

Pacific Lamprey
2017 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 South Oregon Coast sub-region of the Oregon Coast RMU is comprised of twelve 4th field HUCs that are situated within five EPA level III Ecoregions: the Coast Range, Klamath Mountains, Cascades, Eastern Cascades Slopes and Foothills, and the Willamette Valley. 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). Drainages range in size from 1,216 to 4,662 km² for the 12 HUCs (Table 1).

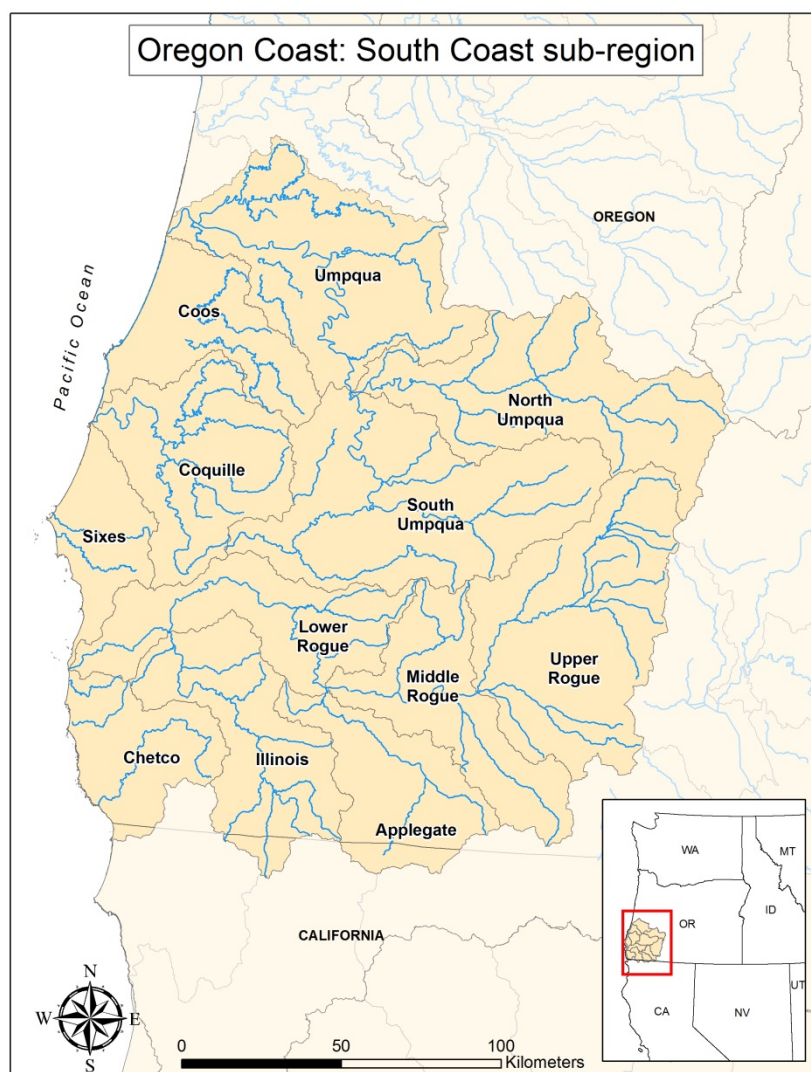


Figure 1. Map of watersheds within the Oregon Coast RMU, South Coast sub-region.

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 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. Assessment ranking of current distribution was increased in the North Umpqua, South Umpqua, Umpqua, Coquille, Upper Rogue and Illinois Rivers. Distribution information is 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 was ranked as stable in most watersheds with available abundance information (see above). The only ongoing long-term data set tracking lamprey numbers in the South Coast is located on Winchester Dam on the North Umpqua. The population has been tracked since 1965 and has indicated 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 long term data set it is unknown whether this apparent increase is simply an upswing in a larger cyclical trend.



Figure 2. Current and historic known distribution for Pacific Lamprey: Oregon Coast Regional Management Unit, South Coast sub-region (USFWS Data Clearinghouse 2017).

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 Treats

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

Watershed	Dewatering and Flow Management		Stream and Floodplain Degradation		Water Quality		Lack of Awareness		Climate Change	
	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity	Scope	Severity
South Oregon Coast										
<i>North Umpqua</i>	4	3	2	3	3	2.5	4	2	4	3
<i>South Umpqua</i>	3	4	4	3	4	3	4	2	4	4
<i>Umpqua</i>	3	3	3	3	3	3	4	2	4	4
<i>Coos</i>	2	2	3	3	3	3	4	2	3	3
<i>Coquille</i>	2.2	2	3	3	3.5	3	4	2	3	3
<i>Sixes</i>	1	2	3	3	3	3	4	2	2	2
<i>Upper Rogue</i>	3	3	3	2.5	3	3	4	2	2.5	2.5
<i>Middle Rogue</i>	3	3	3	3	3	3	4	2	3	2.5
<i>Applegate</i>	3	3	3	2.5	3	3	4	2	3	2.5
<i>Lower Rogue</i>	1	1	1	1.5	1	1	4	2	2	2
<i>Illinois</i>	4	4	3	3	4	4	4	2	4	3.5
<i>Chetco</i>	1	2	1	2	1	2	4	2	2	2
<i>Average Scope/Severity</i>	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
<i>Mean</i>	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, historic 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., $\geq 20^{\circ}\text{C}$) 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 work was recently completed or is actively occurring in the South Coast sub-region.

- Improvement of passage for Pacific Lamprey at Winchester dam (adult passage ramp first installed in 2013), Soda Springs dam, and Rock Creek diversion dam (North Umpqua).
- Tenmile Lakes Basin lamprey conservation project including installation of adult lamprey passage ramp at Eel Creek dam (Coos).
- Lamprey distribution mapping and occupancy sampling in the Umpqua and Rogue basins.
- Expansion of Pacific Lamprey redd surveys in Coquille Basin.
- ODFW will perform lamprey surveys jointly with existing steelhead surveys.
- Survey of Pacific Lamprey spawning and rearing habitat availability upstream of Soda Springs dam (North Umpqua).
- Smallmouth bass predation study in lower Elk Creek and Umpqua River.
- Upcoming Winter Lake Restoration Project will open 1700 acres of wetland to fish (Coquille).
- East Fork Millicoma Oxbow Project reconnected the historic oxbow and restored fish access

to over 16 miles of habitat in the upper basin. Included large salvage effort with many ammocoetes recovered (Coos).

- Ross Slough Project restored 1 mile of channelized stream to meandering reach. Over 7,000 ammocoetes were salvaged during instream work (Coos).
- Water diversion inventory and several large wood placement projects throughout U.S. Forest Service lands.
- Senate Bill 838 imposed a five year moratorium of suction dredge mining on all Oregon streams with designated Essential Salmon Habitat (ESH).
- Completion of Rogue River Estuary Strategic Plan and Lower Rogue Watershed Action Plan (2015), to identify and prioritize conservation and restoration actions in the lower Rogue River and tributaries.
- Summer cold water refugia study in Coquille River.
- Multiple barrier culvert replacement/removal projects where lamprey salvage operations occurred (Coquille and Coos Basins).

II. Selection of Priority Actions

A. Prioritization Process

Participating members of the South Coast sub-region met in Canyonville, Oregon in March 2017 to discuss current threats to Pacific Lamprey, and identify specific actions and research needed to address threats and uncertainties within the region. A conference call was held in May 2017 to review submitted project proposals, and prioritize projects based upon a number of criteria (e.g., threat addressed by project, benefit of proposed action, readiness of project, cost, and partner participation). Members came to consensus and selected the following four priority projects for the South Coast sub-region: Repair Lamprey Counting Mechanism at Winchester Dam, Linking Larval Lamprey Habitat with Strategic Habitat Restoration Approaches, Twelvemile Creek Stream Restoration, and Rogue Basin Lamprey Distribution, Passage and Video Monitoring.

B. High Priority Proposed Project Information

Monitoring and Evaluation

Repair Lamprey Counting Mechanism at Winchester Dam

Project Description:

A lamprey passage ramp has been installed yearly at Winchester Dam since 2013. Two different counting mechanisms were tested to monitor lamprey passage (i.e., exit flap counter and entry door counter), but both were inaccurate and unreliable. Oregon Department of Fish and Wildlife (ODFW) is currently hand passing all lamprey that utilize the ramp in order to obtain an accurate count, and the ramp is shut-down on the weekends. The ODFW and interested partners will work to develop a reliable counting mechanism and install a video recording system for count calibration which should provide an accurate count of lamprey passing through the ramp.

- **HUC 5 Location:** North Umpqua (#17100301) HUC 4 subbasin
- **Facilities ownership:** ODFW
- **Rationale and linkage to the watershed:** With continuous counts dating back to 1965, the Umpqua District has one of the longest running counts for Pacific Lamprey on the Oregon coast. ODFW is currently hand passing all lamprey that are utilizing the lamprey passage ramp to obtain an accurate count, and the ramp is completely shut-down on weekends. Additionally, due to budget cuts within ODFW counts for lamprey passing through the Winchester Dam ladder will be less frequent. A properly functioning counting mechanism along with a video recording system for count calibration would help to ensure that accurate counts of lamprey continue into the future.
- **Expected outcome (threats addressed):** The ODFW and interested partners plan to reconfigure existing or fabricate a new counting mechanism and install a motion activated camera to accurately monitor lamprey abundance and migration timing at Winchester Dam. With a reliable counter and video recording system, the ladder would remain open during the entirety of the period it is installed which would likely increase the number of lamprey using the ramp and lessen potential passage delays while also allowing for an accurate count vital for continued population trend analysis.
- **Identification and coordination with relevant stake holders:** ODFW, USFWS, Cow Creek Tribe
- **Feasibility and expected timeframes:** Feasibility is high. Goal is to have something in place by ramp installation May 2018.
- **Proponent Role and Responsibilities:** Reconfigure existing or develop new counting mechanism and install motion activated camera at Winchester Dam lamprey passage system. Potentially hire personnel to monitor video for three months.
- **Budget and identification of potential funding source:** Potential funding sources include: USFWS, ODFW Restoration and Enhancement Program, and Cow Creek Tribe. Estimated cost \$25,000.
- **Project Lead:** Jason Brandt – ODFW

Lack of Awareness & Monitoring and Evaluation

Linking Larval Lamprey Habitat with Strategic Habitat Restoration Approaches

Project Description:

These tasks are the remaining unfunded task from a proposal by the Cow Creek Band of Umpqua Tribe of Indians and the USGS. Tasks 1, 2, and 4 were funded through the Soda Springs Hydropower

Mitigation fund and included conducting larval lamprey surveys in the area of hydropower impacts and off-site mitigation tributaries, refining the burrowing habitat criteria and stream temperature analyses for larval lamprey, and assessing habitat conditions in a subset of low gradient reaches in the area of the hydropower impacts and off-site mitigation tributaries to determine if fine sediment deposits are present. The remaining tasks for the project include:

Task 3. Producing a summary report of the larval lamprey habitat suitability.

Results from Tasks 1 and 2 will be summarized in a peer-reviewed report. This step is critical to documenting the methods used to determine potential larval lamprey habitat, stream temperature conditions, and science-based restoration strategies. Owing to USGS policies, the completion of Task 2 requires the completion of this task.

Task 5. Convening a “science to restoration” workshop with local partners.

We will work with the BLM, USFS, and others to convene local habitat restoration partners. At this workshop, we will present the new science resulting from Tasks 1-3. As a community, we will discuss and refine strategies for incorporating study results into best practices for habitat restoration, translocation activities, etc. (results of Task 4). The results of the workshop will feed into the development of the restoration factsheet (Task 6).

Task 6. Developing a restoration implications fact sheet, describing how different habitat restoration approaches may or may not benefit lamprey and other native fishes.

This task will distill the results of the Tasks 1-5 into a restoration factsheet. This factsheet will be written for general audiences, and explain how place-based differences in geology and geomorphic processes influence habitat restoration strategies for lamprey and other native fishes with overlapping habitat needs. This task is needed to increase the general understanding of the habitat requirements of lampreys and other native fishes and restoration actions that may or may not benefit them. For instance, larval lampreys burrow in fine sediment for 2-7 years. The Western Cascade streams in the North Umpqua basin probably have little burrowing habitat because these streams tend to have low fine sediment loads. If partners want to increase larval lamprey habitat in these streams, then they may need to place large wood in low gradient reaches with some active bank erosion (a localized source of fine sediment).

Task 7. Conducting surveys for lampreys and other native fishes in summer 2017 (in 2-3 key sub-basins to the North Umpqua River).

This task will jumpstart a native fish inventory for the North Umpqua. This effort differs from Task 1 in that this effort will collect data at more sites within 2-3 key sub-basins (Surveying for Task 1 will be done at sites distributed throughout the mitigation focus area to capture a range of stream conditions). The fine detail on the distributions of lampreys and other native fishes resulting from this task is greatly needed to start building a native species inventory for the North Umpqua basin. These baseline data will support many purposes, including examining progress toward lamprey recovery goals, tracking native fish distributions, prioritizing culvert replacements to improve aquatic connectivity and aquatic organism passage, and helping relate and justify habitat restoration efforts implemented as part of the Mitigation Fund to the status and health of native fishes in the North Umpqua basin.

- **HUC 5 Location:** North Umpqua (#17100301) HUC 4 subbasin

- ***Rationale and linkage to the watershed:*** The North Umpqua basin has been identified as a possible refuge for lamprey from the threat of climate change, increased water temperatures and predation from invasive species. These tasks will aide in gathering and distributing valuable information about the needs of Pacific Lamprey throughout their different life stages and help guide restoration activities to better promote lamprey habitat.
- ***Expected outcome (threats addressed):***
 - Providing science support to address the aquatic connectivity, aquatic habitat, aquatic organism passage, water quality, and aquatic invasive species to inform the strategic planning process.
 - Providing science support to develop “climate aware” restoration strategies, such as identifying reaches where reducing thermal loads may preclude smallmouth bass, a predator of larval lamprey and other native fishes.
 - Tailoring habitat restoration strategies to the diverse geomorphic settings in the North Umpqua basin so that implemented projects work with the geomorphology and geology of the streams.
 - Working with the restoration community to identify best practices for habitat restoration related to lampreys and other native fishes with overlapping habitat needs.
 - Refining the best practices for habitat restoration with the local restoration community at the “science to restoration” workshop.
 - Developing the fish datasets needed to create a prioritized and cost effective approach to improving habitats for multiple native species in the Umpqua National Forest. This element has many benefits, including aiding the USFS in prioritizing culvert replacements, wood placement, and other stream restoration treatments. This native fish inventory may be expanded to other sub-basins in future years, and will inform many future Mitigation Fund projects. Lastly, building this dataset will help USFS, BLM, and others document and assess how mitigation actions may be contributing to sustaining multiple native species in the basin.
 - Establishing baseline data on lampreys, other fishes, and habitat for future hydro-mitigation projects that is consistent with the current strategic planning process, future lamprey management, and restoration and conservation actions in relation to climate change and hydropower operations.
- ***Identification and coordination with relevant stake holders:*** Cow Creek Band of Umpqua Tribe of Indians, USGS, Roseburg BLM, Umpqua National Forest
- ***Feasibility and expected timeframes:*** Feasibility is high. Timeframe is dependent on funding
- ***Proponent Role and Responsibilities:*** Provide personnel to complete lamprey surveys and secure funding to complete remaining tasks
- ***Budget and identification of potential funding source:*** A portion of this project has been funded by the Hydropower Mitigation fund. Project proponent intends to re-apply for additional funding from the Hydropower Mitigation Fund but will most likely need to find other funding sources to complete all tasks for this project

Tasks that still need funding include:

- Task 3: Producing a summary report of the larval lamprey habitat suitability - **\$15,00**
 - Task 5: Convening a “science to restoration” workshop with local partners - **\$10,000**
 - Task 6: Developing a restoration implications fact sheet, describing how different habitat restoration approaches may or may not benefit lamprey and other native fishes - **\$15,000**
 - Task 7: Conducting surveys for lamprey and other native fishes (in 2-3 key sub-basins to the North Umpqua River – **\$65,000**
- ***Project Lead:***
Kelly Coates – Water and Environmental Recourse Program Manager – Cow Creek Tribe
Travis Mackie – Fish Biologist – Cow Creek Tribe
Krista Jones – USGS
Jason Dunham – USGS

Stream and Floodplain Degradation

Twelvemile Creek Stream Restoration

Project Description:

This project would restore floodplain habitat and stream complexity in 3.5 miles of degraded reaches of stream in the Twelvemile Creek (#171003050102) HUC 6 subwatershed. Past land management in portions of the subwatershed involved direct tree/log removal from streams and riparian areas, which led to bedrock habitat conditions in stream reaches. Observations specific to anadromous fish during electrofishing presence/absence surveys as well as spawning surveys targeted at Pacific Lamprey and steelhead have revealed stream reaches in the watershed where Pacific lamprey and steelhead co-occur in addition to reaches where lamprey distribution extends beyond that of steelhead due to natural geomorphic features. Even in portions of the subwatershed where lamprey and steelhead co-occur, lamprey are significantly more abundant- presumably due to prolonged reaches of high gradient habitat downstream.

Photo 1: Past streamside harvest/stream cleaning resulting in degraded, bedrock conditions.



Photo 2: Sporadic patches of high quality habitat in the subwatershed provide a reference in “what to shoot for” when designing instream/floodplain restoration projects in degraded reaches.



- **HUC 5 Location:** Middle Fork Coquille River #1710030501 HUC 5
- **Facilities ownership:** Mixed Ownership-Primarily BLM and Roseburg Resources Co.
- **Rationale and linkage to the watershed:** Pacific Lamprey require a range of substrate sizes during phases of larval rearing and spawning by adults. Bedrock habitat conditions (Photo 1) or stream reaches lacking complexity and floodplain connectivity are commonplace in much of the Twelvemile Creek subwatershed. This project would restore habitat to at least 3.5 miles of the subwatershed through the addition of large wood and boulders to degraded stream reaches.
- **Expected outcome (threats addressed):** Where patches of moderate to high quality habitat are found within the basin, both larval lamprey and spawning adults appear in relatively high abundance. This suggests that instream and floodplain restoration of degraded habitat is likely to profoundly increase the local population of Pacific Lamprey in the Twelvemile Creek subwatershed.
- **Identification and coordination with relevant stake holders:** BLM is one of the two primary landowners/stakeholders of which, BLM is committed to seeing this project through to successful completion. The Coquille Watershed Association has successfully worked on numerous stream restoration projects with Roseburg Resources Co., the other primary landowner/stake holder. The Twelvemile Creek restoration project is expected to follow this successful pattern, but there is not currently a formal agreement in place (partnership meetings to occur May and June 2017).
- **Feasibility and expected timeframes:** Feasibility is high-The BLM and Coquille Watershed Association have successfully completed numerous stream restoration projects. Planning and funding acquisition for the project are expected to continue through 2017. Design and implementation would occur in 2018 and into 2019 with monitoring and public outreach and education occurring thereafter.

- ***Proponent Role and Responsibilities:*** Planning, funding acquisition, design, implementation, monitoring, and outreach.
- ***Budget and identification of potential funding source:*** BLM, PCSRF/NOAA, Bring Back the Natives, Drinking Water Providers Partnership, others. Secured cash \$20,000, unsecured \$95,000. In-kind unsecured \geq (10 trees and 100 logs) \$45,000.
- ***Project Lead:*** Steve Clark-Roseburg District BLM, smclark@blm.gov, 541-464-3264. Alternative contacts: Cory Sipher, csipher@blm.gov; Melaney Dunne, coordinator@coquillewatershed.org

Monitoring and Evaluation & Passage Improvement

Rogue Basin Lamprey Distribution, Passage and Video Monitoring Project

Project Description:

Task 1. Conduct Lamprey Distribution Surveys

This project aims to develop a better understanding of lamprey distribution in the Rogue Basin. Little is currently known about their distribution. Local biologists have some incidental knowledge of lamprey presence primarily from surveys targeting salmonids. The proposed effort will focus specifically on lamprey and will be conducted in the Applegate, Illinois, Upper Rogue, Middle Rogue and Lower Rogue sub-basins (with the priority being on the first 4 sub-basins). The work will be completed by Dr. Stewart Reid, a biologist with specialized expertise in lamprey conservation and management. Dr. Reid is a local Rogue Valley resident who has recently co-authored a paper on lamprey detectability, which describes methods for identifying broad scale lamprey distribution (Reid and Goodman, 2015). This work will be completed and coordinated with relevant agencies and NGO's and will begin with a review of all known lamprey distribution information in the Rogue Drainage. Although the anadromous Pacific Lamprey is the primary target of the project, these broad surveys will allow us to identify additional lamprey species, if they are present in the basin. Currently, Western Brook Lamprey are known to occur only in Lobster Creek (lower Rogue trib.), however, it is possible that Brook Lamprey and possibly other species occur the Rogue Basin. The neighboring Klamath Basin contains six described species of lamprey, four of which are endemic.

Task 2. Irrigation Diversion Retrofits

Across the Rogue Basin, there are a large number of small, channel spanning concrete dams. Many of these structures continue to serve as irrigation diversions for active water rights. Many of these structures may also be complete or partial passage barriers to lamprey often due to sharp edges at the dam's crest, which lamprey are known to struggle to navigate. Lamprey could more easily pass such structures with simple improvements. For example, creating a smooth surface with sheet metal or other material that eliminates these right angles. Dr. Reid and colleagues have implemented low cost

passage retrofit projects in other watersheds and will lead the design of these passage retrofits. One site has already been selected for passage retrofits. Three additional sites will be selected pending the information provided by the distribution surveys.

Task 3. Video Monitoring

One dam selected for passage retrofits will also be configured to allow for video monitoring of lamprey passage. The video monitoring system will be based on a similar system currently being used successfully by CDFW and USFWS (design Reid and Goodman) at Van Arsdale Dam on the Eel River in California. Such monitoring will provide important information for monitoring effectiveness of retrofits and beginning to develop baseline data on lamprey in the Rogue.

- **HUC 5 Location:** HUC 8 (4th field) as follows:
17100307 (Upper Rogue)
17100308 (Middle Rogue)
17100309 (Applegate)
17100310 (Lower Rogue)
17100311 (Illinois)
- **Facilities ownership:** Mix of public and private lands
- **Rationale and linkage to the watershed:** In order to effectively manage any animal, it is crucial to first know where they occur. This knowledge of lampreys in the Rogue basin is lacking. The Rogue, Illinois and Applegate mainstems are known to support populations of Pacific Lamprey, but the extent of their distributions within these watersheds is unknown. In many sub-watersheds (in many cases 5th field watersheds), no information on lamprey presence exists at all. This project would fulfill a recognized gap in lamprey conservation needs, specifically identifying and providing information for principal streams that may be of conservation concern, e.g. Bear Creek, a major southern tributary of Rogue River in the Medford/Ashland area (a priority drainage identified by the Rogue Lamprey Working Group). Additionally, this project will identify lamprey distribution basin-wide in a known time frame (one field season). This contrasts with current information which is dated, temporally and spatially uncertain, and in some cases, unreliable.

Passage retrofits and video monitoring at key locations in selected sub-watersheds will help provide insight into lamprey spawning abundance at the sub-watershed scale. Video monitoring will also help determine the effectiveness of the passage retrofit in providing upstream passage for lamprey. This baseline information collected by video monitoring will help inform future efforts regarding lamprey restoration and management.

- **Expected outcome (threats addressed):** The expected outcome is a better understanding of lamprey distribution and species assemblage in the Rogue. Understanding where lamprey occur will help guide restoration and management efforts. Perhaps most importantly, it will allow us to better understand status and trends in lamprey abundance. Specifically, we aim to identify

distribution in mainstems and principal tributaries of the Rogue, Illinois, and Applegate Rivers. This information will be consolidated into a useable report/map format then can be easily distributed to interested parties and will include recommendations for future actions.

The expected outcomes resulting from retrofits to existing irrigation diversions are improved passage for adult lamprey. The expected outcome of the video monitoring is the creation of a tool that allows for the collection of baseline data regarding migration timing and adult abundance. It is also a tool to monitor passage retrofit effectiveness and will help establish a monitoring method that can be applied at other sites across the watershed, facilitating adaptive management techniques in lamprey passage retrofit design.

This project will also provide the opportunity for streamside community outreach and education, including landowners, volunteers and community passersby, allowing the experienced project biologists to educate the public about lampreys. Lack of awareness in the community is consistently considered a conservation concern under the Pacific Lamprey Conservation Initiative.

- ***Identification and coordination with relevant stake holders:*** Coordination with relevant stakeholders will be facilitated by project managers (primary: Jay Doyno, ODFW) and include local, state, federal resource agencies, NGO's and the local Rogue Lamprey Working Group. The collective knowledge of local staff from these organizations is well suited to design and oversee this project. Local staff members have familiarity with known lamprey distribution, the geographies of the sampling areas, survey techniques and the mixed land based ownership that exists in the Rogue. The local agencies and NGO's are also well positioned to conduct outreach to private landowners on lamprey and to secure access to private lands for survey work as needed.
- ***Feasibility and expected timeframes:*** The feasibility of completing this project as proposed is high. The project would be immediately actionable pending funding and could be completed in a single field season (or multiple depending on timing of funding). A peer reviewed sampling protocol is in place (Reid and Goodman, 2015) for the distribution work and a model video monitoring system is in place which can be used as a template. Materials and tools needed for passage retrofits are simple and readily available. Relevant support staff and local biologists are ready and willing. The proposed contractor, Dr. Reid, is a local Rogue Valley resident and is enthusiastic about working with local agencies and watershed groups to implement this project.

Proponent Role and Responsibilities: The proponent responsibilities will include: 1) prioritization of watersheds where distribution information is to be collected; 2) recruiting volunteers to assist with outreach and survey work as needed; 3) coordinating with Dr. Reid to conduct the work (develop scope of work and contract, oversee data collection, etc.); 4) implement passage retrofits and set up video monitoring system under the guidance of Dr. Reid. 5) review/edit/approve a final report prepared by Dr. Reid and distribute to relevant entities.

- **Budget and identification of potential funding source:** The estimated total cost of this project is \$29,250. Additional cash funding is not anticipated. Match funding will be provided by Rogue ODFW, Medford BLM, Rogue Siskiyou National Forest and Applegate Partnership & Watershed Council in the form of: 1) sharing/collection of existing information; 2) survey prioritization; 3) data collection assistance; 4) final report review. A breakdown of costs by task:

Task 1: \$17,500. Includes: presence absence surveys by 5th field watershed (or smaller) in the Upper Rogue, Middle Rogue, Applegate, Illinois and, if budget allows, the Lower Rogue; voucher specimens collected at each 5th field where they are observed; site photos and descriptions.

Task 2: \$10,000. Retrofits at 4 dams to improve passage for lamprey. Includes: design, materials, labor and installation. One dam has already been selected for retrofit in the Applegate sub-basin. The remaining three dams will be identified based on the results of presence absence surveys.

Task 3: \$1750. Video monitoring. Includes camera, deep cycle battery, lock box, recording equipment and accessories; design and installation;

- **Project Lead:** Jay Doino (project leader), ODFW; Janelle Dunlevy/Jakob Shockey, (project leader and fiscal agent) Applegate Partnership and Watershed Council

Citations

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