
	<b>Section 404 Permit Application</b>		  <b>DAVID EVANS AND ASSOCIATES INC.</b>
	Document Number: J1-000-RGL-PMT-DEA-00002-00		
	Rev.: B	Rev. Date: October 13, 2017	

# Attachment I: Wetland and Waterbody Mitigation Plan



**Pacific  
Connector**  
GAS PIPELINE

**Pacific Connector Gas Pipeline, LP**

**Wetland, Waterbody, and Riparian Mitigation Plan**

**Pacific Connector Gas Pipeline Project**

**October 2017**

## Table of Contents

1.0	Introduction .....	1
2.0	Wetland and Waterbody Mitigation.....	1
2.1	Avoidance and Minimization – Pipeline Routing .....	1
2.1.1	Coos Bay Alternatives MPs 0.00 to 6.37R .....	2
2.1.2	Blue Ridge Route .....	3
2.1.3	Clover Creek Alternative.....	3
2.2	Measures to Minimize Wetland Impacts .....	3
2.3	Specific Measures to Minimize Waterbody Crossing Impacts .....	5
2.4	Impact Mitigation/Rectification .....	7
2.5	Mitigation Monitoring .....	9
3.0	Compensatory Mitigation Requirements .....	10
4.0	References.....	11

## List of Figures

Figure 1	Original PCGP Alignment between MPs 1.0 and 3.0 Sshowing Proposed HDD Crossing of Haynes Inlet and Traversing Coos Bay on the Uplands above the Community of Glasgow .....	3
----------	--	---

## List of Attachments

Attachment 1	Summary of Wetland Impacts
Attachment 2	Summary of Wetland Restoration Treatments
Attachment 3	Procedures for Preparing and Planting Live Stakes or Sprigs and Planting Bare Root Tree Seedlings
Attachment 4	Wetland Construction/Restoration Figures and LWD Figure
Attachment 5	Long-Term Monitoring Plan

## 1.0 INTRODUCTION

Construction of the 229.09-mile Pacific Connector Gas Pipeline Project (Pipeline) will directly impact 113.98 acres of wetlands at 145 individual locations. The trench will cross through wetlands for 30,777.58 linear feet (5.83 miles). Of the total impact to wetlands, the Pipeline will affect 109.61 acres of palustrine emergent wetlands, 2.30 acres of palustrine forested wetlands, 1.43 acres of palustrine scrub-shrub wetlands and 0.64 acre of palustrine unconsolidated bottom or aquatic bed wetlands (stock ponds) wetlands will be disturbed. Effects to the estuarine wetlands within Coos Bay have been avoided by incorporating horizontal directional drill (HDD) trenchless crossing methods in the Pipeline design. Most of the impacts to emergent wetlands, approximately 96.1 percent of the total wetland disturbance, are agricultural wetlands (pastures) which have been previously disturbed (i.e., grazed and/or routinely mowed or farmed for hay production). Most of these wetlands occur in the Klamath Basin; however large pasture wetlands are also crossed in coastal floodplains such as along the Coos River, Kentuck and Stock sloughs, and in a number of the valleys crossed by the Pipeline (e.g., Olalla Valley).

The Pipeline will affect 346 waterbodies; 63 of which are not crossed by the centerline (31 streams, 10 ponds, 21 ditches, and 1 estuarine feature) but are within the right-of-way or workspaces. Of the 346 waterbodies, 66 are perennial, 168 are intermittent, 98 are ditches, 10 are lakes or stock ponds, and 4 are estuarine (Coos Bay/2 HDD crossings, the HDD pullback at MP 0.0, and the Coos River). Available data indicate 82 of the waterbodies crossed are known or assumed to be inhabited by fish.

Tables A.2-2 and A.2-3 (see 'Tables' section in JPA) document the area affected in each waterbody and wetland system crossed by the Pipeline and the impact that will occur within the temporary construction right-of-way, temporary extra work areas (TEWAs), and temporary construction access roads (TARs). Table A.2-2 and A.2-3 also specify the length of trench through each wetland and the cubic yards (removal and fill) that are estimated for excavation and backfill of the trench in each wetland or waterbody.

## 2.0 WETLAND AND WATERBODY MITIGATION

Wetland impacts have been or will be mitigated according to federal, state, and local regulations following a standard mitigation sequence. The sequence is as follows: (1) avoidance; (2) mitigation of impacts; and (3) compensation. Current federal and state regulations require that impacts to wetlands be avoided whenever practicable. Where avoidance of wetlands is not possible, impacts will be minimized and mitigated by restoration. Where permanent impacts to wetlands are unavoidable, compensation is required to offset the loss of wetland area and function. Each of the steps in the wetland mitigation sequence as applied to the Pipeline is described below.

### 2.1 AVOIDANCE AND MINIMIZATION – PIPELINE ROUTING

As described in Attachment A/Project Description, PCGP developed a multidisciplinary team, including engineering, construction and environmental specialists, to identify potential corridors in the area between the interconnects with the GTN Pipeline system and the Ruby Pipeline systems and the proposed LNG Terminal that could be utilized as preliminary pipeline routes. During this routing process, the primary selection criterion was to identify existing corridors such as roads, railroads, pipelines, and powerlines which could be paralleled. Other than existing

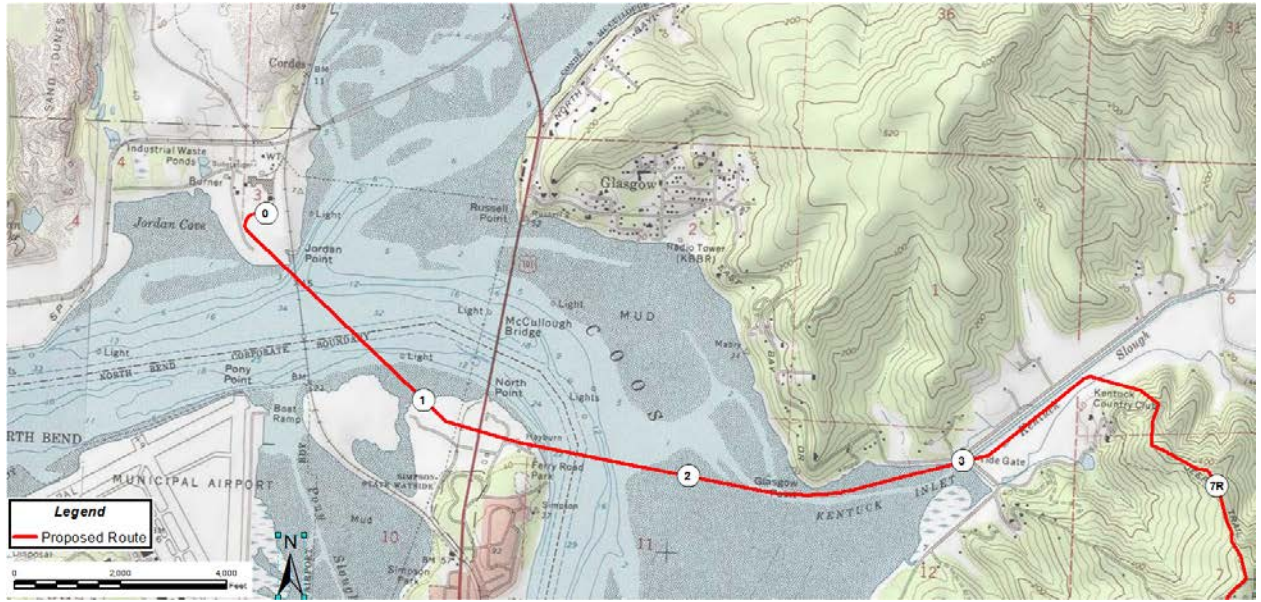
highway corridors, few contiguous corridors (powerline, pipeline or railroad) were identified. PCGP analyzed the preliminary routes based on a number of criteria/objectives outlined in Attachment B/Alternatives, including:

- Construction feasibility to safely construct and operate a large diameter, underground, high pressure, welded steel natural gas transmission pipeline;
- Pipeline stability (avoiding geohazards where possible, minimizing side hill slopes, and maximizing ridgeline alignments where possible);
- Avoidance of known designated sensitive natural resource areas, including national parks, national monuments, wild and scenic rivers, scenic byways, wilderness areas, and Areas of Critical Environmental Concern;
- Utilization of existing corridors and rights-of-way;
- Minimizing disturbance to sensitive areas such as:
  - Reducing waterbody and wetland crossings;
  - Reducing landowner encumbrances by avoiding populated areas (towns, populations centers, commercial areas, and residential subdivisions);
  - Minimizing disturbance near scenic waterways and/or byways;
  - Avoiding identified cultural and historic resources when feasible; and
  - Avoiding or minimizing removal of significant habitat for protected species.
- Locating the most direct route, taking into consideration the above factors. (Minimizing the length of the route reduces vegetation clearing, grading/trenching requirements, overall disturbance and potential impacts to sensitive resources, landowner encumbrances, and overall costs.)

Based on the routing feasibility analysis, a primary cross-country route was selected which traverses ridgelines and watershed boundaries to ensure the safety, stability, and long-term integrity of the Pipeline. By following ridgelines and watershed boundaries, the route significantly avoids and minimizes impacts to wetlands and waterbodies. Most of the waterbodies that are crossed are intermittent headwater streams that are expected to be dry during the summer construction window. The proposed route is provided on USGS-based topographic maps provided in the 'Figures' section in the JPA

### **2.1.1 Coos Bay Alternatives MPs 0.00 to 6.37R**

As noted in Section 10.4-1 and shown on Figure 10.4-1 in Attachment B, PCGP avoided the Coos Bay estuary by incorporating two HDDs into the design. The first 5,200-foot HDD will cross the Coos Bay estuary from the North Spit at about MP 0.12 to MP 1.11 south of North Point on the west side of Highway 101. From MP 1.40 to MP 3.09, an approximate 9,000-foot HDD will be utilized for the second crossing of the Coos Bay estuary (see Figure 1). Appendix G.2 to Attachment C/Affected Water Resources provides the Feasibility Evaluations for the Coos Bay HDDs.



**Figure 1**  
**Alignment between MPs 0.00 and 7.0R**  
**Incorporating Proposed HDD Crossings of Coos Bay Estuary**

### 2.1.2 Blue Ridge Route

PCGP incorporated the Blue Ridge Route between MPs 11.29R and 21.8, as described in Section 10.4.1.2 and shown on Figure 10.4-2 in Attachment B/Alternatives. This route, which reduces impacts to private landowners, was incorporated into the alignment based on stakeholder involvement. The Blue Ridge Route also significantly reduces the number of waterbodies crossed: 10 compared to 57 crossed by the modified 2015 FEIS Route and 65 crossed by the 2015 FEIS Route (see Table 10.4.1.2 in Attachment B). As shown in Table 10.4.1.2 in Attachment B, the Blue Ridge Route reduces the number and total length of wetlands crossed by 1.0 mile or more compared to the other alternatives considered in this area.

### 2.1.3 Clover Creek Alternative

PCGP incorporated the Clover Creek Road Alternative into the design between MPs 171 and 190 to avoid traversing a wet meadow that is known to support the Oregon Spotted Frog (see Section 10.4.1.54 and Figure 10.4-5d in Attachment B/). This alternative also avoids crossing 1.8 miles of Buck Lake, a broad, emergent wetland which has been altered by extensive drainage ditches and grazing activities. Further, incorporating the Clover Creek Road Alternative into the design avoids crossing Spencer Creek, a known redband trout spawning area.

## 2.2 MEASURES TO MINIMIZE WETLAND IMPACTS

PCGP has further reduced potential wetland and waterbody impacts by incorporating the measures outlined in FERC's Wetland and Waterbody Construction and Mitigation Procedures (Wetland and Waterbody Procedures) and Upland Erosion Control, Revegetation, and Maintenance Plan (Upland Plan) into the design. FERC's Wetland and Waterbody Procedures and Upland Plan are provided in Attachments A and B to the Erosion Control and Revegetation Plan (ECRP – see Appendix B.1 to Attachment A/Project Description). There are situations

where PCGP has requested a modification from FERC's Wetland and Waterbody Procedures based on site-specific conditions. Modification requests and rationales are included in Table A.1-1 included in Appendix A.1 to Attachment A/Project Description.

The intent of FERC's Wetland and Waterbody Procedures is to minimize the extent and duration of disturbance in wetlands and waterbodies. The intent of FERC's Upland Plan is to confine disturbance to certificated areas (including construction right-of-way, TEWAs, and access roads), to minimize erosion, and to enhance revegetation in areas affected during construction. The Upland Plan and Wetland and Waterbody Procedures have been developed with the participation of other federal, state and local agencies, industry, and the public nationwide specifically to mitigate potential impacts from pipeline projects.

To minimize impacts to wetlands, PCGP has reduced (or "necked-down") the width of the construction right-of-way through wetlands from 95 to 75 feet where feasible. Neck-downs through wetlands are consistent with FERC's Wetland and Waterbody Procedures. A typical construction right-of-way configuration through wetlands is shown on Drawing 3430.34-X-0005 (see Attachment 4 to this plan, as well as Appendix B.1 to Attachment A/Project Description).

Where clearing is required, PCGP will cut, mow, or shear woody vegetation so that the roots are left intact. This will facilitate the sprouting of tree, shrub and emergent species so that the recovery time following construction is minimized. The roots will also help hold the soils so that erosion is minimized.

Permanent conversion of wetland vegetation types associated with the Pipeline will occur in those few areas where the alignment crosses scrub-shrub or forested wetlands. As required by FERC's Wetland and Waterbody Procedure's (Section VI.D.1), PCGP will not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the Pipeline and up to 10 feet wide may be maintained in an herbaceous state. In addition, trees that are within 15 feet of the pipeline may be cut and removed from the permanent right-of-way during the life of the Pipeline. Permanent vegetation type conversion impacts have been quantified in Table A.2-3 (see 'Tables' section in JPA) based on the length of the centerline through palustrine scrub-shrub (PSS) and palustrine forested (PFO) wetlands. As noted in Table A.2-3, only 0.83 acre of wetlands would be converted from either a shrub to an emergent vegetation type or from a forested vegetation type to either an emergent or scrub-shrub type. Where the Pipeline crosses scrub-shrub wetlands, the centerline was buffered by 10 feet to quantify the area of the wetland along the centerline that would be maintained in an herbaceous state. In forested wetlands the centerline was buffered by 30 feet to determine the area that would be permanently converted to scrub shrub or herbaceous vegetation types.

To minimize disturbance, PCGP will verify and clearly mark (with flagging) the construction limits and boundaries of all sensitive areas (including waterbodies and wetlands) prior to construction clearing. Flagged boundaries will be maintained during construction. PCGP will ensure that all construction activities are confined to the certificated work limits authorized for construction.

TEWAs have been located a minimum of 50 feet from the edge of wetlands and waterbodies, where possible, to minimize impacts to wetland buffers and riparian zones as required by FERC's Wetland and Waterbody Procedures. There are a number of situations where PCGP has requested modifications from the Wetland and Waterbody Procedures (see Table A.1-1 in Appendix A.1 to Attachment A/Project Description) based on topographic or other site-specific

construction feasibility issues which prevent locating a TEWA 50 feet from the wetland or waterbody boundary.

During construction, PCGP will have multiple Environmental Inspectors (EIs) present during all phases of construction within wetlands and waterbodies to ensure compliance with the Upland Plan and Wetland and Waterbody Procedures as well as other permit stipulations/requirements. Section II A. and B. of FERC's Upland Plan (see Attachment A in Appendix B.1 to Attachment A/Project Description) outlines the responsibility of the EIs.

PCGP's proposed erosion control and revegetation techniques have been developed to minimize erosion and the extent and duration of impacts, as well as to maximize revegetation success. Those techniques are described in the ECRP provided in Appendix B.1 to Attachment A/Project Description. The ECRP incorporates measures outlined in FERC's Upland Plan and Wetland and Waterbody Procedures.

Silt fences and/or hay bales will be installed at the edges of the construction right-of-way in wetlands where there is a possibility for excavated trench spoil to flow into undisturbed areas of the wetland. Dewatering of the trench will be accomplished in a manner such that no heavily silt-laden water flows into any wetland or waterbody. Trench breakers will be installed where necessary to prevent the wetland from draining through the trench and to maintain its hydrologic integrity. A diagram of a trench breaker is provided in the ECRP (see Drawing 3430-34-0011 in Attachment C in Appendix B.1 to Attachment A/Project Description). Where the trench could potentially drain a wetland, the trench bottom will be sealed as necessary to maintain wetland hydrology. After construction, all disturbed areas within wetlands will be returned to their preconstruction contours, to the extent practicable, to maintain the wetland's hydrologic characteristics.

To minimize potential for spills and any impact from such spills, a Spill Prevention, Containment, and Countermeasures (SPCC) Plan has been developed and will be implemented during construction (see Appendix B.2 to Attachment C/Affected Water Resources). Fueling and storage of hazardous materials will be conducted in accordance with PCGP's SPCC Plan and FERC's Wetland and Waterbody Procedures.

### **2.3 SPECIFIC MEASURES TO MINIMIZE WATERBODY CROSSING IMPACTS**

PCGP has incorporated five HDDs to install the pipeline beneath the 1) Coos Bay estuary/2 HDDs; 2) Coos River; 3) Rogue River; and 4) Klamath River. In addition, a Direct Pipe<sup>®</sup> (DP<sup>®</sup>) crossing method has been incorporated to cross the South Umpqua River (MP 71.27), which provides an efficient/single trenchless crossing of I-5, the South Umpqua River, Dole Road, and a railroad and eliminates the open cut river crossing. The trenchless HDDs and DP crossing methods will avoid impacts to important aquatic resources. The HDD design reports for the river crossings and feasibility evaluations for the Coos Bay HDDs are included in Appendix G.2 to Attachment C/Affected Water Resources. An overview of the DP<sup>®</sup> technologies and the DP<sup>®</sup> Design for the South Umpqua River (MP 71.27) are provided in Appendix J.2 to Attachment C.

Appendix E.2 to Attachment C provides a site-specific crossing plan for the diverted open-cut crossing of the South Umpqua River Crossing at MP 94.73 along with the Diverted Open Cut Crossing Design Support report.



PCGP has also incorporated conventional bore (trenchless) crossing methods into the design to cross the Medford Aqueduct (MP 133.38) and 26 other canals, ditches, and drains which include all of the Bureau of Reclamation's jurisdictional facilities in the Klamath Basin. The conventional bores will minimize potential impacts to these water conveyance features.

All streams flowing at the time of construction, that are not crossed by HDD, DP<sup>®</sup>, or conventional bores, will be crossed using dry open cut crossing procedures (flume, dam and pump, [or diverted open cut at the South Umpqua River at MP 94.73]). Each crossing method is described in Section 2.2.5.2 in Attachment C/Affected Water Resources. A full discussion of the fluming and dam and pump crossing methods and safeguards are provided in Appendices C.2 and D.2 to Attachment C. A summary of fluming procedures follows:

- A flume pipe (or pipes) is placed on the bottom of the waterbody and aligned with the flow of the stream. The size of the flume pipe and the number of pipes to be used is determined by the amount of flow in the particular waterbody. The flume pipe is longer than the construction area width of the crossing.
- A temporary dam of sandbags and plastic is constructed at the upstream end of the flume, resulting in the entire stream flow passing through the flume and bypassing the construction area. This allows continuous stream flow to downstream reaches.
- A similar temporary dam of sandbags and plastic is constructed at the downstream end of the flume. This prevents the water in the stream from backflowing into the construction area.
- All instream excavation is done between the dams. The dams prevent turbid water created by construction from flowing downstream.
- Adequate flow rates will be maintained.
- Temporary spoil placement will be at least 10 feet from the waterbody and will be contained by sediment barriers.
- Clean gravel or cobbles will be placed in the upper one-foot of trench backfill using specifications provided by the ODFW; and
- All banks will be stabilized and temporary sediment barriers will be installed within 24 hours of completing the crossing.

The dam and pump crossing method is similar to the fluming method, except instead of a flume pipe to divert stream flow to the downstream side of the construction zone, pumps are used to pump water around the upstream and downstream dams isolating the construction zone. Flumes or dams and pumps will be completely installed and functioning prior to any instream disturbance. All dry open cut crossings will be completed as a single effort to minimize the time of instream disturbance. Once stream flow is diverted through the flume pipe or pumps, but prior to pipeline trenching, any fish trapped in the water remaining in the work area between the dams will be removed by seining or electroshocking and released downstream. PCGP will contract with a qualified aquatic consultant to capture fish according to appropriate ODFW permitting requirements. Because the flume will maintain stream flow, fish may move downstream and upstream through the flume pipe. Flumes will be removed as soon as possible following backfilling of the trench. Fish passage using the dam and pump procedures is temporarily restricted during the construction period which is typically less than 48 hours. PCGP proposes to install the pipeline across fish-bearing waterbodies during the ODFW recommended in-water construction windows.

## 2.4 IMPACT MITIGATION/RECTIFICATION

Temporary impacts to wetlands will be mitigated by restoration of disturbed sites. Impacts to palustrine emergent and palustrine scrub-shrub wetlands are considered temporary and short-term. It is expected that palustrine emergent wetlands can be reestablished within one growing season. Scrub-shrub wetlands typically require approximately two to five years to recover to pre-construction cover and density. Impacts to forested wetlands are considered long-term (10 to 25 years or longer) because of the time required to reestablish these systems. Restoration measures that would be utilized to mitigate impacts to wetlands are described below.

Compaction of wetland soils and soil mixing from rutting within wetlands will be minimized by using low ground-weight equipment and/or by working from prefabricated timber mats. In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing (i.e., clear the right-of-way, dig the trench, fabricate and install the pipe, backfill the trench and restore the right-of-way) will use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, all other equipment traffic in wetlands will be limited to using the construction right-of-way to minimize impacts.

Vegetation in wetlands will be cut to ground level in the construction right-of-way to promote vegetation regeneration. Grading and stump removal will be performed only over the trench, except where required for safety and as determined by PCGP's Chief Inspector. This will facilitate reestablishment of emergent and woody species by enabling sprouting from existing root systems.

To further promote reestablishment of native wetland species, 12 inches of topsoil will be salvaged in all unsaturated wetlands over the trenchline. The salvaged topsoil will be stockpiled to prevent mixing with subsoils or spoil materials and returned to the top of the trench after construction. Topsoil salvaging over the trench line and limiting grading within the construction right-of-way will promote reestablishment of wetland species by preserving the vegetative propagules (seeds, roots, tubers, rhizomes, bulbs) present in the soil. Propagules potentially promote reestablishment of native wetland vegetation by germinating or sprouting from replaced topsoil.

After completion of construction and during final clean-up, original topographic conditions and contours of uplands, wetlands, and streambeds will be restored to reestablish drainage patterns and wetland hydrology. Any excess backfill will be spread over upland areas and stabilized during cleanup. Where the trench may drain a wetland, PCGP will install trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology. A permanent slope breaker and a trench breaker will be installed at the base of slopes near boundaries between the wetland and adjacent upland area. The trench breaker will be located immediately upslope of the slope breaker. A diagram of a trench breaker is provided in the ECRP in Appendix B.1 to Attachment A (see Drawing 3430-34-0011).

Impacts to wetlands will also be mitigated or rectified using general revegetation procedures as outlined in the ECRP. Fertilizer or lime will not be used in wetlands. After construction, wetlands will be seeded using the seed mixtures indicated for each wetland in Table 2-1 in Attachment 2 to this plan to further promote vegetation reestablishment. The seed mixes were developed for specific wetland types and with input from federal and state agencies. Wetland and waterbody/riparian seed mixtures include Seed Mixtures 8 through 12 and 15c which are included in Tables 2.2, 2.3, and 2.5 in Attachment 2. Disturbed emergent wetlands crossed by

the Pipeline will be seeded with either Seed Mixture 9, 10, or 11 unless the landowner requests other mixtures. PCGP may also compensate landowners in the Klamath Basin to reestablish their own agricultural fields and wetlands in the pastures and hayfields crossed by the Pipeline. Wetlands that are dominated by native species will be seeded with Seed Mixture 12 or 15c which include native species that occur in wetlands in the region. The seed mixture tables provided in Attachment 2 of this plan list the species and seeding rates of each wetland seed mixture that will be planted. In addition, sprigs (live stakes or cuttings) and woody species will be installed at waterbody and wetland crossings to enhance wetland and riparian functions and to hasten the recovery of these wetland and riparian systems. All restored sites along the pipeline corridor will be planted no later than the first planting season (October through March) after completion of construction.

Selection and planting of woody species will be done in consultation with individual landowners. Woody species (native trees and shrubs) will be planted across the entire construction right-of-way and within riparian zones of all streambanks where woody species are present prior to construction. As indicated on Figure 3430.34-X-0016 provided in Attachment 4 to this plan, on private lands riparian planting will occur across the right-of-way based on Oregon Department of Forestry's (ODF) Riparian Management (RMA) buffer widths (see Table 2-5 in Attachment 2), subject to the 15-foot (trees) either side of centerline planting restriction required for maintenance/corrosion and leak surveys. The riparian planting area will occur to the RMA buffer width or to the limit of existing riparian vegetation where riparian vegetation does not exceed the RMA buffer. On federal lands PCGP will extend riparian strip planting along all perennial and intermittent streams within federally-designated riparian reserves to 100 feet or to the limit of existing riparian vegetation.

Species' placement will be correlated to moisture regime requirements based on three categories of wet, moist, or dry ground as indicated in Table 2-5 provided in Attachment 2. Plantings will conform to FERC's Wetland and Waterbody Procedures (Attachment B to the ECRP in Appendix B.1 to Attachment A) which advise that trees grow no closer than 15 feet to the pipeline. By revegetating streambanks with riparian species, streambank stability will be enhanced over the long-term and will provide for stream shading, sediment intercept, and input of detrital nutrients to the stream, all of which are key functions of riparian zones. FERC's Wetland and Waterbody Procedures limit vegetation maintenance adjacent to waterbodies to allow development of a riparian vegetative strip. Drawings 3430.34-X-0015 and 3430.34-X-0016 included in Attachment 4 (excerpted from Attachment C of the ECRP which is included in Appendix B.1 to Attachment A) show typical drawings of the revegetation and maintenance plan for forested and shrub wetland and riparian areas. Herbicides or pesticides will not be used within 100 feet of a wetland during maintenance activities for the life of the Pipeline.

Additionally, as indicated in the ECRP, PCGP will install supplemental transplanted trees that are root pruned a year in advance of restoration/replanting on the Umpqua National Forest within the riparian areas of East Fork Cow Creek and its tributaries and on South Fork Little Butte Creek on the Rogue River-Siskiyou National Forest. Root pruning a year in advance of replanting is expected to increase the survival success rate of the transplanted stock. Trees that would be root pruned would be selected from areas along the edge of the construction right-of-way or TEWAs that can remain in place without disturbance until the restoration phase of construction. Tree species type and diversity will be the same as what is presently growing at each site. A PCGP representative and the authorized agency representative will identify and flag the appropriate trees to be used for transplanting purposes. Table 2-6 provides the planting distance for the 15- to 20-foot tall root-pruned trees that would be planted on each streambank.

The transplanted root-pruned trees will be monitored annually according to FERC's Wetland and Waterbody Procedures. If the success rate drops below 80 percent, a Forest Service authorized representative will be informed and a plan will be developed between the Forest Service and PCGP to restock these sites.

In consultation with landowners, PCGP may place LWD at appropriate areas in the waterbody within the construction right-of-way to mitigate for potential short-term impacts that may occur to aquatic species from an open cut crossing and instream construction (see Attachment F). LWD placement would occur after the pipe has been installed across the waterbody, during ODFW instream construction windows and during the time when the flume or dam and pump controls are in place to minimize turbidity associated with the installation of the LWD. Other possibilities include placing LWD immediately downstream from the lower flume dam (to create a depositional rather than potential scouring environment at the pipeline crossing) either during or after the flume has been removed. LWD could be placed across a stream channel with minimal or no generation of sediment after construction, as well. Such decisions will be made on a site-by-site basis. Installation of the LWD without the flume or dam and pump control measures in place would only occur with the approval of the appropriate permitting agencies. PCGP has also developed the Stream Crossing Risk Analysis (see Appendix O.2 to Attachment C) which specifies BMPs that incorporate LWD where necessary for bed or bank restoration.

## 2.5 MITIGATION MONITORING

Typical planting schemes that will apply to forested or scrub-shrub wetlands and riparian areas are provided as Drawings 3430.34-X-0015 and 3430.34-X-0016 in the ECRP in Attachment 4 (also see Attachment C in Appendix B.1 to Attachment A). The proposed plant species and spacings are provided in Table 2-4 in Attachment 2 to this plan. Further Table 2-1 in Attachment 2 provides the proposed treatment for each wetland and waterbody affected by the Pipeline. PCGP will contract with a restoration contractor to provide and install the plantings. The contractor will be familiar with wetland and riparian ecological conditions in the area. Attachment 3 provides the typical procedures for preparing and planting live stakes or sprigs and planting bare root tree seedlings. Based on site-specific conditions, the restoration contractor may substitute or add native species to those provided in Table 2-4 in Attachment 2.

An "As-Built" Report documenting the final design of the restoration areas will be prepared when site construction and planting are completed. The report will include the following:

- i. Site vicinity map;
- ii. Drawings that identify the boundaries of the restoration areas;
- iii. The installed planting scheme providing quantities, densities, sizes, and approximate locations of plants, as well as plant sources and the time of planting;
- vii. General notes indicating site conditions, concerns or other issues that might affect site planting success.

A copy of the "As-Built" Report will be provided to the U.S. Army Corps of Engineers and Oregon Department of State Lands by December 31 or other specified date as required by these agencies of the year when planting is complete.

Consistent with FERC's Wetland and Waterbody Procedures and as detailed in PCGP's Long-Term Monitoring Plan (see Attachment 5 to this plan), monitoring of wetlands restored on the right-of-way will be conducted annually for three years following construction or until wetland

revegetation is determined to be successful. In summary, qualified biologists will conduct monitoring during the growing season by collecting information on plant survival, percent vegetative cover, as well as hydrologic conditions. Photographs will be taken each year to support the monitoring efforts. Wetland revegetation shall be considered successful based on Oregon Revegetation Performance Criteria for Wetlands and Riparian Areas as outlined in Table 5-1 in Attachment 5, which provides specific criteria for native plant, invasive species and bare ground cover, species diversity, prevalence index and riparian composition.

Reports will be prepared after each monitoring period to document collected data. The reports will be submitted to the U.S Army Corps of Engineers as well as to the Oregon Department of State Lands by December 31 or other specified date as required by these agencies of each monitoring year. If the results of the monitoring at year three (3) show that the restored areas do not satisfy the performance standards, additional monitoring and mitigation may be required (e.g., replanting, soil amendments, selection of alternative species, etc.). Any additional monitoring or mitigation measures are subject to review and approval by the appropriate agencies.

Vegetation cover will be estimated (ocular) as described in the Long-Term Monitoring Plan (see Section 4.0 in Attachment 5) within a 1- to 2-meter plot that is randomly selected by habitat type. Metric measures will include species occurrence, their indicator status, native status, vegetation strata, species foliar cover, and bare substrate. Species foliar cover will be aggregated to total plant foliar cover, herbaceous plant foliar cover, woody foliar cover, and invasive plant foliar cover. Hydrologic conditions will be monitored by visual inspection to determine if the wetland hydrology has been reestablished. Monitoring will note presence of surface water or if groundwater is present in soil pits. Hydrologic indicators will also be noted (i.e., water marks or drift lines, sediment deposits, evidence of ponding, etc.). PCGP will be responsible for maintaining the restoration sites to meet the required performance standards. Maintenance may include, among others, removal of invasive species, removal of trash, and replacement of dead plants.

### **3.0 COMPENSATORY MITIGATION REQUIREMENTS**

Construction of the Pipeline would not require any permanent wetland fill. However, approximately 0.83 acre of wetland type conversion impacts would occur where maintenance of the operational corridor would convert forested or scrub-shrub wetlands to a different wetland type to facilitate corrosion and leak surveys. To mitigate for the 0.83 acre of permanent wetland vegetation type conversion impacts, PCGP proposes to co-locate compensatory mitigation efforts with the LNG Terminal mitigation efforts at the former Kentuck Golf Course in Coos County (Kentuck Project). The Pipeline component of the Kentuck Project would be required to enhance a minimum of 2.49 acres of degraded emergent wetlands within the golf course to mixed forested and scrub-shrub wetlands based on a ratio of 3:1. The compensatory mitigation plan is in conformance with U.S. Army Corps of Engineers and Department of State Lands compensatory wetland mitigation requirements. The proposed mitigation would improve hydrologic function within the wetland by removing existing levees and regrading the site to improve hydrology and micro-topography to support a variety of plant species and providing access and refugia to fish during high flow events. Impacts from pipeline construction would be primarily a result of conversion from a mixture of forested and shrub wetlands to a mixture of shrub and herbaceous wetlands. The compensatory wetland mitigation plan will convert existing, degraded pasture wetland within the former golf course to complex native forested wetland, essentially a reversal of the proposed Pipeline impacts. Approximately 9.12 acres of

mitigation will be undertaken to achieve this goal, including 6.63 acres of voluntary habitat improvements (above the minimum mitigation requirements). The Compensatory Wetland Mitigation Plan is provided in Attachment J to Part 2 of the Joint Permit Application.

In addition, PCGP will develop a Compensatory Mitigation Plan (CMP) to mitigate for potential effects on BLM and NFS lands. The BLM and Forest Service have previously proposed a suite of off-site mitigation projects which are intended to be responsive to BLM RMP and Forest Service LRMP objectives that include:

- Compliance with the Aquatic Conservation Strategy of the Northwest Forest Plan;
- Habitat for T&E species including northern spotted owls, marbled murrelets, and coho;
- Mitigation of impacts on LSRs; and
- Specific resource issues as they occur by watershed.

The CMP will include the BLM and Forest Service mitigation projects as supplemental mitigation to address important issues or land management plan objectives that cannot be mitigated on-site. Some of these mitigation projects include placement of LWD in streams, road surfacing and drainage repairs, road decommissioning, fish passage culvert replacements, terrestrial restoration, fire protection, fuels reduction, and projects to enhance special habitats.

PCGP will assess the BLM's proposed mitigation projects in relation to Pipeline effects by watershed, along with the Forest Service's mitigation projects that have been approved in principle by PCGP. The BLM and Forest Service mitigation projects are also being reviewed with respect to PCGP's responsibilities to mitigate for the potential effects to ESA-listed species and their habitats during the consultation process with the U.S. Fish and Wildlife Service.

At the request of the Oregon Department of Environmental Quality (ODEQ), through the 401 Water Quality Certification process, PCGP evaluated thermal impacts on streams crossed by the Pipeline using an effective shade-based analysis where solar load was calculated in the baseline condition, as well as temporary construction impact and permanent right-of-way impacts (see Appendix Q.2 to Attachment C/Affected Water Resources). The results of the thermal impact analysis will be applied to developing a thermal mitigation plan to mitigate temporary impacts at a 1:1 ratio and permanent impacts at a 2:1 ratio, which would be associated with the 30-foot operational easement. Mitigation will consist of widespread riparian plantings within each ecoregion and site potential tree height distribution to provide in-kind mitigation where feasible, and a trading protocol will be developed through consultation with ODEQ to provide out-of-kind mitigation where necessary.

#### **4.0 REFERENCES**

National Marine Fisheries Service. 2000. Designated Critical Habitat: Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California. Federal Register 65(32):7764-7787.

National Marine Fisheries Service. 2003. Proposed Rule: Advance Notice of Proposed Rulemaking to Designate Critical Habitat for 20 Listed Evolutionarily Significant Units of Pacific Salmon and Steelhead. Federal Register 68(188):55926-55932.

Oregon Department of Forestry and Oregon Department of Fish and Wildlife. 1995. A Guide to Placing Large Wood in Streams. Oregon Department of Forestry, Forest Practices,

Salem, OR. and Oregon Department of Fish and Wildlife, Habitat Conservation Division, Portland, OR.

Restoration Program, Ministry of Environment, Lands and Parks, and Ministry of Forests. Vancouver, B.C.

U.S. Fish and Wildlife Service. 2004. Proposed Rule: Proposed Designation of Critical Habitat for the Jarbidge River, Coastal-Puget Sound, and Saint Mary-Belly River Populations of Bull Trout. Federal Register 69(122):35768-35857.

Washington State Department of Ecology. 2004. Draft. Wetlands in Washington State Volume 2: Managing and Protecting Wetlands. Washington State Department of Ecology Publication # 04-06-024.

**ATTACHMENT 1**  
**SUMMARY OF WETLAND IMPACTS**



**Table 1-1  
Summary of Wetland Impacts by Fifth Field/HUC10 Watershed**

Ecoregion and Sub-basin <sup>1</sup>	HUC 10/Fifth field Watershed <sup>1</sup>	Approximate Milepost Range <sup>2</sup>	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Coast Range Ecoregion Coos Subbasin (HUC 17100304)	Coos Bay Frontal (HUC 1710030403)	0.0 – 20.06	15.37	PEM	8,573.17	18.32	23.13	<0.01	41.45	0.00
				PSS	68.87	0.13	0.07	0.00	0.20	0.01
				PFO	98.08	0.15	0.00	0.00	0.15	0.07
				PAB/PUB	0.00	0.00	0.64	0.00	0.64	0.00
				<b>Total</b>	<b>8,740.12</b>	<b>18.60</b>	<b>23.84</b>	<b>0.00</b>	<b>42.44</b>	<b>0.08</b>
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	North Fork Coquille River (HUC 1710030504)	20.06 - 28.12	11.47	PEM	21.69	0.08	0.03	0.00	0.11	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	173.67	0.38	0.00	0.00	0.38	0.12
				<b>Total</b>	<b>195.36</b>	<b>0.46</b>	<b>0.03</b>	<b>0.00</b>	<b>0.49</b>	<b>0.12</b>
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	East Fork Coquille River (HUC 1710030503)	28.12 - 42.59	9.71	PEM	36.46	0.24	0.00	0.00	0.24	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				<b>Total</b>	<b>36.46</b>	<b>0.24</b>	<b>0.00</b>	<b>0.00</b>	<b>0.24</b>	<b>0.00</b>
Coast Range Ecoregion Coquille Subbasin (HUC 17100305)	Middle Fork Coquille River (HUC 1710030501)	35.81 - 47.27	6.75	PEM	0.00	<0.01	0.00	0.00	<0.01	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	39.41	0.07	0.00	0.00	0.07	0.03
				<b>Total</b>	<b>39.41</b>	<b>0.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>0.03</b>
Klamath Mountains Ecoregion Coquille Subbasin (HUC 17100305)	Middle Fork Coquille River (HUC 1710030501)	47.27 – 53.16	7.45	PEM	0.00	0.00	0.00	0.00	0.00	0.00
				PSS	0.00	0.01	0.00	0.00	0.01	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				<b>Total</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC 17100302)	Olalla Creek - Lookingglass Cr (HUC 1710030212)	53.16 - 62.41	8.83	PEM	1,503.51	3.48	0.37	0.00	3.85	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	530.50	0.93	0.43	0.00	1.36	0.37
				<b>Total</b>	<b>2034.01</b>	<b>4.41</b>	<b>0.80</b>	<b>0.00</b>	<b>5.21</b>	<b>0.37</b>
Klamath Mountains Ecoregion South Umpqua	Clarks Branch - South Umpqua	62.41 - 74.24	13.64	PEM	249.88	0.30	0.25	0.00	0.55	0.00
				PSS	0.00	0.00	0.00	0.00	0.00	0.00
				PFO	0.00	0.00	0.00	0.00	0.00	0.00
				<b>Total</b>	<b>249.88</b>	<b>0.30</b>	<b>0.25</b>	<b>0.00</b>	<b>0.55</b>	<b>0.00</b>

## Pacific Connector Gas Pipeline Project

## Wetland, Waterbody, and Riparian Mitigation Plan

Ecoregion and Sub-basin <sup>1</sup>	HUC 10/Fifth field Watershed <sup>1</sup>	Approximate Milepost Range <sup>2</sup>	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Subbasin (HUC 17100302)	River (HUC 1710030211)									
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC 17100302)	Myrtle Creek (HUC 1710030210)	74.24 – 82.71	8.77	PEM PSS PFO <b>Total</b>	196.39 0.00 0.00 <b>196.39</b>	0.33 0.00 0.00 <b>0.33</b>	0.06 0.00 0.00 <b>0.06</b>	0.00 0.00 0.00 <b>0.00</b>	0.39 0.00 0.00 <b>0.39</b>	0.00 0.00 0.00 <b>0.00</b>
Klamath Mountains Ecoregion South Umpqua Subbasin (HUC 17100302)	Days Creek - South Umpqua River (HUC 1710030205)	82.71 – 102.58	10.20	PEM PSS PFO <b>Total</b>	1060.82 0.00 0.00 <b>1060.82</b>	2.21 0.00 0.00 <b>2.21</b>	1.27 0.40 <sup>3</sup> 0.00 <b>1.67</b>	0.01 0.00 0.00 <b>0.01</b>	3.49 0.40 <sup>3</sup> 0.00 <b>3.89</b>	0.00 0.00 0.00 <b>0.00</b>
Cascades Ecoregion South Umpqua Subbasin (HUC 17100302)	Upper Cow Creek (HUC 1710030206)	102.58-109.40	4.35	PEM PSS PFO <b>Total</b>	0.00 47.21 0.00 <b>47.21</b>	0.00 0.11 0.00 <b>0.11</b>	0.00 0.05 0.00 <b>0.05</b>	0.00 0.00 0.00 <b>0.00</b>	0.00 0.16 0.00 <b>0.16</b>	0.00 0.01 0.00 <b>0.01</b>
Klamath Mountains South Umpqua Subbasin (HUC 17100302)	Upper Cow Creek (HUC 1710030206)	109.40-111.10	0.92	PEM PSS PFO Total	93.95 0.00 0.00 <b>93.95</b>	0.22 0.00 0.00 <b>0.22</b>	0.00 0.00 0.00 <b>0.00</b>	0.00 0.00 0.00 <b>0.00</b>	0.22 0.00 0.00 <b>0.22</b>	0.00 0.00 0.00 <b>0.00</b>
Klamath Mountains Upper Rogue Subbasin (HUC 17100307)	Trail Creek (HUC 1710030706)	111.10 - 121.78	10.68	PEM PSS PFO <b>Total</b>	27.89 0.00 0.00 <b>27.89</b>	0.05 0.00 0.00 <b>0.05</b>	0.00 0.00 0.00 <b>0.00</b>	0.00 0.00 0.00 <b>0.00</b>	0.05 0.00 0.00 <b>0.05</b>	0.00 0.00 0.00 <b>0.00</b>
Klamath Mountains Ecoregion Upper Rogue Subbasin (HUC 17100307)	Shady Cove-Rogue River (HUC 1710030707)	121.78 – 130.09	8.10	PEM PSS PFO <b>Total</b>	157.55 0.00 0.00 <b>157.55</b>	0.35 0.00 0.00 <b>0.35</b>	0.04 0.00 0.00 <b>0.04</b>	0.00 0.00 0.00 <b>0.00</b>	0.39 0.00 0.00 <b>0.39</b>	0.00 0.00 0.00 <b>0.00</b>
Klamath Mountains Ecoregion	Big Butte Creek (HUC 1710030707)	130.09 - 135.04	5.09	PEM PSS PFO	1,392.74 253.24 34.15	2.86 0.34 0.08	0.89 0.04 0.00	0.01 0.00 0.00	3.76 0.37 0.08	0.00 0.07 0.02

## Pacific Connector Gas Pipeline Project

## Wetland, Waterbody, and Riparian Mitigation Plan

Ecoregion and Sub-basin <sup>1</sup>	HUC 10/Fifth field Watershed <sup>1</sup>	Approximate Milepost Range <sup>2</sup>	Miles Crossed	Cowardin Classification	Width of Crossing (feet)	Acres of Construction ROW in Wetland	Acres of Temporary Extra Work Area in Wetland	Acres of Temporary Access Road in Wetland	Total Construction Disturbance in Wetland (acres)	Total Permanent Wetland Vegetation Type Conversion (or fill) (acres)
Upper Rogue Subbasin (HUC 17100307)	1710030704)			<b>Total</b>	<b>1,680.13</b>	<b>3.28</b>	<b>0.93</b>	<b>0.01</b>	<b>4.21</b>	<b>0.09</b>
Klamath Mountains & Cascades Ecoregion Upper Rogue Subbasin (HUC 17100307)	Little Butte Creek (HUC 1710030708)	135.04 – 168.00	32.92	PEM PSS PFO <b>Total</b>	1,593.62 1.68 0.00 <b>1,595.30</b>	3.96 0.01 0.00 <b>3.97</b>	1.89 0.04 0.00 <b>1.93</b>	0.04 0.00 0.00 <b>0.04</b>	5.89 0.05 0.00 <b>5.94</b>	0.00 <0.01 0.00 <b>&lt;0.01</b>
Eastern Cascades Slopes and Foothills Ecoregion Upper Klamath R. Subbasin (HUC 18010206)	Spencer Creek (HUC 1801020601)	168.00 – 183.02	15.13	PEM PSS PFO <b>Total</b>	0.00 115.67 147.34 <b>263.01</b>	0.00 0.24 0.26 <b>0.50</b>	0.00 0.00 0.00 <b>0.00</b>	0.00 0.00 0.00 <b>0.00</b>	0.00 0.24 0.26 <b>0.50</b>	0.00 0.03 0.10 <b>0.13</b>
Eastern Cascades Slopes and Foothills Ecoregion Lost River Subbasin (HUC 18010204)	Lake Ewauna - Klamath River (HUC 1801020412)	188.40 - 205.64	16.31	PEM PSS PFO <b>Total</b>	14,217.18 0.00 0.00 <b>14,217.18</b>	31.16 0.00 0.00 <b>31.16</b>	17.55 0.00 0.00 <b>17.55</b>	0.01 0.00 0.00 <b>0.01</b>	48.73 0.00 0.00 <b>48.73</b>	0.00 0.00 0.00 <b>0.00</b>
Eastern Cascades Slopes and Foothills Ecoregion Lost River Subbasin (HUC 18010204)	Mills Creek-Lost River (HUC 1801020409)	205.64 – 228.81	23.00	PEM PSS PFO <b>Total</b>	142.91 0.00 0.00 <b>142.91</b>	0.34 0.00 0.00 <b>0.34</b>	0.15 0.00 0.00 <b>0.15</b>	0.00 0.00 0.00 <b>0.00</b>	0.49 0.00 0.00 <b>0.49</b>	0.00 0.00 0.00 <b>0.00</b>
<b>Total</b>					<b>30,777.58</b>	<b>66.61</b>	<b>47.30</b>	<b>0.07</b>	<b>113.98</b>	<b>0.83</b>

<sup>1</sup> Subbasin and Fifth Field Watersheds/HUC 10 USGS Hydrologic Unit Codes  
<sup>2</sup> Mileposts overlap between fifth field watersheds when alignment is located on the boundary between two adjacent watersheds.  
<sup>3</sup> Acres within Milo Pipe Yard 2. No permanent wetland vegetation type conversion.

**ATTACHMENT 2**

**SUMMARY OF WETLAND RESTORATION TREATMENTS**

**Table 2-1**  
**PCGP Wetland and Waterbody Restoration Treatments**  
*(Subject to PCGP EI's or Restoration Representative's determination at the time of restoration based on site-specific conditions)*

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
<b>Coast Range Ecoregion, Coos Subbasin (HUC 17100304), Coos Bay-Frontal Pacific Ocean (HUC 1710030403) 5th Level Watershed <sup>3</sup>, Coos County, Oregon</b>										
Alt_Wetl_NA	0.00	Private	PFOC	Depressional	12	Yes	Wetland	None	N/A	Forested depressional wetland, seasonally flooded.
Alt_Wetl_NE	0.00	Private	PABH/PUBH	Depressional	12	None	Wetland	None	N/A	Depressional aquatic bed wetland, unconsolidated shore, permanently flooded.
Coos Bay Alt Wet NH (West)	0.00	State	E2EM	Estuarine	12	None	Wetland	None	N/A	Estuary Drain
J	0.14	Private	PEMA	Slope/Flats	12	None	Wetland	None	None	Tidally influenced emergent wetland
NE-26 Coos Bay	0.28 to 1.00	State	E1UBL, E2USN, E2USP	Estuarine	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Coos Bay – HDD (Trenchless Crossing)
APC-C2	1.16	State	PSS1R	Slope/Flats	12	Yes	Wetland	None	None	Scrub-shrub wetland, broad-leaved deciduous, seasonally flooded, tidally influenced
EE-WW-9902	1.20 1.41	State	PSSC/ PEM1A	Slope/Flats	9	Yes	Wetland	None	N/A	Scrub-shrub wetland, seasonally flooded
NE-26 Coos Bay	1.46-3.02	State	E1UBL, E2USN, E2USP	Estuarine	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Coos Bay – HDD (Trenchless Crossing)
KEN-A1 (NW-117/EE-6A0)	3.25	State	PEM1Ad	Slope/Flats	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	Emergent wetland, temporarily flooded, partially drained/ditched
KEN-A2 (NW-117/EE-6A)	3.33	State	PEM1Ad	Slope/Flats	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	Emergent wetland, temporarily flooded, partially drained/ditched
KEN-A1 W1-01 (NW-117/EE-6A) Trib to Coos Bay	6.39R	Private/State	PEM	Slope/Flats	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	Off-site determination south of Kentuck Slough. Slough sedge and reed canarygrass dominate – includes ditched drainage – Trib to Coos Bay
KEN-A2 W1-01 (NW-117/EE-6A) Trib to Coos Bay	6.39R	Private/State	PEM	Slope/Flats	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	JCEP <sup>5,6</sup>	Emergent wetland
W1-02	6.47R	Private	PFO	Slope/Flats	12	Yes	Wetland	None	N/A	Spring fed wetland dominated by skunk cabbage.
S1-04 (EE-7 (MOD)) Willanch Slough	8.27R	Private	R2	Riverine F/T	9	Yes	Stream Banks and Riparian	4	Yes	Perennial tributary to Coos Bay
W1-04	8.33R	Private	PEM	Depressional	9	None	Wetland	None	N/A	Wetland in floodplain of Willanch Slough.
GDX-30 Trib. to Willanch Slough	8.48R	Private	R4	Riverine F/T	9	Yes	Stream Banks and Riparian	2	Yes	Intermittent tributary to Willanch Slough
SS-100-002 Trib. to Cooston Channel	10.21R	Private	R4	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	Echo Creek - Intermittent
WW-100-001	11.01R	Private	PEMA	Slope/Flats	9	None	Wetland	None	N/A	Freshwater Emergent Wetland

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
BSP-119 Coos River	11.13R	State	E1UBL	Riverine F/T	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Avoid by HDD Crossing	Coos River, ~650' wide – HDD (Trenchless Crossing)
WW-222-002	11.26R	Private	PEMAd	Slope/Flats	9	None	Wetland	None	N/A	Depressional herbaceous wetland
WW-500-001	11.39BR	Private	PEMA	Slope/Flat	9	None	Wetland	None	N/A	Small wetland swale w/in ditch in pasture
SS-100-005 (BR-S-02) Vogel Creek	11.55BR	Private	R2UBHx	Estuarine	9	None	Stream Banks and Riparian	None (ag)	Yes	Coos River Crossing – perennial stream
BR-W-03	11.74BR 12.00BR	Private	PEMA	Slope/Flats	9	None	Wetland	None	N/A	Wetland associated with Vogel Creek
BR-S-04 Ditch Trib. to Vogel Creek	11.88BR	Private	R2UBHx	N/A/Ditch	9	None	Stream Banks and Riparian	None (ag)	Yes	Perennial ditch
BR-S-06 Ditch Trib. to Vogel Creek	12.11BR	Private	R2UBHx	N/A/Ditch	9	None	Stream Banks and Riparian	None (ag)	Yes	Perennial ditch
EE-WW-9927	12.12BR	Private	PEM/PSS	Slope/Flats	9	None	Wetland	None	N/A	Emergent and shrub wetland, temporarily flooded.
BR-S-31 Trib. to Stock Slough	14.72BR	Private	R4SBC	Riverine F/T	9	None	Stream Banks and Riparian	None (ag)	Yes	Intermittent stream
BR-W-04A	15.01BR	Private	PEMA	Slope/Flats	9	None	Wetland	None	N/A	Pasture wetland fed by Trib. to Stock, Slough (Lazxtrom Gulch), temporarily flooded
BR-W-04B	15.08BR	Private	PEMS	Slope/Flats	9	None	Wetland	None	N/A	Pasture wetland (Lazxtrom Gulch), seasonally flooded/saturated
BR-S-36 Stock Slough	15.11BR	Private	R2UBHx	Riverine F/T	9	Yes	Stream Banks and Riparian	4	Yes	Stock Slough, perennial stream
BR-W-05	15.15BR	Private	PEMS	Slope/Flats	9	None	Wetland	None	N/A	Pasture wetland fed by Stock Slough, seasonally flooded/saturated
EE-SS-9068 Stock Slough	15.32BR	Private	R4SBC	Riverine F/T	9	Yes	Stream Banks and Riparian	4	Yes	Stock Slough, perennial stream, seasonally flooded
<b>Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), North Fork Coquille River (HUC 1710030504) Fifth field Watershed<sup>2</sup>, Coos County, Oregon</b>										
SS-500-003 (BR-S-63) Steinnon Creek	20.20BR	BLM-Coos Bay District	R4SB3	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Steinnon Creek

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
WW-500-003	20.99BR	Private	PEM/PSS	Slope/Flats	12	None	Wetland	None	N/A	Emergent and scrub-shrub wetland
BR-S-63 Steinnon Creek	24.32BR	BLM-Coos Bay District	R3UBH	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Steinnon Creek
DA-10X Ditch	22.72	Private	R4SBx	N/A/Ditch	1 or 9	No	Ditch Banks	None	None	3' wide ditch; drains agricultural field
NW-40	22.78	Private	PEMC	Slope/Flats	9	None	Wetland	None	N/A	Emergent wetland
BSP207 North Fork Coquille River	23.06	Private	R2UBH	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	N. Fork Coquille River, only flagged north bank, no access; 20' wide
WW-222-009 (CW-10)	23.38	BLM - Coos Bay District	PFOC	Slope/Flats	12 <sup>13</sup>	Yes	Wetland and Riparian Reserve	None	N/A	Red alder dominated low area
EE-SS-9073 Trib. to Middle Creek	25.18	Private	S4SBC	Riverine F/T	12	Yes	Wetland and Riparian Reserve	2	Yes	Seasonal intermittent stream
BSI-137 Trib. to Middle Creek	27.01	BLM - Coos Bay District	R4SB3C	Riverine F/T	13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Drainage and Riparian Areas	2 <sup>a13a</sup>	Yes	3-7' wide, parallel to BSI 136, ~10% gradient at top
WW-222-005 (BW-134)	27.02	BLM - Coos Bay District	PEMC	Slope/Flats	12 or 13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Wetland and Riparian Reserve	Yes <sup>13a</sup>	N/A	Flat area; intermittent stream outfalls from wetland
BSI-135 Trib. to Middle Creek	27.03	BLM - Coos Bay District	R4SB3C	Riverine F/T	13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Drainage and Riparian Areas	2 <sup>13a</sup>	Yes	Narrow int. drainage that starts at BW134, steep at top
BSP-133 Middle Creek	27.04	BLM - Coos Bay District	R2SB4H	Riverine F/T	12 or 13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Stream banks and Riparian Reserve	4 <sup>13a</sup>	Yes	Middle Creek-steep banks, 30-60' wide, < 2% gradient
<b>Coast Range Ecoregion, Coquille Subbasin (HUC 17100305), East Fork Coquille River (HUC 1710030503) 5th Level Watershed<sup>3</sup>, Coos County, Oregon</b>										
BSP-77 Trib. to E. Fork Coquille	28.86	Private	R3SB1F	Riverine F/T	12	Yes	Stream banks and Riparian	4	Yes	Forested 1-8' wide stream; 30-40% gradient
BSP-74 Trib. To E. Fork Coquille	29.30	Private	R4UB1C	Riverine F/T	12	Yes	Stream banks and Riparian	2	Yes	Intermittent stream, 3-6' wide, 5-10% gradient
BW-72	29.52	Private	PEMC	Slope/Flats	9	None	Wetland	None	N/A	Pasture wetland fed by hillside seeps
BSI-76 Trib. to E. Fork Coquille	29.53	Private	R4SB1C	N/A/Ditch	12	Yes	Stream banks and Riparian	2	Yes	Intermittent stream connected to BSP74 outside corridor
BSP-71 East Fork Coquille River	29.85	Private	R3OWH	Riverine F/T	12	Yes	Stream Banks	4	Yes	East Fork Coquille River
SS-003-007A Trib. To East Fork Coquille	30.22	Private	R4SBx	Riverine F/T	12	Yes	Stream banks and Riparian	2	No	3' wide ditch; drains agricultural field
SS-003-007B Trib. To East Fork Coquille	30.29	Private	R4SBx	Riverine F/T	12	Yes	Stream banks and Riparian	2	No	3' wide intermittent tributary
BSI-70 Trib. to E. Fork Coquille	31.64	BLM - Coos Bay District	R4UB1C	Riverine F/T	13 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	Yes	1' wide, flows subsurface in areas
BSP-57 Elk Creek	32.40	Private	R3RB2H	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	3-10' wide, 1-5% gradient stream at base of canyon
BSP-55 Trib. To Elk Creek	32.44	Private	R3SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	Elk Creek; 1-5% gradient; 1-5' wide
SS-100-030 Trib. To Elk Creek	32.56	Private	R4SB1C	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	Intermittent stream, seasonally flooded

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
SS-100-031 Trib. To Elk Creek	32.63	Private	R4SB1C	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	Intermittent stream, seasonally flooded
BSP-49 Trib. To Elk Creek	32.99	Private	R3SB1C	Riverine F/T	12	Yes	Stream Banks and Riparian	2	Yes	10' average width; 2-3% gradient
CW-6	34.45	Private	PEMC	Slope/Flats	12	None	Wetland	None	N/A	Similar to CW4, adjacent to Elk Creek
CSP-5 S. Fork Elk Creek	34.46	Private	R3SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian Areas	2	Yes	Elk Creek; 10-15' wetted width; <2% gradient
CW-4	34.46	Private	R3SB1H/PEM	Riverine Slope/Flats	12	None	Wetland	None	N/A	Fringe wetland associated with Elk Creek
BSI-251 Trib. to S. Fork Elk Creek	35.51	BLM - Coos Bay District	R4UB1J	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Small 4' wide intermittent headwater tributary
<b>Coast Range Ecoregion, Coquille Sub-basin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) Fifth field Watershed <sup>3</sup>, Coos County, Oregon</b>										
BLM-35.87/CSP-2 Trib.to Big Creek	35.87	BLM - Coos Bay District	R4SB	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Small intermittent headwater tributary, Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12" culvert which will be replaced.
BLM 36.48 Trib. to Big Creek	36.48	BLM - Coos Bay District	R4SB	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Small intermittent headwater tributary
GSI-25 (BSI-253) Trib. to Big Creek	36.54	BLM - Coos Bay District	R4UB1J	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	None	None	Intermittent stream, 4' average width
BLM 36.85 Trib. to Big Creek	36.85	BLM - Coos Bay District	R4SB	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Small intermittent headwater tributary, Crossing occurs within Elk Creek Road (BLM 28-11-29-0) and flows through a 12-18" culvert which will be replaced.
BSI-252 Trib. To Big Creek	36.92	BLM - Coos Bay District	R4UB1J	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	in Road lay minimize effects to waterbody	None	Intermittent stream, 3' average width
ESI-19 Trib. To Big Creek	37.32	BLM - Coos Bay District	R4UB1J	Riverine F/T	13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Stream banks and Riparian Reserves	2 <sup>13a</sup>	Yes	Narrow creek
ESP-20 Trib. To Big Creek	37.35	BLM - Coos Bay District	R3UB1H	Riverine F/T	13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Stream banks and Riparian Reserves	4 <sup>13a</sup>	Yes	10-15' wide broad U-shaped channel with cobble/silt substrate
WW-222-006 (CW-1)	43.63	Private	R4UB1Cx/PEM	N/A/Ditch	9	None	Wetland	None	N/A	Small wet ditch west of logging road; wetland vegetation
BSP-41 Upper Rock Creek	44.21	Private	R3UB1C	Riverine F/T	12	Yes	Wetlands and Riparian Areas	4	Yes	Unnamed perennial stream
<b>Klamath Mountains Ecoregion, Coquille Subbasin (HUC 17100305), Middle Fork Coquille River (HUC 1710030501) 5th Level Watershed <sup>3</sup>, Douglas County, Oregon</b>										
BW038	46.49	Private	PFO1	Riverine Imp.	12	Yes	Wetlands	1	N/A	Riverine impounding wetland adjacent to road, in clearcut
W3-01 (BW-38 (MOD))	46.56	Private	PFO1	Riverine Imp.	12	Yes	Wetlands	1	N/A	Riverine impounding wetland adjacent to road, in clearcut
S3-07 (BW-38) Trib. to Upper Rock Creek	46.56	Private	R2UBH	Riverine F/T	12	Yes	Wetlands	1	N/A	Perennial tributary to Upper Rock Creek.
S3-06 Ditch	48.21	Private	R4SBx	N/A/Ditch	1 or 11	None	Ditch	None	Yes	Ditch
BSP-257 (MOD) Deep Creek	48.27	Private	PSS/R3UB1H	Slope/Flats	13 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Stream banks and Riparian Reserves	4 <sup>13a</sup>	Yes	Broad perennial stream with associated wetland.
BDX-31 Ditch	50.02	Private	R4UB1Cx	N/A/Ditch	11	None	Ditch	None	None	3-5' wide trapezoidal drainage ditch along farm fence line
BSP-30 Middle Fork Coquille River	50.28	Private	R2OWH	Riverine F/T	12	Yes	Stream Banks and Riparian Areas	4	Yes	Middle Fork Coquille River; 1-3% gradient, 15-25' wide
GDX-36 (BS-66/67) Trib. to Middle Fork Coquille	50.45	Private	R4UB3C	Riverine F/T	11	None	Stream Banks	None	None	BSI066 Up to 1' wide. BSI067 continues to the rerouted alignment. 2-3' wide channel with upland forest species.



Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
GSI-37 (BSP-61) Trib to Middle Fork Coquille	50.71	Private	R3UB3H	Riverine F/T	11	Yes	Stream Banks	4	Yes	3-10' wide stream in forest. Gravel substrate with 2-6" deep water
S1-07 (GSI-38) Trib to Middle Fork Coquille	51.02	Private	R4SBC	Riverine F/T	13 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Ephemeral drainage, no defined channel with vine maple and lady fern
<b>Klamath Mountains Ecoregion, South Umpqua Subbasin (HUC 17100302), Olalla Creek-Lookingglass Cr (HUC 1710030212) 5th Level Watershed <sup>3</sup>, Douglas County, Oregon</b>										
BSI-202 Trib. to Shields Creek	55.90	Private	R4SB3C	Riverine F/T	11	Yes	Stream Banks	2	Yes	Small ephemeral drainage in heavily grazed pasture
BSI-203 Trib. to Shields Creek	55.94	Private	R4SB3C	Riverine F/T	11	Yes	Stream Banks	2	None	Intermittent stream, portions of which are grazed
BW-164	55.98	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Depressional swale dominated by pennyroyal
DA-13 Trib to Shields Creek	56.28	Private	R4SB	Riverine F/T	11 or 12	Yes	Stream Banks	2	Yes	Small 3-4' wide intermittent tributary
DA-14 Trib to Shields Creek	56.34	Private	R4SB	Riverine F/T	11 or 12	Yes	Stream Banks	2	Yes	Small 3-4' wide intermittent tributary
DA-15	56.69	Private	PFO	Slope/Flats	12	Yes	Wetland	None	N/A	Palustrine forested wetland
BW-160	56.75	Private	PFOC	Slope/Flats	12	Yes	Wetland	None	N/A	Adjacent to BW161, separated by a gravel road
BW-161	56.78	Private	PEMC	Slope/Flats	12	Yes	Wetland	None	N/A	Ash dominated wetland
BW-162	56.83	Private	PFO/PEMC	Slope/Flats	12	Yes	Wetland	None	N/A	Spring-fed wetland with forested and emergent portions
BW-163	56.97	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Continuation of BW162 on east side of driveway
BSI-140 Trib. Olalla Creek	57.11 57.14	Private	R4SB1C	Riverine F/T	12	Yes	Stream banks	2	None	Narrow intermittent drain that joins BSI 138; <2% gradient
BW-142	57.18	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Seep-fed wetland on gentle slope above BW141
BW-141	57.25	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Depressional area in field, compacted soils
BSI-138 Trib. to Olalla Creek	57.31	Private	R4SB1C	Riverine F/T	12	Yes	Stream banks	2	None	2-10' wide, <2% gradient, incised channel
BW-145	57.46	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Very small swale, connected to BW146
EE-12 (BSI-147) Trib. to Olalla Creek	57.84	Private	R4SB3C	Riverine F/T	12	Yes	Stream banks	4	Yes	3-12' (average 4') wide, incised. Banks to 5' high. Cobble/gravel
BDX-148 Irrigation Canal	57.97	Private	R4UB3Cx	N/A/Ditch	11	None	Stream banks	None	None	1' wide irrigation canal
BW-150	58.07	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Along edge of corridor, connects to BSI151
BSI-151 Trib. to Olalla Creek	58.20	Private	R4SB1C	Riverine F/T	11	Yes	Stream Banks	2	None	2-3' wide, <5% gradient, U-shaped channel
W4-02 (BW-158 (MOD))	58.42	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Low area receives hydrology from irrigation
BSP-159 Trib. to Olalla Creek	58.55	Private	R2SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Overflow channel of Olalla Creek, ends abruptly in a pool
BSP-155 Olalla Creek	58.78	Private	R2SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Olalla Creek; <5% gradient, 50' wide at TOB
BW-154	58.98	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	100' west of BDX153, similar to BW146
BDX-153 Ditch	59.02	Private	R4UB1Cx	N/A/Ditch	11	None	Ditch	None	None	2-4' wide, 2-3' deep ditch
BSI-132 Trib. to Olalla Creek	59.29	Private	R4UB1Cx	Riverine F/T	11	None	Stream Banks	2	None	Mostly <2% gradient, deeply incised, 2-8' wide
BW-130	59.56	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Small seep wetland at farm road cut and below
BSI-129 Trib. to Olalla Creek	59.65	Private	R4SB3C	Riverine F/T	12	Yes	Stream Banks	2	Yes	< 2% gradient, cobble/gravel, 6-12' wide, mostly dry
BW-127	59.93	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Seep-fed subtle swale, connects to BW126; heavily grazed
BW-126	60.01	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Swale-like wetland dominated by pennyroyal
NSP-14 Trib. to McNabb Creek	60.13	Private	R3SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Forested tributary to McNabb Creek

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
NSP-13 McNabb Creek	60.48	Private	R3SB1H	Riverine F/T	12	Yes	Stream Banks	4	Yes	McNabb Creek
<b>Klamath Mountains Ecoregion, South Umpqua Subbasin (HUC 17100302), Clarks Branch -South Umpqua River (HUC 171003021) 5th Level Watershed <sup>3</sup>, Douglas County, Oregon</b>										
BSI-241 Trib. to Kent Creek	63.95	Private	R4UB1J	Riverine F/T	12	Yes	Stream Banks and Riparian	2	None	Tributary to Kent Creek
BSP-240 Kent Creek	63.95	Private	R2UB1H	Riverine F/T	12	Yes	Stream Banks Banks and Riparian	4	Yes	Kent Creek
BSP-227 Rice Creek	65.76	Private	R3SB1H	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Rice Creek
BW-229	65.83	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Small, emergent wetland near road
BSI-230 Trib. to Willis Creek	66.87	Private	R4SB1J	Riverine F/T	11	None	Stream Banks	None	None	2' wide intermittent tributary to BSP-168
BSP-168 Willis Creek	66.95	Private	R3SB1C	Riverine F/T	12	Yes	Stream Banks	4	Yes	Willis Creek, 30-50' wide
BSI-169 Trib. to Willis Creek	67.00	Private	R4SB3J	Riverine F/T	11	Yes	Stream Banks	2	None	Intermittent tributary to Willis Creek, confluence at MP 65.45
WW-004-005	69.25	Private	PEM	Slope/Flats	11	None	Wetland	None	N/A	Seep fed wetland in floodplain of stream.
SS-004-004 (SS-100-012) Trib. to S. Umpqua	69.28	Private	R3UBF	Riverine F/T	12	Yes	Stream Banks and Riparian	4	Yes	Small perennial tributary
SS-004-005 (SS-100-013) Trib. to S. Umpqua	69.35	Private	R3UBF	Riverine F/T	1 or 12	Yes	Stream Banks	4	Yes	Small perennial tributary
SS-004-006 (SS-100-014) Trib. to S. Umpqua	69.57	Private	R4SBC	Riverine F/T	1 or 12	Yes	Stream Banks	2	No	2'to 3' foot wide headwater tributary
WW-005-002	71.08	Private	PEM	Slope/Flats	11	None	Wetland	None	N/A	Wetland on hillslope.
WW-501-009	71.18	Private	PEM	Slope/Flats	11	None	Wetland	None	N/A	Wetland on hillslope.
BSP-26 South Umpqua River	71.27	Private	R3OWH	Riverine F/T	Avoid by Direct Pipe Crossing	Avoid by Direct Pipe Crossing	Avoid by Direct Pipe Crossing	Avoid by Direct Pipe Crossing	Avoid by Direct Pipe Crossing	Major Perennial Waterbody
SS-005-007 Trib. to South Umpqua River	71.34	Private	R4	Riverine F/T	On edge of Proposed Roth Pipe Yard/ Can be avoided	On edge of Proposed Roth Pipe Yard/ Can be avoided	On edge of Proposed Roth Pipe Yard/ Can be avoided	On edge of Proposed Roth Pipe Yard/ Can be avoided	On edge of Proposed Roth Pipe Yard/ Can be avoided	Intermittent stream, obscured by blackberry thickets – If Yard is Used – this intermittent drainage would be
SS-005-008 (SS-100-016) Trib. to South Umpqua River	71.35 71.51	Private	R4UB1C	Riverine F/T	1 & 11	Yes	Stream banks and Riparian	2	Yes	Intermittent stream, passes through culvert on a road.
SS-005-009 (SS-100-019) Trib. to S. Umpqua	73.04	Private	R4SBA	Riverine F/T	1 & 12	Yes	Stream banks and Riparian	2	No	2'to 3' foot wide headwater tributary
SS-005-013 (SS-100-020) Trib. to S. Umpqua	73.51	Private	R4UB3Cx	Riverine F/T	1 or 11	Yes	Stream Banks	2	No	2'to 3' foot wide headwater tributary
SS-005-011 & 012 (SS-100-021) Trib. to S. Umpqua	73.56	Private	R4SBA	Riverine F/T	1 or 12	Yes	Stream Banks and Riparian	2	No	2'to 3' foot wide headwater tributary
WW-005-006	73.6	Private	PEM	Slope/Flats	11	None	Wetland	None	N/A	Wetland in mostly old channel with small PSS component. Narrow part transected by road
SS-005-010 Trib. to Richardson Creek	73.73	Private	R4	Riverine F/T	11	None	Stream Banks and Riparian	2	No	2'to 3' foot wide headwater tributary
<b>Klamath Mountains Ecoregion, South Umpqua Subbasin (HUC 17100302), Myrtle Creek (HUC 1710030210) 5th Level Watershed <sup>3</sup>, Douglas County, Oregon</b>										
EE-SS-9032 Rock Creek	75.33	Private	R4SBC	Riverine F/T	1 & 12	Yes	Stream Banks and Riparian	2	Yes	Rock Creek, perennial stream
EE-SS-9033 Trib to Rock Creek	75.34	Private	R4SBA	Riverine F/T	1 & 12	Yes	Stream Banks and Riparian	2	Yes	Perennial tributary to Rock Creek

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
BSP-1 Bilger Creek	76.38	Private	R3UB1C/PFOC	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	Bilger Creek
BW-2	76.69	Private	PEMC	Slope/Flats	12	None	Wetland	None	N/A	Wet meadow
BW-258	77.62	Private	PEMC	Slope/Flats	12	None	Wetland	1	N/A	Seep/spring fed wetland
BW-5	77.66	Private	PEMC	Slope/Flats	12	None	Wetland	None	N/A	Seep/spring fed wetland
BSP-6 Little Lick	77.71	Private	R3SB7/PSS1C	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	Little Lick Creek, heavily vegetated
BSI-8 Trib. to Little Lick Creek	77.93	Private	R3SB1H	Riverine F/T	1 or 11	None	Stream Banks	2	None	Tributary to Little Lick Creek
BSI-10 Trib. to Little Lick Creek	78.02	Private	R4SB3C	Riverine F/T	1 or 11	None	Stream Banks	2	None	Tributary to Little Lick Creek
W4-03 (BW-011 (MOD))	78.05	Private	PEMC	Slope/Flats	1 & 12	None	Wetland	None	N/A	Seep/spring fed wetland
NSP-37 North Myrtle Creek	79.12	Private	R3SB1H	Riverine F/T	1 & 12	Yes	Stream banks and riparian	4	Yes	Myrtle Creek
NSP-38 Trib. to North Myrtle Creek	79.15	Private	R3SB1H	Riverine F/T	1 & 12	Yes	Stream banks and riparian	4	Yes	Tributary to NSP37 (Myrtle Creek)
EE-SS-9038 Trib. to N. Myrtle Creek	79.17	Private	R3SB1H	Riverine F/T	1 & 12	Yes	Stream banks and riparian	2	Yes	Small intermittent tributary to NSP-37
EE-SS-9039 Trib. to N. Myrtle Creek	79.19	Private	R3SB1H	Riverine F/T	1 & 12	Yes	Stream banks and riparian	2	Yes	Small intermittent tributary to NSP-37
BSP-172 South Myrtle Creek	81.19	Private	R3OWH	Riverine F/T	1 & 12	Yes	Stream banks and riparian	4	Yes	South Myrtle Creek
BW-173	81.39	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Seasonal emergent wetland
BSP-259 Trib. to S. Myrtle Creek	81.38	Private	R3SB1H	Riverine F/T	1 & 12	Yes	Stream banks and riparian	4	None	Trib. to S. Myrtle Creek
SS-100-023 Trib. to S. Myrtle Creek	81.45	Private	R4SBA	Riverine F/T	1 & 12	Yes	Stream banks and riparian	2	N/A	Small intermittent drainage to BSP-172
EE-SS-9074 Trib. to S. Myrtle Creek	81.93	Private	R4SBA	Riverine F/T	1 & 12	Yes	Stream banks and riparian	2	Yes	Small intermittent drainage to BSP-172
<b>Klamath Mountains Ecoregion, South Umpqua Subbasin (HUC 17100302), Days Creek - South Umpqua River (HUC 1710030205) 5th Level Watershed<sup>3,4</sup>, Douglas County, Oregon</b>										
BSP-226 Wood Creek	84.17	Private	R3SBH	Riverine F/T	1 & 12	Yes	Stream banks and riparian	4	Yes	Wood Creek
EW-24	84.23	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Small wetland at base of slope between slope and roadbed
EW-25	84.23	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Unnamed tributary to Woods Creek with PEM features
EW-26	84.23	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Small, slightly depressional wetland at base of slope.
EE-SS-9040 Trib. to Wood Creek	85.38	Private	R4SBC	Riverine F/T	1 & 11	Yes	Stream banks and riparian	2	No	Seasonal tributary to Wood Creek
EE-SS-9041 Trib. to Wood Creek	85.69	Private	R4SBC	Riverine F/T	1 & 11	Yes	Stream banks and riparian	2	No	Seasonal tributary to Wood Creek
EE-SS-9042 Trib. to Wood Creek	85.71	Private	R3UBF	Riverine F/T	1 & 11	Yes	Stream banks and riparian	2	No	Perennial, semi-permanently flooded drainage to Wood Creek
EE-SS-9043 Trib. to Wood Creek	85.88	Private	R4SBA	Riverine F/T	1 & 11	Yes	Stream banks and riparian	2	No	8' wide intermittent stream
EE-SS-9044	86.07	Private	R4SBA	Riverine F/T	1 & 11	Yes	Stream banks and	2	No	16' wide intermittent stream

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
Trib. to Wood Creek							riparian			
BSI-236 Trib. to Fate Creek	88.20	Private	R4SB1J	Riverine F/T	11	None	Ditch Banks	2	N/A	Intermittent stream, flows into BW237
BW-239	88.22	Private	PEMC	Slope/Flats	11	None	Wetlands	None	N/A	Emergent wetland associated with BSI238
BSI-238 (MOD) Trib. to Fate Creek	88.23	Private	R4SB1J	Riverine F/T	11	Yes	Stream banks and riparian	2	Yes	Forested drainage along roadside
BSP-232 Fate Creek	88.48	Private	R3SB1H	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	Fate Creek, flows into Days Creek
BSP-233 Days Creek	88.60	Private	R3SB1H	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	Days Creek
<b>Cascades Ecoregion, South Umpqua Subbasin (HUC 17100302), Days Creek - South Umpqua River (HUC 1710030205) 5th Level Watershed <sup>3,4</sup>, Douglas County, Oregon</b>										
ASP-303 Saint John Creek	92.62	Private	R3RB2H	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	St. John's Creek
WW-504-012 (AW- 197 (MOD))	94.51	Private	PEMC	Slope/Flats	1 or 11	None	Wetland	None	N/A	Pennyroyal dominated seasonal wetland
WW-502-003 (AW- 201 (MOD))	94.65	Private	PEMC	Slope/Flats	1 or 11	None	Wetland	None	N/A	Grass dominated seasonal wetland
WW-GM-39	94.66	Private	PSS1C	Depressional	11	Yes	Wetland	None	N/A	Depressional wetland, broad-leaved deciduous, seasonally flooded. If Potential Yard area used, this wetland should be able to be avoided.
ASP-196 South Umpqua River	94.73	Private	R2OWH	Riverine F/T	12	Yes	Stream banks and riparian	4	Yes	S. Umpqua River, ~160' wide, 1% gradient
ASI-193 (ASI-191) Trib. to S. Umpqua River	94.85	Private	R4SB3C	Riverine F/T	11 or 12	Yes	Stream Banks	2	None	Tributary to S. Umpqua River, 5-10' wide, 5% gradient
WW-504-013 (AW- 194/AW-195 (MOD))	94.96	Private	PEMC	Slope/Flats	1 or 11	None	Wetland	None	N/A	Adjacent and similar to AW194, connects to ASI193
ASI-193 (ASI-191) Trib. to S. Umpqua River	95.03	Private	R4SB3C	Riverine F/T	11 or 12	Yes	Stream banks and riparian	2	N/A	Small intermittent stream
ASI-190 Trib. to S. Umpqua River	98.46	BLM - Roseburg District	R4SB1	Riverine F/T	13 <sup>13</sup>	Yes	Stream Banks	2	None	v-shaped ditch, 2-4' wide, 25-70% gradient
<b>Klamath Mountains Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed <sup>3</sup>, Douglas County, Oregon</b>										
WW-003-006 (CW-55)	103.90	Private	PEMC	Slope/Flats	13 <sup>13</sup>	None	Wetland	None	N/A	Swale-like depression south of centerline
<b>Cascades Ecoregion, South Umpqua Sub-basin (HUC 17100302), Upper Cow Creek (HUC 1710030206) Fifth field Watershed <sup>2</sup>, Douglas County, Oregon</b>										
CDX-50 Ditch (Beaver Creek)	105.41	Forest Service - Umpqua NF	R4UB3Cx	N/A/Ditch	17 <sup>13</sup>	None	Ditch	None	None	1-4' wide roadside ditch, 20% gradient; extends off-site
CDX-47 Roadside Ditch	108.08	Forest Service - Umpqua NF	R4UB3Cx	N/A/Ditch	17 <sup>13</sup>	None	Ditch	None	None	2' wide roadside ditch, 5-10% gradient; dissipates in forest
CDX-48 Roadside Ditch	108.40	Forest Service - Umpqua NF	R4UB3Cx	N/A/Ditch	17 <sup>13</sup>	None	Ditch	None	None	2' wide roadside ditch; 10% gradient
WW-111-001 (GW-14 (FS-HF-C))	109.15	Forest Service - Umpqua NF	PSS	Slope/Flats	17 <sup>13 and 13a</sup>	Yes <sup>13a and 13b</sup>	Wetland <sup>13a</sup>	4 <sup>13a</sup>	N/A	Seep wetland with shrubs, crosses road and continues on. USFS considers this wetland as a perennial stream.
WW-111-001	109.17	Forest Service - Umpqua NF	PSS	Slopes/Flats	17 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Wetland <sup>13a</sup>	None <sup>13a</sup>	N/A	Connects to GW-14. Seep wetland on USFS
GSI-16 (FS-HF-F) Trib. to East Fork Cow Creek	109.33	Forest Service - Umpqua NF	R4	Riverine F/T	17 <sup>13 and 13a</sup>	Yes <sup>13a</sup>	Stream and Riparian Reserve <sup>13a</sup>	2 <sup>13a</sup>	None	3' wide intermittent stream
GSI-16 (FS-HF-F) East Fork Cow Creek	109.47	Forest Service - Umpqua NF	R3UB1	Riverine F/T	17 <sup>13 and 13a</sup>	Yes <sup>13a and 13b</sup>	Stream and Riparian Reserve <sup>13a</sup>	4 <sup>13a</sup>	Yes	Cow Creek – 28' wide, broad, cobbles, boulders, 2' wide
WW-111-005 (GW-21 (FS-HF-H))	109.47	Forest Service - Umpqua NF	PEM/R3UB1	Riverine F/T	17 <sup>13 and 13a</sup>	None <sup>13a and 13b</sup>	Wetland <sup>13a</sup>	None <sup>13a</sup>	N/A	Emergent wetland seep, connects to GSP019
FS-HF-J	109.69	Forest Service -	R3UB1H	Riverine F/T	17 <sup>13 and 13a</sup>	Yes <sup>13a and 13b</sup>	Stream and Riparian	4 <sup>13a</sup>	Yes	Perennial stream on FS land, – Willow dominated

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
Trib. to East Fork Cow Creek		Umpqua NF					Reserve <sup>13a</sup>			wetland
FS-HF-K Trib. to East Fork Cow Creek	109.78	Forest Service - Umpqua NF	R3UB1H	Riverine F/T	17 <sup>13</sup> and 13a	Yes <sup>13a</sup> and 13b	Stream and Riparian Reserve <sup>13a</sup>	4 <sup>13a</sup>	Yes	Perennial stream on FS land, – Willow dominated wetland
<b>Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Trail Creek (HUC 1710030706) Fifth field Watershed<sup>2</sup>, Jackson County, Oregon</b>										
EW-69 Pond Trib. to W. Fork Trail Creek	110.57	Forest Service - Umpqua NF	PUB3C	Depressional	None	None	Disturbance to be avoided by project activities	None	None	1-2' deep pond in borrow pit.
ESI-68 Trib. to W. Fork Trail Creek	110.57	Forest Service - Umpqua NF	R4SB1H	Riverine F/T	None	None	Disturbance to be avoided by project activities	1	None	Ephemeral drainage from snowmelt, broad u- shaped cobble 1-2' wide.
<b>Cascades Ecoregion, South Umpqua Subbasin (HUC 17100302), Upper Cow Creek (HUC 1710030206) 5th Level Watershed<sup>3</sup>, Jackson County, Oregon</b>										
FS-HF-N (ESI-68) Trib. to East Fork Cow Creek	110.96	Forest Service – Umpqua NF	R4SB1H	Riverine F/T	17 <sup>13</sup>	Yes <sup>13b</sup>	Stream and Riparian Reserve	2	Yes	Ephemeral drainage, U-shaped, cobble 1-2' wide
<b>Klamath Mountains Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Trail Creek (HUC 1710030706) Fifth field Watershed<sup>2</sup>, Jackson County, Oregon</b>										
SS-100-032 Trib to West Fork Trail Creek	118.80	Private	R4SB1H	Riverine F/T						Small perennial tributary, 5' wide
ASP-202 West Fork Trail Creek	118.89	Private	R2SB1H	Riverine F/T	12	Yes	Stream banks and Riparian Areas	4	Yes	Trail Creek; 30-40' wide, 2-3% gradient
S1-06 (DA-16 (MOD)) Trib to Trail Creek	119.84	Private	R4SB1H	Riverine F/T	12	Yes	Stream banks and Riparian areas	2	No	1-2' wide intermittent drainage
NSP-11 Canyon Creek	120.45	BLM - Medford District	R4SB1H	Riverine F/T	15 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	4	Yes	Canyon Creek
AW-204	120.83	Private	PEMC	Slope/Flats	12	Yes	Wetland	None	N/A	Spikerush dominated emergent wetland near Canyon Creek
ASI-205 Trib. to Trail Creek	120.90	Private	R4UBC	Riverine F/T	4	None	Stream Banks	2	N/A	4-6' wide, U-shaped channel; 4-5% gradient
ASI-206 Trib. to Trail Creek	121.57	Private	R4UBC	Riverine F/T	4	None	Stream Banks	2	N/A	4-20' wide (average 8'), U-shaped channel; 3% gradient
<b>Klamath Mountains Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Shady Cove-Rogue River (HUC 1710030707) Fifth field Watershed<sup>2</sup>, Jackson County, Oregon</b>										
ASP-235 Rogue River	122.65	Private	R3UBH	Riverine F/T	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	Rogue River; ~50' wide, <2% gradient; cobble, gravel, sand; with bank
ASI-223 Trib. to Indian Creek	125.91	Private	R4UB1C	Riverine F/T	4	Yes	Stream banks and Riparian Reserves	2	None	Seasonal Creek, U-shaped channel, 2-4' wide.
ASI-222 Trib. to Indian Creek	125.98	Private	R4UB1C	Riverine F/T	4	Yes	Stream banks and Riparian Reserves	2	None	Seasonal Creek, U-shaped channel
RS-4 Trib. to Indian Creek	126.53	BLM - Medford District	R4UB1C	Riverine F/T	15 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	1-2' wide intermittent drainage
ASI-221 Trib. to Indian Creek	126.59	BLM - Medford District	R4UB1C	Riverine F/T	15 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Seasonal Creek, U-shaped channel, 4' wide, 6- 10% gradient
ADX-285	127.35	Private	R4UB3Cx	Riverine F/T	4	None	Ditch	None	None	Trap-shaped
ASP-307 Deer Creek	128.49	Private	R3SB1H	Riverine F/T	4 or 11	Yes (heavily grazed)	Stream Banks	4	Yes	40-50' wide perennial stream
AW-278 Indian Creek	128.61	Private	PEMC/R3UB3	Slope/Flats	11	Yes (heavily grazed)	Wetland and Stream Banks	2	Yes	Herb wetland/perennial stream; continues as AW- 308
ASP-310 Trib. to Indian Creek	128.68	Private	R3SB1H	Riverine F/T	11	None	Ditch	2	None	At eastern edge of AW309
AW-309 Trib. to Indian Creek	128.89	BLM - Medford District	PEM	Slope/Flats	15 <sup>13</sup>	Yes	Wetland/stream banks and Riparian Reserves	2	None	Forested wetland/stream

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
ASI-400 Trib. to Indian Creek	129.13	BLM - Medford District	R4	Riverine F/T	15 <sup>13</sup>	Yes	Stream banks and Riparian Reserves	2	None	Small headwater intermittent stream
ASI-277 Trib. to Indian Creek	129.46	Private	R4UB1C	Riverine F/T	4	None	Stream banks	2	None	Intermittent stream
<b>Klamath Mountains Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Big Butte Creek (HUC 1710030704) Fifth field Watershed <sup>2</sup>, Jackson County, Oregon</b>										
WW-201-003a (AW-245 (MOD))	130.81	Private	PSSC	Slope/Flats	12	Yes	Wetlands	None	N/A	Wetland with small stream running through middle separated from WW-201-003 by a culvert
SS-201-14b	130.83	Private	R4UB1C	Riverine F/T	12	Yes	Stream Banks and Riparian	2	None	Small stream running through middle of wetland.
WW-201-003b (AW-244 (MOD))	130.83	Private	PSSC	Riverine F/T	12	Yes	Wetland	2	None	Wetland with small stream running through middle
ASI-246 Trib. to Neil Creek	130.86	Private	R4UB1C/PEMC	Riverine F/T	4 or 11	None	Wetland/Stream Banks	2	None	Swale feature - culvert. Continues off site
WW-201-001 (AW-248 (MOD))	131.26	Private	PEMC	Slope/Flats	11	None	Wetland	None	None	Spring fed wetland on hillside. Slope 3-5%.
S2-02 (ADX-253 (MOD)) Irrigation Ditch	132.03	Private	R4UB3x	N/A/Ditch	11	None	Ditch	None	None	Irrigation ditch, U-shaped with two shallow deeper ditches running parallel
WW-502-002 (W2-02 (MOD))	132.08	Private	PEMA	Depressional	11	None	Wetland	None	N/A	Wetland on valley floor, potentially along previous alignment of Neil Creek.
ASP-252 Neil Creek	132.12	Private	R4SB1C	Riverine F/T	12	Yes	Stream Banks	4	Yes	Incised perennial stream used for irrigation. OHWM 3-5' wide, 1' deep.
WW-502-001	132.22	Private	PEM1C	Slope/Flats	11 or 12	None	Wetland	None	N/A	Wetland on hillside connects to W3-05
EDX-75 Ditch	132.26	Private	R4UB3x	N/A/Ditch	11 or 4	None	Ditch	None	None	Ditch
W3-05 (AW-243 (MOD))	132.33 132.47	Private	PEMC	Slope/Flats	11	None	Wetland	None	None	Bisected by two ditches, connected to AW242 across road
AW242	132.48	Private	PEMC	Slope/Flats	11	None	Wetland	None	None	Grazed wet meadow connected to ASP241
W5-01	132.54	Private	PEMC	Slope/Flats	11	None	Wetland	None	None	Emergent wetland
W5-02 (AW-242)	132.69	Private	PEMC	Slope/Flats	11	None	Wetland	None	None	Grazed wet meadow connected to ASP241
S5-01 (ASI-265) Trib. to Quartz Creek	132.75	Private	R4SB1C	Riverine F/T	12	None	Stream Banks	2	None	Seasonally flooded trib. to Quartz Creek, 2-3' wide.
S5-02 (AW-264) Quartz Creek	132.77	Private	R4SB1C/PFO	Riverine F/T	12	None	Stream Banks	2	None	Tributary to stream in AW264; U-shaped channel, ~1' wide; Quartz Creek
R5-02 (AW-264 (MOD))	132.77	Private	PFO	Riverine F/T	12	Yes	Wetland	4	None	Wetland with perennial stream running through it
AW-263	133.09	Private	PEMC	Slope/Flats	12	Yes	Wetland	None	None	Large, spring fed, slope wetland; continues off site
ASP-241 Trib. to Quartz Creek	133.35	BLM - Medford District	R3UB3H	Riverine F/T	16 <sup>13</sup>	Yes	Wetland and Riparian Reserves	2	None	Braided channels; at edge of corridor
ASP-240 Medford Aqueduct (Ditch 3)	133.38	BLM - Medford District	R3UB3x	Riverine F/T	None Avoided By Bore	None Avoided By Bore	None Avoided By Bore	None Avoided By Bore	None Avoided By Bore	Medford Aqueduct
R5-05 (AW-239)	133.92	Private	PSSC	Slope/Flats	12	Yes	Wetland	None	N/A	Scrub-shrub wetland dominated by spiraea and rose.
<b>Klamath Mountains Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708) Fifth field Watershed <sup>2</sup>, Jackson County, Oregon</b>										
ASI-207 Whiskey Creek	137.48	Private	R4UB3C	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Whiskey Creek; 4-6% gradient; 2' deep, U-shaped channel
ASI-208 Trib. to Lick Creek	138.26	Private	R4UB3C	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	10-12' wide, V-shaped channel; 6-8% gradient
SS-GM-9 Trib. to Lick Creek	138.36	Private	R4SB3	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Intermittent stream. 10' wide
SS-GM-10 Trib. to Lick Creek	138.44	Private	R3UB1	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Intermittent stream, 8' wide
ASI-210 Trib. to Lick Creek	138.45	Private	R4UB1C	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	6-10' wide, U-shaped channel; >10% gradient

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
SS-GM-11 Trib. to Lick Creek	138.55	Private	R4SB3	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Intermittent stream, 8-10' wide
ASI-211 Trib. to Lick Creek	138.71	Private	R4UB1C	Riverine F/T	11	None (Heavily grazed)	Stream banks	2	None	12-15' wide, U-shaped channel; 4-6% gradient
SS-GM-13 Trib. to Lick Creek	138.74	Private	R4SB7	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Intermittent stream, 8' wide, vegetated
SS-GM-14 Trib. to Lick Creek	139.07	Private	R4SBC	Riverine F/T	4 & 12	Yes	Stream Banks and Riparian	2	None	Intermittent stream, 8' wide, vegetated
WW-GW-33 (ASI-214)	139.15	Private	PEMC/R4UB1C	Riverine F/T	4 or 11	None (Heavily grazed)	Wetland	None	None	Tributary to Lick Creek with PEM features, seasonally flooded
WW-GM-37	139.17	Private	PEMA	Slope/Flats	4	None	Wetland	None	N/A	Emergent wetland, temporarily flooded.
AL-215 Stock Pond	139.17	Private	PUBYx	Depressional	11	None	Pond/banks	None	None	Small stock pond ~ 1' deep.
SS-GM-15 Trib. to Lick Creek	139.21	Private	R4SB1C	Riverine F/T	4	Yes	stream bank and Riparian	None	None	Intermittent stream, 10-12' wide, seasonally
SS-GM-16 Trib. to Lick Creek	139.28	Private	R4SB3	Riverine F/T	4	Yes	Stream Banks and Riparian	None	None	Intermittent stream 8-10' wide
ASI-217 Trib. to Lick Creek	139.42	Private	R4SB1C	Riverine F/T	4 or 11	Yes (Heavily grazed)	Stream Banks	2	None	10' wide, U-shaped channel; 5% gradient
ASI-226 Trib. to Lick Creek	139.59	Private	R4SB1C	Riverine F/T	4 or 11	None (Heavily grazed)	Stream Banks	2	None	Meandering creek, 1-2' wide, U-shaped channel; flows into AW225
ASI-227 Trib. to Lick Creek	139.63	Private	R4SB1C	Riverine F/T	4 or 11	None (Heavily grazed)	Stream Banks	2	None	Meandering creek, 1-2' wide, U-shaped channel; flows into AW225
ASI-228 Trib. to Lick Creek	139.68	Private	R4EMC	Riverine F/T	4 or 11	None (Heavily grazed)	Stream Banks	2	None	<0.5' deep, 1-2' wide poorly defined channel
SS-GM-43 (AW-230)	139.75	Private	PEMC	Slope/Flats	4 or 11	None (Heavily grazed)	Wetland	None	N/A	Swale feature, partially channelized
ASI-232 Trib. to Lick Creek	139.83	Private	R4SB1C	Riverine F/T	4 or 11	None (Heavily grazed)	Stream Banks	2	None	1-1.5' wide dry channel
ASI-233 Lick Creek	140.27	BLM - Medford District	R4SB1C	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	Lick Creek, 10-20' wide, U-shaped channel
ADX-234 Ditch	140.32	BLM - Medford District	R4SB1C	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Ditch Banks	None	None	3' wide at OHWM, V-shaped channel
ASI-189 Trib. to Lick Creek	140.58	Private	R4SB1	Riverine F/T	4 or 11	None (Heavily grazed)	Stream Banks	2	None	1-2' wide intermittent stream
ADX-186 Ditch	140.94	BLM - Medford District	R4SB1	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Ditched Drainage Banks	None	None	Rocky, intermittent stream
EW-77	141.01	Private	PEMC	Slope/Flats	11	None	Wetland if disturbed	None	None	Herbaceous wetland at base of Star Lake Reservoir
EW-78 (EW-82)	141.01	Private	PEMC	Slope/Flats	11	None	Wetland if disturbed	None	None	Herbaceous wetland at base of Star Lake Reservoir.
EW-76	141.01	Private	PEMC	Slope/Flats	11	None	Wetland if disturbed	None	None	Herbaceous wetland at base of Star Lake Reservoir
ASI-187 Trib. to Salt Creek	141.18	BLM - Medford District	R4SB1	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	1-2' wide intermittent stream with little vegetation
ASI-188 Trib. to Salt Creek	141.48	BLM - Medford District	R4SB1	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	3-4' average width, U-shaped channel, 8% gradient
RS-17 Trib. to Salt Creek	141.49	BLM - Medford District	R4SB3C	Riverine F/T	15 or 16 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	1-2' wide intermittent drainage

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
ESI-30 Trib. to Salt Creek	141.95	Private	R4SB1	Riverine F/T	4	Yes	Stream Banks	2	None	3' wide intermittent stream, trap-shaped, cobble substrate; QUsP, TODI, CAQU
EDX-32 Ditch	142.28	Private	R4SB3Cx	Riverine F/T	11	None	Ditch Banks	None	None	Pasture stream, likely excavated
ESI-31 Ditch	142.32 142.35	Private	R4SB3Cx	Riverine F/T	11	None	Ditch Banks	2	None	3' wide, trap-shaped, intermittent stream; cobble substrate, JUEF
EW-33	142.45	Private	PEMC	Slope/Flats	11	None	Ditch Banks	None	None	Large PEM complex, associated with floodplain of Salt Creek
EW-35	142.61	Private	PEMC	Slope/Flats	11	None	Ditch Banks	None	None	Large PEM complex, associated with floodplain of Salt Creek
ESP-34 Salt Creek	142.57	Private	R3SB3H	Riverine F/T	12	Yes	Stream banks and Riparian Areas	2	Yes	Salt Creek, flows through NW3
EDX-36 Ditch	142.65	Private	R4SB3Cx	N/A/Ditch	11	None	Ditch Banks	None	None	Pasture Ditch
ESI-37 Trib. to Salt Creek	143.12	Private	R4SB3C	Riverine F/T	4	Yes	Stream Banks	2	None	4' wide, U-shaped, cobble substrate; QUsP, Ceanothus sp, upland grasses
ESI-38 Trib. to Long Branch Creek	143.51	Private	R4SB3C	Riverine F/T	4	Yes	Stream Banks	2	None	2' wide, V-shaped, cobble/silt substrate, no veg in channel
ESI-39 Trib. to Long Branch Creek	143.74	Private	R4SB3C	Riverine F/T	4	None (Heavily grazed)	Stream Banks	2	None	Tributary/irrigation ditch
ESI-40 Trib. to Long Branch Creek	143.77	Private	R4SB3C	Riverine F/T	4	None (Heavily grazed)	Stream Banks	2	None	Tributary/irrigation ditch to stock pond
ESI-38 Trib. to Long Branch Creek	144.11	Private	R4SB3C	Riverine F/T	4	Yes	Stream Banks and Riparian	2	None	2' wide, V-shaped, cobble/silt substrate, no veg in channel
EDX-42	144.14	Private	R4UBx	N/A/Ditch	4 or 11	None	Ditch Banks	None	None	Irrigation ditch
GSP-5 (ESP-48) Trib. to S. Fork Long Branch	144.70	Private	R4	Riverine F/T	11	Yes	Stream Banks and Riparian	4	Yes	3' wide extension of ESI048 intermittent drainage
GSI-6 (ESP-59) South Fork Long Branch	145.27	Private	R4SBC	Riverine F/T	11	Yes	Stream Banks	2	Yes	3' wide extension of ESI048
NDX-107 Irrigation Ditch	145.32	Private	R4UBx	N/A/Ditch	11	None	Ditch Banks	None	None	Near possible vernal pool complex
NDX-56 Irrigation Ditch	145.37	Private	R4UBx	N/A/Ditch	2, 4 or 11	None	Ditch Banks	None	None	Ditch
ESI-61 Trib. to S. Fork Long Branch	145.54	Private	R4SBC	Riverine F/T	11	Yes	Stream Banks and Riparian	2	None	1' wide, U-shaped, cobble substrate; RUDI, FRLA, pasture veg
EW-63	145.55	Private	PEMC/PSSC	Slope/Flats	12	Yes	Wetland	None	N/A	Emergent wetland associated with ESI061
EDX-64 Irrigation Ditch	145.57	Private	R4UBx	N/A/Ditch	11	None	Ditch Banks	None	None	Linear, 2' wide ditch along Highway 140, V-shaped; CANE, DIFU
EW-67	145.63	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Emergent wetland, associated with surround ditches
ESP-66 North Fork Little Butte Creek	145.69	Private	R3SB3H	Riverine F/T	12	Yes	Stream Banks	4	Yes	North Fork Little Butte Creek
ESI-56 Trib. to N. Fork Little Butte Creek	146.05	Private	R4SBC	Riverine F/T	4	Yes	Stream Banks	2	None	4' wide, U-shaped, cobble substrate; QUsP, water control structure
ESI-55 Trib. to N. Fork Little	146.38	Private	R4SBC	Riverine F/T	4	Yes	Stream Banks	2	None	Connected to EW054; 2' wide, U-shaped, cobble substrate; RUDI, TODI, QUGA



Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
Butte Creek										
EDX-51 Irrigation Ditch	146.80	Private	R4UBx	N/A/Ditch	4 or 11	None	Canal Banks	None	None	6' wide irrigation canal along road
<b>Cascades Ecoregion, Upper Rogue Sub-basin (HUC 17100307), Little Butte Creek (HUC 1710030708) Fifth field Watershed<sup>2,3</sup>, Jackson County, Oregon</b>										
ASP-165 South Fork Little Butte Creek	162.45	Forest Service - Rogue River-Shady Cove NF	R3SB1H	Riverine F/T	17 <sup>13</sup> and 13a	Yes <sup>13a</sup> and 13b	Stream Banks and Riparian Reserves	4 <sup>13a</sup>	Yes	2-30' wide, U-shaped, 1% gradient, braided channels
ESI-76 (ESI-84) Daley Creek	166.21	Forest Service - Rogue River-Shady Cove NF	R4UBC	Riverine F/T	17 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	Yes	30-40' wide braided channel, cobble/gravel substrate, trib. to Daley Creek.
<b>Eastern Cascades Slopes and Foothills Ecoregion, Upper Klamath River Sub-basin (HUC 18010206), Spencer Creek (HUC 1801020601) Fifth field Watershed<sup>2,3</sup>, Klamath County, Oregon</b>										
WW-001-013 (EW-85)	171.06	Forest Service - Fremont-Winema NF	PFO/PSS	Slope/Flats	17 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	Yes	Wetland swale, culverted under road
GSP-7 Trib to Spencer Creek	171.57	Forest Service - Fremont - Winema NF/Private	R3SBC	Riverine F/T	17 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	2' wide stream that fans out into a wetland/stream complex
ESI106a Trib. to Spencer Creek	173.74	Forest Service - Fremont-Winema NF	R4SB2	Riverine F/T	17 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	4' wide, snowmelt ephemeral stream
ESI-69 Trib. to Spencer Creek	176.54	BLM - Lakeview District	R4SB2	Riverine F/T	17 <sup>13</sup>	Yes	Stream Banks and Riparian Reserves	2	None	1' wide intermittent, shrubbed stream 4' wide, 2' deep
SS-502-EW-103 Clover Creek	177.76	Private	R4SB2/PEMC/PSSC	Riverine F/T	12	Yes	Wetland and stream banks and Riparian Aeras	2	None	2' wide stream with associated wetland. Extension of EW103
WW-502-EW-103 (EW-103 (MOD))	177.76	Private	PEMC/PSSC	Riverine F/T	12	Yes	Wetland and stream banks and Riparian Aeras	2	None	Seep wetland
GSI-11 Clover Creek	177.76	Private	R4SB2	Riverine F/T	12	Yes	Wetland and stream banks and Riparian Aeras	2	None	Intermittent stream, 7-8' wide
<b>Eastern Cascades Slopes and Foothills Ecoregion, Upper Klamath R. Sub-basin (HUC 18010206), John C Boyle Reservoir-Klamath River (HUC 1801020602) Fifth field Watershed<sup>2</sup>, Klamath County, Oregon</b>										
ESI-97 Trib. to Klamath River	186.61	Private	R4SB2C	Riverine F/T	10	None	Stream Banks	None	None	Boulders, cobbles 2-5' wide, <1' deep
ESI-99 Trib. to Klamath River	186.65	Private	R4SB2C	Riverine F/T	10	None	Stream Banks	None	None	Small intermittent stream 3' wide, feeds pond
ESI-100 Trib. to Klamath River	186.74	Private	R4SB2C	Riverine F/T	10	None	Stream Banks	None	None	Small intermittent stream 2' wide, feeds pond
<b>Eastern Cascades Slopes and Foothills Ecoregion, Lost River Sub-basin (HUC 18010204), Lake Ewauna-Klamath River (HUC 1801020412) Fifth field Watershed<sup>2</sup>, Klamath County, Oregon</b>										
SS-001-001 (SS-100-025) Trib. to Klamath River	188.90	Private	R4EM2	Riverine F/T	6	Yes	Stream Banks and Riparian	2	None	Main channel (ave 4' wide) & side channel (ave 3')
W2-03	191.47	Private	PEMC	Depressional	10	None	Ditch Banks	None	None	Wetland in roadside ditch.
W2-06	192.20	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Wetland edged by man-made dike at north boundary.
S2-07 (ADX-63 (MOD)) Irrigation Ditch	192.67	Private	R4UB3Cx	N/A/Ditch	8	None	Canal Banks	None	None	Irrigation ditch in pasture
AW-65	192.71	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	None	Irrigated pasture wetland
AW-66	192.86	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	None	Irrigated pasture wetland
NW-71	192.89	Private	PEMC	Slope/Flats	11 or 3	None	Canal Banks (Not expected to be disturbed by dewatering activities)	None	None	Irrigated pasture wetland, continues off-site to the south
ADX-67 Ditch	192.99	Private	R4UB3Cx	N/A/Ditch	8	None	Canal Banks	None	None	12' average width, <1% gradient, u-shaped ditch
AW-68	193.03	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Pasture wetland within harvested hayfield

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
ADX-69 Ditch	193.07	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	12' average width, <1% gradient, trapezoidal ditch
AW-71	193.17	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	None	Slight depression in alfalfa field, similar to AW70
WW-504-014 (NW-72)	193.21	Private	PEMC	Slope/Flats	11 or 3	None	Wetland (Not expected to be disturbed by dewatering activities)	None	N/A	Irrigated pasture wetland, continues off-site to the south
AW-70	193.21	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Pasture wetland within harvested hayfield
WW-504-001 (NW-74)	193.51	Private	PEMC	Slope/Flats	11 or 3	None	Wetland (Not expected to be disturbed by dewatering activities)	None	None	Irrigated pasture wetland, continues off-site to the south
AW-74	194.44	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Pasture wetland within harvested hayfield
ADX-75 Ditch	194.51	Private	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	<1% gradient, u-shaped ditch
ADX-77 Ditch	194.57	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Irrigation ditch, u-shaped ditch
WW-001-008 (AW-76)	194.57	Private	PEMC	Slope/Flats	10 or 3	None	Wetland	None	N/A	Pasture wetland adjacent to canal
WW-504-015 (NW-76) & NDX-77	194.57	Private	PEM/R4UB3x	N/A/Ditch	11 or 3	None	Wetland (Not expected to be disturbed by dewatering activities)	None	N/A	Irrigated pasture wetland, continues off-site to the south
WW-001-010 (ADX-78)	194.64	Private	PEM	Slope Flats	11	None	Canal Banks	None	None	Trapezoidal irrigation ditch with emergent wetland fringe
WW-001-010 (ADX-78) Irrigation Ditch	194.64	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Trapezoidal, <1% gradient irrigation ditch
NDX-80	194.88	Private	PEM/R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks (Not expected to be disturbed by dewatering activities)	None	None	Irrigation ditch with wetland
ADX-81	194.92	Private	PEM/R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	<1% gradient, u-shaped drainage ditch, wetland
WW-502-AW-82 (AW- 82 (MOD))	194.92	Private	PEMC	Slope/Flats	11 or 3	None	Wetland (Not expected to be disturbed by dewatering activities)	None	N/A	Large wetland swale within hayfield
AW-85	195.14	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Wetland in hayfield, associated with adjacent ditch
AW-88	195.34	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Wetland within hayfield
AW-21	195.45	Private	PEM/R4UB2x	N/A/Ditch	11 or 3	None	Wetland	None	N/A	Hydric portion of ditch dug through hydric soils
ADX-19 Ditch	195.46	Private	R4UB2x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	8' wide, 3' deep ditch
GDX-4 Ditch	195.67	Private	R4	N/A/Ditch	11 or 3	None	Wetland	None	N/A	5' wide ditch with pasture grasses
GDX-3 Ditch	195.70 195.73	Private	R4	N/A/Ditch	11 or 3	None	Wetland	None	N/A	Connected to GDX001
GDX-1 Ditch	195.80	Private	PEMA/R4	N/A/Ditch	11 or 3	None	Wetland	None	N/A	7-8' wide ditch with pasture grass
GDX-2 Ditch	195.91	Private	R4	N/A/Ditch	11 or 3	None	Wetland	None	N/A	3-10' wide irrigation ditch
ADX-30 Irrigation Ditch	196.53	Private	R4UB2x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Irrigation ditch
WW-GM-29	196.62	Private	PEMA	Slope/Flats	11 or 3	None	Wetland	None	N/A	Irrigated pasture wetland, temporarily flooded
ADX-32 Irrigation Canal	196.64	Private	R4UB2x	N/A/Ditch	8	None	Canal Banks	None	None	Large irrigation channel

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
WW-GM-28	196.70	Private	PEMA	Slope/Flats	11 or 3	None	Wetland	None	N/A	Irrigated pasture wetland, temporarily flooded
ADX-36 Irrigation Ditch	196.76	Private	R4UB2x	N/A/Ditch	11 or 3	None	Ditch Banks	None	None	Narrow irrigation ditch
ADX-38 Irrigation Ditch	196.78	Private	R4SBFx	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Irrigation ditch
AW-37	196.79	Private	PEMAx	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Wet ditch
NW-91	196.82	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Irrigated pasture wetland
DX-GM-7	196.88	Private	PEMKx	N/A/Ditch	11	None	Canal Banks	None	None	Wet ditch, excavated and artificially flooded.
ADX-39 Irrigation Ditch	196.89	Private	R4SBFx	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Irrigation ditch, connected to ADX38; 2' deep
WW-GM-27	196.94	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	N/A	Irrigated pasture wetland
ADX-40 Irrigation Ditch	197.08	Private	R4SB	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Irrigation ditch
DX-GM-6	197.10	Private	PEMKx	N/A/Ditch	10 or 3	None	Canal Banks	None	None	Wet ditch, excavated and artificially flooded
DX-GM-5	197.17	Private	PEMKx	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Wet ditch, excavated and artificially flooded
DX-GM-3	197.28	Private	PEMKx	N/A/Ditch	11 or 3	None	Canal Banks	None	None	Wet ditch, excavated and artificially flooded
WW-GM-23 (AW-43)	197.80	Private	PEMC	Slope/Flats	11 or 3	None	Wetland	None	None	Irrigated pasture wetland
ASP-151 Klamath River	199.38	State	L1UBHh	Riverine F/T	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	Klamath River/large irrigation channel
AW-152	199.49	Private	PEM/R4UB3x	N/A/Ditch	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	Wet ditch, excavated and artificially flooded.
WW-001-004 (AW-154)	199.54	Private	PEMC	Slope/Flats	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	Emergent wetland seasonally flooded.
WW-001-005 AW-155)	199.55	Private	PEMC	Slope/Flats	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	None Avoided By HDD	Emergent wetland seasonally flooded.
WW-001-006 (AW-156)	199.59	Private	PEMC/R4UB3x	N/A/Ditch	11	None	Wetland	None	N/A	HDD Crossing for Klamath River. Similar to AW155, on east side of Highway 97
AW-157	199.59	Private	PEMC/R4UB3x	N/A/Ditch	11	None	Wetland	None	N/A	Wet ditch associated with AW159
AW-158	199.60	Private	PEMC/R4UB3x	N/A/Ditch	11	None	Wetland	None	N/A	Wet ditch associated with AW159
AW-160	199.77	Private	PEMC/R4UB3x	N/A/Ditch	11	None	Wetland	None	N/A	Wet ditch associated with AW159
WW-GM-36	199.78	Private	PEMC/R4UB3x/PSS	Slope/Flats	11	None	Wetland	None	N/A	Emergent wetland, seasonally flooded.
WW-001-003 (AW-312)	200.03	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Emergent wetland, seasonally flooded.
AW-255	200.06	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Irrigated livestock pasture surrounded by lg. Irrigation ditch
ADX-294 Irrigation Canal (No. 1 Drain)	200.54	BOR	R2UB3Hy	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Trap-shaped canal
AW-93	201.39	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Irrigated hay field wetland
ADX-94 Irrigation Ditch	201.49	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Trapezoidal drainage ditch, <1% gradient
WW-001-002 (AW-95)	201.51	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Irrigated hay field wetland, similar to AW93
ADX-96 Irrigation Ditch (C-4-E Lateral)	201.63	BOR	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	16' average width, u-shaped ditch, <1% gradient

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
WW-GM-35 (AW-98)	203.94	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Depressional wetland adjacent to ditch (ADX99)
ADX-99 Roadside Ditch	203.97	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Ditch along County Highway 888
ADX-100 Irrigation Canal (C-4 Lateral)	204.12	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	20' average width, trapezoidal ditch, <1% gradient
ADX-101 Irrigation Canal (C-4-F Lateral)	204.33	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	15' average width, trapezoidal ditch, <1% gradient
ADX-105 Ditch No. 3 Drain	204.74	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	20' average width, trapezoidal ditch, <1% gradient
ADX-106 Irrigation Canal	204.91	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	3' average width, u-shaped ditch, <1% gradient
AW-108	205.11	Private	PEMC	Slope/Flats	11	None	Wetland	None	N/A	Irrigated pasture
ADX-109 Ditch (C-4-C Lateral)	205.50	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	20' average width, u-shaped ditch, <1% gradient
<b>Eastern Cascades Slopes and Foothills Ecoregion, Lost River Sub-basin (HUC 18010204), Mills Creek-Lost River (HUC 1801020409) Fifth field Watershed<sup>2</sup>, Klamath County, Oregon</b>										
ADX-110 Ditch	205.94	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	Maintained drainage ditch, 2-4' wide, 1-2" deep
ADX-111 Canal (C Canal)	205.96	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	25-30' wide canal adjacent to ADX110 and 112
ADX-112 Wetland Ditch	205.97	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	Wet ditch, may be jurisdictional
ADX-113 Irrigation Ditch (D-2 Lateral)	206.51	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	12' wide irrigation ditch connects to ADX111
AW-114	207.12	Private	PEM/R4UB3x	Slope/Flats	8 or 10	None	Canal Banks	None	None	Wet portion of drainage ditch
ADX-115 Roadside Drainage Ditch (5-A Drain)	207.26	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Roadside drainage ditch, ~20' wide
ADX-116 Irrigation Lateral (C-4-7 Lateral)	207.40	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Mostly unvegetated drainage ditch adjacent to ADX117
ADX-117 Irrigation Drain 5-A Drain	207.42	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Adjacent to ADX116, eastern 50' contains wetland species
ADX-118 Irrigation Drain (5-A Drain)	207.60	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	30' wide drainage ditch with steep banks.
ADX-119 Irrigation Drain (5-A Drain)	207.99	BOR	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	30' wide drainage ditch with no vegetation on banks
ADX-120 Irrigation Ditch	208.07	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	2' wide irrigation ditch
ADX-121 Irrigation Ditch	208.07	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Associated with AW122
ADX-123 Drainage Ditch Irrigation Drain (5-A Drain)	208.18	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	Deep drainage ditch with reed canary grass
ADX-124 Ditch	208.23	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	3-5' wide ditch, 1' deep water with little vegetation
ADX-125 Irrigation Ditch	208.28	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	2' wide irrigation ditch, 8" deep water with little vegetation
ADX-126	208.29	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	2-2.5' wide irrigation ditch

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
Irrigation Ditch										
ADX-128 Roadside Drainage Ditch	208.78	Private	R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Roadside drainage ditch with little vegetation
AW-127	208.79	Private	PEM/R4UB3x	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Roadside drainage ditch with wetland characteristics
ADX-129 Roadside Drainage Ditch	208.85	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Roadside ditch, trapezoidal, <2% gradient, 10-12' wide
ADX-130 Irrigation Drain 5-K Drain	209.02	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	20' wide drainage ditch with no vegetation, 2' water
ADX-131 Roadside Drainage Ditch	209.05	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	1-2' wide roadside drainage ditch
ADX-133 Irrigation	209.15	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	1-2' wide ditch with wetland species
ADX-134 Irrigation Ditch C-9 Lateral	209.15	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	10-12' wide irrigation lateral drainage
ADX-135 Irrigation Ditch	209.16	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	15' wide irrigation lateral drainage, 2-3' deep water
ADX-142 Roadside Ditch	210.16	Private	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	Roadside ditch, connects to other waters, 9-10' wide
SS-003-001 (ADX-143) Irrigation Ditch (No. 5 Drain) (Trib. to Lost River)	210.26	BOR	R4UB3x	N/A/Ditch	8	None	Canal Banks	None	None	Deep, steep sided ditch, 35' wide at top of bank
ADX-260 Irrigation Ditch 5-H Drain (Trib. to Lost River)	210.85	BOR	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	U-shaped irrigation ditch 2-5' deep, 2' wide
ADX-261 Irrigation Ditch	210.87	Private	R4UB3x	N/A/Ditch	8 or 11	None	Canal Banks	None	None	U-shaped irrigation ditch 2-5' deep, 2' wide
WW-003-002	211.19	Private	PEMC	Slope/Flats	8 or 11	None	Canal Banks	None	None	Seasonally flooded wetland.
WW-003-001	211.20	Private	PEMC	Slope/Flats	8 or 11	None	Canal Banks	None	None	Wetland located in lowest part of ditch that runs along south side of private drive.
SS-003-002 (NDX-29) Ditch	211.32	Private	R4UB3Cx	N/A/Ditch	8	None	Canal Banks	None	None	Seasonally flooded ditch
NDX-92 Ditch	211.52	Private	R4UB3Cx	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Seasonally flooded ditch
SS-003-004 (NDX-93) Irrigation Ditch	211.53 211.68	Private	R4UB3Cx	N/A/Ditch	8 or 11	None	Canal Banks	None	None	Irrigation ditch
WW-003-003 (EDX-1)	211.67 211.97	Private	R4UB3Cx\PEMC	Slope/Flats	8 or 11	None	Canal Banks	None	None	Wetland ditch along north side of Cemetery Road. Eventually connects with Lost River via culverts and a ditch
SS-003-005 (NSP-1) Lost River	212.07	State	R3UBH	Riverine F/T	8 1011	Yes	Stream Banks	2	Yes	Lost River
WW-001-001 (EW-86)	212.51	Private	PEMC	Slope/Flats	10	None	Wetland	None	N/A	Emergent wetland associated with Lost River
WW-001-001 (EW-87)	212.54	Private	PEMC	Slope/Flats	10	None	Wetland	None	N/A	Emergent wetland associated with Lost River
ADX-318 EDX055/EDX-90	213.23	Private	R4UB3Cx	N/A/Ditch	8 or 10	None	Canal Banks	None	None	10' wide at TOB, 4' at OHWM, V-shaped ditch

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
Irrigation Ditch										
ADX 318 Irrigation Ditch	213.45	Private	R4UB3Cx	N/A/Ditch	8	None	Canal Banks	None	None	10' wide at TOB, 4' at OHWM, V-shaped ditch
ADX-274 Irrigation Ditch	213.85	Private	R4UB3Cx	N/A/Ditch	8 or 10	None	Canal Banks	None	None	Ag. Ditch/canal dominated by Lemna sp.
ADX-275 G Canal	213.87	BOR	R4UB3Cx	N/A/Ditch	8	None	Canal Banks	None	None	Ag. Canal dominated by Typha latifolia, Alisma sp.
ASI-51 Unnamed Creek	216.10	Private	PEMA	Riverine F/T	7 or 11	None	Stream Banks	None	None	6' wide, 2-3% gradient, 1-2" flowing water, 2-3" deep pools
ASI-50 Unnamed Creek	216.30	Private	R4SBC	Riverine F/T	7 or 11	None	Stream Banks	None	None	Seep/stream with v-shape in northern portion, some wetland
ASI-49 Unnamed Creek	216.44	Private	R4SBC	Riverine F/T	7 or 11	None	Stream Banks	None	None	1-6' wide seep/stream; originates upslope of road off-site
ASI-136 Trib. to D Canal	218.09	Private	R4SB1x	Riverine F/T	7 or 11	None	Stream Banks	None	None	4-25' wide ephemeral stream
ASI-137 Trib. to D Canal	218.46	Private	R4SB1x	Riverine F/T	7	None	Stream Banks	None	None	1-8' (Ave 3') wide ephemeral stream
AW-292	219.69	Private	PEM/R4UB3C	Riverine/FT	10	None	Wetland	None	None	Herb wetland
ASI-291 Trib. to D Canal	219.69	Private	R4UB3C	Riverine F/T	7	None	Stream Banks	None	None	Intermittent stream
SS-502-12	220.72	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 1.5-8 foot wide OHW, 2% slope, stable banks
SS-502.013 & b	221.15	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 2-4 foot wide OHW, 8% slope, stable banks
SS-502-014	221.30	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 4-8 foot wide OHW, 12% slope, stable banks
SS-502-016	221.72	Private	R4SB1	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 3-5 foot wide OHW, 7% slope, stable banks
SS-502-003a & 3b	222.80	Private	R4SB1 & R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 2-3 foot wide OHW, 4% slope, stable banks
SS-502-004	222.99	Private	R4SB1	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 5-6 foot wide OHW, 3% slope, stable banks
SS-502-005	223.08	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 7 foot wide OHW, 3% slope, stable banks
SS-502-006	223.12	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 5-8 foot wide OHW, 5% slope, stable banks
SS-502-023	223.39	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 4-6 foot wide OHW, 5% slope, stable banks, channel dissipates in meadow south of the ROW
SS-502-011	223.54	Private	R4SB1	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 10-15 foot wide OHW, 8% slope, stable banks
SS-502-009a	224.03	Private	R4SB1	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 3-6 foot wide OHW, 8% slope, some banks with nearly 1:1 slopes that show evidence of erosion
SS-502-009	224.04	Private	R4SB1	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 3-6 foot wide OHW, 8% slope, some banks with nearly 1:1 slopes that show evidence of erosion
SS-502-008	224.17	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 4-10 foot wide OHW, 8% slope, stable banks
SS-502-007	224.21	Private	R4SB2	Riverine F/T	7	None	Wetland	None	None	Ephemeral stream, 4-6 foot wide OHW, 5% slope, stable banks
SS-502-021	224.44	Private	R4SB2	Riverine F/T	7 or 11	None	Wetland	None	None	Ephemeral stream, 3-6 foot wide OHW, 4% slope, stable banks
SS-502-025 (ASI-140 Trib. to V Canal)	225.96	Private	R4SB1	Riverine F/T	7	Yes	Stream Banks	None	None	Ephemeral stream, 12-15 foot wide OHW, 5% slope, deeply entrenched channel, recent erosion and deposition evident
SS-502-024	225.99	Private	R4SB1	Riverine F/T	7	Yes	Stream Banks	None	None	Ephemeral stream, 3-10 foot wide OHW, 2-3%

Wetland ID <sup>1</sup> (Waterbody <sup>2</sup> )	Milepost	Jurisdiction	Cowardin Classification	Dominant Oregon HGM	Recommended Wetland Seed Mixture <sup>7</sup>	Woody Species Plantings <sup>8</sup>	Planting Locations <sup>9</sup>	Large Woody Debris Placement <sup>10</sup>	Streambed Gravel <sup>11</sup>	Wetland Description <sup>12</sup>
										slope, stable banks
SS-502-020	227.14	Private	R4SB1	Riverine F/T	7	Yes	Stream Banks	None	None	Ephemeral stream, 3-5 foot wide OHW, 11% slope, bed and banks somewhat unstable, deeply incised
SS-502-017	227.57	Private	R4SB1	Riverine F/T	7	Yes	Stream Banks	None	None	Ephemeral stream, 2-4 foot wide OHW, 5% slope, stable banks, a few dormant side channels

<sup>1</sup> Ecology and Environment. 2017. Pacific Connector Gas Pipeline Updated Wetland Delineation Report. September 2017. National Hydrography Dataset, Jones and Stokes Field Surveys from 2006, 2007, and 2009, StreamNet, LIDAR photo interpretation, and consultation with BLM and Forest Service

<sup>2</sup> National Hydrography Framework Clearinghouse Database, Jones and Stokes and E&E Field Surveys

<sup>3</sup> USGS Hydrologic Unit Codes.

<sup>4</sup> Key Watershed

<sup>5</sup> Kentucky Project Compensatory Mitigation Site for JCEP and PCGP.

<sup>6</sup> Mitigation/rehabilitation/restoration measures are as specified in the Compensatory Mitigation Plan provided in Attachment J to Part 2 of JCEP's Joint Permit Application.

<sup>7</sup> The Environmental Inspector may substitute appropriate seed mixtures based on site specific conditions to benefit restoration efforts/success and the intent of these mixtures. The landowner may specify alternate seed mixtures.

<sup>8</sup> See Table 2-3 for the suggested woody species plantings based on site moisture regime. Species to be planted will be determined at the time of planting based on site specific conditions and available planting locations. Some sites may require land owner approval.

<sup>9</sup> Planting location for seed mixtures and woody species. Upland Riparian Areas seeding will be as specified in the Erosion Control and Revegetation Plan (see Appendix B.1 to Attachment A). Planting locations of woody species will be coordinated with landowners based on existing land use conditions (i.e., agricultural areas).

<sup>10</sup> Placement of in-stream/riparian zone LWD will occur during the crossing when the flume or dam and pump is in place as specified in the PCGP LWD Plan (see Attachment F). The configuration and number of LWD will be dependent on available placement opportunities, landowner agreements and determined by the EI. LWD will consist of conifers (preferably cedar) with root wads attached, and the size will be appropriate for the stream. A typical drawing of LWD placement is provided in Attachment F. Proposed schedule for applying LWD to different waterbody types, subject to landowner approval:

- 4 pieces for each perennial stream crossed with riparian forest removed (2 pieces instream, 2 pieces within riparian zone on the bank);
- 2 pieces for each intermittent stream and unknown stream crossed with riparian forest removed (one or both pieces placed instream or on bank);
- 2 pieces for each perennial, intermittent, and unknown stream crossed but with no riparian forest removed (one or both pieces placed instream or on bank).
- 1 piece each for perennial, intermittent, and unknown stream not crossed but adjacent to ROW with or without riparian forest removed (piece placed on bank).
- LWD would not be placed on Trenchless HDD or bored crossings. Or waterbodies located in agricultural systems.

LWD Placement/configuration according to the Stream Crossing Risk Analysis Addendum (Appendix O.2 to Attachment C will supersede the LWD plan on Streams where LWD BMPs are specified).

<sup>11</sup> The top 12-inches of the trench will be backfilled with clean spawning gravel in fish bearing streams where gravel, cobble or existing rock substrates are present. Gravel may be utilized during trench backfilling at other stream crossings, as determined by the EI to minimize turbidity or to enhance habitat based on site-specific conditions. In some areas such as ditches erosion gravel or erosion control fabric may be installed, where necessary, as determined by the EI, to minimize erosion potentials. Where gravel, cobble or existing rock substrates are not present, the native streambed materials will be utilized for backfill.

<sup>12</sup> Jones and Stokes and Ecology and Environment survey description of wetland and waterbody.

<sup>13</sup> The BLM and Forest Service will approve seed mixtures on their specific districts or forests.

<sup>13a</sup> The restoration measures outlined in the BLM and Forest Services Technical Memorandum Site-Specific Stream Crossing Procedures Perennial Streams on BLM and National Forest System Lands Task 14 (North State Resources, 2014) (see of the Appendix BB of the POD) will be applied, as appropriate based on other restoration measures and BMPs specified in the ECRP (Appendix B.1 to Attachment A), Wetland, Waterbody, Riparian and Mitigation Plan (Attachment I) and the Stream Crossing Risk Analysis (Appendix O.2 to Attachment C).

<sup>13b</sup> See Section 2.4 and Table 2-6 in Attachment 2 regarding planting of root pruned trees at perennial stream crossing Forest Service lands. Also see Section 10.12 in the ECRP provided in Appendix B.1 to Attachment A/Project Description.

**Table 2-2  
(Excerpted from Table 10.9-1 of the ECRP)  
Recommended Seed Mixtures for Private Lands**

<b>Seed Mixture 1 – Erosion Control – Upland Right-of-Way Areas for Coos, Douglas, and Jackson Counties<sup>1</sup></b>					
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>			
<b>Perennial Grasses</b>					
Bentgrass	<i>Agrostis spp.</i>	0.5			
Red Fescue	<i>Festuca rubra</i>	6.0			
Fescue, Tall (endophyte free)	<i>Festuca arundinacea</i>	6.0			
Orchardgrass	<i>Dactylis glomerata</i>	6.0			
Ryegrass, Annual or Italian	<i>Lolium multiflorum</i>	6.0 <sup>2</sup>			
Ryegrass, Perennial	<i>Lolium perenne</i>	4.0			
Timothy	<i>Phleum pretense</i>	2.0			
<b>Legumes</b>					
Clover, Red	<i>Trifolium pretense</i>	3.0			
Clover, White	<i>Trifolium repens</i>	2.0			
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>	3.0			
<b>Total PLS lb/acre</b>		<b>38.5</b>			
<b>Total Acres Estimated for Seed Mixture: 1435 acres</b>		<b>Total lbs (PLS) 55,248.0</b>			
<sup>1</sup> Mountain or California brome ( <i>Bromus marginatus</i> or <i>B. carinatus</i> ) and Blue Wildrye ( <i>Elymus glaucus</i> ) to be added to the mixture at 5 lbs/acre PLS each in substitute for Timothy between MPs 65.6 – 88.3.					
<sup>2</sup> On slopes greater than 20 percent or where seeding occurs after September 30 <sup>th</sup> annual ryegrass will be increased to 10 lbs/acre.					
<b>Seed Mixture 2 – Pasture and Hayland Mixes (Coos, Douglas, and Jackson Counties)</b>					
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>			
<b>Perennial Grasses</b>					
Fescue, Tall (endophyte free)	<i>Festuca arundinacea</i>	Mix A <sup>1</sup>	Mix B <sup>1</sup>	Mix C <sup>1</sup>	Mix D <sup>1</sup>
Orchardgrass	<i>Dactylis glomerate</i>	10.0			16.0
Ryegrass, Perennial or English	<i>Lolium perenne</i>	10.0		25.0	
Ryegrass, Annual or Italian	<i>Lolium multiflorum</i>	3.0	3.0	3.0	3.0
<b>Legumes</b>					
Clover, Red	<i>Trifolium pratense</i>	2.0	2.0	2.0	2.0
Clover, ladino <sup>2</sup>	<i>Trifolium repens</i>	2.0	2.0	2.0	2.0
<b>Total PLS lb/acre</b>		<b>27.0</b>	<b>27.0</b>	<b>32.0</b>	<b>23.0</b>
<b>Total Acres Estimated for Seed Mixtures: 176 acres</b>		<b>Total lbs (PLS) @ 27 lbs/ac = 4,743.0</b>			
<sup>1</sup> Seed Mix 2-A will be utilized as the primary pasture mixture unless landowners request other specific mixtures or a single species pasture mixture is requested such as Mix 2-B, 2-C, or 2-D.					
<sup>2</sup> In Coos County, substitute New Zealand white clover for ladino white clover at 3 lbs/acre. New Zealand white clover is more slug resistance than Ladino white clover. Big trefoil can also be substituted or supplemented in the mixture (6-10 lbs/acre) on poorly drained, strongly acidic soils. Lundin, F. 1996. Pasture Management Guide. Coastal Pastures in Oregon and Washington. Oregon State University Extension Service. EM8645.					



<b>Seed Mixture 3 – Irrigated Pasture and Hayland Mixes (Klamath County) <sup>1</sup></b>					
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>			
<b>Perennial Grasses</b>		Mix A	Mix B	Mix C	Mix D
Orchardgrass	<i>Dactylis glomerata</i>		8.0		
Tall fescue (endophyte free)	<i>Festuca arundinacea</i>	15.0			15.0
Ryegrass, Perennial	<i>Lolium multiflorum</i>		8.0		
Intermediate Wheatgrass	<i>Elytrigia intermedia</i> ssp. <i>Intermedia</i>			12.0	
Ryegrass, Annual or Italian	<i>Lolium multiflorum</i>	2.0	2.0	2.0	2.0
<b>Legumes</b>					
Alfalfa	<i>Medicago L.</i>			2.0	
Clover, ladino	<i>Trifolium repens</i>	2.0	2.0	2.0	2.0
Clover, Red	<i>Trifolium pratense</i>	2.0	2.0		
Strawberry clover	<i>Trifolium fragiferum</i>				1.0
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>				1.0
<b>Total Bulk lb/acre</b>		<b>21.0</b>	<b>22.0</b>	<b>18.0</b>	<b>21.0</b>
<b>Total Acres Estimated for Seed Mixtures: 445 acres</b>		<b>Total lbs (PLS) @ 21 lbs/ac = 9,350.0</b>			
<sup>1</sup> University of California Division of Agriculture and Natural Resources. 1993. Intermountain Irrigated Pastures and Mountain Meadows. Intermountain Workgroup, University of California Cooperative Extension. Mix A – Recommended for pastures that receive winter feeding operations (high yield forage with reasonable quality and a strong sod). Recommended for horse pastures. Mix B – High yield, high quality pasture mixture. Mix C – Recommended on irrigated pastures with marginal water supply. Mix D – Recommended on alkaline irrigated pastures (use Fawn tall fescue)					
<b>Seed Mixture 4 – Erosion Control – Upland Right-of-Way Areas for Jackson County (non-federal land) MPs 113.2 to 150.45, precipitation ranges between 24 and 36 inches</b>					
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>			
<b>Perennial Grasses</b>					
Mountain or California brome	<i>Bromus marginatus</i> or <i>B. carinatus</i>		4.0		
Blue Wildrye	<i>Elymus glaucus</i>		4.0		
Red fescue	<i>Festuca rubra</i>		3.0		
Orchardgrass	<i>Dactylis glomerata</i>		6.0		
Ryegrass, Annual or Italian	<i>Lolium multiflorum</i>		6.0		
<b>Legumes</b>					
Pine or Sickle-Keel Lupine <sup>1</sup>	<i>Lupinus albicalus</i>		4.0		
Clover, White	<i>Trifolium repens</i>		2.0		
Subclover	<i>Trifolium subterranean</i>		1.0		
<b>Total PLS lb/acre</b>			<b>30.0</b>		
<b>Total Acres Estimated for Seed Mixture: 323 acres</b>		<b>Total lbs (PLS) 9,688.0</b>			
<sup>1</sup> To be applied if readily available from commercial sources.					
<b>Seed Mixture 5 – Erosion Control – Upland Right-of-Way Areas Control for Jackson and Klamath Counties (non-federal land) MPs 169.4 to 181.0 precipitation ranges between 20 and 36 inches</b>					
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>			
<b>Perennial Grasses</b>					
Mountain or California brome	<i>Bromus marginatus</i> or <i>B. carinatus</i>		5.0		
Orchardgrass	<i>Dactylis glomerata</i>		6.0		
Timothy	<i>Lolium multiflorum</i>		4.0		
Red fescue	<i>Festuca rubra</i>		3.0		
Ryegrass, Annual or Italian	<i>Lolium multiflorum</i>		4.0		
<b>Legumes</b>					
Clover, White	<i>Trifolium repens</i>		2.0		
Subclover	<i>Trifolium subterranean</i>		2.0		
<b>Total PLS lb/acre</b>			<b>26.0</b>		
<b>Total Acres Estimated for Seed Mixture: 92 acres</b>		<b>Total lbs (PLS) 2,397.0</b>			

<b>Seed Mixture 6 – Erosion Control – Upland Right-of-Way Areas Control for Klamath County (non-federal land) MPs 181.0 to 198.0 precipitation ranges between 16 and 20 and inches</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>	
<b>Perennial Grasses</b>			
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	4.0	
Slender wheatgrass	<i>Elymus trachycaulus</i>	4.0	
Blue wildrye	<i>Elymus glaucus</i>	4.0	
Idaho fescue	<i>Festuca idahoensis</i>	3.0	
Orchardgrass	<i>Dactylis glomerata</i>	3.0	
<b>Legumes</b>			
Clover, White	<i>Trifolium repens</i>	2.0	
<b>Shrubs</b>			
Antelope bitterbrush	<i>Purshia tridentata</i>	1.0	
Birchleaf mountain mahogany	<i>Cercocarpus montanus</i>	1.0	
<b>Total PLS lb/acre</b>		<b>22.0</b>	
<b>Total Acres Estimated for Seed Mixture: 58 acres</b>		<b>Total lbs (PLS) 1,269.0</b>	
<b>Seed Mixture 7 – Rangeland Mixture for Klamath County MPs 198 to 228 precipitation ranges between 10 and 16 inches</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>	
<b>Perennial Grasses</b>			
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	6.0	
Canby bluegrass	<i>Poa canbyi</i>	1.0	
Sheep fescue	<i>Festuca ovina</i>	1.0	
<b>Legumes</b>			
Alfalfa	<i>Medicago L.</i>	1.0	
<b>Shrubs</b>			
Antelope bitterbrush	<i>Purshia tridentata</i>	2.0	
<b>Total PLS lb/acre</b>		<b>11.0</b>	
<b>Total Acres Estimated for Seed Mixture: 143 acres</b>		<b>Total lbs (PLS) 1,571.0</b>	
<b>Seed Mixture 8 – Ditch and Canal Banks &lt; 16 inches precipitation – Klamath County</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>	
<b>Perennial Grasses</b>			
		<b>Mix A</b>	<b>Mix B<sup>1</sup></b>
Streambank wheatgrass	<i>Elymus lanceolatus ssp. Psammophilus</i>	20.0	5.0
Tall wheatgrass	<i>Elytrigia elongata</i>		15.0
Sheep fescue	<i>Festuca ovina</i>	4.0	4.0
<b>Total PLS lb/acre</b>		<b>24.0</b>	<b>24.0</b>
<b>Total Acres Estimated for Seed Mixture: 7.7 acres</b>		<b>Total lbs (PLS) 185.0</b>	
<sup>1</sup> moist or subirrigated, saline areas			
<b>Seed Mixture 9 – Seed Mixture for Disturbed Emergent Wetlands (Pastures) – Coos County</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>	
<b>Perennial Grasses</b>			
Ryegrass, Annual	<i>Lolium multiflorum</i>	10.0	
Bentgrass, Colonial	<i>Agrostis tenuis (Agrostis capillaries)</i>	6.0	
<b>Legumes</b>			
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>	8.0	
New Zealand White Clover	<i>Trifolium repens</i>	2.0	
<b>Total PLS lb/acre</b>		<b>26.0</b>	
<b>Total Acres Estimated for Seed Mixture: 38.6 acres</b>		<b>Total lbs (PLS) 1,004.0</b>	

<b>Seed Mixture 10 – Seed Mixture for Disturbed Emergent Wetlands Klamath County</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>
<b>Perennial Grasses</b>		
Ryegrass, Annual	<i>Lolium multiflorum</i>	10.0
Hairgrass, Tufted	<i>Deschampsia caespitosa</i>	3.0
Barley, Meadow <sup>1</sup>	<i>Hordeum brachyantherum</i>	5.0
Creeping bentgrass	<i>Agrostis stolonifera</i>	0.4
Garrison creeping foxtail	<i>Alopercurus arundianceus</i>	2.0
<b>Total PLS lb/acre</b>		<b>20.4</b>
<b>Total Acres Estimated for Seed Mixture: 1.5 acres</b>		<b>Total lbs (PLS) 31.0</b>
<b>Seed Mixture 11 – Seed Mixture for Disturbed Emergent Wetlands (Pastures) – Douglas, Jackson, and Klamath Counties</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS)</b>
<b>Perennial Grasses</b>		
Ryegrass, Annual	<i>Lolium multiflorum</i>	10.0
Meadow foxtail	<i>Alopercurus pratensis</i>	8.0
Creeping bentgrass	<i>Agrostis stolonifera</i>	1.0
<b>Legumes</b>		
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>	2.0
<b>Total PLS lb/acre</b>		<b>21.0</b>
<b>Total Acres Estimated for Seed Mixture: 87 acres</b>		<b>Total lbs (PLS) 1,827.0</b>
<b>Seed Mixture 12 – Wetland Seed Mixture</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>lbs/ac (PLS) (broadcast seeding rate)</b>
<b>Perennial Grasses</b>		
Ryegrass, Annual	<i>Lolium multiflorum</i>	10
Quick Guard		40
Fescue, Fine or Creeping Red	<i>Festuca rubra</i>	2.0
Hairgrass, Tufted	<i>Deschampsia caespitosa</i>	2.0
Mannagrass, Reed <sup>1</sup>	<i>Glyceria grandis</i>	2.0
American sloughgrass <sup>1</sup>	<i>Beckmannia syzigachne</i>	2.0
Barley, Meadow <sup>1</sup>	<i>Hordeum brachyantherum</i>	5.0
Western Mannagrass <sup>1</sup>	<i>Glyceria occidentalis</i>	2.0
Fowl bluegrass <sup>1</sup>	<i>Poa palustris</i>	1.0
<b>Total PLS lb/acre</b>		<b>66.0</b>
<b>Total Acres Estimated for Seed Mixture: 39.6 acres</b>		<b>@ 58 lbs/ac 2,297.0</b>
<sup>1</sup> These species may be included in the seed mixture if they are readily available from a commercial seed supplier. lbs/acre = pounds per acre PLS = pure live seed		

**Table 2-3  
(Excepted from Table 10.9-2 of the ECRP)**

**Bureau of Land Management Coos Bay, Roseburg, Medford, and Lakeview Districts Seed Mixtures**

<b>Seed Mixture 13 – Coos Bay BLM Lands - Erosion Control - Upland Right-of-Way Areas</b>			
Californian brome	<i>Bromus carinatus</i>		8
Blue Wildrye	<i>Elymus glaucus</i>		12
Regreen or Quickguard <sup>1</sup>			
<b>Total PLS lb/acre</b>			<b>40</b>
<b>Total Acres Estimated for Seed Mixture: 143 acres</b>			<b>Total lbs (PLS) 5,723</b>
<sup>1</sup> The use of native seed mix is preferred; however, there may be instances in highly erosive soils on steep slopes, where mixing sterile perennials such as sterile wheatgrass species or non-persistent annual grasses like Annual Rye could be appropriate. In these areas the PCGP will include Regreen, Quickguard or annual ryegrass in the seeding mixture at 20 lbs/acre for erosion control, if approved, or at a rate specified by the BLM.			
<b>Seed Mixture 14 – Roseburg BLM Lands</b>			
The seeding rate will be 30 seeds Pure Live Seed per square foot (30 seeds PLS/ft <sup>2</sup> ). The seed mix must include at least two species of grasses and at least two species of forbs. Species may include any of those listed below or a different species upon approval by the Roseburg BLM. The seed mix ratio will consist of 60% grasses and 40% forbs. Dominant species proposed by PCGP are footnoted ( <sup>1</sup> ). The other species listed will be utilized where the proposed species are not available. Other species may also be used upon approval by the BLM.			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Variety</b>	<b>Mixture Percentage</b>
<b>Grasses</b>			
California brome	<i>Bromus carinatus</i>	Native <sup>1</sup>	25%
Blue wildrye	<i>Elymus glaucus</i>	Native <sup>1</sup>	35%
California fescue	<i>Festuca californica</i>	Native	
Roemer's fescue	<i>Festuca roemerii</i>	Native	
Harford's onion-grass	<i>Melica harfordii</i>	Native	
<b>Forbs</b>			
big deervetch	<i>Lotus crassifolius</i>	Native	
sickle-keeled lupine	<i>Lupinus albicaulis</i>	Native <sup>1</sup>	20%
silver lupine	<i>Lupinus albifrons</i> var. <i>eminens</i>	Native	
miniature lupine	<i>Lupinus bicolor</i>	Native	
slender goldenbanner	<i>Thermopsis gracilis</i> var. <i>gracilis</i>	Native	
tomcat clover	<i>Trifolium willdenowii</i>	Native	
grassy tarweed	<i>Madia gracilis</i>	Native <sup>1</sup>	20%
woodland tarweed	<i>Madia madioides</i>	Native	
Regreen or Quickguard <sup>2</sup>			20 lbs/acre
<b>Total Acres Estimated for Seed Mixture: 219 acres</b>			<b>Total lbs (PLS) 4,643</b>
Note: where slopes exceed 25 percent, PCGP proposes to include Regreen or Quickguard in the seeding mixture at 20 lbs/acre for erosion control. Prior to application of Regreen or Quickguard, PCGP would receive approval from the Roseburg BLM.			
<b>Seed Mixture 15a–Medford BLM Lands – Oak woodland, Grasslands, Chaparral Types</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Variety</b>	
<b>Grasses<sup>2</sup></b>			
Roemer's fescue	<i>Festuca roemerii</i>	Native <sup>1</sup>	
California Oatgrass	<i>Danthonia californica</i>	Native	
Prairie Junegrass	<i>Koeleria macrantha</i>	Native	
Pine bluegrass	<i>Poa secuda</i>	Native	
California brome	<i>Bromus carinatus</i>	Native <sup>1</sup>	
Blue wildrye	<i>Elymus glaucus</i>	Native <sup>1</sup>	
<b>Total Acres Estimated for Seed Mixture: 77 acres</b>			<b>Total lbs (PLS) 517.0 total lbs</b>

<b>Seed Mixture 15b – Medford BLM Lands - Conifer stands</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Variety</b>
California fescue	<i>Festuca californica</i>	Native
Western fescue	<i>Festuca occidentalis</i>	Native
Harford's onion-grass	<i>Melica hardfordii</i>	Native
Blue wildrye	<i>Elymus glaucus</i>	Native <sup>1</sup>
<b>Total Acres Estimated for Seed Mixture: 157.5 acres</b>		<b>Total lbs (PLS) 666.0 total lbs</b>
Regreen/Quickguard or annual ryegrass <sup>2</sup>		20 lbs/acre
<b>Seed Mixture 15c –Medford BLM Lands – Wet Sites</b>		
Slender hairgrass	<i>Deschampsia elongate</i>	Native
Note: Seeding rates – The seeding rate will be 10-20 seeds Pure Live Seed per square foot (10-20 seeds PLS/ft <sup>2</sup> ). Other species may also be used upon approval by the BLM. The BLM will specify genetically appropriate seed sources/seed zones for all species to be planted/seeded.		

**Table 2-4  
Native Shrub and Tree Plantings for Restoring Wetland and Riparian Areas<sup>1</sup>  
(Excerpted from the ECRP - Table 10.12-1)**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Planting size<sup>2</sup></b>	<b>Plant Spacing<sup>3</sup></b>
<b>Shrubs</b>			
<b>Wet Sites</b>			
Red-osier dogwood	<i>Cornus stolonifera</i>	36" cuttings	3'
Willow spp	<i>Salix spp.</i>	36" cuttings	3'
<b>Moist Sites</b>			
Pacific ninebark	<i>Physocarpus capitatus</i>	1 gal	8'
Red elderberry	<i>Sambucus racemosa</i>	1 gal	8'
Blue elderberry	<i>Sambucus cerulean</i>	1 gal	8'
Vine maple <sup>4</sup>	<i>Acer circinatum</i>	1 gal	6'
Salmonberry	<i>Rubus spectabilis</i>	1 gal	4'
Nootka rose/woods rose	<i>Rosa nutkana/ Rosa woodsii</i>	1 gal	4'
Golden Currant	<i>Ribes aureum</i>	1 gal	6'
<b>Dry Sites</b>			
Snowberry	<i>Symphoricarpos albus</i>	1 gal	4'
Serviceberry <sup>4</sup>	<i>Amelanchier alnifolia</i>	1 gal	8'
Oceanspray <sup>4</sup>	<i>Holodiscus discolor</i>	1 gal	8'
Beaked hazelnut	<i>Corylus cornuta</i>	1 gal	8'
Lewis' mock orange	<i>Philadelphus lewisii</i>	1 gal	8'
Redstem Ceanothus <sup>4</sup>	<i>Ceanothus sanguineus</i>	1 gal	8'
Deerbrush <sup>4</sup>	<i>Ceanothus integerrimus</i>	1 gal	8'
Wedge-leaf ceanothus <sup>4</sup>	<i>Ceanothus cuneatus</i>	1 gal	8'
Oregon Grape	<i>Mahonia aquifolium</i>	1 gal	4'
Salal	<i>Gaultheria shallon</i>	1 gal	4'
Kinnikinnik	<i>Arcostaphylos uva-ursi</i>	1 gal	6'
Hairy manzanita <sup>4</sup>	<i>Arcostaphylos columbiana</i>	1 gal	8'
<b>Trees</b>			
<b>Wet Sites</b>			
Oregon ash	<i>Fraxinus latifolia</i>	1 gal	10'
Red alder	<i>Alnus rubra</i>	1 gal	10'
Sitka spruce	<i>Picea sitchensis</i>	2 gal or bare root	15'
Western red cedar <sup>5</sup>	<i>Thuja plicata</i>	2 gal or bare root	12'
Oregon crabapple	<i>Malus fusca</i>	1 gal	10'
Black cottonwood	<i>Populus balsamifera ssp. trichocarpa</i>	36" cuttings or poles	10'
<b>Moist Sites</b>			
Cascara buckthorn	<i>Frangula purshiana</i>	1 gal	8'

Common Name	Scientific Name	Planting size <sup>2</sup>	Plant Spacing <sup>3</sup>
Western hemlock <sup>5</sup>	<i>Tsuga heterophylla</i>	1 gal	12'
<b>Dry Sites</b>			
Douglas' fir <sup>5</sup>	<i>Pseudotsuga menziesii</i>	1 gal or bare root	12'
Big-leaf maple	<i>Acer macrophyllum</i>	2 gal	15'
<sup>1</sup> The Forest Service and BLM will specify genetically appropriate seed sources/seed zones for all species to be planted. <sup>2</sup> Planting stock sizes may include bare root equivalents. <sup>3</sup> Shrubs will be installed in clusters of 5 to 10, while trees will be individual specimens. <sup>4</sup> Shrubs to be planted on NFS Lands 15 feet each side of the centerline and the outer edge of the construction limits (see Table 10.13-1 in the ECRP). <sup>5</sup> Riparian areas on the BLM's Coos Bay District lands will be replanted with a coniferous mixture of 50% Douglas-fir, 25% western hemlock, and 25% western red cedar on a 15 ft x 15 ft spacing. Note: The Umpqua NF requested the following species be planted to provide additional habitat elements: <i>Asclepias cordifolia</i> (heartleaf milkweed) for monarch butterflies, and <i>Lonicera ciliosa</i> (orange honeysuckle) for humming birds. These species will be included in the shrub clusters, or planted separately in appropriate habitats scattered along the construction right-of-way. Heartleaf milkweed will primarily be planted by seed or rhizome cuttings. Orange honeysuckle will be planted as containerized stock or bare root specimens.			

**Table 2-5  
Riparian Management Area Widths for Streams of Various Sizes and Type<sup>1</sup>  
(Excepted from Section 10.12 of the ECRP)**

Size	Type F <sup>2</sup>	Type D <sup>2</sup>	Type N
Large	100 feet	70 feet	70 feet
Medium	70 feet	50 feet	50 feet
Small	50 feet	20 feet	Apply specified water quality protection measures, and see OAR 629-640-0200
<sup>1</sup> OAR 629-635-0000: <a href="http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_635.html">http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_635.html</a> <sup>2</sup> Type F stream have fish use, including fish use streams that have domestic water use. Type D streams have domestic water use, but not fish use. Type N streams are all other streams.			

**Table 2-6  
Optimal Planting Distance of 15-20-foot Transplanted Root-Pruned Trees  
(Excepted from Table 10.12-2 of the ECRP)**

Site Identifier	Waterbody	Milepost	Jurisdiction	Proposed Planting Distance (feet) from Stream Channel High Water Mark	
				Left Bank <sup>1</sup>	Right Bank <sup>1</sup>
WW-111-001 (GW014/ FS-HF-C)	Trib. to East Fork Cow Creek	109.17	Umpqua National Forest	12	12
GSP019/FSHF- G	East Fork Cow Creek	109.47	Umpqua National Forest	15	12
FS-HF-J	Trib. to East Fork Cow Creek	109.69	Umpqua National Forest	18	25
FS-HF-K	Trib. to East Fork Cow Creek	109.78	Umpqua National Forest	19	26
ESI068/ FS-HF-N	Trib. to East Fork Cow Creek	110.96	Umpqua National Forest	12	12
ASP 165	South Fork Little Butte Creek	162.45	Rogue River-Siskiyou National Forest	18	12
<sup>1</sup> Looking downstream					

**ATTACHMENT 3**  
**PROCEDURES FOR PREPARING AND PLANTING LIVE STAKES OR SPRIGS**  
**AND PLANTING BARE ROOT TREE SEEDLINGS**

## Cuttings and Live Staking or Sprigging

### Preparation and Handling of Cuttings

In preparing and handling cuttings prior to planting, the following guidelines will increase the chances for success:

1. Select healthy wood of reasonable straightness from plant species that root easily and are native to the planting site.
2. Make clear cuts with unsplit ends. Stems up to 1½ inches in diameter can best be cut with two-handed brush pruning shears. Several stems of small diameter may be cut at a time with a carpenter's hatchet. Larger branches can be cut with chain saws. The butt end of cuttings should be pointed to facilitate driving. Long straight "whips" are ideal since they indicate a healthy growing plant.
3. Trim branches from cuttings as close as possible.
4. Length: Cuttings of small diameter (up to 1 ½ inches) should be 12 to 24 inches long. Where water tables are low or receding, 3 to 5 foot whips 1 inch or more in diameter can be used to improve survival.
5. Diameter: The minimum diameter is ¼ inch; the thicker the cutting, the greater the food reserves. Cuttings greater than 1 inch are desirable, although their numbers may be limited by supply.
6. Location of buds and bud scars: Cuttings put out their greatest concentration of shoots and their strongest ones just below an annual ring (formed from a terminal bud scar). Cutting should be cut so that a terminal bud scar is within 1 to 4 inches of the top. At least two buds and/or bud scars should be above the ground after planting.
7. Handling of stakes between cutting and planting: Cuttings must not be allowed to dry out. They must be kept covered and moist during transport, storage, and during the planting operation. Cuttings should be wrapped in moist burlap or stored in plastic garbage bags with moist newsprint, sawdust or peat moss. Cuttings may also be kept submerged in water for one to several days after perpetration to ensure that they remain moist. The cutting should be kept out of direct sunlight and at no time should cuttings be left exposed to the air to dry out prior to planting.
8. Cutting tips should also be treated with a combination of growth hormone and fungicide, substances such as Rootone which contain indolebutyric acid, naphthaleneacetic acid, or naphthaleneacetamide. This aids in survival by inhibiting fungus development, and also stimulates rood development. Following treatment, it is recommended that the cuttings be allowed to dry for 30 minutes to an hour in open air. This will minimize loss of rooting hormone through handling and planting and increases the chances of successful planting.

The cuttings will normally be salvaged from the area to be cleared of vegetation prior to right-of-way clearing. However, in the event additional materials need to be collected for planting to reduce impacts to donor sites, the following procedures will be strictly followed:

1. Obtain permission from landowners before collecting on private land;



2. Take scattered cuttings throughout the donor site and collect no more than 1/3 of any shrub;
3. Collect only the material needed so that material will not be wasted;
4. Prevent soils and vegetation from being trampled and trails from being created; and
5. Collect from large stands in a checkerboard pattern.

### **Time to Plant Stakes**

Stakes should be cut and planted when willows or other suitable species are dormant. This period extends from the time the leaves start to turn yellow in autumn until the time growth starts in the spring. McCluskey *et al.* (1984) indicated that early spring planting prior to the breaking of dormancy is probably the best. In moist soils, willow stakes can sometimes be planted successfully during the summer season, but usually this should not be attempted. When this procedure is attempted, the cuttings should be defoliated. Additional soaking of cuttings prior to planting may be required for late plantings.

### **How to Plant Stakes**

In addition to the way in which stakes are prepared and stored, the way in which they are set in the ground is also crucial for success. The following guidelines should be observed.

1. Plant the cuttings right side up (i.e. with the butt ends in the ground). It is not always easy to tell the top from the butt of a leafless cutting. A good rule is to have the butt end of all stakes painted or marked immediately by the cutting crew at the time they are made. Alternatively, the tops of bundles of cuttings maybe painted with a water-soluble latex paint. The paint also seals the ends and reduces desiccation of the cuttings.
2. Set the cutting as deep as possible. Most of the sprig length should be planted in the ground. It is preferable that at least 80 percent of the sprig length be in the ground. Two reasons for deep planting are to minimize water loss due to transpiration and to lessen the problem of root breakage caused by movement between the cutting and the ground.
3. Avoid stripping the bark or needless bruising of the stakes when setting them in the ground. In fairly soft soil the stakes can be driven with a wooden maul. Do not use an ax or sledge. In hard ground, use an iron bar or star drill to prepare the holes for the cuttings.
4. Tamp the soil around the cutting. The cutting must be firm in the ground so that it cannot be readily moved or pulled out.
5. If the area receives grazing pressures, the site should be fenced or deferred from grazing to ensure cutting establishment.

Recommended propagation techniques for the following species are according to Zeigler (1990) and Stevens and Vanbianchi (1991):

Red-osier Dogwood    Cuttings. Cuttings of 1 year old wood collected and planted before buds start to open; cuttings should be about 18" long and ¾" in diameter. Propagation by seeds requires cold stratification after removal of pulp.

	Cold storage from 30-60 days at 35-41 degrees. Sow seed in ordinary loam to start.
Douglas spirea	Cuttings, as with willows. Use whips where water table is low or receding.
Ninebark	Cuttings
Oceanspray	Cuttings from August to September. Seeds or layering. Has wide range of soil and moisture tolerances.
Black Cottonwood	Cuttings. Does well in almost any soil but best in lowlands and along streams. 4 foot long whips soaked in water for 48 hours prior to planting enhances rooting. Plant on 6 foot plus center.
Oregon Ash	Propagation is by seeds gathered in fall and sown immediately, or stratified and sown in spring. Cover with 1 inch of soil. Also transplants well when young.
Red Alder	Easily grown from fresh seed following 30 day cold stratification. Can be transplanted from donor sites as pull-ups collected in the late winter and early spring before buds break (uproot 2-4' tall plants, transport them to the restoration site with their roots covered and moist, plant immediately).
Snowberry	Cuttings, seeds or suckers. Cuttings from July to September.
Red Elderberry	Cuttings from June to July or clean seed in fall.
Oregon Grape	Cuttings from June to August seeds or suckers.
Huckleberry	Cuttings from July to October, seeds or layering.
Salmonberry	From seed sown in the spring following acid scarification and 60 day cold stratification or from fresh seed sown in the fall. Soft and hardwood cuttings planted on 4 foot plus centers.
Red Elderberry	By seed following 6 months cold stratification, also from hardwood and softwood cuttings taken soon after leaf drop in the fall.

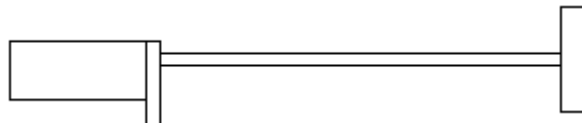
## Procedures for Planting Bare Root Tree Seedlings

### Bare-root seedlings (quality, care and handling)

Bare-root tree seedlings can be inexpensively produced and distributed and generally planted successfully. Seedlings should be dormant, and roots should be moist and fibrous. Seedlings over 12 inches in height above the root collar should have roots about 10 - 12 inches long. Proper storage is necessary to prevent drying (especially of roots), and planting must be completed before dormancy ends.

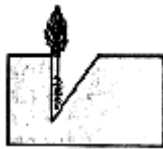
Bare-root seedlings can be quickly and easily planted into a planting slot (deeper than the length of the roots) which is made using a specially designed planting tool such as a "dibble" bar (Figure 1), mattock (Figure 2), spade or planting shovel (Figure 3). Better results, especially in heavier (clay) soils, may be obtained by digging and preparing a planting hole with a shovel, but considerably more time and effort is required. The following web site also provides important planting tips <http://forestry.about.com/library/weekly/aa121299.htm>

Figure 1. Planting with a dibble "Planting" bar.



#### Step 1

Insert dibble as shown and pull handle towards planter



#### Step 2

Remove dibble and place seedling at correct depth.



#### Step 3

Insert dibble at an angle 3-4 inches toward planter from seedling. Push handle of dibble forward from planter.



#### Step 4

Soil at this point must be firmly packed around the seedling that the seedling doesn't move when given a firm tug. Leave the second hole.

Figure 2. Planting with a Mattock (hodad).



**Step 1.** Insert mattock, lift handle and pull.



**Step 2.** Place seedling along straight side at correct depth.



**Step 3.** Fill in and pack soil to bottom of roots.



**Step 4.** Finish filling in soil and firm with heel.



**Step 5.** Firm around seedling with feet.

#### Planting bare-root seedlings using a shovel:

- Soak roots overnight
- Cut broken roots back to healthy tissue
- Dig a hole large enough to accommodate full root length
- Spread roots outward and downward
- Back-fill soil; work in and tamp around roots
- Water, and let the soil settle
- Re-adjust the tree so that the root crown is at grade level
- Fill the rest of the hole, and tamp soil
- Soak with water
- Mulch

#### Planting Bare Root or Containerized Shrubs

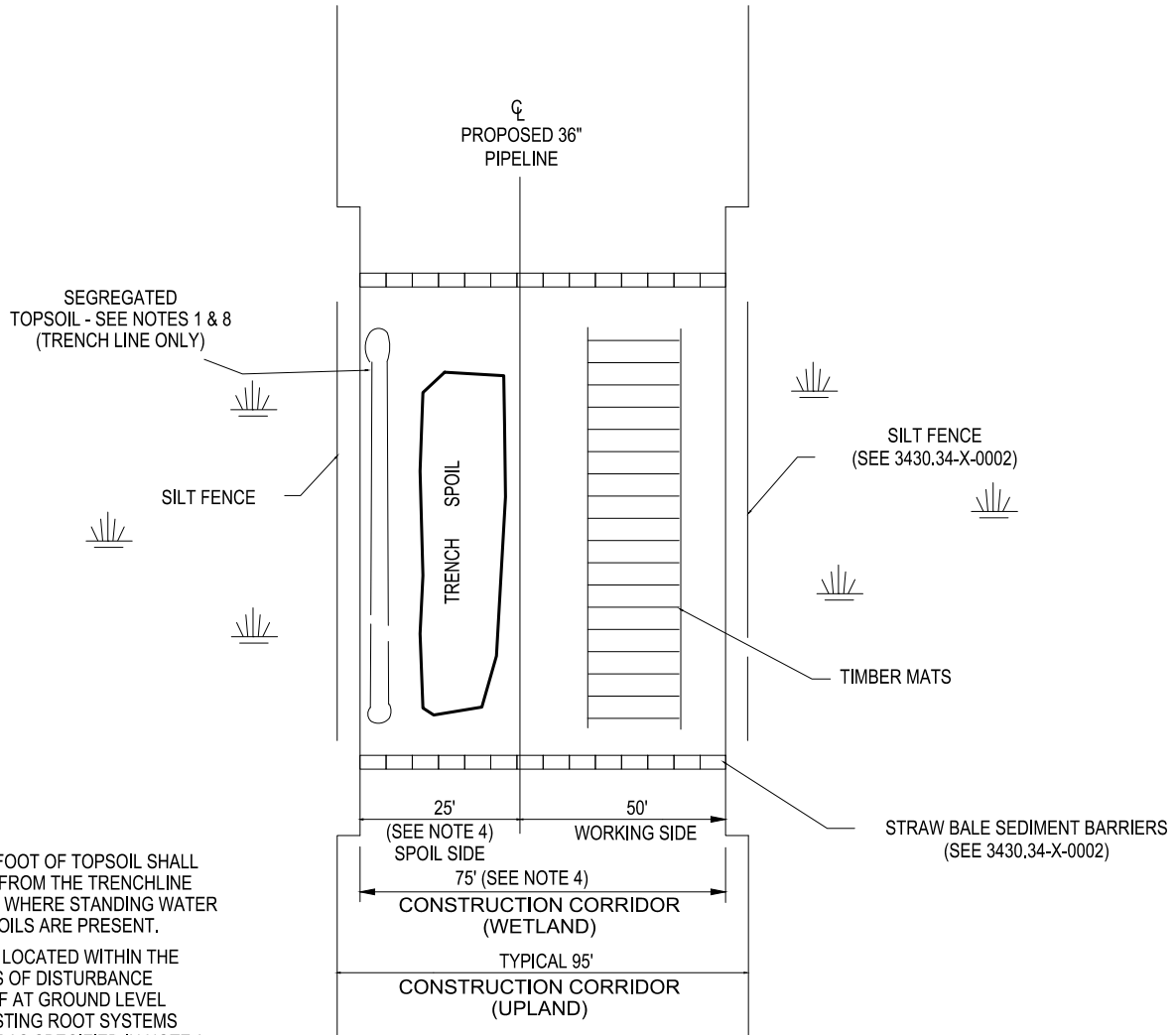
Deciduous bare root shrubs require a hole twice as wide as the root diameter and no deeper than the depth of the roots. Firmly pack the soil around the roots to eliminate air pockets.

Never transplant any seedling deeper than it was originally planted. Bare root trees and shrubs should have roots spread out in the hole. Shovels are the preferred tool for planting deciduous trees and shrubs. A dibble bar or hodad used in the usual fashion does not provide a hole large enough to accommodate the extensive root systems of deciduous trees or shrubs. Insert either of these tools several times to increase the size of the hole; also loosen soil with the tool to avoid soil compaction. Soil compaction will interfere with root growth and available moisture.

Typical figures for installing bare-root shrubs, and containerized plants can be found at <http://www.wa.gov/wdfw/hab/ahq/ispgapph.pdf>

**ATTACHMENT 4**  
**WETLAND CONSTRUCTION/RESTORATION FIGURES AND LWD FIGURE**

# WETLAND CROSSING DETAIL

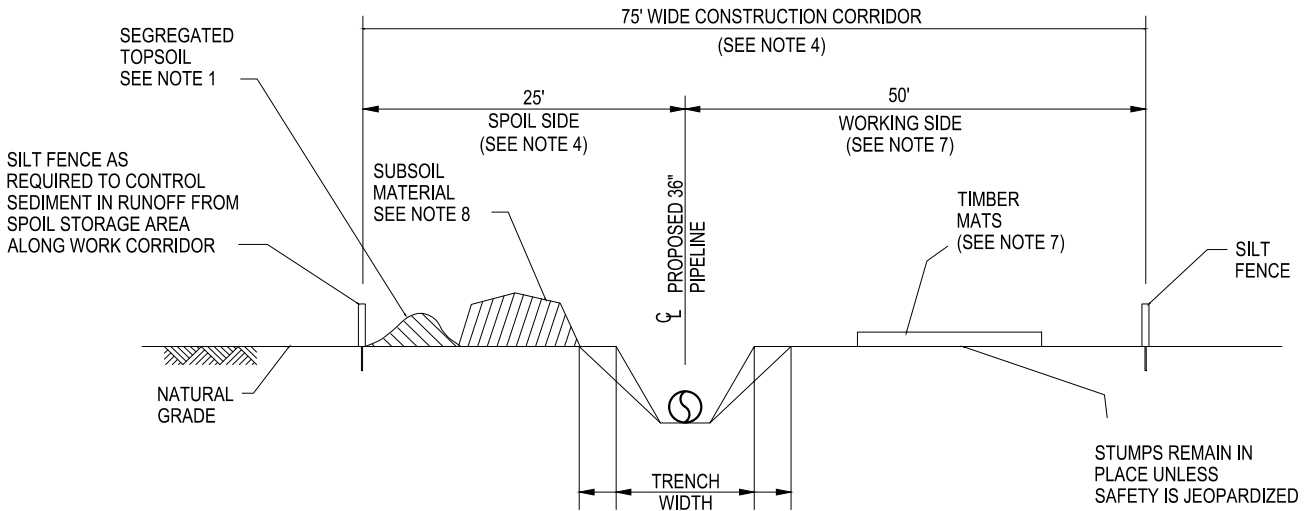


**NOTES:**

1. THE TOP ONE (1) FOOT OF TOPSOIL SHALL BE SEGREGATED FROM THE TRENCHLINE EXCEPT IN AREAS WHERE STANDING WATER OR SATURATED SOILS ARE PRESENT.
2. THE VEGETATION LOCATED WITHIN THE PROPOSED LIMITS OF DISTURBANCE SHALL BE CUT OFF AT GROUND LEVEL LEAVING THE EXISTING ROOT SYSTEMS IN PLACE, EXCEPT AS SPECIFIED IN NOTE 3.
3. PULLING OF TREE STUMPS AND GRADING ACTIVITIES SHALL BE LIMITED TO THE AREA DIRECTLY OVER THE TRENCHLINE UNLESS SAFETY CONDITIONS REQUIRE THE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE WORK CORRIDOR.
4. CONSTRUCTION CORRIDOR THROUGH WETLANDS WILL BE 75 FEET WIDE UNLESS A MODIFICATION IS GRANTED. CONFIGURATION OF RIGHT-OF-WAY MAY VARY.

## PLAN VIEW

DRAWING NO.		REFERENCE TITLE			PACIFIC CONNECTOR GAS PIPELINE PROJECT PACIFIC CONNECTOR GAS PIPELINE, LP  CROSSING DETAIL FOR WETLANDS  <div style="text-align: center; border: 1px solid black; border-radius: 50%; width: 30px; margin: 0 auto;">WC</div>					
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.	DRAWN BY: KLL	DATE: 02-02-2001	DRAWING NUMBER: 3430.34-X-0005  SHEET 1 OF 2	
							CHECKED BY:	DATE:		
							APPROVED BY:	DATE:		

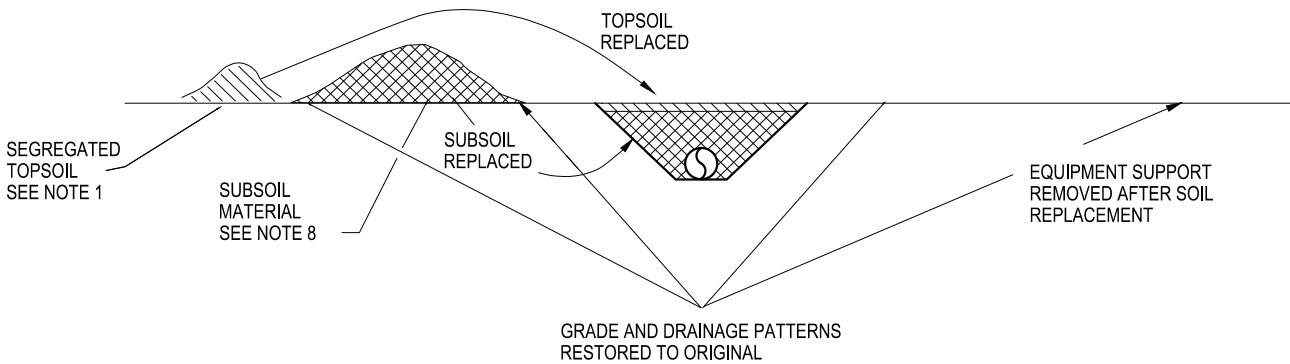


TRENCH WIDTH VARIES DEPENDING ON SOILS ENCOUNTERED DURING CONSTRUCTION


NOTES CONTINUED:

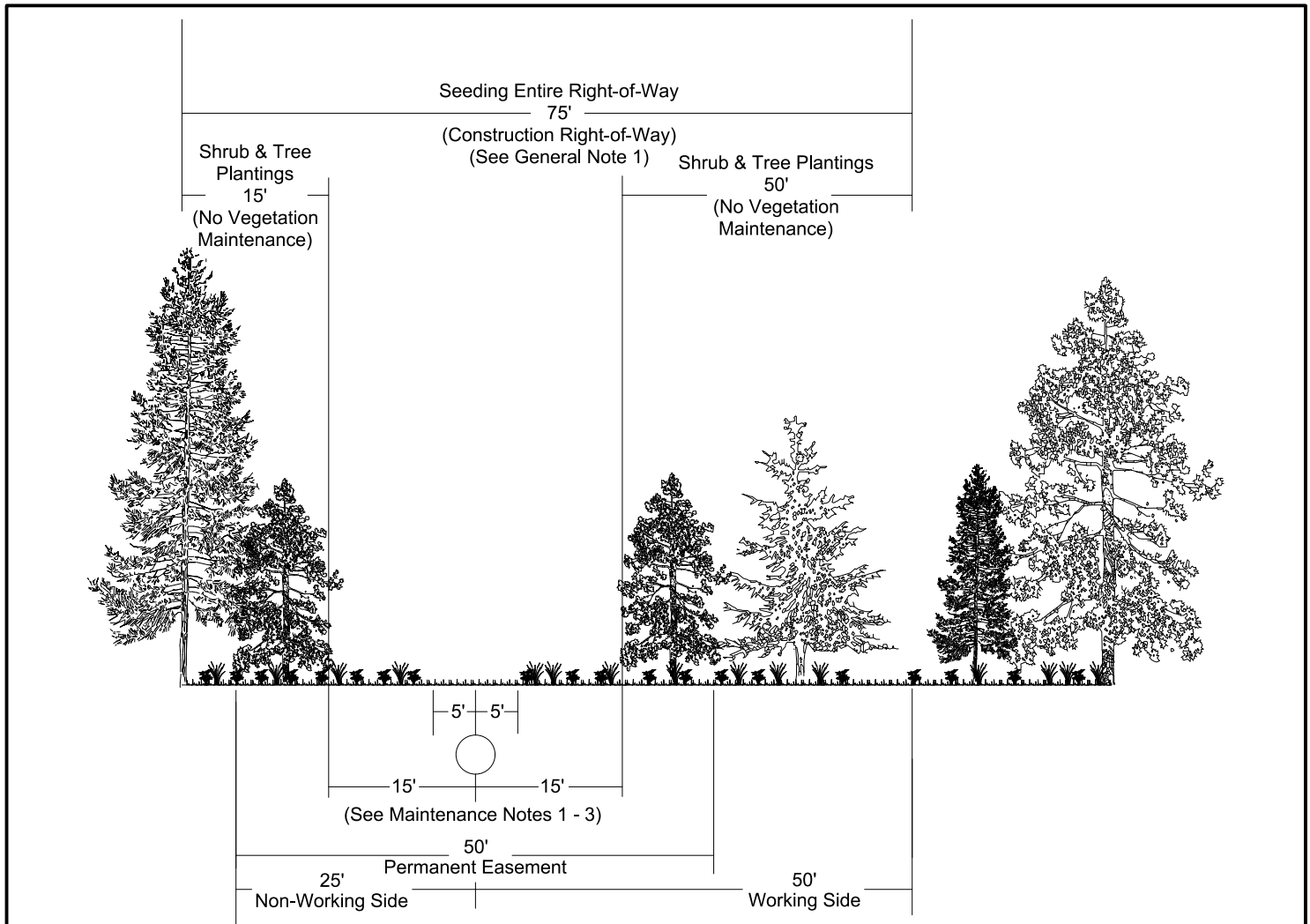
5. SILT FENCE OR STRAW BALES WILL BE USED WHERE APPROPRIATE TO PREVENT SILTATION INTO WATER BODIES OR WETLANDS.
6. SILT FENCES OR STRAW BALES WILL ALSO BE USED TO PREVENT STOCKPILED SOIL OR SPOIL FROM LEAVING THE CONSTRUCTION RIGHT-OF-WAY OR WORKSPACES.
7. TIMBER MATS MAY BE USED OVER SPOIL STORAGE WHERE STANDING WATER OR SATURATED SOILS ARE PRESENT.
8. IF STANDING WATER OR SATURATED SOILS ARE PRESENT, OR IF CONSTRUCTION EQUIPMENT CAUSES RUTS OR MIXING OF TOPSOIL AND SUBSOIL IN WETLANDS, USE LOW-GROUND WEIGHT EQUIPMENT, OR OPERATE NORMAL EQUIPMENT ON TIMBER RIPRAP, PREFABRICATED EQUIPMENT MATS OR TERRA MATS.

### CROSS SECTION





### WETLAND RESTORATION

DRAWING NO.		REFERENCE TITLE			PACIFIC CONNECTOR GAS OPERATOR, LP PACIFIC CONNECTOR GAS PIPELINE PROJECT CROSSING DETAIL FOR WETLANDS				 Pacific Connector GAS PIPELINE	
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.	DRAWN BY: KLL	DATE: 02-02-2001	DRAWING NUMBER: 3430.34-X-0005 <span style="float: right;">SHEET 2 OF 2</span>	
							CHECKED BY:	DATE:		
							APPROVED BY:	DATE:		



General Notes:

1. Construction right-of-way through wetlands will be 75 feet wide unless a modification is granted. Configuration of Right-of-Way may vary.


-  Shrubs
-  Herbaceous vegetation/seed mixture

Planting Notes:

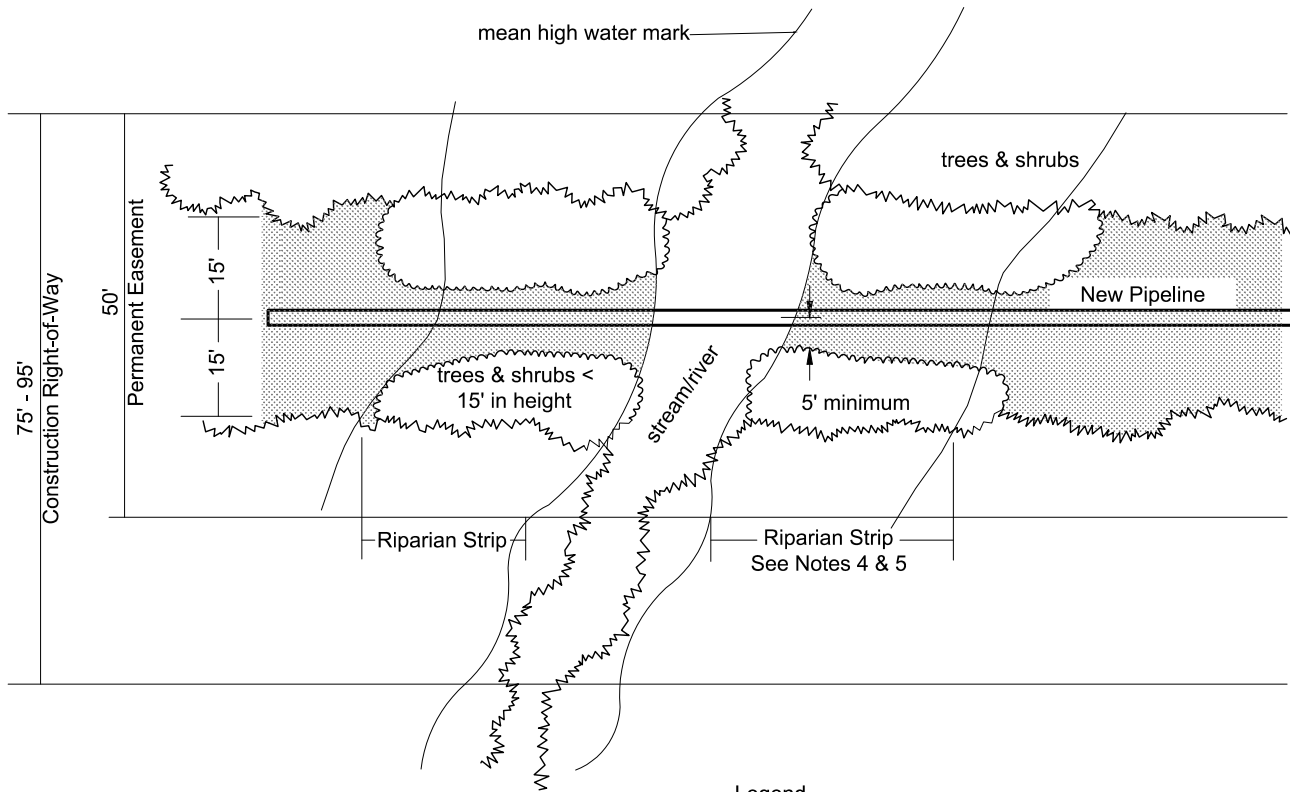
1. Entire right-of-way to be seeded with appropriate wetland seed mixture (see Section 10.9).
2. Shrubs not to be planted within 5' of the pipeline centerline.
3. Trees not to be planted within 15' of the pipeline.
4. Trees and shrubs will be planted in all disturbed forested and shrub wetland areas beyond 15' of pipeline centerline (see Table 10.12-1).

Maintenance Notes:




1. Maintenance of right-of-way in herbaceous state permitted in a 10' corridor centered on the pipeline.
2. Selective cutting of trees within 15' of the pipeline.
3. No vegetation maintenance proposed beyond 15' of the pipeline centerline.

DRAWING NO.		REFERENCE TITLE		PACIFIC CONNECTOR GAS PIPELINE PROJECT PACIFIC CONNECTOR GAS PIPELINE, LP  FOREST & SHRUB WETLAND REVEGETATION & MAINTENANCE PLAN						
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.	DRAWN BY: KLL	DATE: 02-02-2001	ISSUED FOR BID:	SCALE: NOT TO SCALE
							CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
							APPROVED BY:	DATE:	DRAWING NUMBER: 3430.34-X-0015	SHEET 1
									%TIME% %PATH%	OF 1






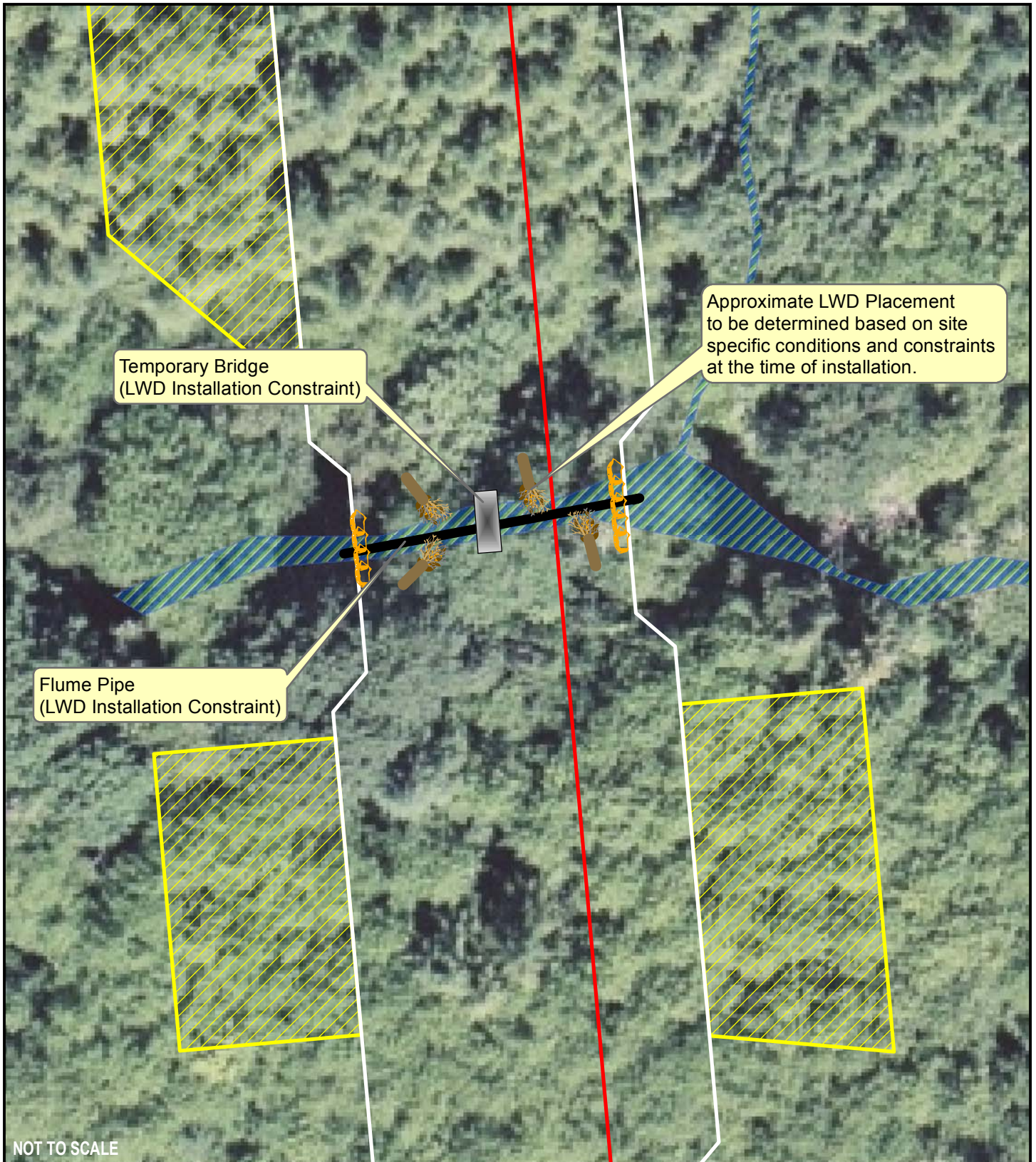
Legend

-  Herbaceous seeding & periodic maintenance
-  Shrub planting & selective cutting (trees <15' in height permitted within 15' of pipeline)
-  No vegetative maintenance

Notes:

1. Maintenance of right-of-way in herbaceous state permitted in a 10' corridor centered on the pipeline.
2. Selective hand cutting of trees within 15' of the pipeline.
3. No vegetation maintenance permitted beyond 15' of the pipeline centerline.
4. On private lands riparian planting will occur across the ROW based on ODF RMA buffer widths (see ECRP), subject to the 15-foot (trees) restriction on either side of centerline. The riparian planting area will occur to the RMA buffer width, or to the limit of existing riparian vegetation where the riparian vegetation does not exceed the RMA buffer width.
5. On federal lands extend riparian strip planting along all perennial & intermittent streams within federally-designated riparian reserves to 100' or to limit of existing riparian vegetation.

DRAWING NO.		REFERENCE TITLE			PACIFIC CONNECTOR GAS PIPELINE PROJECT PACIFIC CONNECTOR GAS PIPELINE, LP					
					WATERBODY / RIPARIAN REVEGETATION & MAINTENANCE PLAN					
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.	DRAWN BY: KLL	DATE: 02-02-2001	ISSUED FOR BID:	SCALE: NOT TO SCALE
							CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
							APPROVED BY:	DATE:	DRAWING NUMBER: 3430.34-X-0016	SHEET 1 OF 1



Proposed schedule for applying LWD based on waterbody types, subject to landowner approval:

- 4 pieces for each perennial stream crossed with riparian forest removed (2 pieces instream, 2 pieces within riparian zone on the bank);
- 2 pieces for each intermittent stream and unknown stream crossed with riparian forest removed (one or both pieces placed instream or on bank);
- 2 pieces for each perennial, intermittent, and unknown stream crossed but with no riparian forest removed (one or both pieces paced instream or on bank).
- 1 piece each for perennial, intermittent, and unknown stream not crossed but adjacent to ROW with or without riparian forest removed (piece placed on bank).

Pacific Connector Gas Pipeline Project  
Pacific Connector Gas Pipeline, LP



### Typical LWD Placement During Restoration

**ATTACHMENT 5**  
**LONG-TERM MONITORING PLAN**



**Pacific  
Connector**  
GAS PIPELINE

**Pacific Connector Gas Pipeline, LP**

**Long-term Monitoring Plan for  
Wetland and Riparian Areas**

**Prepared by:**

**Ecology and Environment, Inc.  
333 SW Fifth Avenue, Suite 600  
Portland, Oregon 97204**

**October 2017**

©2017 Ecology and Environment, Inc.

## Table of Contents

1	Introduction.....	1
2	Purpose of Plan .....	3
3	Monitoring Goals and Objectives.....	5
4	Monitoring Approach .....	6
5	Performance Criteria .....	8
6	Monitoring Reports and Release from Monitoring Obligation.....	10
7	References .....	11

## List of Tables

Table 4-1	Oregon Department of State Lands Monitoring Requirements .....	6
Table 5-1	Oregon Revegetation Performance Criteria for Wetlands and Riparian Areas.....	8

## List of Figures

Figure 1-1	Pipeline Right-Of-Way.....	2
------------	----------------------------	---

## List of Appendices

A	Wetland and Riparian Monitoring Datasheets
---	--

## List of Abbreviations and Acronyms

BLM	Bureau of Land Management
DSL	Oregon Department of State Lands
FERC	Federal Energy Regulatory Commission
JCEP	Jordan Cove Energy Project, L.P.
LNG	liquefied natural gas
PCGP	Pacific Connector Gas Pipeline, LP
Plan	Long-Term Monitoring Plan
SMP	standard monitoring procedure
USACE	United States Army Corps of Engineers
USFS	United States Forest Service

# 1 Introduction

This long-term monitoring plan (Plan) presents approaches for monitoring of wetlands and riparian areas associated with Pacific Connector Gas Pipeline, LP's (PCGP's) proposed 229-mile, 36-inch-diameter intrastate natural gas transmission pipeline (Pipeline) (see Figure 1). The Pipeline, which would connect with two interstate natural gas pipelines near Malin, Oregon, would facilitate transportation of natural gas to the proposed liquefied natural gas (LNG) export facility (LNG Terminal) being developed by Jordan Cove Energy Project, L.P. (JCEP).

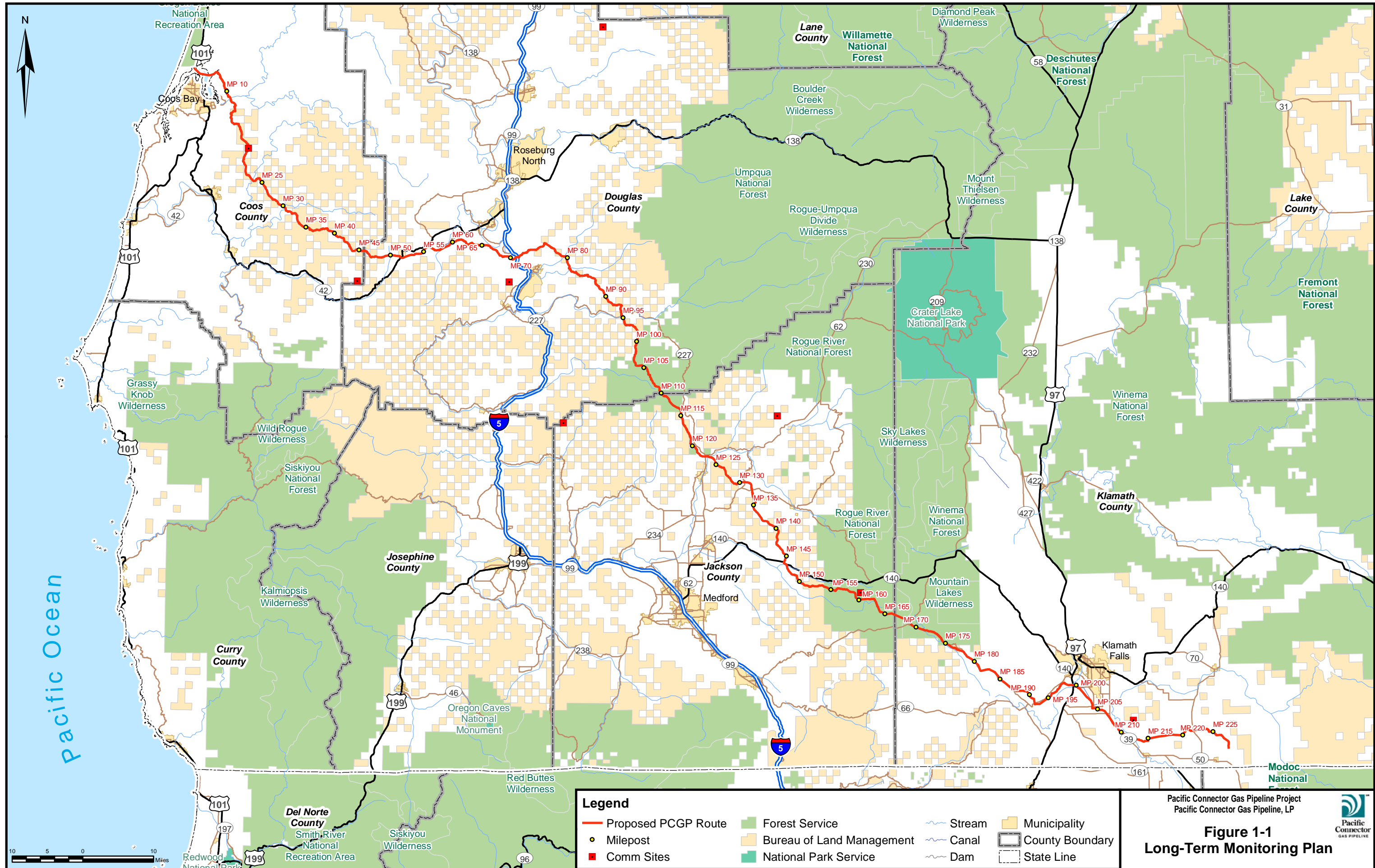
This Plan describes the goals of the restoration and revegetation efforts that would be used to establish perennial vegetation cover within the Pipeline right-of-way in accordance with federal and state agencies involved in permitting. The Federal Energy Regulatory Commission (FERC) is the lead federal agency for permitting the Pipeline. If FERC approves the application, a certificate of public convenience and necessity will be issued. In addition to the certificate, the Oregon Department of State Lands (DSL) and United States Army Corps of Engineers (USACE) would issue a joint permit for wetland and waterbody impacted by the Pipeline.

This Plan describes the standard monitoring procedures (SMPs) for the monitoring metrics to satisfy federal and state agency requirements. Section 5.1 outlines the DSL performance criteria. The development of the Plan's SMPs, including goals and objectives, has incorporated lessons learned on other pipeline projects permitted by FERC, USACE, and DSL, such as the Ruby Pipeline Project.

A separate monitoring plan will apply to the Kentuck Mitigation Project. The Kentuck Project consolidates both the JCEP and PCGP compensatory mitigation requirements at a single location in Coos Bay, Oregon. The monitoring plan for the Kentuck Project will be the responsibility of JCEP.

The following agencies will receive the annual monitoring reports detailing restoration progress:

1. FERC
2. DSL
3. USACE
4. Bureau of Land Management (BLM) Coos Bay District Office
5. BLM Roseburg District Office
6. BLM Medford District Office
7. BLM Klamath Falls Resource Area (Lakeview District) Office
8. Umpqua National Forest
9. Rogue River-Siskiyou National Forest
10. Fremont-Winema National Forest



**Legend**

- Proposed PCGP Route
- Milepost
- Comm Sites
- Forest Service
- Bureau of Land Management
- National Park Service
- Stream
- Canal
- Dam
- Municipality
- ▭ County Boundary
- ▭ State Line

Pacific Connector Gas Pipeline Project  
Pacific Connector Gas Pipeline, LP

**Figure 1-1  
Long-Term Monitoring Plan**



## 2 Purpose of Plan

The goals of the restoration and revegetation efforts for the Pipeline will be to establish a perennial vegetation cover within the right-of-way in accordance with FERC's Upland Erosion Control, Revegetation and Maintenance Plan and Wetland and Waterbody Procedures. Disturbed wetland and riparian areas will be seeded and replanted with tree and shrubs according to Section V.C.6. and V.D.1 in FERC's Wetland and Waterbody Procedures and in accordance with the Oregon Forest Practice Act (Oregon Administrative Rule 629-635-310). For Waters of the U.S., restoration will comply with the Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act and Oregon Administrative Rules 141-085-500 for those waters under permit authorization of DSL.

Vegetation monitoring will occur annually during the growing season for three years after the seeding and planting is completed or until sites are released by permitting agencies. Annual monitoring will continue until FERC and the appropriate land managing agencies agree that restoration goals have been achieved for a given wetland or riparian area. Desirable plant cover would be permanent plant cover, which would include seeded and planted species and species that naturally become established. Noxious and invasive weeds are not desirable species. Monitoring would be conducted beyond the third year, as agreed upon by FERC, DSL, and the land management agencies, if performance criteria have not been met (see Section 5/Performance Criteria).

Monitoring efforts will cease with successful establishment of a perennial plant cover as defined in Section 5/Performance Criteria. PCGP expects that the affected wetlands, the majority of which are disturbed emergent agricultural pasture and hayfields, will be successfully restored within one to two growing seasons. However, PCGP anticipates that successful restoration and revegetation efforts will vary for a given wetland or riparian area because of differences in soil, vegetation type, terrain, grazing, and precipitation. Therefore, it is likely that various wetlands and riparian areas could be released from monitoring efforts at different times. Monitoring locations not meeting performance criteria will require additional evaluation and development of contingency plans to ensure successful establishment of native plant cover.

As described in the Wetland, Waterbody and Riparian Mitigation Plan, once installation of the pipeline is completed, restoration of the wetland and riparian areas will consist of backfilling excavated subsoils, replacing the topsoil, restoring the approximate original contours and drainage patterns, installing erosion control devices, and preparing the topsoil for seeding and planting. Revegetation of the wetlands and riparian areas will be accomplished by using bare-root or container-grown plants and seed mixes that have been developed with input from federal and state agencies. The bare-root/container-grown plants will consist of shrubs, trees, and willow stakes that will be planted at waterbodies that had a woody plant component prior to pipeline construction. Table 2-1 (see Attachment 2 to the Wetland, Waterbody and Riparian Mitigation Plan) summarizes the wetland and waterbody treatments for each of the wetlands and waterbodies affected by the Pipeline. Attachment 2 also lists the various seed mixtures and tree and shrub species proposed for restoration. These native trees and shrubs would be planted during appropriate planting periods (during the winter and late spring). To complete the restoration plantings, PCGP will select a local restoration contractor that is knowledgeable regarding wetland and riparian ecosystems as well as with the species' characteristics and site growth requirements. The shrubs and trees planted at each site will be determined at the time of planting based on the moisture regimes and site-specific conditions at each planting location and on the plant spacing shown in Table 2-4 in Attachment 2. Shrubs will be planted according



to FERC's Wetland and Waterbody Procedures, which allows them to grow within 5 feet of the pipeline centerline. Trees will not be planted within 15 feet of either side of the pipeline centerline to facilitate corrosion and leak surveys and to prevent roots from damaging pipe coatings.

## 2.1 Establishing the Wetland and Riparian Baseline

PCGP will complete pre-construction and post-construction surveys of wetlands and waterbodies within the right-of-way. The purpose of the pre-construction surveys will be to document wetland and waterbody conditions prior to construction and to establish baseline conditions for future monitoring performance criteria. The following information will be collected for the pre-construction surveys for wetlands: 1) existing hydrology, 2) significant topographic features contributing to site hydrology, 3) vegetation cover, 4) vegetation disturbance, 5) invasive species presence, 6) site alteration, and 7) other site-specific conditions. Documentation for waterbody conditions within the right-of-way will include: 1) surrounding land use; 2) riparian vegetation type (forested, scrub-shrub, etc.); 3) riparian vegetation cover; 4) riparian vegetation condition; and 5) presence of woody debris. Other preconstruction waterbody conditions will be documented according to the Stream Crossing Risk Analysis Addendum (GeoEngineers 2017), which was developed at the request of the Oregon Department of Environmental Quality through their authority under the Clean Water Act and Oregon Administrative Rules. The Stream Crossing Risk Analysis Addendum is provided in Appendix O.2 to Attachment C/Affected Water Resources.

The post-construction monitoring efforts will be initiated within the first growing season after restoration. The post-construction report will be as described in Table 4-1 in Section 4.1.1 of this Plan.

The proposed monitoring methodology will differ according to whether the site is a wetland or waterbody and whether the crossing is located in the construction right-of-way or an access road. All monitoring will include the collection of photographs from fixed photo points and the collection of wetland or waterbody data as described above. The datasheets included in Appendix A will be utilized to document pre-construction conditions and future monitoring efforts. Photographs, representative of conditions, will be collected at all wetlands and waterbodies within the right-of-way and access roads. All photograph locations will be documented with a global positioning system location with sub-meter accuracy. Three photographs will be taken of all wetlands. If a wetland is greater than 100 feet in length, a photograph will be taken every 100 feet along the centerline of the trench, or at an appropriate distance as determined by conditions in the field. For wetlands associated with Pipeline-related access roads that were temporarily disturbed, at least three photographs will be taken. One overview photograph and one photograph at each wetland boundary. Up to six photographs will be taken of waterbodies: one upstream view, one downstream view, an across bank view from each bank (left and right), within the construction right-of-way, if accessible,<sup>1</sup> one upstream view from the downstream extent of the construction right-of-way, and one downstream view from the upstream extent of the construction right-of-way.

---

1) If flow conditions are unsafe to cross a waterbody at the time of the monitoring efforts and access to the opposite bank is restricted by remoteness/travel distance, the photo for the opposite bank will not be taken.

### 3 Monitoring Goals and Objectives

The goals of the monitoring program are to document that the federal and state performance criteria are being achieved and to identify right-of-way segments where additional restoration work may be necessary. During the monitoring effort, PCGP will submit monitoring reports to FERC, DSL, BLM, and U.S. Forest Service (USFS) on an annual basis to report restoration and revegetation success. The annual report will list sites that have achieved performance criteria standards that will be requested for release from future monitoring efforts, as well as sites that have not met performance criteria where ongoing monitoring will occur.

The monitoring goals will be achieved by the following objectives:

- Establish monitoring plots for all wetlands and riparian areas impacted by construction;
- Develop detailed SMPs for the various monitoring metrics;
- Train field crews in applying the SMPs;
- Annually survey the monitoring plots to obtain data for the metrics being examined;
- Identify the cause of failed revegetation efforts and take action to correct the situation as necessary;
- Analyze and compare acquired monitoring data to the established performance criteria defined in Section 6;
- Conduct right-of-way restoration monitoring for three years or until performance criteria have been met; and
- Prepare annual monitoring reports for submittal to FERC, BLM, USFS, USACE, and DSL after survey completion.

## 4 Monitoring Approach

Monitoring will take place on all wetland and riparian areas crossed by the Pipeline for a minimum of three years or until performance criteria have been met. If a wetland or riparian site becomes unavailable for continued monitoring because of an event such as flooding or wildfire, then a new plot or set of plots may be established. In that event, a plot relocation discussion would be held with FERC, DSL, and the appropriate land management agencies to determine suitable action. Appropriate action may include relocating the monitoring site or abandoning it. The decision will be based on the number of years the plot has been monitored and the status of vegetation and soil to meet the performance criteria.

### 4.1.1 Monitoring Approach

Wetlands and waterway riparian areas will be monitored according to DSL stipulations and the DSL (2009) guidelines for monitoring vegetation. Table 4-1 lists the DSL monitoring and report requirements for wetlands and waterway riparian areas, which are the same as those used to develop and implement the Ruby Pipeline Project Removal-Fill Permit issued by DSL.

**Table 4-1 Oregon Department of State Lands Monitoring Requirements**

Monitoring Reports	Report Requirements
First year	<ul style="list-style-type: none"> <li>• Establish permanent monitoring transects and photo locations; document locations with global positioning system and photos.</li> <li>• Assess vegetation performance standards.</li> <li>• Brief narrative that describes maintenance activities and contingency measure to meet rectification within a 24-month period from the date wetland or waterway impacts occur.</li> </ul>
Second year	<ul style="list-style-type: none"> <li>• Monitor permanent transects and photo locations.</li> <li>• Assess vegetation performance standards.</li> <li>• Determine if impacts to each wetland or waterway were rectified within a 24-month period from the date the impact occurred.</li> <li>• Brief narrative that describes maintenance activities.</li> </ul>
Third and subsequent years until performance standards are met	<ul style="list-style-type: none"> <li>• Monitor permanent transects and photo locations</li> <li>• Assess vegetation performance standards (if DSL determines temporary impacts were not rectified within a 24-month period from the date wetland or waterway impacts occurred)</li> <li>• Additional information required by DSL if temporary impacts were not rectified within a 24-month period from the date wetland or waterway impacts occurred</li> </ul>

The wetland and waterway riparian areas will be stratified by herbaceous, shrub, and forest habitat types based on pre-disturbance maps, and/or the alignment of habitats as they occur in control plots located in the 400-foot study corridor. However, some of these wetlands and areas within the right-of-way may be less than 0.25 acre and thus would not need habitat stratification.

Permanent sampling locations in each of the wetland habitat types will be randomly selected. Permanent photo locations will be established to visually document revegetation success. Metrics will be measured using a 1 to 2 meter sample plot and will include species occurrence, their indicator status, native status, vegetation strata, species foliar cover, and bare substrate. Species foliar cover will be aggregated to total plant foliar cover, herbaceous plant foliar cover, woody foliar cover, and invasive plant foliar cover. Species diversity and the moisture prevalence index will be calculated from the plot data. Woody plant density will be measured using two 1.0 x 1.0 square meter plots placed randomly. The Vegetation Manager relational database (available at [www.nwhi.org/index/publications](http://www.nwhi.org/index/publications)) or other method that follows requirements outlined in the routine monitoring guidance will be used for data analyses and report preparation (DSL 2009). The number of sampling plots and points will be modified as necessary to achieve data reporting requirements of 80% confidence level and  $\pm 10$  units for all average cover calculations including native plant, invasive plant, and bare-ground cover.

## 5 Performance Criteria

Performance criteria describe the benchmarks by which successful vegetation establishment can be determined. Performance criteria must accommodate the inherent variability of restoring native vegetation and be applicable to the several different kinds of wetland and riparian plant communities across the length of the Pipeline. Monitoring needs to document that progress is being made towards obtaining the end results of desirable plant community establishment, wildlife habitat restoration, and soil surface stability.

### 5.1 Oregon Wetland and Riparian Performance Criteria

The DSL has specified performance standards for the revegetation of all herbaceous and herbaceous/shrub wetlands and riparian areas crossed by the right-of-way (Table 5-1). A combination of pre-disturbance and post-construction criteria will be used for evaluating plant establishment success.

**Table 5-1 Oregon Revegetation Performance Criteria for Wetlands and Riparian Areas**

Performance Criteria	Wetland and Riparian Type	
	Herbaceous	Herbaceous/Shrub
Native herbaceous plant cover <sup>1</sup>	100% of pre disturbance cover or $\geq$ 80% of adjacent, undisturbed wetland habitat. <sup>2</sup>	Herbaceous stratum will meet 100% of pre disturbance cover or $\geq$ 80% of adjacent, undisturbed wetland habitat. <sup>2</sup>
Invasive species cover <sup>3</sup>	The cover of invasive species is the lesser of pre-disturbance percent cover or $\leq$ 10% cover.	The cover of invasive species is the lesser of pre-disturbance percent cover or $\leq$ 10% cover.
Bare substrate cover	Bare substrate will not exceed either pre-disturbance percent cover or 20% cover.	Bare substrate will not exceed either pre-disturbance percent cover or 20% cover.
Species diversity	Dominant native species <sup>4</sup> in the herbaceous layer will meet pre-disturbance diversity or 80% of control plot located in adjacent, undisturbed wetland.	Dominant native species <sup>5</sup> in the herbaceous layer will meet pre-disturbance diversity or 80% of control plot located in adjacent, undisturbed wetland. Woody vegetation will have an 80% stem density of woody plants in the control plot.
Moisture Prevalence Index <sup>4</sup>	< 3.0 for all strata	< 3.0 for all strata
Riparian composition	Composition, density <sup>6</sup> , and distribution will be the same as pre-disturbance	Composition, density, and distribution will be the same as pre-disturbance

---

**Table 5-1 Oregon Revegetation Performance Criteria for Wetlands and Riparian Areas**

---

Notes:

- <sup>1</sup> Native plants as defined by the USDA Plants Database (<http://plants.usda.gov>).
- <sup>2</sup> Control plots will be established within the 400-foot study area referenced in the removal-fill application.
- <sup>3</sup> A plant species will be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list or if it is a known problem species, including, but not limited to, *Phalaris arundinacea*, *Mentha pulegium*, *Holcus lanatus*, *Anthoxanthum odoratum*, and, in the case of agricultural fields, the last crop planted if it is non-native. Non-native plants will be labeled as such if they are listed as non-native on the USDA Plants Database.
- <sup>4</sup> As defined and calculated in Oregon Department of State Lands (2009).
- <sup>5</sup> Dominant species are native, represent at least 5% cover, and have a 10% frequency within the habitat class (DSL 2009).
- <sup>6</sup> In order to count plant density, plants have to be alive. In shrub-dominated systems, the number of live plants for shrubs and the number of live stems for trees are counted.

# 6 Monitoring Reports and Release from Monitoring Obligation

## 6.1 Annual Monitoring Reports

PCGP will monitor plant establishment for a minimum of three years after revegetation is completed or until sites meet performance criteria. Annual monitoring reports will be submitted to FERC, BLM, USFS, and DSL after the annual monitoring is completed (reports to DSL are due by December 31 of the year the survey was completed or as agreed to by the agency).

An “As-Built” Report documenting the final design of the restoration areas will be prepared when site construction and planting are completed. The report will include the following:

- Site vicinity map;
- Drawings that identify the boundaries of the restoration areas;
- The installed planting scheme providing quantities, densities, sizes, and approximate locations of plants, as well as plant sources and the time of planting; and
- General notes indicating site conditions, concerns, or other issues that might affect site planting success.

A copy of the “As-Built” Report will be provided along with other specified data as required by these agencies within the year when planting has been completed. In addition, PCGP will report to FERC and the appropriate land management agency any emergency corrective action that might be taken separately from the data provided in the annual report.

## 6.2 Right-of-Way Release from Monitoring Obligation

PCGP will request formal release from monitoring when a particular wetland or riparian area complies with the performance criteria presented in Section 5. Once monitoring plots are determined to meet performance criteria, they will no longer be included in the annual monitoring. Determination of restoration and revegetation compliance would rest with FERC, DSL, USACE, and the appropriate land management agencies.

## 7 References

- Geier-Hayes, Kathleen, Mark A. Hayes, and Douglas D. Basford. 1995. *Determining Individual Tree Shade Length: A Guide for Silviculturists*. United States Department of Agriculture Forest Service, Intermountain Research Station, General Technical Report INT-GTR-324. September 1995.
- GeoEngineers, 2017. Stream Crossing Risk Analysis Addendum. Pacific Connector Gas Pipeline Coos, Douglas, Jackson and Klamath Counties, Oregon. File No. 22708-001-00 August 28, 2017.
- Oregon Department of State Land. 2009. Routine monitoring guidance for Vegetation: A companion document to the compensatory mitigation for non-tidal wetlands and tidal waters and compensatory non-wetland mitigation. Salem, Oregon.  
[http://www.oregon.gov/DSL/PERMITS/docs/dsl\\_routine\\_monitoring\\_guidance.pdf?ga=t](http://www.oregon.gov/DSL/PERMITS/docs/dsl_routine_monitoring_guidance.pdf?ga=t).



# **A Wetland and Riparian Monitoring Datasheets**

Waterbody ID: \_\_\_\_\_

Date: \_\_\_\_\_

Observers: \_\_\_\_\_

Waterbody Annual Monitoring Data Sheet

Feature association:

- ROW
- AR
- Other: \_\_\_\_\_

Channel Dimensions at centerline (feet):

Width at OHW \_\_\_\_\_  
Depth at OHW \_\_\_\_\_

Bed Material

- Substrate
- Bedrock
- Gravel
- Sand
- Silt
- Cobbles
- Clay
- Concrete
- Other \_\_\_\_\_

Bank Material

- |                          | Left                     | Right                    |
|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Hydrology Conditions:

water present:  yes  no

significant topographic features that contribute to site hydrology (describe):

- pools
- riffles
- cascade
- step

Hydrologic Roughness:

- Boulders
- Large wood
- Shrubs \_\_\_\_\_
- Other \_\_\_\_\_

Mass Wasting

- Landslide
- Debris flow

Bank Condition:

Bank disturbance/erosion:  yes (if yes, describe)  no

- Sloughing \_\_\_\_\_
- Impact from cattle \_\_\_\_\_
- Undercutting \_\_\_\_\_
- Other \_\_\_\_\_

Bank Height and Slope:

Left Bank\* \_\_\_\_\_ Right Bank\* \_\_\_\_\_  
Height (ft): \_\_\_\_\_ Height (ft): \_\_\_\_\_

- |   |   |
|---|---|
| Slope: <input type="checkbox"/> 0-30° (4:1) | Slope: <input type="checkbox"/> 0-30° (4:1) |
| <input type="checkbox"/> 31-45° (3:1)       | <input type="checkbox"/> 31-45° (3:1)       |
| <input type="checkbox"/> 46-60° (2:1)       | <input type="checkbox"/> 46-60° (2:1)       |
| <input type="checkbox"/> 61-90° (1:1)       | <input type="checkbox"/> 61-90° (1:1)       |

Height (ft) (OHWM from stream bed): \_\_\_\_\_  
\*Direction when facing downstream

Riparian vegetation present:  yes  no (if yes, use *Monitoring Plot data sheet*)

Mandatory Photos - List IDs (list w/direction):

\*On Centerline Facing Upstream –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

\*On Centerline Facing Downstream –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

\*On Centerline Facing Right Bank –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

\*On Centerline Facing Left Bank –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

\*Facing Upstream from ROW boundary –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

\*Facing Downstream from ROW boundary –  
ID \_\_\_\_\_ DIR \_\_\_\_\_

Reference Points:

Aquatic Habitat Unit – TYPE \_\_\_\_\_ ID \_\_\_\_\_ DIR \_\_\_\_\_

Aquatic Habitat Unit – TYPE \_\_\_\_\_ ID \_\_\_\_\_ DIR \_\_\_\_\_

Aquatic Habitat Unit – TYPE \_\_\_\_\_ ID \_\_\_\_\_ DIR \_\_\_\_\_

Hydraulic Roughness – TYPE \_\_\_\_\_ ID \_\_\_\_\_ DIR \_\_\_\_\_

Mass Wasting – ID \_\_\_\_\_ DIR \_\_\_\_\_

MISC PHOTO - ID \_\_\_\_\_ DIR \_\_\_\_\_, ID \_\_\_\_\_ DIR \_\_\_\_\_

Waterbody meets performance criteria:  yes (if yes, describe)  no (if no, describe suggested maintenance)

Native herbaceous plant cover  yes  no

Percent native cover \_\_\_\_\_%

Noxious species cover  yes  no

Percent noxious species cover \_\_\_\_\_%

Bare substrate cover same (or less) as pre-disturbance, or ≤20% of total bare cover?  yes  no

Percent bare substrate cover \_\_\_\_\_%

Species diversity  yes  no

Percent species diversity compared to adjacent area \_\_\_\_\_%

Moisture Prevalence Index < 3.0 for all strata  yes  no

Riparian composition, density, and distribution is the same as pre-disturbance  yes  no

Suggested Maintenance:

WETLAND ID: \_\_\_\_\_ Date: \_\_\_\_\_ Observers: \_\_\_\_\_

## Wetland Annual Monitoring Data Sheet

## Feature association:

- ROW  
 AR  
 Other: \_\_\_\_\_

## Reference Points and Photos (list w/direction):

## \*Mandatory Photos - List IDs (list w/direction):

\*On Overview – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

\*On Boundary Cross View – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

\*On Boundary Cross View – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

## Not Mandatory, but if taken in past years, take again

Cross View – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Cross View – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Access Road Overview – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Other – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Other – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Other – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Other – HP: \_\_\_\_\_

Photo ID \_\_\_\_\_ DIR \_\_\_\_\_

Notes:

## Annual Monitoring Conditions:

Wetland Disturbance:  yes (if yes, describe)  no Grazing \_\_\_\_\_ Trampling \_\_\_\_\_ Rutting (OHV) \_\_\_\_\_ Ag Use \_\_\_\_\_ Other \_\_\_\_\_Wetland meets performance criteria:  yes (if yes, describe) no (if no, describe suggested maintenance)Native herbaceous plant cover  yes  no

Percent native cover \_\_\_\_\_%

Noxious species cover  yes  no

Percent noxious species cover \_\_\_\_\_%

Bare substrate cover same (or less) as pre-disturbance, or  
≤20% of total bare cover?  yes  no

Percent bare substrate cover \_\_\_\_\_%

Species diversity  yes  noPercent species diversity compared to adjacent  
area \_\_\_\_\_%

## Moisture Prevalence Index

< 3.0 for all strata:  yes  noRiparian composition, density, and distribution is the same as  
pre-disturbance  yes  no

Suggested Maintenance:

