Pacific lamprey

2017 Regional Implementation Plan

for the

Oregon Coast

Regional Management Unit

North Coast Sub-Region

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I. Status and Distribution of Pacific lamprey in the RMU

A. General Description of the RMU

North Oregon Coast Sub-Region

The North Oregon Coast sub-region of the Oregon Coast RMU is comprised of seven 4th field HUCs that are situated within two Environmental Protection Agency (EPA) Level III Ecoregions: the Coast Range and the Willamette Valley (https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states). Watersheds within the North Coast sub-region range in size from 338 to 2,498 km^2 and include the Necanicum, Nehalem, Wilson-Trask-Nestucca, Siletz-Yaquina, Alsea, Siuslaw and Siltcoos Rivers (Figure 1; Table 1).

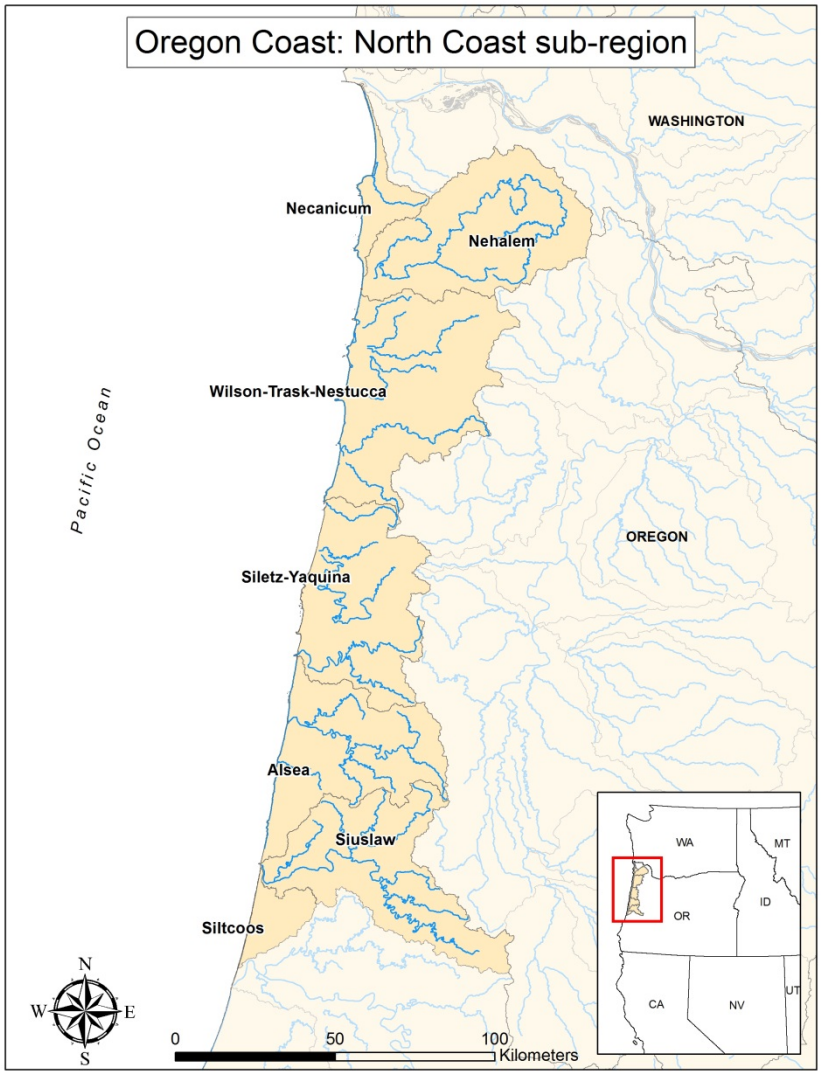

Figure 1. Map of watersheds within the Oregon Coast RMU, North Coast sub-region.

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

Watershed	HUC Number	Drainage Size (km^2)	Level III Ecoregion(s)
Necanicum	17100201	355	Coast Range
Nehalem	17100202	2,212	Coast Range
Wilson-Trask-Nestucca	17100203	2,498	Coast Range
Siletz-Yaquina	17100204	1,964	Coast Range
Alsea	17100205	1,786	Coast Range
Siuslaw	17100206	2,006	Coast Range, Willamette Valley
Siltcoos	17100207	338	Coast Range

B. Status of Species

Conservation Assessment and New Updates

Increased attention on Pacific lamprey has increased our understanding of this species in the North Coast sub-region. Monitoring efforts, in which lamprey are either the target species or information is collected during other species' monitoring, have expanded the amount of information available and the quality of this information. Current distribution increased in each of the HUCs, except the Siltcoos, which remained the same.

Population abundance was estimated within all of the HUCs using information provided Oregon Department of Fish and Wildlife (ODFW 2017). ODFW estimated a range of Pacific lamprey population abundance using extrapolations of published information on the number of Pacific Lamprey per redd by the mean peak redd counts per mile, multiplied by the number of survey miles for Pacific lamprey (Table 2). As part of the monitoring for adult steelhead spawning populations, the Oregon Adult Salmonid Inventory and Sampling (OASIS) field crews have recorded data on lamprey spawners and redds since 2009. These estimates are considered conservative abundance indices, as the surveys are focused on steelhead, and end before the completion of Pacific lamprey spawning (Jacobsen et al. 2014; Jacobsen et al. 2015; Brown et al. 2017, ODFW 2017).

There was consensus that lamprey populations declined significantly from historical numbers about 50-60 years ago (i.e. Downey 1993). However, short-term population trend was not ranked (determined "unknown") because there is insufficient data available over the past 27 years. The data from ODFW is only for the past 3 to 8 years. Abundance indices have generally increased over the 3 to 5 years (Table 2), but without a long term data set it is unknown whether this apparent increase is simply an upswing in a larger cyclical trend.

Based on the ODFW data, and noting this information is limited, the Wilson-Trask-Nestucca, Siuslaw and Nehalem HUCs appear to support greater numbers of lamprey than the other HUCs in the North Coast (ODFW 2017).

Table 2. Minimum, mean, and maximum abundance indices for adult Pacific lamprey in the North Coast RMU (ODFW 2017). Estimates are considered conservative.

Year	MIN	MEAN	MAX
2009	1,113	4,271	7,831
2010	289	1,109	2,032
2011	736	2,828	5,184
2012	758	2,911	5,337
2013	2,335	8,968	16,441
2014	1,162	4,459	8,175
2015	2,456	9,429	17,287
2016	2,500	9,597	17,594
2009-2016 MEAN	**1,419**	**5,447**	**9,985**

Table 3. Current Distribution of Pacific Lamprey by Stream Length and Watershed Area for each 4th Field Hydrologic Unit Code (HUC) Watershed located within the Willamette Sub-Unit.

Watershed HUC	Current Distribution Length (km)	Current Distribution Area (km^2)
Necanicum	64	94
Nehalem	376	582
Wilson-Trask-Nestucca	424	686
Siletz-Yaquina	384	593
Alsea	341	507
Siuslaw	475	692
Siltcoos	28	41
TOTAL	**2,093**	**3,195**

Table 4. Mean abundance indices for adult Pacific lamprey by HUC from 2009 to 2016 in the North Coast RMU (ODFW 2017). Estimates are considered conservative.

HUC	Mean
Necanicum	177
Nehalem	923
Wilson-Trask-Nestucca	1,178
Siletz-Yaquina	885
Alsea	660
Siuslaw	1,157
Siltcoos	18

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

Distribution and Connectivity

In the majority of watersheds that were assessed, the scope and severity of threats from passage are low. Culverts and tidegates in low-lying areas are widespread and may impact or impede lamprey passage to an unknown extent. An extensive effort is currently underway in portions of the North Coast sub-region to identify and prioritize barrier structures for repair (retrofit), replacement, or removal; however, the focus of these efforts is juvenile salmonids.

Several major passage issues have been addressed in the past several years:

- City of Seaside's Diversion Dam was removed and intake screens upgraded on the South Fork Necanicum.
- ODOT breached several dikes in the lower mainstem Necanicum near RM5.
- Several tide gates in the lower North Fork of the Nehalem were replaced.
- Multiple culverts have been replaced or removed in the Wilson-Trask-Nestuccca HUC over the past several years as part of the Salmon Super Highway Project (SSH). SSH project partners plan to continue efforts to replace barrier culverts in these basins in coming years.
- A substantial barrier dam on the East Fork South Fork Trask River was removed during summer 2016 and another dam removal at Skookum Lake (Tillamook River Basin) is planned for summer 2017.
- Several removals are planned for the Necanicum and Nehalem HUCs in 2017 and beyond.
- Upgrades at hatchery barriers and the Lord Creek Culvert in the Alsea watershed.

The Siltcoos and Tahkenitch dams are not believed to be a complete barrier but there is interest in evaluating lamprey passage success at these structures. Culvert passage is thought to be the main concern in the Nehalem watershed, and low water levels in the Alsea and Nestucca may be seasonal barriers in some areas with water diversions. Private and municipal water diversions are present throughout the North Coast sub-region. Aging or obsolete diversions with inadequate screening may impinge or entrain juvenile lamprey.

C. Threats

Summary of Major Treats

The following table summarizes the key threats within the North Coast sub-region as identified by RMU participants during the Risk Assessment revision meeting in April 2017. Stream and floodplain degradation, water quality, and lack of awareness were all considered a moderate threat in the North Coast sub-region.

Table 3. Summary of the assessment results for the key threats of the North Oregon Coast sub-region.

	Stream and Floodplain Degradation		Water Quality		Lack of Awareness	
Watershed	Scope	Severity	Scope	Severity	Scope	Severity
North Oregon Coast						
Necanicum	3	3	2	2	4	2
Nehalem	3	3	3	3	4	2
Wilson-Trask-Nestucca	3	3	2	2	4	2
Siletz-Yaquina	3	3	3	3	4	2
Alsea	3	3	3	2	4	2
Siuslaw	3	3	3	3	4	2
Siltcoos	4	3	3	2.5	4	2
Mean	3.14	3.00	2.71	2.50	4.00	2.00
Rank	**M**	**M**	**M**	**M**	**H**	**M**
Mean Scope & Severity	3.07		2.61		3.00	
Drainage Rank	**M**		**M**		**M**	

Current Threats

The three highest ranked threats in the sub-region are described below. Stream and Floodplain degradation and Water Quality were ranked slightly higher than in 2011; lack of awareness was determined to be a greater concern than 2011. Although not a key threat in 2017 (Mean Scope & Severity = 2.43), dewatering and Flow Management was also ranked higher than in 2011.

Stream and Floodplain Degradation

Stream and floodplain degradation remains an ongoing threat throughout the North 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, and urbanization have deforested or altered the function and diversity of riparian vegetation. Many watersheds in the RMU are lacking mature conifers that play a pivotal role in bank stability, water quality protection, thermal cover, and the provision of large woody debris.

Water Quality

Elevated water temperature is the primary water quality concern in the North Coast sub-region. Excessive temperatures generally occur during summer months and may be attributed to increased air temperature, lack of riparian cover, or reduced instream flows associated with water withdrawals for irrigation, municipal or residential use. The impacts of relatively warm water temperatures (e.g., ≥20°C) on Pacific Lamprey embryonic development, physiology, adult migrations, reproductive capability and evolutionary pressures can be multitudinous and substantial (Clemens et al. 2016). Other water quality concerns in tributaries include low dissolved oxygen and presence of bacteria (e.g., fecal coliform, e coli), that may be associated with elevated water temperatures and agricultural or urban runoff. Monitoring and restoration efforts to improve and protect water quality for fish, wildlife, and human health are ongoing in the North Coast sub-region.

Lack of Awareness

Instream water work, whether for restoration activities or maintenance of diversions, can dewater areas or remove sediments in which juvenile lamprey are burrowed. Such actions without first salvaging lamprey may result in the death of hundreds of juveniles. Increasing public and agency awareness about the presence of juvenile lamprey in the sediments, adult lamprey spawning habitats and timing during inwater work, as well as the effect of water diversions, and education on actions to minimize these impacts, could greatly decrease localized mortality and injury to lamprey populations.

Dewatering and Flow Management

Stream flow conditions have generally improved in the Necanicum since the completion of the 2011 Assessment, however, the scope and/or severity of this threat has increased in the Alsea, Siuslaw, and Siltcoos basins. Water withdrawals for irrigation, municipal, or residential uses leave many watersheds in the North Coast sub-region dewatered or with inadequate flow during summer and fall months. Low flow levels can reduce habitat availability, prevent lamprey access to backwater or side channel habitats, and may contribute to mortality if incubating eggs or burrowing larvae are dewatered or exposed to a high temperature or low oxygen environment. The projected rise in human population and anticipated effects of climate change (i.e., elevated ambient temperatures, decreased surface water availability, altered flow regimes), may increase the frequency, duration and intensity of low flow conditions in the future.

Restoration Actions

Multiple projects are currently underway to restore floodplain connectivity, relocate or reconnect side channel habitat, enhance damaged riparian areas, and remove, replace or improve barriers to fish passage (e.g. culverts, tidegates, and diversion dams). Assessments that identify and prioritize future restoration work and passage problems are also ongoing in these areas. Although the majority of research and restoration projects are developed and implemented with adult and juvenile salmonids in mind, a growing number of projects are incorporating benefits for Pacific lamprey and some passage projects are targeting lamprey specifically.

II. Selection of Priority Actions

A. Prioritization Process

Participating members of the North Coast sub-region met in April 2017 to discuss current threats to Pacific lamprey, and identify specific actions and research needed to address threats and uncertainties within the RMU. Project proposals were submitted online and RMU members were asked to review proposals based on a number of criteria (e.g., threat addressed by project, benefit of proposed action, readiness of project, cost, and partner participation). Members were supportive of all proposals and elected to submit the following five priority projects for the North Coast sub-region: Lamprey Spawning Surveys in Coastal Oregon and Lower Columbia River, Population monitoring in the North Fork Alsea River and Eel Lake Basins, Larval Lamprey Use in Tidal Habitats, OK Ranch Habitat Enhancement Project, and Coho Creek Culvert Removal and Replacement.

B. High Priority Proposed Project Information

Monitoring and Evaluation

Lamprey Spawning Surveys in Coastal Oregon and the Lower Columbia River: Distribution, Timing, and Development of Relative Abundance Indexes

Project Description:

The primary goals of this project are to: 1) continue monitoring the distribution, timing, and number of Pacific Lamprey redds along the Oregon Coast and tributaries to the lower Columbia River in Oregon; 2) estimate redd longevity and cumulative redd numbers to generate area-under-the curve estimators, and 3) use published numbers of lamprey per redd to develop relative abundance indexes of Pacific Lamprey. These surveys will extend the timing and geographic scope of lamprey surveys beyond the steelhead monitoring framework currently used. The distribution, timing, and relative abundance of Pacific Lamprey are integral for informing the five year NatureServe Risk Assessments for the Pacific Lamprey Conservation Initiative, including the three parameters, "watershed population distribution", "watershed population abundance", and "short-term population trends".

- **HUC 5 *Locations*:**
  Necanicum River, Oregon (#17100201)
  Nehalem River, Oregon (#17100202)
  Tillamook Bay, Oregon (#17100203)
  (Miami River, Kilchis River, Wilson River, Trask River, Tillamook River)
  Nestucca River, Oregon (#17100203)
  Salmon River, Oregon (#17100204)
  Siletz River, Oregon (#17100204)
  Yaquina River, Oregon (#17100204)
  Beaver Creek, Oregon (#17100205)
  Alsea River, Oregon (#17100205)
  Siuslaw River, Oregon (#17100206)
  Siltcoos River, Oregon (#17100207)

Tahkenitch Lake, Oregon (#17100207)
Tenmile Lake, Oregon (#17100304)
Coos Bay, Oregon (#17100304)
Coquille River, Oregon (#17100305)
Floras Creek, Oregon (#17100306)
Sixes River, Oregon (#17100306)
Umpqua River, Oregon (#17100303)
North Umpqua River, Oregon (#17100301)
South Umpqua River, Oregon (#17100302)
Clatskanie River, Oregon (#17080003)
Scappoose River, Oregon (#17090012)
Clackamas River, Oregon (#17090011)
Sandy River, Oregon (#17080001)

- ***Facilities ownership:*** Land adjacent to streams is owned by a variety of landowners.
- ***Rationale and linkage to the watershed:*** As part of the monitoring for winter steelhead spawning populations in Western Oregon, including tributaries of the Oregon Coast and Lower Columbia, Oregon Department of Fish and Wildlife field crews record data on lamprey spawners and redds. Sample sites (~ 1 mile long) are selected using a spatially–balanced, random design from within the steelhead spawning distribution (frame). Comprehensive monitoring began in 2003 along the Oregon Coast and in 2012 in the Lower Columbia (Astoria to Hood River). Recording lamprey data in the field was standardized in 2009, as counts of all fish and redds observed on each survey visit. Survey efforts have varied substantially across years and among Distinct Population Units (DPS) of steelhead. Since 2009 the number of survey sites has ranged from 120 to 180 in the Oregon Coast DPS, 0 to 50 in the Klamath Mountain Province DPS, and 100 to 150 in the Lower Columbia.
- ***Expected outcome (threats addressed):*** The Oregon Department of Fish and Wildlife has created an abundance index for Pacific Lamprey, based upon enumeration of Pacific Lamprey redds during steelhead spawning ground surveys along the Oregon Coast and tributaries to the Lower Columbia River. (Steelhead spawning surveys are typically conducted from February through May each year.) The abundance indexes for each surveyed basin likely represent conservative estimates of lamprey numbers within each basin. The abundance index is calculated as follows:

Abundance index = (Average Peak Lamprey Redds per Mile) * (Frame Miles) * (Lamprey per Redd)[1]

[1] Numbers of lamprey per red are available from published, scientific literature.

These abundance estimates of Pacific Lamprey can be built upon in terms of the following parameters:

a) Increasing the geographic scope of lamprey spawning to include spawning within mainstem rivers;
b) Increasing the survey dates to extend further into the spawning season of lamprey (June/July);
c) Generating a random survey distribution based upon lamprey distribution data (and not steelhead distribution data);

d) Measuring redd longevity from a subset of redds throughout coast and enumerating cumulative redd numbers (not just peak redd numbers), to estimate an area-under-the curve estimate of lamprey numbers within each surveyed basin; and
e) Extending the time series for lamprey numbers that can be used for informing the five year NatureServe Risk Assessments for the Pacific Lamprey Conservation Initiative, including the three parameters, "watershed population distribution", "watershed population abundance", and "short-term population trends".

- ***Identification and coordination with relevant stake holders:*** Landowners.
- ***Feasibility and expected timeframes:*** Feasibility is high. The OASIS (Oregon Adult Salmonid Inventory and Sampling) project within the Oregon Department of Fish and Wildlife already possesses the administrative, database, and field expertise and infrastructure to conduct the surveys.
- ***Proponent Role and Responsibilities:*** The OASIS project within the Oregon Department of Fish and Wildlife already possesses the administrative, database, and field expertise and infrastructure to conduct the surveys. Adjustments to sampling frames by OASIS, including identifying random survey locations within the lamprey survey frame are needed, and can be conducted by existing staff. Pre-surveys to finalize particular locations to conduct mainstem surveys are needed, and can be conducted by existing staff. Currently random survey effort concludes at the end of May which does not encompass the entire lamprey spawning season. Up to four part time field positions will need to be funded to add mainstem lamprey spawning surveys, and extend the survey effort through the end of lamprey spawning in June.

- ***Budget and identification of potential funding source:*** Funding from salmonid-oriented sources has been subsidizing the lamprey spawning ground surveys to date, which are currently undertaken as part of steelhead surveys. The potential for continuation of funding for these surveys is unknown, and potentially uncertain. Below are costs for funding four seasonal surveyors for mid-April through mid-June.
    - Total Annual Cost: **$45,108**

- ***Project Lead:*** Ben Clemens – ODFW

Monitoring and Evaluation

Population Monitoring in the North Fork Alsea River and Eel Lake Basins

Project Description:

The primary goal of this project is to address passage concerns for adult Pacific Lamprey in two locations: 1) the North Fork Alsea River (**Oregon mid-coast**), and 2) in Eel Creek (**Oregon south coast**). Passage will be addressed through the design, fabrication, and installation of adult lamprey ramps by the Oregon Department of Fish and Wildlife at: 1) the dam at the water diversion structure, upstream from the Alsea River Hatchery on the North Fork Alsea River, and 2) at Eel Creek Dam. Each of these two locations has a fish ladder and trap, but they are not conducive to lamprey passage. Pacific lamprey distribution in the North Fork Alsea River above the water diversion structure, and in Eel Lake above that dam are unknown. It is possible, but unknown, that a limited number of larval

Pacific Lamprey may exist in the basins above these barriers, prior to installation of adult lamprey ramps. We wish to learn whether larval Pacific Lamprey do in fact exist in the North Fork Alsea and Eel Lake basins, above the aforementioned barriers; and, if their numbers increase after installation of the lamprey ramps.

The second goal of this project (*and the first of two aims of this proposal*), therefore, is to monitor the relative abundance of larval Pacific Lamprey upstream of the diversion dam in the North Fork Alsea, and Eel Creek Dam, pre- and post- ramp installation. Through monitoring, we can learn whether numbers of larvae correlate with installation of the ramp, thereby suggesting that the ramp has increased the relative number of larvae (i.e., progeny of adults passing). This can inform us on the effectiveness of the ramp in increasing the number of successful adult spawners upstream of the dam.

A third goal of this project is to utilize two different monitoring techniques to determine which is more time- and cost-effective (*and the second of two aims of this proposal*).

The lamprey ramps are currently being designed. Monitoring for the relative abundance of larval Pacific Lamprey will occur at base river flows in the North Fork Alsea and Eel Lake basins, during summer 2017. The ramps will be installed during spring 2018. Monitoring for larval Pacific Lamprey will occur again during summer 2018. Monitoring will be done with: 1) backpack electroshockers, using lamprey settings, and with 2) water samples to detect lamprey eDNA.

The costs for eDNA sampling and processing can be distributed cost effectively between the North Fork Alsea and Eel Lake basins because the costs of sampling decreases with the number of samples.

- **HUC 5 *Location*:** Alsea River, Oregon (#17100205)**;** Eel Lake, Oregon (#17120006)
- ***Facilities ownership:*** Oregon Department of Fish and Wildlife (ODFW)
- ***Rationale and linkage to the watershed:*** The water diversion dam upstream of the Alsea River Hatchery on the North Fork Alsea River may impede adult lamprey passage to upstream spawning areas. Similarly, the Eel Creek Dam may impede adult lamprey passage to upstream spawning areas. Installation of a ramp at each location can improve the numbers of adult Pacific Lamprey passing upstream of each of these dams to spawn. Monitoring will be essential to learning whether the ramps have been effective in increasing spawners, through the assessment of relative numbers of their progeny (larval lamprey).
- ***Expected outcome (threats addressed):*** Monitoring will determine a relative increase in larval lamprey upstream of the Alsea River Hatchery diversion dam, and upstream of the Eel Creek Dam. The relative abundance of larval Pacific Lamprey, as determined through backpack electroshocking surveys, will correlate with eDNA from water samples. This will inform biologists whether and how eDNA could be used as a proxy for backpack electroshocking surveys. The monitoring will also inform us on whether the use of eDNA in surveying for larval lamprey is more time- and cost- effective than backpack electroshocking surveys.
- ***Identification and coordination with relevant stake holders:*** USGS (for eDNA surveys)
- ***Feasibility and expected timeframes:*** Feasibility is high. The ramps are currently being designed and fabricated by ODFW. Existing backpack electroshocking gear and personnel are available to conduct surveys. Monitoring is slated to occur during base flows during summer 2017. The lamprey ramps will be installed during the spring of 2018. Monitoring will occur again, after ramp installation, during summer 2018.
- ***Proponent Role and Responsibilities:***

Step 1: Conduct backpack electroshocking surveys upstream of the diversion dam at the Alsea River Hatchery, on the North Fork Alsea River, and upstream of the Eel Creek Dam in the Eel Lake Basin. Collect water samples for eDNA assays, and send these to the USGS lab in Seattle for processing.

Step 2: Install lamprey ramp.

Step 3: Repeat step 1.

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

ODFW will utilize different funding source(s) for the lamprey ramps.

In-kind will be provided through the use of existing backpack electroshocking gear, nets, waders, etc., and staff time to conduct the larval surveys and compile and analyze the data.

The focus of this RIP proposal is on costs for lamprey eDNA assays to be conducted by the USGS laboratory in Seattle. These costs range between $4,546 – $12,581, depending on the number of samples, and the funding source (which determine the overhead rate). The costs cover technician salary and benefits, and laboratory supplies and consumables. Here are the possibilities, from low to high costs within the aforementioned cost range:

  - 1 species (Pacific Lamprey), 10 sites
  - Two species (Pacific Lamprey and *Lampetra* species [Western Brook Lamprey and/or Western River Lamprey]), 10 sites
  - One species (Pacific Lamprey), 20 sites
  - Two species (Pacific Lamprey and *Lampetra* species), 20 sites

- **Project Lead:** Ben Clemens – ODFW

Monitoring and Evaluation

Larval Lamprey Use in Tidal Habitats

Project Description:

This project focuses on furthering our knowledge of larval lamprey use in tidal habitats. This project examines presence/absence of larval lamprey at a sub-set of the existing Southern Flow Corridor fish monitoring sites using both electroshocking and dredge sampling methods. Sampling will occur during late spring 2018 when temperatures are below 18C and local streams have not reached their annual low flow levels. Sampling will occur during a one week period. The Confederated Tribes of Siletz Indians is currently working under contract with the Tillamook Estuaries Partnership utilizing US FWS and NOAA funding sources. The Tribe's contract scope of work is focused on efficacy monitoring of fish and habitat resources during a pre and post-restoration timeframe.

- **HUC 5 *Location*:** Wilson-Trask-Nestucca (#17100203) HUC 4 subbasin
- ***Facilities ownership:*** Property owned by Tillamook County
- ***Rationale and linkage to the watershed:*** The Tillamook Estuary is fed by several river systems and has an extensive amount of tidal brackish water habitat that if properly surveyed for larval lamprey would forward our understanding of larval lamprey habitat needs and the importance of conservation and restoration of tidal habitats found across the Oregon coast.

- ***Expected outcome (threats addressed):*** Outcomes will include new information on fish presence/absence for tidal habitat which will inform future approaches to better quantify the potential role of tidal habitats relative to larval lamprey (multiple species) success/survival.

- ***Identification and coordination with relevant stake holders:*** The proposed work will be coordinated with Oregon Dept. of Fish and Wildlife (Chris Knutsen Tillamook office), Tillamook Estuaries Partnership, and Tillamook County under the coordination efforts occurring within the broader Southern Flow Corridor project monitor plan.
- ***Feasibility and expected timeframes:*** Field work will be completed spring 2018. The field work will include sampling a subset of existing salmonid monitoring sites defined within the Southern Flow Corridor monitoring plan (2014). A report will be delivered March 2019. Field work will involve five days of sampling by the full Tribal fisheries sampling crew (3 biologists and two technicians) assigned to the Southern Floor Corridor monitoring contract. Efficiencies will occur as a result of the sampling crew being on site on a monthly basis while accomplishing work under the existing salmonid focused monitoring plan.
- ***Proponent Role and Responsibilities:*** The Tribe has all the required shocking, dredging, netting, dry suit, snorkel and boat equipment needed. The Tribe will coordinate the plan with the above partners. The Tribe will carry out the contract/grant activities and provide an electronic copy of all data generated as well as a final report describing sampling methods, results and conclusions.
- ***Budget and identification of potential funding source:*** US FWS RIP funding is being requested. Funding will cover three tribal biologists and two technicians during a 5 day period of field sampling. All data summaries and report writing will be covered as inkind.
    - Total Cost: **$5,325**

- ***Project Lead:*** Stan van de Wetering – Confederated Tribes of Siletz Indians

Stream and Floodplain Degradation

OK Ranch Habitat Enhancement Project

Project Description:

The OK Ranch sits at the top of the Miami River floodplain five river miles above the reach of tide and the town of Garibaldi. Landowners Doug and Mary Lee live and farm on the property, and are growingly concerned about the migration of the river channel toward one of their barns, a septic drain-field and a prime piece of pasture. The last 100 years of land use in Tillamook Bay watershed has left its mainstem rivers nearly devoid of riparian trees, log jams, or other significant woody debris. The Tillamook Bay Watershed Council (TBWC) has been looking for opportunities to work with area farmers to place and accumulate large woody debris in the floodplains, and the Lee's situation has resulted in a growing partnership between the OK Ranch, the TBWC, the US Forest Service, and Stimson Lumber to design and implement a major large-wood placement project that will provide significant, lasting fish habitat enhancement to the river, and protection for important farm infrastructure. The technical assistance this grant would provide will help pay for the design and engineering services of the US Forest Service's TEAMS unit to prepare the project for implementation. In addition to the measurable improvement in fish habitat that this project represents,

it is hoped that a successful demonstration of soft-structure techniques might generate interest among other farmers to employ similar treatments where infrastructure is threatened.

- **HUC 5 *Location*:** Tillamook (#17100203)
- ***Facilities ownership:*** Private, Doug & Mark Lee
- ***Rationale and linkage to the watershed:*** Lamprey are in need of habitat complexity, as are salmon and steelhead. This opportunity to enhance a key portion of a mainstem river is expected to benefit all aquatic species. And if it can be duplicated elsewhere downstream as a result of this demonstration, the return on investment could grow substantially.
- ***Expected outcome (threats addressed):*** The underlying goal of this project is to address the lack of habitat complexity and channel roughness in the mainstem rivers of the Tillamook Bay watershed, which is known to be a primary limiting factor for its salmonids. By constructing three major large wood structures along a ¼ mile stretch of the Miami River, the partnership expects to dramatically enhance fish habitat, increase the quality and stability of riparian vegetation, and provide a source of future large wood recruitment. It is also hoped that a successful demonstration of soft-structure techniques will generate interest among other farmers to employ similar treatments where infrastructure is threatened.
- ***Identification and coordination with relevant stake holders:*** The Miami River floodplain has been identified as a focus area for habitat enhancement in the guiding documents to which TBWC and its technical advisory team (Restoration Committee) refer, including but not limited to the Tillamook Bay CCMP (TEP 2010), the Miami River Watershed Assessment (ODF 2005) and the TBWC Strategic Action Plan (Bierly 2015). The Tillamook Bay Rapid Bio Assessments (BioSurveys 2005, 2006, 2007) identifies the need for habitat complexity throughout the watershed, and points to large wood placement as a key path to increasing carrying capacity for fish species. The Lee family approached the Council for help, and the Council brought the project to its Restoration Committee. All partners agreed it should be moved forward as a top-priority project.
- ***Feasibility and expected timeframes:*** The main challenge to getting this project on the ground is money, but with the needed funds we are confident the project will be successful, with construction most likely to occur in 2018.
- ***Proponent Role and Responsibilities:*** The TBWC is prepared to raise funds, file for permits and act as contract holders and project managers for the OK Ranch project.
- ***Budget and identification of potential funding source:***

Total Project Cost: $140,000

  - RIP Request: **$56,000**

- ***Project Lead***: Rob Russell – Tillamook Bay Watershed Council

Passage Improvement

Coho Creek Culvert Removal and Replacement

Project Description:

Coho Creek is a tributary to Neawanna Creek in the Necanicum River watershed within Seaside city limits in Clatsop County. The culverts to be replaced are juvenile and adult fish passage barriers

under certain flow conditions and impair natural channel processes impacting ESA listed coho, cutthroat trout and winter steelhead.

The project involves three existing, undersized culverts. The project proposes to permanently remove two culverts and relocate the City's sewer main which currently is piped over the top of the culverts. In addition, the project proposes to replace the existing undersized culvert crossing under Wahanna Road with a 19' open bottom, multiplate arch with natural stream simulation that meets the design criteria of 1.5x active channel width. The project will improve fish access to 0.5 miles of stream habitat. Project partners include: City of Seaside and Oregon Department of Fish and Wildlife.

- **HUC 5 *Location*:** Necanicum (#1710020101)
- ***Facilities ownership***: City of Seaside
- ***Rationale and linkage to the watershed***: Coho Creek is a tributary to Neawanna Creek in the Necanicum River watershed within Seaside city limits in Clatsop County. The culverts to be replaced/removed are juvenile and adult fish passage barriers under certain flow conditions and impair natural channel processes impacting ESA listed coho, Pacific lamprey, cutthroat trout, chum and winter steelhead. The primary watershed problem identified in the project reach is impaired access to spawning and rearing habitat created by this grouping of three undersized culverts. A related watershed problem is impaired natural channel processes including sediment transport and large wood distribution. An upstream culvert replacement has allowed for increased sediment load and large wood to transport downstream, creating maintenance issues at these under-sized pipes where the wood racks up and sediment falls out of suspension while flows back-up at this undersized crossing.
- ***Expected outcome (threats addressed):*** Restore unimpeded aquatic organism passage to 0.5 miles of aquatic habitat and natural stream processes by removing an existing 36" culvert and replacing it with a 19' wide bottomless arch pipe on Wahanna Road in Seaside, Oregon. In addition to replacing the existing undersized culvert, two immediate upstream culverts that are extremely degraded and partially blocked will be removed to restore channel processes.
- ***Identification and coordination with relevant stake holders***: The proposed work will be coordinated with the ODFW and the City of Seaside.
- ***Feasibility and expected timeframes***: Feasibility is high. This project has been designed by the City of Seaside and was submitted to the Oregon Watershed Enhancement Board for review on May 1.
- ***Proponent Role and Responsibilities***: The Watershed Council will work with the City to secure a contractor for placement, provide project management, and grant administrative functions.
- ***Budget and identification of potential funding source***: estimated cost is $587,655
    - The City has agreed to provide $130,329 of cash and in-kind match related mainly to utility relocation and project management.
    - ODFW will provide $2,000 of staff time for staff time toward site survey, design and implementation.
    - We've asked OWEB for $413,387, but would like to show additional partner support and ask for help paying for Constructed Simulated Streambed material at $28,900.
    - RIP request: $28,900 (for simulated streambed material)
- ***Project Lead:*** Melyssa Graeper – Necanicum Watershed Council

III. Literature Cited

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