3.4 Plants

Plants are 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 also 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 plants in the study area, including high-quality vegetation and special-status species. It then describes impacts on plants that could result under the no-action alternative or as a result of the construction and routine operation[1] of the proposed action. Finally, the section presents any measures identified to mitigate impacts of the proposed action and any remaining unavoidable and significant adverse impacts.

3.4.1 What is the study area for plants?

The study area for plants consists of plants on and near the project site that could be affected during construction and routine operations at the project site. The study area also includes plants that could be affected during rail transport along the Puget Sound & Pacific Railroad (PS&P)[2] rail line and vessel transport through Grays Harbor out to 3 nautical miles from the mouth of the harbor.

3.4.2 What laws and regulations apply to plants?

Laws and regulations for determining potential impacts on plants are summarized in Table 3.4-1. More information about these laws and regulations is provided in Appendix B, *Laws and Regulations*.

[1] Chapter 4, *Environmental Health and Safety*, addresses the potential impacts from increased risk of accidents (e.g., storage tank failure, train derailments, vessel collisions) and related consequences (e.g., release of crude oil or other proposed bulk liquids).

[2] The PS&P rail line refers to the rail line between Centralia and the project site.

Table 3.4-1. Laws and Regulations for Plants

Laws and Regulations	Description
Federal	
Clean Water Act, Section 301 (33 U.S.C. 1251 et seq.)	Prohibits the discharge of any pollutant to a water of the United States without a permit.
Clean Water Act, Section 401 (33 U.S.C. 1251 et seq.)	Ensures that projects within the waters of the United States comply with water quality and related aquatic resource protection requirements.
Clean Water Act, Section 402 (33 U.S.C. 1251 et seq.)	Establishes the NPDES permitting program, under which discharges of pollutants are regulated.
Endangered Species Act (16 U.S.C. 1531 et seq.)	Established with the intent of providing protections for imperiled species and the ecosystems upon which they depend.
State	
Natural Area Preserves Act (RCW 79.70)	Establishes a framework for identifying and cataloging special-status plant species and regionally important or unique plant communities in Washington State.
Noxious Weed Law (RCW 17.10) and Noxious Weed List and Schedule of Monetary Penalties (WAC 16-750)	Establishes the list of noxious weeds within classes that reflect the level of concern and are related to specific mandatory control and prevention measures that are required for managing the spread of those weeds.
Growth Management Act (RCW 36.70Aand WAC 365-190-080–180)	Requires the counties and cities of the state to prepare and adopt comprehensive plans that keep with the Growth Management Act planning goals. Identifies critical areas of Washington State and establishes minimum regulatory standards for local governments to implement.
Water Pollution Control (RCW 90.48)	Regulates the discharge of pollutants into waters of the state, including streams, lakes, rivers, ponds, inland waters, salt waters, watercourses, and other surface and underground waters.
Water Rights—Oil and Hazardous Substance Spill Prevention and Response "Oil Spill Act" (RCW 90.56)	Provides a simplified process to calculate damages from an oil spill and holds responsible parties liable for damages resulting from injuries to public resources.
Oil Spill Natural Resources Damage Assessment (WAC 173-183)	Establishes procedures for convening a resource damage assessment committee, preassessment screening of damages, and selecting the damage assessment methodology.
Local	
Critical Areas Ordinance (HMC 11.06 and AMC 14.100)	Sets forth the definitions and process for designating and protecting critical areas within the city limits of Hoquiam and Aberdeen, respectively.
Hoquiam: Landscaping and Screening Ordinance (HMC 10.05.65)	Requires that 18 inches total caliper of new trees be planted per gross acre of new development.

U.S.C. = United States Code; NPDES = National Pollutant Discharge Elimination System; RCW = Revised Code of Washington; WAC = Washington Administrative Code; HMC = Hoquiam Municipal Code; AMC = Aberdeen Municipal Code

3.4.3 How were impacts on plants evaluated?

This section describes the sources of information and methods used to evaluate impacts.

3.4.3.1 Information Sources

Washington Natural Heritage Program (WNHP) manages the state's only comprehensive database of rare plant species and high-quality native plant communities. WNHP's 2014 global information system (GIS) data, as well as information from the WNHP's online Reference Desk, were used to determine known occurrences of special-status plant species and high-quality native plant communities (including their characteristic plant species) in the study area. A list of special-status plant species for Grays Harbor, Lewis, and Thurston Counties was also generated from the iPAC online system (U.S. Fish and Wildlife Service 2014a).

Special-status plant species are those species regulated by the U.S. Fish and Wildlife Service (USFWS) as threatened, endangered, sensitive, or candidate species under the Endangered Species Act (ESA), and plant species regulated or tracked by the Washington State Department of Natural Resources as state threatened, endangered, or sensitive.

Terrestrial plant communities were characterized using aerial photographs available through GoogleEarth and the 2011 National Land Cover Dataset (Multi-Resolution Land Characteristics Consortium 2014), as well as information gathered from references cited herein. Plants in the study area were characterized during a reconnaissance-level visit conducted in September 2014 at the project site and vicinity, Grays Harbor NWR, and along publicly accessible portions of the PS&P rail line corridor near Hoquiam.

3.4.3.2 Impact Analysis

Impacts on vegetation at the project site were determined by examining the vegetation relative to proposed construction plans. Impacts on vegetation within 0.5 mile of the PS&P rail line and both in and within 0.5 mile of Grays Harbor were qualitatively assessed using the information sources described above.

3.4.4 What plants are in the study area?

This section describes plants in the study area that could be affected by construction and routine operation of the proposed action. This section provides the general context for plants in the study area and describes plants at the project site and plant communities along the PS&P rail line and in and along the shoreline of Grays Harbor, including possible resources out to 3 nautical miles from the mouth of Grays Harbor.

The study area is in the Northwest Coast ecoregion. This region is characterized by a temperate climate with summer fog and generally cool temperatures, particularly along the coastline and adjacent estuaries, such as Grays Harbor and river valleys such as the Chehalis River (Washington State Department of Natural Resources 2007; Franklin and Dyrness 1973).

Undeveloped lowland areas in this ecoregion are typically coniferous forests, characterized by western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), and western red cedar (*Thuja plicata*) as the dominant tree species. Sitka spruce (*Picea sitchensis*) is also a dominant tree in the lowlands adjacent to the coastline and in areas immediately surrounding Grays Harbor (Washington State Department of Natural Resources 2007; Franklin and Dyrness 1973). Undeveloped lowland floodplains and forested wetlands in this ecoregion (as described in Section 3.3, *Water*) are typically characterized by deciduous and mixed forest communities

dominated by red alder (*Alnus rubra*), western red cedar, Sitka spruce, black cottonwood (*Populus balsamifera*), and willow (*Salix* spp.) trees.

Relative to special-status species, five of the six plants listed under the ESA have been documented in Grays Harbor, Thurston, and Lewis Counties (Washington Natural Heritage Program 2014a).

- Marsh sandwort (*Arenaria paludicola*): historically documented in Grays Harbor County
- Golden Paintbrush (*Castilleja levisecta*): documented in Thurston County
- Water howellia (*Howellia aquatilis*): documented in Thurston County
- Kincaid's lupine (*Lupinus sulphureus* ssp.*kincaidii*): documented in Lewis County
- Nelson's checker-mallow (*Sidalcea nelsoniana*): documented in Lewis County

However, the WNHP database contains no records of these ESA-listed plant species having been documented in the portions of these counties in the study area (Washington Natural Heritage Program 2014b).

3.4.4.1 Project Site

The project site does not support a native vegetation community. The land on which the project site is located was created as a result of the former boat slip #1 being filled with dredge material between the 1980s and 1990s (GeoEngineers 2013:1). Wood debris is also present within the fill. The southeastern half of the project site is paved, developed and lacks any landscaping.

The 10.9-acre unpaved portion of the project site exists around the northern and western sides of the project site. The northwestern half of the site was filled in 2011 and this compacted soil area is now characterized by a sparse cover of various grasses and early successional/weedy plant species. Species observed growing on the fill material included herbaceous species such as Canada thistle (*Cirsium arvense),* bull thistle *(Cirsium vulgare),* curly dock *(Rumex crispus),* common horsetail *(Equisetum arvense),* Queen Anne's lace *(Daucus carota),* and Japanese knotweed (*Polygonum cuspidatum)*. Himalayan blackberry (*Rubus armeniacus*) and Scot's broom (*Cytisus scoparius)* and black cottonwood seedlings *(Populus balsamifera)* have been noted along Fry Creek.

Scattered plants generally associated with moist surface conditions, such as common rush (*Juncus effusus),* saltgrass *(Distichlis spicata)*, reed canarygrass (*Phalaris arundinacea*), and common brass buttons (*Cotula coronopifolia)* were noted in the undeveloped area proposed for expansion during the wetlands survey (Parametrix 2013:2).

The industrialized shoreline along Terminal 1, including the shoreline adjacent to the project site, is heavily rocked or riprapped and thus lacks the intertidal marsh communities that characterize the undeveloped portions of the Grays Harbor shoreline. Scattered beach logs are lodged on top of the riprap along the approximate elevation of mean higher high water (MHHW). Blackberry canes are interspersed with the riprap and beach logs above MHHW.

The WNHP database contains no records of any federal or state special-status plant species having been documented at the project site. The nearest documented current occurrence[3] of a special-

[3] The WNHP database defines a current occurrence as an occurrence in which the most recent record was after 1977. Species for which the most current occurrence was prior to 1977 are considered historic occurrences.

status plant is approximately 7 miles to the west-northwest of the project site along the shoreline of Grays Harbor (Washington Natural Heritage Program 2014b).

3.4.4.2 PS&P Rail Line

Four special-status plant species have been recorded in the WNHP database within the 0.5-mile study area along the PS&P rail line (Washington Natural Heritage Program 2014b).

- Four 1991 occurrences of the white-topped aster (*Sericocarpus rigidus;* USFWS Species of Concern, WNHP Sensitive), in four locations along the north side of the PS&P rail line near Rochester and to the east of Scatter Creek. Two of these occurrences are recorded as adjacent to the rail line.
- A 1995 occurrence of tall bugbane (*Cimicifuga elata;* USFWS Species of Concern, WNHP Sensitive), approximately 1 mile southeast of the PS&P rail yard in Centralia.
- A 1997 occurrence of the western wahoo (*Euonymus occidentalis var. occidentalis;* WNHP Sensitive), along the south side of the PS&P rail line near Rochester.
- Eight 2007 occurrences of the small-flowered trillium (*Trillium parviflorum;* WNHP Sensitive). Six of these are recorded 1.5 to 2.5 miles northwest of the Centralia PS&P rail yard (three of which are recorded near the rail line itself) and two occurrences are recorded to the north of the PS&P rail line near US Route 2 (US 2) and Prairie Creek.

Six general types of terrestrial vegetation communities occur along the PS&P rail line based on the 2011 National Land Cover Data Set (Multi-Resolution Land Characteristics Consortium 2014).

Coniferous, Deciduous, and Mixed Forests

Much of the area along the PS&P rail line between approximately Malone-Porter and Oakville is a mixture of coniferous, deciduous, and mixed forests characteristic of the broader region. These forests are generally dominated by Douglas-fir, western red cedar, Sitka spruce, red alder, and black cottonwood trees with an understory that varies depending on the type of overstory vegetation and local soil and moisture conditions. Forested wetlands also occur along the PS&P rail line in areas hydrologically influenced by the Chehalis River and its tributaries and in areas influenced by high groundwater conditions. Wetlands are described in more detail in Section 3.3, *Water*.

Shrub-Scrub Vegetation

Some areas along the PS&P rail line, including northwest of Malone-Porter, are characterized by a shrub-scrub vegetation community. Shrub-scrub areas are generally dominated by a dense mixture of young trees and shrubs less than 20 feet tall, intermixed with multiple-stemmed small trees, such as willows. Recently harvested timberlands are also frequently characterized as shrub-scrub while they are in the early stages of revegetating after trees have been harvested. Scrub-shrub wetlands also occur along the PS&P rail line in areas hydrologically influenced by the Chehalis River and its tributaries and in areas influenced by high groundwater conditions. Wetlands are described in more detail in Section 3.3, *Water*.

Herbaceous Vegetation

Small, generally scattered areas along the PS&P rail line are characterized as herbaceous (i.e., non-woody) vegetation. These areas are typically low-lying areas dominated by grasses such as invasive,

but well-established, reed canarygrass (*Phalaris arundinacea*) and emergent wetlands associated with the floodplain of the Chehalis River, as described in more detail in Section 3.3, *Water*.

Cultivated Crops

Some areas along the PS&P rail line, including areas south of the rail line between Centralia and Oakville and west of Malone-Porter, are cultivated as cropland. These areas are generally in or near the Chehalis River floodplain and typically no longer support a native plant community.

Hay and Pasture Land

Several areas along the PS&P rail line, including south of the rail line between Grand Mound and Oakville and between Malone-Porter and Montesano, are characterized as hay or pasture. These areas are also in or near the Chehalis River floodplain and typically no longer support a native plant community. They are dominated by herbaceous vegetation, a mixture of grasses palatable to cattle, horses, and sheep.

Developed Land

The urbanized areas associated with the Cities and Towns of Centralia, Fords Prairie, Grand Mound, Rochester, Chehalis Village, Oakville, Elma, Satsop, Brady, Montesano, Central Park, Cosmopolis, Aberdeen, and Hoquiam are characterized as developed. These areas generally support a mixture of nonnative and native plants, typically associated with residential and commercial landscaping, public open spaces (such as parks), and small extents of otherwise protected sensitive areas (such as floodplain wetlands) that lie within the cities' urbanized areas but are too small to be mapped separately.

3.4.4.3 Grays Harbor

The WNHP database includes one historically documented special-status plant along the Grays Harbor shoreline near Pt. New and Brackenridge Bluff: a 1982 occurrence of the pink fawn-lily (*Erythronium revolutum*), a plant species classified by the WNHP as Sensitive (Washington Natural Heritage Program 2014b).

Several types of high-quality aquatic and intertidal vegetation communities occur in and along the Grays Harbor shoreline. Eelgrass, macroalgae, salt marshes, and dunegrass, as well as low-elevation freshwater wetlands and tidal surge plain wetlands, are present in the study area along the Grays Harbor shoreline. These vegetation communities provide habitat for a variety of fish, shellfish, benthic invertebrates, shorebirds, and other wildlife that use the study area and are critical elements of both primary production and the benthic/detrital foodweb of the estuary.

The portion of the study area that extends 3 nautical miles into the Pacific Ocean from the mouth of Grays Harbor is characterized by shifting sands and other soft sediments, which are influenced by the Bar Channel and South Jetty Reaches of the Grays Harbor Navigation Channel. These features concentrate flows into and out of Grays Harbor and create an environment that is generally not conducive to the establishment of plants. However, kelp, a group of large seaweeds in the Order *Laminariales*, occurs along the Pacific coast of Washington (as well as in Puget Sound), and has been documented near the mouth of Grays Harbor (Washington State Department of Natural Resources 2001).

Aquatic Vegetation

Grays Harbor supports vast areas of intertidal mudflats that support native eelgrass (*Zostera marina*) and both high-and low-elevation intertidal salt marshes, as well as scattered areas of rocky substrate that support a variety of macroalgae and nonfloating kelp species. These vegetation communities create patches of intertidal and shallow subtidal habitat that are important to a variety of wildlife species, including juvenile salmonids, Dungeness crabs, and migratory shorebirds. Per Washington Administrative Code (WAC) 220.110.250(3)(a,b), eelgrass, macroalgae, and kelp are defined as saltwater habitats of special concern. According to WAC 365-190-130, kelp and eelgrass beds are critical saltwater habitat for forage fish spawning areas.

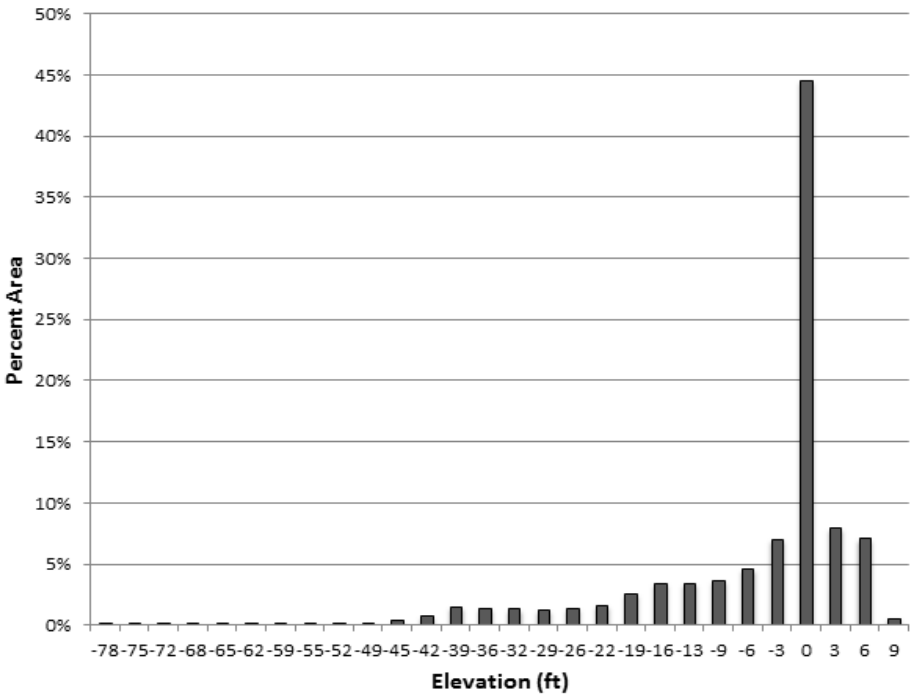
Eelgrass

Eelgrass beds support the thousands of ducks and geese that winter in Grays Harbor, and the vast numbers of shorebirds that stop in Grays Harbor to rest and feed during their annual spring migration to artic breeding grounds (U.S. Fish and Wildlife Service 2014b). Eelgrass flourishes in shallow, sunlit environments with unconsolidated substrate that are protected from strong currents and heavy, repeated wave action. Eelgrass prefers currents less than 3.5 knots, depths less than 22 feet, and salinity greater than or equal to 20 parts per thousand (Phillips 1984:14).

These environmental parameters (i.e., current speed, water depth, salinity, and low turbidity) are not found in the navigation channel, along the shoreline, or in the immediate vicinity of the project site. The landscape that drains to the Chehalis River is high in clay content and, as such, the Chehalis River is highly turbid with suspended sediments. Turbidity levels in the waters of the inner harbor near the project site and at the mouth of the Chehalis River tend to fluctuate, particularly near the middle and bottom of the water column. Turbidity ranging from 3 to 233 nephelometric turbidity units was documented during water quality sampling conducted in January 2008 (U.S. Army Corps of Engineers 2008:6). The shoreline of the inner harbor and the shoreline adjacent to the project site do not support eelgrass (ICF Jones & Stokes 2009:4-1–4-4).

As the turbid waters of the Chehalis River are diluted farther from the river mouth, the increased water clarity creates conditions for eelgrass to grow where substrate, current, and elevation conditions are appropriate. Geospatial analysis conducted in 2003 found an increase in potential eelgrass habitat (based on elevation) in Grays Harbor of approximately 4,430 acres compared to historic (1883) conditions. At least 7,605 acres of Grays Harbor were estimated to lie at elevations found suitable for eelgrass meadows (i.e., between 0 feet and 3.9 feet mean lower low water) (Borde et. al. 2003:1109). Similarly, bathymetric analysis of Grays Harbor indicates that nearly 60% of the harbor (approximately 15,000 acres) is between −6 feet and +3 feet elevation, elevations that typically support eelgrass (Figure 3.4-1).

Figure 3.4-1. Percentage of Grays Harbor Estuary by Elevation



Macroalgae

Because most of Grays Harbor is unconsolidated sand and mud, macroalgae distribution is limited to rocked shoreline areas and the rocked surface of the jetties where macroalgae can find hard substrates for attachment. Low densities of leafy green sea lettuce (*Ulva lactuca*), rockweed (*Fucus distichus*), and green gut weed (*Enteromorpha intestinalis*) have been found distributed sparsely in the inner margins of the harbor near the project site close to Cow Point. Small amounts of sea lettuce and rockweed were also found attached to derelict pilings and on boulder riprap armoring the shoreline (ICF Jones & Stokes 2009:4-1–4-4).

Salt Marsh and Dunegrass

Salt marshes are essential elements of the estuarine landscape and represent an important intertidal component of the aquatic vegetation community in the Grays Harbor estuary. They provide habitat for a variety of fish, bird, and other animal species and are sources of both primary production and benthic foodweb support for the larger estuarine system (Seliskar and Gallagher 1983:37–41). Historically, this type of marsh extended many miles upstream of the estuary, becoming progressively dominated by freshwater species at the upper extent of tidal influence.

Salt marsh plants are generally categorized by their elevational range as low-marsh or high-marsh species. Species such as seaside arrowgrass (*Triglochin maritima*) and pickleweed (*Salicornia virginica*) are generally characterized as low-marsh species, and species such as Baltic rush (*Juncus balticus*), tufted hairgrass (*Descampsia cespitosa*) and Lyngby's sedge (*Carex lynbyei*) are generally characterized as high-marsh species (Seliskar and Gallagher 1983:17–19). Both low-marsh and high-marsh habitats provide important resting and foraging habitat for migrating birds and rearing

juvenile fishes. They also contribute to the benthic productivity of the system by seasonally contributing large amounts of organic material as their leaves and stems die back in the winter.

Although diking of intertidal areas has transformed many areas of salt marsh into wet pasturelands removed from tidal influence, Grays Harbor retains large areas of intact native salt marshes in the Grays Harbor National Wildlife refuge. The harbor also has numerous high-quality salt marshes documented in the WNHP database along the northern shoreline of Grays Harbor, including along the shorelines of the North Bay, of the South Bay near the mouth of the Elk River, and at the mouth of the Johns River (Figure 3.4-2) (Washington Natural Heritage Program 2014b; Northwest Area Committee 2013:6-3–6-8). These marshes are characterized by high quality, characteristic native salt marsh communities dominated by Baltic rush, seaside arrowgrass, pickleweed, tufted hairgrass, and Lyngby's sedge.

Salt marsh is also present along the shoreline of Rennie Island, approximately 1,500 feet to the southwest across the navigation channel from the project site. As described in Section 3.3, *Water*, Rennie Island is surrounded by a band of tidally exposed mudflats and salt marsh, and supports tidally influenced forested and scrub-shrub wetlands. The interior of the island also contains emergent wetlands and open water areas that are remnants of the now defunct ITT Rayonier pulp mill effluent pond.

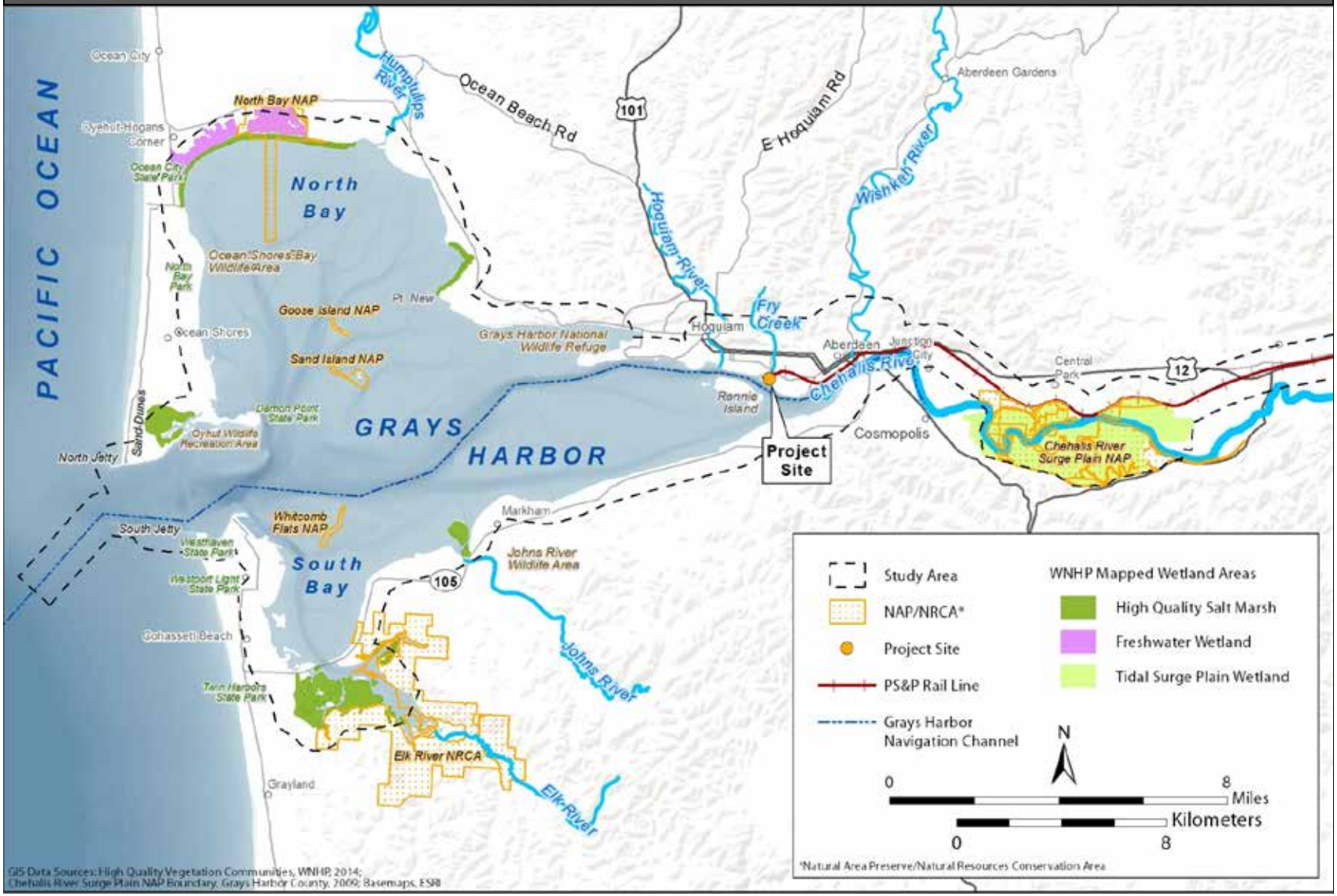
Native dunegrass (*Elymus mollis*) and the introduced European beach grass (*Ammophila arenaria*) occur on sand dunes above MHHW upslope of the South Jetty and Half Moon Bay, where they stabilize the sand dunes and provide nesting habitat for some species of shorebirds, and foraging habitat and shelter for a variety of wildlife. Dunegrass in the Damon Point area provides one of three critical nesting habitat areas for the snowy plover (*Charadrius alexandrius nivosus)*, a federally listed shorebird (Northwest Area Committee 2013:6-3–6-8).

Kelp

Twenty-six species of kelp occur along Washington's shorelines; they are categorized as *floating* or *nonfloating*. Floating kelp species include the familiar bull kelp (*Nereocystis luetkeana*) and giant kelp (*Macrocystis integrifolia*) that form the offshore kelp forests common in rocky, high-energy environments (Mumford 2007). The soft sediments and relatively low-energy waters of Grays Harbor do not support floating kelp forests (Washington State Department of Natural Resources 2001).

Nonfloating kelp, of which 21 species are found in Washington waters, are widely distributed along the northern Pacific coast and the waters of Puget Sound. Approximately 6% of Gray Harbor County's shoreline supports nonfloating kelp (Mumford 2007). Nonfloating kelp species require some solid substrate for growth, but can anchor on rocks as small as pebbles; they tend to grow in areas of high to moderate wave energy or currents. Nonfloating kelp has been documented in Grays Harbor, on the intertidal and shallow subtidal areas of the South Bay/Whitcomb Flats (Mumford 2007; Washington State Department of Natural Resources 2015).

Figure 3.4-2. High-Quality Vegetation Communities in and along the Shoreline of Grays Harbor



Low-Elevation Freshwater Wetlands

The north shore of Grays Harbor also supports a high quality, low-elevation wetland community dominated by species associated with acidic soils and bog-like conditions (Figure 3.4-2). This plant community is dominated by shrubby areas of Labrador tea (*Ledum groenlandicum*), sweetgale (*Myrica gale*), *Sphagnum* moss, and skunk cabbage (*Lysichiton americanum*), interspersed with forested areas of western red cedar, shore pine (*Pinus contorta*), and Sitka spruce trees (Washington Natural Heritage Program 2014b).

Low-elevation freshwater wetlands also support numerous plants that are culturally important for Native American inhabitants of Grays Harbor such as several species of trees and shrubs (e.g., vine maple (*Acer circinatum*), Sitka spruce, western red cedar, willows, rushes and reeds (e.g., species in the genus *Juncus*, *Scirpus*, and *Schoenoplectus*) and cattail (*Typha latifolia*), which were used in basket making (James and Martino 1986:76–83).

Grays Harbor Protected Areas

Grays Harbor National Wildlife Refuge

The Grays Harbor National Wildlife Refuge is located approximately 3 miles west of the project site (Figure 3.4-2) and managed by USFWS. As described in Section 3.5, *Animals*, the refuge was developed to preserve 1,500 acres of high-quality native terrestrial and intertidal communities, as well as crucial habitat foraging and resting habitat for migratory shorebirds, raptors, and waterfowl (U.S. Fish and Wildlife Service 2014b). Native terrestrial plants such as red alder, salmonberry (*Rubus spectabilis*) and red elderberry (*Sambucus racemosa*) present along the higher elevation portions of the refuge provide habitat for terrestrial animals such as neotropical[4] songbirds, raptors, and resident mammals such as black–tailed deer (U.S. Fish and Wildlife Service 2014b).

Native aquatic vegetation communities protected in the Grays Harbor National Wildlife refuge include high-quality low and high marshes dominated by salt marsh species such as pickleweed (*Salicornia virginica*), Lyngby's sedge (*Carex lyngbyei*), and coastal saltgrass (*Distichlis spicata*) (Washington Natural Heritage Program 2014b; U.S. Fish and Wildlife Service 2014b).

In addition, basket grass, also known as American or common three-square or chair-maker's rush (*Schoenoplectus pungens* [formerly classified as *Scirpus americanus*]), is a common, relatively tall sedge. It is a culturally important plant for regional basket makers of the Chehalis, Quileute, Hoh, Quinault, and Makah Tribes, as well as basket makers of several Puget Sound tribes (Natural Resources Conservation Service 2000; James and Martino 1986:71–76). Sweet grass grows in either freshwater or brackish marshes on the flats of the intertidal zone and exists in the area along the shoreline of Bowerman Basin in the Grays Harbor National Wildlife Refuge, where it has been harvested for generations by Native American inhabitants of Grays Harbor (Natural Resources Conservation Service 2000; James and Martino 1986:71–76).

Johns River Wildlife Unit

The 6,700-acre Johns River Wildlife Unit is composed of 15 separate units, each managed to protect or restore particular estuarine and wetland habitats.

[4] *Neotropical* is a common term for songbirds that migrate between the tropics and North America.

The 683-acre Oyhut Wildlife Recreation Area and adjacent Damon Point are located at the south end of the Ocean Shores Peninsula at the mouth of Grays Harbor (Figure 3.4-2) (Washington Department of Fish and Wildlife 2014). High-quality salt marsh plant communities characterized by pickleweed and coastal saltgrass, as well as associated mudflats that are protected in this area (Washington Natural Heritage Program 2014b). Sand dune habitats protected in this area support one of only four remaining nesting areas for snowy plovers in Washington State (Section 3.5, *Animals*).

The 63-acre South Grays Harbor unit along the south shore of Grays Harbor is managed to protect shoreline and estuarine habitats. Inclusion of an additional 800 acres is pending.

The 1,500-acre Johns River Wildlife Area, also along the south shore of Grays Harbor, is managed for waterfowl habitat and hunting and protects areas of high-quality low marsh, dominated by seaside arrowgrass (*Triglochin maritima*) and pickleweed (Figure 3.4-2) (Washington Natural Heritage Program 2014b). This area also protects a high-quality western red cedar swamp (Washington Department of Fish and Wildlife 2014).

The 41-acre Elk River unit, located at the mouth of the Elk River at the southwestern corner of Grays Harbor, protects estuary, tide flat and salt marsh habitats, including extensive areas of high-quality low and high marsh dominated by Baltic rush, coastal saltgrass, tufted hairgrass, and Lyngby's sedge (Figure3.4-2) (Washington Natural Heritage Program 2014b).

Chehalis River Surge Plain Natural Area Preserve

The Chehalis River Surge Plain Natural Area Preserve is located just upstream of Cosmopolis near the downstream end of the Chehalis River approximately between river miles 3.8 and 10.8 (Figure 3.4-2). The Washington State Department of Natural Resources manages approximately 2,345 acres to protect the largest and highest quality Sitka spruce-dominated coastal surge plain wetland in Washington State. There are only four other known wetlands of this type in Washington, all smaller and in poorer ecological condition (Washington State Department of Natural Resources 2009).

The plant community in the Chehalis River Surge Plain Natural Area Preserve is characterized by WNHP as a high-quality/rare plant community (Washington Natural Heritage Program 2014c). The forested areas are characterized by deep, organic alluvium soils over clay and are dominated by Sitka spruce trees. Mature trees in the preserve range from about 50 to more than 200 years old. The forested areas are also dominated by red alder and western red cedar trees, with a dense understory of red-osier dogwood (*Cornus sericea*), salmonberry, slough sedge (*Carex obnupta*) and skunk cabbage (*Lysichiton americanum*). Shrub-scrub areas are characterized by a mixture of red-osier dogwood and willow trees, interspersed with dense patches of Douglas spirea (*Spiraea douglasii*); lady-fern (*Athyrium filix-femina*) and skunk cabbage dominate the herbaceous layer. Mixed herbaceous areas are characterized by species such as soft-stem bulrush (*Schoenoplectus tabernaemontani*), small-fruited bulrush (*Scirpus microcarpus*), Lyngby's sedge, and common cattail. Lyngby's sedge forms vast swaths of native intertidal marsh along the low banks of the river and sloughs (Washington State Department of Natural Resources 2009; Washington Natural Heritage Program 2014b).

3.4.5 What are the potential impacts on plants?

This section describes impacts on plants that could occur in the study area. Potential impacts of the no-action alternative are described first, followed by potential impacts of the proposed action.

3.4.5.1 No-Action Alternative

Under the no-action alternative, the applicant would continue to operate its existing facility as described in Chapter 2, Section 2.1.2.2, *Existing Operations*. Impacts on water quality that could affect vegetation would continue similar to existing conditions. Although the proposed action would not occur, it is assumed that growth in the region would continue under the no-action alternative, which could lead to development of another industrial use at the project site within the 20-year analysis period (2017 to 2037). Such development could result in impacts similar to those described for the proposed action.

3.4.5.2 Proposed Action

This section describes the impacts that could occur in the study area as a result of construction and routine operation of the proposed action. First, this section describes impacts from construction of the proposed action. It then describes impacts of routine operation at the project site and of routine rail and vessel transport to and from the project site.

Construction

No construction activities would occur outside of the project site; therefore, no construction activities would remove vegetation along or in Grays Harbor or along the PS&P rail line. Although construction would occur within 200 feet of Grays Harbor, no in-water work or shoreline work would be required, and thus, no impacts on shoreline or aquatic vegetation would occur. Therefore, the potential for construction to affect vegetation would be limited to onsite vegetation removal and impacts related to increased erosion from ground disturbance and the use of chemicals during construction and hydrostatic testing of the storage tanks.

Ground disturbance related to construction of the proposed action would result in the loss of approximately 10.9 acres of vegetation in the form of the scattered grasses and weeds around the northern periphery of the project site. These scattered grassy areas are early successional and weedy areas that do not support native plant species or provide valuable wildlife habitat. Construction would not affect the vegetation along the upper edges of Fry Creek. Such ground disturbance would also remove any noxious weeds from the project site. Additionally, vegetation loss would be mitigated through tree planting required under the City of Hoquiam's Landscaping and Screening Ordinance (Hoquiam Municipal Code [HMC] 10.05.065) based on the gross area of construction. The permit requirements specific to the proposed action are detailed in Section 3.4.6.

As described in Section 3.3, *Water*, construction activities could temporarily affect biological resources, including shoreline and aquatic vegetation near the project site, through soil disturbance, stockpiling and erosion of sediment, stormwater contamination from equipment and material usage, and temporary increases in turbidity during release of storage tank hydrostatic testing waters. These disturbances could temporarily increase total suspended solids near the project site and result in the release of construction vehicle fluids or construction materials. Such releases could result in increased turbidity and impacts on surface water quality. Depending on the extent and duration of the impairment, vegetation could be affected through interference with photosynthesis, respiration, growth, and reproduction.

As further discussed in Section 3.3, *Water*, the potential for water quality impacts during construction would be reduced by the implementation of permit conditions required by the NPDES Construction Stormwater General Permit from Ecology and Grade and Fill Permit issued by the city.

Compliance with these permits would require implementation of the Stormwater Drainage Control Plan, Temporary Erosion and Sedimentation Control Plan, and best management practices (BMPs) to reduce the potential for water quality and associated biological impacts resulting from soil disturbance. This would also require developing and implementing a spill prevention, control, and countermeasures plan, an oil spill prevention plan and a site-specific Construction Stormwater Pollution Prevention Plan that includes BMPs for material handling and construction waste management would reduce the potential for impacts from these sources.

Upon completion of hydrostatic testing of each newly constructed storage tank, the volume of water of the largest tank (80,000 barrels [3.4 million gallons]) would be discharged into Grays Harbor. Such activities could carry residual chemicals and other materials from tank construction, as well as any additives added to the water for testing (e.g., dyes, biocides), into the harbor, potentially affecting the water quality and increasing turbidity and thus affecting biological resources, including shoreline and aquatic vegetation in the vicinity of the project site.

If testing is to be conducted during the rainy season, the applicant anticipates that a biodegradable, environmentally safe dye would need to be added to the hydrotest water to allow for the visual discovery of leaks during wet conditions. Only one tank would be tested at a time, with the testing water pumped to each of the remaining tanks in succession as each test is completed. The potential for any impacts on vegetation along the shoreline of or within Grays Harbor or the Chehalis River would be reduced by testing of the hydrotest water to confirm compliance with Ecology's discharge requirements. Special treatment of the hydrotest water prior to discharge is not expected but if it is found that the water exceeds discharge requirements, the water would be treated appropriately (e.g., filtering, pH adjustment) onsite prior to discharge or shipped for offsite disposal if it could not be handled onsite. The dyed hydrotest water would be released into Grays Harbor through the Port of Grays Harbor stormwater system at a controlled rate to reduce the potential for erosion and increased turbidity around the outfall and to allow for dilution of the dyed water. Once diluted, the dye is not expected to affect the color of Grays Harbor. Because these activities would occur during the construction period, they would be covered under the applicant's NPDES Construction Stormwater General Permit and would be subject to the terms and conditions of that permit including any applicable BMPs, as describe in Section 3.3, *Water*.

Operations

This section describes impacts that would occur as a result of routine operations at the project site, rail transport along the PS&P rail line, and vessel transport through Grays Harbor.

Onsite

Operation of the proposed action would not affect plants at the project site, because the project site would be completely paved and no plants would be expected to colonize the developed site. Because the project site would be completely paved, colonization by noxious weeds would not likely occur during operations. However, the proposed action could affect plants in and around the harbor as the result of impacts on water quality associated with routine operations. As discussed in detail in Section 3.3., *Water*, stormwater runoff collected at the project site could contain contaminants associated with the operation and maintenance of vehicles and equipment (e.g., diesel fuel, oil, hydraulic fuel, antifreeze, tire and brake dust, exhaust particulates) and associated with small spills or leaks of bulk liquids, such as crude oil, related to the bulk loading transfer facilities.

Although small spills or leaks could occur as the result of human error or minor equipment failure, the potential for these incidents to occur would be reduced by appropriate training and the implementation of prevention and control measures as described in the spill prevention, control, and countermeasures plan and oil spill prevention plan. Specifically, prior to the commencement of bulk liquid loading operations at the project site, all personnel involved in liquid transfer operations would be trained in proper operating and spill-prevention procedures. All pipelines and loading equipment would be regularly inspected for leaks and wear and promptly repaired if necessary. During loading operations, the dock would be constantly attended to by the terminal operator who would have the ability to stop a transfer immediately if a leak or spill occurred from the dock or loading arm piping.

Additionally, as described in Chapter 2, *Proposed Action and Alternatives*, the containment areas underlying the rail unloading area and storage tanks are designed to contain spills or leaks to reduce the conveyance of chemicals to waterways. Spills of this size would be immediately contained and cleaned up by facility staff with on-hand materials consistent with BMPs to be implemented during operations (e.g., implementation and maintenance of a stormwater pollution prevention plan).

For these reasons, impacts related to these events present a very low risk to plants likely to be present along the shoreline near the project site. An analysis of impacts from increased risk of accidents (e.g., storage tank rupture) and related incidents (e.g., oil spills) is provided in Chapter 4, *Environmental Health and Safety.* All oil or hazardous material spills must be reported by the spiller, who must respond appropriately. Under state law (Revised Code of Washington [RCW] 90.56.370), anyone responsible for spilling oil into state waters is liable for damages resulting from injuries to public resources, including plants. The process for determining damages for an oil spill is called a natural resource damage assessment, as defined in WAC 173-183.

Rail

Operation of the proposed action at maximum throughput would add approximately two unit train trips[5] per day on average (730 per year maximum) along the PS&P rail line to the average three train trips per day (1,235 per year) under the no-action alternative (Section 3.15, *Rail Traffic*). This increased traffic and the associated routine operational activities could affect vegetation along the PS&P rail line as the result of increased exposure to pollutants (incidental leaks and spills). An analysis of impacts from increased risk of accidents (e.g., train derailments) and related consequences (e.g., oil spills) is provided in Chapter 4, *Environmental Health and Safety.*

An increase in leaks and spills of petrochemicals used in routine rail operations could occur due to the increased frequency of rail traffic and associated maintenance; the increase would be slightly higher compared to the no-action alternative. Diesel fuel, oils, grease, and other petrochemicals required for rail operation and maintenance could reach vegetation along the rail line through a small-scale spill or dripping from the train. These materials could either leak directly into vegetated areas along the rail bed or be carried short distances by precipitation or surface waters to more sensitive areas such as streams and wetlands through the openings on bridges and trestles. Impacts from a minor spill would be expected to be localized to the area of the spill adjacent to the rail line and would not be expected to spread across a wide area.

[5] A trip represents one-way travel; in other words, an inbound trip and an outbound trip are counted as two trips.

Vessel

Operation of the proposed action at maximum throughput would result in an average of approximately one tank vessel trip[6] per day (400[7] per year maximum) along the navigation channel compared to the 436 large commercial vessel[8] trips under the no-action alternative (Section 3.17, *Vessel Traffic*). This increased traffic and associated routine operation could result in water-quality concerns related to ballast water discharge and propeller wash and vessel wake. These impacts would be similar to, but slightly greater than, conditions under the no-action alternative. All spills of oil or hazardous materials from vessel operations are governed by RCW 90.56.370, as described for onsite operations.

Ballast Water

Vessels calling at the Terminal 1 berth would be required to discharge ballast water during the loading process. Ballast water is carried by empty vessel to provide stability during transit. As a vessel is loaded with cargo, ballast water is discharged to balance the weight of the new cargo. Ballast water discharge could contain a variety of materials that could harm aquatic plants. Primary among these contaminants are invasive marine plants and animals, bacteria, and pathogens that could displace native populations and harm aquatic life. Should an introduced species become a successful invader in a new environment, it can cause a range of ecological impacts. These include competing with native species and altering environmental conditions (e.g., increased water clarity due to mass filter-feeding), altering food web and the overall ecosystem and displacing native species, reducing native biodiversity and even causing local extinctions (Ibrahim and El-naggar 2012). These aquatic system impacts can also lead to economic and public health impacts.

As noted in Section 3.3, *Water*, the likelihood of such occurrences is considered low because vessels calling at Terminal 1 related to the proposed action are required to comply with the federal and state regulatory requirements listed in that section. However, requirements for ballast water treatment or exchange are not 100% effective. While following the ballast water requirements would reduce most of the potential for impacts on aquatic plants, the increase in the number of vessels related to the proposed action (a maximum of 200 per year) would increase the risk of introducing invasive aquatic plants and other organisms. Because the consequences of such an event would affect the native vegetation communities in Grays Harbor, additional monitoring requirements have been recommended, as described in Section 3.4.7.2, *Applicant Mitigation*.

Vessel Wakes

As noted in Section 3.1, *Earth*, operation of the proposed action could result in increased erosion within and along Grays Harbor related to increased vessel traffic. The location and extent of these impacts depends on a variety of factors, including climatic conditions, tidal conditions, vessel type, vessel location, and vessel speeds (U.S. Army Corps of Engineers 2014). However, there would be a small, incremental increase in the potential for impacts associated with wake compared with the no-action alternative, because operation of the proposed action would result in an additional tank vessel trips in the harbor.

[6] A trip represents one-way travel.
[7] Proposed vessel trips are total for the facility so are not in addition to trips attributable to the applicant under the no-action alternative (approximately 14 per year).
[8] The term *large commercial vessels* refers collectively to tank and cargo vessels.

Propeller wash and wakes that extend farther or are more intense than those already occurring in the navigation channel and turning basin have the potential to cause erosion of sediments and possibly also low-lying intertidal vegetation along the shorelines closest to the navigation channel and turning basin (e.g., salt marsh along the northern shoreline of Rennie Island). Similarly, increased intensity of wash or wakes could uproot aquatic vegetation such as eelgrass and macroalgae if present in shallow areas along the outer boundaries of the navigation channel.

The potential for wake and propeller wash impacts along the shoreline of the turning basin near the project site is limited due to the lack of intertidal and aquatic vegetation along the northern banks of the turning basin. There is a potential for such impacts on intertidal vegetation along the northern shoreline of Rennie Island from large wakes, or wakes oriented perpendicular to the navigation channel or dock.

It is anticipated that the potential for impacts could be roughly proportional to the anticipated increase in vessel traffic. However, the actual extent, location, and magnitude of any such shoreline erosion impacts is influenced by the complex interaction of multiple factors that affect when, where, and with what intensity vessel wakes or prop wash turbulence would interact with the shorelines of the turning basin and Grays Harbor. Such factors can include 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). The potential for shoreline erosion can also be influenced by the slope and physical character of the shoreline, as well as its amount and type of vegetation.

Overall, any water quality impacts caused by propeller wash and vessel wake would likely be short-term. Both Terminal 1 and the Cow Point Turning Basin are located in a portion of Grays Harbor that has a high existing baseline for turbidity (U.S. Federal Highway Administration and Washington Department of Transportation 2010:3.1–3-3). Consequently, vessel operations under the proposed action are not expected to increase turbidity levels substantially above existing conditions.

Vessel Shading

Docked large vessels can increase shading in the aquatic environment beneath and adjacent to existing berthing structures (e.g., docks, trestles). Shade can change primary productivity of aquatic plants, which can in turn affect fish behavior, predation, and migration (additional information about potential impacts on fish is presented in Section 3.5, *Animals*). As reviewed in Carrasquero (2001), light attenuation from overwater structures in freshwater environments can lead to lowered primary productivity in phytoplankton and macrophyte (e.g., eelgrass and macroalgae) producers. Reduced primary productivity, including reduced stock of algae and macrophytes, can in turn influence the epibenthic community on which fish and other aquatic organisms depend, particularly the epibenthic communities prevalent in shallow-water habitats.

The existing Terminal 1 dock generates shade in shallow-water habitat immediately adjacent to the shoreline, but the degree of shading is limited because the dock has a small footprint and is elevated over the water surface, allowing light to penetrate beneath it. Due to the dock's primarily east-west orientation, most of the shading around the dock occurs in the area between the dock and the shoreline and does not extend into the deepwater habitat of the adjacent navigation channel and turning basin.

Vessels berthed at the dock increase the shading of both shallow and deepwater habitat. The extent of this increased shading is determined by the size of the vessel and the length of time it is docked. Under the proposed action, tank vessels calling at Terminal 1 would be either tank barges or tankers

(Section 3.17, *Vessel Traffic*). The typical 550-class tank barge is approximately 512 feet in length and a maximum of 78 feet wide and is assisted by a tug that is approximately 127 feet long and a maximum of 42 feet wide, representing approximately 45,270 square feet (1.04 acres) of overwater shading of deepwater habitat.[9] With a maximum overall length of up to 950 feet and a maximum width of approximately 106 feet, Panamax class tankers would add approximately 100,700 square feet (2.31 acres) of overwater shading of deepwater habitat. The operational assumption is that a tank barge would occupy the berth for 24 hours and a tanker would occupy the berth for 48 hours (WorleyParsons 2014). At maximum throughput, a tank vessel would be docked at Terminal 1 up to 200 days per year.

As described in Section 3.4.4.3, *Grays Harbor*, eelgrass does not occur under the dock or along the adjacent shoreline. Low densities of sparsely distributed macroalgae have been found in the inner margins of the harbor on derelict pilings and boulder riprap armoring the shoreline near the project site. Neither eelgrass nor macroalgae occur in the deepwater habitat of the navigation channel. Macroalgae on derelict pilings and boulder riprap armoring the shoreline would not be affected by vessel shading because these substrates are not located beneath the dock where the vessels would be berthed.

Although some reduction in primary productivity from vessel shading is possible, the combination of tidal currents and the flow of the Chehalis River at Terminal 1 continually circulate water along the shoreline, around berthed vessels and the dock, and within the navigation channel and large body of Grays Harbor. As discussed in Section 3.5.4.1, *Project Site*, approximately 8,088 acres of deepwater habitat (areas that are maintain more than 18 feet of water at mean lower low water) are present in Grays Harbor, including the navigation channel and turning basin. Under the proposed action, the largest vessel size (Panamax) would create shade over 0.03% of the deepwater habitat in Grays Harbor. Deepwater habitats generally have lower primary production potential due to reduced penetration of sunlight with depth and increased turbidity. Therefore, the proposed action would not reduce the primary productivity of plankton or aquatic plants to any measurable extent.

3.4.6 What required permits and plans apply to plants?

The following permits conditions and required plans are expected to reduce impacts on plants.

- City of Hoquiam Conditional Land Use Permit
  - Comply with HMC 10.05.065 requiring planting 98 deciduous trees and planting 65 evergreen trees, based on the requirement to achieve 18 total caliper inches (i.e., 18 inches worth of tree trunk diameter—a measure of the size of trees at installation) of new deciduous trees and 18 feet total height of new evergreen trees (each tree being 3 feet high) for every gross acre of construction.

3.4.7 What mitigation measures would reduce impacts on plants?

This section describes the applicant mitigation that would reduce impacts on plants from construction and routine operation of the proposed action.

[9] This estimate is slightly high as the total length of the coupled tank barge is less than the collective lengths of the tank barge and tug.

3.4.7.1 Applicant Mitigation

The applicant will implement the following mitigation.

- To reduce the potential for impacts on aquatic plants from the increase in ballast water discharges during bulk liquid operations, the applicant will prepare an invasive species monitoring plan in consultation with Washington Department of Fish and Wildlife and implement prior to the start of the proposed operation.

3.4.8 Would the proposed action have unavoidable and significant adverse impacts on plants?

Compliance with the applicable regulations and permits along with implementation of the mitigation measure described above would reduce impacts on plants. There would be no unavoidable and significant adverse impacts. Potential impacts related to spills are addressed in Chapter 4, *Environmental Health and Safety*.