CHAPTER 3

AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.0 INTRODUCTION

This introductory chapter and subchapters describe the existing conditions (affected environments) for 17 resources that would be potentially impacted by implementation of the proposed project. Analyses describe the potential environmental impacts associated with construction and operation of the proposed facility, the proposed wetland mitigation, and the transport of crude oil from the mid-continent area to the Shell Puget Sound Refinery (PSR) by unit trains.

OVERVIEW OF APPROACH

This chapter describes *direct, indirect, and cumulative impacts* associated with the proposed project. Impacts can be short term (temporary) or long term (permanent). A short-term impact may occur during construction, such as temporary barriers or fencing put in place for safety reasons, or the staging of materials and equipment. Long-term impacts can result when design features—the creation of new stormwater facilities, for example—result in permanent changes within the project vicinity. For this EIS, each environmental resource was analyzed to determine the potential impacts associated with the no action alternative and the proposed project. The analyses of each environmental resource include the following:

- A description of the study area and the methodology used to analyze potential impacts.
- A description of the affected environment.
- A discussion of the potential environmental impacts.
- A list of measures that could be implemented to avoid, minimize, or mitigate potential impacts.

Skagit County (County) and the Washington State Department of Ecology (Ecology), co-lead agencies, hired a third-party consultant team to conduct an independent review of information relating to the proposed project, and to prepare this environmental impact statement (EIS). Chapter 7 – List of Preparers, names the individuals who contributed to the preparation of the EIS. Generally, readily

Direct impacts are caused by an action and occur at the same time and place as the action. Direct impacts can take place through direct interaction of an activity (e.g., construction or operation of the project) with an environmental resource.

Indirect impacts are similar to direct impacts in that they are caused by the same action, but may occur later in time or be farther in distance from the activity causing the impact. A direct impact to one resource may result in an indirect impact to another (e.g., a direct impact to wildlife habitat could cause an indirect impact to recreational hunting opportunities).

Cumulative impacts are incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions (e.g., numerous small changes in land use could collectively lead to degradation of a watershed).

available information from local, state, and federal jurisdictions and agencies, as well as materials provided by Shell, were reviewed to describe the affected environments and analyze potential impacts for each environmental resource (see Environmental Resources Considered, below).

Shell provided technical reports, responses to data requests, and preliminary engineering plans and data, along with other materials and analyses to provide sufficient information to evaluate the potential impacts of the proposed project. The following documents were provided by Shell for review and analysis in this EIS:

- Clean Water Act (Section 404B1) Alternatives Analysis (AECOM 2015a; Appendix A).
- Biological Evaluation and Essential Fish Habitat Analysis (AECOM 2016a).
- Draft Mitigation Plan (AECOM 2016b).
- Technical Memorandum for Groundwater Hydrology Monitoring (AECOM 2015b).
- Summary of Environmental Features (Anvil 2015).
- Shell PSR Hydrogeologic and Groundwater Quality Data and Reports (Landau Associates 1988; Landau Associates 1989; URS 2014a; URS 2014b).
- State Environmental Policy Act (SEPA) Analysis Checklist (URS 2013a).
- Wetland Delineation Report and Critical Areas Assessment (URS 2013b).
- Washington State Joint Aquatic Resource Permit Application (JARPA) form (URS 2014c).
- Nest Disturbance Permit (USFWS 2014).
- Stormwater Pollution Prevention Plan (SWPPP) (Wilson and Company 2014).
- Hydrology/Hydraulics Report (Wilson and Company 2015).

The analyses of the affected environment and environmental impacts completed for each resource are described in Chapters 3.1 through 3.17, along with descriptions of select laws, regulations, and applicable guidance that apply.

This chapter focuses on the potential impacts of the proposed project and associated activities including construction and operation of project facilities. Chapter 4 – Environmental Health and Risk, discusses the potential impacts associated with an accidental release of crude oil during rail transport to the Shell PSR.

This chapter also identifies recommendations for mitigation measures that could be used to avoid, minimize, or mitigate potential impacts associated with the proposed project. These mitigation measures are discussed further in Chapter 5 – Summary of Impacts and Mitigation.

OVERVIEW OF STUDY AREAS

The study area for an EIS impact analysis encompasses the area in which environmental resources could be affected by the proposed project. In this EIS, the study area determined for each resource depended on how, and to what extent, that resource could experience direct, indirect, and cumulative impacts. Therefore, the study areas considered for impact analyses are presented at the beginning of each resource section, in Chapters 3.1 through 3.17.

The study area for direct and indirect impacts also includes the area that would be affected by construction activities. Impacts generated from construction are typically considered short term because they occur during a limited timeframe. Conversely, impacts from project operation are considered long term as they extend throughout the life of the facility. In most cases, the study areas described in Chapters 3.1 through 3.17 extend beyond the proposed project and wetland mitigation sites to include the broader expanses potentially affected by construction and operation of the proposed facilities. For example, stormwater runoff from the project site could reach waterbodies outside the site boundaries; vehicle traffic at intersections more than 2 miles from the project site could be affected by trucks hauling construction spoils to disposal sites.

Because this project is intended to support delivery of crude oil by rail to the Shell PSR, the extent of the area studied along the rail corridor varied by resource, depending on the characteristics of the resource and the potential impacts from rail operations. Recognizing that the crude oil destined for the Shell PSR is a concern to many stakeholders, analyses were expanded in some cases to include potential impacts along the BNSF Railway main line. However, to offer specific and meaningful analysis, the study area used in this chapter for the rail corridor was generally limited to the Anacortes Subdivision—the rail segment that would experience the greatest increase in rail traffic relative to existing conditions. Chapter 4 – Environmental Health and Risk, provides additional analysis of the potential risks and consequences of an accidental release of crude oil along the rail corridor.

ENVIRONMENTAL RESOURCES CONSIDERED

The co-lead agencies identified several environmental topics in the Determination of Significance to be studied in this EIS (Skagit County and Ecology 2015a). These topics include: earth, air, water, plants and animals, environmental health, land and shoreline use, transportation, and public services and utilities.

As described in Chapter 1 – Introduction, the co-lead agencies invited the public, agencies, and tribes to comment on potentially affected resources, the extent of analysis to be included, and potential measures to mitigate impacts of the proposed project. The comments received are summarized in the *Shell Anacortes Rail Unloading Facility Environmental Impact Statement Scoping Report* (Skagit County and Ecology 2015b).

The co-lead agencies reviewed the scoping comments and refined the scope of this EIS to include the study of 17 environmental resource topics. Table 3.0-1 lists the environmental resources considered in this chapter.

Table 3.0-1 Environmental Resources Considered in this Chapter

Resource	Discussion
3.1 – Earth Resources	An analysis of bedrock geology, topography, and soils within the proposed project area. The regional and local geologic setting included identification of significant topographic features and landforms, soil types, and mineral resources. The potential for geologic hazards to affect the proposed project was also addressed.
3.2 – Groundwater	An evaluation of the geology and soils that influence groundwater flow (hydrogeology) and groundwater quality within the proposed project vicinity. The hydrogeologic analysis considered the groundwater elevation ranges, confining geologic units that overlay or delineate distinct aquifers, and the hydraulic conductivity of the soils and geologic units.
3.3 – Surface Water	An analysis of surface water flows and surface water quality including ditches, streams, sloughs, wetlands, and marine shorelines associated with area receiving waters, in this case, Padilla and Fidalgo bays.
3.4 – Fish and Aquatic Species and Habitat	An analysis of the types of fish and aquatic species and their habitats that exist within the proposed project vicinity, and the potential impacts that could result from construction and operation. Marine mammals and their habitats are also considered.
3.5 – Wetlands	An assessment of the wetlands and buffers that would be affected at the project site in terms of type, size, and function, and the associated mitigation measures proposed at a nearby wetland mitigation site.
3.6 – Vegetation and Terrestrial Wildlife	An analysis of the types of vegetation and terrestrial wildlife that exist within the proposed project and wetland mitigation sites, and the potential impacts that could result from construction and operation.
3.7 – Cultural Resources	An evaluation of the proposed project and its potential impacts relative to locations of special importance for Native American groups in the project vicinity.

Resource	Discussion
3.8 – Treaty and Traditionally Used Resources	An evaluation of how the proposed project could affect traditionally used resources within the project vicinity, namely, impacts that could affect tribal lifeways and culture or the exercise of tribal treaty reserved rights.
3.9 – Noise and Vibration	An assessment of existing noise and vibration levels in and around the project vicinity relative to how those levels would change as a result of both construction and operation of the proposed project.
3.10 – Air Quality and Greenhouse Gases	An evaluation of the types and quantities of atmospheric pollutants and their sources, along with the potential contributing impacts that the proposed project may have on greenhouse gas emissions.
3.11 – Energy and Natural Resources	An examination of the estimated energy requirements of the proposed project and the availability of local natural resources (namely fill materials). The use of fuel to transport crude oil to the Shell PSR and any changes in fuel consumption related to that transport were also considered.
3.12 – Land Use and Social Elements	An analysis of current land uses in the project vicinity, including residential, commercial, and industrial. Recreational resources such as parks, wildlife reserves, and nature trails were also evaluated. Social elements considered include minority, low income, and limited English-speaking populations, community services, and utilities.
3.13 – Visual Resources	An analysis of the visual resources (key observation points) that exist in the vicinity of the proposed project, their sensitivity levels, and how those resources could be altered as a result of project construction and operation.
3.14 – Economics	An evaluation of potential economic impacts resulting from the construction (short term and temporary) and operation (long term and permanent) of the proposed project. These impacts are addressed at both the local and statewide level.

Resource	Discussion
3.15 – Rail Traffic and Transportation	An analysis of how the addition of six round-trip trains per week traveling to and from the Shell PSR would affect at-grade railroad crossing operations as well as the proposed project's potential impacts on the regional rail transportation network.
3.16 – Vehicle Traffic and Transportation	An analysis of how the proposed project could create changes in traffic during the construction period or cause changes in access or vehicle delays on roadways and intersections near at-grade railroad crossings during operation.
3.17 – Public Services and Incident Response	An assessment of existing services within the proposed project vicinity and the potential demands on those services, along with a discussion of incident response capabilities.

OVERVIEW OF CUMULATIVE IMPACTS ANALYSIS

SEPA requires the County and Ecology, as co-lead agencies, to consider the cumulative impacts of the proposed project in this EIS (WAC 197-11-060). A cumulative impact is defined as the incremental impact of an action when added to other past, present, and *reasonably foreseeable future actions*. Cumulative impacts can result from individually minor but collectively significant actions taking place during a determined timeframe (40 CFR § 1508.7).

Reasonably foreseeable future actions were considered in this cumulative impacts analysis if they met at least one of the following criteria:

- Projects are currently within the planning stage and have funding secured for the action.
- Projects are currently undergoing SEPA review.
- Projects have completed the SEPA process and review is in another permitting phase.

An example of a cumulative impact is the additive effect of numerous small changes in land use from natural vegetation to hard surfaces. One individual change within a watershed may not noticeably affect the rate of stormwater runoff or sediment load that enters a stream. However, numerous changes within the watershed could collectively lead to increased rates of stormwater runoff that the receiving stream channel could not accommodate. The cumulative impacts are described within the evaluation of each environmental resource.

The cumulative impacts analysis was prepared in accordance with SEPA (WAC 197-11-060). Additional guidance developed by the Council on Environmental Quality (CEQ) was also considered (CEQ 1997). The following steps were used to analyze cumulative impacts:

1. Identify the cumulative impacts study area for each environmental resource.
2. Determine the timeframe that will be used to analyze the impacts from past, present, and reasonably foreseeable future projects.
3. Identify past, present, and reasonably foreseeable projects.
4. Analyze the cumulative impacts for each environmental resource.

This cumulative impacts analysis evaluates the impacts resulting from construction and operation of the proposed project and the potential for cumulative impacts. Potential cumulative impacts associated with an accidental release of oil during transport of crude by rail are discussed in Chapter 4 – Environmental Health and Risk.

Cumulative Impacts Study Areas

The study areas for cumulative impacts are used to assess the impacts of other past, present, and reasonably foreseeable future actions to determine if those actions, combined with project impacts, have a cumulative impact on environmental resources. For some resources, the study area used to assess direct and indirect impacts may be sufficient to analyze cumulative impacts. In other cases, the study area may be expanded to evaluate impacts to the resource within the scale of human communities, landscapes, watersheds, or air sheds. For this EIS, the study areas for cumulative impacts are described within the discussion of each resource reviewed.

Timeframe for Cumulative Impacts Analysis

The timeframe for cumulative impacts analysis defines the period in which to consider the incremental impacts of past, present, and reasonably foreseeable future actions combined with the proposed project. For this proposed project, the timeframe used to assess cumulative impacts from past actions begins in 1958—the year the Shell PSR began operation. Currently, Shell anticipates that the project would become operational in 2018 (if permits are approved) and be in operation for at least 20 years (see Chapter 2 – Proposed Project and Alternatives). Therefore, the timeframe for this cumulative impacts analysis is 1958 to 2038. Permit requirements that apply to project operation would remain in place for the life of the proposed project.

Past, Present, and Reasonably Foreseeable Future Actions

The identification of past, present, and reasonably foreseeable future actions can provide insight into determining the cause-and-effect relationship between human actions and resources or ecosystems. This requires an evaluation of available data within the resource-specific study area for cumulative impacts. Only the past, present, and reasonably foreseeable future actions that could impact individual resources were included in this analysis. The impacts of past actions were considered as part of the existing environmental conditions. A qualitative assessment of past human impacts on individual resources is also provided in this study.

State and local sources were used to identify present actions for localized study areas (such as Skagit County). For resources with larger study areas (such as Washington State), present projects were addressed qualitatively.

Reasonably foreseeable future actions were considered in this cumulative impacts analysis if they met at least one of the following criteria:

- Projects are currently within the planning stage and have funding secured for the action.
- Projects are currently undergoing SEPA review.
- Projects have completed the SEPA process and review is in another permitting phase.

Table 3.0-2 identifies past, present and reasonably foreseeable future actions based on a review of state and local information sources. Figure 3.0-1 identifies their locations.

The Gateway Pacific Terminal Project is a proposed marine export facility located in Whatcom County, WA (Table 3.0-2). In May 2016, the EIS for the project was suspended, and the U.S. Army Corps of Engineers (USACE) determined that the project, as submitted, could not be permitted. However, in an effort to provide a conservative analysis of potential cumulative impacts, the Gateway Pacific project was included in this analysis as a reasonably foreseeable future action.

Table 3.0-2 Past, Present, and Reasonably Foreseeable Future Actions

Project	Description*	Status
BP Cherry Point Refinery, Blaine, WA	Beginning operations in 1971, the Cherry Point facility currently processes more than 9 million gallons (approximately 214,300 barrels) of crude oil a day, primarily transportation fuels. It provides about 20 percent of the gasoline market in Washington and Oregon, the majority of jet fuel for Seattle, Portland, and Vancouver, B.C. international airports, and is the largest West Coast supplier of jet fuel to the U.S. military (British Petroleum 2016).	Past
BP Rail Logistics, Whatcom County, WA	Constructed in 2014 as part of the BP Cherry Point Refinery, the BP Rail logistics facility is composed of a 10,200-linear-foot rail loop interconnected to the BNSF Railway Custer Spur to transfer crude oil between tank cars and the refinery. The facility is permitted to receive one train per day (one inbound and one outbound train trip) (Whatcom County 2012).	Past
Burlington Northern Railway Old Highway 99N Overpass of BNSF Railroad	Skagit County Public Works is seeking to replace an existing 1,183-foot- long timber trestle bridge on Old Highway 99N where it passes over the BNSF Railway north of Cook Road (north of Burlington). The existing bridge will be replaced with a three-span concrete bridge (Skagit County 2016a). Currently it is anticipated that the project would impact about 0.091 acre of wetlands (Skagit County 2016b).	Reasonably Foreseeable Future Action
Burnaby Refinery and Rail Facility, Vancouver, B.C.	Chevron Canada operates the Burnaby Refinery on the shores of Burrard Inlet near Vancouver, B.C. Crude oil is supplied to the refinery from northern British Columbia, Alberta, and Saskatchewan mainly via pipeline, with supplemental deliveries by rail and truck. The crude oil supply by rail consists of up to 10 tank cars per day to deliver approximately 8,000 barrels. Approximately 57,000 barrels of fuels are refined daily (Chevron Canada 2016; Vancouver Sun 2015).	Past

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Project	Description*	Status
Gateway Pacific Terminal, Whatcom County, WA	Pacific International Terminals, Inc. has proposed a deep water marine terminal at Cherry Point in Whatcom County, WA. The project would handle import and export of up to 54 million metric tons per year of dry bulk commodities. In a related project, BNSF Railway has proposed to modify rail facilities adjacent to the terminal site, including installation of receiving/departure tracks west of the BNSF Railway Bellingham Subdivision and development of a second track along the approximately 6-mile Custer Spur to the proposed terminal site (Gateway Pacific Terminal 2013). This would allow for up to 18 train trips per day.	Reasonably Foreseeable Future Action
Imperium Bulk Liquid Terminal Facility Project, Port of Grays Harbor, WA	Imperium Terminal Services, LLC, proposes to expand its existing bulk liquids terminal. The project involves additional storage tanks and expanding rail unloading capacity and vessel loading capacity for ethanol, oil, and biofuels (crude oil is not part of the proposal). The project results in an additional 400 vessel trips per year and up to two unit train trips per day (Ecology 2015a).	Reasonably Foreseeable Future Action
Millennium Bulk Terminals, Longview, Cowlitz County	Millennium Bulk Terminals proposes to build a coal export terminal on a portion of an existing industrial site that would consist of rail unloading, storage, reclaiming, and loading ships with coal. The planned total throughput capacity of the facility would be 44 million metric tons per year (Millennium Bulk Terminals Longview 2010). An estimated 16 train trips per day are anticipated.	Reasonably Foreseeable Future Action
Northwest Innovation Works, Methane Terminal, Port of Kalama, WA	Northwest Innovation Works is proposing to construct and operate a methanol production plant in an industrial park owned by the Port of Kalama. The plant would manufacture methanol from natural gas. Natural gas would be delivered to the methanol plant by a new lateral distribution pipeline to be constructed by Northwest Pipeline GP. As part of the same development, the Port is proposing a new deep draft marine terminal facility to load methanol onto ships (Port of Kalama 2016).	Reasonably Foreseeable Future Action
NuStar Terminal, Vancouver, WA	NuStar proposes to convert a 120,000-barrel methanol tank for crude oil; receive approximately 22,000 barrels per day. They also proposed to add rail off-load capability. A Determination of Significance was issued on April 3, 2015. Currently, full unit trains cannot be received. Less than one unit train per day could be off loaded (0.6 train trips per day) (NuStar Terminal Services 2015).	Reasonably Foreseeable Future Action

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Project	Description*	Status
Phillips 66 Refineries, Ferndale, WA	Phillips 66 constructed a tank car crude oil unloading facility along existing rail infrastructure at its refinery near Ferndale, WA. The refinery has a throughput capacity of 75,000 barrels per day. The project would provide for the arrival and departure of one unit train every other day (an average of one train trip per day) in addition to the existing rail traffic on the BNSF Railway Custer Spur (Whatcom County 2013).	Past
Puget Sound Energy LNG Project, Port of Tacoma, WA	Puget Sound Energy has proposed a liquefied natural gas (LNG) facility at the Port of Tacoma, WA. The LNG receiving facility would be located on a 30-acre site and provide natural gas to residents, commercial customers, and marine vessels. It is projected to be completed by 2018 (PSE 2016).	Reasonably Foreseeable Future Action
Tesoro Anacortes Refinery, Anacortes, WA	The Tesoro Refinery has a total crude oil storage capacity of 120,000 barrels. It receives crude feedstock via pipeline from Canada, by rail from North Dakota and the central U.S., and by tanker from Alaska and foreign sources (Wilson and Company 2016; Tesoro 2015a). The facility accommodates an estimated two train trips per day.	Past
Tesoro Clean Products Upgrade, Anacortes, WA	Tesoro Refinery and Marketing Company LLC, proposes to install a new marine vapor emissions control system to capture hydrocarbon emissions from marine vessels displaced during marine loading operations. Other proposed improvements include construction of an aromatics recovery unit capable of producing 15,000 barrels per day of mixed xylenes, a new steam boiler, expansion of the naphtha hydrotreater to process 46,000 barrels of naphtha per day, and installation of a new isomerization unit. Additionally, new storage tanks will be installed adjacent to the existing refinery storage tank area, expanding the tank storage area to the west (Skagit County Planning and Development Services 2016). Currently it is anticipated that the project would impact about 0.0105 acre of wetlands (Tesoro 2015b).	Reasonably Foreseeable Future Action

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Project	Description*	Status
Vancouver Energy Distribution Terminal Facility (Tesoro-Savage), Vancouver, WA	Tesoro Savage Petroleum Terminal, LLC, is proposing to construct a facility that would receive 360,000 barrels of crude oil per day by rail, store on site, and then load onto marine vessels for transport. An average of eight unit train trips per day would occur at the facility (Ecology 2014a; Washington Energy Facility Site Evaluation Council 2015).	Reasonably Foreseeable Future Action
U.S. Oil Refinery and Rail Facility, Port of Tacoma, WA	U.S. Oil and Refining Co., operates a refinery with current crude capacity of 48,000 barrels per day at the Port of Tacoma, WA. The refinery receives crude oil by truck, train, and marine vessel. The facility can accommodate approximately one unit train trip per day (Ecology 2014a).	Past
Westway Terminal Expansion Project, Port of Grays Harbor, WA	Westway Terminal Company, LLC, proposes to expand its existing bulk storage terminal at Port of Grays Harbor to allow for the receipt of crude oil unit trains, storage of crude oil, and outbound shipment of crude oil by vessel and/or barge from the Port of Grays Harbor. The project would accommodate 1.25 unit train trips per day and one vessel or barge trip every other day (Ecology 2015b).	Reasonably Foreseeable Future Action

Notes:

- All train trip data provided by Ecology (2016).

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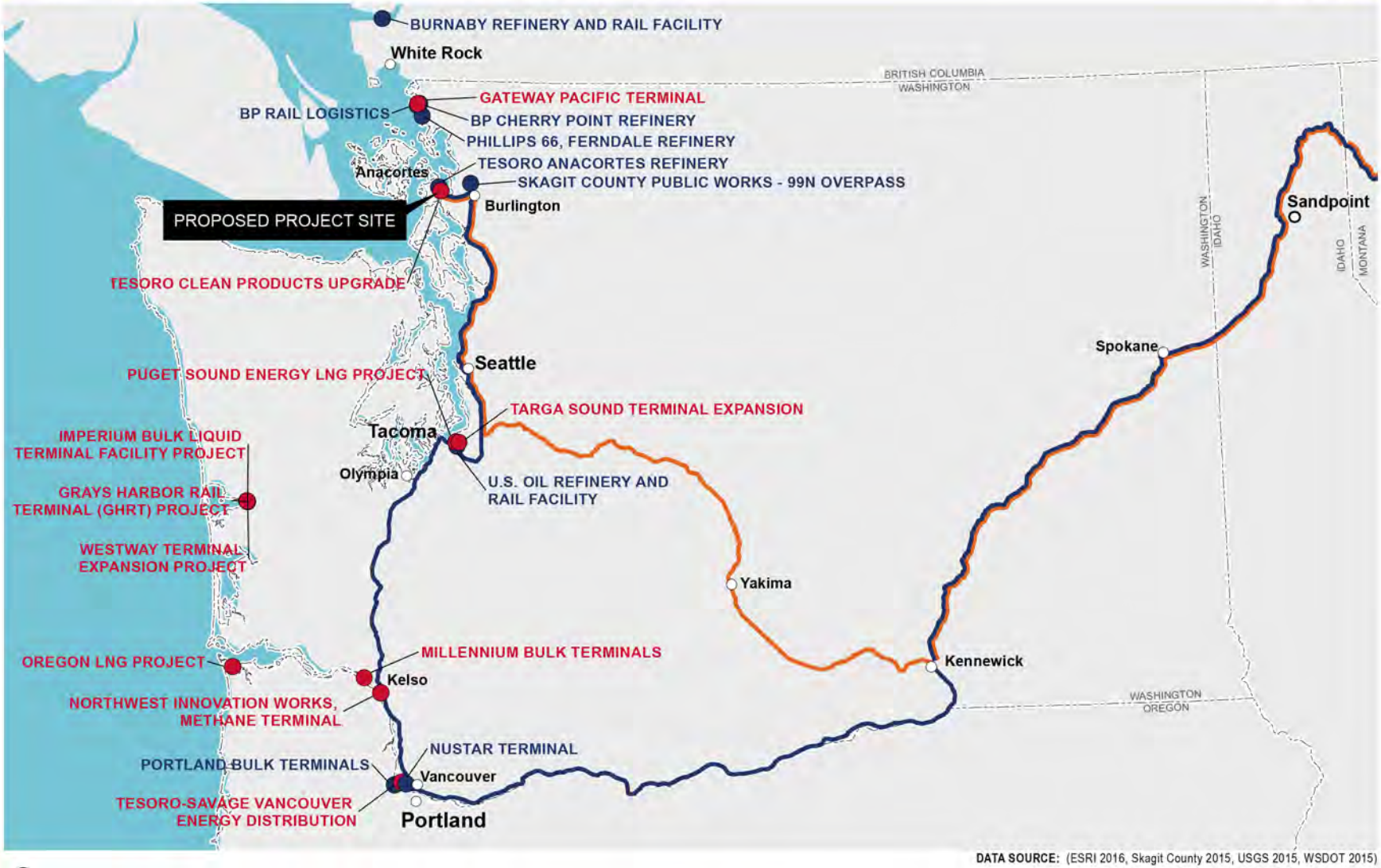

DATA SOURCE: (ESRI 2016, Skagit County 2015, USGS 2015, WSDOT 2015)

Figure 3.0-1
PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

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