprey counts in the South Coast is at Winchester Dam on the North Umpqua. The population has been monitored since 1965 and counts indicate a significant downward trend over time. For example, during 1965 – 1985, the average count of adult Pacific Lamprey at Winchester Dam was 12,343 fish (range: 877 – 46,785), compared with 1986 – 2012, when the average count was only 433 fish (range: 15 – 2,726). However the number of lamprey passing over Winchester Dam has recently shown a slight increase since the lamprey ramp was employed during 2013 – 2016, with an average of 964 lamprey (range: 758 – 1,278) counted passing. It is unclear if the increase in lamprey in recent years is due to the installation of the lamprey ramp and more efficient counting methods, actual increases in the number of adults migrating upstream past the dam, or both. Many watersheds have 3-8 years of high quality data (~2009 – 2016), but information is inaccurate or undocumented before this time. The abundance of lamprey population(s) has generally increased over the last several years, but without a longer term data set it is unknown whether this apparent increase is simply an upswing in a larger cyclical trend.

Table 2. Population demographic and conservation status ranks (see Appendix 1) of the 4th Field Hydrologic Unit Code (HUC) watersheds located within the South Oregon Coast Sub-region. Note – coho salmon distribution was used as a surrogate estimate of historical lamprey range extent in areas where historical occupancy information was not available. Ranks highlighted in Yellow indicate a change from the 2011 Assessment.

Watershed	HUC Number	Conservation Status Rank	Historical Occupancy (km^2)	Current Occupancy (km^2)	Population Size (adults)	Short-Term Trend (% decline)
North Umpqua	17100301	S2↑	1000-5000	100-500	1000-2500	Stable
South Umpqua	17100302	S1↓	1000-5000	100-500	250-2500	30-50%
Umpqua	17100303	S2	1000-5000	500-2000	250-1000	Stable
Coos	17100304	S2	1000-5000	100-500	1000-2500	Stable
Coquille	17100305	S2	1000-5000	500-2000	2500-10,000	Stable
Sixes	17100306	S2	1000-5000	100-500	250-1000	Stable
Upper Rogue	17100307	S1↓	1000-5000	100-500	Unknown	Unknown
Middle Rogue	17100308	S2↑	1000-5000	100-500	Unknown	Unknown
Applegate	17100309	S2	1000-5000	100-500	250-1000	Stable
Lower Rogue	17100310	S2	1000-5000	100-500	Unknown	Unknown
Illinois	17100311	S1↓	1000-5000	100-500	Unknown	Unknown
Chetco	17100312	S2↓	250-1000	100-500	Unknown	Unknown

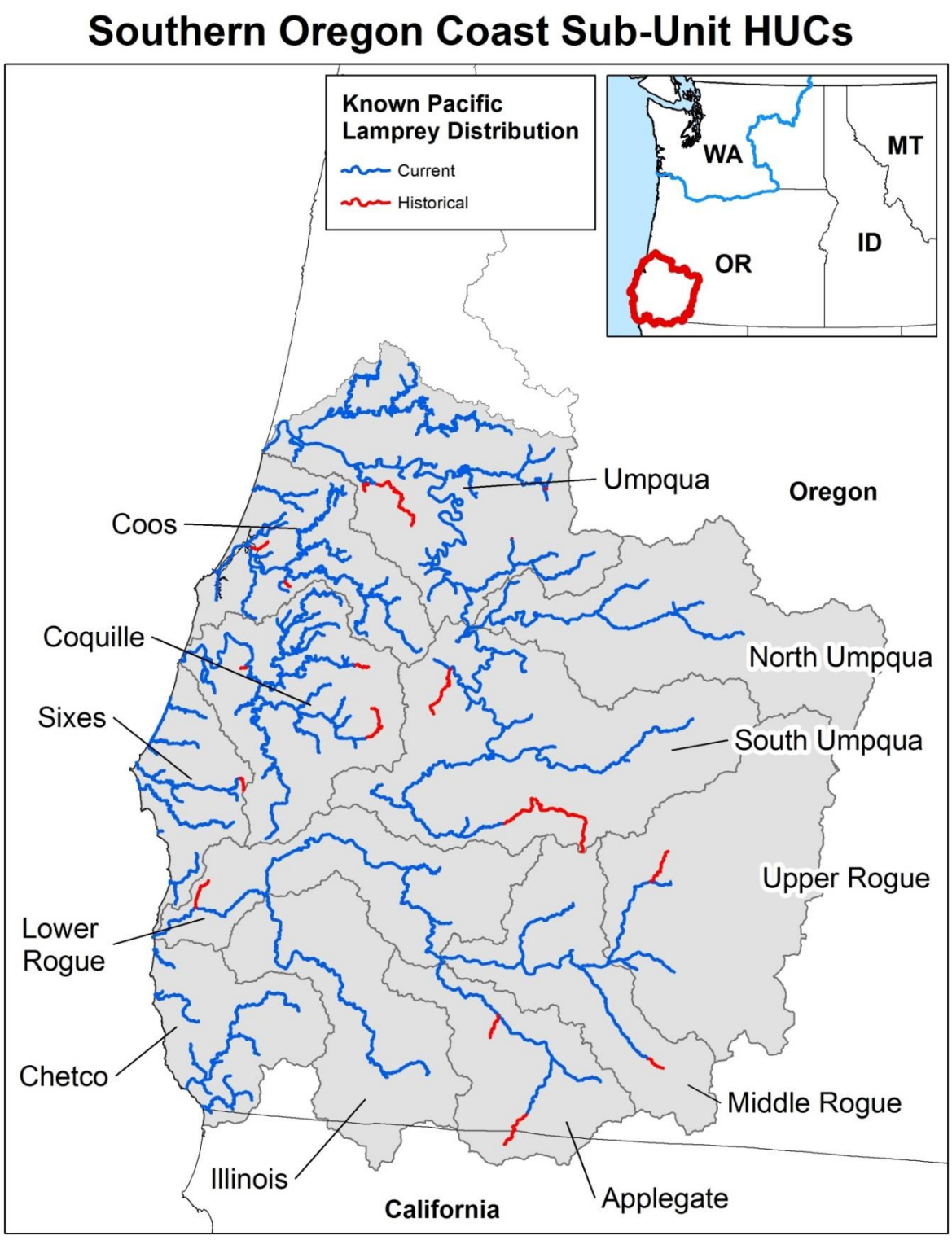


Figure 2. Current and historical known distribution for Pacific Lamprey: Oregon Coast Regional Management Unit, South Coast sub-region (USFWS Data Clearinghouse 2017). Historical Pacific Lamprey distribution depicted in map was obtained from published literature, tribal accounts and state and federal agency records.

Distribution and Connectivity

Threats to passage were considered low in the South Coast sub-region. A number of major passage issues have been addressed in the North Umpqua (e.g., Rock Creek Dam upstream of the hatchery, Soda Springs Dam, Winchester Dam) and an unprecedented four dams have been removed from the Middle Rogue since 2007 (i.e., Savage Rapids, Elk Creek, Gold Hill, and Gold Ray Dam). However, a number of existing structures continue to impede passage or alter the hydrograph to the detriment of fish and aquatic wildlife. Most notably, Applegate Dam and Murphy Dam on the Applegate River, Galesville Dam on Cow Creek (South Umpqua), Emigrant Dam on Bear Creek (Middle Rogue), and Lost Creek Dam on the Upper Rogue completely block upstream passage and access to historical spawning and rearing habitat.

Private and municipal water diversions are abundant within the South Coast sub-region. Contemporary structures are required to operate and maintain screening or by-pass devices to protect fish from impingement or entrainment. Unfortunately there are still a large number of aging or obsolete diversions with inadequate screening and open irrigation ditches that may harm or entrap fish.

Faulty tidegates are numerous in tidally-influenced areas of the Coos and Coquille Rivers. The Coquille Watershed Association completed a tidegate inventory in the Coquille watershed in 2015 and is working with The Nature Conservancy, ODFW, and landowners to prioritize the removal and/or replacement of failing structures. Barrier culverts were also identified as a threat in the South Umpqua, Coos and Coquille Rivers. Stakeholder groups are working to systematically remove or replace problem culverts to restore fish passage.

C. Threats

Summary of Major Threats

The following table summarizes the key threats within the South Coast sub-region as identified by RMU participants during the Risk Assessment revision meeting in March 2017.

Table 3. Summary of the Assessment results for the key threats of the South Oregon Coast sub-region.

	Dewatering and Flow Management		Stream and Floodplain Degradation		Water Quality		Lack of Awareness		Climate Change	
Watershed	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity
South Oregon Coast										
North Umpqua	4	3	2	3	3	2.5	4	2	4	3
South Umpqua	3	4	4	3	4	3	4	2	4	4
Umpqua	3	3	3	3	3	3	4	2	4	4
Coos	2	2	3	3	3	3	4	2	3	3
Coquille	2.2	2	3	3	3.5	3	4	2	3	3
Sixes	1	2	3	3	3	3	4	2	2	2
Upper Rogue	3	3	3	2.5	3	3	4	2	2.5	2.5
Middle Rogue	3	3	3	3	3	3	4	2	3	2.5
Applegate	3	3	3	2.5	3	3	4	2	3	2.5
Lower Rogue	1	1	1	1.5	1	1	4	2	2	2
Illinois	4	4	3	3	4	4	4	2	4	3.5
Chetco	1	2	1	2	1	2	4	2	2	2
Average Scope/Severity	2.54	2.67	2.67	2.71	2.88	2.79	4.00	2.00	3.04	2.83
Rank	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**M**	**M**
Mean	2.60		2.69		2.83		3.00		2.94	
Drainage Rank	**M**		**M**		**M**		**M**		**M**	

Current Threats

Dewatering and Flow Management

Water withdrawals for irrigation, municipal, or residential purposes leave many watersheds in the South Coast sub-region dewatered or with inadequate flow during summer and fall months. Low flow conditions are most severe in the Illinois River and Umpqua Basin. In recent years early cessation of rains, below average snow packs, and above average air temperature have further contributed to reduced stream flows in much of the region. The proliferation of marijuana farms and potential impacts from climate change may exacerbate this situation in the future as well. Low flow conditions may reduce spawning habitat availability, prevent access to backwater or side channel habitats, create low water barriers, and may contribute to mortality if incubating eggs or burrowing larvae are dewatered or exposed to a high temperature or low oxygen environment.

Stream and Floodplain Degradation

Stream and floodplain degradation is widespread throughout the South Coast sub-region. Within lowlands, wetlands and side channels have been channelized, diked, diverted or drained to prevent flooding, create farmland or pastures, and provide land for commercial and residential development. In upland areas, historical and ongoing timber practices, agriculture, road construction, and urbanization have deforested or altered the function and diversity of riparian vegetation. Suction dredge mining is of particular concern in the South Umpqua, Umpqua, and Illinois River. This practice may increase sedimentation and turbidity, alter stream channel topography, disturb and destabilize spawning and rearing habitat, kill incubating eggs and larvae, and may re-suspend contaminants such as mercury or other heavy metals in the water body.

Water Quality

Current water quality conditions are impaired in many watersheds; and elevated water temperature remains a widespread issue throughout the South Coast sub-region (https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Approved-by-EPA.aspx). Excessive temperatures are likely associated with heavy water withdrawals and extensive floodplain degradation. Chemical and herbicide inputs from agriculture and industrial forest practices were also noted as problematic in the Umpqua Basin and Chetco River.

Lack of Awareness

Scientific understanding of Pacific Lamprey life history characteristics, habitat needs, physiological limitations, and awareness in terms of Best Management Practices when conducting instream work has improved over the last 5-10 years. Nevertheless, there is still a large portion of the human population that is not aware of lamprey, its importance to freshwater ecosystems, and how to avoid impacts to them.

Climate Change

Some watersheds in the South Coast sub-region may be more resilient to impacts of climate change (Upper Rogue, Applegate, Sixes, North Umpqua), while others may be at greater risk from potential change (Illinois, Umpqua, South Umpqua) based upon the underlying geology,

impoundments, and other factors. Climate models predict increasing water temperatures, which may restrict habitat availability. Increased high intensity storm events and more precipitation falling as rain at higher elevations could cause flooding, which may lead to erosion and scouring of lamprey habitat. Earlier melting of snow pack due to warmer ambient temperatures may alter flow regimes during periods of lamprey spawning.

The impacts of relatively warm water temperatures (e.g., ≥20°C) on the embryonic development, physiology, adult migrations, reproductive capability and evolutionary pressures can be multitudinous and substantial (Clemens et al. 2016).

Predation

Although not considered a 'key threat', predation of lamprey ammocoetes by non-native fish species is a known issue in the South Coast sub-region. Smallmouth bass predation on juvenile lamprey has been documented in the Umpqua Basin (Schultz et al. in press) and is also believed to occur in the Coquille River. Furthermore, the introduction of the non-native Umpqua pikeminnow to the Applegate, Illinois, Chetco, and Rogue Rivers has likely increased predation of ammocoetes in these basins. Dams and diversions can increase habitat suitability for warm water fish species and may contribute to the decline of lamprey by delaying juvenile migration or exposing fish to increased predation. In addition stream temperature increases predicted with climate models may impact regulated and non-regulated rivers as well, increasing the upstream extent of habitat for non-native species (Lawrence and Olden 2013; Lawrence et al. 2014).

Restoration Actions

Pacific Lamprey conservation work in the South Coast sub-region is currently focused on adult passage improvement, expansion of occupancy surveys, habitat assessments, predation studies, and numerous projects to restore degraded habitat. The following conservation actions were initiated or recently completed by RMU partners in the South Coast sub-region from 2012-2017.

HUC	Threat	Action Description	Type	Status
RMU	Stream Degradation	Implementation of instream and floodplain habitat restoration activities (e.g. large wood placement, side channel and floodplain reconnection, channel reconstruction, bank stabilization, gravel recruitment, etc.).	Instream	Ongoing
RMU	Population	Conduct spawning ground surveys in mainstem and principal tributaries to monitor Pacific Lamprey distribution, timing, and number of redds to develop relative abundance indexes.	Survey	Ongoing
RMU	Stream Degradation	Senate Bill 838 imposed 5-year moratorium of suction dredge mining on all Oregon streams with designated	Instream	Underway

		Essential Salmon Habitat (ESH). Also restrictions on specific USFS and BLM waterways (e.g. Rogue, Illinois)		
RMU	Population	Environmental DNA sampling to fill distribution gaps on Rogue River Siskiyou National Forest Land.	Survey	Underway
North Umpqua	Passage	Passage improvement at Soda Springs Dam.	Instream	Complete
North Umpqua	Passage	Pacific Lamprey spawning and rearing habitat suitability above Soda Springs Dam	Survey/ Assessment	Complete
North Umpqua	Passage	Passage improvement at Rock Creek Hatchery diversion dam fish ladder.	Instream	Complete
North Umpqua	Passage	Installation of Lamprey Passage Structure at Winchester Dam.	Instream	Complete
North Umpqua	Population	Conduct native fish inventory to establish baseline lamprey distribution dataset	Survey	Proposed
Umpqua	Predation	Smallmouth bass predation evaluation in lower Elk Creek and Umpqua R.	Assessment	Complete
Umpqua	Other	Formation of Umpqua River Basin Lamprey Working Group.	Coordination	Ongoing
Umpqua & Rogue Basins	Population	Lamprey distribution mapping and occupancy sampling.	Survey	Ongoing
Umpqua & Rogue Basins	Lack of Awareness	Provide education and outreach to stakeholders, resource managers and community members	Coordination	Ongoing
Rogue Basin	Passage	Rogue Basinwide Priority Barrier Removal Analysis - project characterized and prioritized 38 passage barriers in basin.	Assessment	Complete
Rogue Basin	Passage	Low cost passage retrofits at irrigation diversion dams.	Assessment/ Instream	Proposed
Upper & Middle Rogue	Population	Distribution surveys in principal tributaries.	Survey	Underway
Middle Rogue	Passage	Removal of Fielder and Wimer dams on Evans Creek	Instream	Complete
Lower Rogue	Stream Degradation	Rogue River Estuary Strategic Plan and Lower Rogue Watershed Action Plan - to identify and prioritize conservation and restoration actions in lower Rogue and tributaries.	Assessment	Complete

Applegate & Illinois	Population	Distribution surveys in principal tributaries	Survey	Underway
Applegate & Illinois	Predation	Umpqua pikeminnow predation evaluation	Assessment	Proposed
Coos	Passage & Population	Evaluation of passage constraints and baseline presence/absence of lamprey within the Eel Lake basin	Assessment	Underway/ Complete
Coos	Passage	Installation of lamprey passage ramp/trap at Eel Creek Dam.	Instream	Underway
Coos	Population	Telemetry to monitor movement and distribution of Pacific Lamprey through Eel Lake Basin.	Assessment	Underway
Coos	Stream Degradation	Implementation of instream and floodplain habitat restoration activities (e.g. East Fork Millicoma Oxbow project, Ross Slough Project)	Instream	Complete
Coos/ Coquille	Passage	Multiple culvert replacement or removal projects where lamprey salvage efforts occurred.	Instream	Ongoing
Coquille	Population	Expansion of lamprey spawning ground surveys in South Fork Coquille River.	Survey	Proposed
Coquille	Climate Change	Water quality monitoring in lower Coquille River to identify cold water refuge.	Survey/ Assessment	Underway

II. Selection of Priority Actions

A. Prioritization Process

Participating members of the South Coast sub-region had a conference call on May 11th, 2018 to discuss completed and ongoing conservation actions and identify specific projects and research needed to address threats and uncertainties within the region. Project proposals were submitted online and sent to RMU members for review. Members were supportive of all proposals and elected to submit the following priority projects for the South Coast sub-region in 2018:

- Eel Subbasin Pacific Lamprey Monitoring
- Baker Creek Culvert Removal/Fish Passage Restoration.

B. High Priority Proposed Project Information

Project Title: Eel Lake Subbasin Pacific Lamprey Monitoring

Project Applicant/Organization: Tenmile Lakes Basin Partnership
Contact: Richard Litts
Email: *tlbp@presys.com*
Phone: 503-702-2220

***Landowner Organization/Contact Person*:**
Several private landowners have granted access to their lands for monitoring purposes. All have been informed and are willing to grant access to their property to implement monitoring activities.

Project Location: Tenmile Lakes Watershed
NPCC Subbasin (4th HUC Field) name: 17100304
Watershed (5th HUC Field):1710030404
Lamprey RMU population: Oregon Coast RMU; South Coast Sub-Region
HUC4 Risk Level: **S2**

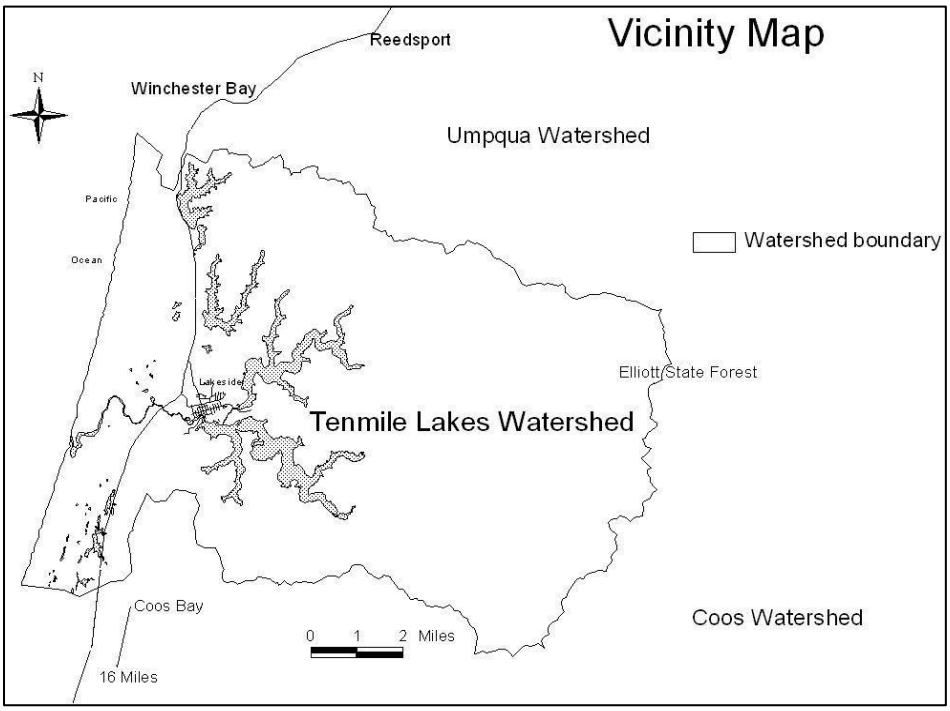
Requested funds: **$42,101.00**

***Total Project cost*:** $73,153.00

Short Project Description:

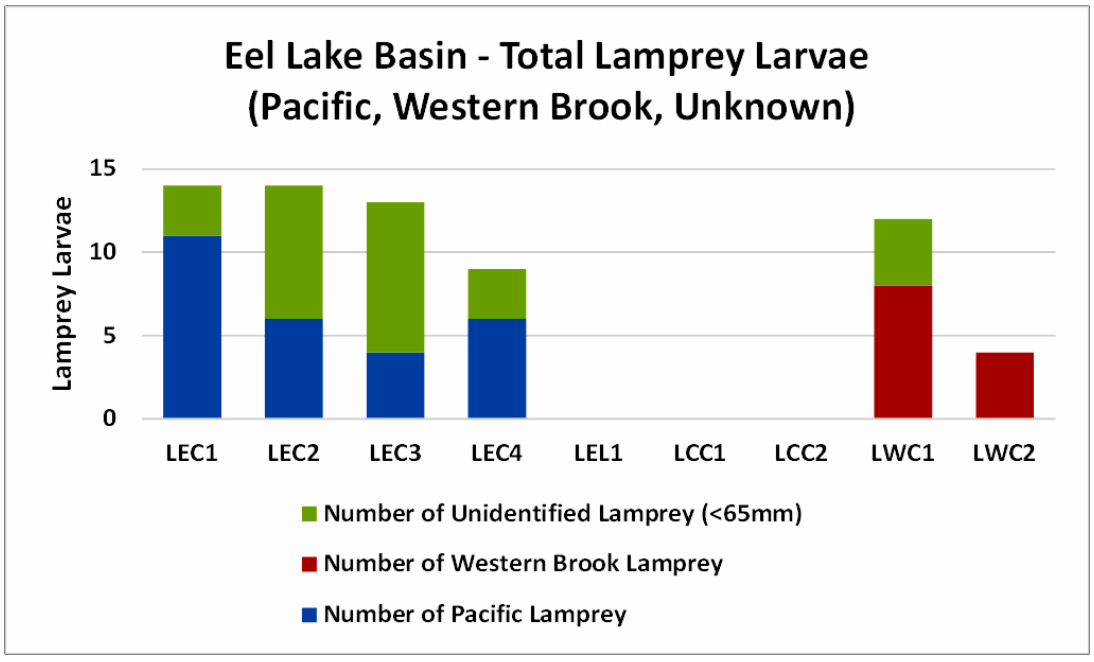
The Tenmile Lamprey Group (TLG) is requesting funding to implement priority monitoring actions for Pacific Lamprey listed in the Tenmile Lakes Basin 30-YR Pacific Lamprey Conservation Plan (CTCLUSI, June 2018). The TLG was formed in the summer of 2017 to do site selection, sampling protocol development, shocking for larval lamprey, lamprey barrier evaluations on Eel Creek, and development of monitoring recommendations for Pacific Lamprey in the Tenmile Lakes Watershed. RMU Group funding will be utilized to expand our current monitoring efforts in the Eel Lake subbasin. Funding is needed to support project management, purchase of monitoring supplies and equipment, airplane fuel, grant administration, and monitoring staff mileage to conduct on the ground adult and juvenile surveys as well as aerial tracking of the radio tagged specimens. In-kind match includes technical assistance, equipment, and GIS mapping. Funding this project is essential to take advantage and continue the unique momentum of the Tenmile Lamprey Group, assess the identified key threats of lack of awareness, water quality, and habitat degradation to this important species and provide the state and federal managers with valuable information for Coastal Oregon Pacific Lamprey.

***Descriptive Photographs-illustrations-Maps*:**



The Tenmile Lamprey Group conducting Eel Cr. juvenile surveys – 2017

Eel Creek Subbasin Lamprey Presence/Absence Survey Sampling Site Map.



Counts of all lamprey larvae in the sampling area, includes those too small to identify. At the 4 Eel Creek sites (LEC1-LEC4), the only lamprey that were identified were all Pacific Lamprey (including the results from the genetic tests on several "unknown" specimens), so it is likely that these are all Pacific Lamprey larvae.

The Tenmile Lamprey Group and Volunteers on May 16, 2018 tagging day.

Set up for tagging and measuring stations

Set up for tagging and measuring stations

John Schaefer from CTCLUSI searing in Eel Cr for Lamprey #25 after tracking to this vicinity

Volunteer Pilot Mr. Ken Robbers with his plane ready for first radio tagging flight. Note antennae mounted on port side wing.

1.0 Detailed Project Description:

The Coastal RMU, and specifically the Tenmile Lakes Watershed, feature unique habitats that are very different than other well-studied Pacific Lamprey systems such as the Columbia and Willamette Rivers. The Eel Creek subbasin is a dunal system that lacks the typical Pacific Lamprey natural spawning and rearing habitats. Understanding their adaptations to this unique environment will immediately reduce our lack of awareness for coastal Pacific Lamprey. Improving our understanding of local Pacific Lamprey behavior is a necessary first step in addressing the current and future threats to the species.

If funding is awarded, monitoring activities are scheduled for 2019-2020. Efforts will focus on evaluating 1) effectiveness monitoring of the newly install Eel Lake Trap Lamprey Ramp, 2) Capture and radio tagging 30 adult Pacific Lamprey, 3) Ground and Aerial tracking of radio tagged Pacific Lamprey, 4) Juvenile/Adult surveys in Eel Lake tributaries, and 5) Install and monitor 4 continuous temperature probes in Eel Creek.

Implementing these monitoring activities will dramatically improve our understanding of this species and provide valuable information on water quality (temperature), as well as identifying priority stream reaches for spawning, rearing, and hold-over locations. This information is essential for the TLG and stakeholders to address the key threats to stream and floodplains degradation, water quality and lack of awareness.

1) Effectiveness monitoring of the Eel Lake Trap Pacific Lamprey Ramp

Effectiveness monitoring of the lamprey ladder has two components. The first is the evaluation of the physical design and its ability to operate as intended and to allow safe, efficient lamprey passage. The second is if the ladder is used by the lamprey as expected to allow passage to Eel Lake and its tributaries, and if this is effective in assisting the species to "old" spawning grounds in the basin and re-establishing rearing areas for ammocoetes in the upper watershed.

2) Conduct Adult Pacific Lamprey spawning/redd surveys in Eel Lake tributaries

Spawning and redd surveys will be conducted by the TLG from April through June in the tributaries of Eel Lake. Surveys will be conducted on Eel, Clear, and Winters Arm Creeks.

3) Expand Eel Creek Adult radio tracking

Over the 1 year period of the project, 30 adult Pacific Lamprey will be captured, measured, tagged, and released according to protocols described in (Moser et al. 2002a, 2007 and Johnson et al. 2012). Lampreys with a girth circumference greater than 88mm (at the insertion of the first dorsal fin) will be anesthetized in a 50 ppm tricaine methane sulfonate (MS222) solution. Radio transmitters will be inserted through a 12mm ventral incision made directly below the anterior edge of the first dorsal fin fold. Lamprey will also be measured for length and girth, weighted, and photograph. A DNA sample will be taken, and a visual Floy Tag will be inserted under the anterior dorsal fin. Lamprey will be allowed at least 2 hours recovery before being released. Tracking will be done using a Lotek SX800 series receiver with built-in GPS capability. Use of an airplane and pilot is being donated by a local Watershed Council supporter for use in tracking. One H-antenna and mount will be mounted to the wing strut of the aircraft and attached via cable to the receiver. Flights will occur at least once per month throughout the year as weather and local airport conditions allow, and more frequently during lamprey high movement periods. Ground tracking will occur throughout the year using the data collected from the air surveys to narrow the search. In-stream location of individuals will occur as needed to evaluate habitat usage (holdover, spawning), barriers, and spawning grounds. Tracking at the lamprey ramp will facilitate effectiveness monitoring as described.

4) Expand juvenile surveys in Eel Lake basin

Survey sites were chosen by ODFW, Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians (CTCLUSI) and Tenmile Lakes Basin Partnership (TLBP) biologists for their appropriate habitat, and location relative to potential passage barriers. The surveys will occur within wadable areas of prime larval lamprey habitat — that is, silty/sandy substrate in depositional areas such as shallow pools (Reid and Goodman 2015). We will follow the rapid biological assessment protocol outlined by Reid and Goodman (2015), wherein shocking occurred for no more than 30 minutes per site. The TLG will use a backpack electroshocker on larval lamprey settings (either a Wisconsin type ABP-2 or Smith Root LR 24; (Dunham et al. 2013; Reid and Goodman 2012) and 2-4 netters. The shocker will be used to momentarily stun larval lamprey to enable biologists to collect them. Larval lamprey will be anesthetized with buffered MS-222, measured, enumerated, and identified before being returned alive to the stream; similar to the protocols outlined in Schultz et al. (2014). A small subsample of individuals (5 – 10) may be euthanized and preserved for further use in identification if they are too small to identify or present otherwise unique samples.

5) Identify and map holdover and priority spawning areas

The TLG will utilize GIS and Google Earth to create maps of radio tracking data, adult and juvenile sampling sites, water quality sites, and holdover and spawning areas that Pacific Lamprey utilize in the Tenmile Basin.

6) Collect associated water quality data
Following protocols listed in the Tenmile Lakes Water Quality Assurance Project Plan (TLBP 2015), members of the TLG will collect continuous water temperatures from loggers placed in 4 locations in Eel Creek.

7) Analysis and reporting of Pacific Lamprey and water quality data
CTCLUSI Staff, TLBP and ODFW combined have vast experience managing, collecting, and utilizing monitoring information to prioritize and direct monitoring and restoration efforts in the Tenmile Lakes Watershed. The information gathered under this monitoring project will complement the goals of each of these entities. All monitoring results will be stored at TLBP's office and will be included in the year-end report. Field data sheets for monitoring will be maintained at the watershed office for each monitoring activity during the project. All data will be archived at the watershed office for 5 years and then transferred to data CDs, or portable hard drives, for permanent storage in TLBP's archives. Information recorded on data sheets is to include: Date and time of sampling events, site ID, names of field staff, data results. Field staff will also maintain data sheets for each study with all pertinent field observations during the project. This data will be used to plan future implementation projects and implement the Tenmile Lakes Basin 30 Year Pacific Lamprey Conservation Plan, as well as help inform stakeholders as political decisions are made in regards to Tenmile watershed lamprey issues, and issues regarding state lamprey policies. Reports will also been given to CTCLUIS, ODFW and be available online through the Tenmile Watershed's website at tenmilewatershed.com.

8) Complete Pacific Lamprey Outreach materials for scientific and annual outreach events.
The data and some specimens from this project will used by TLBP, CTCLUSI, and ODFW staff in leading the communication of our findings and the importance of Pacific Lamprey to the TLBP Board members, CTCLUSI's Tribal Council, ODFW, volunteers with the Salmon Trout Enhancement Program (STEP), Funding Sources, Coos County, our Designated Management Agency partners, and the general public. This component will utilize the monitoring information collected, and develop it into an outreach format. Outreach activities are a natural element and outcome of all of the TLG's past Pacific Lamprey efforts. Funding will address the key threat of lack of awareness for this species.

2.0 Regional Priorities: Linkage of actions to Identified Threats:

- What threat(s) does this project address?

Funding will address the key threats of habitat degradation, water quality and the lack of knowledge with biologists and the general public about Pacific Lamprey.

- How does this project address this key threat(s)?

This project will result in effectiveness monitoring data of the current passage barrier designs that ODFW designed Eel Lake Trap Lamprey Ramp. This information will help stakeholders evaluate and adapt these designs so successful lamprey passage designs can be implemented

in future.

This project has already dramatically improved our local knowledge of this important species in Oregon coastal streams. Information collected will expand our current knowledge and support the TLG with their on-going and continuing outreach efforts that will reduce everyone's lack of awareness and knowledge of Pacific Lamprey.

Dr. Ben Clemens, ODFW State Lamprey Coordinator and John Schaefer, CTCLUIS Fisheries Biologist, both TLG members, stated that 2017 efforts have improved our Pacific Lamprey knowledge by:

1) Learned novel approach to sampling and collecting adult Pacific Lamprey in a small coastal tributary
2) Learned about the relative abundance and habitat use of adults in a small coastal tributary
3) Observed the first recorded presence of an adult Pacific Lamprey downstream of the Eel Lake Trap
4) Recorded the first presence/absence data for larval Pacific Lamprey and Western Brook Lamprey in the Tenmile Lakes Basin
5) Recorded the first ever migration data in the Tenmile Lakes Basin on adult Pacific Lamprey, including from sexually mature and sexually immature fish of both sexes
6) Collected baseline information on body sizes
7) Pacific Lamprey are in Eel Creek and in much higher numbers than expected
8) Successful radio tagging of adult Pacific Lamprey is possible in our region.
9) Airplanes can detect the radio tags fairly quickly and accurately
10) Interference from home WiFi and cell towers can give false reading on the radio tags.

- Does this project address a threat(s) specific only to his RMU or does the project address the threat(s) for multiple RMUs?

Effectiveness monitoring information for lamprey passage will assist managers with Pacific Lamprey passage fixes in multiple RMUs with similar passage project. This project will also produce general Pacific Lamprey information that can be adapted in other RMUs to address the important threat of Lack of Knowledge.

3.0 Project Goals/Objectives and Species/Habitat Benefits:

- What life stage or stages will benefit from action? How?

With the current limited knowledge about coastal Pacific Lamprey, the monitoring project will fill important data gaps for all life stages of Pacific Lamprey. This monitoring information is essential and will help partners identify priority spawning, rearing, and holdover areas. In addition, funding will assist with identifying migration timing, and lake use that will enable the TLG and stakeholders to propose and implement effectiveness restoration projects that will benefit Pacific and Western Brook Lamprey.

- What other species may benefit from action?

The project will collect information on Western Brook Lamprey and water quality parameters that will benefit other species of lamprey and other native fish species. Increasing the number of spawning adults will benefit many species of macroinvertebrates and native juvenile Coho salmon and Cutthroat Trout. In the long term, increasing our understanding and achieving our long term goal of increasing Pacific Lamprey populations, will benefit all species and the Tenmile basin as a whole.

- How will the project provide meaningful measureable results to improve lamprey populations and/or their habitat conditions?

This project has clear, achievable objectives and the results can be assessed, analyzed, and duplicated in other regions. This project will identify, measure, and prioritize coastal Pacific Lamprey spawning, rearing, and hold-over areas necessary for future enhancement and protective actions.

4.0 Project Design / Feasibility:

- Have the designs for the project been completed already or will they be completed before planned project implementation?

No on-the-ground components are proposed within this funding request.

- Are the appropriate permits (ESA and environmental compliance) in place already or will they be in place before planned project implementation?

Yes. Pacific Lamprey collections will be under ODFW permit.

- Can the project be implemented within the defined time frame?

Yes. Please see following project schedule.

	2019								2020			
Monitoring Element	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
Effectiveness monitoring of Eel Lake Trap Lamprey Ladder												
Eel Creek Lamprey Spawning surveys												
Eel Cr. Adult Lamprey tagging												
Radio Tracking Lamprey in Eel Cr.												
Eel Cr. Juvenile surveys												
Tenmile Cr. capture development												
Map holdover and spawning areas												
Eel Lake Trap Lamprey Ramp												

Water quality monitoring												
Training /Conferences												
Data analysis												
Reporting												
Pacific Lamprey Outreach												

5.0 Partner Engagement and Support:

- What partners are supporting the project?

Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Tribes	Oregon Department of Fish & Wildlife. Charleston District	Oregon Watershed Enhancement Board
Oregon Department of Fish and Wildlife State Lamprey Coordinator	Eel~Tenmile S.T.E.P.	Oregon State Parks- Tugman State Park
Mr. Ken Robbers	Tenmile Lakes Basin Partnership	Coos County Board of Commissioners

- What partners are active in implementing the project?

  CTCLUIS – John Schaefer, Tribal Fisheries
  Biologist ODFW- Gary Vonderohe, Assistant
  District Fish Biologist ODFW – Dr. Ben
  Clemens, State Lamprey Coordinator TLBP-
  Richard Litts, Monitoring Coordinator
  TLBP-Mike Mader, Watershed Coordinator/Project Manager

- What partners are providing matching funds or in-kind services that directly contribute to the project?

Project Partner	Proposed Match
CTCLUSI	Technical Assistance, project supplies
ODFW Charleston District	Technical Assistance, project equipment
ODFW State Lamprey Coordinator	Technical Assistance, project equipment
TLBP	Technical Assistance, project supplies and equipment, pending grant funds, project oversight
OWEB	Matching grant funds
Mr. Ken Robbers	Airplane rental for radio tag tracking & Pilot

Please see attached budget for specific matching in-kind values.

6.0 Monitoring and Evaluation – Contribution to Knowledge Gaps:

- If this is a monitoring or evaluation project or an on the ground project with a monitoring or evaluation component:

  - Is there a monitoring framework in the proposal?

  Yes. The TLG has developed and reviewed monitoring recommendations to be funded and implemented.

  - Does the monitoring framework provide clear objectives and measureable metrics that can be observed over time?

<u>The objectives and monitoring questions of this proposal are:</u>

1) Conduct Effectiveness Monitoring of the new lamprey ramp at Eel Lake Trap. Monitoring will occur weekly or as needed to accommodate lamprey usage. Data will be collected using both radio telemetry data and on-site observations.
   a. Are lamprey able to transit all passage barriers in Eel Creek and reach the ramp?
   b. Using telemetry data or visual observations, can we verify that lamprey are able to migrate to the base of the Trap?
   c. Are lamprey able to efficiently navigate to the ramp entrance and ascend the ramp, or are they attracted elsewhere on the Trap?
   d. Does the Trap Box work properly to capture the lamprey and hold them in the water unharmed until they can be counted and released?
   e. Is the Trap Box large enough to accommodate the number of lamprey present at peak migration? What do lamprey do if trap is full?
   f. Can lamprey be released in the lake at the Trap without being carrier downstream over the weir?
   g. How many Pacific Lamprey are migrating into Eel Lake?
   h. What is the timing of the lamprey in-migration at the Trap?
   i. Are ramp components working together as designed?
   j. Is ramp blocked, damaged or disabled by floating debris from the lake?
   k. Is water flowing as intended and continuously through the ramp in all seasons?
   l. Is ramp designed to allow staff and STEP volunteers the ability to work on trap safely, and be able to efficiently catch, measure, enumerate, and release lamprey unharmed without lamprey escaping?
   m. Does ramp need to be "seasoned" by being in the lake water for a period of time before the lamprey will use it?
   n. Are Pacific Lamprey tracked or observed in the tributaries that flow into Eel Lake (Clear Creek, Winters Arm Creek)?
   o. Do Pacific Lamprey spawn in any of the Eel Lake tributaries? Using both spawning survey and telemetry data.
   p. Are Pacific Lamprey larvae rearing areas found in the upper Eel Lake Basin?

2) Monitor movement and distribution of Pacific Lamprey through the Eel Lake Basin with the use of radio telemetry tags.
   a. Capture 30+ adult Pacific Lamprey and implant 30 radio telemetry tags

b. Use aerial and ground surveys to track migration, passage barriers, holdover and spawning activities within the watershed.
c. Use telemetry ability to assess movement efficiency through Eel Lake Trap lamprey ramp in conjunction with ramp effectiveness monitoring.
d. Use tracking ability to monitor passage through Eel Lake.
e. Compile data and map preliminary adult lamprey distribution and spawning areas.
f. Share data with stakeholders and state.

3) Install, monitor, and audit 4 continuous temperature loggers in Eel Creek to collect water quality data.

a. What are the longitudinal stream temperatures within Eel Creek?
b. What are the 7 day average maximum temperatures?
c. Do Eel Creek water temperatures reach 72 degrees?
d. Does Eel Creek have adequate water quality (temperatures) to support adult and juvenile lamprey?
e. Can correlations be made between observed Lamprey activity and water temperature?

- Does the framework provide a clear description of the expected outcome?

The framework in these proposed monitoring activities were developed over a one year period by members of the TLG. The monitoring actions have been developed to be simple to follow and implement, as well as designed to provide answers to the TLG questions and to complete the stated objectives.

7.0 Budget and Timelines:

Available on request.

8.0 References:

Available on request.

Project Title: Baker Creek Culvert Removal/Fish Passage Restoration

Project Applicant/Organization: Bureau of Land Management – Coos Bay District
Contact: Jeff Jackson
Email: jbjackson@blm.gov
Phone: 541-751-4293

***Landowner Organization/Contact Person*:**

Project Location: Baker Creek, tributary to SF Coquille River
NPCC Subbasin (4th HUC Field) name: Coquille - 17100305
Watershed (5th HUC Field): South Fork Coquille River - 1710030502
Lamprey RMU population: Oregon Coast RMU, South Coast Sub-region
HUC4 Risk Level: S2

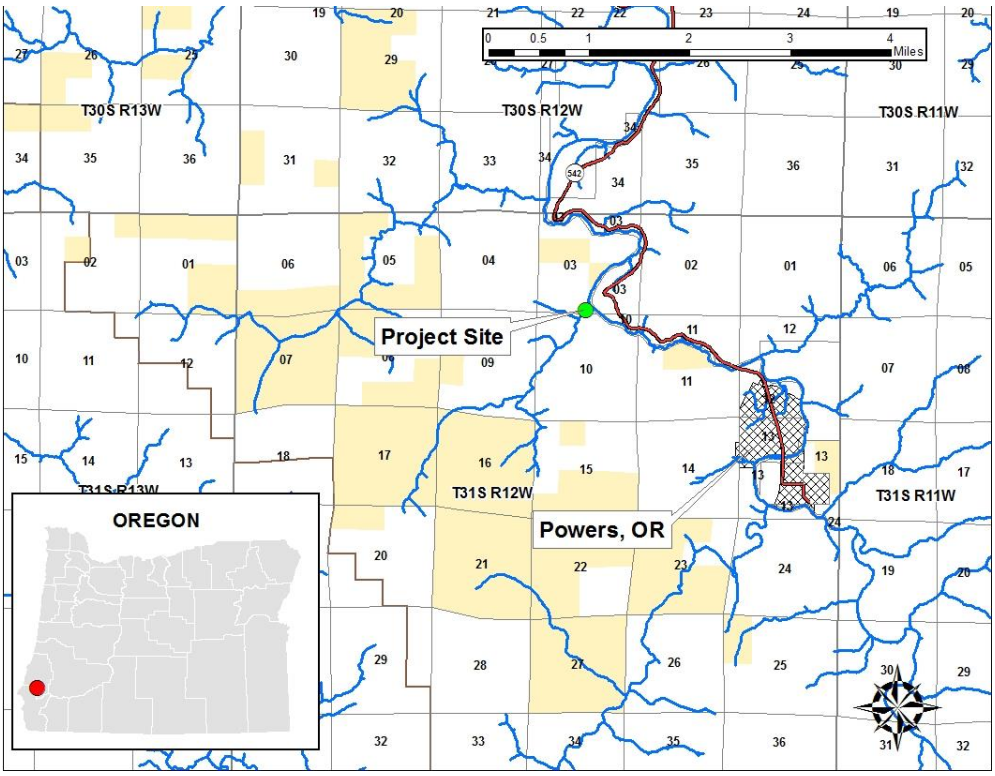
Requested funds: **$50,000**

***Total Project cost*:** $1,200,018

Short Project Description:

The project would remove a 12' x 250' culvert located on Baker Creek, a tributary to the South Fork Coquille River. The culvert is located on Weyerhaeuser Company property near the mouth of Baker Creek. During the early 1950's, a large culvert was installed through a section of failing wooden railroad trestles. This culvert, perched approximately 15-18 feet, was a total fish barrier when it was originally installed and for a number of years no migratory fish including Pacific Lamprey were able to move upstream into Baker Creek. A Denil fishway (Alaska steep pass) was constructed in 1994 to allow fish passage. The 25 foot wooden Denil fishway was placed through a hole cut into the side of the culvert. Baffles were also added to the inside upper reaches of the culvert to help passage along the steep grade of this upper portion. While this has allowed for limited salmonid fish passage, there is a very low potential if any for adult Pacific Lamprey passage. The Denil fishway was designed for salmonid passage with straight edges and did not consider lamprey passage needs. Additionally navigating the extended length of the culvert would be difficult due to high velocity.

Descriptive Photographs-illustrations-Maps:



Project site near Powers, Oregon.

Photo 1 – Baker Creek culvert during winter low flow.

Photo 2 – Denil fishway during summer low flow.

1.0 Detailed Project Description:

The goal of this project is to enhance natural hydrologic and biological processes in the Baker Creek watershed by restoring stream connectivity and volitional fish passage to over 2 miles of vital rearing and spawning habitat and thermal refugia for Pacific Lamprey and other native anadromous species, as well as provide for the downstream movement of stream sediment and gravel important for stream processes in the SF Coquille River. To accomplish this goal, a diverse group of partners and funding has been engaged. During the summer of 2018, Weyerhaeuser will perform infrastructure improvements surrounding the project site to fortify the existing road and upstream bridge. These improvements will also improve road generated storm water management. During the 2019 In-Water Work Period (IWWP) of July 1 to September 15, the culvert and overburden fill will be removed. A temporary road and bridge will be constructed to transport fill to a deposit site on ODOT property near the Baker Creek Road Bridge. A pilot channel will also be graded and constructed during the 2019 IWWP. Natural bedload delivery will be allowed to occur during winter of 2019-2020. Channel modifications and in-stream wood placement will take place during the 2020 IWWP. The following are a detailed list of project objectives:

1. Improve and fortify the road and bridge upstream of the culvert during the summer of 2018 to provide better stormwater management and to protect against potential flow and elevation/gradient changes in Baker Creek.
    - **a.** Bridge ramps on both sides will be extended to protect against potential erosion and ensure structural integrity
    - **b.** Concrete abutments supporting the bridge will be extended to ensure structural support against changes in streambed elevation
    - **c.** Low elevation spots in the road on both sides of the bridge will be raised to provide a more even grade and improved stormwater dispersal.
2. Remove the Baker Creek culvert and overburden fill and dismantle the degraded fish ladder from the Baker Creek channel during the 2019 In-Water Work Period (IWWP).
    - **a.** 27,800 CY of overburden fill will be removed with an excavator.
    - **b.** Fill will be transported via a temporary road along Baker Creek and a temporary bridge across the South Fork Coquille River to a disposal site on ODOT property near the Baker Creek Bridge.
    - **c.** Culvert and fish ladder will be dismantled and transported to an upland site for storage until disposal**.**
3. Construct a 20ft wide pilot channel with a 6% grade during the 2019 IWWP to restore natural hydrologic connection and biological processes to Baker Creek.
    - **a.** A 20 ft. wide pilot channel with a 6% grade will be constructed to connect the disconnected streambed, allow for natural channel adjustment and maximize water surface depths for fish.
    - **b.** Excavated material (included in the 27,800 CY estimate) will be transported via a temporary road along Baker Creek and a temporary bridge across the South Fork Coquille River to a disposal site on ODOT property near the Baker Creek Bridge.
    - **c.** The temporary bridge will be removed at the end of the 2019 IWWP. The temporary road will remain for access during the 2020 IWWP.
    - **d.** Temporary stabilization of the project site will include mulching, seeding and placement of erosion control fabric as needed.
4. Allow for natural sediment delivery and channel modification of Baker Creek to a maximum 2% grade during high winter flows through the winter of 2019-2020.

a. Natural dispersal of stored sediments will be allowed through the winter into the lower reach of Baker Creek and the South Fork Coquille River. Sediment delivery will result in a new channel with a maximum grade of 2%, predicted by River Design Group based on bedrock presence.

5. Modify and stabilize Baker Creek to connect vertical discontinuities for fish passage during the 2020 IWWP.

a. Following the natural regrading process, fish passage performance in the new channel will be evaluated with a Passage Monitoring Plan (see attached). Necessary mitigation for areas that don't meet fish passage criteria will consist of the development of a streambed connecting vertical discontinuities and potentially unstable areas.

6. Construct large wood structures to promote pool and habitat production and connect vertical discontinuities for fish passage during the 2020 IWWP.

a. Following observation of the natural regrading process in the winter of 2019/2020, final designs will be completed for LWD jam construction and implementation in 2020. Permitting will cover both the culvert removal and LWD jam construction. At a minimum we will design 5 sites that include at least 5 logs each using standard design protocols and technical team expertise.

b. The temporary road will be decommissioned, mulched and seeded at the end of the 2020 IWWP.

2.0 Regional Priorities: Linkage of actions to Identified Threats:

- What threat(s) does this project address?

  This project addresses the following Identified Threats: *Lack of Awareness, Climate Change, Water Quality, and Stream and Floodplain Degradation.*

- How does this project address this key threat(s)?

  This project addresses **Lack of Awareness** in the following ways: the project will be showcased by the Coquille Watershed Association, Coquille Indian Tribe, Oregon Department of Fish and Wildlife, Weyerhaeuser and the Bureau of Land Management once the project is completed. This project, which is essentially a dam removal, will be highlighted because of its scale, ecological importance of the project, and the restoration of Pacific Lamprey habitat. All discussions, articles and newsletters generated and web-based stories will note the importance of this project to Pacific Lamprey. This project will help to shield Pacific Lamprey from the negative effects of **Climate Change** in the following ways: lamprey will be able to access Baker Creek, which is a cold-water refuge in the SF Coquille drainage. The SF Coquille River is Oregon DEQ 303-d listed (in part) for stream temperature. If Pacific Lamprey and other native species are able to occupy Baker Creek, population resiliency will be enhanced and better adapted to climate change. This project will result in improved **Water Quality** in the SF Coquille River. Not only will this project result in better hydrologic connectivity for a major SF Coquille River tributary, but valuable substrate that is sequestered by the culvert will be allowed to move downstream in a natural manner. This substrate will be utilized by spawning adults as well as developing juveniles. This project will also result in better stormwater management as road improvements and sediment abatement will be part of the overall project. Restoring natural sediment delivery will address issues related to **Stream and Floodplain Degradation**. By allowing an estimated 30,000-40,000 cubic yards of

substrate to move beyond the project site, it is anticipated that positive effects such as gravel bar building will occur. This may result in long term floodplain connectivity, which will improve stream conditions by reducing overall stream velocities and associated bank erosion.

- Does this project address a threat(s) specific only to this RMU or does the project address the threat(s) for multiple RMUs?

  While this project will specifically benefit Pacific Lamprey in the Oregon Coast RMU, the project can be used as an example for other RMUs.

3.0 Project Goals/Objectives and Species/Habitat Benefits:

- What life stage or stages will benefit from action? How?

  This project will benefit all freshwater life stages of Pacific Lamprey in several ways: Pacific Lamprey will have access to over 2 miles of high quality spawning and rearing habitat; additional spawning and rearing substrate will be available in the SF Coquille River, which historically had a large and robust Pacific Lamprey population; and spawning and rearing fish will be able to migrate into Baker Creek to take advantage of cold water refugia. The project will re-initiate natural sediment delivery processes that benefit native fish, and will create better, more complex spawning and rearing habitat for Pacific Lamprey. By introducing improved habitat features, lamprey populations will have more elasticity and be better able to withstand the rigors of climate change and other natural and man-made impacts.

- What other species may benefit from action?

  Several other native anadromous and resident fish species will benefit from this project, including: resident and anadromous Cutthroat trout, steelhead, Coho Salmon, Chinook Salmon and Western Brook Lamprey. While no formal surveys exist at this site, indications are that aquatic invertebrates and amphibians will better be able to access upstream habitat once this project is implemented.

- How will the project provide meaningful measureable results to improve lamprey populations and/or their habitat conditions?

  This project will allow Pacific Lamprey to access a major section of stream network that has been blocked for over 60 years. This project also benefits fish migrating downstream as they can take advantage of cool water refugia, and ammocoetes maturing in the substrate through the availability of more substrate and more complex habitat.

4.0 Project Design / Feasibility:

- Have the designs for the project been completed already or will they be completed before planned project implementation?

  In 2015 and 2016, funding was obtained to accomplish the engineering for the culvert removal through the USFWS, Plum Creek Timber, and BLM. However, in 2016 before engineering work commenced, Weyerhaeuser Company acquired Plum Creek Timber Company lands

within the Coquille River basin. The project was delayed a year while Weyerhaeuser staff reviewed the current status of the project and pathways to engineering and implementation. In 2017, engineering work began following Weyerhaeuser feedback and company approval to move forward on the culvert removal project. McGee Engineering Inc. has conducted data reviews and borings to determine the historic channel alignment and subsurface bedrock and is engineering and developing the infrastructure/earthen fill removal related design elements. A second engineering team, River Design Group, is working on the channel design portion of the project and has completed a 30% project design. RDG is scheduled to finish a 60% design by May 31st and will coordinate necessary permits with this design.

An OWEB Technical Assistance grant (218-2033-15971) was awarded in April 2018. Funds from this application will cover a cultural resources survey of the project area, which is currently underway, and the final phases of the engineering. This Technical Assistance grant will fund the last portion engineering and planning during the summer of 2018, but progress over the past winter has moved the project to a stage where it will be ready for implementation in 2019. Engineering designs will be finalized, permits will be received and archaeology clearance will be completed well in advance of the 2019 In-water Work Period. Additionally, $200,000 has been secured for restoration implementation from Oregon Department of Transportation Fish Passage Compensation Funds.

- Are the appropriate permits (ESA and environmental compliance) in place already or will they be in place before planned project implementation?
  All necessary permits will be in place before project implementation. The final engineering and design plans will give project managers the information necessary to apply for permits with the US Army Corps of Engineers/Oregon Department of State Lands, Oregon Department of Environmental Quality, and the National Marine Fisheries Service.

- Can the project be implemented within the defined time frame?

  Project partners believe feasibility is high for implementing this project. The project has great support from the landowner and many partner agencies. During the summer of 2018, Weyerhaeuser will perform infrastructure improvements surrounding the project site to fortify the existing road and upstream bridge. It is anticipated that culvert/fish ladder removal and channel reconstruction will begin in 2019, and continue in to 2020. The Coquille Watershed Association received an OWEB technical assistance grants in 2011 and 2018 to conduct a feasibility and geotechnical analysis. In 2012, GHD completed the Baker Creek Culvert Passage Barrier Preliminary Concept Study that included a Geotechnical Analysis, Topographic Analysis and Hydrologic Analysis along with four proposed options. The Technical Advisory Team and partners determined it was feasible to remove the culvert while incorporating measures to reduce the instability of the adjacent private road and upstream bridge. Weyerhaeuser has agreed to fund major portions of this project. Project partners have begun the permitting process: cultural surveys are underway as well as initial information gathering for state and federal permits. **Additionally, project partners have secured $275,000 in cash and $197,490 in in-kind support for this project**, and have a pending grant application in review by the Oregon Watershed Enhancement Board for the balance needed for implementation.

5.0 Partner Engagement and Support:

- What partners are supporting the project?

  Weyerhaeuser, Coquille Watershed Association, Coquille Indian Tribe, Oregon Dept. of Fish and Wildlife, Oregon Dept. of Transportation, Oregon Dept. of Environmental Quality, US Fish and Wildlife Service, Bureau of Land Management, and River Design Group.

- What partners are active in implementing the project?

  All of the partners listed above have provided implementation funding for this project. On the ground implementation leadership will be provided by Weyerhaeuser, Coquille Watershed Association, Oregon Dept. of Fish and Wildlife, Bureau of Land Management and River Design Group.

- What partners are providing matching funds or in-kind services that directly contribute to the project?

  Weyerhaeuser, Coquille Watershed Association, Coquille Indian Tribe, Oregon Dept. of Fish and Wildlife, Oregon Dept. of Transportation, Oregon Dept. of Environmental Quality, US Fish and Wildlife Service, Bureau of Land Management, and River Design Group.

6.0 Monitoring and Evaluation – Contribution to Knowledge Gaps:

- If this is a monitoring or evaluation project or an on the ground project with a monitoring or evaluation component:
  - Is there a monitoring framework in the proposal?

    Project managers plan to conduct physical habitat and biological spawning fish surveys in Baker Creek above and below the project site post-implementation. Fish biologists for the project team will catalog/enumerate fish salvage results and water quality monitoring during and after project implementation. Contractors will incorporate project design features to prevent large-scale sediment releases during implementation, and cease work if sediment plumes exceed thresholds. Post project, spawning fish surveys will be conducted, focusing on Dec-May timeframe in order to ascertain post-implementation fish use. Random summer surveys will be conducted with electrofishing equipment to determine if Pacific Lamprey are using areas above the project site. Longitudinal stream profiles will be conducted pre- and post-project to measure channel changes due to culvert removal. Permanent photo points will be established to record the changes to the project site.

  - Does the monitoring framework provide clear objectives and measureable metrics that can be observed over time?

    Project managers intend to quantify fish use above the project site, measure physical habitat changes above and below the project site, and inspect post-project riparian planting. Since biological and physical habitat conditions have been measured before the project (in some instances, for several seasons), project managers can assess and measure project success.

- Does the framework provide a clear description of the expected outcome?

  The Baker Creek monitoring framework provides a clear description of project success: removal of physical habitat barriers that prevent Pacific Lamprey and other anadromous and resident fish from accessing Baker Creek.

- If this is an on the ground project without a monitoring or evaluation component:
  - How is completion of the project going to be documented?

    Project completion will be documented and reported to permitting agencies and funders. Oregon Watershed Enhancement Board, who will be a major funding source for this project, requires managers to report project results. Project managers will also report post-project to USFWS and BLM. This project will be monitored comprehensively due to the size, scale, cost and expected positive outcomes for the SF Coquille River.

  - Is the project's effectiveness linked to another M&E project?

    The Baker Creek culvert removal/fish passage improvement project is not related to another M&E project, though the Coquille Indian Tribe is conducting annual Pacific Lamprey redd surveys in the SF Coquille River in the vicinity of Baker Creek.

7.0 Budget and Timelines:

In May 2018, the Coquille Watershed Association applied for the balance needed for project implementation ($676,683). Based on River Design Group's 30% design, this is the amount needed for project implementation (budget available upon request). Any funding secured through the RIP Prioritization Process will reduce the total amount needed for implementation, and will be used as match for future grant applications.

III. Literature Cited

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Appendix 1

The following are the definitions for interpreting the NatureServe conservation status ranks in Table 2.

SX Presumed Extirpated.—Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation, or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. (= "Regionally Extinct" in IUCN Red List terminology).

SH Possibly Extirpated.—Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include: (1) that a species has not been documented in approximately 20–40 years despite some searching or some evidence of significant habitat loss or degradation; or (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.

SU Unrankable. .—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

S1 Critically Imperiled.—Critically imperiled in the jurisdiction because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the jurisdiction.

S2 Imperiled.—Imperiled in the jurisdiction because of rarity due to very restricted range, very few occurrences, steep declines, or other factors making it very vulnerable to extirpation from the jurisdiction.

S3 Vulnerable.—Vulnerable in the jurisdiction due to a restricted range, relatively few occurrences, recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure.—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure.—Common, widespread, and abundant in the jurisdiction.