

## 4.6 Vegetation

Vegetation is the foundation of most aquatic and terrestrial ecosystems. Among other functions, plants release oxygen and sequester carbon, provide wildlife habitat and food, affect soil development, and can increase slope stability. Plants are involved in the regulation of biogeochemical cycles such as the movement and filtration of water, carbon, and nitrogen. Plants can also have cultural, spiritual, and psychological benefits for humans.

This section describes vegetation in the study area. It then describes impacts on vegetation that could result from construction and operation of the Proposed Action and under the No-Action Alternative. This section also presents the measures identified to mitigate impacts resulting from the Proposed Action.

### 4.6.1 Regulatory Setting

Laws and regulations relevant to vegetation are summarized in Table 4.6-1.

**Table 4.6-1. Regulations, Statutes, and Guidelines for Vegetation**

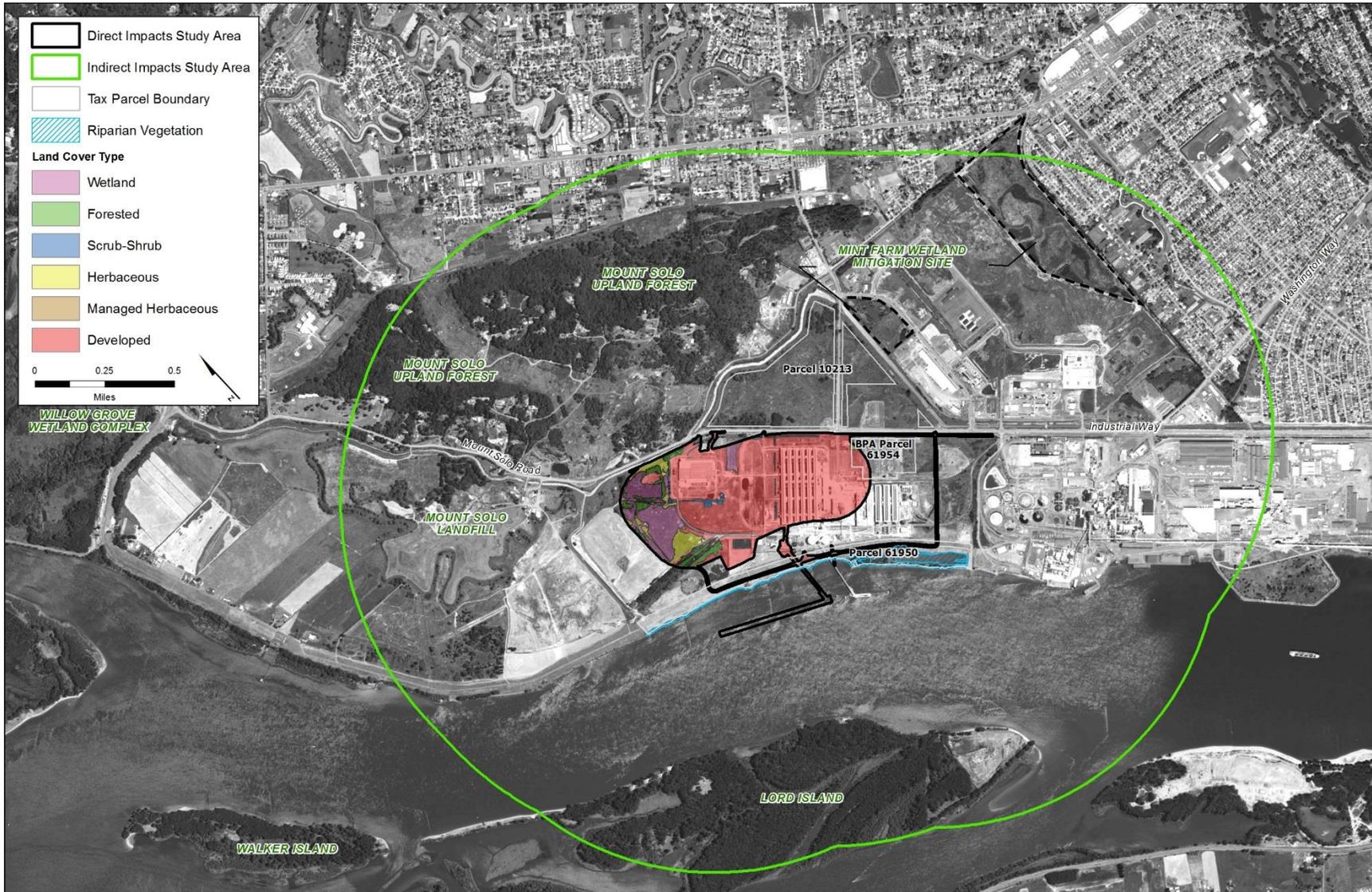
Regulation, Statute, Guideline	Description
<b>Federal</b>	
Clean Water Act (33 USC 1251, <i>et seq.</i> )	Authorizes EPA to establish the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Regulates activities in streams, wetlands, and other aquatic resources, including integral vegetated components.
Endangered Species Act (16 USC 1531-1544)	Provides for the conservation of species listed as threatened or endangered and the habitat upon which they depend. Section 7 of the ESA requires federal agencies to consult with USFWS and/or NMFS to ensure a federal action is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.
<b>State</b>	
Washington State Growth Management Act (RCW 36.70A)	Defines a variety of critical areas, which are designated and regulated at the local level under city and county critical areas ordinances.
Washington State Shoreline Management Act (RCW 90.58)	Requires cities and counties (through their Shoreline Master Programs) to protect shoreline natural resources against adverse impacts.
State Water Pollution Control Act (RCW90.48)	Provides Ecology with the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland water, salt waters, watercourses, and other surface and groundwater in the state.
Washington Natural Resource Damage Assessment (RCW 90.56.370)	Holds parties responsible for spilling oil into state waters liable for damages resulting from injuries to public resources.

<b>Regulation, Statute, Guideline</b>	<b>Description</b>
Oil Spill Natural Resource Damage Assessment (WAC 173-183)	Establishes procedures for convening a resource damage assessment committee and screening of resource damages resulting from oil spills to determine which damage assessment to use. Provides for determining damages in cases where the compensation schedule is selected as the damage assessment method to apply.
Washington Natural Area Preserves Act	Establishes the Washington Natural Heritage Program to identify candidates for natural areas designated to preserve special-status plant species and regionally important or unique plant communities. Authorizes the program to track plant species and high-quality natural ecosystems in the state and to designate plants with a state status as threatened, sensitive, or endangered. WDNR is the implementing agency.
Washington State Noxious Weed Control Act (RCW 17.10, WAC 16-750)	Establishes noxious weed control boards, which designate certain plant species as Class A, B, or C noxious weeds. Authorizes the management, control, and/or elimination of noxious weed populations in the state.
Washington State Hydraulic Code (WAC 220-110)	WDFW issues a hydraulic project approval for certain construction projects or activities in or near state waters. Considers effects on riparian and shoreline or bank vegetation in issuance and conditions of the permit.
Clean Water Act Section 401 Water Quality Certification	Ecology issues Section 401 Water Quality Certification for in-water construction activities to ensure compliance with state water quality standards and other aquatic resources protection requirements under Ecology's authority as outlined in the federal Clean Water Act.
<b>Local</b>	
Cowlitz County Critical Areas Protection Ordinance (19.15)	Requires the County to designate critical areas, including vegetation in wetlands and their buffers.
City of Longview Critical Areas Ordinance (17.10.140)	Regulates activities within and adjacent to critical areas including vegetation occurring in wetlands and their buffers, fish and wildlife habitat conservation areas (including streams and their buffers), frequently flooded areas, and geological hazard areas.
Cowlitz County Shoreline Master Program (CCC 19.20)	Regulates development in the shoreline, including the shoreline of the Columbia River, a Shoreline of Statewide Significance.
Notes: USC = United States Code; ESA = federal Endangered Species Act; EPA = U.S. Environmental Protection Agency; USFWS = U.S. Fish and Wildlife Service; NMFS = National Marine Fisheries Service; WDFW = Washington Department of Fish and Wildlife; RCW = Revised Code of Washington; WAC = Washington Administrative Code	

## 4.6.2 Study Area

The study area for direct impacts on vegetation is the 190-acre project area plus additional elements (e.g., access roads, docks, and rail line), a total of 212 acres, as shown in Figure 4.6-1.

**Figure 4.6-1. Vegetation Study Area**



The indirect impacts study area for vegetation related to operations in the project area is the area within 1 mile of the project area, for a total of 4,401 acres (Figure 4.6-1). This area considers the extent to which potential coal dust deposition (Chapter 5, Section 5.7, *Coal Dust*) could affect vegetation during operations.

Further vegetation indirect impact study areas were also established for vessel and rail traffic associated with the Proposed Action. These include the lower Columbia River to evaluate the potential impacts on shoreline vegetation resulting from Proposed Action-related vessels transiting the Columbia River and rail routes for Proposed Action-related trains in Cowlitz County and Washington State to evaluate the potential impacts that could occur because of a coal spill. Wetland vegetation is discussed in more detail in Section 4.3, *Wetlands*.

### 4.6.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts on vegetation associated with the construction and operation of the Proposed Action and No-Action Alternative.

#### 4.6.3.1 Information Sources

The following sources of information were used to describe the existing conditions relevant to vegetation and identify the potential impacts of the Proposed Action and No-Action Alternative on vegetation in the study area.

- Two site visits conducted by ICF biologists on April 8, 2014, and December 11, 2014.
- Historical aerial photos from 1994 and 2014 accessed through Google Earth Professional, a 2010 aerial photo provided by ESRI, and a 2012 aerial photo from the North Agriculture Imagery Program.
- Reports prepared by Grette Associates for the Applicant as part of the permit application materials (Grette 2014a through 2014i).
- U.S. Fish and Wildlife Service (USFWS) (2015) Information for Planning and Conservation, online database.
- 2011 National Land Cover Database (Homer et al. 2015) to describe land cover classes in the indirect impacts study area. Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) spatial data provided by WDFW on May 5, 2014, for the study area (Washington Department of Fish and Wildlife 2014).
- The Washington State Department of Natural Resources (WDNR) Natural Heritage Program Information System (Washington State Department of Natural Resources 2015) list of known occurrences of rare plants in Cowlitz County, Washington, and details regarding their occurrence, habitat, and range.

#### 4.6.3.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the Proposed Action and No-Action Alternative on vegetation. A full description of analysis methods is provided in the *SEPA Vegetation Technical Report* (ICF 2017).

- Five land cover types (developed lands, uplands, wetlands, riparian lands, and open water) were mapped to describe vegetation for the direct impacts study area based on site visits, aerial photographs, federal databases, and information provided by the applicant. Vegetation cover within these land cover types was then characterized (e.g., forested, scrub-shrub, herbaceous, and managed herbaceous). Land cover type mapping was adjusted based on field observations.
- Land cover types in the indirect impacts study area within 1 mile of the project area are described based on the 2011 National Land Cover Database GIS data (Homer et al. 2015); land cover classifications described in these data consist of open water, developed, forest, shrub, herbaceous, barren land, agriculture (planted/cultivated and hay/pasture), and wetlands.
- Direct impacts on vegetation from construction of the Proposed Action would result when portions of the study area are cleared to construct the coal export terminal and associated infrastructure. These impacts were quantified by overlaying the study area on the land cover map. The approximate acreage of each affected cover type was calculated and expressed as a percentage of all cover types in the study area.
- Direct and indirect impacts from operations are qualitatively described, including the impact mechanism, potential impacts, duration (i.e., temporary or permanent), and likelihood of occurrence.

For the purposes of this analysis, construction impacts are based on peak construction period and operations impacts are based on maximum throughput capacity (up to 44 million metric tons per year).

## 4.6.4 Existing Conditions

This section describes the existing environmental conditions in the study areas related to vegetation that could be affected by the construction and operation of the Proposed Action and the No-Action Alternative.

### 4.6.4.1 Direct Impacts Study Area

The following land cover types are found in the direct impacts study area.

#### Developed Lands

Developed lands account for 151.14 acres (71%) of the direct impacts study area. Developed lands are those areas where the majority of the vegetation has been removed and replaced with pavement, buildings, or other types of infrastructure. Developed lands also include disturbed areas of land comprising widely scattered patches of invasive shrubs such as Himalayan blackberry (*Rubus armeniacus*) and Scotch broom (*Cytisus scoparius*). These areas are typically found on higher mounds and around derelict structures and equipment. Developed lands include all of the areas previously developed by the former Reynolds Metals Company facility (Reynolds facility) and the Bonneville Power Administration (BPA) and Cowlitz County Public Utility District substations. Named features and facilities described below are shown in Figure 4.2-3 in Section 4.2, *Surface Water*. Wetlands discussed below are shown in Section 4.3, *Wetlands*, Figures 4.3-1 through 4.3-4.

## Uplands

Uplands are undeveloped vegetated areas that do not exhibit wetland characteristics. Uplands account for 26.26 acres (12%) of the direct impacts study area and consist of the following vegetation types.

- **Forested uplands.** Forested uplands are areas where trees more than 16 feet high provide more than 20% canopy cover (Multi-Resolution Land Characteristic Consortium 2011). Approximately 8.90 acres (4%) of the direct impacts study area were identified as forested uplands. On the former Reynolds facility, forested uplands occur around Wetlands A, C, and Y between the closed Black Mud Pond (BMP) facility and the former cable plant and along the U-Ditch and Interceptor Ditch. Dominant trees in the uplands adjacent to Wetlands A, C, and Y include black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), some Pacific willow (*Salix lucida*), and Oregon ash (*Fraxinus latifolia*). Common shrubs include Himalayan blackberry, red elderberry (*Sambucus racemosa*), and sweetbriar rose (*Rosa rubiginosa*), with black cottonwood and Oregon ash saplings also present. Dominant trees in the forested corridor along the U-Ditch and Interceptor Ditch include black cottonwood, red alder (*Alnus rubra*), and some Oregon ash along the ditch banks. Himalayan blackberry is the most common plant in the shrub layer, but has been recently cleared from some areas on the western end of the U-Ditch. Red osier-dogwood (*Cornus sericea*) is also common. Several types and sizes of fallen trees are present in this forested corridor, as are various snags. Reed canarygrass (*Phalaris arundinacea*) is common in the herbaceous layer in all of these forested upland areas.

Forested uplands in the direct impacts study area also include a small area (0.05 acre) of forest in the riparian zone along the Columbia River between the ordinary high water mark (OHWM) and the top of the Consolidated Diking Improvement District (CDID) #1 levee.

- **Scrub-shrub uplands.** Scrub-shrub uplands are areas with more than 20% canopy cover of shrubs or small trees that are less than 16 feet high (Multi-Resolution Land Characteristic Consortium 2011). Approximately 2.11 acres (1%) of the direct impacts study area were identified as scrub-shrub uplands. Scrub-shrub uplands on the former Reynolds facility occur around the former cable plant and north of the closed BMP facility around Wetland Y. Common species in these areas include young black cottonwood, willows, and Himalayan blackberry. Reed canarygrass is also common in the herbaceous layer.
- **Unmanaged herbaceous uplands.** Unmanaged herbaceous uplands are areas dominated by native and nonnative grasses and forbs and not maintained or managed (e.g., mowed) on a regular basis. Approximately 10.88 acres (5%) of the direct impacts study area were identified as unmanaged herbaceous uplands. These areas occur on the former Reynolds facility and BPA Parcel 61954. Unmanaged herbaceous uplands in the direct impacts study area occur along the CDID #1 Ditch 10 to the northwest of the former cable plant; in the former borrow area to the east of the closed BMP facility; and in the southeastern portion of the direct impacts study area along the Reynolds Lead spur. These areas are primarily dominated by reed canarygrass. Unmanaged herbaceous uplands on BPA Parcel 61954 are located in a transmission line easement to the northwest of the Longview Substation. This area is dominated by species similar to those listed above for the direct impacts study area, as well as Himalayan blackberry.
- **Managed herbaceous uplands.** Managed herbaceous uplands are areas regularly managed by mowing, grazing, or other activities. Approximately 4.37 acres (2%) of this cover type occur on the former Reynolds facility, CDID #1 levee, lawns around the administrative and maintenance

buildings, and caps of the closed BMP facility. All of these areas are dominated by grasses and forbs that are regularly mown. Species present include reed canarygrass, haired bentgrass (*Agrostis scabra*), colonial bentgrass (*Agrostis capillaris*), broadleaf plantain (*Plantago major*), orchard grass (*Dactylis* spp.), short-awn foxtail (*Alopecurus aequalis*), western bittercress (*Cardamine oligosperma*), blue wildrye (*Elymus glaucus*), common horsetail (*Equisetum arvense*), Queen Anne's lace (*Daucus carota*), scouring rush (*Equisetum hyemale affinis*), bedstraw (*Galium aparine*), velvetgrass (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), Kentucky bluegrass (*Poa pratensis*), and American vetch (*Vicia Americana*).

## Wetlands

Wetlands exhibit the wetland vegetation, soil, and hydrology characteristics defined in the federal wetland delineation manual and account for 26.93 acres (11%) of the direct impacts study area. The most prevalent wetland type is herbaceous wetlands, followed by forested wetlands and scrub-shrub wetlands. Section 4.3, *Wetlands*, discusses wetlands and wetland vegetation in detail.

## Open Water

Open water accounts for 10.78 acres (5%) of the direct impacts study area and consist of the Columbia River and various ditches and ponds. This land cover is described in more detail in Sections 4.2, *Surface Water and Floodplains*, and 4.8, *Wildlife*, as an aquatic habitat. These areas support vegetation along their perimeters, typically including native plants as well as noxious weeds. Curly pondweed (*Potamogeton crispus*) was observed at approximately -1 foot Columbia River Datum downstream of Dock 1 during a period of high visibility. The gently sloping portion of the shallow water habitat area between the east and west pile dikes near the project area may support a narrow band of sparse aquatic vegetation in the uppermost elevations where increased light penetration and reduced river velocity are present, relative to the deeper portions of the river in this area.

### 4.6.4.2 Indirect Impacts Study Area

Table 4.6-2 summarizes the areas and percent cover of land cover classes in the indirect impacts study area within 1 mile of the project area. Approximately 70% of the indirect impacts study area is occupied by developed lands, open water (primarily the Columbia River), and agricultural lands; the remaining 30% consists of forest, shrub, herbaceous, wetlands, and barren lands.

Land cover immediately surrounding the project area is similar to the project area, consisting primarily of developed areas, managed/unmanaged herbaceous areas, wetlands, and open water (the Columbia River). Riparian lands are found predominantly along the Columbia River between the OHWM and the top of the CDID #1 levee, and include vegetation adjacent to the active channel margin in riparian zones identified in the previous upland and shoreline habitat inventories (Grette Associates 2014e, 2014g, 2014h).

**Table 4.6-2. Land Cover in the Indirect Impacts Study Area**

<b>Land Cover Classification</b>	<b>Area in Indirect Impacts Study Area (acres)</b>	<b>Percent Cover in Indirect Impacts Study Area</b>
Developed	1631	37
Forest	347	8
Shrub	106	2
Herbaceous	62	2
Agriculture	573	13
Wetlands	719	16
Open water	880	20
Barren land	83	2
<b>Total</b>	<b>4401</b>	<b>100</b>

Notes:  
Source: National Land Cover Data Base 2011 (Homer et al. 2015).

The riparian lands consist of three vegetation types: forest, scrub-shrub, and herbaceous.

- **Riparian forest.** Riparian forest extends in a band of varying width along most of the shoreline, with the widest areas found on the southern portion of the shoreline near the previous dredged material storage area. Dominant vegetation in this cover type includes black cottonwood and various willow trees, underlain by a mixture of native shrubs such as red osier dogwood, and invasive shrubs, such as Himalayan blackberry and Scotch broom. Scattered accumulations of large woody material are present in these areas.
- **Riparian scrub-shrub.** Riparian scrub-shrub contains similar species to riparian forest. Two scrub-shrub riparian areas were found on BPA Parcel 61950 between the Columbia River and the levee. These areas are dominated by black cottonwood saplings, various willows, and nonnative vegetation including Himalayan blackberry and Scotch broom. Native and nonnative herbaceous species are also present.
- **Riparian herbaceous.** Riparian herbaceous areas are generally dominated by grasses and weeds including reed canarygrass, velvet grass, common horsetail, and broadleaf plantain. These sparse patches of herbaceous vegetation occur under the existing Dock 1 conveyor and trestle, and on sandy flats between the OHWM and the approximate elevation of mean higher high water.

The following areas in the indirect impacts study area contain higher quality vegetation communities and generally represent contiguous forest and other intact vegetation communities (Figure 4.6-1).

- **Mount Solo upland forest.** Mount Solo is a forested ridge north of the project area. It supports a large area (approximately 505 acres) of native forest intermixed with rural residential areas and some light industrial uses. This area is the largest inland forested area in the indirect impacts study area. Vegetation includes Douglas fir (*Pseudotsuga menziesii*), big leaf maple (*Acer macrophyllum*), red alder, and western hemlock (*Tsuga heterophylla*). It supports a diversity of native plant communities and provides habitat for a variety of wildlife species.

- **Mint Farm wetland mitigation sites.** Two compensatory wetland mitigation sites for the Mint Farm Industrial Park are located east of the project area. The Phase I mitigation site is 4.28 acres and is a complex of forested, scrub-shrub and emergent wetlands; the Phase II mitigation site is 67 acres and is a mixture of forested, scrub-shrub and emergent wetlands intermixed with forested uplands.
- **Lord Island.** Lord Island is located in the Columbia River near the project area. The 234-acre island was previously used for dredge material disposal. It is densely forested and bisected by various high-flow channels that support tidal marshes and shallow habitat areas. Vegetation on the island is largely native. Refer to Section 4.8, *Wildlife*, for habitats and wildlife of Lord Island.

#### 4.6.4.3 Special-Status Plant Species

As shown in Table 4.6-3, there are 15 plant species with some type of federal or state status in Cowlitz County (Washington State Department of Natural Resources 2015).

**Table 4.6-3. Known Occurrences of Threatened, Endangered, Sensitive, and Rare Plants in Cowlitz County**

Scientific Name	Common Name	Federal Status <sup>a</sup>	State Status <sup>b</sup>	Historical Record <sup>c</sup>
<i>Agoseris elata</i>	Tall agoseris	--	S	C
<i>Buxbaumia viridis</i>	Buxbaumia moss	--	R1	C
<i>Cimicifuga elata</i>	Tall bugbane	SC	S	H
<i>Corydalis aquae-gelidae</i>	Clackamas corydalis	SC	S	C
<i>Erythronium revolutum</i>	Pink fawn-lily	--	S	C
<i>Euonymus occidentalis</i> var. <i>occidentalis</i>	Western wahoo	--	S	C
<i>Isoetes nuttallii</i>	Nuttall's quillwort	--	S	C
<i>Physostegia parviflora</i>	Western false dragonhead	--	R1	H
<i>Poa laxiflora</i>	Loose-flowered bluegrass	--	S	C
<i>Poa nervosa</i>	Wheeler's bluegrass	--	S	C
<i>Salix sessilifolia</i>	Soft-leaved willow	--	S	C
<i>Sidalcea nelsoniana</i>	Nelson's checker-mallow	LT	E	C
<i>Tetraphis geniculata</i>	Tetraphis moss	--	R1	C
<i>Utricularia gibba</i>	Humped bladderwort	--	R1	C
<i>Wolffia columbiana</i>	Columbia water-meal	--	R1	C

Notes:

<sup>a</sup> Federal Status under the Endangered Species Act:

LT = Listed Threatened (likely to become endangered)

SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

<sup>b</sup> State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness. Values include:

E = Endangered. In danger of becoming extinct or extirpated from Washington.

S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.

R1 = Review group 1. Of potential concern but needs more fieldwork to assign another rank.

<sup>c</sup> Historical Record refers to when the occurrence was documented:

C = Most recent sightings after 1977.

H = Most recent sighting before 1977.

Source: Washington State Department of Natural Resources 2014.

None of these species has been recorded in the direct or indirect study areas. The nearest record of occurrence of a special-status plant species is a documented siting of the obligate wetland species Columbia water-meal (*Wolffia columbiana*) approximately 1.5 miles northwest of the project area and outside of the direct and indirect study areas (Washington State Department of Natural Resources 2015).

The special-status plant species, and the preferred elevation, habitat and geographic range for each are provided in Table 4.6-4. As indicated in Table 4.6-4, of the 15 special-status plant species known to occur in Cowlitz County, six were identified as potentially occurring in the direct impacts study area, based on the presence of potentially suitable habitat. These species are Nelson's checker-mallow (*Sidalcea nelsoniana*), western wahoo (*Euonymus occidentalis* var *occidentalis*), western false dragonhead (*Physostegia parviflora*), loose-flowered bluegrass (*Poa laxiflora*), soft-leaved willow (*Salix sessilifolia*), and Columbia water-meal.

**Table 4.6-4. Elevation, Habitat, and Geographic Range of Listed Threatened, Endangered, Sensitive, and Rare Plants in Cowlitz County**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Elevation Range</b>	<b>Habitat</b>	<b>Geographic Range</b>	<b>Occurrence Relative to Project Area</b>
Tall agoseris	<i>Agoseris elata</i>	500 to 7,800 feet	Found in meadows, prairies, open woods, and exposed rocky ridges. Occurs in areas with little to no canopy cover and assumed to be shade intolerant.	Throughout California, Oregon, and Washington.	Documented in northeastern Cowlitz County. Not likely to occur on the project area due to elevation.
Buxbaumia moss	<i>Buxbaumia viridis</i>	Low to subalpine elevations	Found in coniferous forests on well-rotted logs and peaty soil and humus.	Western North America including the western portion of Washington.	Documented in east-central Cowlitz County. Not likely to occur on the project area due to lack of suitable coniferous habitat.
Tall bugbane	<i>Cimicifuga elata</i>	100 to 2,800 feet, with majority below 700 feet	Occurs in or along margins of mixed mature or old growth forests, including mesic coniferous or mixed coniferous-deciduous stands. Frequently found on north or east-facing slopes.	Southwestern British Columbia to southern Oregon, west of Cascade range.	Documented in western Cowlitz County in areas along the Columbia River. Not likely to occur on the project area due to lack of appropriate forest habitat.
Clackamas corydalis	<i>Corydalis aquae-gelidae</i>	1,250 to 4,200 feet	Occurs in or near cold flowing water, including seeps and small streams; often occurring in stream channels. Moist shady woods in western hemlock ( <i>Tsuga heterophylla</i> ) and silver fir ( <i>Abies amabilis</i> ) zones. Prefers intermediate levels of overstory canopy closure.	Regionally endemic of Washington; Clackamas and Multnomah Counties in Oregon.	Documented in eastern Cowlitz County. Not likely to occur on the project area due to elevation and lack of suitable habitat.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Elevation Range</b>	<b>Habitat</b>	<b>Geographic Range</b>	<b>Occurrence Relative to Project Area</b>
Pink fawn-lily	<i>Erythronium revolutum</i>	100 to 600 feet	Occurs in high-precipitation areas within 100 km of the coast, in moist soil in open or moderately shaded forests that provide full light at ground level. Habitats in Washington include swampy western redcedar ( <i>Thuja plicata</i> )-lodgepole pine ( <i>Pinus contorta</i> ) forests, Sitka spruce ( <i>Picea sitchensis</i> ) woods on consolidated sand dunes, Sitka spruce-western hemlock forests, and shaded river bottoms.	Pacific coast region from southern British Columbia to northwestern California.	Documented in northwestern Cowlitz County. Not likely to occur on the project area due to lack of suitable coniferous forest habitat.
Western wahoo	<i>Euonymus occidentalis</i> var. <i>occidentalis</i>	20 to 600 feet	Occurs in moist woods and forested areas on west side of Cascades. Often found in shaded draws, riparian areas, and ravines. Sometimes found in grassy areas with scattered trees. In Washington, it typically occurs on fine sandy loam, silty loam, and silty clay loams.	British Columbia, western Washington, and Oregon, south to central California.	Documented in west-central Cowlitz County, potentially near the project area. Appropriate habitat may occur on and near the project area.
Nuttall's quillwort	<i>Isoetes nuttallii</i>	200 to 345 feet	Terrestrial species found in seasonally wet ground, seepages, temporary streams, and mud near vernal pools.	Southeast Vancouver Island, British Columbia to southern California.	Documented in west-central Cowlitz County, potentially near the project area. Not likely to occur on the project area due to elevation.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Elevation Range</b>	<b>Habitat</b>	<b>Geographic Range</b>	<b>Occurrence Relative to Project Area</b>
Western false dragonhead	<i>Physostegia parviflora</i>	None provided	Occurs along shores of streams and lakes, marshes, and other low, wet places in the valleys and foothills. <sup>a</sup>	East of the Cascade summits, British Columbia south through Washington to the Columbia Gorge, then west to Portland, Oregon; east to Idaho and North Dakota. <sup>a</sup>	Most recent documentation in Cowlitz County is prior to 1977. Appropriate habitat may occur on and near the project area.
Loose-flowered bluegrass	<i>Poa laxiflora</i>	50 to 3,700 feet	Found on moss-covered rocks and logs, along streams and rivers, and on edges of wet meadows in moist shady woods.	Found in coastal Alaska, British Columbia, western Washington, and western Oregon.	Documented in northwestern Cowlitz County. Appropriate habitat may occur on and near the project area.
Wheeler's bluegrass	<i>Poa nervosa</i>	10 to 800 feet	Found in low-elevation wet habitats west of the Cascade crest in forest openings with minimal canopy cover, mossy rock outcrops, cliff crevices, and occasionally talus. Sites are often sparsely vegetated with little soil development.	Endemic from Vancouver Island, British Columbia, to northwest Oregon.	Documented in west-central Cowlitz County, potentially near project area. Unlikely to occur on the project area due to lack of preferred habitat elements.
Soft-leaved willow	<i>Salix sessilifolia</i>	None provided	Found in wet lowland habitats, including silty or sandy riverbanks, riparian forests, dredge spoils, sandy beaches, and at the upper edge of an intertidal zone.	Found in southern British Columbia to northern California.	Documented in northern Cowlitz County. Appropriate habitat may occur on or near the project area.
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	None provided	Found in low-elevation meadows, prairie, or grassland, along fencerows, streams, and roadsides, drainage swales, and edges of plowed fields adjacent to wooded areas.	Regionally endemic of Benton County, Oregon, north to Lewis County, Washington, and from central Linn County, Oregon to just west of the crest of the Coast Range.	Documented in northwestern Cowlitz County. Appropriate habitat may occur on and near the project area.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Elevation Range</b>	<b>Habitat</b>	<b>Geographic Range</b>	<b>Occurrence Relative to Project Area</b>
Tetraphis moss	<i>Tetraphis geniculata</i>	Sea level to subalpine elevations	Occurs on the cut or broken ends or lower half of large decay class rotten logs or stumps, and occasionally on peaty banks in moist coniferous forests.	From Alaska and British Columbia through western Washington and select sites in Oregon.	Not documented in Cowlitz County. Not likely to occur on project area due to lack of suitable coniferous habitat with logs and stumps.
Humped bladderwort	<i>Utricularia gibba</i>	160 to 490 feet	Occurs in lakes, lake edges, and muddy disturbed sites in the lowland zone.	Southern British Columbia south to California.	Documented in northern Cowlitz County. Not likely to occur on project area due to elevation.
Columbia water-meal	<i>Wolffia columbiana</i>	10 to 250 feet	Found in freshwater lakes, ponds, and slow streams.	From California to British Columbia, east to Quebec, and south to Florida, excluding the interior southwestern states.	Occurs within 1.5 miles of the project area; could occur in ponded habitats on or near the project area.

Notes:

<sup>a</sup> Herbarium, Burke Museum of Natural History and Culture 2014.

Source: Unless noted otherwise, this information came from the Washington State Department of Natural Resources, Washington Natural Heritage Program plant species fact sheets at <http://www1.dnr.wa.gov/nhp/refdesk/lists/plantsxco/cowlitz.html>.

#### 4.6.4.4 Noxious Weeds

The project area supports plant species regulated as noxious weeds. Fourteen noxious weed species have been documented in the project area (Table 4.6-5) (Cowlitz County Noxious Weed Control Board 2015; Washington State Noxious Weed Control Board 2015). No species designated for Cowlitz County as Class A noxious weeds has been observed in the project area (Table 4.6-6 provides definitions for the noxious weed classifications). Six of the species identified in the project area (indigobush [*Amorpha fruticosa*], Scotch broom, policeman’s helmet [*Impatiens glandulifera*], Eurasian water milfoil [*Myriophyllum spicatum*], parrotfeather [*Myriophyllum aquaticum*], and water primrose [*Ludwigia hexapetala*]) are considered Class B weeds, and identified as priorities for control, either by Washington State or Cowlitz County. The remaining eight species in the study area are listed Class C noxious weeds, a classification assigned to weeds that are not typically considered a priority for weed control because they are already widespread throughout the state. These species are Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), English ivy (*Hedera helix*), yellow-flag iris (*Iris pseudacorus*), reed canarygrass, Himalayan blackberry, common tansy (*Tanacetum vulgare*), and nonnative cattail.

**Table 4.6-5. Noxious Weeds Identified in the Project Area**

Noxious Weed Species		Location Observed <sup>a,b,c</sup>	Classification		State/County Priority Weed for Control <sup>e</sup>
Common Name	Scientific Name		State <sup>d</sup>	Cowlitz County <sup>e</sup>	
Indigobush	<i>Amorpha fruticosa</i>	Riparian <sup>b</sup>	B	B	Yes/No
Scotch broom	<i>Cytisus scoparius</i>	W/U <sup>a, b</sup>	B	B	No/Yes
Policeman’s helmet	<i>Impatiens glandulifera</i>	W/U <sup>a</sup>	B	B	Yes/Yes
Eurasian water milfoil	<i>Myriophyllum spicatum</i>	W/OW <sup>a</sup>	B	B	Yes/No
Parrotfeather	<i>Myriophyllum aquaticum</i>	W/OW <sup>a</sup>	B	B	No/No
Water primrose	<i>Ludwigia hexapetala</i>	D <sup>c</sup>	B	B	No/No
Canada thistle	<i>Cirsium arvense</i>	W/U <sup>a, b</sup>	C	C	No/Yes
Bull thistle	<i>Cirsium vulgare</i>	W/U <sup>a, b</sup>	C	C	No/No
English ivy	<i>Hedera helix</i>	W/U <sup>a, b</sup>	C	C	No/No
Yellowflag iris	<i>Iris pseudacorus</i>	W/D <sup>b</sup>	C	C	No/No
Reed canarygrass	<i>Phalaris arundinacea</i>	W/U <sup>a, b</sup>	C	Not listed	No/No
Himalayan blackberry	<i>Rubus armeniacus</i>	U <sup>a, b</sup>	C	C	No/No
Common tansy	<i>Tanacetum vulgare</i>	U <sup>a</sup>	C	C	No/Yes
Nonnative cattail	<i>Typha</i> spp.	W <sup>a, b</sup>	C	C	No/No

Notes:

- <sup>a</sup> Appendix F: Noxious Weeds and Sensitive Plants in Grette Associates 2014a. Location values: W = wetland; U = upland; D = Ditches; OW = open water
- <sup>b</sup> Observations made by ICF during site investigations in April and December 2014.
- <sup>c</sup> Observations by Washington State Noxious Weed Control Board (1999).
- <sup>d</sup> State classification based on Washington State Noxious Weed Control Board 2015 Noxious Weed List.
- <sup>e</sup> County classification and priority for weed control (state and county level) based on Proposed 2015 Cowlitz County Noxious Weed List (Cowlitz County Noxious Weed Control Board 2015).

**Table 4.6-6. Washington State Noxious Weed Classification**

<b>Class</b>	<b>Definition</b>
A	Nonnative species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. Eradication of Class A plants is required by law.
B	Nonnative species presently limited to portions of the State. Species are designated for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.
C	Noxious weeds that are typically widespread in Washington or are of special interest to the state’s agricultural industry. The Class C status allows counties to require control if locally desired. Other counties may choose to provide education or technical consultation.

Notes:  
Source: Washington State Noxious Weed Control Board 2015.

## 4.6.5 Impacts

This section describes the potential direct and indirect impacts on vegetation that would result from construction and operation of the Proposed Action and the No-Action Alternative.

### 4.6.5.1 Proposed Action

This section describes the potential direct and indirect impacts related to vegetation that would result from construction and operation of the Proposed Action and the No-Action Alternative. Direct impacts could result from activities that directly disturb or damage vegetation including such actions as removing vegetation during clearing and grading activities and the physical and chemical management of vegetation and noxious weeds as part of routine facility maintenance. Indirect impacts include the future spread of noxious weeds into areas adjacent to the construction site and the associated changes in plant communities that could result from this activity.

Potential impacts on vegetation were also considered in terms of duration. Permanent impacts would modify vegetation cover types to such a degree that they would not return to their preconstruction state for the life of the project. Temporary vegetation impacts would result in the disturbance of vegetation cover types, but implementation of best management practices, project design components, regulatory requirements, or an on-site vegetation management plan would facilitate reestablishment of vegetation cover types similar to preproject conditions after construction is completed.

The following measures have been identified by the Applicant as measures that would be implemented during operations to suppress coal dust. These measures were considered part of the Proposed Action when evaluating the potential impacts on vegetation.

- The Applicant would implement best management practices and the following project components (and related activities) to avoid and minimize potential impacts associated with coal dust.
  - Conveyors would be:
    - Monitored for general status and washed down regularly.

- Cleaned using high-pressure water in the collection and containment areas, including belts.
- Transfer points would be:
  - Cleaned using high-pressure water as part of regular washdowns of underbelt plating, and water collection and containment system.
- Rail car unloaders would:
  - Use dry fog and water spray systems to control dust.
- Stockpiles would be:
  - Sprayed via a spray system controlled by local and remote weather stations.
  - Managed via a controlled dropper from the stackers to manage height of piles.
  - Cleaned along conveyor berms and sealed roadways.
- Shiploading equipment would be:
  - Discharged below deck of vessel.
  - Cleaned and washed by high-pressure water.

## **Construction—Direct Impacts**

Construction-related activities associated with the Proposed Action would result in direct impacts as described below. As explained in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*, construction-related activities include demolishing existing structures and preparing the site, constructing the rail loop and docks, and constructing supporting infrastructure (e.g., conveyors and transfer towers).

### **Permanently Remove Vegetation**

Clearing and grading would permanently alter or remove approximately 212 acres of land cover types from the direct impacts study area (Table 4.6-7). Most of the clearing would affect disturbed vegetation and weedy areas (Figure 4.6-2).

The majority of the total impact (71%) would occur in areas occupied by developed lands, typically consisting of areas of existing infrastructure and scattered grasses and weeds in and around the developed portions of the project area. Approximately 26.26 acres of upland vegetation would be removed, or 12% of the direct impacts study area. Herbaceous upland vegetation surrounding Wetlands A, C, and Z make up the majority of this acreage. These herbaceous upland areas are generally dominated by reed canarygrass. Approximately 8.90 acres of upland forest would be removed, with most impacts occurring around Wetland A and the areas surrounding the interception ditch and stormwater conveyance. These areas are dominated by native trees, primarily black cottonwood, red alder, Oregon ash, and Pacific willow trees, with an understory of mixed native and invasive shrubs dominated by red elderberry, sweetbriar rose, and Himalayan blackberry. The impacts would occur as a result of construction of the rail loop, stockpile pads, and a series of stacking and reclaim conveyors.

**Table 4.6-7. Permanent Impacts by Land Cover and Vegetation Cover Type in the Direct Impacts Study Area**

Land Cover Category	Vegetation Cover Type	Impacts in Direct Impacts Study Area (Acres) <sup>b</sup>	Percentage of Cover Type <sup>c</sup>
Developed land	<b>Developed land total</b>	<b>151.14</b>	<b>71</b>
	Forested	8.90	4
	Scrub-shrub	2.11	1
Upland	Herbaceous	10.88	5
	Managed herbaceous	4.37	2
	<b>Upland total</b>	<b>26.26</b>	<b>12</b>
Wetlands	<b>Wetlands total<sup>a</sup></b>	<b>24.10</b>	<b>12</b>
Open water	<b>Open water total</b>	<b>10.78<sup>d</sup></b>	<b>5</b>
<b>Total</b>		<b>212.28</b>	<b>100</b>

Notes:

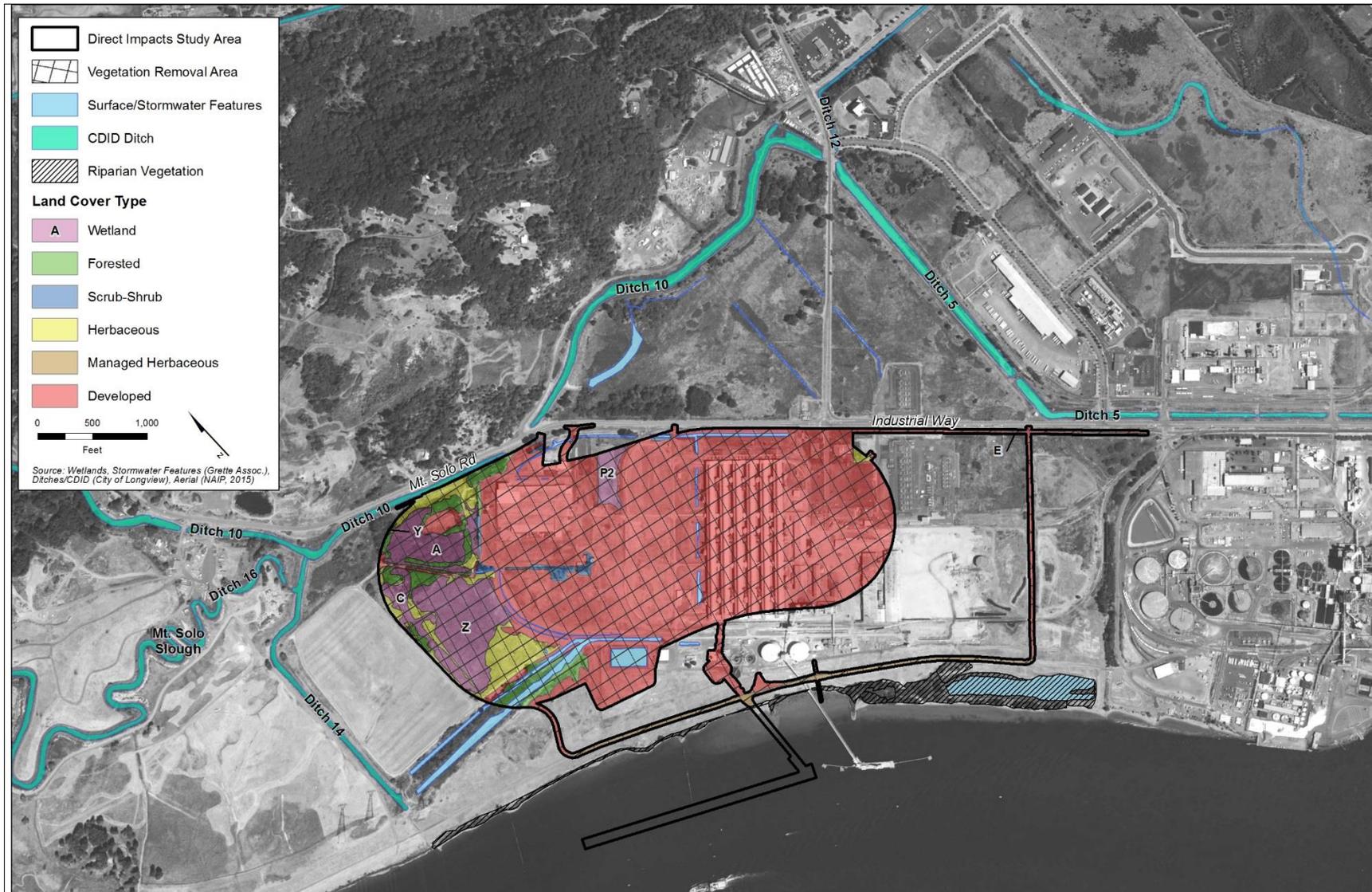
- <sup>a</sup> For a detailed discussion of wetland impacts, refer to Section 4.3, *Wetlands*.
- <sup>b</sup> These are direct impacts on vegetation in the 212-acre project area, which includes the 190-acre terminal plus additional elements (e.g., access roads, docks, and the rail line).
- <sup>c</sup> This column represents the percent of cover type in the direct impacts study area that would be affected by construction.
- <sup>d</sup> Approximate open water area within footprint of project area. This area includes area of docks and trestle over the open water of the Columbia River. For details on permanent impacts to open water, see Section 4.8 *Wildlife*.

Approximately 0.05 acre of upland forest impact consists of riparian forest. This impact would occur as a result of construction of the trestle that would connect the surge bin to Docks 2 and 3, and would include removing and trimming black cottonwood and willow trees, and understory shrubs as red-osier dogwood and Himalayan blackberry.

Construction would result in the permanent loss of 24.10 acres of vegetated wetland from placement of permanent fill in all of Wetlands A, C, Z, and P2, and a portion of Wetland Y. For a detailed discussion of wetland impacts, refer to Section 4.3 *Wetlands*.

Although no special-status plant species have been recorded in the project area, potentially suitable habitat is present. Should any special-status plant species occur in the project area, they could be destroyed as a result of project construction depending on the location of the plant. Implementation of the proposed mitigation measure to conduct a special-status plant survey would determine presence of special-status plants in the project area and would determine if any special-status plants identified could be avoided or impacts minimized. These surveys would occur during the appropriate time of year, prior to any project related construction activities beginning.

**Figure 4.6-2. Impacts on Existing Land Cover Classes and Vegetation Cover Types**



### **Temporarily Disturb Adjacent Vegetation**

Construction and staging activities along the edges of the project area could crush and bury adjacent vegetation and compact soil in the direct impacts study area through vehicle use, material storage and stockpiling, and ground disturbance. Ground disturbance related to these activities could also increase the opportunity for stormwater runoff to carry sediments, spilled vehicle fluids, or other construction materials into areas outside of the project area, potentially affecting the health and vigor of adjacent vegetation. Depending on the extent, duration, and content of this runoff, vegetation could be affected through interference with photosynthesis, respiration, growth, and/or reproduction.

Dust from construction activities could also affect vegetation by collecting on leaves and other plant surfaces, potentially inhibiting photosynthesis and other plant functions.

The 35-foot-high preload material piles could provide an area for invasive plant species, including noxious weeds, to colonize. Such conditions would provide a seed source that could be readily dispersed into adjacent areas by wind and runoff, increasing the potential for invasive species and noxious weeds to spread and displace native vegetation.

Special-status plants adjacent to the project area could be temporarily affected by construction. The extent of any such impact cannot be quantified until a special-status plant survey is conducted.

### **Construction—Indirect Impacts**

Construction of the Proposed Action would not result in indirect impacts on vegetation because construction impacts would be limited to the project area, and would not occur later in time or farther removed in distance than the direct impacts.

### **Operations—Direct Impacts**

Direct impacts on vegetation from operation of the Proposed Action would likely be limited to the continued existence and possible colonization by noxious weeds around (and outside) the periphery of the project area, impacts from vessel loading and transport along rail tracks, and control of vegetation under the conveyor and along the rail tracks and rail loop.

#### **Promote Colonization by Noxious Weeds**

The disturbed nature of the project area during operations would favor colonization by noxious weeds, which are generally adapted to highly disturbed areas, such as the periphery and other portions of the project area. Areas along rail tracks, along stacking conveyors, and between tracks of the rail loop would be most likely to support noxious weed species. Reed canarygrass, Himalayan blackberry, Canadian and/or bull thistle, and Scotch broom, which are already present on the project area, would likely persist during operations.

#### **Disturb Vegetation during Rail and Vessel Loading**

Operation of the Proposed Action could disturb vegetation along the railroad tracks entering the project area, along the shoreline of the Columbia River, and in the shallow waters of the Columbia River near the project area. Such impacts could occur as the result of spills of coal or

other materials associated with operation of the rail cars, the conveyor and stockpiling systems, the mobile maintenance equipment, and the shiploaders.

Direct impacts on aquatic vegetation along the shoreline of the Columbia River cannot be quantified until an aquatic vegetation survey is conducted. Mitigation is proposed to conduct an aquatic vegetation survey (described in Section 4.6.7, *Proposed Mitigation Measures*) to reduce potential impacts on aquatic vegetation prior to initiating in-water work. Impacts on water quality associated with the routine movement of coal near water bodies could also affect vegetation along or in receiving waters. However, stormwater runoff would be collected and treated to remove potential contaminants associated with the operations and maintenance activities (e.g., coal, diesel fuel, oil, hydraulic fuel, antifreeze, tire, and brake dust, exhaust particulates) prior to discharge to the Columbia River. Best management practices and mitigation to reduce potential water quality impacts are detailed in Section 4.5, *Water Quality*.

Although hazardous material spills or leaks could occur, the potential for these to occur and affect the environment would be minimized by appropriate training and the implementation of prevention and control measures. Best management practices and mitigation to reduce potential impacts from spills and leaks are detailed in Chapter 3, Section 3.6, *Hazardous Materials*, Chapter 5, Sections 5.1, *Rail Transportation*, and 5.4, *Vessel Transportation*.

### **Alter Vegetation during Maintenance Activities**

Trees and tall shrubs around the trestle and conveyor to Docks 2 and 3 would likely be regularly trimmed or removed, slightly reducing organic material delivered to the river, shading for the upper beach and shoreline, and native foraging, resting, and perching opportunities for birds. The affected 45- to 50-foot-wide area would be small relative to the approximately 5,000 linear feet of vegetated shoreline in the project area.

Routine vegetation maintenance along the perimeter road, rail tracks, and rail loop would involve trimming trees and tall shrubs within approximately 25 feet of either side of the perimeter road. This maintenance would artificially stunt individual trees and shrubs in these areas but would not measurably reduce the functions of native plant communities because it would be confined to the outermost edges of such communities. Any vegetation that colonizes the disturbed interior of the project area along the rail loop would likely also be removed, controlled, or trimmed to eliminate any interference with the movement of the rail cars, equipment, or personnel.

Any special-status plants that occur along the periphery of the project, along the rail tracks and rail loop, or under the conveyor would be affected by operations as described above. The spatial extent of any such impact cannot be quantified until a special status plant survey is conducted.

### **Spill Coal during Operations of the Proposed Action**

Direct impacts resulting from a coal spill during coal handling at the coal export terminal would likely be minor because the amount of coal that could be spilled would be expected to be small due to the contained nature and features of the terminal and safety mechanisms to stop operations of coal moving equipment. It is anticipated that a small spill could be cleaned up by hand, hand tools, or small mechanized equipment in a short period so as to not stop or delay routine terminal operations. Also, impacts would be negligible because of the absence of vegetation in the project area and the contained nature and design features of the terminal.

Coal spilled into terrestrial environments could affect vegetation. Herbaceous vegetation would be more susceptible to damage and smothering from a coal spill compared to more rigid, woody vegetation like shrubs and trees, which may be better able to withstand the weight and force of a coal spill, depending on the magnitude of the spill. The magnitude of potential impacts would depend on the size (volume) and extent (area) of the coal spill. The physical impact of coal spilled on vegetation would range from minor plant damage to complete loss of vegetation. Some plant species may be more sensitive to coal than other species. Coal dust associated with a coal spill could also cover vegetation, resulting in reduced light penetration and photosynthesis, which could lead to reduced vegetation density and plant diversity. The magnitude of potential coal dust impact would depend on duration of exposure, tolerance of vegetation, and aggressiveness of nonnative species. Cleanup of coal spilled during operations could further affect vegetation by either removing or further damaging vegetation as a result of ground disturbance related to cleanup activities. Any coal remaining on the ground after a cleanup effort could leach chemicals from exposure to rain, which could damage or kill vegetation. However, if this were to occur, the impact area would generally be highly localized and limited to the extent of the spill, and unlikely to disrupt the overall plant community in the project area.

## Operations—Indirect Impacts

Operation of the Proposed Action would result in the following indirect impacts.

### Deposit Coal Dust on Vegetation

The movement of coal into and around the project area, creation of large stockpiles of coal, and use of open conveyors could generate approximately 14.6 tons of coal particles and fugitive coal dust per year at maximum throughput. Figure 5.7-4 depicts estimated maximum annual coal deposition at varying distances from the project area. Windborne coal dust can deposit on vegetation, soils, and sediments. The potential extent and deposition rate of coal dust particles less than 75 microns in diameter was modeled as part of the air quality analysis. Based on this modeling, the highest rate of coal dust deposition would be expected in the area adjacent to the project area, but smaller particles could also deposit in a zone extending around and downwind of the project area. Deposition rates could range from 1.99 grams per square meter per year ( $\text{g}/\text{m}^2/\text{year}$ ) closest to the project area, gradually declining to less than  $0.01 \text{ g}/\text{m}^2/\text{year}$  approximately 2.4 miles from the project area.

The potential zone of deposition includes the coniferous forest vegetation on the hills adjacent to the northern extent of the project area, as well as the riparian vegetation along the shoreline of the river. Deposition rates of less than  $0.1 \text{ g}/\text{m}^2/\text{year}$  are projected to occur over the forested communities on Lord Island within the Columbia River just east of the project area, with declining concentrations across the island and to the south and west toward Walker Island.

The impacts of dust on vegetation, including special-status plants, would vary depending on dust load, climatic conditions, and the physical characteristics of the vegetation. Impacts could be physical, such as blocked stomata that alters gas diffusion into and out of the leaves, causing reduced respiration or increased transpiration; altered leaf surface reflectance and light absorption potential; and increased leaf temperature due to optical properties of the dust (Chaston and Doley 2006; Doley 2006; Farmer 1993). The *SEPA Vegetation Technical Report* summarizes studies of the impacts of dust deposition on vegetation. Coal dust deposition is also discussed in Chapter 5, Sections 5.6, *Air Quality*, and 5.7, *Coal Dust*.

Although coal transport could release contaminants such as arsenic and polycyclic hydrocarbons into the soil, concentrations would vary greatly and impacts on vegetation communities in the study area are not known. Given the number and variety of environmental, climatic and plant factors affecting the deposition of dust (Doley 2006), information regarding foliage density, leaf dimensions and characteristics, as well as particle size distribution, dust color, and climatic conditions would likely be needed to determine the level of dust deposition that could affect vegetation or plant functions.

The movement of coal by rail could generate coal particles and fugitive coal dust, which could be deposited on vegetation, soil, and sediments. Coal transported by vessel would be in enclosed cargo holds and is not likely to result in deposition of coal on vegetation along the vessel route in the Columbia River. Coal dust deposition from rail cars is discussed in Chapter 5, Sections 5.6, *Air Quality*, and 5.7, *Coal Dust*. Potential impacts from coal dust deposition on vegetation are the same as described above for the proposed coal export terminal.

### **Erode Vegetation Due to Vessel Wakes**

Increased vessel traffic resulting from the coal export terminal and associated wakes could contribute to erosion of vegetation along the Columbia River. Operation of the coal export terminal at maximum throughput would result in 1,680 vessel transits (i.e., one-way trips either to or from the coal export terminal) a year (Chapter 5, Section 5.4, *Vessel Transportation*). The location and extent of these impacts would depend on vessel design, hull shape, vessel weight and speed, angle of travel relative to the shoreline, proximity to the shoreline, currents and waves, tidal stage, and water depth (Jonason 1993:29–30; MARCOM 2003). The potential for shoreline erosion could also be influenced by the slope and physical character of the shoreline (i.e., soil erodibility), as well as the amount and type of vegetation that occurs along the shoreline.

Shoreline erosion is both a natural process as well as a human-caused process that removes sediment from the shoreline. It is caused by a number of factors including storms, wave action, and wind. Erosion of shoreline sediment can remove the substrate in which vegetation grows, eventually leading to loss of plants. Although erosion does naturally occur, it can be increased by vessel wakes, which can intensify the impacts and/or rate of the erosion process. In riverine environments the wave periods of vessels are longer compared to waves generated by wind. Riverbank vegetation is naturally adapted to the shorter period of wind waves, but not to the longer periods of vessel wakes. Long-period waves are an erosion mechanism to which the riverbank vegetation may be susceptible (Macfarlane and Cox 2004 in Gourlay 2011). While shoreline erosion along the Columbia River currently occurs due to existing vessel traffic, operation of the terminal would increase vessel traffic and probably increase or intensify the extent and/or rate of shoreline erosion and subsequent loss of shoreline vegetation.

The potential for vessel wake impacts on vegetation along the project area shoreline would be limited due to the slope of the shoreline and the general lack of aquatic vegetation near the docks. Additionally, vessels maneuvering near the docks would move very slowly and likely would not generate a wake sufficient to cause shoreline erosion. However, there is potential for erosion along the thin strip of shoreline vegetation along the northern end of Lord Island from large wakes or wakes oriented perpendicular to the main navigation channel and docks, such as those occurring when tugs push vessels into position at docks. There is higher potential for vessel wake impacts on vegetation along the shoreline of the lower Columbia River as a result of

the Proposed Action. Vessel operations in the Lower Columbia River are federally regulated, including size, speed, and navigation. Additionally, large vessels in the lower Columbia River must be operated by pilots licensed by the United States Coast Guard to perform this function. The navigation channel and its ongoing maintenance are also managed and regulated at the federal level.

### **Disturb Vegetation during Rail and Vessel Transport**

Operation of the Proposed Action could indirectly affect vegetation outside of the project area along the rail tracks entering the project area, along the shoreline of the Columbia River, and in the shallow waters of the Columbia River. Such impacts could occur as the result of spills of coal or hazardous materials associated with operation of the trains and vessels transporting coal within the study area. Chapter 3, Section 3.6, *Hazardous Materials*, and Chapter 5, Sections 5.1, *Rail Transportation*, and 5.4, *Vessel Transportation*, provide further details. Washington State oil transfer rules include requirements for trained personnel, procedures, and equipment to prevent a spill during a transfer of oil over water, such as diesel for emergency ship generators.

### **Spill Coal during Rail Transport**

The magnitude of the potential indirect impact from a coal spill on terrestrial environments would be similar to those described previously and would depend on the location of the spill, the volume of the spill, and success of efforts to contain and clean up the spill, none of which can be predicted.

The potential impact of a coal spill from a Proposed Action-related train is directly related to the probability of a Proposed Action-related train incident occurring. Chapter 5, Section 5.2, *Rail Safety*, estimates the number of Proposed Action-related train incidents that could occur during coal transport within Cowlitz County and Washington. The predicted number of incidents of loaded trains related to the Proposed Action is approximately one every 2 years in Cowlitz County or five per year in Washington.

Not every incident of a loaded coal train would necessarily result in a rail car derailment or a coal spill. A train incident could involve one or multiple rail cars, and could include derailment in certain circumstances. The size and speed of the train and the terrain at the location of an incident would influence whether the incident resulted in a coal spill that could have impacts on vegetation. A broad range of spill sizes from a partial rail car to multiple rail cars could occur as a result of a Proposed Action-related train incident.

Additionally, containment and cleanup efforts for coal spills from a rail incident factor into the potential impact on vegetation and the environment. It is expected that coal spills in the terrestrial and built environments would be easier to contain and clean up than spills occurring in an aquatic environment. Spills occurring on land may have a quicker response time and cleanup in some locations due to their visibility and access for cleanup equipment, as compared to spills into aquatic environments. Cleanup of spills in the terrestrial environment could affect vegetation and require restoration.

Potential physical and chemical effects of a coal release in terrestrial environments would be the same or similar to those described above under direct impacts.

#### **4.6.5.2 No-Action Alternative**

Under the No-Action Alternative, the Applicant would not construct the Proposed Action. Current operations would continue and the existing bulk product terminal site would be expanded. However, any expansion would be limited to activities that would not require a permit from the U.S. Army Corps of Engineers (Corps) or a shoreline permit from Cowlitz County. Therefore, no construction impacts on aquatic habitats or plant species would be expected to occur as a result of an expansion of the existing bulk production terminal under the No-Action Alternative.

Continued industrial use of the project area over the 20-year analysis period (2018 to 2038) would likely result in the redevelopment of the largely developed upland areas of the project area. New construction, demolition, and activities related to this development could affect the disturbed vegetation that is present throughout the developed portions of the site. Cleanup activities, relative to past industrial uses, would also continue, potentially affecting vegetation in disturbed areas.

#### **4.6.6 Required Permits**

No permits related to vegetation would be required for the Proposed Action.

#### **4.6.7 Proposed Mitigation Measures**

This section describes the proposed mitigation measures that would reduce impacts related to vegetation from construction and operation of the Proposed Action. These mitigation measures would be implemented in addition to project design measures, best management practices, and compliance with environmental permits, plans, and authorizations that are assumed as part of the Proposed Action.

##### **4.6.7.1 Applicant Mitigation**

The Applicant would implement the following measures to mitigate impacts on vegetation.

###### **MM VEG-1. Conduct Rare Plant Surveys Prior to Construction.**

To ensure that threatened, endangered, or rare plants are not affected, the Applicant will conduct rare plant surveys of the project area, including the ditches and stormwater conveyance features. Surveys for rare plants will be performed for those rare plants that may occur in Cowlitz County, according to the Washington Natural Heritage Program. Surveys will be performed prior to any project related ground disturbance and during the appropriate survey windows for each species. If such plant species are found, the Applicant will notify and consult with the Washington State Department of Natural Resources, and the U.S. Fish and Wildlife Service (if federally protected species are found). The Applicant and the agencies will work together to determine the appropriate conservation and mitigation measures should potential impacts on any rare plants be possible as a result of ground-disturbing activities.

###### **MM VEG-2. Conduct Aquatic Vegetation Surveys Prior to Construction.**

To ensure that aquatic plants along the shoreline of the Columbia River are not affected, the Applicant will conduct an aquatic plant survey along the shoreline of the project area prior to commencing in-water work associated with construction of Docks 2 and 3 and construction related dredging, including all areas within the shallow water zone adjacent to the proposed

docks. If areas of aquatic vegetation are found, the Applicant will notify the Washington State Department of Natural Resources, Cowlitz County, and the U.S. Fish and Wildlife Service, and work with these agencies to develop appropriate conservation or mitigation measures before beginning any in-water work.

**MM VEG-3. Replant Areas Temporarily Disturbed during Construction.**

To ensure that disturbed native vegetation is restored, after construction the Applicant will replant vegetated areas temporarily disturbed during construction with native vegetation suitable for site conditions post-construction. The Applicant will monitor replanted vegetation annually for 5 years and will ensure the survival of 80% of all replanted vegetation. The Applicant will submit annual monitoring reports to Cowlitz County.

**MM VEG-4. Develop and Implement a Revegetation Plan.**

To mitigate permanent removal of vegetation from project construction, the Applicant will develop and implement a revegetation plan for the project area. This plan will be approved by Cowlitz County prior to implementation and will be consistent with the Cowlitz County Critical Areas Ordinance 19.15.170.

**MM VEG-5. Control Noxious Weeds.**

To limit further invasion and colonization of noxious weeds on disturbed land, the Applicant will monitor for noxious weeds during construction and operations and remove noxious weeds that invade new areas of the site. The Applicant will coordinate with the Cowlitz County Noxious Weed Control Board if Class A and B noxious weeds are detected.

**MM CDUST-3. Reduce Coal Dust Emissions from Rail Cars.**

To address coal dust emissions, the Applicant will not receive coal trains unless surfactant has been applied at the BNSF Railway Company (BNSF) surfactant facility in Pasco, Washington for BNSF trains traveling through Pasco. While other measures to control emissions are allowed by BNSF, those measures were not analyzed in this EIS and would require additional environmental review. For trains that will not have surfactant applied at the BNSF surfactant facility in Pasco, before beginning operations, the Applicant will work with rail companies to implement advanced technology for application of surfactants along the rail routes for Proposed Action-related trains.

**MM WQ-2. Develop and Implement a Coal Spill Containment and Cleanup Plan.**

To limit the exposure of spilled coal to the terrestrial, aquatic, and built environments during coal handling, the Applicant will develop a containment and cleanup plan. The plan will be reviewed by Cowlitz County and Ecology and implemented prior to beginning export terminal operations. In the event of a coal spill in the aquatic environment by the Applicant during export terminal operations, action will be taken based on the specific coal spill, and the Applicant will develop a cleanup and monitoring plan consistent with the approved containment and cleanup plan. This plan will include water quality and sediment monitoring to determine the potential impact of the coal spill on the aquatic habitat and aquatic species. The Applicant will develop the cleanup and monitoring plan in coordination with Cowlitz County, Ecology, and the Corps. The cleanup and monitoring will be similar in scope to the monitoring completed for the Aquatic

Impact Assessment (Borealis 2015) associated with a coal spill in British Columbia, Canada in 2014.

## **4.6.8 Unavoidable and Significant Adverse Environmental Impacts**

Compliance with laws and implementation of the mitigation measures and design features described above would reduce impacts on vegetation. There would be no unavoidable and significant adverse environmental impacts on vegetation.