

Winter 2013

Cherry Point exporting of coal on large ships, environmental impact assessment, Bellingham, WA

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Cherry Point Terminal: Coal Exporting Ships



Environmental Impact Assessment

Huxley College of the Environment

Western Washington University

Winter 2013

ESCI 493

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Environmental Impact Assessment

Huxley College of the Environment

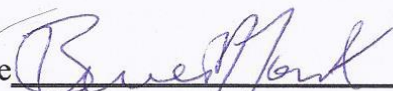
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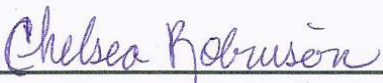
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Date 03/11/2013

March 15, 2013

Dear Concerned Citizen,

This Environmental Impact Assessment (EIA) was performed as a class project under the supervision of Dr. Leo Bodensteiner. As a group, we analyzed the proposed plan for the accommodation of the shipments of coal from the Powder River basin of Montana and Wyoming. This would need additional ships to transport the coal to the principal customer, China. This project includes the shoreline and hydro sediment of Cherry Point, WA, and the Capesize and Panamax ships transporting the coal to China. This discussion includes the current proposal and alternatives for the ships and the loading of coal. Each of the alternatives and impacts are outlined within the EIA. Potential impacts from the transport and burning of the coal are also discussed in this EIA.

The proposed plan of loading the coal with covered conveyor belts, and shipping coal on Capesize and Panamax size ships that have treated the ballast water, utilized scrubbers, more regulatory maintenance people, tug boats and coast guard. Additional alternatives would include changed the bunker fuel to natural gas and a cover over the shipments of coal. As well as, employing an additional on-site fire brigade for Terminal related fires including fires on docked ships. Pumping raw or treated sewage off vessels for further treatment on land; connecting docked ships to onshore electricity network to shutdown combustion engines during docking time. These alternatives to the proposed plan are the preferred course of action

This EIA adequately summarizes the impacts of the project on the built and natural environment. We hope this EIA offers valuable insight into the environmental issues raised by this development.

We thank you for your interest in the topic of increased coal ships in Whatcom County.

Sincerely,

The Cherry Point Terminal Coal Exporting Ships EIA Team

Cherry Point Exporting of Coal on Large Ships Environmental Impact Assessment Bellingham, WA

Prepared for:

Environmental Science 493
Professor Leo Bodensteiner
Western Washington University
Huxley College of the Environment

Prepared by:

Judith Debay
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** This presentation represents a class project that was carried out by students of Western Washington University, Huxley College of the Environment. It has not been undertaken at the request of persons representing local governments or private individuals, nor does it necessarily represent the opinion or position of individuals from government or the private sector. **

FACT SHEET

Title

Cherry Point Coal Exporting Ships Environmental Impact Assessment

Description

This Environmental Impact Assessment (EIA) is based on the State Environmental Policy Act (SEPA) requirements for any action that has a significant, adverse impact on the environment. These requirements are set forth in Chapter 197-11 of the Washington Administrative Code (WAC).

The proposed action is to move up to 54 million metric tons per year of dry bulk commodities including coal requiring approximately 487 vessels (Panamax and Capesize class) per year, each at a length of 800 to 900 feet (GPT FAQ, 2011). At half-capacity one more vessel every other day would follow this shipping route and at full operational capacity about 1-2 vessels would call at the Gateway Pacific Terminal per day. Under this proposal, the immense size and weight of the ships combined with the storage methods of coal and bunker fuel will increase the possibility and severity of fire, explosions, and oil spills.

Our alternative to the proposed action evaluates use of covered and well maintained conveyor belts for coal loading, treated ballast water, higher quality bunker fuel, covered coal storage on board ships, increased regulation and maintenance, increased tugboat use and increased U.S. coast guard (USCG) presence. The alternative would allow the coal to be transported while also minimizing the associated air pollution, water pollution, and accidents such as oil spills, fires, and collisions.

Under the no action plan, the Cherry Point Coal Terminal proposal would not be approved and there would be no change in the current overseas transport of coal and other dry bulk commodities through Haro Strait from a proposed terminal at Cherry Point.

Location of Site

This Environmental Impact Assessment focuses on the adverse environmental effects of the ships transporting coal and dry bulk goods through Haro Strait and the impacts on the Cherry Point shoreline.

Proponent

Gateway Pacific Terminal

Lead Agency

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Permits & Approvals

Potentially including but not limited to:

- Clean Water Act, Section 404 and Section 10 Permits --USACE
- National Historic Preservation Act, Section 106 Review --USACE
- National Environmental Policy Act--USACE
- Private Aids to Navigation--US Coast Guard
- Endangered Species Act, Section 7 Consultation--USFWS and NOAA Fisheries
- Marine Mammal Protection Act, Marine Mammals--NOAA Fisheries
- Magnuson-Stevenson Act--NOAA Fisheries
- Hydraulic Project Approval(s)--WDFW
- Aquatic Lease Agreement--WDNR
- Clean Water Act, Section 401 Water Quality Certification--Ecology
- Coastal Zone Management Consistency Determination--Ecology
- NPDES General Industrial Stormwater Permit--Ecology
- NPDES General Stormwater Permit for Construction--Ecology
- NPDES Vessel General Permit--Ecology
- Clean Air Act--Order of Approval to Construct--NWCAA--
- Building Permits--Whatcom County
- Certificate of Occupancy--Whatcom County
- Major Project Permit--Whatcom County
- State Environmental Policy Act Threshold Determination--Whatcom County

EIA Contributors

Brennan Nowak: Environmental Health, Land & Shoreline
Chelsea Robinson: Transportation, Earth
Genevieve Shank: Air, Water
Judith DeBay: Public Utilities, Plants
Sabina Sherrill: Animals, Energy & Natural Resources

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Acknowledgements:

We would like to thank the following people for their contributions and guidance:

Dr. Leo Bodensteiner, Ph.D., Professor, Western Washington University

Matt Krough, Project Manager, North Sound Baykeeper Team

Gary Russell, Fire Chief, District 7, North Whatcom Fire & Rescue

Issue Date

March 7th, 2013

Public Hearing

5:30 PM, March 14th, 2013

REI Meeting Room

400 36th St

Bellingham, WA 98225

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Glossary

Adhesion: The action of sticking to or adhering to something

Adjacent: Lying near, close, or contiguous; adjoining; neighboring.

Anthropogenic: Originating in human activity (chiefly of environmental pollution and pollutants).

Arrhythmias: Any disturbance in the rhythm of the heartbeat.

Autotroph: An organism capable of making nutritive organic molecules from inorganic sources via photosynthesis

Ballast Water: Tanks can be emptied, reducing draft or the weight of the boat and water added back in after the boat is launched or cargo unloaded. Pumps can also be used to empty the leeward ballast tank and fill the windward tank as the boat tacks, and the quantity of ballast can be varied to keep the boat at the optimum angle of heel. On empty cargo vessels water is added to ballast tanks to increase propeller immersion, to improve steering, and to control trim and draft.

Bioaccumulation: Refers to the accumulation of substances, such as pesticides, or other organic chemicals in an organism.

Biodiversity: Is the degree of variation of life forms within a given species, ecosystem, biome, or an entire planet.

Biomagnification: Is the increase in concentration of a substance that occurs in a food chain as a consequence of persistence of the substance throughout the food chain.

Bulk Carriers- A ship constructed with a single deck, topside tanks and hopper side tanks in cargo spaces and intended to primarily carry dry cargo in bulk; an ore carrier; or a combination carrier.

Byproducts: Something produced in a usually industrial or biological process in addition to primary product.

Capesize- Cargo ships originally too large to transit the Suez Canal (larger than both Panamax and Suezmax vessels). To travel between oceans, such vessels used to have to pass either the Cape of Good Hope or Cape Horn.

Cardiopulmonary: Of, pertaining to, or affecting the heart and lungs.

Cardiovascular: Of, pertaining to, or affecting the heart and blood vessels.

Cavitation: The sudden formation and collapse of low-pressure bubbles in liquids by means of mechanical forces

Climate Change: A change in the world's climate--in this case specifically in reference to anthropogenic greenhouse gas emissions

Coal Worker's Pneumoconiosis: Black Lung Disease; lung disease caused by inhaling coal dust.

Cohesion: Refers to the aspect of togetherness between two or more members of a community.

Coronary: Of or pertaining to the human heart, with respect to health.

dBa: A unit used to express the intensity of a sound wave, equal to 20 times the common logarithm of the ratio of the pressure produced by the sound wave to a reference pressure, usually 0.0002 microbar.

Deadweight Tonnage: A measure of how much weight a ship is carrying or can safely carry. It is the sum of the weights of cargo, fuel, fresh water, ballast water, provisions, passengers, and crew.

Emissions: The production and discharge of something, especially gas or radiation

Erosion: The process of eroding or being eroded by wind, water, or other natural agents.

Exclusion Zone: An area in which certain operations or events are not allowed.

Feeder Bluff- Applies to certain coastal cliffs or headlands that provide sediment to beaches down current as the result of wave action on the bluff.

Greenhouse Gas: A gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g. carbon dioxide.

Habitat: The place or environment where a plant or animal naturally or normally lives and grows.

Idling: To pass time without working or while avoiding work.

Knots: A measure of speed for boats. One knot equals about 1.15 miles per hour.

Maritime/Marine: Is primarily an adjective that describes objects or activities related to the sea.

Methylmercury: Organic form of mercury and the form of mercury that is most easily bioaccumulated in organisms; a neurotoxin.

Mortality: The relative frequency of deaths in a specific population; death rate

Neurotoxins: Extensive classes of exogenous chemical neurological insults which can adversely affect function in both developing and mature nervous tissue.

Non-Renewable Resource: A natural resource, which cannot be replenished by natural means.

Organic compound: Is any member of a large class of gaseous, liquid, or solid chemical compounds whose molecules contain carbon.

PAH: (Polycyclic aromatic hydrocarbons) are potent atmospheric pollutants that consist of fused aromatic rings and do not contain heteroatoms or carry substituents. They occur in oil, coal, and tar deposits, and are produced as byproducts of fuel burning (whether fossil fuel or biomass).

Panamax: The maximum size for the canal as a Panamax ship is a tight fit that requires precise control of the vessel in the locks, possibly resulting in longer lock time, and requiring that these ships transit in daylight. Because the largest ships traveling in opposite directions cannot pass safely within the Culebra Cut, the canal effectively operates an alternating one-way system for these ships.

Particulate matter: Are tiny subdivisions of solid matter suspended in a gas or liquid.

Piscivorous: Habitually feeding on fish; fish-eating.

Resident Killer Whales: In the Pacific Northwest, Killer Whales that are continually seen throughout the year and are also known for their specific diet of just fish and live in complex families called pods that could have up to 50 or 90 individuals in one pod.

Salish Sea- Includes the Strait of Juan de Fuca, Strait of Georgia, and Puget Sound, and all their connecting channels and adjoining waters, such as Haro Strait, Rosario Strait, Bellingham Bay, and the waters around and between the San Juan Islands in the U.S. state of Washington and the Gulf Islands in British Columbia, Canada.

Spawning: The act of producing or depositing eggs and sperm for reproduction of fish.

Surface water: All lakes, rivers, ponds, wetlands, streams, inland waters, salt waters and all other surface water and surface water courses within the jurisdiction of the state of Washington (WAC 173-350-100).

Telecommunications: Is the transmission of information over significant distances to communicate.

Topography: A field of planetary science comprising the study of surface shape and features of the Earth and other observable astronomical objects including planets, moons, and asteroids. It is also the description of such surface shapes and features.

Transient Killer Whales: Killer Whales, whose diets consist almost only of marine mammals, travel in small groups of 2-6 individuals.

Trophic Level: Is the position of a plant or animal in a food chain. Primary producers such as plants being at level 1, herbivores at level 2, and predators at the higher levels.

Vegetation: Is a general term for the plant life of a region; it refers to the ground cover provided by plants. It is a general term, without specific reference to particular taxa, life forms, structure, spatial extent, or any other specific botanical or geographic characteristics.

Nonpoint Source Pollution: Both water and air pollution from diffuse sources. Although these pollutants have originated from a point source, the long-range transport ability and multiple sources of the pollutant make it a nonpoint source of pollution.

Point Source Pollution: A single identifiable source of air, water, thermal, noise or light pollution. A point source has negligible extent, distinguishing it from other pollution source geometries.

Acronyms & Abbreviations

AQI—Air Quality Index

BMP—Best Management Practices

BPA—Bonneville Power Administration

CAA—Clean Air Act

CO—Carbon monoxide

CO₂—Carbon dioxide

DNR—Department of Natural Resources

DPM—Diesel Particulate Matter

Ecology—Washington State Department of Ecology

EIA—Environmental Impact Assessment

EPA—Environmental Protection Agency

GPT—Gateway Pacific Terminal

IEA—International Energy Agency

MARPOL—International Convention for the Prevention of Pollution From Ships

NAAQS—National Ambient Air Quality Standard

NM—Nautical mile

NO_x—Nitrogen oxides

NOAA—National Oceanic and Atmospheric Administration

NWCAA—Northwest Clean Air Agency

NWFRS—North Whatcom Fire and Rescue

PAH—Polycyclic aromatic hydrocarbons

PIT—Pacific International Terminal Inc.

PM—Particulate matter

PUD—Whatcom County Public Utility District

RACT—Reasonable Available Control Technology

Resources—United States House of Committee on Natural Resources

SEPA—State Environmental Policy Act

SO₂—Sulfur dioxide

SWPPP—Storm Water Pollution Prevention Plan

USACE—United States Army Corps of Engineers

USCG—United States Coast Guard
USFWS—United States Fish and Wildlife Service
VTS—Vessel Traffic Service
WAC—Washington Administrative Code
WCFD7—Whatcom County Fire District Seven
WDFW—Washington Department of Fish and Wildlife
WDNR—Washington Department of Natural Resources

1. Executive Summary

1.1 Purpose

The purpose of this environmental impact assessment (EIA) is to determine the effects of increased ship traffic and transport of coal from Cherry Point Terminal, in Washington State, to China. This EIA investigates the impacts on both the natural and built environments. Evaluations of the impacts are based on the guidelines and regulations of the State Environmental Policy Act (SEPA) as found in Washington Administrative Code (WAC) 197-11. The proposed action is to construct a new coal terminal at Cherry Point, WA in which bulk carriers would make port to load 54 million metric tons of coal and transport this cargo to its destination in China as a fuel source. An alternative to avoid the most detrimental impacts of the proposed action is to enact a series of mitigations, such as, covered storage and loading, renovations and increased regulations. Under the no action scenario considered there would be no change in the current overseas transport of coal and other dry bulk commodities through Haro Strait from the proposed location at Cherry Point.

1.2 Site Location

Cherry Point is a 1,200 acre location located in the northwest part of Whatcom County. It is approximately 18 miles northwest of Bellingham and five miles east of Ferndale (BBJ Today, 2012). Currently a pier with three terminals already exists at this site. The location of the proposed terminal is also home to a marine aquatic reserve (Cherry Point Aquatic Reserve) and is a Lummi Nation historical site.

1.3 Problem Description

The construction of the new terminal would disrupt the Cherry Point Aquatic Reserve and the Lummi Nation historical site, increase vessel traffic through Haro Strait, as well as potentially introduce a multitude of air and water pollutants. Combined, these impacts could result in degradation of air, water, and habitat quality as well as impact environmental health and the built environment.

1.4 Description of Proposed Action and Alternatives

The proposed action is to move up to 54 million metric tons per year of dry bulk commodities including coal. This will require approximately 487 Panamax and Capesize class vessels per year. These vessels are characteristically 800 to 900 feet long (GPT FAQ, 2011). At half operational capacity one more vessel every other day would follow this shipping route and at full operational capacity about 1-2 vessels would go travel to and from the proposed Gateway Pacific Terminal per day (Figure 4).

The alternative action entails a series of mitigations including use of covered and well maintained conveyor belts for coal loading, treated ballast water, higher quality bunker fuel, covered coal storage, increased regulation and maintenance, renovation of ship hulls and rudder alignment, increased tugboat use and increased coast guard presence. The alternative would allow the coal to be transported while also minimizing the associated risks for air pollution and water pollution, and possibility of accidents such as oil spills, fires, and collisions.

Under the no action alternative, the terminal would not load dry bulk commodities onto ships and there would be no change in the current overseas transport of coal and other dry bulk commodities through Haro Strait from Cherry Point. This would prevent potential degradation of both the natural and built environment.

1.5 Recommendation

The authors recommend the no action alternative for this project. Since both the alternative and the proposed action entail negative impacts to the built and natural environment, the no action plan is the best course of action. The alternative action would include mitigations that would decrease the impact of the proposed action through better regulation and efficiency. However, significant unavoidable impacts would still be present with the alternative. Overall this site is nothe most appropriate location fo the coal exporting terminal. We encourage further research to find a more suitable site which lowers the environmental impacts.

Photograph of Current Cherry Point Site



Figure 1. Photo of the current Cherry Point site including wharf and trestle (courtesy of Judith Debay).

Photograph of Cherry Point



Figure 2. Photo of the current Cherry Point with original wharf and trestle (NOAA, 2009).

Gateway Pacific Terminal Conceptual Design



Figure 3. Design concept of proposed Gateway Pacific Terminal at Cherry Point (SSA Marine, 2012).

Map of Proposed Shipping Route



Figure 4. Map of the proposed Gateway Pacific Terminal shipping route from Cherry Point through Haro Strait and the Strait of Juan de Fuca. The lower (orange) line indicates the incoming route and the upper (red) line indicates the outgoing route (map courtesy of Brennan Nowak).

1.6 Decision Matrix

Element of the Environment:	Proposed Action	Alternative Action	No Action
<i>Earth</i>			
Geology	O	O	O
Soils/Sediment	*	*	O
Topography	O	O	O
Unique Physical features	O	O	O
Erosion/Enlargement of Land Area	*	*	O
<i>Air</i>			
Air Quality	***	**	O
Odor	*	*	O
Climate	***	**	O
<i>Water</i>			
Surface Water	***	**	O
Runoff/absorption	O	O	O
Floods	O	O	O
Groundwater	O	O	O
Public Water Supplies	O	O	O
<i>Plants and Animals</i>			
Habitat and Diversity	***	*	O
Unique Species	***	**	O
Fish and Wildlife Migration Routes	***	*	O
<i>Energy and Natural Resources</i>			
Amount required	**	**	O
Source/availability	O	O	O
Nonrenewable resources	***	**	O
Conservation and renewable resources	O	O	O
Scenic Resources	O	O	O
<i>Environmental Health</i>			
Noise	**	*	O
Risk of Explosion	**	***	O
Release of toxic materials	***	*	O
<i>Land and Shoreline</i>			

Relationship to existing land use plans	O	O	O
Housing	**	*	O
Light and Glare	O	O	O
Aesthetics	**	**	O
Recreation	**	**	O
Historic and Cultural Preservation	**	**	O
Agricultural Crops	O	O	O
Transportation			
Transportation systems	**	**	O
Vehicular traffic	O	O	O
Waterborne Traffic	***	***	O
Parking	O	O	O
Movement of people/goods	**	**	O
Traffic Hazards	***	**	O
Public Services and Utilities			
Fire	**	O	O
Police	O	O	O
Schools	O	O	O
Parks and Recreational Facilities			
Maintenance	O	O	O
Communications	*	O	O
Water/Storm Water	*	*	O
Sewer/Solid Waste	O	O	O
Other Governmental Services	*	*	O

* to *** = Negative Impact (weak to strong)

O = No impact

2. Project Objectives

This Environmental Impact Assessment (EIA) is based on the State Environmental Policy Act (SEPA) requirements for any action that has a significant, adverse impact on the environment. These requirements are set forth in Chapter 197-11 of the Washington Administrative Code (WAC). The proposed action is to move up to 54 million metric tons per year of dry bulk commodities including coal requiring approximately 487 vessels (Panamax and Capesize class) per year, each at a length of 800 to 900 feet long (GPT FAQ, 2011). At half operational capacity one more vessel every other day would follow this shipping route and at full operational capacity about 1-2 vessels would call at the Gateway Pacific Terminal per day. Under this proposal, the immense size and weight of the ships combined with the storage methods of coal and bunker fuel will increase the possibility and severity of fire, explosions, and oil spills. Our alternative to the proposed action evaluates use of covered and well maintained conveyor belts for coal loading, treated ballast water, higher quality bunker fuel, covered coal storage on board ships, increased regulation and maintenance, increased tugboat use and increased U.S. coast guard (USCG) presence. The alternative would allow the coal to be transported while also minimizing the associated air pollution, water pollution, and accidents such as oil spills, fires, and collisions. Under the no action plan, the Cherry Point Coal Terminal proposal would not be approved and there would be no change in the current overseas transport of coal and other dry bulk commodities through Haro Strait from a proposed terminal at Cherry Point. Outlined below are the impacts to the elements of the natural and built environment.

3. Elements of the Natural Environment

3.1 Earth

Existing Conditions

The sediment around the area of Cherry Point has become contaminated with PAHs from at least 70 oil spills and waste from the aluminum facility. If a spill happens on sight the coal will mix with the current PAHs, which can lead to adverse effects.

3.1.1 Sediments/Erosion

Proposed Action

Impacts

The sediment is brought down stream by currents moving from the Bluffed Back Feeder Bluff Beaches. This sediment brings more to areas such as the rapidly eroding bluffs and the accretion shore. The pier of Cherry Point could disrupt any south flowing sediment from the eroding areas, which could prevent replenishment of shoreline. Along with the blocking of replenishing sediments the shores could erode due to the increased wave action created by the wake of the large ships.

Alternative Action

Impacts

Reduction of erosion along the shoreline could be reduced by having the tugboats bring the ship in to port. With the ship coasting and travelling at lower speeds the wakes created would be

smaller and lead to less erosion on the shore. The lack of sedimentation along the shore would still be affected due to the pier.

No Action Alternative

Impacts

By having the tugboats bring the ship in and with the ship coasting in it would lead to less erosion from the propeller.

3.2 Air

Existing Conditions

The existing average air quality in Whatcom County is categorized as good under the National Ambient Air Quality Standards due to its low population and stringent emission control requirements placed on the County's industrial facilities (U.S. EPA, 2011). Bellingham's average air quality score is 20 out of 200, where 0 is considered excellent and 500 is life threateningly poor (NWCAA, 2005). However, weather must also be considered due to its effect on air quality—if weather conditions are stagnant this can cause air pollutants to not disperse. The Cherry Point shoreline has a mild maritime climate and wind is typical, but rarely exceeds 20 mph for extended periods of time (Brownell et al., 2012). In addition, Cherry Point has several industrial facilities (refineries, aluminum, and bulk fuel storage facilities), local traffic sources, and residential wood burning which are sources of air pollution. Residential wood burning produces a variety of air emissions, including large quantities of fine particulate matter characterized as PM10 and PM2.5 (PIT, 2011).

3.2.1 Air Quality

Proposed Action

Impacts

The sulfur dioxide, mercury, nitrogen oxides, ozone, carbon monoxide, and particulate matter associated with burning coal have been shown to circumnavigate the globe. In addition, these particulates have caused decreased air quality locally in the Pacific Northwest (Kirby, 2011). Therefore, burning bunker fuel in transit would potentially see a similar effect. These pollutants add to local sources causing an increase in the EPA's Air Quality Index (AQI) for the area where an AQI of 0 represents no pollution and an AQI of 100 is the maximum allowable limit without demonstrable health effects (Jaffe Group, 2011).

Un-combusted coal alone is associated with the toxic air pollutants sulfur dioxide, sulfur trioxide, and methane when exposed to air (Greens Mining, 2010). Increased transit of the coal also results in increased fugitive coal dust releases (Climate Solutions, 2009). These pollutants will circulate the globe potentially causing a significant decrease in Cherry Point's air quality in the process. Increased transit also means increased use of bunker fuel. Bunker fuel, the cheapest and most polluting form of diesel fuel, emissions consist of a complex mixture of thousands of gases and fine particles that contain more than 40 toxic air contaminants (U.S. DOL, OSHA). These toxic substances include carbon dioxide, carbon monoxide, nitrogen dioxide, nitric oxide, sulfur dioxide, particulate matter (2.5 micrometers in diameter and smaller) and

many additional less significant components (U.S. EPA, 2011). These diesel emissions would reduce air quality, adding not only harmful chemicals to the air but also a smoggy haze.

The addition of coal ships may also negatively affect air quality in Whatcom County through the release of fugitive coal dust. While the amount of coal dust released from each individual storage unit depends on the weather, distance traveled and preventative measures taken by the shipping company, Burlington Northern Santa Fe estimates that between 500 and 2000 pounds of coal dust (or 3% of the load) can escape from a single loaded railcar in a single one way trip (de Place, 2011). Due to the uncovered storage of coal during shipping, the proposed action would likely result in similar effects.

Mitigation

No measures are proposed for mitigating impacts on air quality due to fugitive coal dust and diesel emissions in transit. However, Reasonable Available Control Technology (RACT) to minimize off-site dust emissions must be employed, as stated in NWCAA regulation 550, "Preventing Particulate Matter from Becoming Airborne" (550.3). According to the Gateway Pacific Terminal Project Information Document, mitigation measures will be taken to reduce fugitive coal dust emissions while loading and unloading the coal between the trains and vessels at the Cherry Point site (PIT, 2011). Railcar unloading onto vessels at the project proposal site would occur inside a covered unloading station. Inside the unloading station, air would be drawn into a dust control system to remove particulate matter. The ventilation system inside of the unloading station will maintain negative air pressure to prevent particulate matter emissions from escaping from the open ends of the shed (PIT, 2011).

Alternative Action

Impacts

The proposed alternative action would reduce the negative air quality impacts of the proposed action. These impacts would be lessened with the use of higher quality fuel instead of bunker fuel, thereby decreasing the magnitude of toxic pollution associated with diesel. The proposed alternative action also requires the use of covered coal storage on vessels to reduce fugitive coal dust as well as other toxic pollutants released by coal exposure to air.

No Action

Impacts

If no action ensues, air quality at the terminal site location, Cherry Point, will not be affected by factors associated with ship transport of coal (U.S. EPA, 2011).

Significant Unavoidable Adverse Impacts

Some of the impacts of the proposed and alternative action may be unavoidable, even with mitigation measures. With the alternative some fugitive coal dust and release of toxic pollutants will likely occur.

3.2.2 Odor

Proposed Action

Impacts

Bunker fuel is the cheapest and most polluting form of diesel fuel. Emissions would likely add an unpleasant odor to the air in the vicinity of the terminal as well as along the transit route.

Alternative Action

The alternative action does not reduce odor.

No Action

Impacts

See previous *No Action* statement.

3.2.3 Climate

Proposed Action

Impacts

The proposed action is to move up to 54 million metric tons per year of dry bulk commodities including coal, which would require approximately 487 vessels (Panamax and Capesize class) per year, each at a length of 800 to 900 feet long (GPT FAQ, 2011). At half operational capacity one vessel every other day would follow the Haro Strait shipping route and at full operational capacity one to two vessels would travel to and from the Gateway Pacific Terminal per day. Each vessel has the capacity to carry two million gallons of bunker fuel—also known as bunker C or fuel no. 6—for use during each one-way journey (McKay, 2012). This capacity becomes approximately four million gallons round trip. The stationary combustion emission factors of carbon dioxide, methane, nitrous oxide for fuel oil no.6 are 11.27 kilograms per gallon, 0.45 grams per gallon, and 0.09 g per gallon respectively (see Table 1) (EPA, 2011). At roughly four million gallons capacity round trip, roughly 45 million kilograms of carbon dioxide, 1.8 million grams of methane, and 3.6 million grams of nitrous oxide would be emitted based on these stationary combustion emission factors. This immense addition of greenhouse gas emissions to the atmosphere will likely contribute to climate change over time by being a source of positive radiative forcing.

Table 1. List of stationary combustion emission factors for greenhouse gases for different petroleum products (EPA, 2011).

Stationary Combustion Emission Factors							
	mmBtu per gallon	kg CO ₂ per mmBtu	g CH ₄ per mmBtu	g N ₂ O per mmBtu	kg CO ₂ per gallon	g CH ₄ per gallon	g N ₂ O per gallon
Petroleum Products							
Asphalt and Road Oil	0.158	75.36	3.0	0.60	11.91	0.47	0.09
Aviation Gasoline	0.120	69.25	3.0	0.60	8.31	0.36	0.07
Butane	0.101	65.15	3.0	0.60	6.58	0.30	0.06
Butylene	0.103	67.73	3.0	0.60	6.98	0.31	0.06
Crude Oil	0.138	74.49	3.0	0.60	10.28	0.41	0.08
Distillate Fuel Oil No. 1	0.139	73.25	3.0	0.60	10.18	0.42	0.08
Distillate Fuel Oil No. 2	0.138	73.96	3.0	0.60	10.21	0.41	0.08
Distillate Fuel Oil No. 4	0.146	75.04	3.0	0.60	10.96	0.44	0.09
Ethane	0.069	62.64	3.0	0.60	4.32	0.21	0.04
Ethylene	0.100	67.43	3.0	0.60	6.74	0.30	0.06
Heavy Gas Oils	0.148	74.92	3.0	0.60	11.09	0.44	0.09
Isobutane	0.097	64.91	3.0	0.60	6.30	0.29	0.06
Isobutylene	0.103	67.74	3.0	0.60	6.98	0.31	0.06
Kerosene	0.135	75.20	3.0	0.60	10.15	0.41	0.08
Kerosene-type Jet Fuel	0.135	72.22	3.0	0.60	9.75	0.41	0.08
Liquefied Petroleum Gases (LPG)	0.092	62.98	3.0	0.60	5.79	0.28	0.06
Lubricants	0.144	74.27	3.0	0.60	10.69	0.43	0.09
Motor Gasoline	0.125	70.22	3.0	0.60	8.78	0.38	0.08
Naphtha (<401 deg F)	0.125	68.02	3.0	0.60	8.50	0.38	0.08
Natural Gasoline	0.110	66.83	3.0	0.60	7.35	0.33	0.07
Other Oil (>401 deg F)	0.139	76.22	3.0	0.60	10.59	0.42	0.08
Pentanes Plus	0.110	70.02	3.0	0.60	7.70	0.33	0.07
Petrochemical Feedstocks	0.129	70.97	3.0	0.60	9.16	0.39	0.08
Petroleum Coke	0.143	102.41	3.0	0.60	14.64	0.43	0.09
Propane	0.091	61.46	3.0	0.60	5.59	0.27	0.05
Propylene	0.091	65.95	3.0	0.60	6.00	0.27	0.05
Residual Fuel Oil No. 5	0.140	72.93	3.0	0.60	10.21	0.42	0.08
Residual Fuel Oil No. 6	0.150	75.10	3.0	0.60	11.27	0.45	0.09

Alternative Action

Impacts

The proposed alternative action would result in reduced negative climate effects. These impacts would be lessened with the use of higher quality bunker fuel, thereby slightly decreasing the associated stationary combustion emission factors for the carbon dioxide and methane (EPA, 2011).

No Action

Impacts

See previous No Action statement.

Significant Unavoidable Adverse Impacts

The impacts of the proposed and alternative action are unavoidable. Large amounts of bunker fuel, high or low quality, would be necessary for transport in both the proposed and alternative action. As a result, climate may be negatively affected.

3.3 Water

Existing Conditions

The site of the proposed Gateway Pacific Terminal is directly adjacent to the Cherry Point Aquatic Reserve—an environment that has multiple unique features, including important natural habitats and deep-water access for industrial use (PIT, 2011). The proposed action includes a marine trestle and wharf constructed in the nearshore environment. The nearshore environment is host to a marine community that is unique in providing direct functional interaction between upland and marine habitats (PIT, 2011). The construction and operation of the marine trestle and wharf could have potential effects on marine resources including fish species, marine mammals, and marine birds. Specifically, Cherry Point Pacific Herring, which are part of a larger population that stretches along 4,500 miles of Pacific coastline, spawn next to the proposed site for marine facilities (Department of Natural Resources, 2010).

3.3.1 Surface Water

Proposed Action

Impacts

Coal dust released into the air while loading and during transport at the Gateway Pacific Terminal may contaminate the coastal waters of Cherry Point with heavy metals and other toxins. Heavy metals in un-combusted coal include elements such as arsenic, mercury, lead, cadmium, selenium, nickel, vanadium and copper (Clean Air Task Force, 2001). The fine particulate nature of coal dust allows the coal to accumulate in waterways causing aquatic sediments to be less conducive to aquatic life, decreasing environmental quality of the waterways (Roberts, 2010). However, other specific effects of coal dust on marine plants and animals have not been studied.

Mercury, one of the inorganic heavy metals found in coal dust, can be converted to the highly toxic, organic compound methylmercury when it comes in contact with water (Brownell et al, 2012). Methylmercury is absorbed by the body about six times more quickly than inorganic mercury, and it can directly affect brain and fetal cells in humans (Environment Canada, 2010). Furthermore, it is just as quickly absorbed by fish and other aquatic organisms (see figure 5). This bioaccumulation of mercury moves up the food chain and can eventually affect humans, resulting in exposure to mercury through the consumption of fish such as salmon.

Pollution of surface water may also result during the process of washing off conveyor belts and storage areas to remove settled coal dust and to prevent spontaneous combustion (Douberly, 2003). The potential for collision increases with the size of the ships involved which may cause a spill of bunker fuel. Any fuel spill will result in degradation of surface water quality and cause significant detriment to marine wildlife.

Methylmercury Bioaccumulation

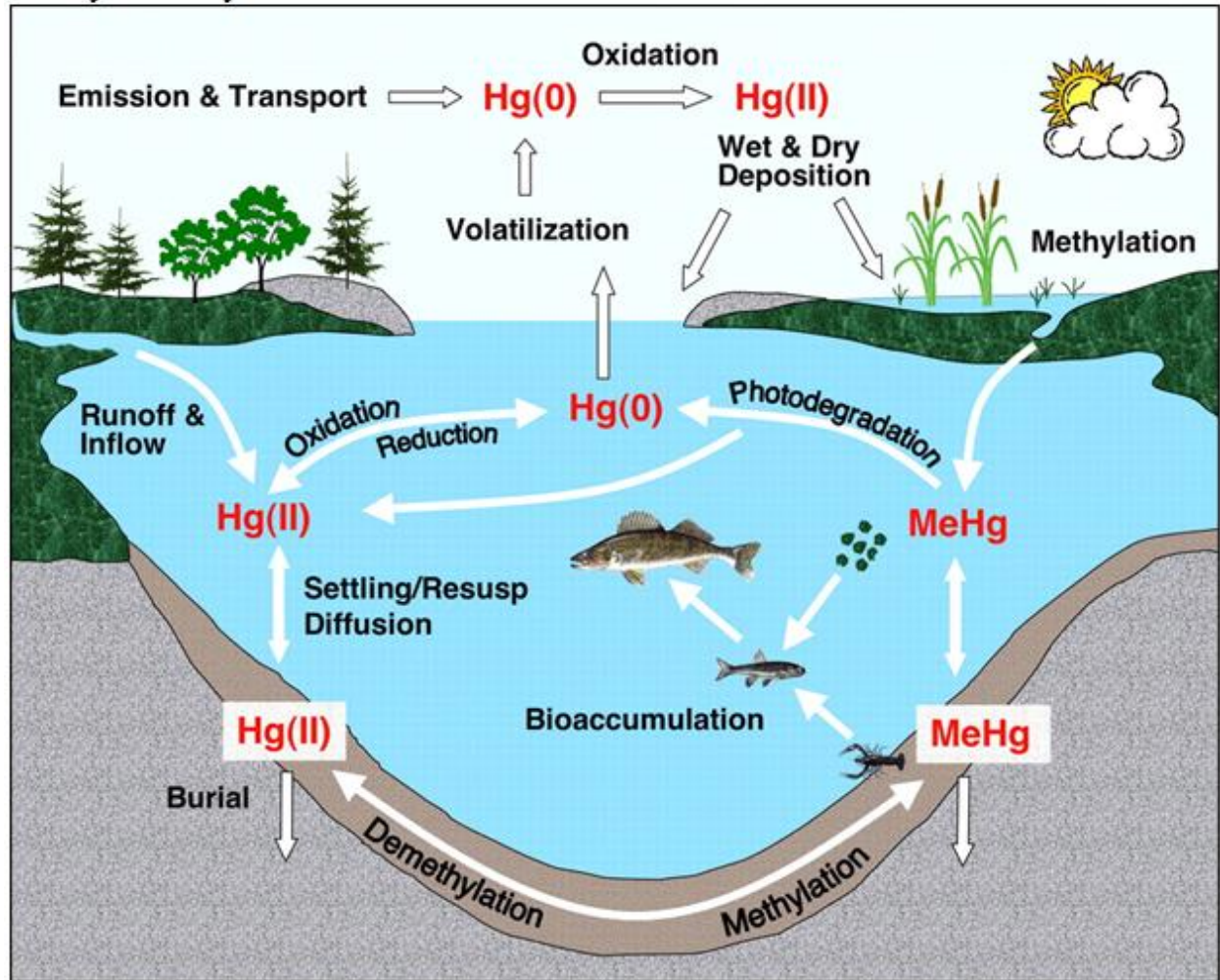


Figure 5. Diagram depicting the process by which emitted mercury gets into waterways and bioaccumulates in fish (Engstrom, 2007).

Mitigation

According to Pacific International Terminals, Inc., Best Management Practices (BMPs) would be developed and published in the Final Operations Plan for the facility. BMPs would include, among other management practices, implementation of a stormwater pollution prevention plan (SWPPP), and a marine spill avoidance and response plan (PIT, 2011).

During construction and operation of the facility, BMPs would also be implemented for handling any material spills. In addition, state and federal requirements for managing stormwater discharge and all protocols to avoid vessel traffic collisions, interactions, and marine spills would be followed (PIT, 2011). If a catastrophic spill occurred, private, local, state, and federal response action plans would be implemented to minimize damage.

Alternative Action

Impacts

The proposed alternative action would still result in negative water quality impacts (see proposed

action impacts). These impacts would be lessened with the use of covered and well-maintained conveyor belts and covered coal storage on vessels. This proposed alternative action would reduce fugitive coal dust as well as other associated heavy metals and toxins.

No Action

Impacts

If no action is taken, water quality at the terminal site location, Cherry Point, and along the transit route will remain unaffected by coal transit.

Significant Unavoidable Adverse Impacts

The impacts of the proposed and alternative action are unavoidable, even with the help of mitigation measures. Although the alternative action will help to prevent a large amount of fugitive coal dust making its way into the water, there will still be some fugitive coal dust during loading, unloading, and transit. With any fugitive coal dust contamination methylmercury may still result. In addition, there will be no change to the size of the ships transporting the coal and bunker fuel will still be used albeit a higher quality bunker fuel. Therefore, the possibility and severity of fuel spills will likely remain the same.

3.4 Plants

Existing Conditions

Eelgrass provides essential breeding ground for the Pacific herring, a species considered a species of concern by the Washington Department of Fish and Wildlife. Eelgrass as well as bull kelp, both present at Cherry Point, provide essential habitat for many other populations estuary life forms. Both are shallow water plants and require a considerable amount of light for photosynthesis (Mumford, 2007).

The construction of a pier could cause shading of currently unshaded sea floor areas and effect bull kelp and eelgrass distribution. Furthermore, elevated concentrations of coal dust in the vicinity of terminals can have a direct effect on plants (Johnson, 1999).

3.4.1 Habitat

Proposed Action

Impacts

Additional shading may cause loss of bull kelp and eelgrass vegetation and hence a loss of herring breeding ground and habitat for certain estuary populations. The herring population is of imminent concern, this impact should be avoided. Suspended coal dust would further decrease light penetration ability which reduces photosynthetic abilities of water plants. With reduced light penetration ability, the maximum depth of habitat for photosynthetic plants would be decreased.

Alternative Action

Impacts

Grated decking should be used to minimize shading of seafloor in nearshore environment.

No Action

Impacts

No impact would occur under this alternative. Bull kelp and eelgrass populations would remain unaffected.

3.5 Animals

Existing Conditions

Cherry Point has had three shipping terminals since 1971 (DNR, 2010). These shipping terminals are Intalco, Conoco Phillips, and British Petroleum. There is a broken conveyor belt that goes into the water at Cherry Point. Many ships are traveling to and from the current terminals. The current traffic through the Salish Seas is about 250,000 ships per year. The spawning habitat for Pacific Herring along the Georgia Strait near the proposed terminal is known as the least impacted of all of the spawning habitats for Pacific Herring (Revella. 2012). There are groups of Southern Resident Killer Whales that are found in Haro Strait of the Salish Seas (McKay. 2012.). There is also an exclusion zone for Sea Urchins and Sea Cucumbers on the west side of San Juan Island along Haro Strait (Washington Department of Fish and Wildlife. 2013).

Proposed Action

Impacts

Among the various animals that may be affected, the animals of greater concern are Pacific Herring, Salmon, Killer Whales, and Sea Cucumbers and Urchins. At the terminal the ship is within the Cherry Point Aquatic Reserve, which is where a Pacific Herring spawning habitat is located. When ships traveling through the Haro Strait, pass by a known location of Southern Resident Killer Whales are, and an Urchin and Sea Cucumber Exclusion Zone. Throughout the transportation of coal, dust, oil spill, and collisions especially with whales are likely to impact the environment.

Pacific Herring (*Clupea pallasii*) such as the population at Cherry Point Pacific Herring spawn in shallow tidal areas where marine algae and eelgrass are abundant (West et al. 2008). Eggs adhere to vegetation. Cherry Point is one of the last remaining spawning areas where the habitat has not been severely impacted. Historically, about 95% of the Pacific Herring in Washington come from Cherry Point (Revella. 2012). However, population has declined substantially. The concerns are that the coal dust could contaminate the adults and embryos and cause: birth defects, reproductive failure, immune system disorders, behavioral and learning disorders, and death (Fisheries and Oceans Canada. 2009). The building of the new pier could cause disruption and destruction of habitat for spawning. The propellers of the boat could disruption and destruction of the habitat for spawning.

Salmon are one of the main food sources for Southern Resident Killer Whales and people (Whale Museum. 2009). Coal dust from the ships and oil spills could directly and indirectly contaminate salmon. This contamination can cause: birth defects, reproductive failure, immune system disorders, behavioral and learning disorders, and death (Fisheries and Oceans Canada. 2009). Contamination will also affect other large edible fish species. These concerns also affect many ground fish and species listed in Table 2.

The Southern Resident Killer Whales (*Orcinus orca*) are an endangered group of orcas that feed only on fish, unlike other Killer Whales. These orcas are known to live in the waters of Salish

Sea and Pacific Ocean. The Southern Resident Killer Whales of Salish Seas are known to return to Haro Strait during the summer when their food source of salmon that are traveling to their home streams to spawn (McKay. 2012.). Southern Resident Killer Whales communicate social and feeding purposes by sound production. Whale calls are used to form bonds between other whales in the population, and also used to maintain cohesion and coordination for feeding behavior (Holt et al. 2008).

An increase in traffic of these large ships will change their communication patterns. The ships emit a frequency range of sound that overlaps that of the whale calls. This interference could possibly affect reproduction and survival success, but when ship noise (background noise) increased 1 decibel of sound pressure, the whales would increase their calls by 1 decibel of sound (Holt et al. 2008).

Another concern is that the increased ship traffic could increase the collisions with whales. Fatal ship collisions with whales happen when ships are traveling at speed of 12-15 knots or faster. Most lethal are the ships that are 80 meters or longer. Most of the ships will be traveling at a maximum of between 14 and 15 knots, and the ships used for the transportation of coal are an average of between 244-274 meters in length (Laist et al. 2001).

The final concern for the Southern Resident Orcas is contamination from possible oil spills and coal dust. Some of the constituents of oil and coal already bioaccumulate up the trophic level from the whales' food sources, and contamination from both bioaccumulation and direct exposure can cause: birth defects, reproductive failure, immune system disorders, behavioral and learning disorders, and death (Fisheries and Oceans Canada. 2009).

These collision facts and other concerns are for all whales including Humpback (*Megaptera novaeangliae*), Dall's Porpoise (*Phocoenoides dalli*), Gray whale (*Eschrichtius robustus*), and Pacific harbor porpoise (*Phocoena phocoena*) that are found on the route of these ships. Other marine mammals: Steller Sea lions (*Eumetopias jubatus*), Harbor Seals (*Phoca vitulina*).

Urchins and Sea Cucumbers have a known habitat off of San Juan Island on the Haro Strait that, where fishing for or collecting of these creatures are prohibited (Washington Department of Fish and Wildlife. 2013). Therefore Haro Strait has a large possibility of oil spills from the bunker fuel of the ships (McKay. 2012). Spilled oil and fugitive coal dust could adversely affect the habitat, and cause one or all of the following to these species: birth defects, reproductive failure, immune system disorders, behavioral disorders, and death (Fisheries and Oceans Canada. 2009). A list of prominent marine invertebrate species may also be adversely affected is provided in Table 2.

These ships will use ballast water to balance the weight of the ship when empty ships come from China to transport coal from Cherry Point (McKay. 2012). The ballast water could contain larvae of or small adult animals of species that could be invasive to the Pacific Northwest and other areas that the ships travel through.

Alternative Action

Impacts

The covering of coal during loading would limit the amount of coal dust entering the water environment, therefore reducing total toxicants entering the environment. The alternative does not completely stop the stray coal dust from entering our air and waterways. Toxicants can still cause adverse effects to the environment, yet to a smaller extent with this alternative. There will

still be a problem with ship collisions with whales. There will also be an increased impact of oil spill because of increased ship traffic.

No Action

Impacts

The no action alternative would present no detrimental impacts to the environment.

3.6 Energy and Natural Resources

Existing Conditions

There are two natural resources used in this project for the shipping of coal. These resources are coal and petroleum. The coal originates from the Powder River Basin in Wyoming mined by Peabody Energy (Coal Train Facts, 2013). The coal is claimed to have low ash and sulfur content and is considered “clean” coal (Wyoming State Geological Survey, 2013). The proposed action is to move up to 54 million metric tons per year of dry bulk commodities including coal which would require approximately 487 vessels (Panamax and Capesize class) per year, each at a length of 800 to 900 feet (GPT FAQ, 2011).

The petroleum that powers the ships is known as bunker fuel. There are fewer refinery processes that the fuel goes through than other derivatives of crude oil such as gasoline or diesel. This oil is very thick in texture. The oil has both water soluble metal salts such as sodium, potassium, calcium, and sulfates, and oil soluble metals such as vanadium, lead, nickel and others (Liquid Minerals Group Inc. 2013). Each ship can hold more than 2 million gallons of bunker fuel (McKay, 2012).

3.6.1 Non-Renewable Resources

Proposed Action

Impact

The proposed action would contribute to the increasing demand for coal to be used for power production in China. The coal is considered a non-renewable resource. The ship that carries the coal would also consume fossil fuel in the form of bunker. The ships transporting coal across the Pacific will use bunker fuel. The use of this fuel is known to degrade the environment. It is considered a non-renewable resource.

Alternative Action

Impact

The alternative presented would reduce the use of fossil fuels for one leg of the coal transportation. It is intended that bunker fuel on ships be replaced by natural gas. Natural gas is a cleaner energy source and would reduce the reliance on non-renewable sources. This alternative only reduces impacts on one leg of transportation and still encourages the burning of coal in china, due to the continued export.

No Action

Impact

No impact would occur under this alternative until a different shipping terminal is proposed in another area.

4. Elements of the Built Environment

4.1 Environmental Health

Existing Conditions

Cherry Point has had three shipping terminals since 1971 (DNR, 2010). These piers have been loading ships with aluminum and refined oils for many years since construction of the terminals. The terminals are owned by BP, Conoco Phillips and Intalco Aluminium. Marine vessels account for 22% of the nitrogen dioxide emissions and 33% of the sulfur dioxide emissions into the Whatcom County airshed (DNR, 2010). The Northwest Clean Air Agency (NWCAA) monitors Whatcom County's annual emissions and has found that much of the particulate matter found in the air is sourced from Cherry Point (DNR, 2010). Currently the particulate matter found in Whatcom County's airshed meets EPA standards according to the Clean Air Act (DNR, 2010). This proposed action would add to the particulate matter in the air and possibly make Whatcom County's airshed fall below EPA standards.

4.1.1 Noise

Proposed Action

Impacts

It is known that ships are noisy, both above the water and below. Sound; which can have adverse effects on marine life, travels much further underwater. The proposed action would increase ship traffic and resulting noise in the area and in the Salish Sea. The engines emit noise into the environment and the large propellers create noise in the water. Both may be detrimental to the environmental health of the area. The most damaging noise is produced underwater. The engines create a continuous noise that is additive to the cavitation that the propellers create (Wittekind, 2009). This underwater noise is detrimental because sounds carry much further underwater and will have effects on the marine animals (see Animals).

Pacific Herring (*Clupea harengus pallasii*) may experience the effects of marine noise pollution. Pacific Herring have been studied to be greatly stressed by the underwater noise created by ships entering the terminals, which reside next to natural herring spawning grounds (Schwartz and Galen, 1984). Herring elicit their avoidance responses when large vessel noises are present (Schwartz et al., 1984). This fact is extremely important to understand, as Cherry Point is a primary spawning point for the Pacific Herring and noise may interrupt spawning activity.

Alternative Action

Impacts

The alternative action would still present noise to the area, however; with the mitigation sounds under water due to cavitation could be reduced. With streamlining the ships and adjusting rudder

angles would reduce the cavitation that each ship creates. Lowering cavitation lowers the noise produced and would lead to less stress on local marine animals.

4.1.2 Risk of Explosion

Proposed Action

Impacts

Coal is going to be the main cargo transported from this new terminal. Coal can be very volatile. Coal and its dust are highly flammable and explosive. The particles are an important determinate for explosiveness. Coal has been found to be most combustible as dust (Cashdollar, 1996). Studies have shown that unobservable coal dust has the ability to combust, but visible coal dust combusts more easily (Stephan, No date).

Alternative Action

Impacts

The alternative action may increase the possibility of explosion by covering of the coal. Covering the coal may trap the coal dust to concentrations that would become a visible dust cloud, which increases its explosiveness.

No Action

Impacts

The no action would present no detrimental impacts to the environment.

4.1.3 Release of Toxic Chemicals

Proposed Action

Impacts

Coal and coal dust both contain heavy metals. Metals that are often found in coal are arsenic, boron, lead, chromium, and mercury (Whatcom & Skagit County Physicians, 2012). Trace amounts of some of these metals can be beneficial or needed for our health, yet the amounts presented by a coal terminal could lead to toxicity to humans and the environment.

Particles of coal in marine sediments can adversely affect marine ecosystem. Coal is known to contain mercury, which in water transforms into methyl-mercury via biogeochemical processes. Coal dust dynamics have been studied in Delta, BC, where a coal terminal with similar characteristics in is located. Coal particles were found out to 100 meters from the loading zone (Johnson, 2005). Dispersal of coal particles did not increase in the 22 years since the last measurement, but the quantity doubled in the sediment (Johnson, 2005).

The release of coal dust into the air is also of concern. Coal contains many heavy metals, which could be released into the air. Heavy metals, in excess have been found to increase risk of lung disease from bronchitis to exacerbations of asthma.

Burning bunker fuel will release Diesel Particulate Matter (DPM). DPM may exacerbate lung disease and asthma. Every 10 microgram/m³ increase in DPM results in 6% increase in cardiopulmonary mortality (Pope, 2002).

Alternative Action

Impacts

The covering of our coal during loading would limit the amount of coal dust entering both the air and water environments, therefore reducing total toxicants entering the environment. The alternative action reduces the stray coal dust from entering our air and waterways. Toxicants can still cause adverse effects to the environment, yet to a smaller extent with this alternative.

No Action

Impacts

The no action would present no detrimental impacts to the environment.

4.2 Land and Shoreline Use

Existing Conditions

This area is home to the Cherry Point Aquatic Reserve. This is one of six total marine reserves in the state of Washington. Cherry Point is host to popular recreational activities such as boating, fishing, shellfish harvesting, swimming and beach combing (DNR, 2010). As well, Cherry Point has historic value to the Lummi Nation, which has used the area for tribal commercial, ceremonial and subsistence harvest of many species in the area (DNR, 2010). The conditions of the shoreline at Cherry Point already show signs of decline due to the building of the first three terminals built at Cherry Point. Tribal activities have been adversely affected by the industrial development of the area.

4.2.1 Housing

Proposed Action

Impacts

The addition of ships transporting coal out of Cherry Point would lead to impacts on surrounding homes. The impacts that would occur due to the ships are that of increased coal dust falling upon houses that are in close proximity to the terminal. Coal dust has the ability to travel great distance while in the air column. This fact means it has the ability to easily coat houses, personal property and beaches near the terminal.

Mitigation

The covering of the coal storage on ships and covered conveyor belts would lead to less coal dust being transported via wind and would lower the amount of dust being washed ashore.

Alternative Action

Impacts

The impacts on the housing around the area would be lessened due to the covering and control of

coal dust. Covering the conveyors and ship tanks would end up lowering the amount of coal dust that leaves the area.

No Action

Impacts

This action would result in no environmental impacts that would be a detriment to the environment.

4.2.2 Aesthetics

Proposed Action

Impacts

The addition of a 3000 ft. wide pier and the increase in large ship traffic will likely decrease the aesthetics of the area (Figure 6). Haro Strait is best known for its natural beauty and whale watching (All Trips, 2013). These attractions would be negatively impacted by the large ships, which would obstruct views and repel whales (see Environmental Health-Noise).

Aerial Map of Proposed Wharf and Trestle

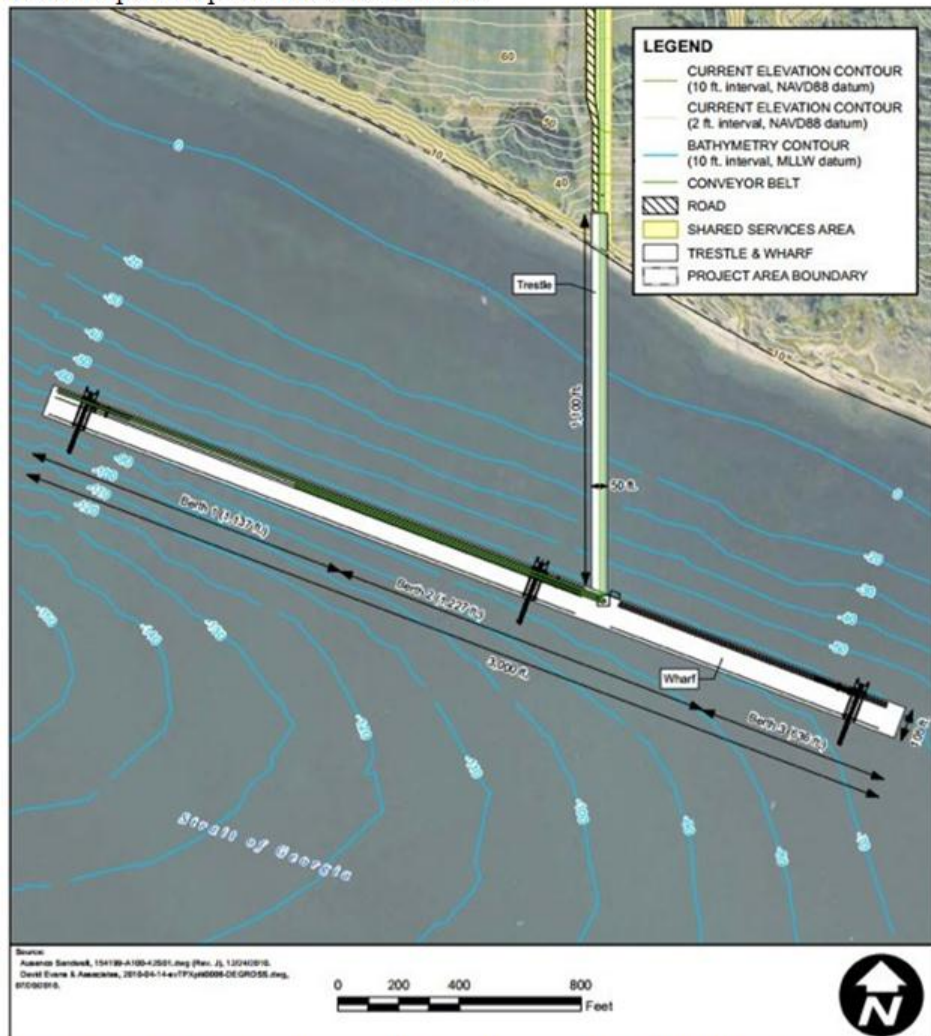


Figure 6. Aerial view depicting the proposed wharf and trestle at Cherry Point (PIT, 2011).

Alternative Action

Impacts

Shoreline aesthetics could be improved with the alternative action, with less coal dust falling on surrounding beach. The aesthetics of the Haro Strait may be preserved. With the implementation of noise reduced vehicles, marine life will continue to reside in the Strait. With marine life residing in the Strait the beauty of the region will be maintained.

No Action

Impacts

This action would result in no environmental impacts that would be a detriment to the environment.

4.2.3 Recreation

Proposed Action

Impacts

Sailing, kayaking, fishing and other water recreation are prevalent throughout the Salish Sea and Puget Sound. With an increase of up to 1 to 2 ships per day traveling through the Salish Sea (PIT, 2011) impacts associated with large commercial vessels will increase. All boats must avoid proximity to large vessels (Rutgers.edu, 1997). This rule along with the increase traffic will reduce and restrict use of open waters, and increase hazards caused by waves and wakes.

Alternative Action

Impacts

The alternative action would decrease the hazards caused by waves and wakes. The decrease in hazards from waves and wakes is due to the tug boats creating less of a wake than the commercial vessel moving on its own. The speeds of both tug boat and commercial vessel will be less and create less of a wake.

No Action

Impacts

This action would result in no environmental impacts that would be a detriment to the environment.

4.2.4 Historic and Cultural Preservation

Proposed Action

Impacts

Historically, Cherry Point has had many important uses for natives in the area. It was the primary home of many Lummi villages. The area is an important component of food gathering by the Lummi people used for hunting, fishing and gathering (Goldmark, 2010). The

implementation of another terminal on the shores of this historic area would degrade its cultural significance.

Alternative Action

Impacts

The alternative action would not result in any improvement in the effects that the proposed plan places on recreation in the area.

No Action

Impacts

This action would result in no environmental impacts that would be a detriment to the environment.

4.3 Transportation

Existing Conditions

Currently, there are about 250,000 ships that move through the Salish Sea every year (U.S. Coast Guard, 2004). These ships are comprised of tankers, cargo ships, ferries and tug boats with tows. Up to 950 ships per year may be transporting coal from Cherry Point through the Salish Sea to China. Capesize and Panamax ships are the largest ships in the world. Due to their massive size these ships would put an increase strain on the flow of transportation in and out of the Salish Sea. Bulk carriers are required to have a pilot and a tugboat escort through the Salish Sea and then a tow once the ship is closer to port. This would create an increase need of the limited number of pilots and tug boats because certain ships are required by law to have both the pilot and tug boat with them while in the Salish Sea (Watts, 2012).

4.3.1 Waterborne Vehicles

Proposed Action

Impacts

The ships are the length of three football fields and can be up to 32 meters wide. The main fuel for these ships is low-grade bunker fuel. Bunker fuel is the lowest grade of non-refined oil and contains the most contaminants of any liquid fuel type. Bunker fuel has not gone through the refiner process that gasoline and other fuels have gone through. This fuel must be heated up before being used in the engine. The newer carriers are required to have double hulls, while the ships that are over 20 years old are single hull (McKay, 2012). A single hull increases the possibility of being ruptured and spilling oil. The speed of the ships is between 14-15 knots. If the engines of the ship were to fail, it would take 3-4 miles for the ships to coast to a stop. The ships can hold more than 2 million gallons of bunker fuel and over 100,000 gallons of ballast water (McKay, 2012). These ships are able to hold 254,000 metric tons of deadweight coal and other shipments. This is a major issue if the ships were to have a shift in their cargo, causing them to capsize. Another problem would be if the ships were to run aground or into other vessels.

These ships would come from China and halfway across the pacific they would dump out the ballast water from China and pick up new ballast water from the ocean (McKay, 2012). Then

once near the USA water boundary they would once again dump out the ballast water and fill their tanks with US water. The ballast water is used to add weight to the empty ship to keep the ship low in the water to avoid the ship from capsizing. This ballast water has the potential to bring in various invasive species into the waters of the Salish Sea. On the return trip the carriers would not need ballast water due to their heavy cargo. Once the ships reach Port Angeles, they would pick up a pilot to steer the ship through the Salish Sea and into port at Cherry Point.

In entering and leaving the Salish Sea and Cherry Point, the carriers are required to have a tugboat escort through the Salish Sea and then a tow once the ships get closer to port. Bulk carriers are also required to have a pilot steer the ship through U.S. and Canadian waters. Ships of this size usually have at least two tugs through the sound. When entering US waters and the Salish Sea, the carriers must pick up a pilot to steer the ship through the various islands near and around the Haro Strait (Watts, 2012). The U.S. Coast Guard that provides the pilots and tugboats has very limited resources. Currently, there are not enough tugboats to both escort and come to the aid of ships that are in distress (U.S. Coast guard, 2004). This puts the responsibility of aiding a distressed ship upon any passing ship, either commercial or recreational (International Maritime Organization, 1997). Due to their size, amount of cargo, and the corrosion of the hull from the salt water, these ships have a tendency to break in the middle because that is where the most weight is and also the spot where the ships bows the most. This would cause a large spill of oil and coal.

Mitigation

By having more tugboats available for the increased number of ships would aid in less navigational errors. Additional tugboats would also decrease the buildup of shipping congestion if a spill were to happen by providing aid to the vessel.

Alternative Action

Impacts

The proposed alternatives for decreasing the probability of traffic accidents for these ships would be to have the ships treat their ballast water by either filtration, sterilization, UV light or chemical treatments, before dumping it directly into the ocean and near the US waters (Smithsonian, 2011). Treatments like these would decrease the possibility of invasive species entering the Salish Sea. Another proposed action would be to change the bunker fuel that is currently being used to a higher quality of bunker fuel that has been refined.

No Action

Impacts

This would also leave the current regulations of the Coast Guard as they are. This would avoid to any major coal or fuel spills in the Salish Sea from water transport vessels.

4.3.2 Bulk Carrier Hazards

Proposed Action

Impacts

Moisture from the open ocean air is another major problem for the ships and the cargo of coal. Water from the ocean air mixed with the coal dust, can cause a sludge to develop in the

bottom of the cargo hold. This allows the coal to move around in the hold and shift the ship's center of gravity (International Maritime Organization, 1997). This can lead the ship to pitch to one side, which in turn would cause a major shift in the coal and cause the ship to either capsize or break in half. After the coal is unloaded the ship's holds are required to be washed before a new shipment of coal can be placed in the holds. Any residual water from the cleaning can also mix with the shipment and form potential problems as well.

The ocean air and sea water have an impact on the ships themselves. The salt in the seawater can lead to an increase in corrosion of the hull and other parts of the ship. Corrosion can lead to the ship having a shorter life and to increase problems of equipment failure.

Because of the combined weight of the fuel, coal and of the ship itself, the carriers sink extremely fast. In some cases the ships sink faster than the crew can respond or be able to get to the lifeboats safely. During 1990-1991, 44 carrier ships sank, resulting in 248 deaths (McKay, 2012); these ships were all older than 15 years of age. With a disaster like this, a bottleneck can be potentially formed, slowing down the movements of other transport vessels for long periods of time. Spills can also put an increased stress on the U.S. Coast Guard to clean up the spill and keep vessels moving quickly through the Salish Sea.

Alternative Action

Impacts

These alternatives would be to have more maintenance people to ensure that the ship is in good condition before leaving port. The crew and the foreman of the port would verify that the holds have been cleaned for the next shipment.

No Action

Impacts

This would avoid any major spills in the Salish Sea from water transport vehicles.

4.4 Public Services and Utilities

Existing Conditions

Water and electricity services are provided by the Whatcom County Public Utility District. A sewage treatment plant will be located on the site of Gateway Pacific Terminal. Electricity utility lines are already provided to nearby facilities such as BP, Alcoa, and ConocoPhillips and require possibly a single line extension to supply the planned main substation on the northeastern portion of the project site. Water will require the installation of one additional line off the main underground pipe either along Aldergrove Road or Kickerville Road (GPT, 2011).

Emergency Services are provided by the North Whatcom Fire Rescue District 7 onshore and USCG offshore. The USCG responds to environmental and fire emergencies for all vessel traffic in the Salish Sea and responds to pollution reports within Puget Sound through the Marine Safety Office. The local fire district is generally equipped and trained for industrial fire emergencies. Currently there are no state wastewater regulations and permits required for coal transport. The EPA is presently the only regulatory force in terms of wastewater and ballast water production by commercial vessels. A revised version of the Vessel General Permit (VGP) incorporating state specific regulations is expected to be released in 2013.

Communication in the Salish Sea is provided by the USCG with the communication central based in Seattle. Commercial vessels of this size are required to move only in USCG VTS transit lanes. A vessel traffic risk assessment is currently underway.

4.4.1 Fire

Proposed Action

Impacts

Offshore fire safety as well as fire safety of docked vessels is provided by the USCG and the captain of the vessel. Onshore fire safety conveyer belts on the piers would be provided by NWFRS District 7. District 7 is presently staffed by 26 full-time career firefighters and 43 volunteer firefighters (WCFR7, n.d.). BP, Alcoa, and ConocoPhillips employ their own fire response team. NWFRS District 7 provides fire response for local private households, businesses, and industries as well as shipping industries along the coastline including an oil refinery and an aluminum smelting industry. The two closest fire stations are staffed by volunteer firefighters.

There will be an increase in demand for firefighters in case of emergency fire response. There will also be the need to train and equip local fire responders for possible oil and coal fires. Additional employment of staff would be required which are paid for by Whatcom County District 7 property taxes. With the location of GTP in this district an estimated \$655 million of property tax revenue will be provided which will enable the fire district to employ approximately 7 more full-time firefighters (Chief Gary Russell, 2013).

Alternative Action

Impacts

The installation of a reinforced pier and/or the installation of water docking stations along the pier as well as the installation of a sprinkler system within the conveyer belt will be required. Proper training of NWFRS District 7 fire personnel will have to be provided by GPT.

No Action

Impacts

No impact to the public or the NWFRS District 7 would occur under this alternative. There would be no need for additional fire response staff, equipment, or training.

4.4.2 Parks and Recreational Facilities

Proposed Action

Impacts

Elements that may be affected are Birch Bay State Park and Whitehorn Marine Reserve (Figure 14). Birch Bay State Park consists of 184 acres including 8,255 feet of marine saltwater shoreline and is located 2 miles north-northwest of proposed Gateway Pacific Terminal (WDNR, 2010). Whitehorn Marine Reserve is located about 2 miles northwest of Gateway Pacific Terminal and

includes 54 acres of beach, bluff, and forest (Whatcom County, 2007). In 1999 an agreement was reached with the Pacific International Terminals to provide public access to a portion of the saltwater marsh and adjacent lands at the southwest corner of the Whitehorn Marine Reserve property.

A new beach access would have to be established to mitigate for the loss of access possibly along Gulf Road (GTP, 2011).

Alternative Action

Impacts

A new beach access would have to be established to accommodate for the loss of beach access. There would be a possible endangerment of herring spawning ground along the saltwater shoreline, which will be turned into private property.

No Action

Impacts

No impacts would occur under this alternative. The currently established parks would remain in their current state.

4.4.3 Communications

Proposed Action

Impacts

The USCS handles all communication and is responsible for reviewing designated anchorage sites. Puget Sound Vessel Traffic Service (VTS) is located in Seattle and currently staffed by 31 active duty personnel, 1 reserve personnel, and 20 civilian personnel. The VTS communicates with two foreign services, Canada's Vancouver Traffic and Tofino Traffic. They currently monitor about 250,000 vessel movements a year comprised of tankers, cargo ships, ferries, and tugboats. An Advanced Notice of Arrival of at least 96 hours is required by the Puget Sound Harbor Safety Plan.

There will be up to an additional 487 vessels round trip per year. There is currently no proposed action to address communication for the increased traffic volume in the Salish Sea and the Strait of Juan. There will be a rise in need of USCG staff for the VTS to cover the increased amount of commercial vessel traffic.

Alternative Action

There is no alternative action for communication.

No Action

Impacts

No impacts would occur under this alternative. There would be no need for additional communication staff.

4.4.4 Sewage and Solid Waste

Existing Conditions

The International Convention for the Prevention of Pollution from Ships (MARPOL) prohibits the discharge of raw sewage into the sea within 12nm from land. Sewage has to be either stored onboard or treated by a sewage treatment plant before release (IMO, 2013). Release of sewage has to occur outside of the required 12 NM off Washington's outer Pacific coast. Sewage treated for type III is the most common form on recreational vessels, is re-circulated, incinerated MSDS and with holding tanks and can be released at least 3 nm off Washington's outer Pacific coast. Sewage biologically treated for type II and then separated from solids can be discharged within Puget Sound. (Washington State Department of Ecology, 2013). However, sewage treated for type II often contains higher levels of chemicals that has to be considered as possible impact. Type I sewage which is chopped and macerated and sometimes contains disinfectants. Sewage treated as type I can only be used for vessels smaller than 65ft and is only allowed on vessels built before January 1978. A new standard for maximum nitrogen and phosphorus content of release sewage is to be determined.

Proposed Action

There is currently no proposed action for raw sewage treatment and disposal from coal ships docking at GPT. There will be a sewage treatment plant for onshore facilities on-site.

Alternative Action

Impacts

Sewage has to be pumped off the docked vessels and treated in the sewage plant on-site. Additional pumps and hoses would have to be installed to pump sewage off docked vessels into the sewage treatment plant on site. Additional water will be required for reverse osmosis sewage treatment operation.

No Action

Impacts

No impacts would occur under this alternative. There would be no increased release of raw sewage into the Salish Sea.

4.4.5 Other Governmental Utilities

Proposed Action

Impacts

Offshore emergency response will be coordinated by the USCG. This includes on vessel emergencies as well as environmental pollution response through the Maritime Safety Office. The Oil Spill Prevention Act of 2010 outlines action in case of a spill (Resources, 2010). Commercial vessels of that size will be traveling only on USCG VTS transit lanes. A vessel traffic and risk assessment study has been requested. There will be a rise in need of US Coast Guard Maritime Safety Office staff to cover the increased amount of commercial vessel traffic.

Alternative Action

Impacts

A vessel traffic and risk assessment study will have to be conducted. There will be a rise in need of US Coast Guard Maritime Safety Office staff to cover for the increased number of commercial vessel traffic.

No Action

Impacts

No impacts would occur under this alternative. There would be no increased need of US Coast Guard staff.

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6. Appendices

Appendix A. Air

Carbon Dioxide Emissions by Fuel Type

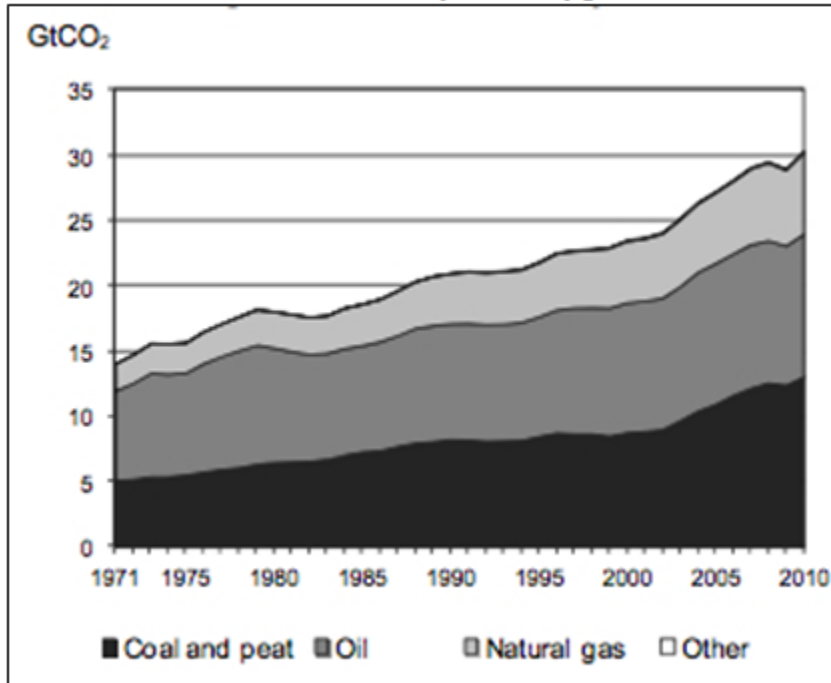


Figure 7. Carbon dioxide emissions by fuel type (IEA, 2012).

Carbon Dioxide Emissions from Transport

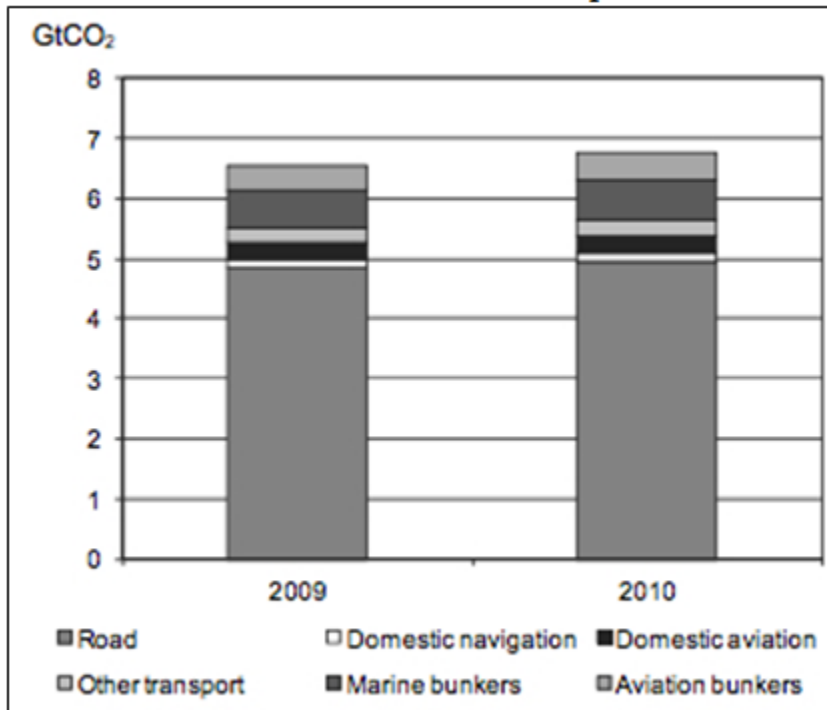


Figure 8. Carbon dioxide emissions from transport in 2009 and 2010 (IEA, 2012).

Appendix B. Flora and Fauna

Table 2. Federally listed Species that occur on the travel routes of the Coal Ships.

Name	Scientific Name	Federal Status and/or State Status
Bocaccio Rockfish	<i>Sebastes paucispinis</i>	Endangered
Canary Rockfish	<i>Sebastes pinniger</i>	Threatened
Yellow Rockfish	<i>Sebastes reuberrimus</i>	Threatened
Pacific Herring	<i>Clupea pallasii</i>	Species of Concern
Chum Salmon	<i>Oncorhynchus keta</i>	Threatened
Coho Salmon	<i>Oncorhynchus kisutch</i>	Species of Concern
Sockeye Salmon	<i>Oncorhynchus nerka</i>	Candidate
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened
Steelhead Trout	<i>Oncorhynchus mykiss</i>	Threatened
Pacific Cod	<i>Gadus macrocephalus</i>	Species of Concern
Pacific Hake	<i>Merluccius productus</i>	Species of Concern
Walleye Polluck	<i>Theragra chalcogramma</i>	Species of Concern
Brown Rockfish	<i>Sebastes auriculatus</i>	Species of Concern
Copper Rockfish	<i>Sebastes caurinus</i>	Species of Concern
Quilback Rockfish	<i>Sebastes maliger</i>	Species of Concern
Pinto Abalone	<i>Haliotis kamtschatkana</i>	Species of Concern
Dall's Porpoise	<i>Phocoenoides dalli</i>	None
Gray Whale	<i>Eschrichtius robustus</i>	Sensitive
Harbor Seal	<i>Phoca vitulina</i>	None
Pacific harbor Porpoise	<i>Phocoena phocoena</i>	Candidate
Humpback Whale	<i>Megaptera novaeangliae</i>	Endangered
Killer Whale	<i>Orcinus orca</i>	Threatened
Eel Grass	<i>Zostera marina</i>	N/A
Bull Kelp	<i>Nereocystis luetkeana</i>	N/A

Map of Herring Spawning Grounds

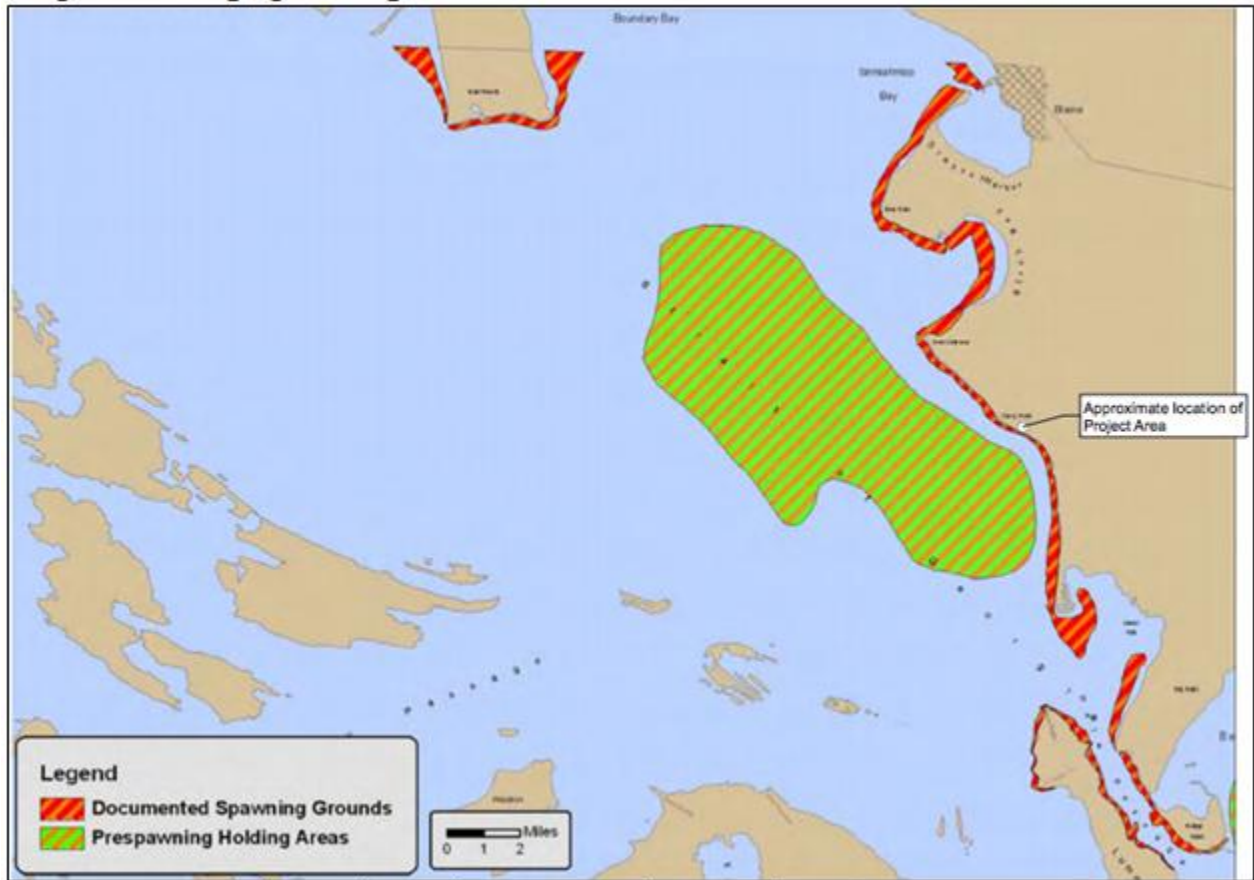


Figure 10. Map of Cherry Point Herring Spawn Area (PIT, 2011).

Appendix C. Transportation

Table 3. Vessels per Year by Vessel Class and Operations Phase (PIT, 2011).

Operation Phase	Approximate Year (estimated)	Operational Capacity (Mtpa)	Capesize/yr		Panamax/yr		Total
			Serving East Loop	Serving West Loop	Serving East Loop	Serving West Loop	
1	2015	25	77	0	144	0	221
2	2017	31	77	31	144	59	311
3	2021	45	122	31	229	59	441
4	2026	54	138	31	259	59	487

Bulk Carrier Design

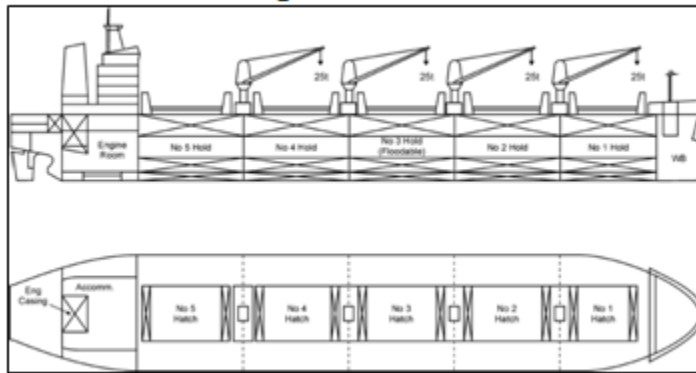


Figure 11. Bulk carrier general arrangement (Vladsinger, 2009).

Unified Command Vessel Drawing

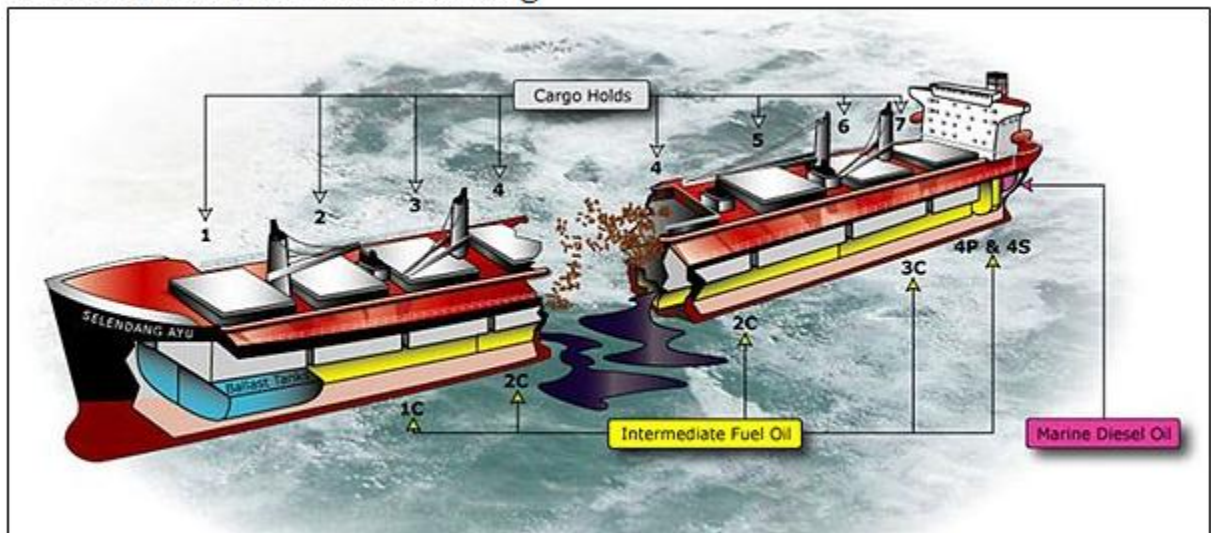


Figure 12. Drawing of the Selendang Ayu breaking in half dumping oil and cargo (Unified Command, 2005).

Appendix D. Public Services and Utilities



Figure 13. Map of Cherry Point Aquatic Reserve (WDNR, 2010).

Map of Parks & Recreation



Figure 14. Map depicting parks and recreational elements affected by the proposal namely Whitehorn Marine Reserve and Birch Bay State Park (PIT, 2011).

Whatcom County Fire Districts



Figure 15. Map depicting districts used by the Whatcom County Fire Department (WC7D, n.d.).

Table 4. Types of Marine Sanitation Devices (MSDs) and Treatment Systems (Ecology, 2013).

Type I	Type II	Type III
<p>Treats sewage before discharge by chopping or macerating. May add disinfectant chemicals. Disintegrates solids before discharging into water.</p>	<p>Provides higher level of treatment than Type I. Treats sewage by biological means before discharging. Separates solids for incineration or pumpout.</p>	<p>Does not allow the discharge of sewage. Includes re-circulating, incinerating MSDs and holding tanks.</p>
<p>Discharge must meet certain health standards for bacteria content; must not show any visible floating solids.</p>	<p>Effluent is cleaner than Type I, but contains greater level of chemicals.</p>	<p>Holding tanks are the most common kind of Type III MSD used on recreational boats. Waste is stored until it can be pumped out to a reception facility.</p>
<p>Only allowed on vessels smaller than 65 feet in length.</p>	<p>Usually requires more space and power than Type I.</p>	<p>Holding tank waste is not treated even if odor-reducing chemicals are added.</p>
<p>Being phased out of use on larger vessels. Only allowed if equipment was on vessel before Jan. 1978.</p>	<p>Usually installed on larger vessels only.</p>	<p>Allows for "Y-valve" to discharge directly overboard while outside the three nautical mile limit along Washington's outer coast.</p>