

Pacific lamprey
2016 Regional Implementation Plan
for the
Oregon Coast
Regional Management Unit
North and South Coast Sub-Regions



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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 Willamette Valley (http://www.epa.gov/wed/pages/ecoregions/level_iii.htm). Watersheds within the North Coast Sub-Region include the Necanicum, Nehalem, Wilson-Trask-Nestucca, Siletz-Yaquina, Alsea, Siuslaw and Siltcoos (Figure 1). Drainages range in size from 334 to 2,520 km² for the 7 HUCs (Table 1).

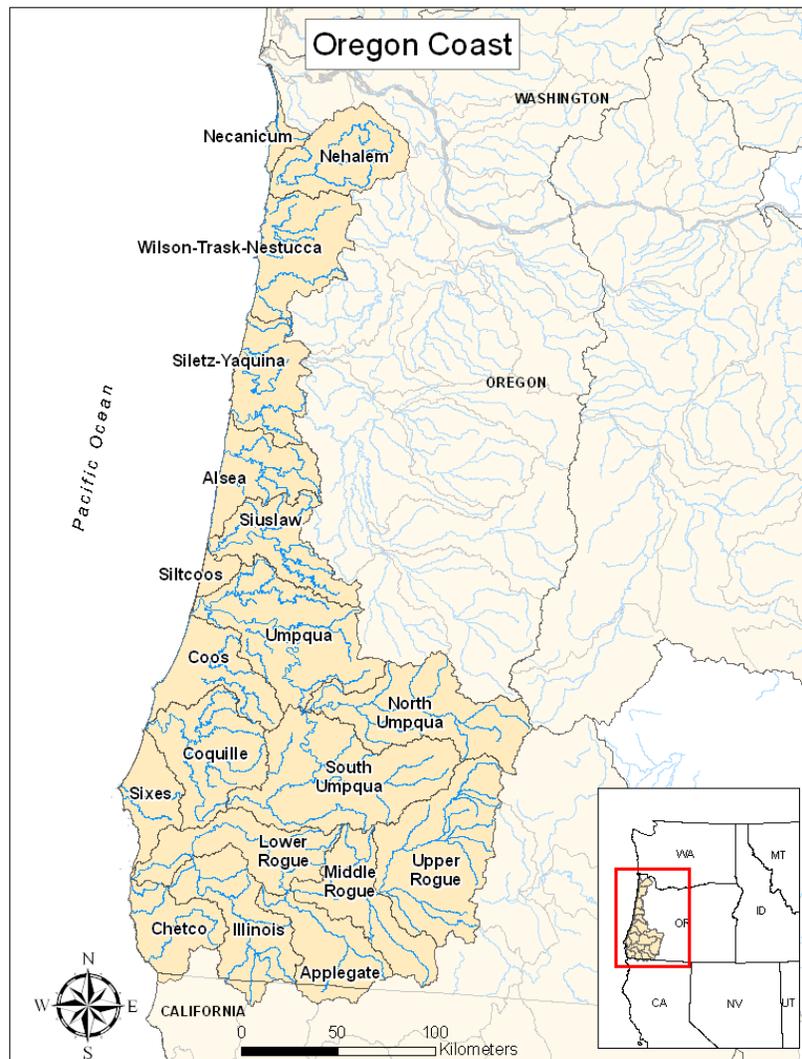


Figure 1. Map of watersheds within the Oregon Coast RMU (taken directly from the USFWS Conservation Assessment, Luzier et al. 2011)

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 (km²)	Level III Ecoregion(s)
Necanicum	17100201	334	Coast Range
Nehalem	17100202	1,728	Coast Range
Wilson-Trask-Nestucca	17100203	2,520	Coast Range
Siletz-Yaquina	17100204	1,950	Coast Range
Alsea	17100205	1,805	Coast Range
Siuslaw	17100206	1,992	Coast Range, Willamette Valley
Siltcoos	17100207	334	Coast Range

South Oregon Coast Sub-Region

The South Oregon Coast Sub-Region of the Oregon Coast RMU is comprised of 12 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 1,210 to 4,636 km² for the 12 HUCs (Table 2).

Table 2. 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 (km²)	Level III Ecoregion(s)
North Umpqua	17100301	3,497	Cascades, Klamath Mountains
South Umpqua	17100302	4,636	Coast Range, Cascades, Klamath Mountains
Umpqua	17100303	3,885	Coast Range, Cascades, Willamette Valley, Klamath Mountains
Coos	17100304	1,914	Coast Range
Coquille	17100305	2,668	Coast Range, Klamath Mountains
Sixes	17100306	1,210	Coast Range
Upper Rogue	17100307	4,170	Cascades, Klamath Mountains, Eastern Cascades Slopes and Foothills
Middle Rogue	17100308	2,292	Cascades, Klamath Mountains
Applegate	17100309	1,966	Klamath Mountains
Lower Rogue	17100310	2,326	Coast Range, Klamath Mountains
Illinois	17100311	2,541	Klamath Mountains
Chetco	17100312	1,632	Coast Range, Klamath Mountains

B. Status of Species

Conservation Assessment and New Updates

Historical occupancy of Pacific lamprey was relatively widespread across all watersheds of the Oregon Coast RMU (Luzier et al. 2011) (Figure 2). Current distribution is reduced in a number of watersheds, and abundance of adult Pacific lamprey has generally declined in all areas. Current trends in abundance of Pacific lamprey within the Applegate, Lower Rogue, Illinois and Chetco are unknown (see Table 12-3 of Luzier et al. 2011).

Current and Historic known Distribution of Pacific Lamprey: Oregon Coast

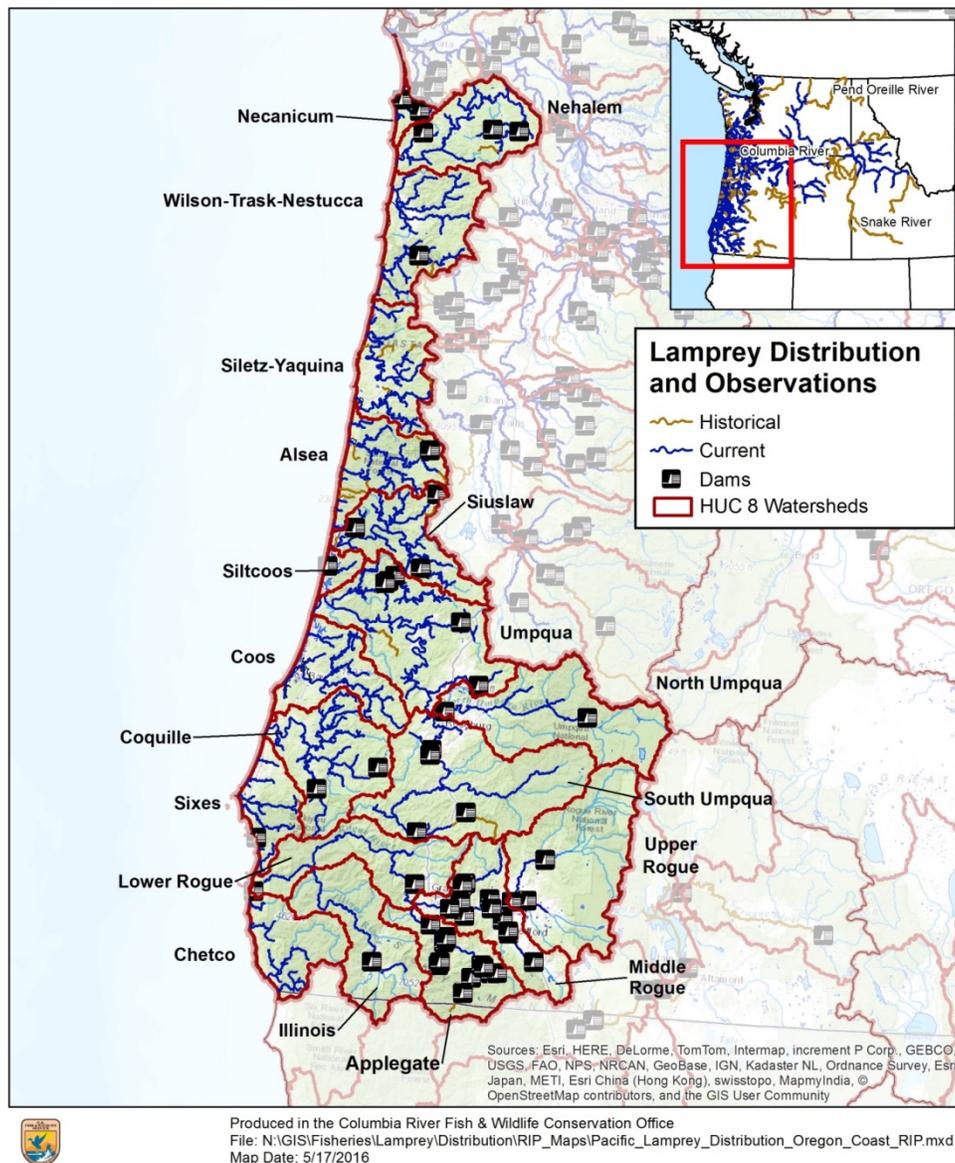


Figure 2. Current and historic known distribution for Pacific Lamprey: Oregon Coast Regional Management Unit (USFWS Data Clearinghouse 2016).

Distribution and Connectivity

Passage in the North Coast Sub-Region is not impeded by large hydroelectric or storage dams. In the majority of watersheds that were assessed, the scope and severity of threats from passage are low. However, culverts and tidegates in low lying areas are widespread and may impact lamprey to an unknown extent. An extensive effort is currently underway in the North Coast Sub-Region to identify and prioritize barrier structures for repair (retrofit), replacement, or removal.

Threats to passage were also considered low in the South Coast Sub-Region. 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), but a number of existing structures continue to impede passage (e.g., O’Shea Creek dam [South Umpqua], Lost Creek dam [Upper Rogue]), or alter the hydrograph (e.g., Applegate dam and Immigrant dam [Upper Rogue]) to the detriment of fish and other aquatic wildlife. Water diversions such as seasonal or permanent dams, pumps, and weirs are prevalent throughout much of the South Coast Sub-Region. Culverts are less of an issue, but tidegates impact a number of low lying areas and tributaries within the Umpqua, Coos and Coquille Rivers.

C. Threats

Summary of Major Threats

The following table summarizes the known key threats within the Oregon Coast RMU identified during the USFWS Conservation Assessment in 2011 (H – High, M – Medium, L – Low). Stream and floodplain degradation was considered a moderate threat in both the North and South Oregon Coast watersheds. Water quality was also considered a moderate threat, primarily in HUCs of the South Coast Sub-Region (Luzier et al. 2011).

Table 2. Summary of the assessment results for the key threats of the North Oregon Coast Sub-Region (Luzier et al. 2011).

Key Threats	Necanicum	Nehalem	Wilson-Trask-Nestucca	Siletz-Yaquina	Alesea	Siuslaw	Siltcoos
Passage	L	L	L	L	L	L	L/M
Dewatering & Flow Mgmt.	L	L	L	M	L	L/M	L/M
Stream & Floodplain Degradation	M	M	M	M	M	M	M
Water Quality	L	L/M	L	L	L	L	L

Table 3. Summary of the assessment results for the key threats of the South Oregon Coast Sub-Region (Luzier et al. 2011).

Key Threats	North Umpqua	South Umpqua	Umpqua	Coos	Coquille	Sixes	Upper Rogue	Middle rogue	Applegate	Lower Rogue	Illinois
Passage	M/H	L	L	L/M	L	L	M	L/M	L	L	L
Dewatering & Flow Mgmt.	M/H	L/M	L	L	L	L	L/M	M	M/H	L	M/H
Stream & Floodplain Degradation	L/M	M	L/M	M	M	M	M	M/H	M	L	L/M
Water Quality	L/M	L/M	M	M/H	M/H	L/M	M	M	M	L	M

Current Threats

Stream and floodplain degradation remains an ongoing threat throughout the Oregon Coast RMU. 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.

Elevated water temperatures, low dissolved oxygen levels, and increased pollution inputs (e.g. sediment, nutrients, heavy metals, and bacteria) are also widespread throughout the Oregon Coast RMU. This general decline in water quality is likely attributable to low stream flows, increased air temperature, lack of riparian vegetation, and agricultural and urban runoff. Monitoring efforts to improve and protect water quality for fish, wildlife, and human health are ongoing in both North and South Oregon Coast Sub-Regions.

Water withdrawals for irrigation, recreational, municipal, or residential purposes leave many watersheds within the Oregon Coast RMU dewatered or with inadequate flow during late summer and early fall. Water diversions and impoundments alter the quantity and timing of the natural flow regime which may impact adult and juvenile lamprey migration cues, decrease spawning habitat availability, prevent access to backwater or side channel habitats, create low water barriers, and may contribute to mortality if incubating eggs or burrowing larvae are dewatered or exposed to a high temperature or low oxygen environment. The anticipated effects of climate change may exacerbate the problem further by reducing summer and fall flows when demand is at its highest.

Private and municipal water diversions are abundant, especially 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. Dams and diversions may contribute to the further decline of Pacific lamprey by delaying migration or exposing fish to increased predation.

Suction dredge mining is a popular recreational activity in many tributaries and mainstem areas of the South Coast Sub-Region (e.g. South Umpqua, Applegate, Illinois, Upper, Middle, and Lower Rogue, Sixes, and Chetco). Suction dredge mining involves the systematic removal and sifting of streambed substrates to isolate precious metals. 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. Senate Bill 838 imposed a five year moratorium on motorized suction dredge mining that went into effect January 2, 2016. The moratorium currently prohibits motorized mining in all Oregon streams with designated Essential Salmon Habitat (ESH), or naturally reproducing populations of bull trout. It also prohibits the disturbance of riparian vegetation in these areas within 100 yards from the normal high water mark if water quality will be adversely affected.

Restoration Actions

Multiple projects are currently underway to restore floodplain connectivity, relocate or reconnect side channel habitat, decommission roads, 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 being targeted towards Pacific lamprey. The following work was recently completed or is actively occurring in the Oregon Coast RMU.

- Installation of lamprey passage ramp on Winchester Dam (North Umpqua).
- Lamprey distribution mapping and occupancy sampling in the Umpqua and Rogue basins.
- Survey of Pacific Lamprey habitat availability upstream of Soda Springs dam (North Umpqua).
- Smallmouth bass predation on lamprey study in lower Elk Creek and Umpqua River.
- Tenmile Lakes Basin lamprey conservation project (Coos).
- Research study evaluating how fine sediment transport and water temperature may influence larval lamprey habitat availability and distribution of predators.

II. Selection of Priority Actions

A. Prioritization Process

Participating members of the Oregon Coast Regional Management Unit met in May 2016 to discuss current threats to Pacific lamprey, and identify specific actions and research needed to address threats and uncertainties within the RMU. Priority projects identified during the meetings focused on threats to passage, uncertainties regarding Pacific lamprey abundance and occupancy, and the post assessment of a lamprey passage ramp installed at Winchester Dam (North Umpqua) in 2013.

B. High Priority Proposed Project Information

Passage Improvement

Project Description: Eel Creek Dam Lamprey Passage Structure

Eel Creek is a tributary of Tenmile Creek (Coos Co., OR) located in the South Oregon Coast Sub-Region. Eel Creek dam was built in 1989 and provides a source of drinking water for the City of Lakeside, as well as recreational boating and fishing opportunities. The dam has a fish ladder and trap, but they are not conducive to lamprey passage. Pacific lamprey distribution in Eel Creek is unknown, but it is assumed they are present given they are present in Tenmile Creek.

- **HUC 5 Location:** Coos (#17100304) HUC 4 subbasin
- **Facilities ownership:** Unknown at this time
- **Rationale and linkage to the watershed:** Eel Creek Dam fish ladder and trap impede upstream passage to adult Pacific lamprey.
- **Expected outcome (threats addressed):** This project would potentially expand the current distribution of Pacific lamprey by improving/providing access to Eel Lake and tributaries (Clear Creek, Eel Creek and Marsh Creek).
- **Identification and coordination with relevant stake holders:** Confederated Tribes of Coos, Lower Umpqua and Siuslaw, ODFW, TLBP
- **Feasibility and expected timeframes:** Feasibility is high.
- **Proponent Role and Responsibilities:** Design, fabricate, and install lamprey passage structure at the Eel Creek Dam.
- **Consensus within the RMU Groups:** One of six projects proposed by Oregon Coast RMU.
- **Budget and identification of potential funding source:** This is part of a broader project intended to support and benefit lamprey populations in the Tenmile Lakes Basin on the Southern Oregon Coast. Estimated cost is \$39,000.

Passage Improvement

Project Description: Prouty Creek Culvert Replacement

Prouty Creek is a tributary of the Miami River (Tillamook Co., OR) located in the North Oregon Coast Sub-Region. The existing culvert failed in 2015 and the remnants are buried beneath 19 feet of fill. This project would replace the failed culvert with a new open bottom culvert that meets active channel criteria.

- **HUC 5 Location:** Wilson-Trask-Nestucca (#17100203) HUC 4 subbasin
- **Culvert ownership:** Oregon Department of Forestry, private landowner
- **Rationale and linkage to the watershed:** Failed culvert currently blocks passage to all anadromous fish.

- **Expected outcome (threats addressed):** This project would restore accessibility to 1.1 miles of spawning and rearing habitat.
- **Identification and coordination with relevant stake holders:** Tillamook Estuary Partnership, Oregon Department of Forestry, Private landowner, Tillamook Bay Watershed Council, ODFW
- **Feasibility and expected timeframes:** This is a very high priority project locally and there is a push to complete the project as quickly as possible.
- **Proponent Role and Responsibilities:** Remove fill and replace failed culvert with open bottom culvert.
- **Consensus within the RMU Groups:** One of six projects proposed by Oregon Coast RMU.
- **Budget and identification of potential funding source:** OWEB, USFWS. Oregon Department of Forestry is working with landowner on temporary fix and is looking at doing the design work in-house. Estimated cost \$500,000.

Passage Improvement

Project Description: Baker Creek Culvert Removal

Baker Creek is a tributary of the South Fork Coquille. The existing culvert, located at the mouth of Baker Creek, is perched 15 feet with a Denali fish ladder for passage. This project would remove the culvert and restore natural bedload movement and hydrological connectivity to the SF Coquille mainstem, a major stronghold for Pacific lamprey in the basin. There is an estimated 2.27 miles of anadromous fish habitat upstream of this barrier.

- **HUC 5 Location:** Coquille (#17100305) HUC 4 subbasin
- **Culvert ownership:** Weyerhaeuser Corp.
- **Rationale and linkage to the watershed:** Perched culvert impedes upstream passage to adult Pacific lamprey.
- **Expected outcome (threats addressed):** This project would remove a known Pacific lamprey passage barrier and restore connectivity to Baker Creek, an important cold water tributary. The culvert removal would open accessibility to 2.27 miles of Pacific lamprey spawning and rearing habitat.
- **Identification and coordination with relevant stake holders:** Coquille Watershed Association, Weyerhaeuser, BLM, ODFW, USFWS
- **Feasibility and expected timeframes:** Feasibility is medium/high. Culvert removal and channel stabilization expected to occur in 2018.
- **Proponent Role and Responsibilities:** Remove existing culvert and restore stream channel.
- **Consensus within the RMU Groups:** One of six projects proposed by RMU.

- **Budget and identification of potential funding source:** OWEB, PCSRF/NOAA, BLM, Weyerhaeuser. Estimated cost \$800,000.

Monitoring and Evaluation

Project Description: Repair Lamprey Counting Mechanism at Winchester Dam

A lamprey passage ramp was installed on Winchester Dam in 2013. Two different counting mechanisms have been utilized 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 lampreys that utilize the ramp in order to obtain an accurate count.

- **HUC 5 Location:** North Umpqua (#17100301) HUC 4 subbasin
- **Facilities ownership:** ODFW
- **Rationale and linkage to the watershed:** The Umpqua has one of the longest running counts for Pacific lamprey on the Oregon coast. ODFW is currently hand passing all lampreys to obtain an accurate count. Due to budget cuts within ODFW, counts for lamprey at Winchester Dam will be less frequent. A new counting mechanism or camera would ensure accurate counts of lamprey continue into the future.
- **Expected outcome (threats addressed):** Reconfigure/fabricate a new counting mechanism or install motion activated camera to accurately monitor lamprey abundance and migration timing at Winchester Dam.
- **Identification and coordination with relevant stake holders:** ODFW
- **Feasibility and expected timeframes:** Feasibility is high.
- **Proponent Role and Responsibilities:** Fabricate or install new lamprey counter/camera at Winchester Dam lamprey passage system. Hire personnel to monitor video for three months.
- **Consensus within the RMU Groups:** One of six projects proposed by RMU.
- **Budget and identification of potential funding source:** USFWS, ODFW Restoration and Enhancement Program, Cow Creek Umpqua Tribe. Estimated cost \$22,500.

Monitoring and Evaluation

Project Description: Post Monitoring of Lamprey Ramp at Winchester Dam

Counts of Pacific lamprey have increased dramatically at Winchester Dam since the installation of the passage ramp in 2013. Approximately 50% of adult lampreys utilize the ramp while 50% use the ladder. This project would use radio-telemetry to investigate whether lamprey are still climbing over the dam, examine passage time through the ladder versus the ramp, and identify mainstem North Umpqua spawning areas.

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

- **Facilities ownership:** ODFW
- **Rationale and linkage to the watershed:** This project could help identify deficiencies in the ramp that may hinder adult lamprey passage.
- **Expected outcome (threats addressed):** This project would address uncertainties regarding the performance of the lamprey passage ramp as well as identify focal spawning areas in the North Umpqua.
- **Identification and coordination with relevant stake holders:** Partnership for Umpqua Rivers, OSU
- **Feasibility and expected timeframes:** Feasibility is high.
- **Proponent Role and Responsibilities:** Conduct radio-telemetry study to assess the performance of the lamprey passage ramp and adult lamprey spawning distribution.
- **Consensus within the RMU Groups:** One of six projects proposed by RMU.
- **Budget and identification of potential funding source:** USFWS, ODFW Restoration and Enhancement Program, Cow Creek Umpqua Tribe, OSU, Partnership for the Umpqua Rivers. Estimated cost \$60,000.

Monitoring and Evaluation

Project Description: Survey of Lamprey Occupancy on O'Shea Creek

O'Shea Creek Dam is located approximately 2 miles upstream from the confluence of O'Shea Creek with the South Umpqua River. The 20' concrete dam provides water for the City of Canyonville and currently has no fish passage. Pacific lamprey distribution in O'Shea Creek is unknown, but Western brook lampreys have been observed in the creek.

- **HUC 5 Location:** South Umpqua (#17100302) HUC 4 subbasin
- **Rationale and linkage to the watershed:** Pacific lampreys are present throughout the South Umpqua, but distribution in O'Shea Creek is unknown.
- **Expected outcome (threats addressed):** This project would investigate the presence and distribution of Pacific lamprey in O'Shea Creek. If occupancy is confirmed, passage issues at O'Shea Creek dam could be addressed as a next step. There is approximately 2.5 miles of habitat upstream of O'Shea Dam.
- **Identification and coordination with relevant stake holders:** ODFW, Cow Creek Umpqua Tribe, USFWS
- **Feasibility and expected timeframes:** Feasibility is high.
- **Proponent Role and Responsibilities:** Perform Pacific lamprey occupancy survey in O'Shea Creek.

- *Consensus within the RMU Groups:* One of six projects proposed by RMU.
- *Budget and identification of potential funding source:* USFWS

References

Luzier, C.W., H.A. Schaller, J.K. Brostrom, C. Cook-Tabor, D.H. Goodman, R.D. Nelle, K. Ostrand and B. Streif. 2011. Pacific Lamprey (*Entosphenus tridentatus*) Assessment and Template for Conservation Measures. U.S. Fish and Wildlife Service, Portland, Oregon. 282 pp.
<http://www.fws.gov/columbiariver/publications.html>