3.3 Water

Water resources in Washington State include surface waters, groundwater, floodplains, and wetlands. Surface waters such as rivers, wetlands, lakes, and coastal waterways provide natural beauty and sustain the health of human and natural communities. Groundwater, often stored in aquifers formed of permeable rock or loose material, provides water for human and environmental well-being. The quality of surface waters and groundwater refers to the physical, chemical, biological, and aesthetic characteristics of water, which are used to measure the ability of water to support aquatic life and human uses. Groundwater and surface-water quality can be eroded by contaminants introduced by domestic, industrial, and agricultural practices.

Wetlands form a regularly saturated transition between surface waters and uplands. These wet soils support a diversity of plants that are adapted to these conditions. Floodplains are also lowland areas adjacent to lakes, wetlands, and rivers, but they are periodically covered by water during a flood. Floodplains carry and store floodwaters, thus protecting human life and property from flood damage. Undeveloped floodplains provide many other natural and economic resource benefits. Floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. Undisturbed, they have high natural biological diversity and productivity, and support many waterfowl species and migrating birds.

This section describes water in the study area, including hydrology and water quality related to surface waters, wetlands, floodplains, and groundwater. It then describes impacts on water that could result under the no-action alternative or as a result of the construction and routine operation[1] of the proposed action. Finally, this section presents any measures identified to mitigate impacts of the proposed action and any remaining unavoidable and significant adverse impacts.

3.3.1 What is the study area for water?

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

3.3.2 What laws and regulations apply to water?

Laws and regulations for determining potential impacts on water are summarized in Table 3.3-1. 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 3.3-1. Laws and Regulations for Water

Laws and Regulations	Description
Federal	
Clean Water Act (33 U.S.C. 1251 et seq.)	Establishes the basic structure for regulating discharges of pollutants into navigable waters of the United States by regulating point pollution sources, such as stormwater discharges, and contains specific provisions related to the accidental release of oil and other hazardous substances into U.S. waters.
Oil Pollution Act of 1990 (33 U.S.C 40 et seq.)	Expands the federal government's ability to prevent and respond to oil spills and preserves state authority to establish laws governing oil spill prevention and response.
National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.)	Establishes the NFIP, a federal floodplain management program designed to reduce future flood losses through the implementation of community-enforced building and zoning ordinances.
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996 (16 U.S.C. 4711 et seq.)	Establishes regulations enforced by the U.S. Coast Guard regarding the discharge into U.S. waters of aquatic nuisance species from ship ballast water.
State	
Water Pollution Control Act (RCW 90.48)	Regulates the discharge of pollutants into waters of the state with the goal of preventing and restoring the quality and integrity of these resources.
NPDES Permit Program (WAC 173-220)	Establishes a state permit program applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state.
Water Rights—Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56)	Establishes programs to reduce risks and develop a response to oil and hazardous substance spills; provides a 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 method.
Ballast Water Management Law (RCW 77.120)	Regulates discharge of ballast water into waters of the state for vessels of 300 gross tons or more.

Laws and Regulations	Description
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.
Stormwater Management Regulations (HMC 10.05.120 and AMC 13.70)	HMC 10.05.120 requires all new industrial development to provide for the control and management of stormwater runoff. AMC 13.70 establishes minimum requirements and procedures to control the adverse impacts associated with increased storm and surface water runoff.

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

3.3.3 How were impacts on water evaluated?

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

3.3.3.1 Information Sources

Information used to complete the impact analysis included the following sources.

- Environmental permitting documents prepared for the proposed action by the applicant, the City of Hoquiam, the City of Aberdeen, and Washington State Department of Ecology (Ecology).
- U.S. Geological Survey National Hydrography Dataset for information on rivers, streams, and drainages.
- Northwest Area Committee's Grays Harbor Geographic Response Plan for information on the Grays Harbor estuary and its hydrologic characteristics.
- U.S. Fish and Wildlife Service National Wetland Inventory maps for information on potential wetlands.
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Hoquiam, Aberdeen, Ocean Shores, Westport, Cosmopolis, Montesano, Elma, Oakville, Centralia, and unincorporated portions of Grays Harbor, Thurston, and Lewis Counties for information on flood hazard areas and mapped floodplains.
- Ecology's Chehalis Basin Area Water Quality Improvement Project website for information on general water quality issues in the basin.
- Ecology's 2012 U.S. Environmental Protection Agency-approved Water Quality Assessment and Clean Water Act Section 303(d) List for information on water quality-impaired surface waters.
- Ecology's Permit and Reporting Information System for information on existing National Pollutant Discharge Elimination System (NPDES) and state-issued stormwater and industrial discharge permits.
- U.S. Geological Survey scientific investigations reports for information on regional groundwater resources.

Information obtained from these sources was augmented with information collected during a September 10, 2014, site visit and facility tour.

3.3.3.2 Impact Analysis

Potential impacts on water resources were assessed qualitatively. The analysis identifies potentially affected resources located on, adjacent to, and within 1 mile of the project site. Potentially affected resources within 0.5 mile of the PS&P rail line, portions of Grays Harbor farther than 1 mile from the project site, and in the Pacific Ocean up to 3 nautical miles from the harbor entrance are discussed more generally.

Impacts on water resources in the study area were determined by examining the information sources above. Impacts related to construction and onsite operations were determined by determining how construction would affect mapped water resources and how stormwater received at the project site would connect to water resources.

3.3.4 What water resources are in the study area?

This section describes water in the study area that could be affected by construction and routine operation of the proposed action. This section describes the general hydrologic setting of the study area and describes the location, characteristics, and quality of water resources at the project site, along the PS&P rail line, and in and along the shoreline of Grays Harbor. These water resources include surface waters, wetlands, groundwater, and floodplains. This section also provides a brief discussion of the existing stormwater system at the project site and describes how it connects to local waters.

3.3.4.1 General Hydrologic Setting

The study area is located in the Chehalis River watershed, which is composed of two Washington State Watershed Resources Inventory Areas (WRIAs): WRIA 22, lower Chehalis River and WRIA 23, upper Chehalis River. WRIAs are formalized water resource management and planning areas that represent the 62 major watersheds in Washington State. The project site, the portion of the PS&P rail line that goes to the town of Porter, and Grays Harbor are all located in WRIA 22. The remaining portions of the rail line between Porter and Centralia are in WRIA 23.

The Chehalis River is one of the primary drainage features in WRIAs 22 and 23. It terminates in Grays Harbor, which is connected to the Pacific Ocean at its western end. Tributaries to the Chehalis River include the Newaukum River, Skookumchuck River, Black River, Satsop River, Wynoochee River, and Wishkah River, as well as numerous other creeks and drainages. The headwaters of the upper Chehalis River originate in the Willapa Hills and foothills of the Cascade Range, while those of the lower Chehalis River originate in the foothills of the Olympic Range. Other tributaries that feed directly into Grays Harbor include the Hoquiam River, Humptulips River, Elk River, and Johns River. Headwaters for these drainages originate in the Willapa Hills and Olympic foothills. Much of the land in these basins consists of evergreen forests on the upper and middle slopes in active forestry use; mixed coniferous/deciduous forests on mid- to lower slopes and along the edges of river valleys; and agricultural lands in river valleys and associated lowlands. Agricultural land use is more extensive in the area of the upper Chehalis River.

Annual precipitation in the Chehalis River watershed is approximately 40 inches in the lowland valleys and over 100 inches in the Willapa Hills and Olympic foothills, with most of the precipitation occurring during the winter months when water demands are the lowest. Summers are typically dry, with little to no rainfall, so naturally low streamflows are primarily dependent on groundwater inflow. These conditions coincide with the highest water demands for human uses, including irrigation and municipal water supply, as well as the state's requirements to maintain instream flows to ensure adequate water quality and fish migration under the instream flow rule for the Chehalis River Basin (Washington Administrative Code 173-522). Consequently, there is very little water available for new uses (Washington State Department of Ecology 2012a:1–2).

3.3.4.2 Surface Waters

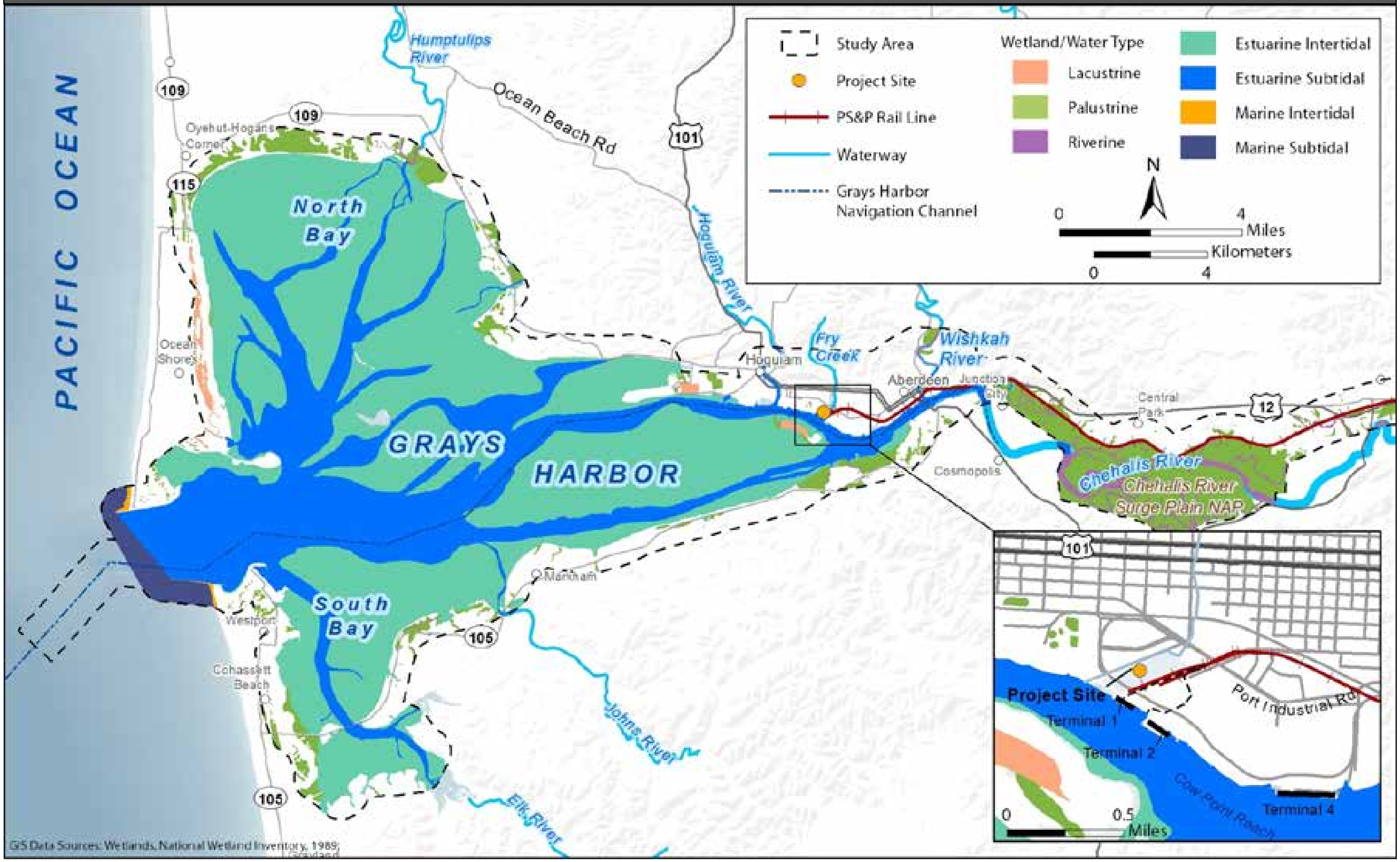
Surface waters are bodies of open water that flow and collect on the surface of the earth. They include streams, rivers, lakes, estuaries, and the ocean. For the purposes of this report, they do not include wetlands, which are generally considered transitional areas between open waters and uplands and are discussed in Section 3.3.4.3, *Wetlands*. This section describes the location, general hydrologic characteristics, and water quality of surface water in the study area.

Project Site

This section addresses surface waters located on, adjacent to, or within 1 mile of the project site.

The project site is located in a developed industrial area owned by the Port of Grays Harbor (Port) (Figure 3.3-1). It is situated at Terminal 1, a bulk liquid loading facility located in Grays Harbor adjacent to the Cow Point Reach of the Grays Harbor Navigation Channel and Fry Creek. It is also within 0.5 mile of the mouth of the Chehalis River (Figure 3.3-1).

Figure 3.3-1. Wetlands, Water Bodies, and Waterways—Project Site and Grays Harbor



Water Bodies

This section describes the location and general characteristics of the surface waters on, adjacent to, or within 1 mile of the project site including Grays Harbor Navigation Channel, Fry Creek, and the Chehalis River.

Grays Harbor Navigation Channel

The Grays Harbor Navigation Channel provides shipping access between the Pacific Ocean and Cosmopolis on the Chehalis River. It is divided into nine discrete reaches—five inner harbor and four outer harbor—based on physical characteristics and dredging requirements. The project site is adjacent to the Cow Point Reach, an inner harbor reach that extends from Terminal 1 to the mouth of the Chehalis River. It includes the Cow Point Turning Basin, which lies just upstream of the project site, off the shorelines of Port Terminals 2 and 4. To maintain navigational depths, Cow Point Reach and Cow Point Turning Basin are typically dredged annually by the U.S. Army Corps of Engineers using contractor mechanical dredges. Channel dimensions in the Cow Point Reach are maintained at a minimum depth of -36 feet mean lower low water, with a channel width varying from 350 to 550 feet. Channel dimensions in the Cow Point Turning Basin are maintained at a minimum depth of -36 feet mean lower low water, with a channel width varying between 350 to 950 feet. Annual maintenance dredging typically takes 5 to 6 months to complete and is conducted by clamshell dredge between July and February. The average annual volume of material removed is approximately 750,000 cubic yards for the Cow Point Reach and approximately 215,000 cubic yards for the Cow Point Turning Basin. Dredged material is typically characterized by sandy silt and disposed of at the South Jetty or Point Chehalis in-water disposal sites (U.S. Army Corps of Engineers 2011:1–10).

Fry Creek

Fry Creek is adjacent to the project site, along its northern boundary, between the project site and John Stevens Way (Figure 3.3-1). It consists of an excavated, trapezoidal channel that connects Fry Creek to the Chehalis River and Grays Harbor through property owned by the Port. Fry Creek is a small headwater stream that drains approximately 3.75 square miles of residential/commercial areas and forested slopes to the north of the proposed expansion site. It enters the diversion channel to the northeast of the project site via a culvert located under Port Industrial Road. The diversion channel is subject to tidal action and known to support the presence of coho salmon, winter steelhead, and fall Chinook salmon (Washington Department of Fish and Wildlife 2014).

Chehalis River Mouth

The convergence of Chehalis River and Grays Harbor is approximately 0.8 mile upstream of the project site (Figure 3.3-1). At the mouth, the Chehalis River is approximately 0.5 mile wide. The river experiences large diurnal tidal fluctuations and minor impacts from regulation of water flow of the Skookumchuck River from the Skookumchuck Dam (U.S. Geological Survey 2013). Tidal influence extends up to the Satsop River east of Montesano, Washington (Northwest Area Committee 2013:2-5).

Water Quality

According to Ecology's current Water Quality Assessment (i.e., 305(b) list), no portions of the surface waters adjacent to the project site are identified as Category 5 impaired waters (Washington State Department of Ecology 2012b). Category 5 listed waterbodies (i.e., the 303(d) list) are polluted waters where water quality standards have been violated for one or more pollutants (Washington State Department of Ecology 2006:3). Category 5-listed waters require the development and implementation of Total Maximum Daily Loads projects (TMDL).

TMDLs establish pollutant load and wasteload allocations (for nonpoint and point sources, respectively) that will reduce or eliminate pollutant loading so that a waterbody will eventually meet water quality standards for those pollutants. Category 4a listed waterbodies are those that have a TMDL. The Grays Harbor bacteria TMDL established fecal coliform bacteria wasteload allocations for urban stormwater from Aberdeen, point sources including wastewater treatment plants and pulp mills, and for nonpoint sources to meet both the applicable fresh water and marine water quality standards. High bacteria concentrations can cause human illnesses and trigger commercial shellfish harvest closures.

In their current water quality assessment, Ecology identifies a portion of the navigation channel just downstream from the project site as a Category 2 water of concern for water column bioassay. A Category 2 listing indicates that there is evidence of a water quality problem, but not enough to require the development of a TMDL (Washington State Department of Ecology 2006:3). In this location, Ecology's determination was based on a bioassay study showing that effluent from the ITT-Rayonier paper mill did not have adequate dilution in the receiving water (Grays Harbor) to meet the *no effect* level for certain aquatic organisms (Washington State Department of Ecology 2012b). Another Category 2-listed site is located upstream from the project site, near the Port's Terminal 4 facilities. This site is listed as a water of concern for copper. Neither of these listed sites is covered by a TMDL.

Ecology also identifies several portions of the navigation channel adjacent to the project site as having sediments that meet sediment quality standards (i.e., Category 1 sediments or uncontaminated sediments[3]) for such contaminants as arsenic, bis (2-ethylhexyl) phthalate, cadmium, chromium, copper, fluoranthene, lead, mercury, high-molecular weight polycyclic aromatic hydrocarbons, silver, and zinc (Washington State Department of Ecology 2012b).

PS&P Rail Line

This section describes surface waters located on, adjacent to, or within 0.5 mile of the PS&P rail line.

The PS&P rail line extends along the Chehalis River Valley, running adjacent to the river in many locations but never crossing it (Figure 3.3-2). Along this route, the rail line crosses approximately 37 named and unnamed tributaries to the Chehalis River in both WRIAs 22 and 23, including the Wishkah River, Elliot Slough, Higgins Slough, Wynoochee River, Sylvia Creek, Camp Creek, Satsop River, Sherwood Creek, Newman Creek, Vance Creek, McDonald Creek, Cloquallum Creek, Mox Chehalis Creek, Porter Creek, Gibson Creek, Cedar Creek, Harris Creek, Roundtree Creek, Black River, Scatter Creek, Prairie Creek, and Skookumchuck River. The rail line runs within 1 mile of but does not cross several other named and unnamed tributaries including Mox Chuck Slough, Gaddis Creek, Davis Creek, Coffee Creek, and China Creek. Within 1 mile beyond the project site to the west, the rail line continues, crossing both Fry Creek and the Hoquiam River.

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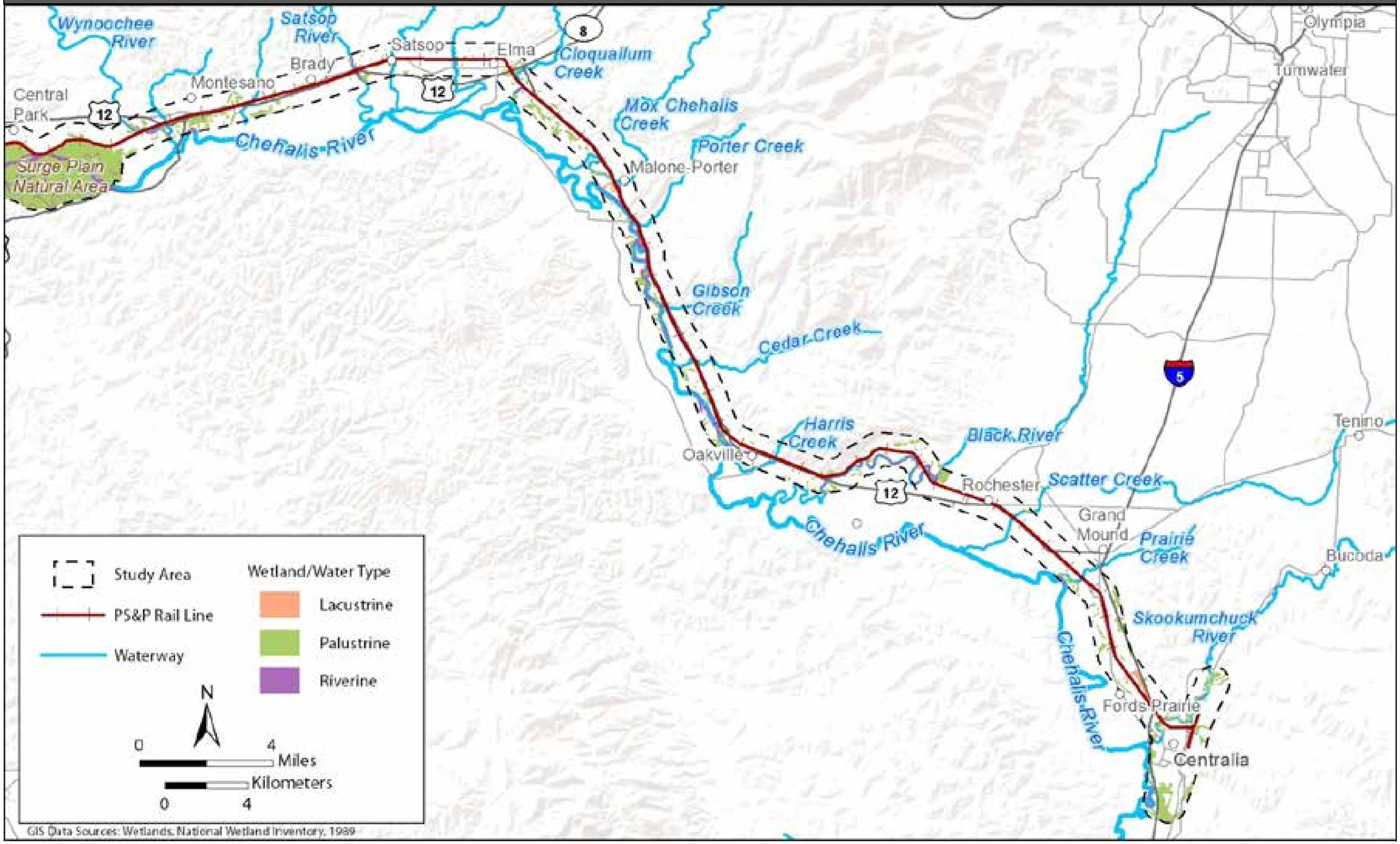
[3] Specific standards and classification categories relative to the standards are identified in WAC 173-240 for the purposes of managing sediment quality in the state. Category 1 sediments meet applicable sediment quality standards.

Figure 3.3-2. Wetlands, Water Bodies, and Waterways—PS&P Rail Line



Water Bodies

The mainstem Chehalis River and its tributaries form the Chehalis River Basin, which drains approximately 2,700 square miles (Figure 3.3-2). The basin is bounded by the Pacific Ocean to the west, the Deschutes River Basin to the east, the Olympic Mountains to the north, and the Willapa Hills and Cowlitz River Basin to the south. Elevations in the basin range from sea level at Grays Harbor to over 3,000 feet in the Willapa Hills and Olympic foothills (Chehalis River Basin Flood Authority 2010:7). Peak discharges from the Chehalis River (greater than 50,000 cubic feet per second [cfs]) occur during winter (December and January), and minimum flows (600 to 800 cfs) occur from June through September (Washington State Department of Ecology 2000a:3).

The mainstem and South Fork Chehalis drain uplands south and west of Chehalis. The Chehalis Basin includes WRIA 22 and 23. Two major tributaries in mid-basin, the Newaukum and Skookumchuck Rivers, have their headwaters in the foothills of the Cascade Range. Another mid-basin tributary, the Black River, originates in wetlands near Black Lake, in Thurston County. The largest tributaries, the Satsop and Wynoochee Rivers, arise in southern extensions of the Olympic Mountains and join the mainstem shortly before its terminus at Grays Harbor. The Humptulips, Hoquiam, and Wishkah Rivers also have their headwaters in the southern Olympic Mountains and flow into Grays Harbor. The Humptulips River flows into North Bay, the Hoquiam River into the inner estuary of Grays Harbor just downstream from the project site, and the Wishkah River into the Chehalis River near the mouth. The Johns and Elk Rivers flow into the South Bay of Grays Harbor. The terminus of all rivers is where they enter another river or Grays Harbor (saltwater influence) (Chehalis Basin Partnership 2004:III–3).

The following dams and diversion structures are on the rivers of the Chehalis River Basin.

- The Hoquiam and Wishkah Rivers have diversion structures to supply municipal and industrial water to the Hoquiam/Aberdeen area. These structures allow Hoquiam to remove 2.5 cfs from the Hoquiam River and Aberdeen to divert 10 cfs from the Wishkah River.
- The Wynoochee Dam on the Wynoochee River provides water for fish and wildlife habitat, irrigation, recreation, flood control, and municipal and industrial water supply for Aberdeen. The reservoir has a maximum retention capacity of 70,000 acre-feet.
- The Bloody Run Dam on the Skookumchuck River supplies up to 54 cfs for use in the Centralia Steam Electric plant.

Water Quality

Water quality issues in the Chehalis River and its tributaries have been recognized in studies since the early 1990s. Land use in the basin is mostly forestlands, interspersed with agricultural and residential areas. Intensive agriculture and irrigation occur in the low-lying valleys along the river and its tributaries. The most common water quality issues experienced in the basin are high water temperature, low dissolved oxygen, and fecal coliform (bacteria) exceedances of water quality standards (Washington State Department of Ecology 2014a). The major causes of these problems include degraded or inadequate riparian conditions, agricultural activities that do not incorporate best management practices (BMP) to protect water quality, failing septic systems, and urban stormwater runoff. High water temperatures and low dissolved oxygen levels negatively affect the growth and development of different life stages of salmon, including spawning, rearing, and migration. Fecal coliform contains human pathogens and high concentrations can make people sick when they are exposed to contaminated water.

According to Ecology's current U.S. Environmental Protection Agency-approved 303(d) Category 5 list, water quality impaired river segments are present in both the lower and upper Chehalis River watersheds (WRIAs 22 and 23). These include sections in the lower portion of the river that are considered impaired by mercury and polychlorinated biphenyl, and sections in the upper portion of the river that are considered impaired due to elevated levels of polychlorinated biphenyls, dioxin, and turbidity (Washington State Department of Ecology 2012b). As previously described, Category 5 impaired waters are those where water quality standards have been violated for one or more pollutants and TMDL action is required (Washington State Department of Ecology 2006:3).

Under Category 2, Ecology currently lists the lower Chehalis River as a water of concern for dioxin (specifically 2,3,7,8-tetrachlorodibenzo-para-dioxin).Sources of dioxins were addressed in the 1992 Grays Harbor Dioxin TMDL and this listing has not been reevaluated since. Portions of the upper Chehalis Watersheds are listed as a water of concern for temperature bacteria, pH, dissolved oxygen, and turbidity (Washington State Department of Ecology 2014b). These listings are addressed by the existing TMDLs.

Ecology lists multiple waterbodies in WRIA 22 and 23 on the 305(b) list under Category 4a for bacteria, temperature, and dissolved oxygen in water (Washington State Department of Ecology 2012b). Category 4a includes impaired waters that have TMDLs already in place (Washington State Department of Ecology 2006:3). The U.S. Environmental Protection Agency has approved TMDLs in Grays Harbor for dioxin and fecal coliform bacteria, and in the Upper Chehalis River Watershed for dissolved oxygen, temperature, and fecal coliform bacteria (Washington State Department of Ecology 1992, 2000b, and 2004a).

In 2004, Ecology published a detailed implementation (cleanup) plan for these pollutants in the Chehalis River/Grays Harbor watershed. The plan identified responsible entities for implementation of best management practices (BMPs) that will meet the TMDL goals (Washington State Department of Ecology 2004b). Implementation of BMPs to reduce or eliminate nonpoint sources of pollution covered by the Upper Chehalis River and Grays Harbor TMDLs is a coordinated effort between Ecology and stakeholders in the basin.

Limiting Factors to Fisheries

The mainstem Chehalis River has been severely affected by channel incision, sedimentation, and reduction in streamflow, and many of these problems are seen in its tributaries. Increased peak flows due to urbanization, disconnected floodplains and lack of channel complexity, extensive loss of riparian habitat due to agriculture and urbanization, and improperly managed upland forestry practices are believed to be causes of the changes in river geomorphology. These changes have resulted in adverse water quality conditions for fish, particularly warm water temperatures and low dissolved oxygen levels.

High stream temperature problems are related to increased erosion altering channel dimensions and loss of riparian vegetation exposing rivers and creeks to direct solar radiation. Whereas, low dissolved oxygen levels are caused by increased nutrients in runoff from agricultural and residential land uses, increased primary productivity due to lack of shade, and urban stormwater pollution. It is also likely that the reduction in wetlands has contributed to degraded water quality.

Additionally, lower baseflows and higher peak flows threaten fish habitat. Since 1953, Chehalis River flows have decreased 19% whereas annual precipitation decreased by only 6% (Washington State Conservation Commission 2001:17). Lower stream flows are the result of climate change and increased water use for irrigation, power generation, and domestic water use. Increases in groundwater withdrawals are also thought to lower summer baseflow conditions (Washington State Conservation Commission 2001:17).

Grays Harbor

This section briefly describes the location, general characteristics, and water quality of surface waters located in the portions of Grays Harbor that are greater than 1 mile away from the project site, including surface waters within 0.5 mile of the shoreline of Grays Harbor (Figure 3.3-1).

Water Bodies

Grays Harbor is a large estuary fed by a 2,600-square-mile drainage basin. The estuary was formed by sedimentation and erosion caused by the Chehalis River, which enters the east end of the harbor, and the Pacific Ocean, which connects with the harbor to the west through a 1.8-mile-wide inlet. Grays Harbor is approximately 15 miles long and 13 miles across at its widest point, narrowing to fewer than 100 yards in some places. Grays Harbor is in the Chehalis River Valley, and is continually filled in with river-borne sediments and marine deposits. Shorelines inside Grays Harbor consist primarily of marsh and sheltered tidal flats (Northwest Area Committee 2013:2-1–2-2).

Water depths throughout most of Grays Harbor are usually less than 20 feet. However, depths up to 80 feet have been measured at the mouth of the harbor. Grays Harbor has three main channels: north channel, middle channel, and south channel. The north channel contains the Grays Harbor Navigation Channel, a 27.5-mile channel that extends from the Pacific Ocean to Cosmopolis. Its nine reaches are the Entrance Channel, Point Chehalis, South, Outer Crossover Channel, Inner Crossover Channel, North Channel, Hoquiam, Cow Point, and Aberdeen Reaches. The majority of the navigation channel is 350 feet wide, increasing to 1,000 feet wide at the harbor entrance. It is currently maintained at an authorized depth of -36 feet mean lower low water up to the Terminal 1 and 2 docks and at 32 feet mean lower low water between the Terminal 4 dock and South Aberdeen (U.S. Army Corps of Engineers 2015)[4]. The middle and south channels remain shoaled by erosion and sediment deposits. Numerous shallow channels created by ebb tide flows and river discharges are present throughout the harbor (Northwest Area Committee 2013:2-2).

Net surface flow in the harbor is seaward and dominated by tidal currents, with a mean tide rise of about 9 feet (National Oceanic and Atmospheric Administration 2015:257). Tides of this height typically cover up to 94 square miles in Grays Harbor, while at mean lower low water, low tides typically cover fewer than 38 square miles, exposing large areas of mudflats, sandbars, and low islands dissected by multiple shallow channels (U.S. Army Corps of Engineers 2014:58). High flows on the Chehalis River can control currents in the upper portion of the harbor, especially during the winter when storms increase the flow in rivers and streams that feed Grays Harbor. The largest source of fresh water is from the Chehalis River. Other significant sources of fresh water from the north include the Hoquiam, Humptulips, and Wishkah Rivers and Chenois and Grass Creeks. The major contributing freshwater sources from the south are Elk River and Johns River (and tributaries), and Andrews, Barlow, Gold, O'Leary, Stafford and Chapin Creeks. Seasonal freshwater input creates a range of salinity from 5 parts per thousand during the winter to 20 parts per thousand in the summer (Northwest Area Committee 2013:2-2).

[4] The U.S. Army Corps of Engineers was recently authorized to increase the minimum depth to -38 feet MLLW in a 14.5- mile section of the navigation channel under the Grays Harbor Navigation Improvement Project.

The form and structure of Grays Harbor are largely determined by differences in the capacity of harbor inflows (flood currents) and ocean waves that transport sediment into the harbor and outflows (ebb currents) that transport sediment out of the harbor. Sediment accumulation in the seaward portion of the harbor is controlled primarily by redistribution of harbor silt by wind and waves and deposition of ocean sands by tidal action; sediment accumulations in the interior harbor are controlled by river inputs (U.S. Army Corps of Engineers 2014: 59).

Beyond the harbor to the west, the connection to the Pacific Ocean extends between two low-lying peninsulas. The ocean side of the inlet is protected by two rock jetties (north and south) that include above-water and submerged sections. As defined in 33 Code of Federal Regulations (CFR) 80.1375 (International Regulations for Preventing Collisions at Sea Demarcation Lines, Grays Harbor, WA) the regulatory transition between inland waters and the territorial sea is demarcated by a line extending between seaward extremities of the above-water portion of these jetties. The Bar Channel Reach, which is approximately 1,000 feet wide with a minimum maintained depth of 46 feet, approaches the entrance from the southwest then turns eastward into the Entrance Channel Reach of the navigation channel. Outside of the harbor entrance, open, fine-grained sandy beaches extend along the coastline for several miles to the north and south. To the west, the Pacific Ocean overlies the continental shelf extending out and beyond the 3-nautical-mile limit of state jurisdiction. Within the 3-nautical-mile zone, a relatively shallow (2 to 18 feet deep) area extends approximately 0.25 to 0.5 nautical mile seaward from the beach, with a deeper (19 to 78 feet deep) area extending from there to the 3-nautical-mile limit.

Water Quality

Water quality in Grays Harbor is affected by discharges of effluents from multiple wastewater treatment facilities and pulp and paper mills; runoff from chemical usage for pest control and wood preservation usage; and loss of estuarine habitat from diking and filling to promote urban development and shipping and railroad access in tidally affected areas. The introduction and spread of invasive exotic plants and animals have also contributed to water quality degradation in the harbor.

The industrial use of Grays Harbor shoreline and waterways has led to past water quality problems for the Chehalis River and inner harbor[5] near Hoquiam and Aberdeen. Inner Grays Harbor remains listed as a Category 4a impaired water under Clean Water Act Section 303(d) for dioxin (Washington State Department of Ecology 2012b).

A portion of outer Grays Harbor north of Westport in the mouth of the harbor is listed on the Section 303(d) list as a Category 5 impaired water for dieldrin, an organochloride insecticide (Washington State Department of Ecology 2012b). As of 2014, no TMDL had been developed for this impairment.

Both inner and outer Grays Harbor (and the lower Chehalis River) were listed as impaired under Clean Water Act Section 303(d) for fecal coliform bacteria on the 1996 and 1998 Section 303(d) lists due to inadequate controls of point or nonpoint sources in the harbor and its freshwater tributaries (Washington State Department of Ecology 2000a:1; 2002:1, 3). Identified point sources of fecal coliform bacteria included the sewage treatment plants in Hoquiam, Aberdeen, Ocean Shores, and Westport; multiple sewage lift stations and collection systems associated with these facilities; various industrial wastewater treatment plants; and two local marinas (Washington State

[5] The inner region of Grays Harbor is east of longitude 123°59’ W to longitude 123°45’45” W.

Department of Ecology 2000a:3–7). Potential nonpoint sources included onsite septic-systems, and agricultural activities. The Grays Harbor Chehalis Watershed Fecal Coliform Bacteria TMDL was approved by the U.S. Environmental Protection Agency in 2003 (Washington State Department of Ecology 2002). Wasteload allocations for permitted point sources of fecal coliform are include municipal sewage treatment plants and industrial permittees including Ocean Spray Cranberries, Grays Harbor Paper, Weyerhaeuser, Merino's Seafoods, and Washington Crab. With this TMDL in place, bacteria listings in Grays Harbor and its freshwater tributaries remain Category 4a (Washington State Department of Ecology 2012b).

Several portions of both inner and outer Grays Harbor are listed in the current water quality assessment as Category 4c due to the presence of green crab (*Carcinus maenas*), an invasive exotic species (Washington State Department of Ecology 2012b). Category 4c waters are those that are impaired by a nonpollutant such as an invasive exotic species or a type of pollution that is not appropriately addressed through the TMDL process (Washington State Department of Ecology 2006:14–15). Additional information on green crab is provided in Section 3.5, *Animals*.

Ecology currently identifies inner Grays Harbor as a water of concern (category 2) for copper and temperature and outer Grays Harbor as a water of concern for dissolved oxygen, temperature, and bacteria (Washington State Department of Ecology 2012b). Category 2 listing indicates that there is some evidence of a water quality problem, but no TMDL has been developed to address these at this time. An assessment of water quality is being developed by Ecology. Inner Grays Harbor is listed for ammonia-nitrogen under Category 1, which indicates that water quality monitoring shows that the waterbody has met standards for this pollutant.

Outer Grays Harbor[6] is listed as impaired due to fecal coliform under Category 4a. Bacteria load allocations for inner and outer Grays Harbor are contained within the same TMDL (Washington State Department of Ecology 2002). The majority of this area has been classified as approved for commercial shellfish harvest. The National Shellfish Sanitation Program (NSSP), the federal/state cooperative program recognized by the US Food and Drug Administration and implemented by the Washington Department of Health, sets fecal coliform bacteria criteria for marine waters that can determine whether a growing area remains open for harvest or not.

Limiting Factors to Fisheries

Severe water quality problems were documented in 1992 in Grays Harbor that resulted in a significant loss of coho smolt production (Washington State Conservation Commission 2001:16).

Since the 1990s, shellfish growers in outer Grays Harbor have experienced repeated temporary closures from elevated levels of fecal coliform bacteria (Washington State Department of Ecology 2014b). Much of this contamination has been attributed to permit effluent limit violations as well as to nonpoint sources of fecal coliform from onsite septic systems, agricultural operations, and stormwater runoff.

Sediment Quality and Contamination

Dioxin has been found in the sediments immediately downstream of the outfalls from the pulp mills; historical accumulations of this and other persistent bioaccumulative toxics (related to industrial

[6] The outer region of Grays Harbor is west of longitude 123 degrees 59' W.

and urban activities) could be released from sediments during dredging activities. Testing of the sediments prior to dredging indicates dioxin concentrations are below the current guidelines for Grays Harbor.

The U.S. Army Corps of Engineers conducted sediment fecal coliform tests and analyses to assess potential impacts on commercial shellfish beds from dredging/disposal operations in Grays Harbor. Findings of this study show that the Chehalis River is the primary source of sediment in Grays Harbor. Peak winter loads of sediment from the Chehalis River carry bacteria as attached particles from livestock waste and municipal sewer discharges (Washington State Department of Ecology 2000a).

3.3.4.3 Wetlands

Wetlands are transitional areas between areas of open water (e.g., streams, rivers, lakes) and uplands. For regulatory purposes under the Clean Water Act (33 U.S.C. 1251), wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Protection of Environment Definitions, 40 CFR 230.3(t)). Common examples of wetlands are swamps, marshes, and bogs. This section describes wetlands in the study area.

No wetlands are present on or within 300 feet of the project site. The closest wetlands are located on and around Rennie Island, which lies approximately 1,500 feet to the southwest across the Chehalis River channel. Rennie Island is surrounded by a band of tidally exposed mudflats, salt marsh, and tidally influenced forested and scrub-shrub wetlands (Vincent 1978:23–26). The interior of the island also contains emergent wetlands and open water areas associated with a former effluent pond from the now defunct ITT Rayonier pulp mill. Several artificially created treatment ponds are also present to the northwest of the project site, the site of the former pulp mill. Although these constructed features are mapped as wetlands by National Wetland Inventory, they are not likely to be considered waters of the United States under the Clean Water Act (33 U.S.C. 1251). According to the Protection of Environment Definitions (40 CFR 122.2), waste treatment ponds designed to meet the requirements of the Clean Water Act are not waters of the United States.

Wetlands in Grays Harbor include widespread intertidal estuarine wetlands and special aquatic sites including both low and high salt marshes, subtidal open waters, large eelgrass beds, extensive mudflats, and scattered macroalgae beds on rocky shoreline and jetty substrates. Forested, scrub-shrub, and emergent wetlands are also present around the perimeter of Grays Harbor, both along the shoreline and extending inland along contributing rivers, streams, and drainages. A few rare types of wetlands are also present, including low-elevation freshwater wetlands that support bog-like conditions and interdunal wetlands. The wetlands and special aquatic sites of the estuary provide many important functions, including floodwater retention, sediment and pollutant filtration and removal, shoreline erosion control, groundwater recharge, carbon sequestration, and fish and wildlife habitat provision.

The Chehalis River surge plain consists of a 3,018-acre area that extends upstream along the river from the eastern side of Aberdeen to the river's confluence with the Wynoochee River. In this area, heavier saltwater from incoming high tides forms a wedge under the fresh river water, lifting it up and forcing it to surge out over low-lying floodplain areas. This hydrologic regime forms a unique type of wetland system known as a freshwater tidal surge plain, which is characterized by tidal sloughs, intermittently flooded areas, and regularly flooded areas. This diversity of hydrologic regimes supports a variety of forested, scrub-shrub, and emergent wetlands including the largest Sitka spruce-dominated coastal surge plain wetland in Washington State (Washington State Department of Natural Resources 2009:3). Because of its large size, flat topography, and minimal development, the surge plain provides important ecosystem services to the surrounding communities by slowing and storing floodwaters and filtering sediments as they move downstream toward the Grays Harbor estuary. It also provides extensive wildlife habitat for a variety of amphibians, reptiles, various small and large mammals, and a variety of birds, including bald eagle and other special status species. The surge plain also provides important habitat for anadromous fish and critical spawning habitat for resident fish. Approximately 2,345 acres of this area are managed and protected by the Washington State Department of Natural Resources as part of the Chehalis River Surge Plain Natural Area Preserve. The PS&P rail line runs just outside the northern edge of the surge plain and Natural Area Preserve for 5.5 miles.

Multiple wetlands of varying types are also present along the segment of the PS&P rail line that extends between the upstream end of the Chehalis River surge plain and Centralia. Such areas occur in association with the rivers, streams, and former channels crossed by the rail line, and in adjacent riparian and agricultural areas. Wetland types include freshwater forested, scrub-shrub, and emergent wetlands, as well as open-water areas that support aquatic vegetation. Hydrology for these areas is typically provided by overbank flooding, overland flow, groundwater seepage, or direct precipitation.

3.3.4.4 Floodplains

Floodplains are lowlands adjacent to rivers and streams that are subject to flooding from instream flows that overtop the channel banks. This section describes floodplains in the study area.

The project site does not lie within a designated Special Flood Hazard Area or a 100-year floodplain (e.g., Zone A or V) per the FEMA mapping currently in effect for this area (Appendix E, *FEMA Flood Insurance Rate Maps*). It is mapped as an *area of minimal flooding* (Zone C) on the original and revised Flood Insurance Rate Maps for Hoquiam and Aberdeen, Washington (Federal Emergency Management Agency 1979, 1984, 2006a, 2006b). Areas of minimal flooding are defined by FEMA as being outside the Special Flood Hazard Area and higher than the elevation of the 0.2% annual chance (i.e., 500-year) flood (Federal Emergency Management Agency 2011:29). The portion of Chehalis River bordering the project site is mapped as *areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined* (Zone V2), which is considered a Special Flood Hazard Area (Federal Emergency Management Agency 1979, 1984, 2006a, 2006b). Many of the urban areas north and east of the project site are also within the 100-year floodplain Special Flood Hazard Area (Zone A), including the PS&P rail line from the west end of the Hoquiam River rail bridge to the US 12 crossing of Wilson Creek. The Poynor Yard in Aberdeen and the rail bridge over the Wishkah River also lie within this zone.

Since 2012, FEMA has been working with a contractor, Strategic Alliance for Risk Reduction, Washington State Department of Natural Resources, and other state and local agencies to complete a multihazard risk assessment for Grays Harbor County under its Risk Mapping, Assessment, and Planning program. The purpose of this study is to identify potential building losses due to floods, earthquakes, tsunamis, and landslides so that local communities can better plan their development policies and enhance their natural disaster mitigation plans. As part of this study, the Flood Insurance Rate Maps for coastal communities in the county, including those for the project site, have been updated and reissued as preliminary maps pending public review and final approval by FEMA. The October 25, 2013 preliminary Flood Insurance Rate Map issued by FEMA shows the entire project site as being in Zone X, which is defined as *areas determined to be outside the 0.2% annual chance flood* (Federal Emergency Management Agency 2013). The portion of Grays Harbor that borders the project site is mapped as Zone AE (EL 13). This zone is defined by FEMA as a Special Flood Hazard Area subject to inundation by the 1% annual chance flood, where the base flood elevation has been determined at 13 feet National Geodetic Vertical Datum of 1988.

Outside of the project site, most of the surrounding shoreline of Grays Harbor is within the 100-year floodplain (Zones A and V on the effective maps and Zones AE and VE on the preliminary maps), which also extends up several of the contributing rivers and streams. The PS&P rail line crosses several mapped flood hazard areas between its origin in Centralia, Washington and terminus at the project site. These include the 100-year floodplains (Zone A) of Skookumchuck River, Scatter Creek, Black River, Roundtree Creek, Harris Creek, Cedar Creek, Gibson Creek, Porter Creek, Mox Chehalis Creek, Delezene Creek, Newman Creek, Satsop River, Sylvia Creek, Wynoochee River, Higgins Slough, Elliot Slough, Wishkah River, and Chehalis River (Washington State Department of Ecology 2014c). The rail line also crosses the 100 to 500-year floodplains (Zone B) of Dry Bed Creek and Vance Creek.

3.3.4.5 Groundwater

Groundwater is the water that flows and collects beneath the Earth's surface in the cracks and spaces in soil, sand, and rock. The geologic features that store and transmit groundwater are known as aquifers. Groundwater interfaces with surface waters via springs and as baseflow in streams and rivers. This section describes groundwater resources in the study area.

Project Site

As described in Section 3.1.4.1 of *Earth*, the project site is located on top of a former marine slip (Port of Grays Harbor Slip 1) that was filled with hydraulically placed dredged material from the Chehalis River between 1983 and 1994. This fill was subsequently capped with fill excavated during the widening of US Route 12 (US 12) at the east end of Aberdeen (GeoEngineers 2006:11). Geotechnical investigations conducted by GeoEngineers in 2006 determined that fill composition primarily includes interbedded silts and sands to an approximate depth of 74 feet. Groundwater borings performed at the project site in 2006 encountered groundwater at depths of approximately 10 feet below ground surface (GeoEngineers 2006:4). In 2011, the Port placed additional fill on the northern portion of the project site, along Fry Creek. Following fill placement in this area, groundwater was encountered at 1 to 7 feet below ground surface during a 2012 Phase II environmental site assessment (GeoEngineers 2012:7). Groundwater depth likely fluctuates with tide stage. Although general movement underneath the project site is not explicitly known, the inferred direction of groundwater flow is southerly towards the harbor and likely discharges into the Chehalis River.

According to federal and state database searches, no drinking water wells are located on or within 1 mile of the project site. Groundwater quality is generally impaired due to lube oil-range petroleum products. Other contaminants may be present but not at levels that require cleanup. Fry Creek, which is located to the northwest of the project site, likely acts as a barrier to groundwater migration to the north and west. However, contaminated groundwater does likely discharge via the Chehalis River towards the Harbor (GeoEngineers 2012:4).

PS&P Rail Line

The majority of the PS&P rail line between Centralia and Grays Harbor runs through the Chehalis River Valley, which is underlain by glacial drift and alluvial (water deposited) sediments from the Chehalis River and its tributaries. Many of these sediments support surficial aquifers[7] within thick glacial and alluvial deposits (Washington State Department of Ecology 1998:9). The two principal alluvial aquifers present in the Chehalis River Valley are informally known as the East Chehalis Surficial Aquifer and the West Chehalis Surficial Aquifer. Both consist of laterally extensive deposits of interbedded clay, silt, sand, and gravel laid down in former floodplains, alluvial fans, and low river terraces (Washington State Department of Ecology 1998:1). Groundwater flow within these aquifers generally spreads from upland recharge areas along their perimeter toward natural discharge points along streams and tributaries, as well as moving downward to recharge regional aquifers (Washington State Department of Ecology 1998:v).

The East Chehalis Surficial Aquifer extends upstream from the Scatter Creek confluence with the mainstem Chehalis River south of Rochester to the confluence of the South Fork Chehalis River beyond Centralia. Depth to groundwater in this aquifer varies from 10 to 30 feet below ground surface, with the aquifer thickness being around 90 feet near Fords Prairie (Washington State Department of Ecology 1998:14).

The West Chehalis Surficial Aquifer extends from the river mouth at Grays Harbor to the Scatter Creek confluence with the mainstem of the Chehalis River. Groundwater throughout this aquifer is directly coupled to the Chehalis River. Between Aberdeen and Elma, the aquifer consists of two zones: an upper zone that extends to approximately 100 feet below ground surface, and a lower, more permeable zone located between 100 to 200 feet below ground surface (Washington State Department of Ecology 1998:15). The lower layer is the principal aquifer in the area due to its better water quality and yield. In general, the water table is less than 20 feet below ground surface throughout most of this reach.

From Elma upstream to Oakville, the West Chehalis Surficial Aquifer is limited to one shallow zone composed of highly permeable course-grained alluvium and reworked glacial drift (Washington State Department of Ecology 1998:15). Water table depths are typically less than 20 feet below ground surface and fluctuate closely with the water level in the Chehalis River. Percolation of water to the water table is rapid and horizontal hydraulic conductivity is high, supporting highly productive wells. Deposits in the former floodplain (terraces) of the Chehalis River in this reach also yield significant amounts of groundwater, although they are not as thick as the adjacent alluvium (Washington State Department of Ecology 1998:15).

These aquifers provide a local water source for farms, private residences, and public water systems. Along the PS&P rail line, several wells within 0.25 mile of the rail line provide domestic and municipal drinking water, as well as water for irrigation and industrial uses (Washington State Department of Ecology 2014b). Because of the shallow water table and hydraulic connection to the Chehalis River and other waterbodies, these aquifers are susceptible to groundwater contamination due to several hydrogeological factors including the depth to groundwater, highly conductive soils, presence or absence of near-surface clay layers, and the nature and rate of contaminant loading

[7] Surficial aquifers are defined as the uppermost saturated zone, typically an unconfined aquifer, or mapable extreme (Washington State Department of Ecology 1998:v). Surficial aquifers in the Chehalis River watershed typically lie only a few feet below land surface and extend to a depth no more than 100 feet.

(Washington State Department of Ecology 1998:16). Thurston County has designated much of the Black River and Scatter Creek subwatersheds as a Critical Aquifer Recharge Area under its Critical Areas Ordinance (Thurston County Washington 2010). While Grays Harbor County and Lewis County have not designated any such recharge areas in their jurisdictions, similar hydrogeological conditions exist along the Chehalis River in those counties.

3.3.4.6 Stormwater

Stormwater is water that falls on the Earth's surface during precipitation events (e.g., rainfall, snow, and ice melt). It includes the portion of this water that infiltrates into the ground and that which accumulates on or flows over the ground surface on its way to a receiving water (stormwater runoff).

Stormwater that falls on the paved surfaces (approximately 9.5 acres covered with impervious asphalt and concrete) of the project site is handled in the following ways.

- Stormwater that falls on the vegetable oil feedstock and biodiesel storage tank containment areas, the containment area underlying the rail spur used for loading and unloading glycerin byproduct and sodium methylate, and the truck loading and unloading areas collects in sumps, where it is visually inspected before being manually released to the Port's stormwater conveyance system. Once released, this water flows to an oil/water separator before being discharged to Grays Harbor via the Port outfall located next to the Terminal 1 dock (Chapter 2, *Proposed Action and Alternatives*, Figure 2-2). If water in the sumps is contaminated, it can be treated in place or, if necessary, pumped out by a certified wastewater hauler and taken to an appropriate treatment facility.
- Stormwater that falls within the methanol/sodium methylate storage tank containment area and the biodiesel production area is collected and sent to the City of Aberdeen's publicly owned treatment works along with other production water (e.g., cooling tower blowdown, steam reboiler blowdown).
- Stormwater that falls on developed areas of the project site outside of the tank containment areas flows into catch basins that drain into the Port's stormwater conveyance system. This flow is conveyed into the oil/water separator before being discharged to Grays Harbor via the Port outfall next to the Terminal 1 dock.

Stormwater that falls on the remaining 13.4 acres of the project site that are unpaved and mostly vegetated typically infiltrates into the ground. Any surface runoff is directed into two temporary sedimentation ponds that were constructed in 2011, following the placement of fill material at the project site. These ponds are equipped with overflow structures that discharge to Grays Harbor. According to the Port, neither of these overflows has been used because the ponds have never filled to the level of the outfall riser before being discharged to Grays Harbor via the Port outfall near the northwest corner of the project site (Chapter 2, *Proposed Action and Alternatives*, Figure 2-2).

Stormwater from the project site that is discharged to Grays Harbor through the two Port outfalls is covered under the applicant's current NPDES Industrial Stormwater General Permit (Permit No. WAR006655). Under this permit, the applicant must monitor stormwater discharges for turbidity, pH, oil sheen, total copper, and total zinc. In addition, as a biodiesel production facility with a Standard Industrial Classification of 2869, the applicant must also monitor for certain parameters specific to the Chemicals and Allied Products industrial group. These include 5-day biochemical oxygen demand, nitrogen (nitrate and nitrite), and total phosphorus.

Stormwater discharged to the Aberdeen treatment works is covered under the applicant's individual Washington State Waste Discharge Permit (Permit ST0006214). Under this permit, the applicant is required to monitor for the following parameters: flow, 5-day biochemical oxygen demand, total suspended solids, oil and grease, pH, temperature, sulfate, lead, and magnesium. Effluent limits are assigned to flow (35,000 gallons per day), pH (6.0 to 9.0 Standard Units), 5-day biochemical oxygen demand (300 milligrams per liter) total suspended solids (350 milligrams per liter), oil and grease (300 milligrams per liter), and temperature (65° Celsius).

3.3.5 What are the potential impacts on water?

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

3.3.5.1 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*, and some potential for 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.

3.3.5.2 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

As described in Chapter 2, *Proposed Action and Alternatives*, construction of the proposed action would be limited to the project site, with no construction activities occurring in Grays Harbor, Fry Creek, or along the existing PS&P rail line. Although onsite construction would occur within 200 feet of the shorelines of Grays Harbor and the Fry Creek, no dredge or fill operations or other inwater construction work would be required in these waters or any other surface waters, wetlands, or floodplains. Consequently, construction of the proposed action is not expected to result in any permanent impacts on water resources in the study area. Temporary impacts on water resources could occur from construction activities that involve soil disturbance, equipment and material use, and storage tank hydrostatic testing. Construction would not affect wetlands because wetlands are not present on or within 300 feet of the project site.

Soil Disturbance

Construction of the proposed action would include ground-disturbing activities that would require exposure of soils and soil stockpiling. Rainfall on these areas could transfer sediments into adjacent waterways via stormwater runoff. Such flows could enter Grays Harbor or the Fry Creek by flowing from the project site over the shoreline or through the Port's stormwater conveyance system. The potential for erosion during most cut and fill activities is considered to be relatively low because the construction site is level; however, placement of stockpiles in proximity to storm drain inlets or the shoreline could increase the potential for sediment-laden runoff to enter adjacent waterbodies. Such discharges could temporarily increase the total suspended solids in these waters, increasing turbidity and potentially affecting surface water quality through interference with photosynthesis, oxygen exchange, and the respiration, growth, and reproduction of aquatic species. Other pollutants, such as nutrients, trace metals, and hydrocarbons, could adsorb to sediment and be transported to other locations within Grays Harbor, potentially degrading water quality in these areas.

Construction projects in Washington that engage in clearing, grading, and excavating activities that disturb one or more acres and discharge stormwater to surface waters of the state are required to obtain and comply with an NPDES Construction Stormwater General Permit from Ecology (NPDES Permit Program, Washington Administrative Code [WAC] 173-220]).

The NPDES permit will require the preparation of a temporary erosion and sedimentation control plan, a stormwater pollution prevention plan for construction, and BMPs to control the risk of erosion. These actions would reduce sedimentation of waterways and loss of topsoil. As a performance standard, the BMPs would represent the best available technology that is economically achievable and the best conventional pollutant control technology to reduce pollutants. Commonly practiced BMPs may consist of a variety of measures taken to reduce pollutants in stormwater and other nonpoint-source runoff consistent Ecology directives (Washington State Department of Ecology 2012c).

The Cities of Hoquiam and Aberdeen also require critical areas (Critical Areas Ordinance Hoquiam Municipal Code [HMC] 11.06 and Aberdeen Municipal Code [AMC] 14.100) and local land use development permits prior to construction. Implementing the plans and BMPs required by these permits would reduce the potential for impacts resulting from soil disturbance.

Equipment and Material Use

The delivery, handling, and storage of construction materials and wastes, as well as the use of heavy construction equipment during construction could provide potential sources for stormwater contamination. Use and maintenance of heavy equipment could result in leaks or accidental spills of vehicle fluids on exposed parts of the equipment or onto the ground, where it could enter the groundwater aquifer via infiltration or nearby surface waterbodies through surface runoff. Constituents in vehicle fluids such as fuel, oil, hydraulic fluid, and grease could be acutely toxic to aquatic organisms and could bioaccumulate in the environment. Chemicals used during construction including paints, solvents, and cleaning agents could also enter surface water and groundwater through infiltration and stormwater runoff if such substances are spilled or exposed to precipitation. These substances can also be toxic to aquatic organisms and can degrade water quality.

Waste materials such as metals, welding wastes (e.g., scrap electrodes, slag, flux), and uncured concrete can pollute water resources. Waste metals and welding wastes contain heavy metals and other chemicals and uncured concrete has a high pH, all of which can be harmful to water quality and aquatic organisms (Washington State Department of Ecology 2012c).

As discussed above, the applicant would be required to develop and implement a site-specific stormwater pollution prevention plan for construction that includes BMPs for material handling and construction waste management would reduce the potential for water resource impacts from these sources.

Hydrostatic Testing

As part of construction, all new storage tanks would need to undergo hydrostatic testing. The hydrostatic testing process involves completely filling each tank with water and allowing it to sit for a period to check for leaks or defects in the tank structure. Upon completion of the test, this water is typically discharged to a nearby surface water body, released to a stormwater/sanitary sewer system, allowed to infiltrate into ground, or hauled off to a licensed disposal facility. If discharged to a surface water or onto the ground, impacts could include the transport of residual chemicals and other materials from tank construction, as well as any additives added to the water for testing (e.g., dyes, biocides), into surface waters or groundwater, potentially affecting their water quality. Depending on the discharge method and rate, the discharge of several million gallons of hydrostatic testing water could also cause erosion and increase turbidity in the receiving waters. Potential impacts on water quality by the introduction of contaminants and increased turbidity would be similar to those previously discussed.

The applicant would use industrial water from the City of Aberdeen's water supply system for hydrostatic testing of the new storage tanks. 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. As a result, the volume of water used will be limited to the capacity of the largest tank, which in this case is 80,000 barrels (3.4 million gallons). Once testing of all tanks has been completed, the hydrotest water would be tested 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 will be treated appropriately (e.g., filtering, pH adjustment) on site prior to discharge or shipped for offsite disposal if it cannot be handled on site. If no contamination issues are found, the dyed hydrotest water would be discharged to the harbor through the Port's 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 the river. Because these activities would occur during the construction period, they would be covered under the facility's NPDES Construction Stormwater General Permit and would be subject to the terms and conditions of that permit, including any applicable BMPs.

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

Routine operation at the project site could affect Grays Harbor as the result of leaks or spills of various petrochemicals and other fluids used for facility operations and maintenance. For example, diesel fuel, oil, hydraulic fluid, or antifreeze would be used to operate and maintain vehicles and equipment. Additionally, operation of the bulk liquid transfer operations could result in leaks or spills of bulk liquids (e.g., crude oil) as the result of equipment failure or human error during unloading or loading activities. Other potential stormwater contaminants include vehicle residues (e.g., tire and brake dust) that accumulate in parking lots and material handling areas; airborne particulates from vehicle and vessel exhaust and facility emissions that are deposited on pavement and other impervious surfaces of the facility; and residues of herbicides from areas where vegetation management (e.g., weed control in tank containment area) occurs. Oil spills, the potential impacts and risks, preventative measures and mitigation are described in Chapter 4, *Environmental Health and Safety.*

These chemicals could enter adjacent surface waters by transport in stormwater runoff. The potential for such substances to directly enter surface waters would be limited to equipment used on the Terminal 1 dock (e.g., loading arms) and its associated access ramp. Stormwater flowing across the facility during and after precipitation events could pick up contaminants from a variety of sources and carry these pollutants into Grays Harbor via the Port's stormwater conveyance system. The introduction of such substances to surface waters could degrade water quality and adversely affect both aquatic vegetation and aquatic life near the facility or transport these substances to other portions of Grays Harbor. The potential for these impacts to occur would be similar to but slightly greater than under the no-action alternative because of the increased impervious surface area and increased activity associated with the bulk liquid transfer facilities (e.g., crude oil unloading and loading). Any spills of oil or hazardous materials to water require notification and response as described in Chapter 4, *Environmental Health and Safety.* All oil or hazardous material spills must be reported by the spiller, who must respond appropriately. Under Washington Water Rights—Oil and Hazardous Substance Spill Prevention and Response 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.

Although spills or leaks could occur as the result of human error or minor equipment failure, the potential for these accidents to occur would be reduced by appropriate training and the implementation of prevention and control measures. This includes processes and procedures as described in the federally and state approved site-specific spill prevention, control, and countermeasures plan, facility response plan, and the oil spill prevention plan (which may be consolidated into an integrated contingency plan), which are discussed in greater detail in Chapter 4, *Environmental Health and Safety*. Specifically, prior to the commencement of bulk liquid loading operations at the facility, 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 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 accidental spills or leaks to reduce the conveyance of chemicals to waterways. Further, all stormwater discharges from the project site will be subject to the terms and conditions of a facility-specific NPDES Industrial Stormwater Discharge Permit. This permit will include requirements for the development, implementation, and maintenance of a stormwater pollution prevention plan, which will include BMPs to protect water quality; routine maintenance, inspection, and monitoring practices; and benchmarks for the pollutants in the facility's stormwater discharge.

The primary method of reducing stormwater runoff contamination on the facility will be the stormwater conveyance system. As with the applicant's current stormwater system, all precipitation that falls within the tank and rail containment areas will be routed to collection sumps where it will be visually inspected prior to being released to the Port's stormwater system. If contamination is found, the stormwater will either be treated in place or pumped out by a certified wastewater hauler and taken to an appropriate treatment facility. All stormwater that leaves the facility via the Port's stormwater system, including runoff from all parking lots and other impervious surfaces, will also pass through an oil/water separator before being discharged to Grays Harbor, further reducing the potential of the release of contaminated stormwater. An oil/water separator is designed to separate oil from stormwater for normal operations and in the case of a spill, can contain small spills by isolating the spill run-off from the stormwater system. With these structures and the implementation of the stormwater BMPs to be required per the facility's NPDES permit contaminated stormwater would have a low impact on water resources.

Requirements for facility spill prevention and response is described in Chapter 4, *Environmental Health and Safety*. The potential for increased risks during onsite, rail, and vessel operations (e.g., storage tank failure, train derailment, or vessel collision) and the related environmental consequences (e.g., release of crude oil or other proposed bulk liquids) and any additional mitigation are also addressed in Chapter 4.

Rail

Operation of the proposed action at maximum throughput would add approximately two unit train trips per day on average (730 per year maximum)[8] compared to an average of three rail trips per day (1,235 per year) under the no-action alternative (Section 3.15, *Rail Traffic*). This increased rail traffic could affect water quality of surface waters and groundwater along the PS&P rail line as the result of 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 maintenance, which would be slightly higher compared to the no-action alternative. Diesel fuel, oils, grease, and other fluids required for the operation and maintenance of railroad engines and rail cars could leak directly into surface waters and wetlands through the openings on bridges and trestles. Fuels could also be deposited onto the rail bed where they could be exposed to precipitation and storm flows that could carry them into adjacent surface waters and wetlands. Such discharges could degrade water quality and adversely affect aquatic vegetation, aquatic animals, birds, and wildlife in these and other downstream waterways. Sensitive areas that could be affected by such releases include the Chehalis River Surge Plain and the designated Critical Aquifer Recharge Area in the Black River and Scatter Creek subwatersheds in Thurston County. Most of these releases would be limited to minor drips and leaks whose potential can be reduced by regularly inspecting and maintaining railroad engines and rail cars and by implementing standard good housekeeping BMPs.

Vessel

Operation of the proposed action at maximum throughput would result in an average of approximately one tank vessel trip[9] per day (a maximum of 400 per year[10]) along the navigation

[9] A trip represents one-way travel.

[10] 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).

channel compared to the 436 large commercial vessel[11] trips under the no-action alternative (Section 3.17, *Vessel Traffic*). This increased traffic and associated routine operation could result in water quality impacts related to ballast water discharge, propeller wash, and vessel wake. These impacts would be similar to but slightly greater compared with the no-action alternative. All spills of oil or hazardous materials from vessel operations are governed by Water Rights—Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56.370), as described for onsite and rail operations.

Ballast Water

As described in Chapter 2, *Proposed Action and Alternatives*, tank vessels calling at the project site would likely discharge ballast water during the loading process. Ballast water discharge could contain a variety of materials that could harm surface waters. Primary among these contaminants are invasive marine plants and animals, bacteria, and pathogens that could displace native populations and harm aquatic life (Sections 3.4, *Plants*, and 3.5, *Animals*). This contaminated water could be discharged into Grays Harbor during loading where it could degrade water quality and harm aquatic organisms.

Under federal regulations (*Nuisance Prevention and Control Act of 1990*, as amended by the *National Invasive Species Act of 1996* 16 U.S.C. 4711 et seq.), crude oil tankers engaged in coastwise trade would be exempt from requirements to install and operate U.S. Coast Guard approved ballast water management systems and are not required to conduct mid-oceanic exchanges of ballast water. However, the Washington Department of Fish and Wildlife is responsible for implementing ballast water regulations under Revised Code of Washington (RCW) 77.120, Ballast Water Management Law. According to RCW 77.120.030, discharge of ballast water into waters of the state is not allowed unless there has been an open sea exchange, or if the vessel has treated its ballast water to meet state and federal standards. Vessels voyaging to Washington State from a port in Puget Sound or the Columbia River do not have to conduct an open sea exchange if the ballast water is from these waters. Under the proposed action, all tanks vessels, including tank barges, must file a ballast water reporting form to Washington Department of Fish and Wildlife 24 hours before entering Washington State waters.

A review of the ballast water delivery and management data compiled by the National Ballast Information Clearinghouse indicates that of the 66 tank vessels that operated in Grays Harbor during the past 7 years, all of those that discharged ballast water in the harbor had previously performed an open-sea exchange prior to entering the harbor (National Ballast Information Clearinghouse 2014). However, a number of studies has shown that mid-ocean ballast water exchanges are only partially effective (Verling et al. 2005; Minton et al. 2005; Ruiz and Smith 2005; Cordell et al. 2015). 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 plans and other organisms. Potential impacts on plants and animals are addressed in Section 3.4, *Plants*, and 3.5, *Animals*.

Propeller Wash and Vessel Wake

As noted in Section 3.1, *Earth*, operation of the proposed action could increase the potential for erosion within and along the harbor related to increased vessel traffic. The location and extent of

[11] The term *large commercial vessels* refers collectively to tank and cargo vessels.

these impacts would depend on a variety of factors, including climatic conditions, tidal conditions, vessel type, vessel location, and vessel speeds. There would be an 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 additional tank vessel trips in the harbor.

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 (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.

3.3.6 What required permits and plans apply to water?

The following permit conditions and required plans are expected to reduce impacts on water.

- City of Hoquiam and City of Aberdeen Critical Areas Review for fish and wildlife habitat and geologically hazardous areas
  - Critical area review report
  - Buffer establishment and protection requirements
  - Buffer mitigation and monitoring requirements
  - Buffer activity limits and restrictions
- City of Hoquiam and City of Aberdeen Shoreline Substantial Development Permits
- City of Hoquiam Conditional Land Use Permit
- City of Hoquiam and City of Aberdeen Building Permits
- City of Hoquiam and City of Aberdeen Grade and Fill Permits
- Washington State Department of Ecology National Pollutant Discharge Elimination System Construction Stormwater General Permit
  - Discharge/effluent limit requirements
  - Monitoring, sampling and reporting requirements
  - Onsite spill control material provision requirements
  - Stormwater pollution prevention plan preparation requirement
  - Stormwater BMP development and implementation
- Washington State Department of Ecology National Pollutant Discharge Elimination System Industrial Stormwater Permit
  - Discharge/effluent limit requirements
  - Monitoring, sampling, and reporting requirements
  - Operations and maintenance plan
  - Stormwater pollution prevention plan
  - Onsite spill control material provision requirements

- Spill Prevention Control and Countermeasures Plan preparation requirement
- Industrial discharge BMP development and implementation
- Integrated Contingency Plan to satisfy federal and state oil spill prevention and contingency planning and facility operations requirements
  - Evaluation of onsite safety and health hazards
  - Pre-emergency planning and coordination with outside organizations
  - Roles and responsibilities in an emergency
  - Evacuation routes and emergency alert and response protocols
  - Oil and hazardous material transfer operation protocols
  - Containment and countermeasures to prevent oil spills from entering navigable waterways
  - Notification procedures
  - Spill mitigation procedures
  - Facility response activities
  - Training and exercise procedures
  - Equipment descriptions: emergency shutdown system, containment, fire fighting

3.3.7 What mitigation measures would reduce impacts on water?

This section describes voluntary measures, design features, and applicant mitigation that would reduce impacts on water from construction and routine operation of the proposed action.

3.3.7.1 Voluntary Measures and Design Features

The proposed action does not include any voluntary measures or design features that would reduce potential impacts on water.

3.3.7.2 Applicant Mitigation

With implementation of the permit conditions and required plans described above, impacts resulting from the proposed action are considered low and would not necessitate mitigation.

3.3.8 Would the proposed action have unavoidable and significant adverse impacts on water?

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