
APPENDIX S

Jordan Cove's Draft Wildlife Habitat Mitigation Plan

Jordan Cove Energy Project

Wildlife Habitat Mitigation Plan in accordance with OAR 635-415-0000 through 0025

Prepared for:



125 Central Avenue, Suite 380
Coos Bay, OR 97420

Prepared by:



2100 SW River Parkway
Portland, OR 97201

May 2014

TABLE OF CONTENTS

- 1. INTRODUCTION.....1**
- 2. ALTERNATIVES.....2**
- 3. IMPACTS2**
 - 3.1 IMPACT SUMMARY 2
 - 3.2 EXISTING HABITAT FUNCTION..... 3
 - 3.3 DIRECT IMPACTS AND HABITAT FUNCTION POST-CONSTRUCTION..... 5
 - 3.4 INDIRECT IMPACTS 6
 - 3.5 TEMPORAL LOSS..... 6
- 4. MITIGATION SITE SELECTION.....6**
- 5. MITIGATION SITE BASELINE CONDITIONS AND MITIGATION CONCEPTS.....8**
 - 5.1 THIRD-PARTY MANAGER CONCEPT 8
 - 5.2 THE PANHANDLE SITE (PARCEL P)..... 9
 - 5.3 THE NORTH BANK SITE (PARCEL S)13
 - 5.4 THE LAGOON SITE (PARCEL W)14
- 6. MITIGATION CALCULATIONS.....14**
- 7. COMPLEMENTARY MITIGATION15**
- 8. MONITORING PLAN16**
 - 8.1 AS-BUILT SURVEY (YEAR 1)16
 - 8.2 PHOTO DOCUMENTATION (YEARS 1 THROUGH 5)16
 - 8.3 PERFORMANCE STANDARDS16
 - 8.4 CONTINGENCY PLAN17
- 9. LONG-TERM PROTECTION AND FINANCIAL SECURITY INSTRUMENTS17**
 - 9.1 PROTECTION INSTRUMENT17
 - 9.2 LONG-TERM MAINTENANCE PLAN17
- 10. PREPARERS AND CONTRIBUTORS18**
- 11. APPENDICES19**
 - APPENDIX A: PHOTOGRAPHS
 - APPENDIX B: FIGURES
 - APPENDIX C:DRAFT JORDAN COVE ENERGY PROJECT WILDLIFE SALVAGE PLAN

Tables

- Table 1: Jordan Cove Energy Project Mitigation Opportunities/ Constraints by Parcel7
- Table 2: Mitigation Acreage Calculations 15

1. INTRODUCTION

The Jordan Cove Energy Project (JCEP) is comprised of three components: the Jordan Cove Liquefied Natural Gas (LNG) Terminal Project, the Pacific Connector Gas Pipeline Project (PCGP), and the Slip and Access Channel Project. Jordan Cove Energy Project, L.P. (JCEP L.P.), the Oregon International Port of Coos Bay (Port), and Pacific Connector Gas Pipeline, L.P. (Pacific Connector) are seeking to construct, operate, and maintain these three project components. Figure 1, Project Vicinity, shows the primary elements of the JCEP discussed in this plan. The PCGP is not shown on Figure 1 because this plan does not cover the PCGP as mitigation for the PCGP will be addressed separately by Pacific Connector.

Natural gas will be delivered to the LNG terminal site (via the gas pipeline, which will connect the terminal with existing Pacific Gas and Electric Company [PG&E] intrastate pipeline and interstate natural gas pipeline systems), where it will be conditioned, cooled into a liquid, stored in two full-containment 160,000 m³ LNG storage tanks, and loaded on to LNG carriers for export at newly constructed marine facilities.

Such marine facilities include an access channel and a slip that the Port will seek authorization to construct, operate, and maintain. The Slip and Access Channel will connect the existing Coos Bay Navigation Channel and the Jordan Cove LNG Terminal Project site at approximately Coos Bay Navigation Channel Mile 7.3. Based on the estimated size of the LNG carriers expected to call upon the terminal, it is anticipated that approximately 90 ships per year will be required to transport the LNG from the terminal. The Project footprint is defined as the area that will be both temporarily and permanently impacted by the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project.

Impacts resulting from the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project have been minimized, to the greatest extent practicable, as discussed in the Federal Energy Regulatory Commission (FERC) Resource Reports available on line at the Jordan Cove Energy Project, L.P. FERC website:

http://www.jordancoveenergy.com/ferc_application_and_resource_reports_1-13.htm#rr3

Please refer to the FERC Resource Reports for additional information on how the Project design was evaluated and selected as proposed.

JCEP L.P. contracted with David Evans and Associates, Inc. (DEA) to develop a plan to mitigate unavoidable impacts to wildlife habitat. This mitigation plan is intended to thoroughly describe the manner in which the impact of the project will be reduced or eliminated over time, avoided, and/or minimized; and the affected environment, including fish and wildlife habitat, monitored, restored, rehabilitated, repaired and/or replaced or otherwise compensated for in accordance with Oregon Administrative Rule (OAR) 635-415-0000 through 0025.

Meetings with three Oregon Department of Fish and Wildlife (ODFW) representatives and three JCEP team members took place in Coos Bay on July 23 and August 26, 2013. The purpose of these meetings was to discuss habitat mapping for the Jordan Cove LNG Terminal Project and the Slip and Access Channel Project components, and formulate an overall mitigation strategy that meets the ODFW Habitat Mitigation Policy. DEA presented a summary of existing conditions and unavoidable impacts to habitat resulting from proposed project development.

The group reviewed and edited the draft ODFW habitat categorization for the project, discussed potential strategies and locations for mitigating impacts, and visited potential mitigation sites to further refine these concepts. The results of these discussions are included in this document.

ODFW concurred with the habitat mapping within project elements described in the Final ODFW Habitat Categorization Technical Memo (dated September 10, 2013) on October 30, 2013. This mitigation plan was reviewed by ODFW and their input has been incorporated.

2. ALTERNATIVES

The alternatives to the proposed development action are provided in detail in Resource Report 10 (Docket No. CP13-483), which was produced by SHN Consulting Engineers & Geologists (SHN) in May 2013 and is available online.

3. IMPACTS

3.1 IMPACT SUMMARY

The location, physical and operational characteristics, and duration of the proposed development action and wetland impacts are described in the permit applications submitted to the Oregon Department of State Lands (DSL) on March 20, 2014 and the US Army Corps of Engineers (USACE) on June 11, 2013 with recent updates sent on March 28, 2014. These documents are available on DSL's website:

<http://www.statelandsonline.com/index.cfm?fuseaction=Comments.AppListLF&county=Coos>

The DSL permit application (#54908-RF) was deemed complete by DSL on April 18, 2014. Since mitigation for wetland and estuarine resources is overseen by DSL and USACE, it is not emphasized in this document, and the remainder of this document focuses on upland habitat mitigation.

The habitat types that may be affected by the proposed development action are shown in Figure 2. They are described by mitigation site in the following sections and in detail in FERC Resource Report 3 (RR3), which is available online, and is summarized below:

The Project is not expected to have a long-term significant impact to vegetation resources, as the areas that will be graded and cleared for construction are relatively common and widespread throughout the North Spit and the Project vicinity. The Project footprint was selected on the basis of avoiding, to the extent practical, unique vegetation communities and higher value wetlands. Selection of temporary construction staging sites was primarily restricted to upland areas to avoid impacting wetlands.

The fish and wildlife species which will be affected are described in detail in RR3, as summarized below:

A number of habitats exist on the Project site that support a variety of wildlife species as temporary or permanent residents. Approximately 178 tetrapod species (amphibians, reptiles, birds, and mammals) were recorded on or adjacent to the Project site during surveys conducted in October 2012 and during previous surveys from June to December 2005 and in early 2006. Terrestrial species include approximately 115 species. Approximately 151 seasonal or year-round resident bird species occur in the Project site area, and a variety of habitats suitable for migratory birds exists within the Project site boundaries. Species types and densities are directly related to season of year, preferred habitats, food resources, and protective cover.

The proposed Project site provides suitable habitat for a number of wildlife species associated with the coastal, mid-coastal, interior foothills, and mountain terrains that construction and operation of the proposed Project could affect. The majority of wildlife species detected on or adjacent to the Project site during the 2005/2006 and 2012 surveys were birds. Twenty-nine federal or state-listed threatened or endangered species, and one proposed species, potentially occur in the proposed Project area.

Although these species potentially occur, the report goes on to say that, based on available knowledge, consultation with agencies, and focused surveys for particular species, no listed terrestrial species are known or expected to occur within the study area. Please refer to RR3 for greater detail.

In order to decrease impacts to wildlife from construction, the Draft Jordan Cove Energy Project Wildlife Salvage Plan was assembled using best available information regarding salvage of a variety of species, and has been included as Appendix C. ODFW provided input for this plan, and they and other agencies are invited to comment and provide additional on-site guidance as the project nears initiation.

The nature, extent, and duration of impacts expected to result from the proposed development action are described in detail in RR3. These impacts have been incorporated into Figure 3, which shows post-construction habitat categories. Function of these areas before and after construction is described below.

3.2 EXISTING HABITAT FUNCTION

3.2.1 Category 2 and 3 Habitats

As indicated by their assigned number, Category 2 and 3 habitats currently function at a high level for wildlife. Category 2 habitats are limited to wetland and estuarine resources. Category 3 habitats include dune forest, un-vegetated sand, and riparian forest. The mitigation goal for Habitat Category 2 is: “if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality **and** to provide a net benefit of habitat quantity **or** quality”. The mitigation goal for Habitat Category 3 is: “if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality” (OAR 635-415-0015).

3.2.2 Category 4 Habitats

Category 4 habitats, on the other hand, are not currently functioning at a high level for wildlife (compared to less-disturbed habitats in the vicinity). The vast majority of Category 4 habitats that would be impacted by the project lie on dredge spoils covered by very weedy herbaceous and shrub habitat (Photos 1-8, Appendix A). The mitigation goal for Habitat Category 4 is: “if impacts are unavoidable, [mitigation] is no net loss of either habitat quantity **or** quality” (OAR 635-415-0015). These habitats have been degraded extensively historically, and only provide habitat for generalist species such as deer, small mammals, and a limited suite of songbirds. No sensitive species are known to use these habitats, as discussed in RR3. In fact, at the Mill Site, much of the Category 4 habitat lies on top of historic development and waste dumping areas and on top of currently permitted landfills, all of which are required to be capped in the future as part of the Oregon Department of Environmental Quality (DEQ) approved site cleanup process.

Photos representing typical Category 4 habitat have been provided in Appendix A to inform the discussion. As shown, the herbaceous habitat type is found primarily on historically leveled areas (and to a lesser degree on recently colonized dunes) where pioneering species (mainly European beachgrass, [*Ammophila arenaria*]) have established themselves. Dominant species include European beachgrass, tall fescue (*Schedonorus arundinaceus*), sweet vernal grass (*Anthoxanthum odoratum*), Queen Ann’s lace (*Daucus carota*), and hedgehog dogtail grass (*Cynosurus echinatus*).

Other species include velvet grass (*Holcus lanatus*), English plantain (*Plantago lanceolata*), tall orchardgrass (*Dactylis glomerata*), colonial bentgrass (*Agrostis capillaris*), hairy catsear (*Hypochaeris radicata*), small-head clover (*Trifolium microcephalum*), hop clover (*T. dubium*), and red and white clover (*T. pratense and repens*). Some of these areas were planted with pasture species. Native species are generally limited to yarrow (*Achillea millefolium*) and pearly everlasting (*Anaphalis margaritacea*), with American dunegrass (*Elymus mollis*) present in very limited areas. Himalayan blackberry (*Rubus armeniacus*) and scattered trees and shrubs (cultivated as well as native) are present in some places along the edges of the habitat near developed areas, and have been included in this habitat type due to their low cover overall. Some of these areas were planted with pasture species.

In Herbaceous/Shrub and Shrub habitat, several species of shrub, primarily Scotch broom (*Cytisus scoparius*), and Himalayan blackberry, as well as some native shrub species and trailing blackberry (*Rubus ursinus*) provided greater cover, but understory species were similar to Herbaceous habitat. In many places, Scotch broom has formed dense thickets, excluding most other species, as is the case in most of the Shrub habitat. Nearly all Category 4 habitats within the project footprint have been re-contoured historically.

The least-disturbed Category 4 habitats within the project footprint occur in the leveled area along the western edge of the project. This area is used by a variety of generalist species, and also by elk. Species such as peregrine falcon are known to forage over the habitat, and human disturbance is generally limited to occasional foot traffic and vehicles. The habitat at the North Point Workforce Housing Project (NPWHP) site is similarly little-disturbed, but similarly dominated by non-native species, and less accessible to species such as elk due to its geographic isolation.

The remaining Category 4 areas are more frequently disturbed, occurring at the edge of Roseburg forest industrial property, and at the Mill Site interspersed with paved and gravel lots. As mentioned, active (but covered) landfill occupies the western edge of the Mill Site (west of the two ponds near the center of the site). In addition, the Mill Site contains large quantities of buried hazardous materials left over from mill activities, which don't directly affect existing wildlife function, but limit potential for restoration activities. Vehicular and foot traffic from property management activities is present at times, but the areas retain some function for wildlife due to their position adjacent to Jordan Cove. These habitats would be converted to herbaceous habitat post-construction, and would be mitigated for at a 1:1 ratio.

No Category 5 habitats were present within the study area. Category 6 habitats require avoidance and minimization, but no mitigation, and were not included in mitigation calculations.

3.3 DIRECT IMPACTS AND HABITAT FUNCTION POST-CONSTRUCTION

Project impacts include both long-term and short-term impacts. Long-term impacts include portions of the landscape that are converted to structures, pavement, or gravel, rendering the habitat essentially useless to wildlife. Short-term impacts include activities such as grading and re-vegetation of dune habitats adjacent to project facilities, which would likely occur for several weeks or months in duration. These impacts are shown in Figure 3, with long-term impacts (Category 6) in orange and short-term impacts (Category 4) in yellow.

Since long-term impact areas have low potential to become essential or important habitat for fish and wildlife, they would be considered Category 6. The majority of the project footprint would consist of Category 6 habitat post-construction. Areas that were mapped as Category 6 (pink) prior to project impacts were not included in mitigation calculations.

Only areas that were mapped in orange and yellow in Figure 3 were included in mitigation calculations. For instance, placement of underground water lines along the Trans Pacific Parkway was not mapped, and was not included in impact calculations for several reasons. First, the existing habitat although classified as Category 4, is extremely degraded by weeds and disturbance due to its location between the Trans Pacific Parkway and the railroad. Second, impacts would be extremely short-term (require less than one week in duration, with impacts occurring along each portion of the water line for only several hours at a time). Finally, since the waterline area would be re-vegetated with native species following installation, condition of impacted areas would be improved over existing condition, resulting in in-situ mitigation for impacts. Similarly, since wetland impacts are dealt with in the joint permit application and wetland mitigation process, they were not included in impact calculations, since that would mean that mitigation would occur twice for the same impact.

During the July 23, 2013 meeting, ODFW indicated that OAR 615-415-000 through 0025 does not differentiate between short-term and long-term impacts. Instead, ODFW considers the magnitude, duration, and geographic size of proposed mitigation in context with the magnitude, duration, and geographic size of the proposed impacts and with the specific mitigation goals defined for each Habitat Category. The project specific short-term impact areas, (which would be graded and re-vegetated with native seed) may retain minimal function for a few species of wildlife and would therefore typically be considered Category 4. However, these areas would

lose nearly all of their function for wildlife due to re-contouring and disturbance from proximity to project elements (compared to existing conditions). Therefore, for simplicity, JCEP has assumed conservatively that all habitats that are impacted, whether short-term or long-term (post-construction Habitat Category 4 or Category 6) would be considered to have no function post-construction (zero percent function), and would be mitigated for at a 1:1 ratio.

Since all habitats shown to be impacted in Figure 3 would be considered to have no function post-construction, and since JCEP will provide 1:1 mitigation for all these impacted areas, it is assumed that no additional future mitigation would be required for subsequent project activities within habitats shown to be impacted in Figure 3.

Areas mapped in olive indicate habitats that are currently Category 6, but would be converted to Category 4 (level grassy areas) following construction. Although the function of this habitat would improve slightly, the mitigation calculations do not take credit for this increase in function. In other words, it is assumed that the slightly improved habitat would still provide zero function for wildlife post-construction due to disturbance from adjacent project elements.

As mentioned previously, wetland impacts and mitigation is overseen by DSL and USACE, and is not emphasized in this document. However, as shown in Figure 3, impacts to non-jurisdictional wetlands would occur (shown in purple), which would not be included in that mitigation. Therefore, mitigation for those impacts would be provided at the Panhandle in the form of preservation, with net uplift provided for the overall parcel. Mitigation locations are shown in Figures 4 and 5.

3.4 INDIRECT IMPACTS

Regarding indirect impacts, the July 2013 meeting attendees agreed that due to the complexity and mitigation implications, JCEP would not attempt to quantify mitigation for indirect impacts, and that ODFW would discuss this internally and comment on indirect impacts as the process evolves. However, it should be assumed that some form of additional mitigation may be required for indirect impacts outside the project footprint, especially for indirect impacts to less-disturbed wildlife areas near the project.

3.5 TEMPORAL LOSS

It is assumed that activities resulting in ecological uplift at the mitigation sites would occur prior to or concurrent with construction, which would result in no temporal loss of function for wildlife habitat. If this were to become impossible due to timing of financing or implementation, additional mitigation would be required to offset temporal loss of function.

4. MITIGATION SITE SELECTION

In order to meet the fish and wildlife habitat mitigation goals for the project, DEA worked with ODFW to identify essential wildlife habitat to be protected from future disturbance and development, and to be enhanced to provide improved wildlife habitat function. DEA investigated numerous potential mitigation strategies, beginning in 2007. The first effort identified possible habitat enhancement projects on Bureau of Land Management (BLM) land on the North Spit. These ideas were developed for several months, but abandoned due to lack of

support from BLM management. The next strategy was to provide funding for protection of Forest Service lands threatened by off-highway vehicle (OHV) use within the Oregon Dunes National Recreation Area (ODNRA). However, this plan was not possible due to administrative requirements.

In 2010 and 2011, DEA investigated the opportunities and constraints involved in mitigation on private lands adjacent to the ODNRA. Research was based on aerial photography interpretation, and site visits and conversations with Stuart Love, ODFW Wildlife Biologist, and Chris Claire, ODFW Fish Biologist. At the time, numerous sites were investigated, but with no success because no private landowners within suitable parcels were willing to sell their property (Parcels A-H). Several suitable Coos County parcels were found (Parcels L-O), but it was uncertain whether the County would commit to selling the parcels. JCEP was able to obtain two large parcels suitable for some portions of the mitigation plan (Parcels P and W), but sufficient acreage for in-kind mitigation for forested habitats was still lacking.

In 2013 and 2014, investigation of private and Coos County parcels was renewed, and coordination with ODFW continued, but neither Coos County nor private landowners in the vicinity were willing to sell, and the search was widened to include areas further north and south of the project. In April, 2014, a parcel deemed suitable for in-kind mitigation for forested habitats and also available for sale was found (Parcel S).

Figure 4 provides an overview of parcels investigated, which are discussed in detail below and shown in Figure 5. Table 1 provides a summary of opportunities and constraints for all parcels that were investigated.

Table 1: Jordan Cove Energy Project Mitigation Opportunities/ Constraints by Parcel

Map ID	Taxlot	Owner/ Site Name	Site Acres	Comments
A-D	Various-see Figure 4	Sand Hills Gun Club, Inc.	>100	Good opportunities, but owner not interested.
E-H	Various-see Figure 4	McKeown, Joseph, et al.	>100	Good opportunities, but owner not interested..
I	24S13W28TL0 030000	U.S.A	39	Federal parcel surrounded by private lands. Unlikely opportunity for mitigation due to ownership.
J	24S13W03TL0 030000	Coos County	84	Split by USFS-designated main OHV route North-South which limits suitability.
K	23S13W14TL0 020000	Coos County	58	A designated main OHV route runs through the center of parcel, but western portions may provide protection for unique wildlife habitats. ODFW verified suitability.
L	23S13W22TL0 010000	Coos County	22	Contains unique wildlife habitats along Tenmile Creek. ODFW verified suitability of habitat for mitigation.
M	24S13W02BBT L009000	Coos County	28	Good opportunity for protection from development which is occurring north and south of parcel. Potential wildlife corridor to east from ODNRA.

Map ID	Taxlot	Owner/ Site Name	Site Acres	Comments
N	24S13W02TL0 040000	Coos County	86	Portions of the parcel could provide opportunities for protection and enhancement.
O	24S13W11TL0 040000	Coos County	17	Good potential conservation opportunity. Potential wildlife corridor to east from ODNRA.
P	24S13W32TL0 020000	Panhandle site	105	Parcel connects public trailhead to ODNRA lands and contains high quality wetland and upland habitats. Good opportunity.
Q	24S13W16TL0 0100, 200	Adamek	68	Parcel is primarily suitable for out-of-kind mitigation and therefore not as desirable for the project.
R	21121700400, 21121700700	Roseburg North and South	150	Dune forest logged 5-15 yrs ago, located north of the Umpqua River. Confirmed suitable by ODFW, but sold before it could be acquired.
S	26S14W09TL0 010000	North Bank	161	Dune forest located on the north bank of the Coquille River, adjacent to the Bandon Marsh National Wildlife Refuge, with opportunities for complementary mitigation.
W	25S13W06TL0 010100, 25S13W07TL0 010100	Weyerhaeuser Lagoons	315	Located on the North Spit between Coos Bay and the ocean. Heavily used by wildlife and recreationists, and therefore a good mitigation opportunity, though primarily out-of-kind.

5. MITIGATION SITE BASELINE CONDITIONS AND MITIGATION CONCEPTS

This section provides a detailed description of mitigation site conditions and mitigation concepts for parcels selected from Table 1 for use in the JCEP mitigation. The parcels that were selected were chosen based on their suitability for mitigation, availability, and composition of habitats that could meet the in-kind and out-of-kind mitigation needs of the project. Habitat types and categories in each of these parcels were mapped using the same methodology used for other project elements, and are shown in Figure 5.

The overall mitigation concept is to protect high quality habitats through implementation of a conservation easement. In addition, habitat enhancement (uplift) would be provided at each site, as described individually by site below.

5.1 THIRD-PARTY MANAGER CONCEPT

JCEP L.P. has entered negotiations with the Coos Watershed Association (CWA), a local non-profit organization established in 1993 meeting the requirements of ORS 271.715(3)(b), to provide long-term management and maintenance of all mitigation sites associated with the JCEP (including estuarine and freshwater wetland mitigation). JCEP L.P. would endow CWA to provide these services through the life of the Project (estimated approximately 30 years post construction). In doing so, JCEP LP, via CWA, can steer the mitigation sites toward substantial compliance with permit conditions and provide the required ecological uplift. In addition, a long-term maintenance plan is being written to provide guidance for the third-party manager.

If negotiations with CWA fail, JCEP L.P. would create and endow a third party entity meeting the requirements of ORS 271.715(3)(b) to provide management and maintenance services for the mitigation projects for the life of the Project.

5.2 THE PANHANDLE SITE (PARCEL P)

The Panhandle Site (Figure 5) lies north of the Trans Pacific Parkway and is part of a larger natural area that extends north into the ODNRA. The area has exceptional ecological features that are difficult to replace. For this reason, it was purchased in 2012 to be used for mitigation. The site is used by hikers from the Weyerhaeuser North Spit Overlook trailhead west of the site, and such use, which is supported by ODFW, would be allowed to continue.

5.2.1 Existing Conditions

The site contains several upland vegetation communities, as shown in Figure 2 and described below.

5.2.1.1 Coastal Dune Forest Habitat

Coastal dune forest habitat consists of forest areas established on fully stabilized sand dunes in the region. It is found throughout the study area in various successional stages. Dominant species include Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), shore pine (*Pinus contorta* spp. *contorta*), and Port Orford cedar (*Chamaecyparis lawsoniana*), with scattered Sitka spruce (*Picea sitchensis*). In some places, patchy canopy promotes vigorous shrub growth and cover, ranging from dense to nearly impenetrable.

Dominant shrubs are evergreen huckleberry (*Vaccinium ovatum*), salal (*Gaultheria shallon*), bearberry (*Arctostaphylos uva-ursi*), and Pacific rhododendron (*Rhododendron macrophyllum*) with scattered California wax myrtle (*Myrica californica*) and hairy Manzanita (*Arctostaphylos columbiana*). The understory is generally lacking herbaceous species due to dense canopy cover, although portions of the forest are less dense than others.

Project specific coastal dune forest habitat parcels would be considered Category 3, due to the essential function they provide (based on ODFW policy definition). Species such as American marten, bats, and some songbirds depend upon it for species survival, and loss of the habitat could result in depletion of some of these species on a local scale. However, the habitat is not limited since similar habitats are found north and east of the project and provide alternate functional habitat for these relatively mobile species.

5.2.1.2 Herbaceous Habitat

The herbaceous habitat type is found on recently colonized dunes where pioneering species have established themselves. Dominant species include European beachgrass and colonial bentgrass, tall fescue, sweet vernal grass, and other non-native species, with some cover by native species such as seashore lupine (*Lupinus littoralis*), small-head clover, and beach strawberry (*Trifolium microcephalum*). Scotch broom is present in places, but is fairly limited.

This habitat type would not be considered essential (based on ODFW policy definition) because no species are known to depend upon it exclusively for their survival, and loss of the habitat would not likely result in depletion of any species. The habitat is not limited since similar habitats are found in the vicinity. Therefore the habitat is classified as Category 4 because it is not essential, or limited, but is important to wildlife.

5.2.1.3 Shrub Habitat

This habitat type is located on more stabilized dunes and has been colonized by shrubs and young trees, primarily Scotch broom and young shore pine. Overall shrub cover is 25% or more in this habitat type. The herbaceous species include mainly the non-native species described above such as European beachgrass, sweet vernal grass, and colonial bentgrass. The habitat is classified as Category 4 because it is not essential, or limited, but is important to wildlife.

5.2.1.4 Un-vegetated Sand Habitat

This habitat type includes areas of moving sand that have not been colonized by vegetation, except for very scattered herbaceous pioneer species such as European beachgrass. Although the habitat formed by these dunes is generally devoid of vegetation, it provides important habitat for a variety of wildlife, including songbirds that forage on seeds blown into this habitat, and raptors and small mammals that use the edges for foraging. ODFW considers the habitat to be limited on a local scale, since it is present only on a small strip of land between Highway 101 and the ocean. By ODFW definition, it is non-essential, but important to wildlife and limited, and would therefore be classified as Category 3.

5.2.1.5 Forested Wetland

The forested wetland habitat type consists of wetlands that have remained undisturbed long enough to develop a consistent tree canopy. It is dominated primarily by shore pine with some areas of tree-sized Hooker willow (*Salix hookeriana*). Mature red alder (*Alnus rubra*) and Sitka spruce also occurs in places, typically at the wetland boundary or on upland hummocks within the wetlands. The shrub layer is dominated by common coastal wetland species such as Pacific crabapple (*Malus fusca*), Hooker willow, Douglas' spirea (*Spirea douglasii*) and twinberry (*Lonicera involucrata*) in places. The herbaceous layer is typically dominated by slough sedge (*Carex obnupta*). The habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.6 Scrub-Shrub Wetland

This habitat type is commonly dominated by Hooker willow, with salmonberry and other common coastal wetland species such as slough sedge and skunk cabbage (*Lysichiton americanus*). Pacific crabapple was also a dominant shrub species in some areas. The habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.7 Emergent Wetland

This habitat type is typically dominated by slough sedge. In places, other typical species include spreading rush (*Juncus patens*), water parsley (*Oenanthe sarmentosa*), Pacific silverweed (*Potentilla anserina*), and salt grass (*Distichlis spicata*), among others. Wetter portions of this habitat type consisted of aquatic floating and emergent plants in relatively shallow seasonally or perennially inundated areas, including pond lily (*Nuphar polysephalum*), water parsley, cattail (*Typha latifolia*), and small-fruited bulrush (*Scirpus microcarpus*). The emergent wetland habitat is classified as Category 2 because it is essential for wildlife, and limited, but can be replaced through mitigation.

5.2.1.8 Open Water

Open water habitat is present in steep-sided interdunal areas and within deeper portions of wetland areas, where no vegetation was present. This habitat is classified as Category 2 because it is essential to wildlife and limited.

5.2.1.9 Unique Habitats Present

The Panhandle site contains unique qualities determined to be of significant importance to the State of Oregon, in the Coast Range Ecosystem. Information regarding the presence of these qualities has been gathered from resources found in the Oregon Conservation Strategy (ODFW, 2006) and from information provided by the Oregon Biodiversity Information Center (ORBIC) website. Important qualities observed at the mitigation site include the following:

1. Significant populations of rare plants or animals;
2. Rare wetland type;
3. Native, mature forest wetland and;
4. Preserves a wetland type disproportionately lost

1. Significant populations of the rare amphibian Northern red-legged frog (*Rana aurora*) have been observed in multiple locations throughout and adjacent to the site. Northern red-legged frogs are listed by the ODFW as “Sensitive – Vulnerable,” federally as a “Species of Concern” and listed by ORBIC as “List 4.”

2. Two rare wetland types based on rare plant associations have been observed at the site. Rare plant associations are listed on the Oregon Wetlands Explorer National Resources Digital Library (<http://oregonexplorer.info/wetlands/AtriskWetlandPlantAssociations>).

The first plant association at the site includes *Salix hookeriana* - (*Malus fusca*) / *Carex obnupta* - *Lysichiton americanus* (coast willow - (crabapple) / slough sedge - skunk cabbage shrub swamp). This plant association has a state rank of S2, defined as imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences. This wetland type was observed in patchy distribution throughout the area defined in the wetland delineation as scrub-shrub wetland (DEA, 2013). This includes approximately 6.4 acres wetlands.

The second at-risk plant association observed at the site is shore pine / slough sedge. This plant association has a state rank of S1, defined as critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences. This wetland type was observed in the majority of forested portions of the site defined in the wetland delineation as forested wetland (DEA, 2013). This includes approximately 3.2 acres of wetlands.

3. A mature forested wetland is defined as a wetland in which mean diameter of trees (d.b.h., FACW and FAC species only) exceeds 18 inches, and/or the average age of trees exceeds 80 years, or there are >5 trees/acre with diameter >32 inches. Although no data has been collected, the site appears to meet this criterion.

4. Historical evidence suggests that this site is a remaining portion of a much larger complex of interdunal wetlands that once occurred on the North Spit. Interdunal wetlands are considered by the state to be an area of “special areas of concern”. An interdunal wetland is defined as a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located between sand dunes where wind has scoured the sand down to the water table (deflation plain), and often with significant cover of native species.

5.2.2 Mitigation Concept

In addition to permanent preservation of the parcel, an ecological uplift is required. Several ecological uplift concepts have been discussed with ODFW during meetings and site visits to discuss project mitigation. The uplift concepts are presented as a portfolio of potential options; although not all these activities would occur, they have been vetted by ODFW as acceptable forms of uplift for the project. In order to document uplift (thereby making the parcels eligible as mitigation under OAR 635-415-0000 through 0025), some combination of uplift alternatives that results in measurable functional uplift at each proposed mitigation parcel would be required.

In order to limit disturbance from mitigation, implementation at the Panhandle is anticipated to be completed with hand-tools and small-equipment to the extent possible. Activities would focus on upland habitat, and would include the following:

- 1.6 acres of un-vegetated sand currently exists at the Panhandle. In order mitigate for impacts to 3.4 acres of un-vegetated sand (Category 3), at least 1.8 acres of European beachgrass and Scotch broom would be returned to un-vegetated sand condition by use of herbicide or other methods over a period of time sufficient to ensure that existing beachgrass does not re-sprout.

Activities would also include one or more of the following:

- Removal of invasive Scotch broom and replanting with native species. Scotch broom is currently present in patches (Photo 9) and the site would benefit from control to prevent further establishment. Control would focus on the western edge of the property, and would begin with mapping of Scotch broom, followed by documented reduction of cover over time.

- Where Scotch broom is removed, bare ground would be planted with native species. American dunegrass culms and other native species such as coast buckwheat (*Eriogonum latifolium*) would be used. Where possible, invasive European beachgrass could be removed and planted with natives as well. Although it is uncertain whether American dunegrass would survive in the long-term, or whether European beachgrass could be controlled by hand methods (rather than heavy equipment), the approach would be to use best available science to conduct restoration in small areas, followed by monitoring and adaptive management.
- Enhancement of habitat for American marten. Activities could include increasing coarse woody debris and snags to improve denning and foraging opportunities for the species. Methods could include placement of slash debris and topping of live trees to form snags. This approach would need to be discussed more thoroughly with ODFW prior to potential implementation.

5.3 THE NORTH BANK SITE (PARCEL S)

5.3.1 Existing Conditions

Parcel S (161 acres) lies on the north bank of the Coquille River adjacent to the Bandon Marsh National Wildlife Refuge (Figure 5). It is currently owned by Roseburg Forest Products, and contains primarily conifer forest atop stabilized sand dunes (Category 3) that was harvested between 14 and 58 years ago, which are scheduled to be harvested at 40-50 year rotations. Scrub-shrub wetlands (Category 2) lie along the eastern edge of the parcel, and a small drainage mapped as scrub-shrub wetland runs through the center of the parcel. Timber roads that have been reclaimed by vegetation (including large populations of noxious weeds) run throughout the parcel.

5.3.2 Mitigation Concept

The proximity of the parcel to Bandon Marsh provides opportunities for complementary mitigation between the two areas. Bandon Marsh consists primarily of wetlands and contains relatively little upland, forested habitat. Enhancement of Parcel S for wildlife could increase use of the parcel and travel through it. If suitable, educational opportunities could be coordinated as well.

Uplift methods would be aimed at improving native plant composition and improving habitat function for wildlife, and would include one or more of the following:

- Removal of weeds, including Scotch broom, gorse, and blackberry (Photo 11).
- Native plant enhancement.
- Coarse woody debris and snag enhancement.

5.4 THE LAGOON SITE (PARCEL W)

5.4.1 Existing Conditions

Parcel W lies on the North Spit just west of the Trans Pacific Parkway near the project area. It is a 315-acre parcel composed primarily of Category 2 wetland habitats, with Category 4 upland habitats up slope of the wetlands (Figure 5). Otherwise known as the Weyerhauser lagoons, the site is used heavily by songbirds and waterbirds, as well as by recreationists and birdwatchers, who access the lagoons and the beach by gated gravel roads on the north side of the parcel. Similar to the Panhandle, JCEP intends to allow for public use and enjoyment of the site, while enhancing portions of the site for wildlife. The North Spit sand road runs along the southern edge of the parcel and provides additional recreational and education opportunities.

5.4.2 Mitigation Concept

Uplift methods would be aimed at improving native plant composition and improving habitat function for wildlife, and would include one or more of the following:

- Wetland buffer enhancement.
- Scotch broom and other weed removal (Photo 12).
- Native plant enhancement.

6. MITIGATION CALCULATIONS

The number of acres required for mitigation for each habitat type, and the number of acres to be used for 1:1 mitigation, are shown in Table 2. As described in the ODFW policy, in-kind, in-proximity mitigation is required for Habitat Category 2 and 3. Therefore, impacted Category 2 and 3 habitats are mitigated by protecting and enhancing the same kind of habitat that was impacted. Other habitats may be mitigated by preserving habitats other than those that were impacted.

Acreage requirements were determined by comparing existing habitat mapping with the post-construction mapping provided in Figure 3. Since all areas to be either temporarily or permanently impacted by the project would be considered to retain zero function post-construction, this resulted in a requirement of 259.4 acres of mitigation.

The majority of in-kind mitigation would occur in Parcel P and Parcel S. Out-of-kind mitigation would also occur, preserving and enhancing wetlands as mitigation for impacts to Category 4 herbaceous and shrub habitats. Wetland types used for out-of-kind mitigation includes freshwater wetland and open water, and estuarine wetlands.

As discussed, in order to mitigate in-kind for impacts to 1.8 acres of un-vegetated sand, at least 1.8 acres of herbaceous habitat covered by European beachgrass at the Panhandle would be returned to un-vegetated sand (dune) condition through application of herbicides, manual removal, or a combination of techniques. This is in addition to the 1.6 acres of existing sand being used for in-kind mitigation at the Panhandle (Parcel P).

Table 2: Mitigation Acreage Calculations

DRAFT JCEP Upland Habitats	Acres needed	In-Kind Mitigation, in Acres			Out-of Kind Mitigation, in Acres*			Acres Used
		Parcel P	Parcel W	Parcel S	Parcel P	Parcel W	Parcel S	
Coastal Dune Forest	102.4							
Acres available at site		33.1	0.0	137.0				
Acres used at site		33.1		69.3				102.4
Riparian Forest	1.1							
Acres available at site			0.0	5.2				
Acres used at site				1.1				1.1
Shrub	8.7							
Acres available at site		3.7	5.1					
Acres used at site		3.7	5.0					8.7
Herbaceous Shrub	53.0							
Acres available at site		0.4	22.9					
Acres used at site		0.4	22.9		29.7			53.0
Herbaceous	90.8							
Acres available at site		12.3	11.8					
Acres used at site		12.3	11.8		22.5	44.2		90.8
Unvegetated Sand	3.4							
Acres available at site	**	3.4						
Acres used at site		3.4						3.4
Total	259.4	52.9	39.7	70.4	52.2	44.2	0.0	259.4
* Wetland types used for out-of-kind mitigation include freshwater and estuarine wetlands, and open water.								
** 1.8 acres of weedy herbaceous habitat at the Panhandle will be converted to sand as in-kind mitigation in addition to 1.6 acres of existing sand.								

7. COMPLEMENTARY MITIGATION

As required by the OARs, all these actions complement and do not diminish mitigation provided for previous development actions. This is especially true at the Panhandle Site, where previous wetland mitigation on adjacent Weyerhaeuser property will be augmented by upland habitat mitigation, and at North Bank, where complementary mitigation could occur in coordination with Bandon Marsh. Mitigation at the Panhandle would also expand existing protection of the adjacent ODNRA lands.

8. MONITORING PLAN

Per OARs, monitoring efforts shall continue for the duration and at a frequency needed to ensure that the goals and standards in OAR 635-415-0025 are met, unless the Department determines that no significant benefit would result from such monitoring. Monitoring efforts should include protocols and methods, and a reporting schedule for monitoring the effectiveness of mitigation measures. This plan proposes a monitoring period of no more than five years. Monitoring Year 1 shall begin upon substantial completion of mitigation construction/implementation.

8.1 AS-BUILT SURVEY (YEAR 1)

An as-built survey will be conducted to document appropriate contours have been attained (where grading may be proposed) and plantings were installed as designed. An as-built report will be prepared including the as-built survey, photos, and a brief synopsis of work completed including any design changes.

8.2 PHOTO DOCUMENTATION (YEARS 1 THROUGH 5)

Photo locations will be established as appropriate within the mitigation sites to document conditions within the first five years. Supplemental photos will be taken as appropriate to document enhancement and any problem areas.

8.3 PERFORMANCE STANDARDS

Performance standards common to all sites for each objective are presented below.

Objective 1: Permanent preservation of parcel.

- **Performance Standard 2.1:** Legal protection instrument in place.

Objective 2: The preserved parcel is demonstrably managed for conservation for the life of the project.

- **Performance Standard 2.1:** A third-party conservation entity will be endowed to monitor and maintain the parcels, demonstrate that an ecological uplift has been provided at each site, provide monitoring reports for the first five years after implementation of proposed mitigation measures, and maintain the sites throughout the life of the Project. In addition, a long-term maintenance plan, which will be in place prior to JCEP L.P.'s issuing Notice to Proceed for construction of the Jordan Cove Energy Project, is being written to provide guidance for the third-party manager.

Objective 3: An ecological uplift has been provided at each mitigation site.

Panhandle Site (Parcel P)

- **Performance Standard 3.1:** Ecological uplift (such as noxious weed removal, native plantings, or habitat enhancement for marten) has been completed and is reflected in monitoring reports for five years.

North Bank Site (Parcel S)

- **Performance Standard 3.3:** Ecological uplift (such as noxious weed removal or native plantings) has been completed for five years based on annual monitoring reports.

Lagoon Site (Parcel W)

- **Performance Standard 3.4:** Ecological uplift (such as creation of unvegetated sand from Scotch broom monoculture, wetland buffer enhancement, or other native plantings) has been completed for five years based on annual monitoring reports.

8.4 CONTINGENCY PLAN

Contingency plans will be developed by the endowed conservation entity and coordinated with ODFW should the performance standards not be met. The nature of the contingency plan will depend on the problems that arise and would likely be related to weed control and plant establishment.

9. LONG-TERM PROTECTION AND FINANCIAL SECURITY INSTRUMENTS**9.1 PROTECTION INSTRUMENT**

JCEP L.P. will prepare a conservation easement (rather than a deed restriction) to provide long term protection for the mitigation sites for the life of the project. The conservation easement will be vetted with ODFW, and will be in place prior to JCEP L.P.'s issuing Notice to Proceed for construction of the Jordan Cove Energy Project.

9.2 LONG-TERM MAINTENANCE PLAN**9.2.1 Anticipated Ownership**

The mitigation site would be owned by Fort Chicago LNG II U.S. L.P. (a wholly owned and controlled subsidiary of JCEP L.P.'s parent company Veresen, Inc.).

9.2.2 Anticipated Long-term Maintenance Actions

Long-term maintenance will include the activities described for each site above. Other activities may include garbage/debris removal and installation of protective signage and/or other deterrents if vandalism or inappropriate activities are found to occur.

9.2.3 Entity Responsible for Maintenance

JCEP L.P. will be responsible for maintenance of the mitigation sites, and long-term maintenance will be performed by third-party manager endowed by JCEP L.P.

9.2.4 Anticipated Funding Source

JCEP L.P. will create an endowment to fund long term maintenance of the mitigation sites by the third-party manager.

10. PREPARERS AND CONTRIBUTORS

Phil Rickus, DEA Ecologist, authored this report. Ethan Rosenthal, Ecologist, and Art Martin, Energy Coordinator, Wildlife Division, Oregon Department of Fish and Wildlife, and Sean Sullivan, DEA Project Manager, provided the quality reviews. Dawn Afman, DEA Project Assistant, prepared the report drafts, and Sara Gilbert, DEA GIS Project Manager, provided graphics.

P:\J\JCEP00000004\0600INFO\0670REPORTS\01_ODFW_HABITAT\01_MITIGATION_PLAN\VER2_A_REPORT\2014-05-15_JCEP_UPLAND_MIT_PLAN_DRAFT.DOCX

11. APPENDICES

APPENDIX A: Photographs



Photo 1: Looking south along the eastern edge of the Mill Site:



Photo 2: Looking north along the eastern edge of the Mill Site:



Photo 3: Looking west from the south-central portion of the Mill Site.



Photo 4: Herbaceous shrub habitat atop the landfill at the Mill Site.



Photo 5: Typical weedy shrub habitat on the north side of the Mill Site.



Photo 6: Looking south at weedy Herbaceous habitat west of Ingram Yard.



Photo 7: Looking northwest from the west side of the North Point Workforce Housing Project property at weedy Herbaceous and Shrub habitat.



Photo 8: Typical upland conditions on top of fill pad in the eastern portion of the North Point Workforce Housing Project. Photo from center of site looking north.



Photo 9: Looking east from ridge at western edge of the Panhandle Scotch broom that that can be removed to provide uplift.



Photo 10: Looking north at habitats in the northern portion of the Panhandle to be preserved.



Photo 11: Parcel S- Looking northwest from North Bank Lane at old, re-vegetated access road with patches of gorse that can be removed to provide uplift.



Photo 12: Parcel W- Looking west toward the ocean from the south end of the parcel at Scotch broom that can be removed to provide uplift.

APPENDIX B: Figures

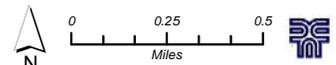
Pacific Ocean

Jordan Cove Energy Project Wildlife Habitat Mitigation Plan

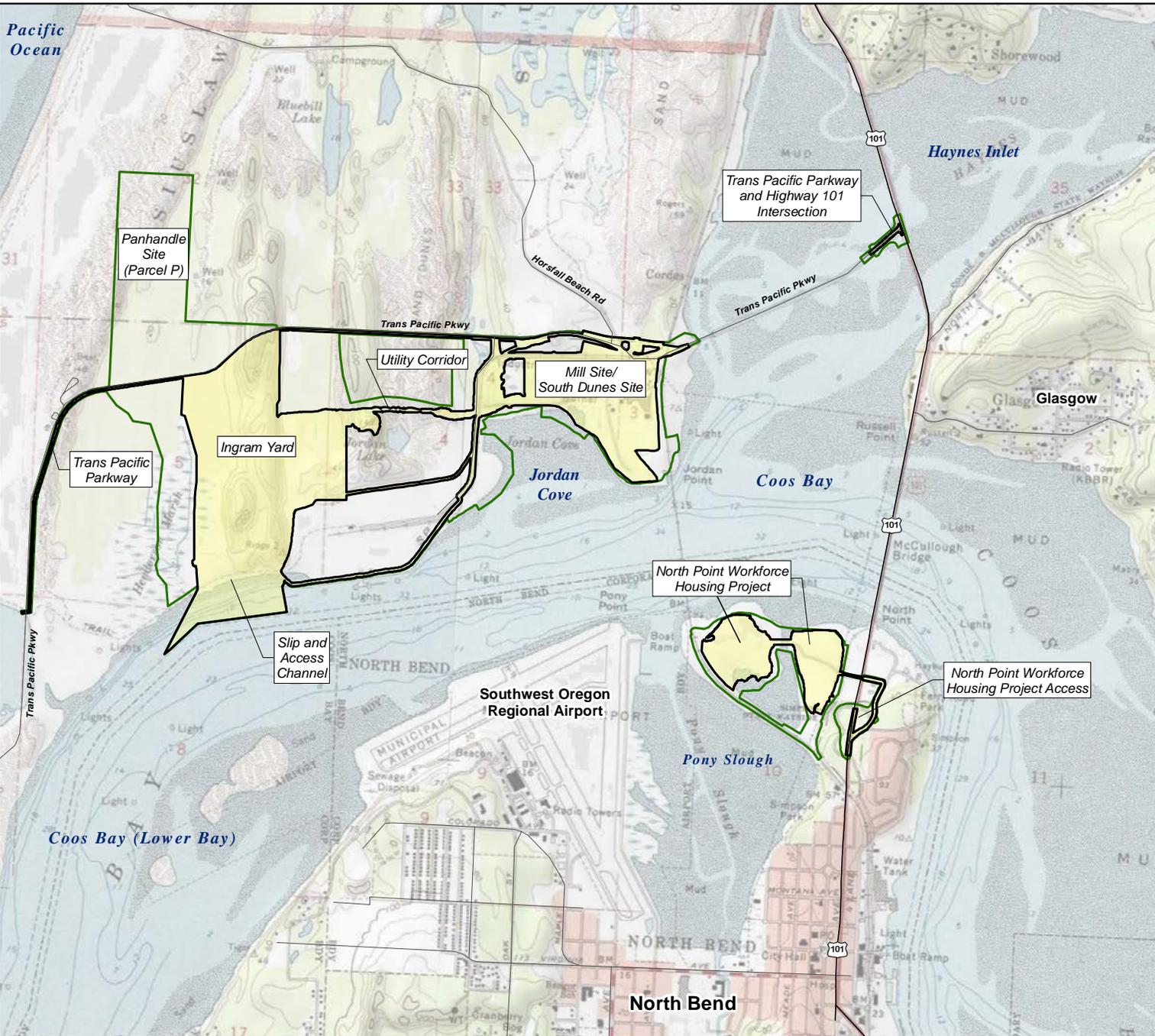
Figure 1
Project Vicinity

Legend

-  Project Footprint
-  Wetland Delineation Study Area



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sas@deainc.com with any questions or reports of errors or omissions.

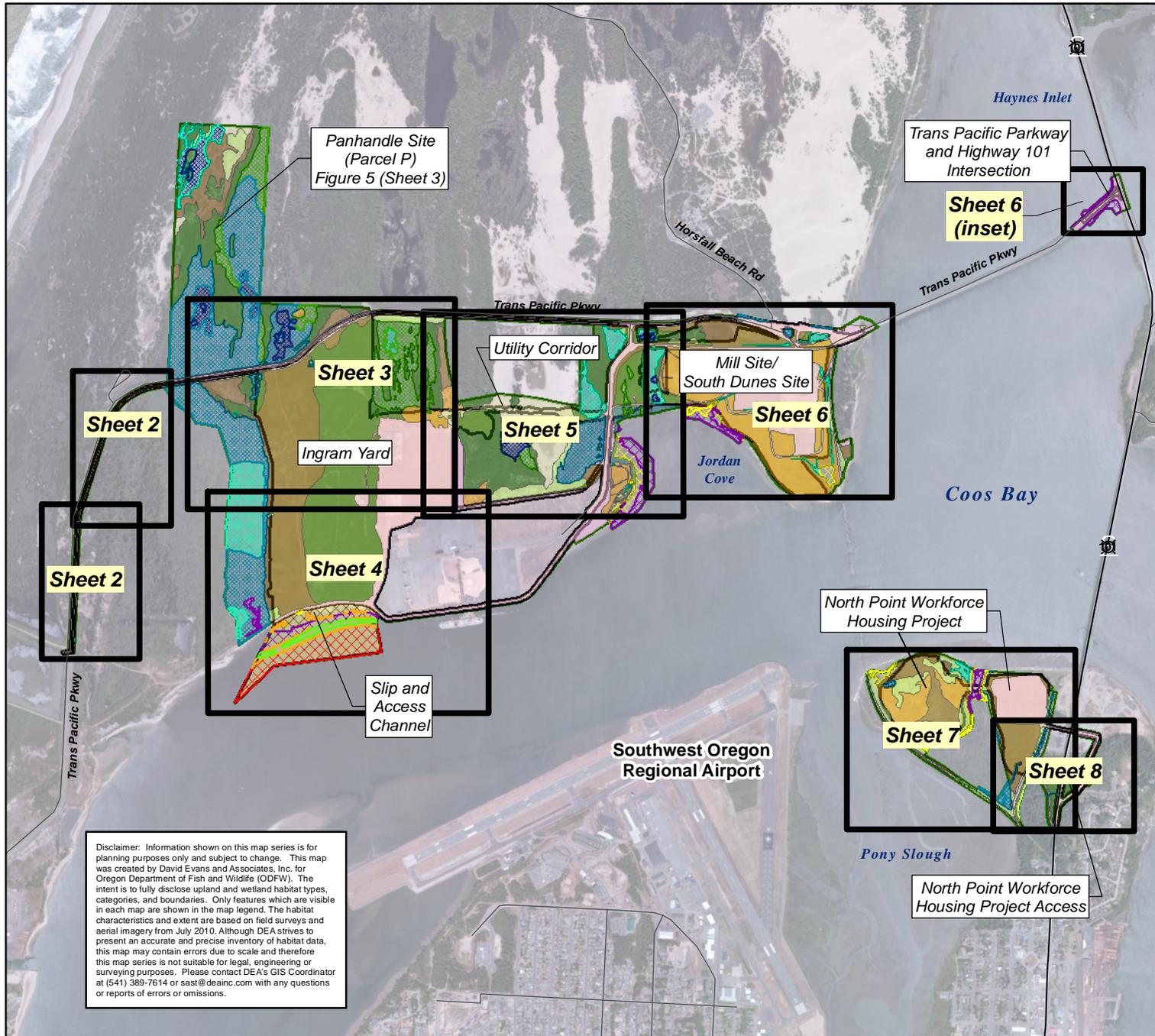


Jordan Cove Energy Project Wildlife Habitat Mitigation Plan

Existing Wildlife Habitat Maps
Figure 2 (Sheet 1 of 8)
Index Map

Legend

-  Extent of Sheet
- Upland Habitat Types**
-  3/Coastal Dune Forest (CF)
-  3/Riparian Forest (RF)
-  4/Shrub (SH)
-  4/Herbaceous Shrub (HS)
-  4/Herbaceous (HE)
-  4/Unvegetated Sand (US)
-  6/Developed (DE)
- Estuarine Habitat Types**
-  2/Salt Marsh (SM)
-  2/Intertidal Unvegetated Sand (IUS)
-  2/Shallow Subtidal (SST)
-  2/Algae/Mud/Sand (AMS)
-  2/Eelgrass (EEL)
-  3/Deep Subtidal (DST)
- Wetland Habitat Types**
-  2/Forested/Shrub Wetland (FSW)
-  2/Forested Wetland (FOW)
-  2/Scrub-Shrub Wetland (SSW)
-  2/Emergent Wetland (EMW)
-  2/Open Water (WTR)



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

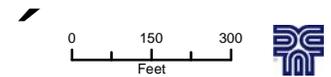
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Existing Wildlife Habitat Maps
Figure 2 (Sheet 2 of 8)
Trans Pacific Parkway

Legend

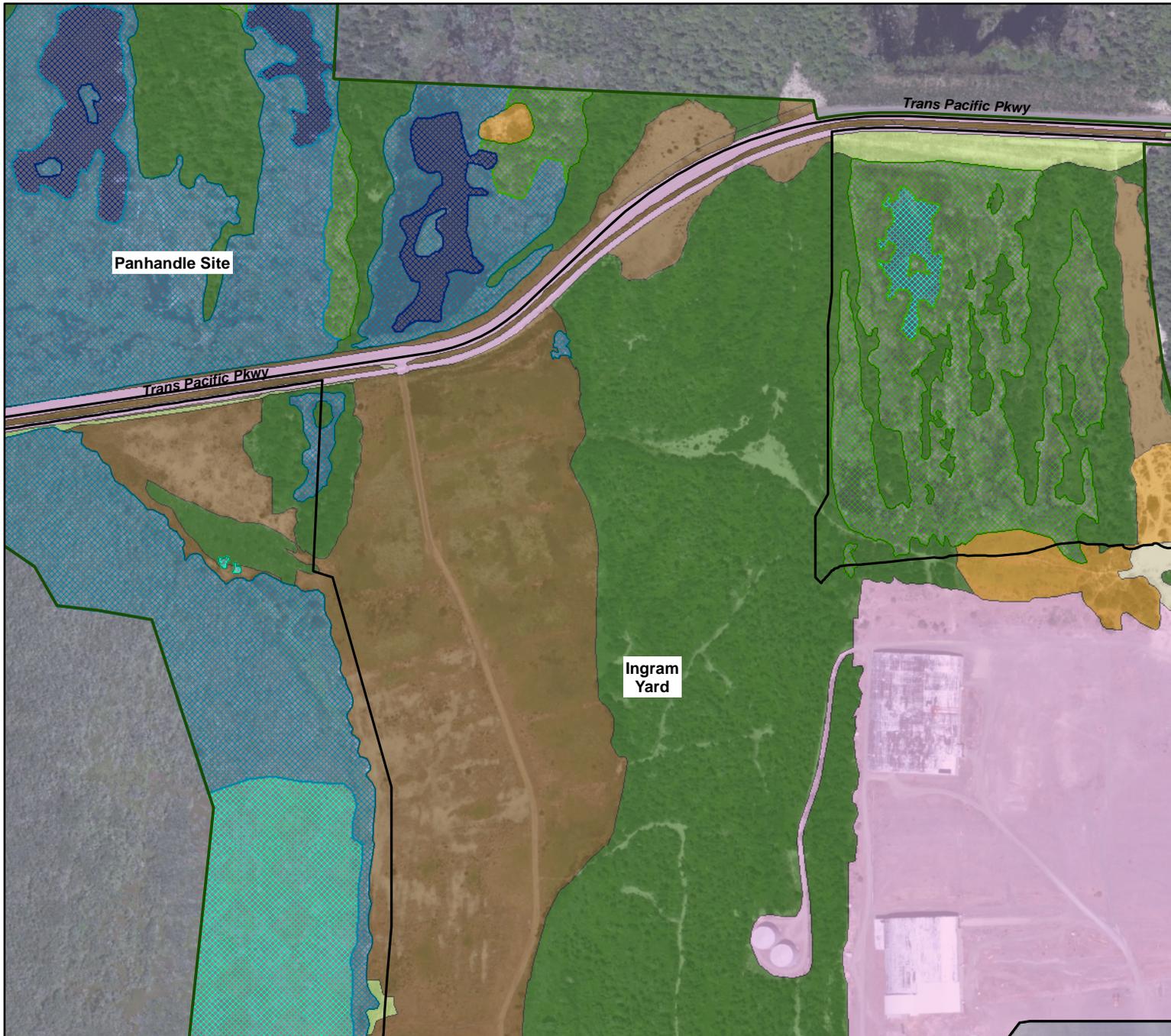
-  Project Footprint
-  Wetland Delineation Study Area
- Upland Habitat Types**
-  4/Shrub (SH)
-  4/Herbaceous (HE)
-  6/Developed (DE)
- Wetland Habitat Types**
-  2/Emergent Wetland (EMW)
-  2/Scrub-Shrub Wetland (SSW)

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DE's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

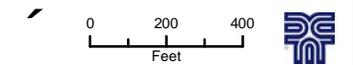
Existing Wildlife Habitat Maps
Figure 2 (Sheet 3 of 8)
Ingram Yard



Legend

- Project Footprint
- Wetland Delineation Study Area
- Upland Habitat Types**
- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbageous Shrub (HS)
- 4/Herbageous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)
- Wetland Habitat Types**
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)
- 2/Open Water (WTR)

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

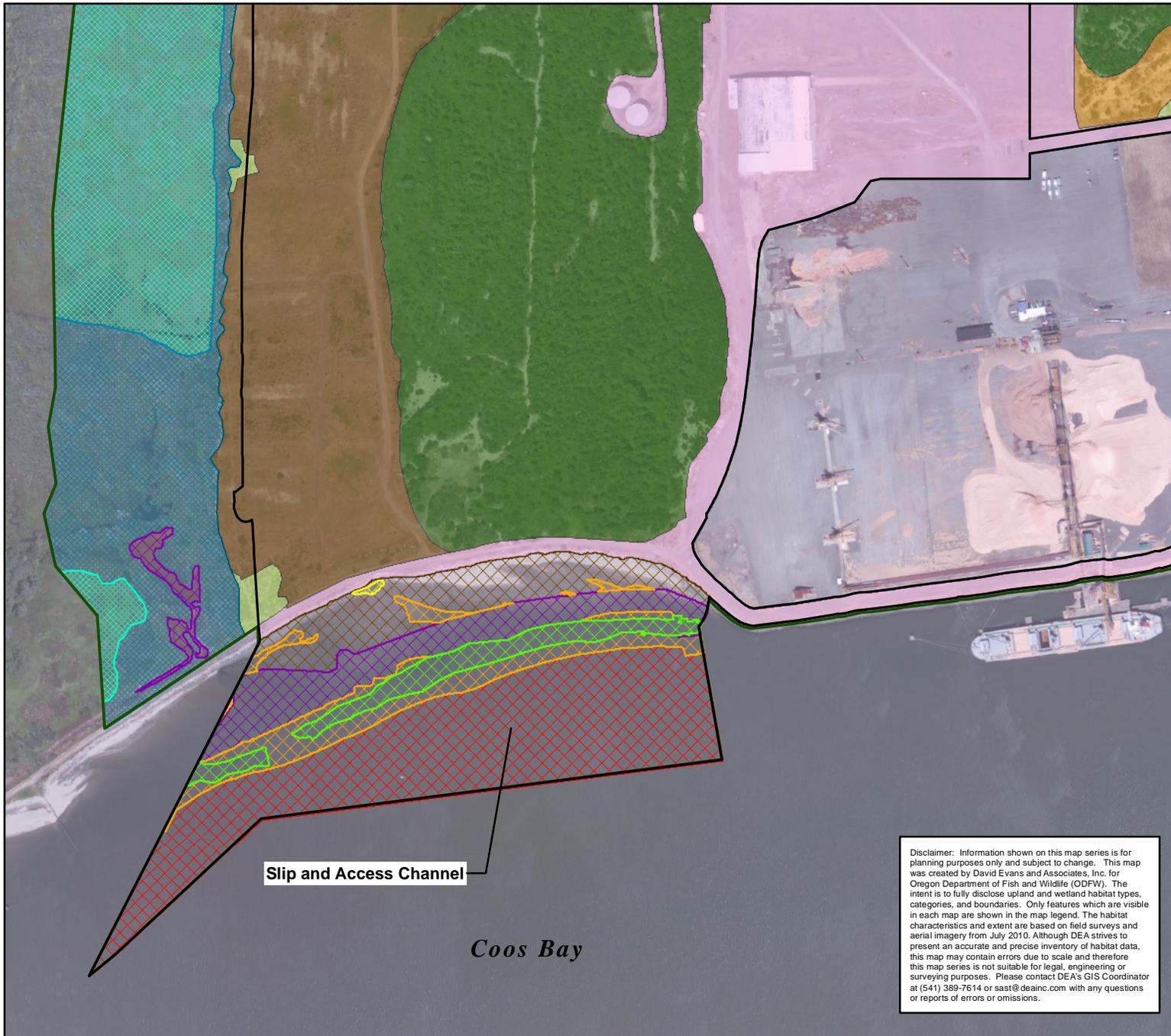
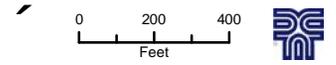


**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Existing Wildlife Habitat Maps
Figure 2 (Sheet 4 of 8)
Slip and Access Channel

Legend

-  Project Footprint
-  Wetland Delineation Study Area
- Upland Habitat Types**
-  3/Coastal Dune Forest (CF)
-  4/Shrub (SH)
-  4/Herbaceous Shrub (HS)
-  4/Herbaceous (HE)
-  6/Developed (DE)
- Estuarine Habitat Types**
-  2/Salt Marsh (SM)
-  2/Intertidal Unvegetated Sand (IUS)
-  2/Shallow Subtidal (SST)
-  2/Algae/Mud/Sand (AMS)
-  2/Eelgrass (EEL)
-  3/Deep Subtidal (DST)
- Wetland Habitat Types**
-  2/Scrub-Shrub Wetland (SSW)
-  2/Emergent Wetland (EMW)



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

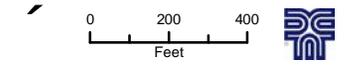
Existing Wildlife Habitat Maps
Figure 2 (Sheet 5 of 8)
Utility Corridor

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

Utility Corridor

Legend

-  Project Footprint
-  Wetland Delineation Study Area
- Upland Habitat Types**
-  3/Coastal Dune Forest (CF)
-  3/Riparian Forest (RF)
-  4/Shrub (SH)
-  4/Herbaceous Shrub (HS)
-  4/Herbaceous (HE)
-  4/Unvegetated Sand (US)
-  6/Developed (DE)
- Estuarine Habitat Types**
-  2/Salt Marsh (SM)
-  2/Algae/Mud/Sand (AMS)
- Wetland Habitat Types**
-  2/Forested Wetland (FOW)
-  2/Scrub-Shrub Wetland (SSW)
-  2/Emergent Wetland (EMW)
-  2/Open Water (WTR)



**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Existing Wildlife Habitat Maps
Figure 2 (Sheet 2 of 8)
Mill Site/South Dunes Site and
Trans Pacific Parkway/
Highway 101 Intersection

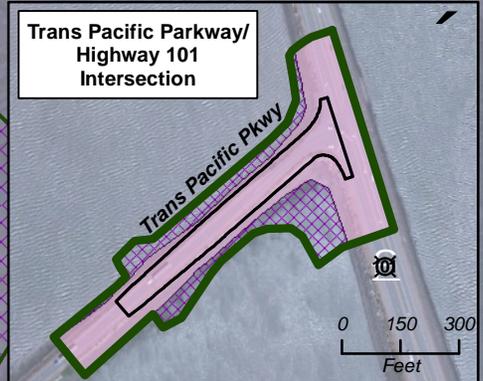
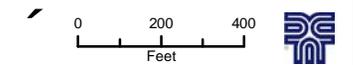


Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

Legend

- Project Footprint
- Wetland Delineation Study Area
- Upland Habitat Types**
- 3/Coastal Dune Forest (CF)
- 3/Riparian Forest (RF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)
- Estuarine Habitat Types**
- 2/Salt Marsh (SM)
- 2/Algae/Mud/Sand (AMS)
- Wetland Habitat Types**
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)
- 2/Open Water (WTR)

Habitat categories are provided in the legend except as noted on the map.



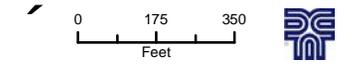
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Existing Wildlife Habitat Maps
Figure 2 (Sheet 7 of 8)
North Point Workforce
Housing Project



Legend

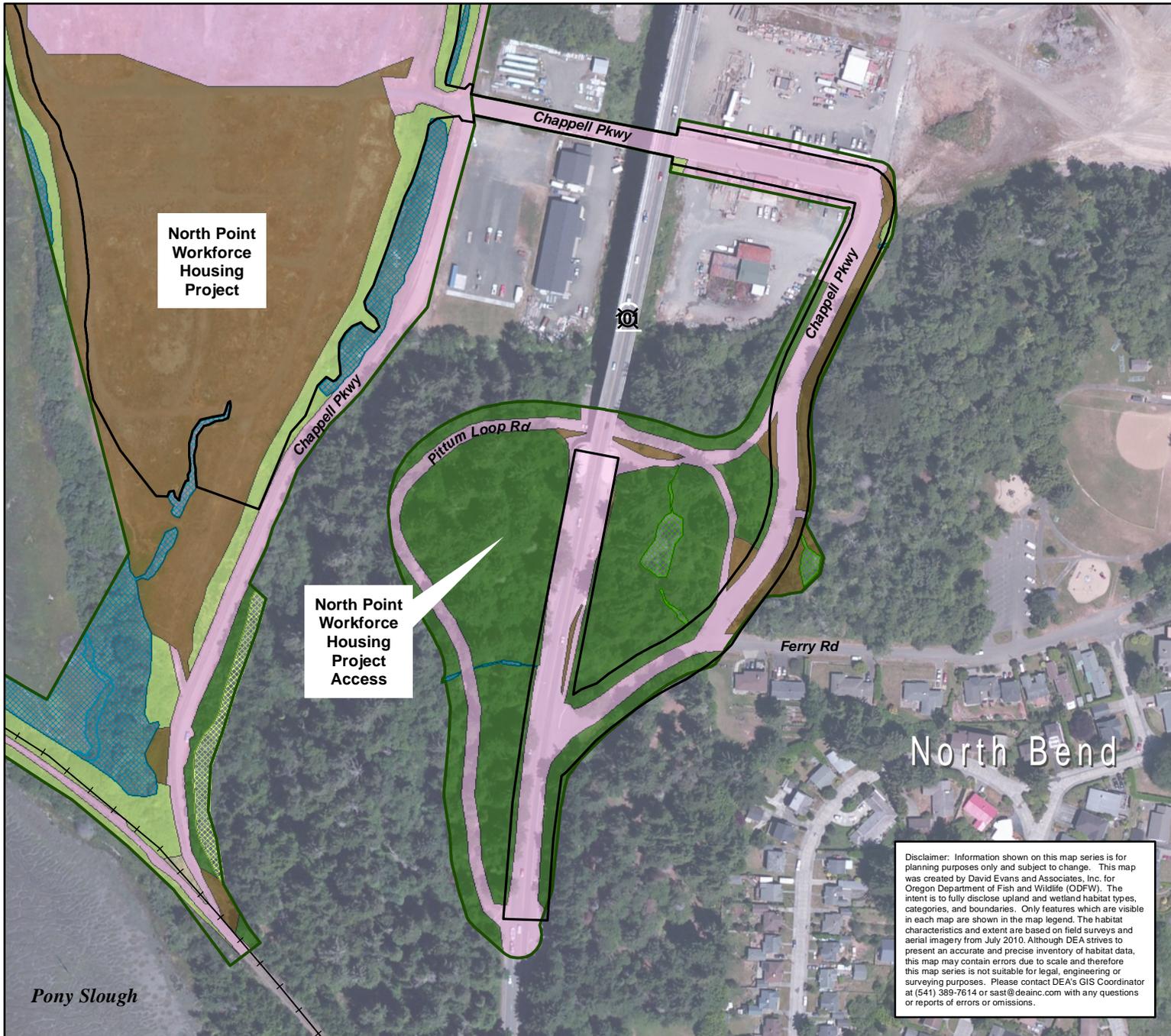
- Project Footprint
- Wetland Delineation Study Area
- Existing Rail
- Upland Habitat Types**
- 3/Coastal Dune Forest (CF)
- 4/Shrub (SH)
- 4/Herbaceous Shrub (HS)
- 4/Herbaceous (HE)
- 4/Unvegetated Sand (US)
- 6/Developed (DE)
- Estuarine Habitat Types**
- 2/Salt Marsh (SM)
- 2/Algae/Mud/Sand (AMS)
- Wetland Habitat Types**
- 2/Forested/Shrub Wetland (FSW)
- 2/Forested Wetland (FOW)
- 2/Scrub-Shrub Wetland (SSW)
- 2/Emergent Wetland (EMW)



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sasi@deainc.com with any questions or reports of errors or omissions.

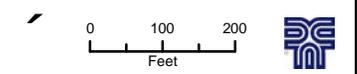
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Existing Wildlife Habitat Maps
Figure 2 (Sheet 8 of 8)
North Point Workforce
Housing Project Access



Legend

- Project Footprint
- Wetland Delineation Study Area
- Existing Rail
- Upland Habitat Types**
 - 3/Coastal Dune Forest (CF)
 - 4/Shrub (SH)
 - 4/Herbaceous (HE)
 - 4/Unvegetated Sand (US)
 - 6/Developed (DE)
- Wetland Habitat Types**
 - 2/Forested/Shrub Wetland (FSW)
 - 2/Forested Wetland (FOW)
 - 2/Scrub-Shrub Wetland (SSW)

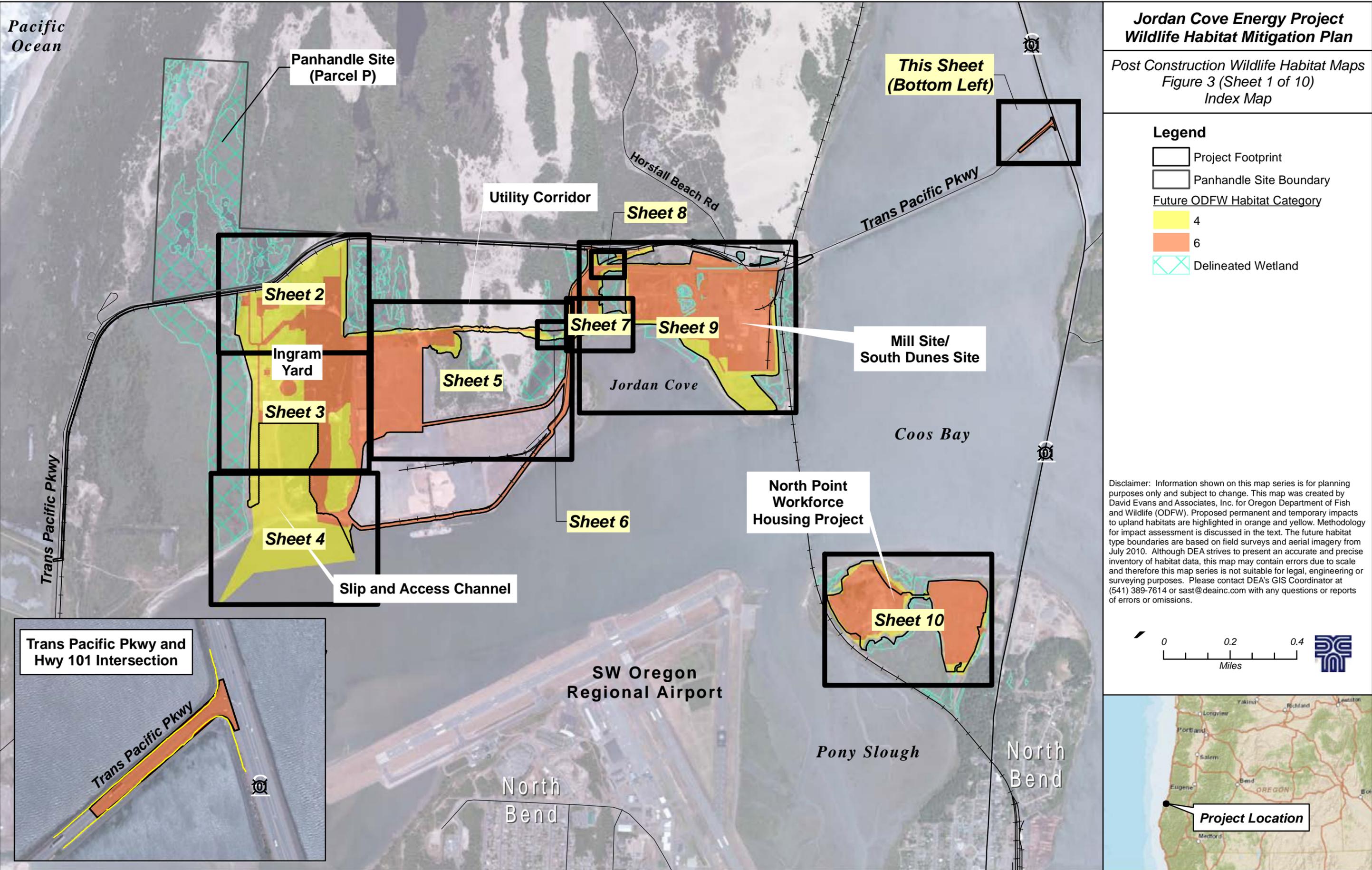


Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



Pony Slough

North Bend



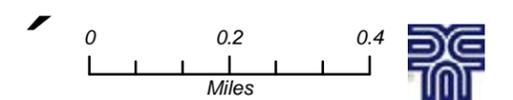
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 1 of 10)
Index Map

Legend

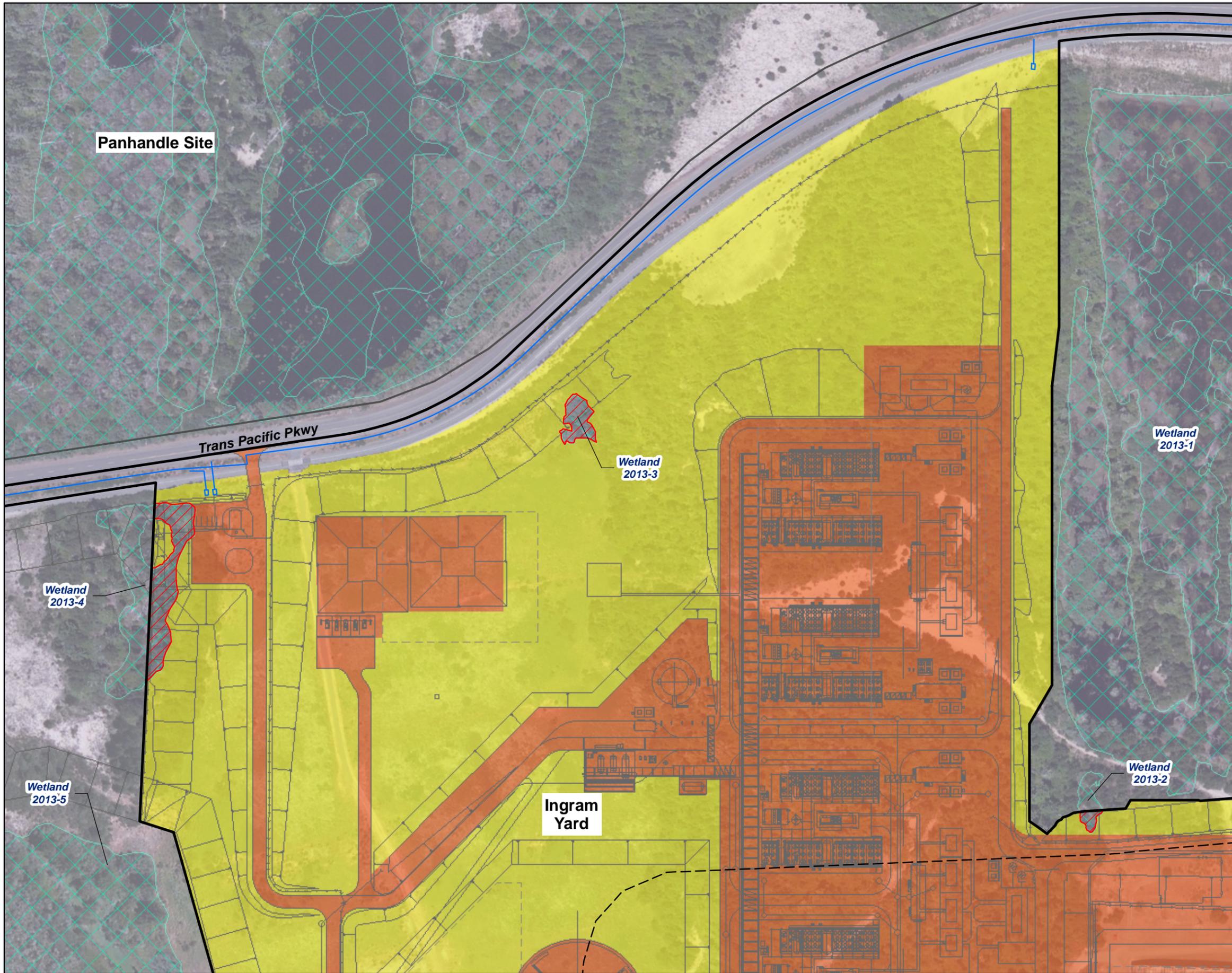
- Project Footprint
- Panhandle Site Boundary
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



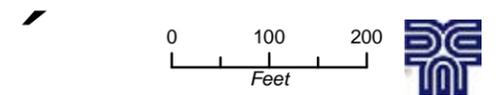
Jordan Cove Energy Project Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 2 of 10)
Ingram Yard



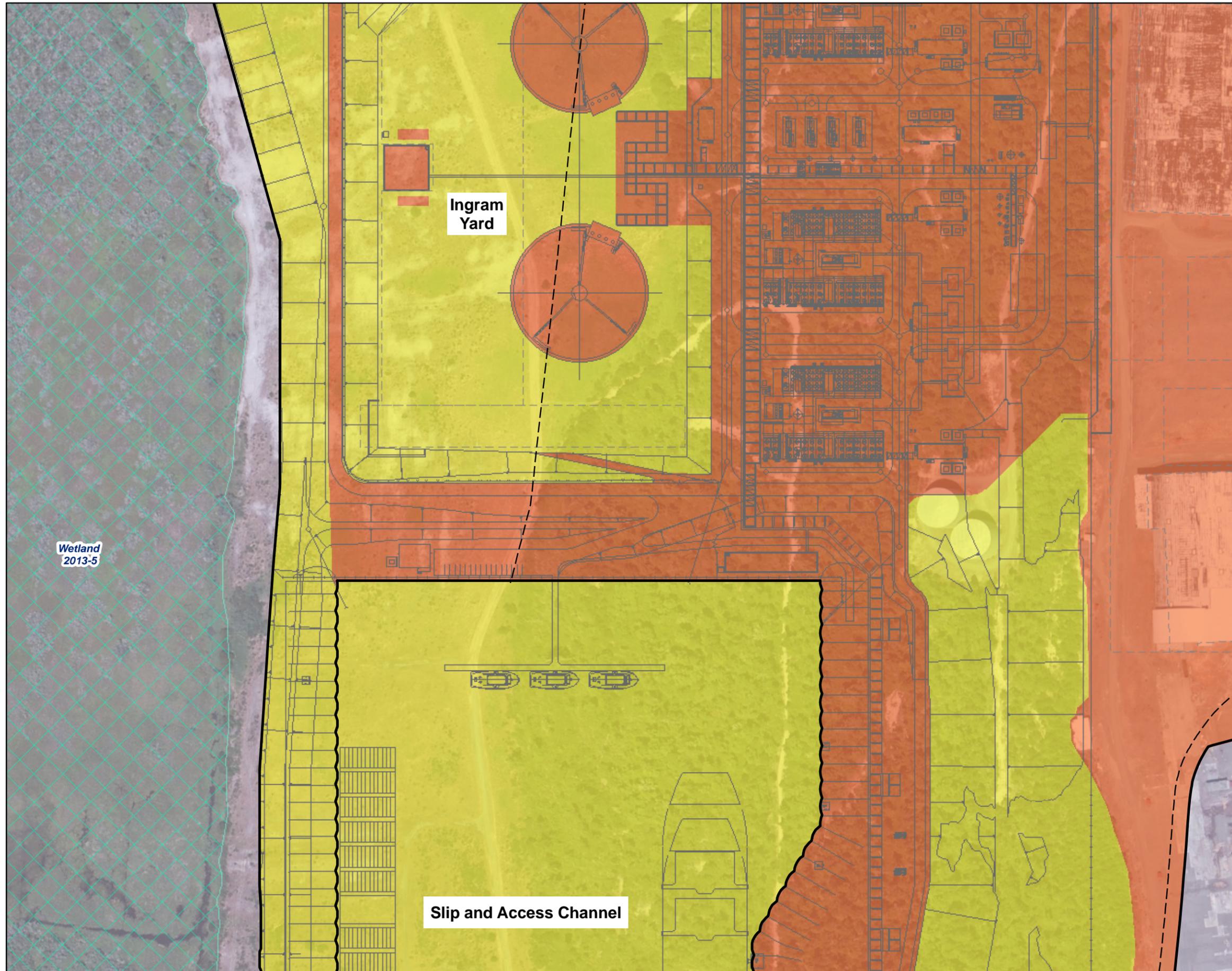
- Project Footprint
- Panhandle Site Boundary
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Water Line
- Haul Road
- Temporary Facility

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



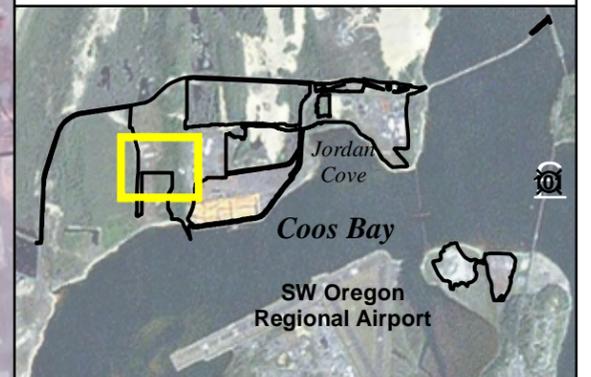
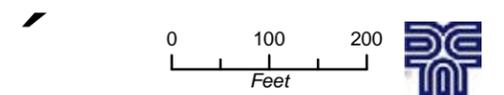
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 3 of 10)
South Ingram Yard/Slip



-  Project Footprint
- Future ODFW Habitat Category**
-  4
-  6
-  Delineated Wetland
-  Haul Road
-  Temporary Facility

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



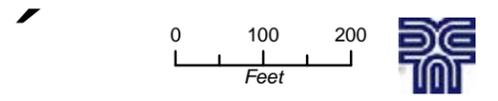
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 4 of 10)
Slip and Access Channel



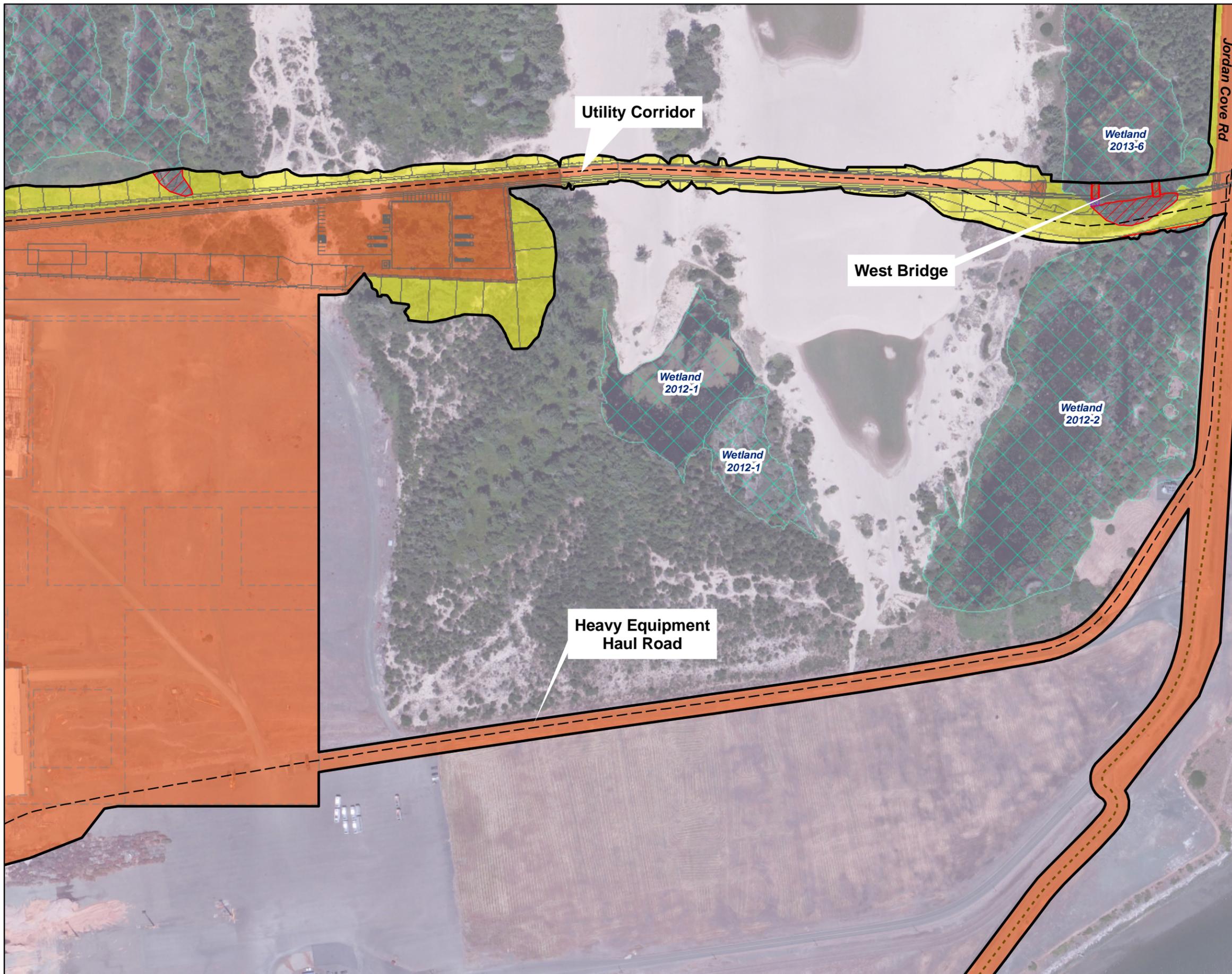
-  Project Footprint
- Future ODFW Habitat Category**
-  4
-  6
-  Delineated Wetland
-  Permanent Wetland Impact
-  Temporary Wetland Impact
-  Pipeline
-  Haul Road

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



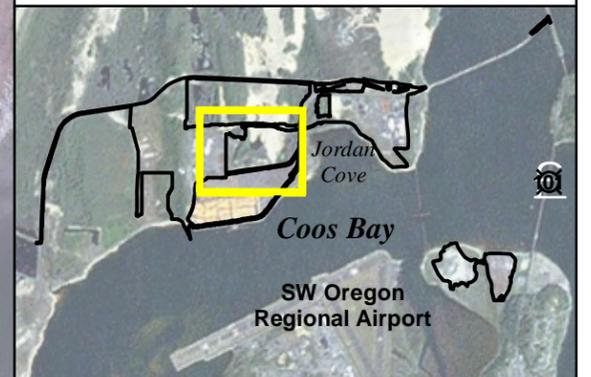
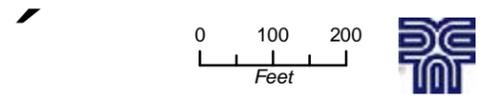
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 5 of 10)
Utility Corridor



- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Pipeline
- Haul Road
- Temporary Facility

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



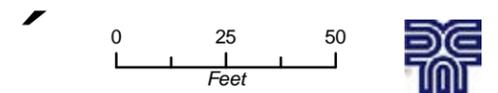
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 6 of 10)
West Bridge



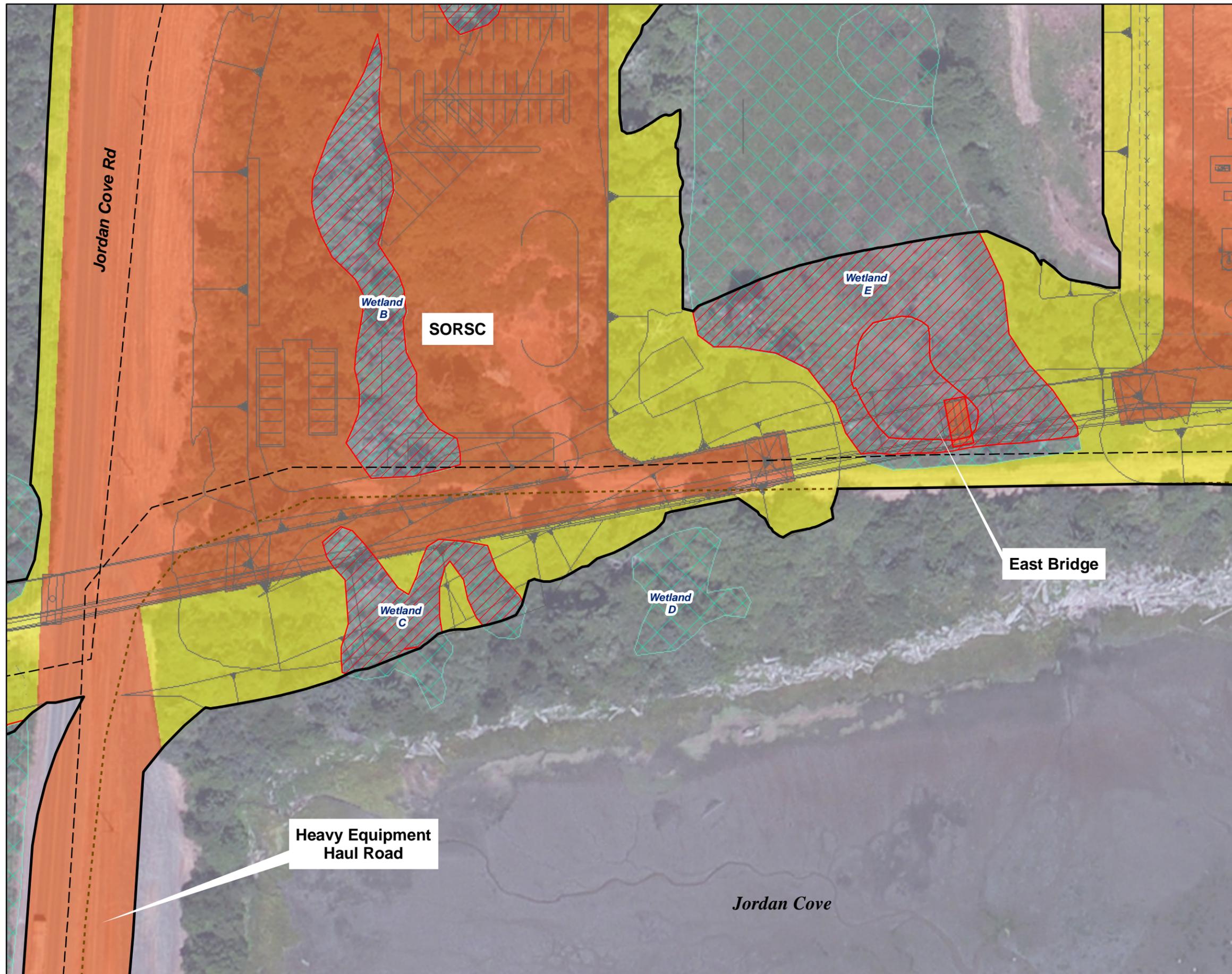
- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Pipeline
- Haul Road

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



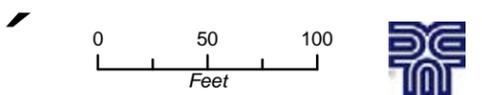
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 7 of 10)
East Bridge



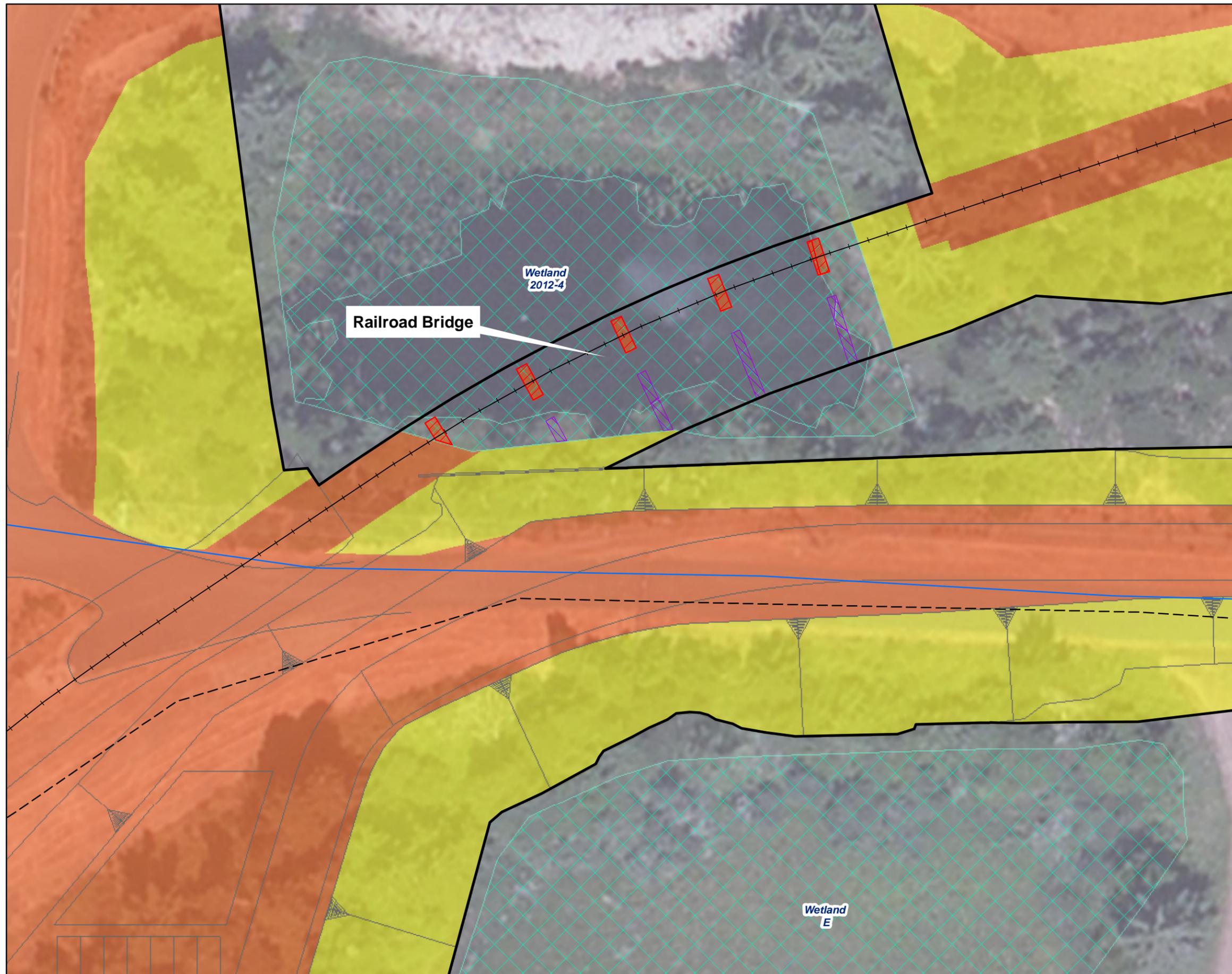
- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Pipeline
- Haul Road
- Temporary Facility

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



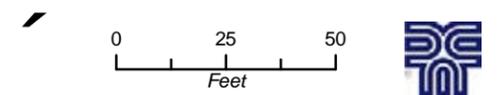
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 8 of 10)
Railroad Bridge



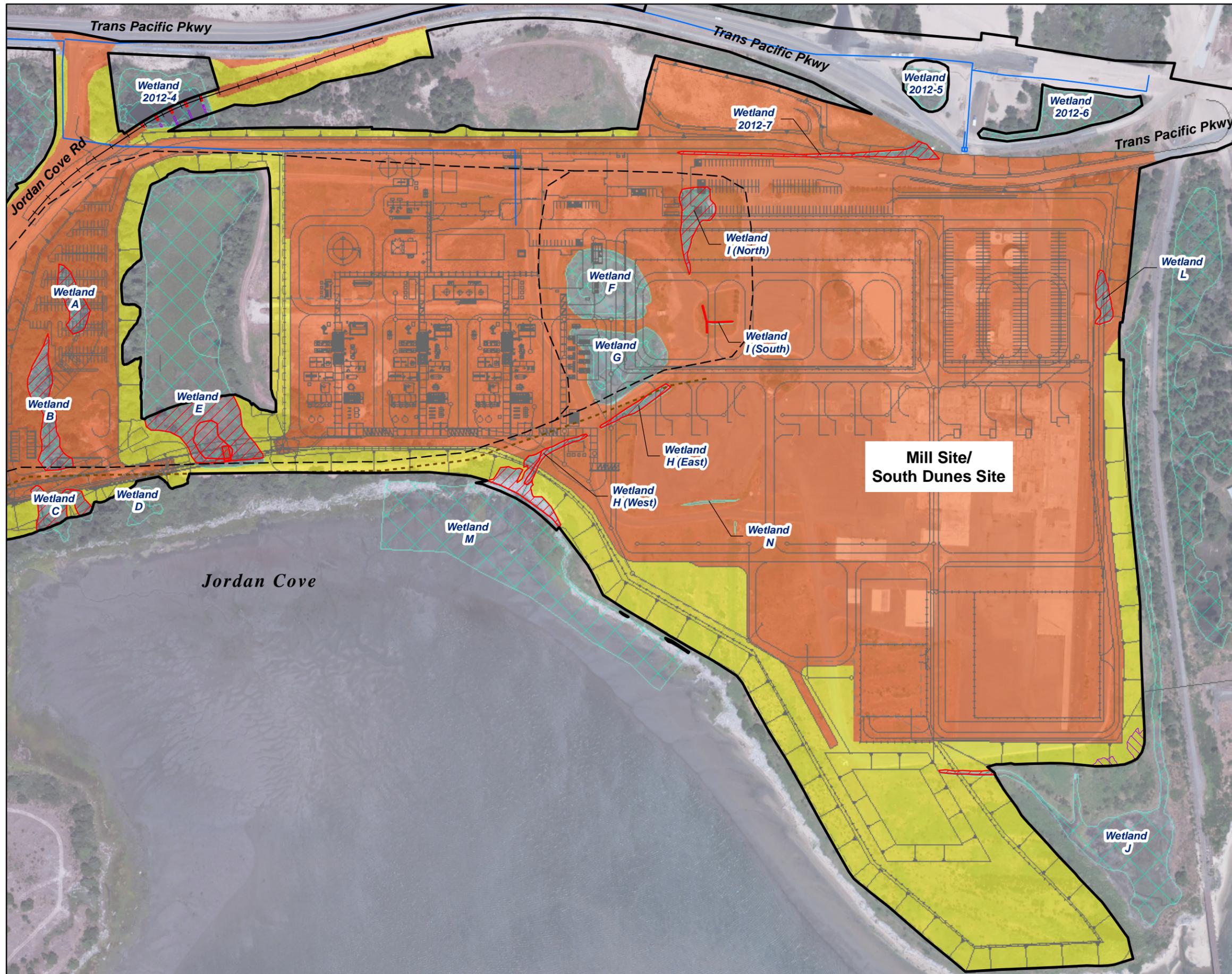
- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Haul Road
- Proposed Rail

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



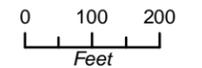
Jordan Cove Energy Project Wildlife Habitat Mitigation Plan

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 9 of 10)
South Dunes Power Plant



- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact
- Water Line
- Pipeline
- Haul Road
- Temporary Facility
- Proposed Rail

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.



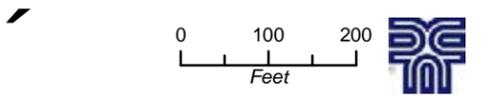
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Post Construction Wildlife Habitat Maps
Figure 3 (Sheet 10 of 10)
North Point Workforce Housing Project

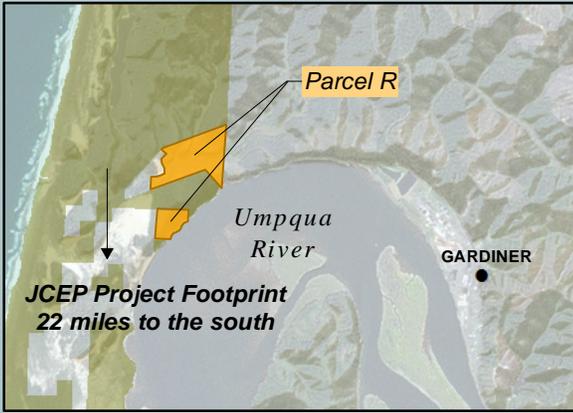


- Project Footprint
- Future ODFW Habitat Category**
- 4
- 6
- Delineated Wetland
- Permanent Wetland Impact
- Temporary Wetland Impact

Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). Proposed permanent and temporary impacts to upland habitats are highlighted in orange and yellow. Methodology for impact assessment is discussed in the text. The future habitat type boundaries are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

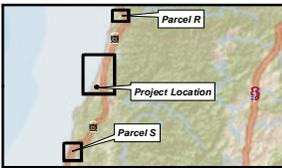
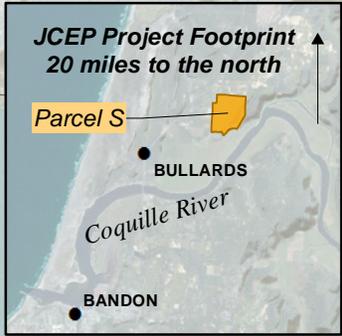
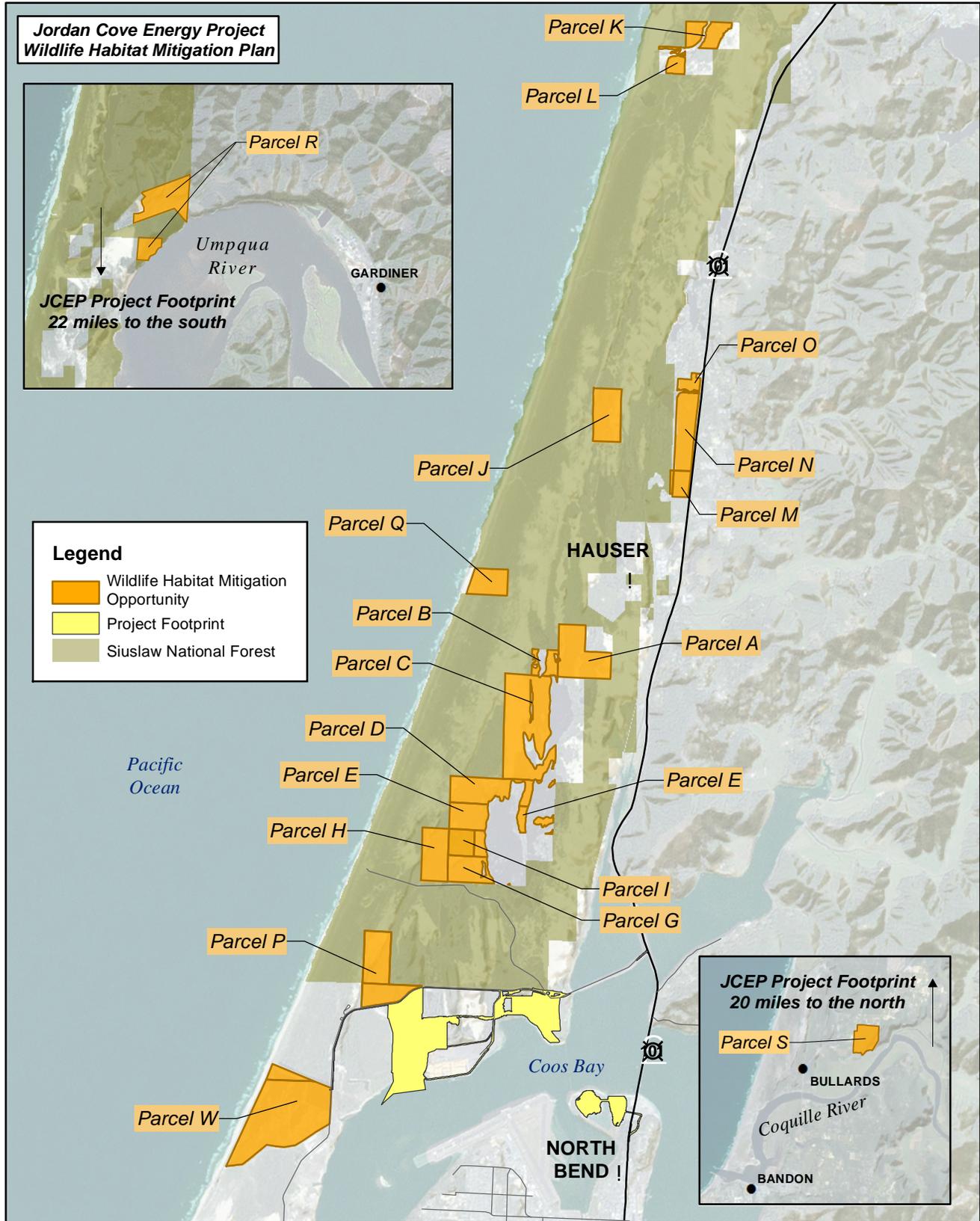


**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**



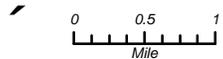
Legend

- Wildlife Habitat Mitigation Opportunity
- Project Footprint
- Siuslaw National Forest



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

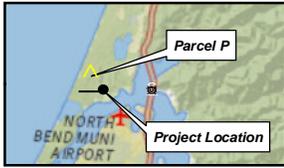
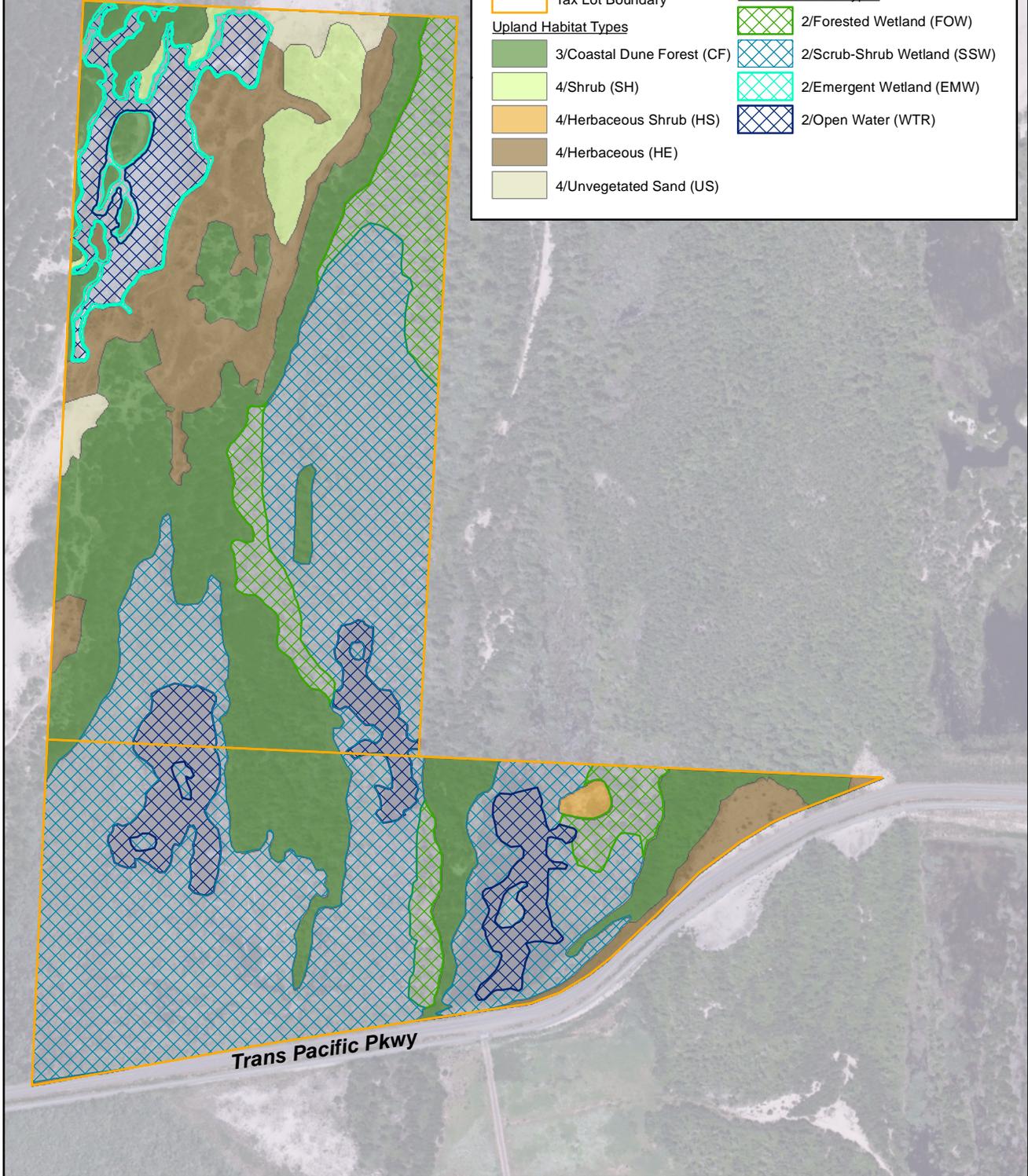
Wildlife Habitat Mitigation Site Maps
Figure 4
Wildlife Habitat Parcels Investigated



**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

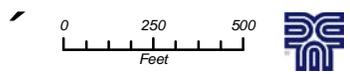
Legend

 Tax Lot Boundary	Wetland Habitat Types
Upland Habitat Types	 2/Forested Wetland (FOW)
 3/Coastal Dune Forest (CF)	 2/Scrub-Shrub Wetland (SSW)
 4/Shrub (SH)	 2/Emergent Wetland (EMW)
 4/Herbaceous Shrub (HS)	 2/Open Water (WTR)
 4/Herbaceous (HE)	
 4/Unvegetated Sand (US)	



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@dea-inc.com with any questions or reports of errors or omissions.

*Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 1 of 3)
Panhandle (Parcel P)*



**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**

Pacific
Ocean

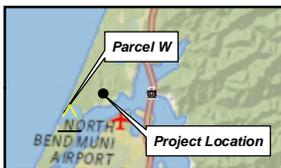
Trans Pacific Pkwy

Coos
Bay

ODFW Habitat Type and Category	
Parcel W	Acres
Category 2	274.7
Scrub-Shrub Wetlands	126.9
Emergent Wetland	118.1
Open Water	29.8
Category 4	39.8
Shrub	5.1
Herbaceous Shrub	22.9
Herbaceous	11.8
Category 6	4.3
Developed	4.3
Total	318.8

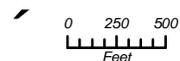
Legend

-  Tax Lot Boundary
- Upland Habitat Types**
-  4/Shrub (SH)
-  4/Herbaceous Shrub (HS)
-  4/Herbaceous (HE)
-  6/Developed (DE)
- Wetland Habitat Types**
-  2/Scrub-Shrub Wetland (SSW)
-  2/Emergent Wetland (EMW)
-  2/Open Water (WTR)

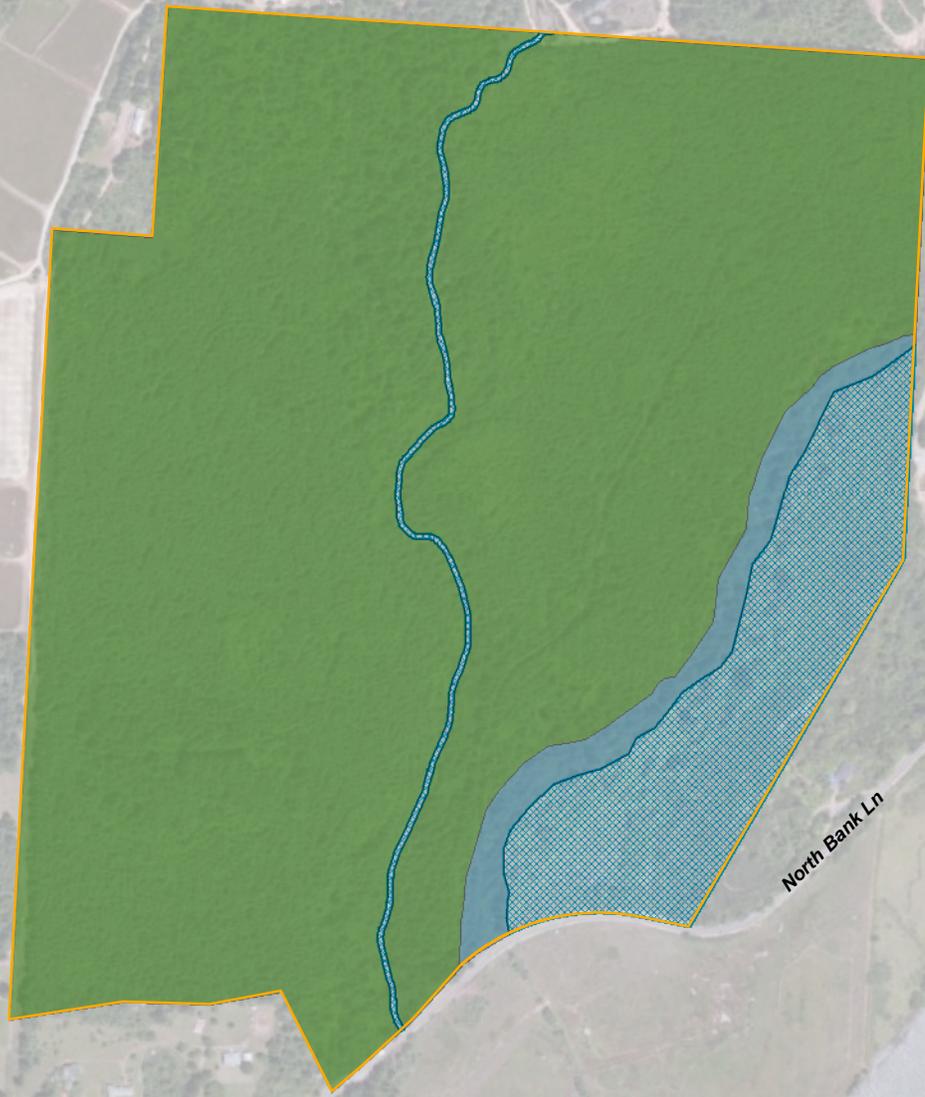


Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 2 of 3)
Lagoon Site (Parcel W)



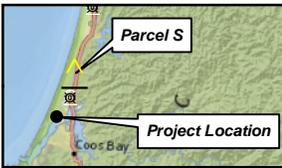
**Jordan Cove Energy Project
Wildlife Habitat Mitigation Plan**



ODFW Habitat Type and Category	
Parcel S	Acres
Category 2	18.9
Scrub/Shrub Wetland	18.9
Category 3	142.2
Coastal Dune Forest	137.0
Riparian Forest	5.2
Total	161.1

Legend

- Tax Lot Boundary
- Upland Habitat Types**
 - 3/Coastal Dune Forest (CF)
 - 3/Riparian Forest (RF)
- Wetland Habitat Types**
 - 2/Scrub-Shrub Wetland (SSW)



Disclaimer: Information shown on this map series is for planning purposes only and subject to change. This map was created by David Evans and Associates, Inc. for Oregon Department of Fish and Wildlife (ODFW). The intent is to fully disclose upland and wetland habitat types, categories, and boundaries. Only features which are visible in each map are shown in the map legend. The habitat characteristics and extent are based on field surveys and aerial imagery from July 2010. Although DEA strives to present an accurate and precise inventory of habitat data, this map may contain errors due to scale and therefore this map series is not suitable for legal, engineering or surveying purposes. Please contact DEA's GIS Coordinator at (541) 389-7614 or sast@deainc.com with any questions or reports of errors or omissions.

*Wildlife Habitat Mitigation Site Maps
Figure 5 (Sheet 3 of 3)
North Bank Site (Parcel S)*



***APPENDIX C: Draft Jordan Cove Energy Project Wildlife
Salvage Plan***



DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: January 29, 2014
TO: Stuart Love, Wildlife Biologist; Chris Claire, Fish Biologist; Art Martin, Energy and NRDA Coordinator, Wildlife Division
FIRM: Oregon Department of Fish and Wildlife (ODFW)
FROM: Phil Rickus
SUBJECT: **DRAFT Jordan Cove Energy Project Wildlife Salvage Plan**
PROJECT: JCEP0000-0004 – Jordan Cove Energy Project
COPIES: Bob Braddock, Jordan Cove Energy, LP
Sean Sullivan, David Evans and Associates, Inc. (DEA)
Steve Donovan, SHN Consulting Engineers & Geologists

The following Draft memorandum is intended to provide initial guidance for salvage of species present in freshwater wetlands that may be impacted by the Jordan Cove Energy Project (JCEP). Oregon Department of Fish and Wildlife (ODFW) provided input for this plan, and they and other agencies are invited to comment and provide additional on-site guidance as the project nears initiation. David Evans and Associated, Inc. (DEA) assembled this plan using best available information regarding salvage of a variety of species, and welcomes additional input.

The species that would benefit most from salvage are amphibians and aquatic species within wetlands to be fully or partially filled by the project. Other species (including most upland species) would be expected to move to adjacent habitats as construction commences, or are impractical to salvage based on difficulty in locating them. Every effort should be made prior to construction to identify species that may be present. However, depending on the time of year, nesting or denning wildlife could be discovered during construction, and in need of salvage.

Vegetation clearing is planned to occur outside of the breeding season for birds, but may occur during the denning season. If terrestrial species are encountered, they should be delivered to a predetermined licensed rehabilitator, and arrangements with this rehabilitator need to be made before construction begins. The following applies primarily to aquatic species with considerations for terrestrial species where appropriate.

The general plan for salvage is as follows:

1. Water areas are blocked off with silt fence to prevent movement of species into the construction areas. This fencing will remain in place during construction to prevent migration of species back into construction areas. Screen or fence mesh size will need to restrict movements of the smallest life stage present that will be captured.
2. Seine nets and/or dip nets are utilized first (where possible) to capture/remove species within the construction reach. Hand-removal of species is the preferred method of capture, but may not be effective in wetlands with woody debris or dense vegetation.
3. Once as many species are caught by hand as possible, an electro-shocker is utilized to capture remaining species, using the most current National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS) protocols for anadromous fish.

4. Often fish and amphibians are very difficult to capture through any seining, dipnetting, or electroshocking effort, especially in water deeper than 3.5 feet. Moving fish and amphibians to a shallower area where they can then be captured can be effective. Although stress can occur as a result, often a much higher proportion of the population is able to be salvaged.
5. Filling of the wetland or stream from a consistent direction with relatively clean fill material (sand, etc.) can help maintain livable habitat; the species of concern can then migrate ahead of the fill material and thereby be salvaged.
6. Species transport is conducted using 6-wheeled, Off-Highway Vehicles (OHVs) with integrated utility beds for secured storage of trapping containers. Specific detail regarding transport is provided below, and has been adapted from Appendix F of the 2006 USFWS DRAFT Chiricahua Leopard Frog Recovery Plan (USFWS 2006), which is available online.
7. Species are transported in large, aerated coolers secured in OHV utility beds. Species hold times are minimized by making multiple transport trips. Water temperatures are monitored as work progresses to avoid thermal stress.
8. All encountered fish, amphibians, and reptiles are salvaged and relocated to pre-determined wetland and waters areas that have been surveyed for similar condition compared to impact site, and absence of bullfrogs (predators). Species are relocated to several different pre-designated areas to avoid concentrating individuals at release sites. Distance from capture site, and release site connectivity and perennial water supply should be among the many factors considered during release site selection.
9. Relocation sites would be pre-determined by coordination with ODFW, as well as with National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS) if applicable for federally listed species. Relocation sites for terrestrial wildlife will be determined based on requirements under which licensed rehabilitators operate at the time of construction.

General Considerations:

- Qualified biologists will conduct the work under a Scientific Research and Take permit issued by ODFW.
- Release sites should contain similar habitat conditions to collection sites (pH, temperature, etc.).
- Identification of release sites will be coordinated with ODFW to ensure impacts to release sites are minimal, and access to sites is clear (including land ownership). Release sites would likely include private properties only. If release sites include public lands, additional permits or coordination may be required.
- Relocated organisms are especially susceptible to predation, and areas with predators (e.g. largemouth bass or bullfrogs) should be avoided if possible.
- Active searches (including electroshocking) are generally most effective, and are recommended for this project. Pitfall and funnel traps could also be used, but are usually less effective and more time-consuming, and have not been included in this plan to date. However, hoop and funnel traps are often a good method for initial determination of general composition and abundance, and could be useful if implemented sufficiently prior to construction.

- Surface activity of amphibians is needed for salvage. A minimum of 45 degree Fahrenheit water temperature is preferred for red-legged frog capture.
- ODFW uses specific settings for sampling lamprey larvae. Lamprey electroshocking settings have been utilized effectively for salamander surveys and may be useful for stimulating amphibians to emerge for capture.
- Breeding adults generally congregate in the littoral zone during egg-laying season. Egg mass relocation can be effective, but also requires fencing to prevent egg drift without restricting larval movement.

Transport Considerations (adapted from USFWS 2006):

- General Container Information
 - Use only plastic containers, no metal or glass.
 - Containers should be water tight when tipped upside down.
 - Do not use bags more than once. Use only new, rinsed bags.
 - Carry 1 or 2 extra containers filled with water in case of an emergency (i.e., leak).
- Type of Containers per animal size
 - Larvae at any stage, ship well in one gallon self-closing bags (e.g. Ziplocs®). Double bagging should be considered for trips longer than 4 hours or when driving on rough roads. Larvae may also be transported in hard plastic buckets or containers that have tight fitting lids.
 - GladWare® is highly recommended for transportation of metamorphs, juveniles, and adults. Keep them from being crushed and they are reusable. For longer trips multiple individuals can be placed in a container with holes, and then placed in a cooler with a bubbler such as this one (www.google.com/#q=marine+metal+products+quiet+bubbles+air+pump).
 - For transportation and temporary containment of terrestrial wildlife (should they be encountered), pet carriers work well for many species like large birds and large mammals. Smaller cages need to be used for smaller animals. For many species plastic carriers can be chewed through, and steel cages may be better. JCEP should work with the licensed rehabilitator to develop specific strategies for capture and transport.
- Preparing Containers
 - Thoroughly rinse all shipping containers with water. Do not use any type of detergent or soap to clean the containers.
 - The GladWare® needs holes drilled in the top, approximately 16 holes. A standard hole punch works well. Drill from the inside out so that no sharp edges protrude into the animal holding space.
 - If desired, mark each bag with identification of eventual destination and the number of animals in the container.
- Container densities (per gallon bag for short shipments-avoid overcrowding):
 - Eggs: 1 mass per bag, minimize disturbance and division of mass
 - Larvae under ½": 25 per bag
 - Larvae 1" - 1 ½": 15 per bag
 - Larvae over 1 ½": 10 per bag
 - Recently metamorphosed frogs: 5 per container

- Water
 - Water put in the bags must be chlorine and chloramine free. Dechlorinating chemicals can be used to immediately remove chlorine. ODFW recommends using onsite water unless it is too hot or turbid due to active construction.
 - Stream or pond water from which the animals originated can be used. Avoid capturing aquatic invertebrates or organic debris.
 - Other alternatives are bottled drinking water or tap water left uncovered for 24 or more hours.
 - For larvae, fill bags by approximately 75 percent or greater volume water to avoid excessive sloshing.

Sincerely,

David Evans and Associates, Inc.

A handwritten signature in blue ink that reads "PRR".

Philip Rickus
DEA Ecologist