

## 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 impacts on wetlands and other vegetated areas such as shoreline vegetation at and below ordinary high water, and vegetated shallows waterward of the shoreline along the Columbia River.
Endangered Species Act	Requires that applicants seeking a federal action, such as issuing a permit under a federal regulation (e.g., NEPA, Clean Water Act, Clean Air Act) undergo consultation with USFWS and/or NMFS. This will ensure the federal action is not likely to jeopardize the continued existence of any listed threatened or endangered species or result in the destruction or adverse modification of designated critical habitat. Section 6 requires USFWS and WDNR work cooperatively to conduct research and conservation activities to protect and recover rare or endangered plant species.
<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.
Water Quality Standard for Surface Waters of the State of Washington (WAC 173-201A)	Establishes water quality standards for surface waters. Ecology is the responsible agency.

<b>Regulation, Statute, Guideline</b>	<b>Description</b>
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.
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>Regulation, Statute, Guideline</b>	<b>Description</b>
<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.
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; EPA = U.S. Environmental Protection Agency; NEPA = National Environmental Policy Act; USFWS = NMFS = National Marine Fisheries Service; U.S. Fish and Wildlife Service; WDNR = Washington Department of Natural Resources; Ecology = Washington State Department of Ecology; RCW = Revised Code of Washington; WAC = Washington Administrative Code	

## 4.6.2 Study Area

The study area for direct impacts on vegetation is defined as the Applicant’s leased area, which also includes the project area. The study area for indirect impacts on vegetation is defined as the area immediately adjacent to the direct impact study area, contiguous forestland and other intact vegetation communities, and vegetation within 1 mile of the project area. This broader study area considers potential coal dust deposition (Chapter 5, Section 5.7, *Coal Dust*) that could occur as a result of the Proposed Action (Figure 4.6-1). An indirect study area was also established to evaluate the potential impacts that could occur as a result of a coal spill, which includes the rail routes for Proposed Action-related trains in Cowlitz County and Washington State to transport coal to the proposed coal export terminal. Wetland vegetation is further discussed in Section 4.3, *Wetlands*.

## 4.6.3 Methods

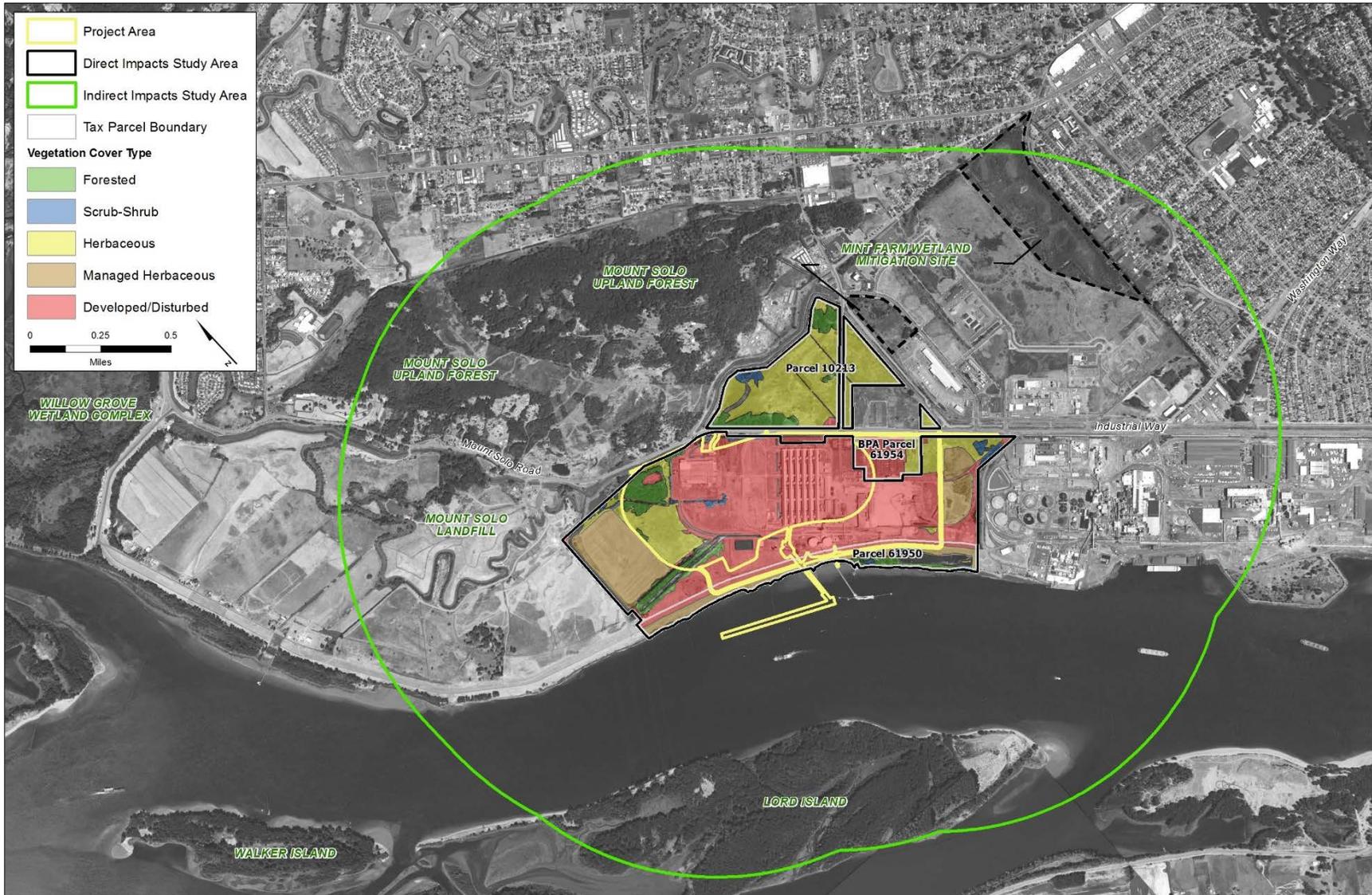
This section describes the sources of information and methods used to evaluate the potential impacts on vegetation associated with the construction and operation of the Proposed Action and No-Action Alternative.

### 4.6.3.1 Information Sources

The following sources of information were used to define 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 International 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.

Figure 4.6-1. Vegetation 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 5-mile radius surrounding the project area (Washington Department of Fish and Wildlife 2014).
- The Washington Department of Natural Resources (WDNR) Natural Heritage Program Information System (Washington 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 International 2016a).

- Vegetation cover maps were developed for five cover types (developed lands, uplands, wetlands, riparian lands, and open water) based on site visits, aerial photographs, federal data bases, and information provided by the applicant. Vegetation cover was then characterized (forested, scrub-shrub, herbaceous, and managed herbaceous). Cover type mapping was adjusted based on field observations.
- 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 vegetation 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.
- Indirect impacts on vegetation from construction could occur outside of the Applicant's leased area. These impacts are qualitatively described by identifying the impact mechanism (i.e., how the impact would occur), describing the potential impacts, and assessing the likelihood of impacts after implementation of mitigation measures.
- 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 Impact Study Area

The following land cover types are found in the Applicant's leased area, which includes the project area. Of the cover types discussed below, open water is not considered in Applicant's leased area.

##### Developed Lands

Developed lands accounts for 267 acres (48%) and includes those areas where the majority of the vegetation has been removed and replaced with pavement, buildings, or other types of infrastructure. Widely scattered patches of invasive shrubs such as Himalayan blackberry and Scotch broom occur on higher mounds, and around derelict structures and pieces of equipment. The disturbed cover type occurs on all of the areas previously developed by the former Reynolds Metals Company facility (Reynolds facility), with the exception of the closed Black Mud Pond (BMP) facility, which is classified as a managed herbaceous upland area. Also classified as disturbed areas are the Bonneville Power Administration (BPA) and Cowlitz County Public Utility District substations and the former commercial area on Parcel 10213, i.e., the portion of the study area north of the project area and Industrial Way (Figure 4.6-1). 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 Figures 4.3-1 through 4.3-4 in Section 4.3, *Wetlands*.

##### Uplands

Uplands account for 160 acres (29%) and include the following vegetation types.

- **Forested upland.** Forested upland includes areas where trees more than 16 feet in height provide more than 20% canopy cover (Multi-Resolution Land Characteristic Consortium 2011). Approximately 26.71 acres of the Applicant's leased area (4.8%) were identified as forested upland. On Parcel 10213, forested upland occurs along both Industrial Way and 38th Avenue in the northwestern and central portions, and between Ditch 10 and 38th Avenue on the northeastern portion. The dominant tree species in these forested areas includes black cottonwood and Sitka willow, with Hooker's willow and Himalayan blackberry common in the shrub layer. On the former Reynolds facility, forested upland occurs around Wetlands A, C, and Y between the closed 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, some Pacific willow, and Oregon ash. Common shrubs include Himalayan blackberry, red elderberry, and sweetbriar rose, with black cottonwood and Oregon ash sapling also present. Dominant trees in the forested corridor along the U-Ditch and Interceptor Ditch include black cottonwood, red alder, 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 is also common. Several types and sizes of down wood are present in this forested corridor, as are various snags. Reed canarygrass is common in the herbaceous layer in all of these forested upland areas.
- **Scrub-shrub upland.** Scrub-shrub upland includes 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 4.74 acres of the Applicant's leased area (0.9%) were identified as scrub-shrub upland. On Parcel 10213, scrub-shrub uplands occur between Wetland LW1 and Ditch 10. Dominant shrubs in these areas include Pacific and Hooker's willow and Himalayan blackberry. Young black cottonwood is also present. Reed canarygrass dominates the

herbaceous layer in these areas. 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 upland.** Approximately 49.91 acres of the Applicant's leased area (9.0%) were identified as herbaceous uplands. These areas occur on Parcel 10213, the former Reynolds facility, and BPA Parcel 61954. Herbaceous uplands occur in between the herbaceous wetlands throughout Parcel 10213. These areas are dominated by a near monoculture of reed canarygrass, with some widely scattered Scotch broom and bentgrass also present. Herbaceous uplands on the Applicant's leased area occur along the Consolidated Diking Improvement District (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 Applicant leased area along the Reynolds Lead spur. These areas are primarily dominated by reed canarygrass. 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 Applicant's leased area, as well as Himalayan blackberry.
- **Managed herbaceous upland.** Approximately 78.61 acres of this cover type occurs on the former Reynolds facility, on the CDID #1 levee, the lawns around the administrative and maintenance buildings, and on the caps of the closed BMP facility, and fill deposits A (White Mud Pond), and B-2 (Eastern Black Mud Ponds). All of these areas are dominated by grasses and forbs that are regularly mown. Species present include reed canarygrass, haired bentgrass, colonial bentgrass, American plantain, orchard grass, short-awn foxtail, western bittercress, blue wildrye, common horsetail, Queen Anne's lace, scouring rush, bedstraw, velvetgrass, perennial ryegrass, Kentucky bluegrass, and American vetch may also be present.

## Wetlands

Wetlands account for 97 acres (17%). The most prevalent wetland type is herbaceous wetlands followed by forested wetlands, scrub-shrub wetlands, disturbed wetlands, and managed wetlands. Approximately 5.25 acres of the Applicant's leased area were identified as disturbed wetland. Section 4.3, *Wetlands*, discusses wetlands and wetland vegetation in detail, including potential impacts and mitigation.

## Riparian Lands

Riparian lands account for 10 acres (2%). They are predominantly along the shoreline of the Columbia River between the ordinary high water mark (OHWM) and the top of the CDID #1 levee. Riparian lands include vegetation growing in the active channel margin and riparian zones identified in the previous upland and shoreline habitat inventories (Grette Associates 2014e, 2014g, 2014h). For the purposes of this analysis, riparian vegetation communities are limited to uplands located in the riparian zone. Wetlands located in the riparian zone are included in the wetland vegetation community (Section 4.3, *Wetlands*). Riparian lands include the following vegetation types.

- **Riparian forest.** Riparian forest includes upland areas with more than 30% canopy cover of trees at least 20 feet high along the shoreline of the Columbia River between the OHWM and the levee. This cover type is found growing within both sandy substrates and among riprap and other types of shoreline armoring. Approximately 8.63 acres of the Applicant's leased area

(1.5%) were identified as forested riparian. All forested riparian areas are found on Parcel 61950, between the Columbia River and the CDID #1 levee (Figure 4.6-1). They extend in a band of varying width along most of the site's shoreline, with the widest areas found on the southern portion of the shoreline near the Dredged Material Storage Area. Dominant vegetation in this cover type includes 12- to 16-inch-diameter 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 debris and downed trees are present in these areas

- **Riparian scrub-shrub.** Riparian scrub-shrub includes upland areas with more than 30% canopy cover of shrubs or small trees (less than 20 feet in height) along the shoreline of the Columbia River between the OHWM and the levee. It is found in similar substrates as the forest vegetation community and contains similar species. Approximately 1.25 acres of the Applicant's leased area (0.2%) were identified as scrub-shrub riparian areas. Two scrub-shrub riparian areas are found on Parcel 61950, between the Columbia River and the levee. These areas are dominated by black cottonwood saplings, various willow, and nonnative vegetation including Himalayan blackberry and Scotch broom. Native and nonnative herbaceous species are also present.
- **Riparian herbaceous cover.** Approximately 0.01 acre of the Applicant's leased area (<0.01%) was identified as herbaceous riparian area. These sparse patches of emergent vegetation occur under the existing Dock 1 conveyor and trestle, and on the sandy flats that lie between OHWM and the approximate elevation of mean high water.

## Open Water

Open water accounts for 24 acres (4%). Open waters include the various surface and stormwater ditches and ponds. This land cover is described in more detail Section 4.2, *Surface Water and Floodplains*. These areas support vegetation along their outer perimeters, typically including native plants as well as noxious weeds. Curly pondweed was observed at approximately -1 foot Columbia River datum downstream of Dock 1 during a period of high visibility. It is possible that the gently sloping portion of the shallow water habitat area between the east and west pile dikes near the project area could support a narrow band of sparse aquatic vegetation in the upper most 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 Impact Study Area

Much of the surrounding study area is occupied by the Columbia River and lands that have been heavily disturbed by residential, industrial, and agricultural development. However, the following areas contain higher-quality vegetation communities adjacent to the Applicant's leased area that generally represent contiguous forestland 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 of contiguous native forest intermixed with rural residential areas and some light industrial uses. This area is the largest inland contiguous forested area in the indirect impact study area. Vegetation includes Douglas fir, big leaf maple, red alder, and western hemlock. 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 more than 4 acres and is a complex of forested, scrub-shrub and emergent wetlands; the Phase II mitigation site is more than 66 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 off the shoreline of 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.

#### 4.6.4.3 Special-Status Plant Species

As shown in Table 4.6-2, there are 15 plant species with some type of federal or state status in Cowlitz County (Washington Department of Natural Resources 2015). 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 approximately 1.5 miles northwest of the project area and outside of the direct and indirect study area (Washington Department of Natural Resources 2015).

The special-status plant species, and the preferred elevation, habitat and geographic range for each are provided in Table 4.6-3. As indicated in Table 4.6-3, of the 15 special-status plant species known to occur in Cowlitz County, six were identified as potentially occurring in the study area for direct impacts, based on the presence of potentially suitable habitat. These species are Nelson's checker-mallow, western wahoo, western false dragonhead, loose-flowered bluegrass, soft-leaved willow, and Columbia water-meal.

**Table 4.6-2. 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:  
LE = Listed Endangered (in danger of extinction)  
LT = Listed Threatened (likely to become endangered)  
PE = Proposed Endangered  
PT = Proposed Threatened  
C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.  
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.  
T = Threatened. Likely to become Endangered in 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 Department of Natural Resources 2014.

**Table 4.6-3. 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.

Common Name	Scientific Name	Elevation Range	Habitat	Geographic Range	Occurrence Relative to Project Area
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.
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.

<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>
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.	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.	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.
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.

<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>
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 Department of Natural Resources, Washington Natural Heritage Program plant species fact sheets; available 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 under the law. The management of developed areas can also affect the spread of noxious weeds to adjacent undeveloped areas of natural plant communities. Fourteen noxious weed species have been documented in the project area (Table 4.6-4) (Cowlitz County Noxious Weed Control Board 2015; Washington State Noxious Weed Control Board 2015). None of the species designated for Cowlitz County as Class A noxious weeds has been observed in the project area (Table 4.6-5 provides definitions for the noxious weed classifications). Six of these species (indigobush, scotch broom, policeman’s helmet, Eurasian water milfoil, Canada thistle, and common tansy) are considered Class B weeds, and identified as priorities for control, either by Washington State or Cowlitz County. 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, bull thistle, English ivy, yellow-flag iris, reed canarygrass, Himalayan blackberry, common tansy, and nonnative cattail.

**Table 4.6-4. 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 International 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 4.6-5. 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 related to 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 adjacent areas from the construction site and the associated changes in plant communities over time that could result from this activity.

Potential impacts on vegetation were also considered regarding duration. Permanent impacts are those that 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 are those that would result in the disturbance of vegetation cover types but that due to 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 project when evaluating the potential impacts of the project on vegetation.

- The Applicant will implement best management practices and the following project components (and related activities) to avoid and minimize potential impacts associated with coal dust.
  - Conveyors will be:
    - Monitored for general status and washed down regularly.
    - Cleaned using high-pressure water in the collection and containment areas, including belts.

- Transfer points will be:
  - Cleaned using high-pressure water as part of regular washdowns of underbelt plating, and water collection and containment system.
- Rail car unloaders will be:
  - Cleaned with dry fog and water spray systems.
- Stockpiles will 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 will be:
  - Discharged below deck of vessel.
  - Cleaned and washed by high-pressure water.

## Construction—Direct Impacts

Construction-related activities associated with the Proposed Action could 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 dock, and constructing supporting infrastructure (i.e., conveyors and transfer towers).

### Permanently Remove Vegetation

Clearing and grading would permanently remove 189 acres of nonwetland vegetation, including noxious weeds, from the project area (Table 4.6-6). Most of the clearing would affect disturbed vegetation and weedy areas that generally do not support native plant species or provide suitable wildlife habitat (Figure 4.6-2).

The majority (71%) of the total impact would occur in areas occupied by the disturbed cover type (i.e., scattered grasses and weeds in and around the developed portions of the project area). Approximately 26.19 acres of upland vegetation or 16.4% of the total upland vegetation within the project area would be removed. Herbaceous upland vegetation surrounding Wetlands A, C, and Z make up the majority (41.5%) of this acreage. These herbaceous upland areas are generally dominated by reed canarygrass. Approximately one-third of the upland forest in the project area would be removed. The majority of the 8.84 acres of upland forest impacts would occur to the upland forested areas surrounding Wetland A and the upland forested 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 the series of stacking and reclaim conveyors.

**Table 4.6-6. Permanent Direct Impacts by Land Cover and Vegetation Cover Type in the Study Area**

Land Cover Category	Vegetation Cover Type <sup>a</sup>	Total Applicant's Leased Area (Acres) <sup>a</sup>	Impacts in Project Area (Acres) <sup>b</sup>	Percentage of Cover Type <sup>c</sup>
Developed land	<i>Disturbed</i>	266.76	151.61	56.8
	<b>Developed land total</b>	<b>266.76</b>	<b>151.61</b>	<b>56.8</b>
Upland	<i>Forested</i>	26.71	8.84	33.1
	<i>Scrub-shrub</i>	4.74	2.10	44.3
	<i>Herbaceous</i>	49.91	10.88	21.8
	<i>Managed herbaceous</i>	78.61	4.37	5.6
	<b>Upland total</b>	<b>159.97</b>	<b>26.19</b>	<b>16.4</b>
Riparian land	<i>Forested</i>	8.63	0.05	0.6
	<i>Scrub-shrub</i>	1.25	0.00	0
	<i>Herbaceous</i>	0.01	0.00	0
	<b>Riparian land total</b>	<b>9.89</b>	<b>0.05</b>	<b>0.5</b>
Open water	<b>Open water total</b>	<b>23.54</b>	<b>10.78</b>	<b>45.8</b>
<b>Total</b>		<b>460.16</b>	<b>188.64<sup>b</sup></b>	<b>40.99<sup>c</sup></b>

Notes:

- <sup>a</sup> Wetland area is not included in this total. Refer to the Section 4.3, *Wetlands*, for information on impacts on Wetlands.
- <sup>b</sup> These are direct impacts on vegetation in the 190-acre project area.
- <sup>c</sup> This column represents the percent of cover type in the Applicant's leased area that would be affected by construction.

Impacts on riparian vegetation would be limited to approximately 0.05 acre, or 0.5% of the total riparian vegetation in the project area, including black cottonwood and willow trees, and understory shrubs such as red-osier dogwood and Himalayan blackberry. These impacts would occur as a result of construction of the trestle conveyor that connects the surge bin to Docks 2 and 3.

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 would be permanently removed as a result of project construction.

As mentioned previously, six special-status plant species were identified as potentially occurring in the study area for direct impacts, based on the presence of potentially suitable habitat. These plant species include Nelson's checker-mallow, western wahoo, western false dragonhead, loose-flowered bluegrass, soft-leaved willow, and Columbia water-meal. The spatial extent of any impact on special-status plants cannot be quantified until a special-status plant survey is conducted. Such surveys would be required mitigation, as identified in Section 4.6.7.1, *Applicant Mitigation*. 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 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.

Fugitive 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.

Any special-status plants adjacent to the project area would be temporarily affected by construction as described previously. The spatial 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 of the coal export terminal would be limited to the project area.

### **Operations—Direct Impacts**

Operation of the Proposed Action would result in the following direct impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*. Direct impacts on vegetation from operation of the Proposed Action would likely be limited to the continued existence or possible colonization by noxious weeds around the periphery of the project area, impacts from vessel loading and transport along rail tracks, and maintenance 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 rather than native plants. Invasive plant species, including noxious weeds, are generally adapted to colonize highly disturbed areas and could thus colonize the periphery and portions of the project area. Areas along the rail tracks, along the stacking conveyors, and between the tracks of the rail loop would be most likely to support noxious weed species in scattered patches. Reed canarygrass, Himalayan blackberry, Canadian and/or bull thistle, and Scotch broom are already present on the project area, and are common in adjacent areas. These species would likely continue to persist during operations.

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

Operation of the Proposed Action could affect vegetation along the rail 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. A mitigation measure to conduct an aquatic vegetation survey is described in Section 4.6.7, *Potential Mitigation Measures*. Impacts on water quality associated with the routine movement of coal across the shoreline zone and along the shiploaders into vessels at the docks could also affect vegetation along or in receiving waters. However, stormwater runoff would be collected at the project area 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 conveyor to the shiploaders on Docks 2 and 3 would likely be regularly trimmed or removed, slightly reducing organic material delivered to the river, shade the upper beach and shoreline, and native foraging, resting, and perching opportunities to for passerine birds. The 45- to 50-foot-wide area that would be affected is 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 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.

### **Deposit Coal Dust on Vegetation**

The movement of coal into and around the project area, the creation of large stockpiles of coal, and the use of 29,100 linear feet of open conveyors to move coal onto vessels could generate

coal particles and fugitive coal dust, which could be deposited on vegetation, soils, and sediments.

Windborne coal dust can deposit on vegetation, soils, and sediments. The potential extent and deposition rate of coal dust particles less than 75 microns was modeled as part of the analysis conducted relative to air quality. 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 be expected to deposit in a zone extending around and downwind of the project area. Deposition rates could range from 1.88 grams per square meter per year ( $\text{g}/\text{m}^2/\text{year}$ ) closest to the project area, gradually declining to less than  $0.0003 \text{ g}/\text{m}^2/\text{year}$  approximately 2.5 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 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 2006:38; Farmer 1993). Such impacts can be complex and neither the impact mechanism nor a threshold for any potential physical or biological effects of coal dust deposition have been studied relative to the climate and native vegetation of the Pacific Northwest. The *SEPA Vegetation Technical Report* summarizes studies of the impacts of dust deposition on vegetation in other regions. Coal dust deposition is also discussed in Chapter 5, Sections 5.6, *Air Quality*, and 5.7, *Coal Dust*.

Although coal transport may increase the concentration of contaminants such as arsenic, polycyclic hydrocarbons in the soil, concentrations could vary greatly and impacts on vegetation communities have not been studied in the Columbia River Gorge or the study area. 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 sensitive plant species or functions.

Coal dust deposition could also affect special-status plant species in the same areas. The spatial extent of any such impact cannot be quantified until a special-status plant survey is conducted. A mitigation measure to conduct a special-status plant survey is described in Section 4.6.7, *Potential Mitigation Measures*.

The potential impacts for fugitive emissions of coal dust could be reduced through use of the following equipment and system operations that are part of the Proposed Action. The Applicant would use enclosed conveyors and transfer points (except for stockyard and shiploader conveyors). Transfer chutes would be enclosed in transfer towers with soft flow transfer chutes and inlet and outlet curtains and side skirts. The conveyor system would include a washdown water collection and containment system that is discussed further in Section 4.5, *Water Quality*. Rail car unloaders are located in an enclosed building and would use a dry fog system and water

spray systems. The coal stockpile would have a spray system controlled by local and remote weather stations. The system would control drop height from stackers. During shiploading, the shiploader boom would be enclosed and coal would be discharged below deck of vessel.

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

Direct impacts on the natural environment from a coal spill during operations of the Proposed Action could occur. Direct impacts resulting from a spill during coal handling at the coal export terminal would likely be minor because the amount of coal that could be spilled would be relatively small. Also, impacts would be minor because of the absence of terrestrial environments in the project area and the contained nature and features of the terminal (e.g., fully enclosed belt conveyors, transfer towers, and shiploaders).

Coal released as the result of a spill into terrestrial environments could result in impacts. 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 may further impact vegetation by either removing or further damaging vegetation as a result of ground disturbance related to cleanup activities. Any pieces of residual coal that might remain 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 ecosystem.

### **Operations—Indirect Impacts**

Operation of the Proposed Action would result in the following indirect impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*.

#### **Deposit Coal Dust on Vegetation**

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 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*. The potential impacts from coal dust deposition on vegetation is described the *Operations—Direct Impacts* section.

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

Increased vessel traffic and associated wakes could contribute to erosion of tidal marsh vegetation along the shoreline of the Columbia River. Operation of the coal export terminal at maximum throughput would deliver 70 vessels per month or 840 vessels per year to Docks 2

and 3 and would equate to 1,680 vessel transits a year (840 vessels each way) (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, 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 susceptibility to erosion), as well as the amount and type of vegetation that occurs along the shoreline.

The potential for vessel wake impacts on vegetation along the shoreline would be limited by the slope of the shoreline and the general lack of aquatic vegetation near the docks. Additionally, vessels maneuvering near the docks would move slowly as they prepare to dock and likely not putting out a wake sufficient to cause shoreline erosion. However, there may be a potential for such impacts on 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 that can occur when tugs are oriented perpendicular to the shoreline as they push vessels into position at docks. There is the potential for impacts related to vessel wakes 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 must be operated by pilots within the Lower Columbia River, who are licensed by the Coast Guard to perform this function. The navigation channel and its ongoing maintenance are also managed and regulated at the federal level, including dredging and dredged material disposal.

### **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. These spills could also affect special-status plant species in the same areas. The spatial extent of any such impact cannot be quantified until a special-status plant survey(s) is conducted. 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 cleanup 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. Section 5.2, *Rail Safety*, estimates the number of Proposed Action-related train incidents that could potentially occur during coal transport within Cowlitz County and Washington State. In Cowlitz County, the predicted number of loaded coal train incidents is approximately one every 2 years. The

predicted number of loaded coal train incidents within Washington State is approximately five per year.

Not every incident of a loaded coal train would 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 where an incident were to occur would influence if the incident resulted in a coal spill. A broad range of spill sizes from a partial rail car to multiple rail cars could potentially occur from a Proposed Action-related train accident.

Additionally, containment and cleanup efforts for coal spills from a rail incident factor into the potential impact on 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.

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 Potential Mitigation Measures**

This section describes the 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 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 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 the invasion and colonization of noxious weeds on disturbed land, the Applicant will monitor for noxious weeds during construction and operations. The Applicant will coordinate with the Cowlitz County Noxious Weed Control Board if noxious weeds are detected.

#### **MM CDUST-1. Monitor and Reduce Coal Dust Emissions in the Project Area.**

To address coal dust emissions, the Applicant will monitor coal dust during operation of the Proposed Action at locations approved by the Southwest Clean Air Agency. If coal dust levels exceed an established level, the Applicant will take further actions to reduce coal dust emissions.

Potential locations to monitor coal dust include the coal piles, on the dock, where the rail line enters the facility when coal operations begin, and at a location near the closest residences to the project area, if agreed to by the property owner(s). The Applicant will conduct monthly reviews of the emissions data and maintain a record of data for at least 5 years after full operations. If emissions data show exceedances of air quality standards, the Applicant will report this information to Southwest Clean Air Agency, Cowlitz County and Ecology. The Applicant will gather 1 year of fence-line data on particulate matter (PM) 2.5 and PM 10 prior to beginning operations and maintain the data as reference. This data will be reported to the Southwest Clean Air Agency, Cowlitz County, and Ecology.

**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 Draft 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.

**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 operations.

## **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.