3.4 WETLANDS

3.4.1 Affected Environment

This section presents information related to wetlands along the pipeline corridor. Unless otherwise noted, information presented in this section is based on field surveys, the ASC (OPL 1998), and the wetland report prepared for this proposal (Dames & Moore 1997). A detailed analysis of the conditions of each wetland and impacts is presented in the ASC.

The scientific names of plant species used in this section are provided in Table 3.4-1. For ease of reading, only common plant names are used in text.

Table 3.4-1. Common and Scientific Names of Plant Species Mentioned in Section 3.4, Wetlands

Common Name	Scientific Name
black cottonwood	*Populus trichocarpa*
common bullrush	*Scirpus acutus*
common cattail	*Typha latifolia*
Douglas' spirea	*Spiraea douglasii*
hairy willow-herb	*Epilobium ciliatum*
red alder	*Alnus rubra*
red-osier dogwood	*Cornus stolonifera*
reed canarygrass	*Phalaris arundinacea*
Russian olive	*Elaeagnus angustifola*
salmonberry	*Rubus spectabilis*
saltgrass	*Distichlis spicata*
sedges	*Carex* spp.
soft rush	*Juncus effusus*
western red cedar	*Thuja plicata*
willow	*Salix* spp.

3.4.1.1 Wetland Numbers, Location, and Size

Wetlands are important natural communities that have been documented along the pipeline corridor because of federal, state, and local laws and policies that pertain to their protection. Wetlands are protected because of historic and current statewide losses of this habitat. The regulatory definition of wetlands is as follows:

> areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3, 40 CFR 230.3).

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (ACOE) and U.S. Environmental Protection Agency (EPA) regulate the placement of dredge or fill material into waters of the United States. Such waters include surface water features such as wetlands, intermittent and perennial streams, rivers, ponds, lakes, and wet meadows. Streams and rivers are discussed in Section 3.6, Water and Section 3.7, Fisheries.

Although the Clean Water Act protects wetlands, filling of wetlands may occur under the Act and only by authorization of the ACOE. Projects that will involve filling wetlands or other water bodies require a Section 404 permit from the ACOE before filling can occur. The ACOE also considers excavation and mechanized land clearing in wetlands as regulated activities. Section 10 of the Rivers and Harbors Act of 1899 also regulates activities that occur in navigable waters such as the Columbia River.

Wetlands along the pipeline corridor were identified by reviewing aerial photographs, National Wetland Inventory Maps, and local agency wetland maps, and by conducting field surveys along the corridor, pump stations, terminal facility, and alternative Columbia River and YTC segments. Wetlands were field delineated by OPL using the 1987 ACOE Wetlands Delineation Manual. Wetland maps showing boundaries of all wetlands impacted by the construction corridor have been submitted to the ACOE.

A total of 137 wetlands were identified within the 61 m (200-foot) study corridor centered on the pipeline corridor (Figures 3.4-1 and 3.4-2). The pipeline would cross 78 of these wetlands within the 9.1 m (30-foot) construction corridor. (The construction corridor would be narrowed to 9.1 m [30 feet] in wetlands, instead of the 18.3 m [60-foot] construction corridor used for other areas, to minimize potential wetland impacts.)

Wetland numbers used in this EIS correspond to those in the wetland report (Dames & Moore 1997). Wetlands were numbered in the wetland report according to the township, range, and section in which they are located. For example, a wetland located in Township 18 North, Range 12 East, Section 21 would be numbered 181221. Wetland maps showing the configurations and locations of each wetland affected by the proposal are presented in the wetland report on 1 inch = 250 feet aerial photographs (Dames & Moore 1997).

The 78 wetlands affected by the project encompass an area of approximately 284 ha (702 acres) and range in size from less than 1 ha to over 40 ha (100 acres). Wetland vegetation classes within the construction corridor include palustrine emergent, scrub-shrub, and forested

wetlands as defined by Cowardin et al. (1979). Some riverine and open water areas totaling 0.3 ha (0.7 acre) are included within the wetland boundaries. Appendix B summarizes the size, vegetation classes, dominant plant species, and categories for 72 of the 78 wetlands within the construction corridor (based on Ecology's [1991, 1993] four-tiered rating systems for eastern and western Washington). (Information for 6 of the 78 affected wetlands was not available at the time of printing this Draft EIS.)

3.4.1.2 Wetland Conditions and Resource Rating

Conditions of wetlands are typically described by discussing the wetland vegetation, soil, hydrology, and functions. Because of the numerous wetlands located along the pipeline corridor, it is impractical to discuss the characteristics of each wetland in the EIS. However, the specific conditions for the majority of the wetlands are presented in OPL=s wetland report (Dames & Moore 1997). The wetland report describes the dominant plant species found in each wetland, soil types and characteristics, and hydrologic conditions (e.g., seasonal or perennial saturation or inundation; whether the source of water to the wetland is associated with a stream, surface runoff, or high groundwater; and field characteristics that indicate wetland hydrology is present). Functions associated with each wetland are also discussed in the report.

The wetlands along the pipeline corridor in western and eastern Washington include isolated wetlands (i.e., wetlands not part of a surface tributary system) and wetlands associated with surface water features. Some of the larger creeks and streams where wetlands are found include wetlands associated with Bear Creek in Snohomish County; Cherry Creek, Harris Creek, and Griffin Creek in King County; Cabin Creek and Swauk Creek in Kittitas County; Crab Creek in Grant County; and Eagle Lake in Franklin County.

Resource Rating Definitions. Washington's wetland resource values can be evaluated using the Washington Department of Ecology's wetland rating systems for western and eastern Washington (Ecology 1991). The wetlands rating system ranks wetlands as Category I, II, III, or IV using a variety of factors such as habitat characteristics, vegetation patterns, species diversity, size, wildlife habitat use, degree of disturbance, and connectivity to other resources:

- Category I wetlands are considered to be of the highest resource value. Category I wetlands can include large forested wetlands, and wetlands with habitat for federal or state listed threatened and endangered species.

- Category II wetlands contain important habitat characteristics or habitat for state priority fish and wildlife species, can provide very high function for wildlife species, and are more common than Category I wetlands. Category II wetlands can be larger than many Category III and IV wetlands.

- Category III wetlands can provide important functions and values and are important for a variety of wildlife species. Generally these wetlands occur more commonly than Category I and II wetlands; they are smaller, less diverse, and/or more isolated in the landscape than Category II wetlands.

- **#** Category IV wetlands are generally the smallest and least diverse in habitat structure and plant species than Category I, II, and III wetlands but still provide some function or value commonly attributed to wetlands.

Table 3.4-2 summarizes the number of wetlands along the pipeline corridor in western and eastern Washington by category.

Table 3.4-2. Number of Wetlands within the 30-Foot Construction Corridor by Category in Eastern and Western Washington

	Category I	Category II	Category III	Category IV	Total
Western Washington	26	8	10	1	45
Eastern Washington	5	18	10	0	33
Total	31	26	20	1	78

Source: Dames & Moore 1997 and other information provided by Dames & Moore.

Category I Wetlands along Pipeline Corridor. The 26 Category I wetlands in western Washington received this rating because some portion of the wetland contains forested habitat greater than 0.4 ha (1 acre) in size, or state priority species or their habitats occur in these wetlands (e.g., osprey and pileated woodpecker). No wetlands that are considered bogs or wetlands in alpine or subalpine settings are located in the construction corridor.

Five Category I wetlands are located along the pipeline corridor in eastern Washington. One of the wetlands located in Kittitas County (Wetland No. 201309) is a forested wetland dominated by western red cedar and red alder. The other Category I wetlands are emergent wetlands associated with the Crab Creek drainage in Grant and Adams Counties. They are considered Category I wetlands because of the presence of anadromous fish in the associated streams and sandhill crane, a state endangered upland bird, in the region.

Although the pipeline corridor crosses 26 Category I wetlands in western Washington, the portion of the wetlands where the corridor would be located is within the BPA ROW in 23 of those wetlands. A USFS road crosses through two of the other Category I wetlands. In these cases, the vegetation has already been affected by ROW and road maintenance, and the quality and condition of the wetlands have previously been altered. Where the pipeline corridor crosses, these wetlands are dominated by scrub-shrub or emergent vegetation. Wetland plants along these ROW corridors are common species such as salmonberry, spiraea, red alder, willow, soft rush, cattail, and reed canarygrass. The forested portion of the Category I wetland located in Kittitas County occurs within the 61 m (200-foot) study corridor but not the 9.1 m (30-foot) construction corridor. The pipeline corridor utilizes the edge of the John Wayne Trail and avoids the forested portion of the wetland.

A Category I wetland near the Tolt River (Wetland No. 250714) in western Washington is a forested wetland located outside of existing maintained corridors. This wetland is dominated by western red cedar, red alder, and black cottonwood.

Category II Wetlands along Pipeline Corridor. Category II wetlands are the most common wetlands in the study corridor in eastern Washington. They are primarily scrub-shrub or emergent wetlands associated with intermittent or perennial creeks with sufficient habitat structure and species diversity to meet Ecology's Category II rating. Scrub-shrub wetlands are dominated by shrubs and small trees that are less than 6.1 m (20 feet) tall; emergent wetlands are dominated by herbaceous plants such as grasses, sedges, rushes, and forbs. Common plant species include reed canarygrass, sedges, soft rush, cattail, hairy willow-herb, red alder, willow, and Russian olive.

Category III and IV Wetlands along Pipeline Corridor. The 10 Category III and one Category IV wetland in western Washington received this Ecology rating because these are generally small wetlands (less than 0.8 ha [2 acres]) with low habitat diversity and vegetation structural diversity. The Category III and IV wetlands are scrub-shrub wetlands (plus one emergent wetland) dominated by species commonly found in wetlands of western Washington such as red alder, salmonberry, Douglas spirea, and soft rush.

Category III wetlands in eastern Washington include eight emergent wetlands and two scrub-shrub wetlands that are small (0.4 to 2 ha [1 to 5 acres]) with low to moderate habitat diversity, vegetation structure diversity, and plant diversity. The emergent wetlands are dominated by various herbaceous species which include cattail, common bulrush, saltgrass, and reed canarygrass.

Wetland Functions and Values. Functions and values of 72 of the wetlands within the construction corridor are discussed in the wetland report (Dames & Moore 1997). Functions and values presented in the wetland report include water quality, floodflow moderation, biological support, groundwater recharge/discharge, and recreation:

- Water quality functions were most commonly rated moderate to high for larger wetlands with herbaceous cover that can act as a sediment filter or capture pollutants from urban or agricultural runoff.

- Floodflow moderation was rated moderate to high for wetlands in a floodplain.

- Biological support was rated moderate to high for the Category I wetlands with several vegetation classes.

- Groundwater recharge and discharge functions were generally rated moderate.

- Recreation values were generally rated moderate to low because of the inaccessibility of many of the wetlands.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Petroleum Product Pipeline

Construction Impacts - Overall Proposal. Direct, temporary construction impacts would occur within the 9.1 m (30-foot) construction corridor from placement of the pipeline in the ground, movement of heavy equipment through the wetland, temporary storage of backfill soil, and pulling of pipes through the wetland. This is expected to result in the temporary loss of vegetation and other habitat features such as stumps, downed logs, and snags. Soil disturbance from these activities and digging the trench could injure or kill plants if large portions of the plants= roots or aboveground shoots are cut or damaged. Indirect impacts could occur within the 9.1 m (30-foot) construction corridor or away from the corridor through water quality degradation, sedimentation, introduction of invasive species, and changes in wetland hydrology. These impacts would be reduced to a minor level of impact by implementing the BMPs presented in Appendix C and mitigation measures described in this section.

No impacts would occur from the construction of a building or facility in a wetland that result in a net loss of wetland acreage. However, permanent wetland impacts would occur where the pipeline is placed in a forested wetland, and the forest cover is removed and permanently maintained in a scrub-shrub or emergent vegetation class. Wetland functions would be compensated over time by restoring wetland areas temporarily impacted during pipeline construction and enhancing existing degraded wetlands (as discussed below).

Number and Area of Wetlands Impacted. Of the 137 wetlands within the 61 m (200-foot) study corridor, 59 would not be affected by construction activities. Portions of the other 78 wetlands are within the 9.1 m (30-foot) construction corridor. Approximately 6.9 ha (17.1 acres) of these wetlands would be directly impacted along the 372 km (231-mile) corridor (Table 3.4-3). See Appendix B for the impact area and vegetation class associated with most of the wetlands. The 78 wetlands impacted within the construction corridor cover a total of approximately 284 ha (702 acres); therefore, the 6.9 ha of wetland that would be impacted by pipeline construction represents approximately 2 percent of the total area covered by these 78 wetlands.

Other construction impacts that would occur in wetlands would include boring of the pipeline under four roads that are adjacent to wetlands: Maltby Road (Wetland No. 270522A), State Route 203 (Wetland No. 270625B), Lake Fontel Road (Wetland No. 270729), and Kelly Road (Wetland No. 260727A). The construction activities associated with the drilling would occur within the 9.1 m (30-foot) construction corridor and would not increase the footprint of construction impacts in the wetlands. Effects of boring on wetland hydrology are discussed below under AHydrology Impacts@.

Wetland Impact Avoidance and Minimization. NEPA guidelines prioritize mitigation to first reduce impacts through avoidance and minimization, and then rectify and compensate for unavoidable impacts. Selection criteria to identify the proposed route included utilization of existing roads, trails, and transmission line corridors to avoid wetland impacts. Following field studies, additional wetland impacts were avoided by realignment of the route where feasible. Feasibility includes consideration of land ownership and acquisition of easements, construction costs, reducing sharp angles and bends in the pipeline corridor, and access. Within the 61 m (200-foot) study corridor, 137 wetlands were identified and 59 of those wetlands were avoided by the proposed route. The proposed route would avoid approximately 277 ha (685 acres) of the 284

Table 3.4-3. Summary of Area of Impact by Wetland Vegetation Class and by County (in acres)

County	Palustrine Forest	Palustrine Scrub-Shrub	Palustrine Emergent	Riverine	Palustrine Open Water	Total Impact
Snohomish County	0.03	3.88	1.31	0.02	0.12	5.36
King County	0.51	5.02	0.09	0.03	0	5.65
Kittitas County	0	1.36	1.96	0.02	0	3.34
Grant County	0	0	1.13	0.03	0.24	1.40
Adams County	0	0	0.07	0	0.21	0.28
Franklin County	0	0.71	0.30	0.03	0	1.04
Total	0.54	10.97	4.86	0.13	0.57	17.07

Source: OPL 1998.

ha (702 acres) of wetland in the construction corridor. Additional wetlands may be avoided when the final alignment design is completed.

Forested wetlands, which are a more difficult type of wetland to compensate for through restoration or creation, have been largely avoided. There is 0.22 ha (0.54 acre) of impact along the 372 km (231-mile) route. For example, potential impacts on two wetlands (Nos. 240806 and 240807) in King County would occur where the pipeline corridor follows a road through the forested wetlands. However, most of the potential impact at these two wetlands has been minimized by using the unvegetated road surface.

Wetland impacts are further avoided by narrowing the construction corridor from 18.3 m (60 feet) to 9.1 m (30 feet) within the wetlands, placing staging areas for construction and pipe fitting in upland areas, and crossing the narrowest portion of the wetlands where feasible.

To minimize impacts on wetlands, the proposal would include mitigation measures identified in this chapter and Appendix C.

Vegetation Impacts. Vegetation impacts from construction would include clearing shrubs, trees, and herbaceous vegetation from wetlands. Vegetation within the construction corridor would be cut and removed, leaving roots intact where possible. Pulling of tree stumps and other rooted vegetation would occur within the open trench and other places within the construction corridor where they interfere with construction activities. The area of impact for forested, scrub-shrub, and emergent vegetation is shown in Table 3.4-3. This impact is considered minor because the vegetation removed for construction would be replanted with native wetland species common to the wetlands. The majority of the highest category wetlands in western Washington are located in the BPA ROW, which is maintained in a scrub-shrub or emergent wetland condition. Plant species in this portion of the wetland, such as Douglas' spiraea, salmonberry, cattail, and soft rush, can easily be reestablished through revegetation.

Minor impacts on forested vegetation would occur at four wetlands and total 0.22 ha (0.54 acre). This impact is considered minor because:

- Although the dominant vegetation of the wetland would change, no loss of wetland acreage would occur. The proposal includes restoring the disturbed area to a scrub-shrub or emergent vegetated community (to allow for pipeline inspections) and enhancing degraded emergent wetlands to forested wetland in an amount equal to twice the disturbed area.

- The forested impact area within Wetland No. 270729 in Snohomish County would be 0.01 ha (0.03 acre) and would occur adjacent to existing cleared forested buffer areas at the narrow end of the wetland.

- Impacts on two of the wetlands (Nos. 240806 and 240807) in King County would occur where the pipeline corridor follows a USFS road through the wetland. Within the 0.14 ha (0.34 acre) wetland impact area identified for these two wetlands, most of the impact area is associated with the unvegetated road surface. Some forest wetland vegetation would be impacted where the road is not wide enough for the construction corridor.

The greatest impacts would occur at the forested wetland near the Tolt River in King County where the pipeline creates a new corridor and 0.07 ha (0.17 acre) of red alder and western red cedar forested wetland would be removed.

Directional drilling under four roads would affect a forested and three scrub-shrub wetlands. Wetland No. 270729 is a forested wetland and the boring entry site, and trenching, would affect 0.01 ha (0.03 acre) of red alder and western red cedar trees. Dominant plant species in the three scrub-shrub wetlands include salmonberry, spiraea, and red-osier dogwood. As previously discussed

under ANumber and Area of Wetlands Impacted@, the directional drilling staging areas would occur within the 9.1 m (30-foot) construction corridor. Therefore, the impact area associated with this activity is already considered in the wetland impact area calculations along the proposed route.

Vegetation impacts that result from trenching or drilling in all scrub-shrub and emergent wetlands would be minimized by restoring these communities to their pre-construction plant cover and condition. Although many of the wetlands crossed are considered high quality because of the Category I or II rating, the construction corridor in most of these wetlands would be located in a previously impacted community. Plant communities in the wetlands have been altered by tree removal and/or agricultural practices in 75 of the 78 wetlands. As presented in the ASC, OPL would restore these wetlands after pipeline construction by separately stockpiling subsoil and topsoil and replanting with native species common to the wetland. Habitat values associated with large woody debris would be compensated by replacing downed logs greater than 12 inches in diameter and large root wads that may have been moved in the construction corridor during construction. Snags would be replaced by creating new snags in adjacent wetlands.

Wetland restoration and compensation goals would focus on addressing the impacts of the project. The project would result primarily in a temporary impact and, in forested wetland conditions, permanent loss of functions, but not in a loss of wetland acreage. Therefore, the goals of the restoration and compensation would be oriented towards replacing wetland functions. Wetland functions impacted by construction (trenching and boring) would be replaced by restoring onsite wetlands and enhancing other degraded wetlands located at four sites near the pipeline route in Snohomish, King, Kittitas, and Grant Counties. Enhancement of low-value wetlands would include:

- 4.5 ha (11.0 acres) of degraded emergent wetlands would be enhanced to scrub-shrub conditions;

- 1.0 ha (2.4 acres) of degraded emergent wetland would be enhanced as higher quality emergent wetland by planting native emergent vegetation; and

- 0.4 ha (1.1 acres) of degraded emergent wetland would be enhanced to forested wetland conditions.

This additional enhancement is proposed to help compensate for the loss of wetland functions during the time it takes for restoring the impacted wetlands to pre-construction conditions. A total of 5.9 ha (14.5 acres) of wetland would be enhanced in addition to restoring the 6.9 ha (17.1 acres) of wetland impacted along the pipeline corridor.

To ensure restoration and enhancement are successful, a 5-year monitoring program would be implemented by OPL as part of the proposal. Additional plant replacement through enhancement or restoration would be required where restored areas along the pipeline do not meet the following success standard: native herbaceous (for emergent wetlands) and woody cover (for scrub-shrub and forested wetlands) is at least 80 percent of the total plant cover; total cover is at least 80 percent of the wetland area; and the number of native plant species present in the restored or enhanced wetland is at least 50 percent of the number of species present before the restoration or enhancement occurred. Additional replacement through enhancement or restoration would be required for areas

that do not meet the performance standards by enhancing or restoring additional amounts of forested, scrub-shrub, and emergent wetlands.

Wetland buffer impacts would be minimized by revegetating the buffer with vegetation similar to that found at the time of construction. Of the 78 wetlands impacted, 73 have buffers that are not forested within the construction corridor because the pipeline would follow existing corridors, roads, trails, and agricultural areas. For the remaining five wetlands with forest cover in all or part of the buffers, buffers would be planted with trees and shrubs. A 9.1 m (30-foot) maintenance corridor would remove approximately 1 to 2 percent of the total existing forested buffer area around the wetlands. This is considered a minor impact because of the small area of buffer affected, and the buffer would be replanted with native shrubs to provide for some of the same functions a forested buffer provides.

Hydrology Impacts. The wetland report discusses potential risks of creating a hydrologic change by trenching through wetlands (Dames & Moore 1997). At wetland crossings, the pipeline would be installed in a trench 2.4 m (8 feet) deep and 1 m (3 feet) wide. Digging the trench through a wetland could result in three types of risks that could alter wetland hydrology:

- draining a wetland by allowing water to flow out of the wetland along the pipeline trench, because the replaced material in the trench would have greater hydraulic conductivity than the surrounding undisturbed soils;

- draining a wetland through the subsoil by puncturing the impermeable layer with the trench; and

- altering the subbasin that drains to a particular wetland by diverting subsurface flows through the trench and away from the wetland.

Factors that were used to determine the risk of altering wetland hydrology included the source of water to the wetland (e.g., groundwater, surface runoff, or streamflow), landscape position, size, surficial geology, and soils. Table B-2 in Appendix B summarizes these factors for most of the 78 wetlands and identifies the wetlands at risk for hydrologic changes.

Based on the analysis by Dames & Moore, 5 of the 78 wetlands are located in a site that could be drained through the pipeline trench. Wetlands located in a topographic depression or river valley would not be drained through the trench because the trench in the wetland is at the lowest point in the surrounding landscape. The only wetlands subject to being drained by the trench are those located on slopes that are also crossed by the pipeline trench in a direction other than parallel to the slope. The potential hydrologic risk to the five wetlands identified by Dames & Moore is water flowing downslope away from the wetland through the trench, presumably in material with greater hydraulic conductivity than the undisturbed native material.

To reduce the potential for this impact, trench plugs would be placed in the trench at the downslope side of the wetland to prevent the water from following the trench and to maintain wetland hydrology. Trench plugs would be impervious material such as concrete or compacted clay and

would be keyed into the trench walls to prevent downslope subsurface water movement away from the wetland.

Trenching would not drain wetlands through the subsoil if the impermeable layer (soil or geologic feature) extends to a depth greater than the depth of the pipeline trench. All wetlands located on compacted glacial till, or in alluvium associated with a river or stream or supported by groundwater discharge, are not expected to be affected by this risk category. Based on the analysis, 25 wetlands are considered to be potentially at risk from draining through subsoils if no protective measures are taken. To prevent the eventual draining of the wetland, wetland and soil specialists monitoring the wetland trenching would identify those sites where an impervious layer would be installed in the pipeline trench before backfilling. Impervious trenches would be connected with or overlayed on existing layers to make a continuous seal.

The third risk category, altering upslope hydrologic flow patterns above the wetland, could occur at three wetlands in King and Kittitas Counties (Wetland Nos. 221013, 201309, and 191504). The pipeline corridor is located on a slope above these wetlands in an area where shallow subsurface flow drains downslope to the wetland. To prevent potential hydrologic impacts on these wetlands, trench plugs would be installed within the pipeline trench to prevent shallow subsurface water from diverting along the trench and away from the wetland.

Indirect impacts on wetlands located outside of the construction corridor would be avoided by using the same methods to plug the trench line. Appropriate placement of trench plugs could be used to prevent subsurface flows from being rerouted away from wetlands downslope of the trench. Wetlands upslope of the trench could be protected by appropriate placement of trench plugs to prevent a lowering of the groundwater by subsurface flows following the trench.

Potential hydrologic impacts are considered minor because wetland and soil specialists would monitor all wetlands during construction to determine if trench plugs, impervious seals, surface berms, or other measures should be implemented to prevent draining of any wetland. Wetland and soil specialists would be present during construction in all wetlands to identify the relationship between wetland hydrology and soil conditions to ensure the subsurface soil conditions are reestablished during the backfilling of the trench. Maintaining subsurface features to support wetland hydrology would help to retain wetland functions associated with the hydrologic regime of the wetland.

Directional Drilling Under Roads. Drilling under four roads would require staging the boring entry site in the wetlands adjacent to the roads. At two of the wetlands (Nos. 270522A and 270729), the proposal includes use of trench plugs and seals at appropriate places to prevent a preferential path for subsurface flow to follow the pipeline. A soil scientist and/or geologist would be onsite to help determine the locations and designs of the plugs and seals around the pipeline.

Altered wetland hydrology is not expected at Wetland No. 270625B (a Category III wetland along SR 203 in Snohomish County) from drilling because the wetland is located on a deep alluvial soil with wetland hydrology supported by groundwater associated with the Snoqualmie River Valley and surface runoff. The fourth wetland where drilling would occur, Wetland No. 260727A (Harris

Creek crossing) is not expected to result in altered wetland hydrology. Wetland hydrology is supported by groundwater associated with Harris Creek and the 183 m (600-foot) wide floodplain. Trenching or drilling in the deep alluvial soils associated with the floodplain is not expected to break through any impervious layers that create a perched groundwater system. The pipeline trench is not expected to Adrain@ water away from the wetland because the pipeline trench crosses the valley and runs upslope on both sides of the wetland floodplain.

Onsite restoration as previously discussed would be completed to rectify wetland impacts associated with drilling in the construction corridor.

Water Quality Impacts. Construction of the pipeline could introduce sediments into wetlands. Water quality of the wetlands would be degraded if preventive measures are not taken. While working in wet sections of trenches or directional drilling pits, the trenches or pits would be de-watered to maintain safe working conditions. Water removed from the trench would not be discharged into streams or wetlands without first controlling the sediments with temporary sediment basins and filter fences.

To reduce the potential of chemicals and toxic substances from construction equipment entering the wetlands, the spill prevention and control plan would be followed during and after construction. All vehicle fueling and maintenance would occur outside of the wetland and surrounding buffer.

Potential water quality impacts would be considered minor if measures (discussed in Section 3.6, Water and Appendix C) are successfully implemented.

Wildlife Impacts. Three wetlands (Wetland Nos. 270619B, 270628, 260717) in western Washington were observed to provide habitat for osprey (a state species of recreational value as determined by WDFW) or pileated woodpecker (a state candidate species for threatened status). Wetlands in the Crab Creek area contain habitat suitable for sandhill crane. Measures to reduce impacts on special-status wildlife species are discussed in Section 3.5, Wildlife.

Construction Impacts - Alternative Segments. The alternative corridor segments along I-90 and alternative Columbia River crossings, are located in the shrub-steppe communities of eastern Washington. Because of the uncommon occurrence of wetlands in shrub-steppe communities in this portion of the proposed corridor, wetland impacts are very similar between the proposed route and the alternative segments. Wetland impacts for the different alternatives are discussed below.

Columbia River Approach Options. Wetland impact acreage would be 0.03 ha (0.08 acre) greater for the YTC segment option south of I-90, in the YTC than the proposal. The alternative segment south of I-90 would impact two scrub-shrub wetlands (a Category II and a Category III wetland) totaling 0.03 ha (0.08 acre). An alternative segment south of I-90 along the fenceline within the YTC would avoid the two wetlands and wetland impacts would be similar to the proposed route.

Columbia River Crossing Options. In addition to the proposed Columbia River crossing method (horizontally drill a crossing below Wanapum Dam), OPL has identified four alternative Columbia River crossing routes: dredging a crossing north of I-90, attaching the pipeline

to the I-90 Bridge, crossing on Wanapum Dam, or attaching the pipeline to the Burlington Northern Beverly Railroad Bridge. There are various approach routes to the alternative crossing sites.

Assuming the crossing of the Columbia River at or north of the I-90 Bridge would utilize the proposed route north of I-90, no additional wetland impacts have been recorded.

No wetlands were recorded to occur along the alternative segments that would continue the pipeline from approximately MP 149 south to the Burlington Northern Beverly Railroad Bridge and then north to reconnect with the proposed corridor east of the Columbia River (Heal pers. comm.). Therefore, no additional wetland impacts would occur from crossing the Columbia River at the Burlington Northern Beverly Railroad Bridge as compared to the proposal.

Operational Impacts. Operational impacts are those impacts that would occur after the pipeline is constructed. Such impacts would be associated with the maintenance of the line or pipeline breaks and spills.

Vegetation Clearing for Maintenance. Maintenance of the pipeline corridor would require the permanent removal of trees growing within a 9.1 m (30-foot) corridor. This would be done to allow visual inspection of the pipeline from the air and to prevent the roots of woody vegetation from damaging the pipe.

Tree clearing could be required as a maintenance activity in the forested wetlands along the proposed corridor. As previously mentioned, 0.22 ha (0.54 acre) of forested wetland occurs within the 9.1 m (30-foot) construction corridor. After tree clearing has occurred for pipeline construction, this forested wetland area would continue to be maintained as an emergent and/or scrub-shrub wetland during operation of the pipeline. Maintenance tree clearing in wetlands along the pipeline would be done by cutting vegetation with saws and tree trimmers. Herbicides would not be used in wetlands along the corridor for vegetation maintenance. Emergent and scrub-shrub wetlands would be allowed to grow naturally once the pipeline is installed.

Maintenance of a 9.1 m (30-foot) wide visual corridor represents a minor impact because of the limited amount of forested wetland area that would be affected along the pipeline corridor. In addition, no wetland area would be lost permanently except for the permanent conversion of 0.22 ha (0.54 acres) to emergent or scrub/shrub wetland, and all wetlands would be revegetated with herbaceous and shrub vegetation to create some habitat value and resource protection.

Spills. Impacts from a spill are uncertain because the location and extent of a potential spill are unpredictable, except in terms of risk frequency (see Appendix A, Spill Risk Information, and Section 3.18, Health and Safety). However, all wetland plants are vulnerable to the effects of a petroleum product spill. Effects on vegetation would depend on the season, location, volume, and product at the point where the spill occurred. Effects of a spill or spray on wetland vegetation would be similar to that described under Section 3.3, Botanical Resources.

Specific impacts on wetlands would occur given a large enough volume of spill that reaches plant foliage or wetland soil. A jet fuel spill on marsh vegetation at Vancouver International Airport in British Columbia indicated acute short-term impacts on vegetation as well as potential long-term

chronic effects (Moody 1990). In the most severely affected areas, marsh species responded differently to the fuel spill, although a few individuals of bulrush remained 5 months after the spill. Most vegetation was unable to recover in 5 months in the severely affected areas, although some stunted annual species were able to invade the site. In lightly affected fuel spill areas, marsh vegetation could recover if the roots were not damaged either by translocation of fuel from the leaves to the roots or accumulation in the soil. The study of the Vancouver spill indicated jet fuel had the most toxic effect on new growth (shoots and leaves); vegetation recovery of the marsh appeared to be occurring in the less severely affected sites.

Cumulative Impacts. The proposed project would not result in the permanent loss of any wetland area and would not contribute to the gradual decline of wetland area in Washington. All wetlands would be restored to their previous condition except for 0.22 ha (0.54 acre) of forested wetland which would be restored to scrub-shrub wetland. In addition to the onsite restoration at pipeline construction impact sites, approximately 5.9 ha (14.5 acres) of degraded wetland would be enhanced to further compensate for wetland impacts.

3.4.2.2 No Action

The No Action Alternative would not have direct impacts on wetlands. Impacts from the proposal would not occur, although operational impacts on some wetlands would continue for maintenance of the existing north-south pipeline, including clearing of trees and large shrubs from existing corridors. Wetlands along road corridors would continue to be at slight risk from oil spills associated with increased trucking activities to transport oil from western Washington to eastern Washington. Intertidal mudflat and salt marsh wetlands would be at slight risk from 12 to 20 barges per month in Puget Sound, the Strait, and along the coast to the Columbia River.

3.4.3 Additional Proposed Mitigation Measures

3.4.3.1 Construction Mitigation and Subsequent Impacts

OPL has included BMPs to minimize wetland impacts (Appendix C). Additional mitigation measures, beyond those proposed by OPL, that could be used to further reduce impacts are as follows:

- Return construction corridors to their original contours after the pipeline is installed and before revegetation begins. This would reestablish surface water flow.

- Ensure noxious weed infestations do not become a problem in wetlands by conducting a weed inventory 1 year after construction to determine the extent noxious weeds may have invaded disturbed areas. Develop and implement a plan approved by the local county noxious weed control board as described in Section 3.3, Botanical Resources, to ensure that noxious weed prevention is successful..

- # Prepare a wetland mitigation plan before any ground disturbance begins that focuses on replacing wetland functions at impacted wetlands as identified in the wetland report for this project. The plan would include a restoration design that specifies plant material size, planting densities, planting methods, seed mixes, application rates, timing of planting, and seed application. Monitor the revegetation plantings to ensure the revegetation plan is implemented as designed. The restoration plan would include locations of wetland enhancement sites and specific planting plans for those areas. All wetland restoration plan details would need approval by the ACOE as part of the Section 404 federal permitting process and by local agencies (through EFSEC) where wetland impacts would occur.

- # Prepare and implement a monitoring plan that describes performance standards and contingency plans for the off-site wetland restoration and enhancement program.

- # Identify the locations of temporary sediment basins and other means to control sediment, and routing of water pumped from wetland trenches and pits, before construction activities begin so that runoff can be routed immediately.

- # Avoid an additional 0.2 ha (0.58 acre) of impacts at three Category I wetlands where directional drilling staging areas would be needed to bore under roads. Impacts at Wetland Nos. 270522A, 270729, and 260727A could be avoided by moving the boring entry site outside of the wetland to bore under the road and wetland.

- # Use vehicle crossing mats to support equipment used for digging the trench which would minimize soil compaction and disturbance to vegetation not removed for trenching.

- # Pipe would be welded together in sufficient lengths to cross each wetland before lowering the pipeline into the trench.

- # Stockpiled subsoils and topsoils would be stored in uplands to avoid covering wetland vegetation.

Implementation of these mitigation measures would further minimize the potential impacts of the proposal by avoiding an additional 0.2 ha (0.58 acre) of a Category I wetland, minimizing sedimentation of wetlands, and helping to ensure revegetation and restoration efforts are successful.

The mitigation measures, combined with the measures described as part of the proposal, that would be used to minimize impacts on vegetation, hydrology, and soil conditions in the wetlands would help ensure wetland functions would be replaced. As previously stated, a 9.1 m (30-foot) corridor would be affected in the wetland, not the entire wetland. Therefore, functions such as biological support, wildlife habitat, filtration of sediments and capturing pollutants from surrounding runoff, and floodflow moderation would be maintained to some degree because the majority of the wetland area would not be disturbed from the construction corridor. Replacing subsurface soil conditions to maintain surface and subsurface hydrology conditions in the wetland and replanting wetland vegetation with native species common to the wetlands would, over a relatively short time

(approximately 5 years), replace wetland functions described in the wetland report (Dames & Moore 1997).

3.4.3.2 Operational Mitigation and Subsequent Impacts

No additional mitigation is proposed because of OPL=s commitment to enhance 0.4 ha (1.1 acres) of degraded emergent wetlands to forested wetlands as compensation for the loss of 0.22 hectare (0.54 acre) of forested wetlands. Additional mitigation would be required if a spill occurs and wetland vegetation is killed.

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