November 14, 2013

U.S. Army Corps of Engineers
Washington State Department of Ecology and
Cowlitz County
Delivered via e-mail
comments@millenniumbulkeiswa.gov

RE: Docket No. 2013-19738, EIS Scoping Comment for proposed Millennium Bulk Terminals - Longview LLC coal export terminal

Scoping Topics Covered in this Letter: Impacts on National Wildlife Refuges, fish and wildlife resources, ecosystems, communities, atmosphere

Dear Lead Agency Representatives:

Thank you for this opportunity to provide scoping comments for preparation of an Environmental Impact Statement (EIS) for the proposed Millennium Bulk Terminals – Longview LLC coal export facility (hereinafter referred to as "MBTL"). Please accept the following comments from Friends of Alaska National Wildlife Refuges, FRIENDS of the San Juans and Friends of Grays Harbor.

Friends of Alaska National Wildlife Refuges is an independent, non-profit organization dedicated to promoting the conservation of the natural resources of all the Alaska National Wildlife Refuges. The Friends promote understanding and appreciation of these refuges and assist the U.S. Fish and Wildlife Service in meeting its mandates. Our work includes educating the public and decision makers on local, national, and international levels about Alaska's National Wildlife Refuges; assisting refuges in accomplishing their missions through wildlife management and habitat improvement projects and funding refuge oriented projects through grants, memberships, donations, and other activities.

Friends of the San Juans is a non-profit organization founded in 1979 to support local efforts to manage growth and protect the natural beauty and rich wildlife in

Washington's San Juan Islands. Using science, policy, law, education, and citizen activism, Friends of the San Juans works to protect, preserve, and restore the land, water, and sea of the San Juan archipelago. Friends of the San Juans' activities include protection of orca whales and other endangered species; marine research and habitat restoration; ecological stewardship and conservation; land use and environmental compliance; community engagement and education. Friends of the San Juans' efforts have produced cleaner, healthier habitats for sensitive species in beaches, parks, and waters; inventories of marine and nearshore habitat to help rebuild depleted salmon stocks; and increased protections for our magnificent orca whales. Members of Friends of the San Juans live, work, and recreate in the San Juan Islands and on the surrounding waters, where they enjoy observing orca whales. FRIENDS is concerned about the marine impacts associated with the MBTL project – many of the concerns are echoed along the entire shipping route and must be included in the EIS process.

Friends of Grays Harbor (FOGH) is a broad-based 100% volunteer non-profit citizens group made up of crabbers, fishers, oyster growers, and caring citizens. The mission of FOGH is to foster and promote the economic, biological, and social uniqueness of Washington's estuaries and ocean coastal environments. The goal of FOGH is to protect the natural environment, human health and safety in Grays Harbor and vicinity through science, advocacy, law, activism and empowerment.

I. INTRODUCTION

MBTL proposes to construct and operate a shipping terminal along the Columbia River in Cowlitz County in order to export thermal coal from the Powder River Basin to Asia for burning in coal-fired power plants. In order for the MBTL to export coal to Asia as planned, it must use large commercial bulk carriers. If the MBTL is permitted, these vessels would transport at least 44 million metric tons of thermal coal annually from MBTL to Asia. The large bulk carrier vessels that MBTL would use for export of its cargoes (hereinafter referred to as "MBTL vessels") would be single hulled and use large amounts of fuel ("heavy residual oil" or "bunker fuel") and other oil that can persist if spilled in the environment. Although neither the MBTL letter dated August 5, 2013 from MBTL (Ms. Kristin Gaines) to Ms. Elaine Placido of Cowlitz County Building and Planning nor the JARPA submitted by MBTL describe the types or number of bulk carrier vessels that would be needed for MBTL's coal export scheme, it is estimated that 850 Panamax vessels would be required annually to export 44 mmt of coal resulting in some 1,700 Columbia River bar crossings to and from the proposed facility. It is also estimated that the coal burned from MBTL's export project would contribute

approximately 81 million tons of CO2 to the earth's atmosphere every year.

The Columbia River had approximately 1,428 large (over 300 gross tons) vessels crossing the bar to traverse up the Lower Columbia River in 2012. Given that they then return out the same route, the number crossing the bar is actually double that figure. The 2012 figure includes was made up of 1,311 cargo and passenger vessels, and 117 tankers/articulated tank barges. Although this number of transits is currently below higher levels of transit that existed at the turn of the century (2,283 per year), the volume of cargo has remained the same as the vessels have become larger.

The proposed MBTL would have a significant adverse impact on the National Wildlife Refuges in Alaska and Washington State. These refuges are inextricably linked by law (the National Wildlife Refuge System Administration Act of 1966 and National Wildlife Improvement Act of 1997, 16 U.S.C. §§ 668dd -668ee), and by the migratory fish and wildlife resources they share. Congress recognized that refuges in the National Wildlife Refuge system serve "a pivotal role in the conservation of migratory birds, anadromous and interjurisdictional fish, marine mammals, endangered and threatened species, and the habitats on which these species depend." Findings §2, National Wildlife Improvement Act of 1997, Pub.L.105-57, 105th Congress. The biological integrity, fish and wildlife diversity and environmental health of the Alaska and Washington's Refuges are interdependent. These refuges must be safeguarded as part of the network of related lands, waters, fish and wildlife for the benefit of present and future generations of Americans.

We request that the scope of the EIS for the MBTL include a full and rigorous assessment of all direct, indirect and cumulative impacts on Alaska's National Wildlife Refuges and National Wildlife Refuges in Washington State, including the fish and wildlife dependent upon these Refuges; the air, water, marine, and terrestrial environments in these refuges; and the communities, economies, and cultures that rely on the health of the natural systems that sustain these refuges. Because NEPA and SEPA do not place a time or location restraint on reasonably foreseeable adverse impacts, our request is within the purview of the EIS.

II. SHIPPING IMPACTS ON ALASKA MARITIME NATIONAL WILDLIFE REFUGE AND OTHER REFUGES

Alaska has 16 wildlife refuges that are part of the National Wildlife Refuge System (see map, Attachment C). 83% of all National Wildlife Refuge lands in the U.S.

are located in Alaska. The Alaska Maritime National Wildlife Refuge (hereinafter Alaska Maritime Refuge) contains more than 2,500 islands, islets, spires, rocks, reefs, waters and headlands that extend from Forrester Island, to the north of Canada's Queen Charlotte Islands deep in the southeast tongue of the state, to the westernmost tip of the Aleutian Islands, and north to Cape Lisburne on the Arctic Ocean. The 3.4 million acres of the Refuge are spread out along most of the 47,300 miles of Alaska's coastline. There are five units within the Refuge: Aleutian Islands Unit; Gulf of Alaska Unit, Bering Sea Unit, Alaska Peninsula Unit, and Chukchi Sea Unit. The Refuge protects essential habitat for seabirds, shorebirds, waterfowl, marine mammals, fish, and other wildlife. The Refuge contains one of the most important marine ecosystems in the world. Its isolated islands host unique species not found anywhere else. For more than two decades, Alaska Maritime Refuge has operated the M/V Tîglâx, a research vessel used for studying the biological resources and marine food web in the Gulf of Alaska and Bering Sea.

The Alaska Maritime Refuge is home to more than 40 million seabirds (80% of all the seabirds found in Alaska) representing more than 30 species. These birds forage for fish and plankton in the seas surrounding the Refuge. Some 250 migratory bird species, including rare species from Asia and North America, use the Refuge. Some species and subspecies of birds in the Refuge are found nowhere else. Some of the birds that nest on the refuge – including Whiskered, Crested, and Least Auklets, Red-legged Kittiwakes, Aleutian Terns and Red-faced Cormorants – live and breed solely in the core Bering Sea-North Pacific Ocean zone. The vast majority of Fork-Tailed Storm-Petrels and Horned and Tufted Puffins breed in Alaska and on the Refuge. Millions of Shearwaters come to the Refuge during the summer to feast on the abundant ocean resources. The Aleutian Cackling Goose relies on unique nesting habitat on Buldir Island in the Refuge and is one of the few species to have been removed from the Endangered Species list based upon conservation efforts in the Refuge. The Refuge also provides important breeding and nonbreeding habitat for shorebirds. For example, a large proportion of the *couesi* race of Rock Sandpipers breeds and winters in the Aleutian Islands. These Islands also support about 10% of the breeding population of Black Oystercatchers. Species of migratory shorebirds that breed or stopover in the Refuge and that winter or stopover in Refuges in Washington State include Black-bellied Plover, Semipalmated Plover, Greater Yellowlegs, Whimbrel, Marbled Godwit, Red Knot, Red-necked Phalarope, Sanderling, Western Sandpiper, Least sandpiper, Short-billed and Long-billed Dowitchers, Surfbird, Killdeer and Dunlin.

Thirty Maritime Refuge sites (including Unimak Pass identified as a top Important Bird Area (IBA) based upon bird abundance and diversity) have been identified by National Audubon as IBAs of the Bering Sea Eco-region under an international bird

conservation program spearheaded by Audubon Alaska with Russian and Asian partners. (An IBA is an international designation used in more than 150 countries to indicate that an area harbors bird species of special concern, species with restricted home ranges, and species that are vulnerable because they exist in high concentrations and therefore could suffer significant negative impact from a single event). Birds found in the Alaska Maritime Refuge, including individuals of 58 species in the Aleutian Islands Unit, 60 species in the Alaska Peninsula Unit, and 64 species in the Gulf of Alaska Unit, migrate to the San Juan Islands; Grays Harbor, Willapa Bay, and Columbia River estuaries, and the national wildlife refuges in Washington.

The Refuge also supports endangered and threatened marine mammals (Steller sea lion and sea otters), as well as Northern fur seals, walrus, harbor seals, and Northern elephant seals. These mammals breed or find refuge on remote Refuge beaches or offshore islets. Nearshore waters of the Refuge provide protected "nurseries" for endangered and declining marine mammals. Nearshore waters also contain habitat for the following Cetacea: Gray Whale, Blue Whale, Fin Whale, Sei Whale, Minke Whale, Humpback Whale, Sperm Whale, Baird's Beaked Whale, Cuvier's Beaked Whale, Killer Whale, Pacific White-sided Dolphin, and the Dall's Porpoise. For many marine mammals, Unimak Pass in the Aleutian Islands provides a critical migratory corridor between the North Pacific Ocean and the Bering Sea. This Pass has been called a marine mammal "superhighway," used by Humpback Whales, the threatened population of Steller Sea Lions, fur seals, and many other wildlife species moving between the two water bodies.

At least 93 species of fish, skates, and sharks have been documented in the cold, turbulent nutrient-rich Alaska Maritime Refuge waters. The fish resources in waters around the Alaska Maritime Refuge are not only important to wildlife. The waters of the Bering Sea and Gulf of Alaska surrounding and adjacent to the Alaska Maritime Refuge provide vital habitat for the five species of Pacific salmon during the ocean phase of their life: Chinook, Chum, Coho, Pink, and Sockeye. Each year, juvenile Pacific salmon from Washington, Oregon, California, and British Columbia migrate far at sea to Alaskan waters – into the Gulf of Alaska, Bristol Bay, and Aleutian Islands - and eventually back to their inland natal streams to spawn. The species of salmon spend a significant part of their lives in open waters of the North Pacific and Bering Sea. Populations of Pacific salmon from Washington State, including from the Salish Sea area and their natal streams that empty into the Pacific Ocean along coastal Washington, migrate thousands of miles north from Washington. They travel in nutrient-rich currents along the west coast of Canada and southeast Alaska to reach the biologically rich waters of the Gulf of Alaska and around the arc of the Gulf into the Bering Sea. (See maps, Attachment A.) Unimak Pass in the Aleutian Islands provides a major, direct conduit for salmon to travel

between the shelves of the North Pacific and eastern Bering Sea. The Pass is a significant source of nutrients to the productive "green-belt" ecosystem of the southeastern Bering Sea shelf. Chinook salmon and steelhead trout tagged in the Aleutian Islands have been recovered in rivers in Washington.

Rich eelgrass beds and kelp forests that provide substrate and shelter for invertebrates and fish and serve as an important source of nutrition for seabirds are found in the waters of the Aleutian Islands. Izembek Lagoon in the adjacent Izembek National Wildlife Refuge contains two of the world's largest eelgrass beds that provide a rich fueling and resting area for over half a million migrating geese, ducks, and shorebirds. The Lagoon supports nearly the entire world's population of migrating Pacific Black Brant, a species whose numbers have been declining in recent decades. The Aleutian Islands are also home to coral gardens where more than 100 species of cold water corals, including some endemic to the region, provide rich habitat for numerous fish and invertebrates, including rockfish, shrimp, and golden king crab. New species are continually being discovered in the Alaska Maritime Refuge.

A. <u>North Pacific Great Circle Route and Unimak Pass</u>

A "great circle route" is the shortest distance between two places on the earth's surface. A circle route follows a line described by the intersection of the surface with an imaginary plane passing through the earth's center. Large commercial vessels from Pacific coast ports in the U.S., Canada, and Asia traverse the North Pacific Great Circle Route (Great Circle Route) because it is the most direct transit route (see map of Route, Attachment B). Large and small vessels traveling the Route carry significant volumes of fuel and other oils as well as cargoes - including hazardous materials, fossil fuels, and chemicals - and invasive species. A foreseeable consequence of the proposed MBTL, if approved, would be a significant increase in vessel traffic to and from Asia along the North Pacific Great Circle Route through the waters surrounding and adjacent to the Alaska Maritime Refuge and other Alaska coastal refuges, including through and/or near the Aleutian Islands and Unimak Pass. MBTL vessel traffic would add to all existing and foreseeable future vessel traffic using this Great Circle Route.

Because of the Aleutian Islands arc, vessels traveling to Asia using the North Pacific Great Circle Route may pass through the islands twice, once through Unimak Pass and again through the westernmost islands, for example, Buldir Island. Vessels from Asia also travel through or near the Aleutian Islands. The Great Circle Route crosses the transit lanes and fishing grounds of the largest fisheries in North America, valued in excess of $1.5 billion annually.

The majority of the vessels traversing the Great Circle Route are foreign flagged on “innocent passage” (right of vessel passage through a state’s territorial sea when not calling at a port in that state - up to 12 nautical miles from the baseline), so they are exempt from U.S. Coast Guard requirements for vessels calling on ports. Heavily traveled Unimak Pass in the Aleutians is an "international strait" that foreign vessels can enter without regulatory restriction. There are no shipping lanes and no notification or pilotage requirements. In addition to large commercial vessels (classed as containerships, bulk carriers, car carriers, tanker vessels, and others), fishing vessels, ferries, cruise ships, tugs, and local supply, service and work vessels and barges operate in and around areas within the Great Circle Route including the Aleutian Islands region.

In addition to ships sailing on the Great Circle Route, large vessels traveling to and through the Artic Northwest Passage will also pass through the Aleutian Islands including via Unimak Pass. Usage of the Arctic Northwest Passage shipping route is predicted to increase due to warming of the climate and melting sea ice resulting from greenhouse gas emissions. In September 2013, a Panamax size bulk carrier, the *Nordic Orion*, containing 73,000 tons of metallurgical coal exported from Vancouver, B.C passed through the Aleutian Islands to sail via the Arctic Northwest Passage to Finland.

B. <u>Vessel Accidents – Risks and Consequences</u>

Accidents along the Great Circle Route, particularly in Alaska Maritime Refuge’s Aleutian Islands region, are not uncommon. In fact, this area is well-known not only for frequent and sudden storms, very high winds and severe sea conditions, but also its history of accidents and spills. (See map Attachment B.) Recent accidents involving the large and growing fleet of vessels traveling along the Great Circle Route from Pacific Coast ports have resulted in fuel oil and cargo spills with serious consequences. In December 2004, a Malaysian-registered bulk grain carrier, *M/V Selendang Ayu*, traveling from Seattle to China went adrift just past Unimak Pass, ran aground and broke apart on Unalaska Island during a severe storm. The accident resulted in the death of six crew members when a U.S. Coast Guard (USCG) rescue helicopter crashed. The event also resulted in a spill of 340,000 gallons of heavy bunker fuel and the ship’s cargo of soybeans. Due to bad weather and the near-absence of oil-spill-cleanup capability, nearly none of the oil was recovered. The oil coated twenty miles of the Alaska Maritime Refuge coastline. Some 1,700 seabird carcasses were found, but this is believed to be only a fraction of the number of birds killed. Only 29 birds were rescued. The incident also endangered commercial fisheries.

The Transportation Board of the National Academies of Sciences (NAS) stated that the M/V *Selendang Ayu* accident was not an isolated event: “[E]ach year, accidents and near accidents occur in the Aleutians with the potential for significant environmental

and economic consequences." Many of these accidents have involved casualties as well as fuel and cargo spills. There is only very minimal capability to respond to large vessels in distress along the North Pacific Great Circle Route near and through the Aleutians, particularly in harsh weather conditions. Radio network gaps can hinder communication in the area. In many cases, the nearly complete lack of response equipment and vessels coupled with unforgiving weather and sea conditions have prevented any response to these events. As a result, nearly all efforts to recover oil from these accidents have been ineffective.

Other recent large vessel accidents in the Aleutian Islands include the *Golden Seas* freighter carrying canola seed, diesel and fuel oil that went adrift during a massive storm just north of Adak Island in December 2010; the 14-deck car carrier *Cougar Ace* tipped over south of the Aleutian Islands while switching out water in its ballast tanks in July 2006; the M/V *Kuroshima* frozen seafood freighter broke its anchorage during a storm in November 1997 and ran aground in Summer Bay, Unalaska Island, releasing approximately 40,000 gallons of heavy fuel oil that damaged fish and wildlife resources and threatened fisheries.

Accidents and spills along the North Pacific Great Circle Route are not confined to the Aleutian Islands. Most recently, on December 31, 2012 in the Gulf of Alaska during an intense winter storm, the Shell Oil drilling rig *Kulluk* en route from the Beaufort Sea to Seattle broke away from one of its tow lines, drifted, and ran aground off Sitkalidak Island, southeast of Kodiak Island near units of the Kodiak National Wildlife Refuge. The coastline off Sitkalidak Island traps abundant food sources upwelling from the central Gulf of Alaska that attract large numbers of seabirds and marine mammals. Waters around this island have the largest concentration of herring in the archipelago. The largest flock of common murres ever recorded by U.S. Fish and Wildlife was in Sitkalidak Strait, which is also threatened Steller sea lion critical habitat. Accidents and spills from increased vessel traffic would have significant adverse impacts on the ecosystems of the Alaska Maritime Refuge and possibly other Alaska National Wildlife Refuges, including the Izembek, Alaska Peninsula/Becharof, Kodiak, and Togiak Refuges, devastating wildlife, marine and coastal habitat, economies, and cultures that depend on the region's rich fish and wildlife resources.

Based upon the volume of vessel traffic currently traversing and planned to traverse the North Pacific Great Circle Route to and from Asia and via the Aleutian Islands to the Arctic Northwest Passage, we request that the EIS for the MBTL identify, quantify and evaluate the risk and consequences of accidents, spills and other discharges of fuel and cargo along this route, as well as the potential impacts on the ecosystems and

resources of Alaska's National Wildlife Refuges. This must include an evaluation of worst case scenarios. The EIS must at a minimum:

- *identify the type and quantify the number of vessels that would travel to and from MBTL annually from the time of initial operation of the MBTL, through full operation of the terminal, and over the life of the MBTL;*

- *identify with specificity the entire route or routes, that MBTL vessels would take to and from Asia during all seasons of the year, including passage along the North Pacific Great Circle Route and through the Aleutian Islands;*

- *identify and evaluate operation and safety laws/regulations applicable to the MBTL vessels' passage along the entire route or routes from Washington State to Asia, including international straits and waters, and identify the entities that would be responsible for compliance with each law/regulation identified and liability for non-compliance;*

- *identify with specificity the likely owners and operators of MBTL vessels, the flags under which they would operate, and whether/where the vessels would be sailing under the right of innocent passage;*

- *identify, quantify, and evaluate the risk of MBTL vessel accidents all along the Great Circle Route (including collisions, allisions, powered groundings, drift groundings, fire and explosion, structural failures, and founderings);*

- *identify, quantify and evaluate the types and volumes of fuel (including fuel oil and diesel fuel), lubricating oil, hydraulic oil, mechanical oil, and cargo that would be carried by MBTL vessels, and under what circumstances, including results of an accident or during operations, fuel and other oils, and/or cargo could be spilled, discharged, or otherwise released into the environment;*

- *evaluate the types and efficacy of all safety communication systems and equipment that would be on board each MBTL vessel and the entities that would be responsible for providing and maintaining this equipment;*

- *identify and evaluate all rescue protocols and maritime accident response infrastructure along the MBTL vessels' routes;*

- *identify, quantify, and evaluate all potential impacts of MBTL vessel accidents or operational events that may result in fuel, oils, and cargo spills and/or other materials discharges on:*

a. *oceans and shorelines, including all aquatic and terrestrial habitats;*
b. *fish, marine mammals, other marine vertebrates and invertebrates;*
c. *seabirds and their rookeries, water fowl, shorebirds and all other birds;*
d. *terrestrial mammals;*
e. *phytoplankton and zooplankton;*
f. *aquatic and terrestrial plants*
g. *the marine food web;*
h. *commercial, sport, and subsistence fisheries;*
i. *tourism, local economies, communities, and cultures;*

- *identify who would pay the costs of response, assessment of damages, remediation, cleanup, and restoration of natural resources and damages for all impacts that could result from a MBTL vessel accident or operation;*

- *Identify impacts from projections of ship traffic for the MBT project, and quantify the increased risk of accident from the extra transits; and*

- *evaluate the cumulative risks of all existing and projected transits, including large vessels over 300 tons, vessels carrying a dangerous cargo, and cruise ships and other vessels. This type of cumulative assessment is required as it will reveal risks that, while perhaps appearing to be minor on an individual level, once quantified in a cumulative assessment framework, may actually turn out to be highly relevant contributors to the risk profile when placed in the context of the overall risk to the North Pacific Great Circle Route, waters near Alaska's National Wildlife Refuges, and the Lower Columbia River.*

A reasonable review of the increased risk and consequences of accidents and spills from vessel traffic along the route from Washington State to Asia must not consider the MBTL vessels in isolation. Instead, the EIS must also evaluate MBTL vessel traffic in the context of existing and future vessel traffic along the North Pacific Great Circle Route, including large commercial vessels on their way to the Arctic Northwest Passage. *Therefore, we request that you identify, quantify, and evaluate the cumulative risks and impacts of accidents and spills involving MBTL vessels when added to the following existing and future vessel traffic along the North Pacific Great Circle Route, including in waters near Alaska's National Wildlife Refuges:*

- *the 4,500+ large commercial vessels and all other vessels that currently travel this route;*

- *future vessels from all other new coal export terminal projects planned for Washington, Oregon and British Columbia ("B.C."), including planned expansions of existing B.C. coal terminals;*
- *all other planned Washington, Oregon, B.C., and Alaska fossil fuel export projects, including Enbridge Northern Gateway and Kinder Morgan tar sands export projects as well as LNG export projects; and*
- *all planned new container, bulk carrier, and cruise ship projects.*

C. Non-Native and Invasive Species

Another significant impact of increased vessel traffic from MBTL is the introduction of alien aquatic species. Shipping is a well-known vector for introducing alien species into the marine environment, and it is reasonably foreseeable that the risk of introducing alien species would be amplified by increased vessel traffic. Marine and terrestrial invasive species threaten Alaska's National Wildlife Refuges' resources. Significant adverse impacts result from the introduction of invasive aquatic species into the marine environment including competing for food with indigenous fish, shellfish, and birds. Some invasive marine species could irreparably and permanently alter the invaded marine ecosystem. The coastal areas of Alaska are already experiencing the effects of invasions by aquatic species. These species are most commonly introduced through ballast water exchange, although ballast water may also be released during an accident or other emergency event. Alien aquatic species are also released from fouled hulls or other vessel structures and equipment.

The Bering Sea region has been dramatically affected by the introduction of alien terrestrial species from vessel traffic. In particular, rodents are a major threat to birds in the Aleutians because they prey on live nesting birds, their chicks, and eggs and can destroy entire sea bird colonies. Rats, including those swimming to land from shipwrecks, have invaded 30 Alaskan Islands, including those within the Alaska Maritime Refuge. Although the U.S. Fish and Wildlife Service has undertaken eradication efforts, the threats from rodents persist. It is reasonably foreseeable that increased vessel traffic would bring increased rodents.

We request that you include within the scope of the EIS a study of the risk to and direct, indirect, and cumulative impacts on Alaska's marine environment from the introduction of non-native and invasive aquatic species from MBTL vessels and the cumulative impacts of MBTL vessels and the existing and future vessels identified in the previous section, "Vessel Accidents and Consequences." Identify: areas of the oceans, habitats, native species, and fisheries within the Great Northern Circle Route that are vulnerable to this impact; the measures MBTL would take to ensure that its vessels

would not introduce alien marine species into Alaskan waters; the entities that would be responsible for enforcement of these measures; and who would pay the costs resulting from release of these species into Alaskan waters.

The EIS must also include a study of the risk to and potential direct, indirect, and cumulative impacts on the Alaska Maritime Refuge, including to its bird species and their habitats, from the introduction of non-native rodent species from MBTL vessels and the cumulative impacts of MBTL vessels and the existing and future vessels identified in the previous section, "Vessel Accidents and Consequences." Identify: areas of the Alaska Maritime Refuge and other Alaska National Wildlife Refuges vulnerable to this impact; all measures MBTL would take to ensure that its vessels would not introduce alien rodent species into the Alaska Maritime Refuge, including all rodent prevention and control measures aboard MBTL vessels; the entities that would be responsible for enforcement of these measures; and who would pay the costs resulting from release of these species on or near Alaska's islands and the efforts to eradicate them.

D. <u>Noise Impacts On Marine Mammals</u>

Marine mammals, especially cetaceans, depend on sound to communicate, find food, reproduce, detect predators and hazards, navigate, and sense their surroundings. The increasing large commercial vessel traffic is also increasing the amount of human-produced ocean sound that functions as noise for marine mammals. Large commercial vessels, including large bulk carriers that would be used by MBTL for its shipments to Asia, produce loud and predominantly low frequency sounds. Sounds can emanate from the ships' propellers, machinery, hull passage through the water, and the increasing use of sonar and depth sounders. The concentration of large commercial vessels in areas like the North Pacific Great Circle Route, including Unimak Pass, can amplify low-frequency ambient noise in these areas. Low-intensity sound, in particular, can travel over great distances and encompass a potentially large area of impact. These noises may be heard over millions of square kilometers of the ocean. It is reasonably foreseeable that MBTL vessels would add substantially to the noise all along the route to and from Asia.

The reaction of marine mammal species to noise can vary depending on species and individual characteristics. Some effects include: stress; hearing damage; strandings; displacement from critical feeding and breeding grounds; avoidance and shifts in migration paths; and changes in vocalizations (including decrease), respiration, swim speed, diving, and foraging behavior. Noise may contribute to the decline of lack of recovery of some marine species. Noise may also change the distribution of prey species and disturb other aspects of the marine ecosystem, with resulting negative

impacts on marine mammals. The increased noise in the marine environment from MBTL vessels would have significant adverse impacts on marine mammals. Moreover, this noise would add to the already increasing ambient noise in the Northern Hemisphere, with significant damaging effects on marine mammals.

In*clude within the scope of the EIS for MBTL a study of the direct, indirect and cumulative impacts on marine mammals from noise emanating from MBTL vessels along the routes to and from Asia. Study the cumulative impacts of noise on marine mammals from MBTL vessels that would be added to existing and future vessels identified in the previous section, "Vessel Accidents and Consequences," and other sources of noise in the marine environment along the route of the MBTL vessels, including marine seismic surveys, military sonar, oil and gas exploration and production. Determine the marine mammal species vulnerable to these noise impacts and their likely responses to noise impacts. Also include in your study the type, volume (including decibel level), and duration (pulse and/or constant) of noise from the MBTL vessels, input per unit, and total input from MBTL vessels. Study how noise would be generated by MBTL vessels, including the specific structure(s) and equipment; operational measures that would be taken to avoid or lessen noise impacts; and how and by whom such measures would be enforced.*

III. ATMOSPHERIC CO2 AND MERCURY IMPACTS IN ARCTIC NATIONAL WILDLIFE REFUGE AND OTHER REFUGES

The effects of additional increases in atmospheric CO2 will impact not only the Alaska Maritime Refuge, but will occur in all Alaska National Wildlife Refuges. The vast, remote, and undisturbed lands in these refuges contain relatively intact and complete ecosystems that provide habitats for the species dependent upon them. Global climate change is already having dramatic effects at high latitudes, including the Alaska Refuges and their trust species. Evidence of climate change in Alaska includes increasing air temperatures, changing precipitation patterns, decreasing snow and sea-ice extent, thawing permafrost, glacial retreat, drying of wetlands, alteration of habitats, rising sea level, and frequency and intensity of storms. Terrestrial, marine, and freshwater biological systems are all affected by climate change.

Impacts on fish and wildlife from climate change can include changes to their habitats, distributions, population sizes, physiology, migration routes, and behavior. Some habitats may disappear entirely, forcing species into new areas where they may encounter increased harvest pressures, disturbance, greater incidence of disease, predation and competition. Migratory bird species in the Refuges are also

fundamental components of biodiversity in more southerly latitudes. Timing of bird migration, egg hatch, and insect emergence may shift because of climate change affecting biodiversity not only in Alaska's National Wildlife Refuges but also in Washington State refuges. A changing plant growing season or the disappearance of some plant species can impact wildlife species, such as migrating caribou that are dependent on the occurrence of forage plants during the peak calving season. The most vulnerable species are those specifically adapted to the specific features of the arctic or alpine environment, those that are cold-adapted, rare or endangered species, and less mobile species. Climate change also impacts fisheries and the people, economies, and cultures that depend on them. Changes in water temperature can affect fish growth, egg development, transition from freshwater to saltwater, migration, spawning, and incidence of disease. Pacific salmon are particularly at risk as climate change alters temperature, water-mass distribution, and food supply.

The effects of climate change on wildlife are already keenly felt in the Arctic National Wildlife Refuge (Arctic Refuge) which stretches from interior Alaska north across the Brooks range and contains some of the most diverse wildlife in the Arctic, including 42 fish species, 37 land mammals, eight marine mammals, and more than 200 migratory and resident bird species. The Arctic Refuge, considered by many to be the crown jewel of the National Refuge System, contains the largest intact ecosystem in the world. This Refuge stretches across five different ecological regions: coastal marine areas with lagoons, beaches, and saltmarshes; coastal plain tundra; alpine tundra of the Brooks Range; the forest-tundra transition south of the mountains; and spruce, birch, and aspen of the boreal forest. More than any other region, the Arctic has experienced warming rates almost twice the global average. The Arctic Refuge has warmed more than 4° Fahrenheit over the last 50 years and is predicted to continue warming. Trust mammal species that are being impacted in the Arctic Refuge include the iconic polar bear and muskox.

The highest density of polar bear land dens along Alaska's coast is in the Arctic Refuge. It is well-known that polar bears are already profoundly impacted by changes to their sea-ice habitat, prey availability, and altered denning habitat. Muskox numbers on the Arctic Refuge are also in decline. Shorebirds and waterfowl use the Arctic Refuge's river deltas, barrier islands, lagoons, and other coastal areas for nesting and staging. The Arctic coastal plain in the Refuge supports high densities of breeding shorebirds including the Semipalmated Sandpiper, Red-necked Phalarope, Black-bellied Plover, Long-billed Dowitcher, Ruddy Turnstone, Red Knot and Red phalarope. Over 7% of the world's population of American Golden Plovers breeds in the refuge. Bird habitats in the Arctic Refuge are vulnerable to flooding from rising sea levels and increased storm surges, drying wetlands, and melting permafrost that can result in

hydrological changes in terrestrial arctic regions and changes in dominant tundra vegetation types. These changes can disrupt the feeding and nesting of birds. Other significant climate change effects in the Arctic Refuge that impact fish, wildlife and plant species include melting glaciers, coastal erosion, and warming permafrost areas.

Carbon dioxide (CO2) is the most important anthropogenic greenhouse gas driving global climate change. Global increases in CO2 concentrations are due primarily to fossil fuel use, including a majority from burning coal in power plants. Increasing CO2 emissions from burning coal will result in more warming of the Arctic, loss of sea ice and melting permafrost. Methane releases from shallow hydrate deposits in the Arctic are expected to increase as climate change continues to cause diminishing sea ice and melting permafrost. Methane is the second most important long-lived greenhouse gas that contributes to climate change. Although increases in Arctic methane due to permafrost melting and hydrates have not been measured, some scientists predict dramatically increased future methane releases that will have catastrophic greenhouse warming consequences.

In addition to global climate change, ocean acidification is a grave consequence of increases in anthropogenic CO2 in the atmosphere. Alaska's productive marine waters are becoming increasingly acidic from CO2 uptake. Colder waters, including the frigid waters off Alaska's coasts, absorb more CO2 than tropical waters. The shallow waters of Alaska's continental shelves also retain more CO2 in areas of less mixing of seawater with deeper ocean waters. Ocean acidification hampers the ability of calcareous invertebrates, such as shellfish and oysters, to build shells. These animals are important food to bird and mammal species and are commercially important. Calcareous invertebrates such as pteropods (sea butterflies) and euphausiids, essential prey items of marine mammals and commercially important fish species like salmon, are also at great risk from increasingly corrosive ocean waters. Ocean acidification can also have profound effects on Alaska's corals (used by many fish and crab species as habitat) that are dependent on the extraction of calcium carbonate from seawater for skeletal building.

Time is running out. The rate of greenhouse gas emissions must be slowed significantly. The World Meteorological Organization reports that the 2012 average annual concentration of CO2 in the atmosphere reached a new high of 391.1 parts per million. According to the Organization, this was an increase of 2.2 parts per million of CO2 from 2011 to 2012, and above the average 2.02 parts per million per year for the past 10 years, showing an upward and accelerating trend. Approval of MBTL's proposed coal export facility would promote increasing Asian coal consumption and undermine efforts to reduce greenhouse gas emissions.

Coal fired power plants not only contribute to atmospheric CO2, but also release the potent neurotoxin mercury into the atmosphere. Mercury released into air from coal fired power plants in Asia travels across the Pacific Ocean by atmospheric and oceanic currents to Alaska. In aquatic environments, mercury converts to methylmercury and enters the food chain. Methylmercury accumulates in animal tissues and builds up through the food chain (bio-magnification), particularly in an aquatic food web. For example, plankton that take up mercury are eaten by smaller fish that are eaten by larger fish that are consumed by marine mammals and humans. At each step of the food chain, the toxic effects of mercury are amplified.

The MBTL would export for use in Asian coal-fired power plants: 44 million metric tons of coal annually upon full build out. It has been estimated that the coal burned from MBTL's export project would contribute approximately 81 million tons of CO2 to the earth's atmosphere every year. MBTL, in addition to other coal export projects currently planned for Washington and Oregon, would annually export nearly 100 million metric tons of thermal coal to Asia for use in coal-fired power plants with the potential for an even higher ultimate planned coal export capacity. Canada currently exports coal to Asia and has plans to increase its coal export. Alaska also has coal export projects. It is reasonably foreseeable that burning coal exported from MBTL as well as from MBTL coal exports added to coal exported from other planned northwest coal export terminals will contribute to atmospheric CO2 and mercury, climate change, and ocean acidification resulting in significant impacts to Alaska's National Wildlife Refuges and their marine environment.

The EIS must include a detailed and comprehensive study of the greenhouse gas and mercury emissions associated with burning coal in countries that would import coal from MBTL, as well as cumulative impacts from burning coal from all other coal export existing and planned coal terminals for Washington, Oregon, Alaska, and B.C. Include a study of the direct, indirect, and cumulative impacts of greenhouse gas emissions and mercury releases over the projected operational life of the MBTL coal terminal singly and in combination with the other existing and planned northwest coal export terminals. Provide an analysis of the direct, indirect and cumulative climate change, ocean acidification, and mercury emissions impacts on Alaska's National Wildlife Refuges, including on:

a. *oceans and shorelines, including all aquatic and terrestrial habitats;*
b. *fish, marine mammals, other marine vertebrates and invertebrates;*
c. *seabirds and their rookeries, water fowl, shorebirds and all other birds;*
d. *terrestrial mammals;*

e. phytoplankton and zooplankton;
f. aquatic and terrestrial plants
g. the marine food web;
h. commercial, sport, and subsistence fisheries; and
i. tourism, local economies, communities, and cultures.

IV. IMPACTS ON WASHINGTON REFUGES THAT SHARE FISH AND WILDLIFE RESOURCES WITH ALASKA AND PROVIDE SUPPORTING ECOSYSTEMS

Important fish and wildlife resources protected in Alaska's National Wildlife Refuges are also held in trust in these National Wildlife Refuges along the lower Columbia River, Pacific Coast, and in the Salish Sea in Washington: Grays Harbor National Wildlife Refuge, the Willapa National Wildlife Refuge Complex, and the Washington Maritime National Wildlife Refuge (see map, Attachment D). The distinctive ecosystems in these Washington refuges provide vital seasonal support for Alaska's migratory species as well as for the non-migratory species protected by them.

The entire Grays Harbor is an estuary where freshwaters of the Chehalis, Humptulips, Hoquiam, Elk, and Johns Rivers combine with salt waters of the Pacific Ocean, creating a biologically rich and productive ecosystem. Mudflats, saltmarsh, eel grass beds, and open salt water in this estuary provide essential habitat for fish and wildlife, including waterfowl, shorebirds, salmon, clams, and crustaceans. The estuary is designated by the Western Hemisphere Shorebird Reserve Network as a hemispheric reserve of international significance because it is visited by over 500,000 shorebirds annually during spring and fall migrations. The Grays Harbor National Wildlife Refuge was established by Congress to protect critical shorebird habitat. The Refuge provides roosting and foraging grounds for nearly half of the shorebirds that migrate to the estuary. The Refuge's mudflats, refreshed by tides, are rich in nutrients and invertebrates enabling migrating shorebirds that feed on the mudflats to gain up to 30% of their body weight in fat before resuming their journeys.

Shorebirds in this Refuge that annually migrate to and from the Arctic and Alaska's National Wildlife Refuges, include: Killdeer, Short-billed Dowitcher, Long-billed Dowitcher, Black-bellied Plover, Semipalmated Plover, Greater Yellowlegs, Wandering Tattler, Whimbrel, Marbled Godwit, Ruddy Turnstone, Surfbird, Red Knot, Sanderling, Western Sandpiper, Least Sandpiper, Red-necked Phalarope, and Dunlin.

Shorebird species have experienced dramatic population declines over the last decades. The migratory shorebirds underlined in the list above are species of highest concern for which coastal habitats in the Northern Pacific Coast Region are especially important. One of these migratory shorebirds, the Red Knot, *Calidris canutus roselaari*,

breeds on Wrangel Island, Russia and on tundra in Northern and Northwest Alaska (see Attachment G). The Red Knot is one of the rarest of the long-distance migrant shorebirds that use the Pacific Flyway. Red Knots undertake long flights during their migration that can span thousands of miles. The Red Knot depends on Alaska's Yukon Delta National Wildlife Refuge, the Copper River Delta in Alaska, and the Grays Harbor and Willapa National Wildlife Refuges in Washington as vital migration stopover points for large numbers of the birds. They feed on bivalves and other benthic invertebrates in the Washington Refuges to fuel their return trip to Arctic breeding grounds. They are known to overwinter in parts of Mexico and possibly further south. Shorebird species like the Red Knot that concentrate in large numbers in a single area during migration are highly vulnerable to the loss of any critical staging area. Other migratory shorebird species listed above nest and/or stop over along coastal plains in Alaska Refuges, including in the Alaska Maritime, Izembek, Yukon Delta, Alaska Peninsula/Becharof, Kodiak, and Togiak Refuges.

The National Wildlife Refuges along the lower Columbia River comprise the Willapa National Wildlife Refuge Complex. These refuges are the Willapa National Wildlife Refuge, the Lewis and Clark National Wildlife Refuge, and the Julia Butler Hansen National Wildlife Refuge for the Columbian White-tailed Deer. The three refuges in this complex contain special habitats, including intertidal mudflats, sand beaches, salt marshes, open water channels and sloughs, estuaries, eel-grass meadows, oyster reefs, dunes, wetlands, islands, forests, and woodlands. The Willapa Refuge is located on Willapa Bay, one of the most pristine estuaries in the U.S., and was established to protect migrating birds. Although part of the Julia Butler Hansen Refuge and the Lewis and Clark Refuge are across the Washington state line in Oregon, the fish and wildlife in them do not recognize political boundaries. The Willapa National Wildlife Refuge Complex refuges all share and support many of the same fish and wildlife species; the environmental health and integrity of each refuge in the Complex is critically important to the others.

The lower Columbia River estuary stretches some 60 miles upstream from the mouth of the River. The Lewis and Clark Refuge in the Complex, made up of 20 islands stretching over 27 miles from the mouth of the river, was specifically established to preserve the vital fish and wildlife habitat in the estuary. The estuary is recognized as globally significant for migrating shorebirds. The Willapa Complex Refuges in this estuary not only provide migratory stopping and wintering areas for shorebirds but also contain large concentrations of migrating waterfowl, including Pacific Black Brant, Aleutian Cackling Geese, Dusky Canada Geese, Tundra and Trumpeter Swans and numerous duck species that nest in Alaska's National Wildlife Refuges.

The lower Columbia River estuary, Willapa Bay, and the Grays Harbor estuary, including those portions within the National Wildlife Refuges, support various fish species, oysters, clams, and crabs. Anadromous fish species rely on the refuges for spawning and feeding and a connection between the upper rivers that flow into the refuges and the Pacific Ocean. The estuaries are especially important as a feeding area for juvenile salmon, some species of which then migrate to the ocean along the coast of Washington and British Columbia into waters off Alaska as described in Section II above. These salmon return to their natal streams by way of the estuaries in the Refuges. The estuaries support chum, coho, and Chinook salmon; steelhead; and sea-run cutthroat trout.

The Washington Maritime National Wildlife Refuge Complex is comprised of six National Wildlife Refuges: Copalis, Dungeness, Flattery Rocks, Protection Island, Quillayute Needles, and the San Juan Islands NWRs. These refuges provide important habitats, including coastal rocks and reefs, sandy/gravelly shoreline and spits, tidal and mud flats, marshes, and grasslands that protect significant colonies of seabirds, shorebirds, waterfowl and marine mammals. Sea and shorebirds migrating from Alaska to these refuges sometimes number more than a million. Species of whales and other marine mammals, including species that migrate to waters surrounding Alaska's and Washington's Refuges, are found in and near the waters of the Refuges in the Complex: anadromous fish species also migrate along the Washington coast through waters surrounding these refuges.

Chinook and Steelhead salmon of the Columbia River are recognized as endangered and threatened with extinction under the Endangered Species Act. These species, which are also a critical part of the diet of the equally endangered Southern Resident Killer Whales (Southern Resident Orca) are also subject to further conservation considerations under the Fish and Wildlife Coordination Act, 16 U.S.C. 661-667e and the Magnus-Stevens Fishery Conservation and Management Act-Essential Fish Habitat, Pub. L. 94-265 and by international conservation efforts under the Treaty Between the Government of Canada and the Government of the United States of America Concerning Pacific Salmon. March, 1985, as amended by bilateral agreement May, 2008. (See especially, Article III and Annex IV, Chapter 3 of the Treaty). As species listed under the Endangered Species Act, they also have defined critical habitat that must be protected under law. Pocket beaches and all shorelines in the San Juan Islands sustain significant numbers of juvenile Chinook salmon and their prey "forage prey" primarily surf smelt, sand lance and herring.

Southern Resident Orca are San Juan County's icon. These charismatic marine mammals are loved by our residents and are a major tourist attraction and economic

driver for San Juan County. The Southern Resident Killer Whale was listed as endangered in 2005. Since then the National Oceanic and Atmospheric Administration (NOAA) has funded studies of Southern Resident Killer (Orca) Whales to better understand how they can be protected. A key part of this effort is defining Critical Habitat areas that are essential for their traveling, foraging, resting, and reproduction.

It is well-established that Southern Resident Orca Whales spend much of the summer near the San Juan and Canadian Gulf Islands, but winter sightings had been rare until a recent NOAA-funded project tracked the winter travels of the Southern Resident Orca Whale K pod along the outer coast from Northern California to the Strait of San Juan de Fuca. See Attachment E. K pod spent the most time between December 29, 2012 and February 22, 2013 outside the mouth of the Columbia River and along the coast to the north and south of the mouth of the river. They are presumed to have been feasting on upper Columbia and Snake River Chinook salmon that were transiting these waters at the time. The Chinook salmon is the preferred food of the Southern Resident Orca and their birth rates are strongly correlated with the abundance of Chinook salmon.

These initial tagging data strongly reinforce previous data and logical assumptions that upper Columbia and Snake River Chinook are vital for the survival of Southern Resident orcas, and that restoration of abundant runs of those Chinook represents an essential opportunity to help this struggling orca clan get through the lean winter months. See Attachment F.

It is reasonably foreseeable that construction and operation of MBTL would result in significant adverse direct, indirect, and cumulative impacts on the Washington National Wildlife Refuges. Increased vessel traffic associated with MBTL would increase the risk of accidents and discharges, including from collisions, groundings, and spills during vessel fueling that would release fuel and other oils and the cargo of coal at the MBTL terminal, along the lower Columbia River, and off the Washington coast. This would have significant adverse impacts on the species and habitats in the Washington National Wildlife Refuges and on the communities, cultures, and economies that depend upon them. These contaminants would not only harm organisms that consume them, but those organisms would also accumulate them in their tissues and transfer the contaminants throughout the food web, including to fishes and mammals, including humans.

Added noise in the marine environment from MBTL vessels would disrupt the behavior and survival of marine mammals in waters surrounding the refuges. The increase in vessels associated with MBTL would also increase the risk of introducing alien species from accidental or intended release of ballast water and from vessel hull

fouling. Coal dust blowing from coal piles at the MBTL terminal and spilled during loading operations would contaminate and accumulate in the lower Columbia River estuary.

Burning coal exported from MBTL and MBTL's coal exports combined with coal exported from other planned northwest coal export terminals would contribute to greenhouse gas emissions, climate change, ocean acidification and mercury releases resulting in significant adverse impacts to these refuges and their marine environments. Sea level rise resulting from climate change would lead to increased inundation, erosion, and overwash during storm events, leading to losses of shoreline habitats in the refuges that support eelgrass beds, shorebirds, seabirds, juvenile salmon, and marine mammals. Climate-driven changes in air and ocean currents and temperatures and the timing of available food sources would impact all migratory bird and marine species protected by the refuges.

These impacts would not only affect the Washington National Wildlife Refuges, but the shockwaves from impacts there would reverberate throughout the Alaska National Wildlife Refuges with which Washington shares migratory species of birds, fish, and marine mammals. Similarly, the adverse environmental impacts to Alaska's refuges from MBTL's proposed coal export scheme would reverberate throughout the Washington National Wildlife Refuges.

The proposed Millennium Bulk Terminals Longview LLC Coal Export Terminal's EIS must include detailed comprehensive studies of all direct, indirect, and cumulative impacts set forth in Sections II and III above as applied to the Washington National Wildlife Refuges, the fish and wildlife resources dependent upon these refuges, the habitats in them, and the communities, cultures, and economies the refuges support. Include an assessment of the direct, indirect, and cumulative impacts of coal dust blowing from coal piles at the MBTL terminal and spilled during loading operations. The EIS must also include detailed studies of the potential adverse environmental impacts addressed in this letter, not only on resources these refuges share with those in Alaska, but also on <u>all</u> fish and wildlife resources and ecosystems protected by the National Wildlife Refuges in Washington.

The EIS for MBTL must include a detailed and comprehensive analysis of the direct, indirect and cumulative adverse impacts to Chinook salmon. What would be the adverse impacts to Chinook salmon from the construction and the on-going operation of the proposed Millennium Bulk Terminals Longview LLC Coal Export Terminal and associated rail lines, docks, shiploaders, stockpile pads, conveyors and equipment? What would be the adverse impacts to Chinook salmon from the on-going adverse impacts to water quality from stormwater runoff?

What would be the cumulative adverse impacts to Chinook salmon from the MBTL and the MBTL added to all the proposed fossil fuel terminal proposals within the Columbia River? What would be the cumulative adverse impacts to Chinook salmon from the increased vessel traffic associated with the Millennium Bulk Terminals Longview LLC Coal Export Terminal and all other proposed fossil fuel terminal projects in the Columbia River? What would be the cumulative adverse impacts to Chinook salmon from the increased risks of an oil spill especially given the treacherous conditions that can exist at the Columbia River Bar which is also known as the "Graveyard of the Pacific." What would be the cumulative adverse impacts from multiple smaller fuel spills over time to Chinook salmon? What would be the cumulative adverse impacts from multiple moderately-sized fuel spills over time to Chinook salmon? What would be the adverse impacts to Chinook salmon from a single catastrophic fuel spill? What would be the adverse impacts to Chinook salmon smolts during migration from oil spills of all sizes and in particular from heavy (also referred to as persistent) oils? The EIS must fully respond to all of these questions.

V. IMPACTS ON ECONOMIC BENEFITS FROM REFUGES

The environmental health of the National Wildlife Refuges in Alaska and Washington State contributes to the economic well-being of local communities and cultures. Ecosystems protected by the refuges provide vital support to commercial and non-commercial fisheries. Visitors to the refuges and surrounding areas provide tourism monies. For example, the Aleutian Islands are home to the largest and most valuable commercial fishing grounds of the United States. Foreign and domestic fishing fleets, sport anglers, and subsistence users, from Alaska and Washington State depend on plentiful pollock, herring, sole, cod, halibut, shellfish, and salmon in waters adjacent to Alaska Maritime Refuge lands. Commercial fishing dominates the economies of the Aleutian Islands region. Alaskans in this region also depend heavily on subsistence-caught salmon, halibut, and crab for food and cultural purposes. Charter boats carry sport fisherman from Homer, Seward, Sitka, Kodiak and Unalaska to fish the salt waters off the Alaska Maritime Refuge lands. The Alaska Maritime Refuge and its surrounding waters (and particularly its Aleutian Islands) have become a coveted destination for serious birders and wildlife photographers. Despite the remoteness of some areas in the Refuge, its bird colonies are regularly visited by the Alaska Ferries and commercial and charter boats operating out of Seward, Sitka, Homer, and coastal communities located near refuge lands, including Kodiak, Nome, Unalaska, St. Paul and Sand Point.

Tribal fishermen depend on the fish and shellfish in waters surrounding Washington's National Wildlife Refuges. Their treaty rights include the right to harvest

salmon and shellfish and the protection and restoration of salmon habitat. Under law, the tribes are "co-managers" of these resources in Washington State. Commercial and sport fishermen also depend on the fish, shellfish and crab protected in the estuarine and marine waters in and surrounding these refuges. The Washington Department of Fish and Wildlife has estimated that commercial and recreational fishing in Washington supports 16,374 jobs and $540 million in annual personal income.

The refuges also provide support to tourism industry and local economies in Washington State. Hundreds of thousands of tourists visit the San Juan Islands, the lower Columbia River, and coast of Washington State each year because of their natural beauty and abundance of wildlife. Each spring, the Grays Harbor Shorebird Festival attracts visitors from around the world to view and photograph the astounding numbers of migrating shorebirds in the estuary. In addition to wildlife observation and fishing, the refuges provide other recreational opportunities such as hunting, boating, and hiking. Local businesses depend on the income from the many visitors to these areas.

A recent peer-reviewed report by the Economic Division of the U.S. Department of Interior entitled *Banking on Nature: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation*, confirmed that the nation's national wildlife refuges serve as strong economic engines for local communities by supporting over 35,000 jobs and pumping over $2.4 billion into the economy in 2011. This report analyzed data from 92 sample refuges chosen from within each region of the refuge system. Visitor recreation expenditures include food, lodging, transportation, various fees, equipment rental, and other expenditures outlined in the report. "Final demand" reported in the study means total spending by final consumers on all goods. The amount reported in this study is the change in spending by final consumers in the region attributable to refuge visitation. This includes spending by people who earn income from refuge visitation as well as spending by refuge visitors themselves. Tax revenues include local, county, state and federal taxes.

Here are a few examples for individual Alaska National Wildlife Refuges: visitor recreation expenditures from 50,855 visits to the Kodiak National Wildlife Refuge in 2011 were over $6.1 million. Final demand totaled $9.7 million with associated employment of 85 jobs, yielding $2.9 million in employment income and $1.3 million in total tax revenue. Recreation expenditures from 5,900 visits to the Alaska Peninsula/Becharof Refuge in 2011 were over $1.2 million dollars. Final demand totaled $1.6 million and visits to this Refuge supported 12 area jobs, $486,900 in employment income and $221,200 in total tax revenue. The Togiak Refuge estimates are based on 32,827 visits in 2011. Many of these visits were fishing trips to the Refuge lasting several days. Visitor expenditures for the Togiak Refuge were $9.1 million. Final

demand was $14.3 million supporting 95 jobs, $4.3 million in employment income and $1.9 million in total tax revenue.

There are also examples for individual National Wildlife Refuges in Washington: Visitor recreation expenditures (including food, lodging, transportation and "other" from 114,680 visits to the Willapa Bay National Wildlife Refuge in 2011 were over $1.8 million. Final demand totaled $2.6 million associated with 21 area jobs, $719,800 in employment income and $311,300 in total tax revenue. Recreation expenditures from 111,628 visits to the Dungeness Refuge in 2011 were over $1.9 million dollars. Final demand for the Dungeness Refuge totaled $2.8 million and supported 25 associated jobs, $860,600 in employment income and $323,700 in total tax revenue.

Adverse environmental impacts from the MBTL on Alaska and Washington's National Wildlife Refuges would undermine the economic benefits and associated jobs, employment income, and tax revenues derived not only from visitation to the refuges themselves, but also from activities including commercial, sport, and subsistence fishing, hunting, boating, and tourism in areas supported by refuge ecosystems. *We request that the scope of the EIS for MBTL include a detailed and comprehensive analysis of any and all direct, indirect, and cumulative negative economic consequences for the Alaska and Washington National Wildlife Refuges and the communities and cultures they support resulting from any adverse environmental impacts of MBTL's proposed coal export project.*

VI. SYNERGISTIC IMPACTS

Just as the vessels exporting MBTL's cargo must not be considered in isolation, so too the impacts on Alaska's and Washington's oceans, shorelines, marine species, bird species, fish and fisheries, tourism, communities, local economies, and cultures must not be considered singly. W*e request that you study the potential adverse impacts discussed herein acting in synergy with other impacts. For example, what would be the combined impacts upon oceans, shorelines, seabirds and their rookeries, and marine species from climate change/ocean acidification and oil spills in the Aleutian Islands or along the lower Columbia River? How would noise from an increase in large vessel traffic impact marine mammals in combination with impacts from climate change/ocean acidification? What impacts could result if effects from vessel noise and oil spills occurred in synergy? How would release of invasive marine or terrestrial species impact marine and/or land animals and plants combined with climate change/ocean acidification impacts? How does climate change and ocean acidification act in*

combination with mercury exposure in fish and marine mammals?

VII. CONCLUSION

The citizens of Alaska and Washington State share a common interest in the rich and diverse fish and wildlife resources and habitats protected by National Wildlife Refuges that would be adversely impacted by MBTL's coal export plans. Among those resources are salmon and other fish and shellfish species; bird, mammal and plant species; marine and terrestrial ecosystems, and the atmosphere. Among the interests the refuges protect are ecosystems, habitats, wildlife, fisheries, local economies, communities, and cultures.

NEPA and SEPA confer an affirmative obligation on you as trustees to protect the resources in these refuges for the benefit of all, including succeeding generations. The National Wildlife Refuges and the natural resources we have discussed in this EIS scoping comment belong to the public and are placed at great risk by schemes like MBTL that would increase global trade in fossil fuels. Air, water, terrestrial, marine noise and atmospheric pollution from MBTL's proposed coal export project threaten to undermine the laws that established our nation's system of National Wildlife Refuges and the health and environmental integrity of these Refuges.

Your statutory duties as trustees of the resources discussed in this comment are based on the public trust doctrine, which has a long tradition in Western democracy. Environmental standards based upon this doctrine cannot be treated as merely a set of minimum requirements. Instead, laws based upon the public trust doctrine must be applied broadly and rigorously to protect crucial public resources, including consideration of the full geographic extent of potential significant adverse impacts. In this case, your duty to protect trust resources dependent on Alaska's and Washington's National Wildlife Refuges is unavoidable. Friends of Alaska National Wildlife Refuges, FRIENDS of the San Juans, and Friends of Grays Harbor respectfully request that you fully exercise your legally conferred duties as trustees to study in detail the broader implications and impacts of the MBTL proposal, including the impacts on the resources and interests of Alaska's and Washington's National Wildlife Refuges and the natural systems that sustain them, including the earth's atmosphere.

Many of the impacts we have raised in these comments cannot or would not be mitigated or mitigation would be ineffective to prevent or remediate permanent environmental harm. Unless every one of these impacts, singly and in combination, would be fully mitigated, we recommend the "no action" alternative.

Thank you for consideration of the issues we have raised in this EIS scoping comment. We request that all SEPA/NEPA notifications for the MBTL EIS be sent to the e-mail addresses below.

Respectfully submitted by:

David C. Raskin, PhD
Past President and Advocacy Chair
Friends of Alaska National Wildlife Refuges
davidraskin@alaskarefugefriends.org

Stephanie Buffum Field, MURP/MPA
Executive Director
FRIENDS of the San Juans
Stephanie@sanjuans.org

Arthur (R.D.) Grunbaum
President
Friends of Grays Harbor
rd@fogh.org

References and Attachments A through G follow

REFERENCES:

Alaska Department of Fish and Game. Fishing in Alaska. Available at: http://www.adfg.alaska.gov/index.cfm?adfg=fishing.main

Alaska Shorebird Group. 2008. Alaska Shorebird Conservation Plan. Version II. Alaska Shorebird Group, Anchorage, AK. Available from: http://www.fws.gov/alaska/mbsp/mbm/shorebirds/pdf/ascp_nov2008.pdf

Aleutian Islands Risk Assessment Project. Updated October 17, 2013. http://www.aleutianriskassessment.com/ (*NOTE: anticipated future vessel traffic information on this site does **not** include future coal export vessel traffic from MBTL or other planned coal terminals in WA, OR, AK, B.C. or expanded B.C. coal export terminals, nor have these projects otherwise been taken into account by the Project team)*.

Aleutian Island Risk Assessment Project. Oil Spills in Alaska's Maritime National Wildlife Refuge. Available from: http://www.aleutiansriskassessment.com/documents/akmnwr_spills.pdf

Audubon. Globally Significant Important Bird Areas. Available from: http://iba.audubon.org/iba/prioritySiteIndex.do?priority=Global

Buchanan, J.B. and L. J. Salzer, Red Knot (Calidris canutus) migration on the Pacific coast of the Americas. 2013. Washington Department of Fish and Wildlife. Available from: http://wdfw.wa.gov/publications/01547/

Byrd, G.V., J.H. Reynolds, and P.L. Flint. 2009. Persistence rates and detection probabilities of bird carcasses on beaches of Unalaska Island, Alaska, following the wreck of the M/V Selendang Ayu. Marine Ornithology 37: 197–204. Available from: http://www.marineornithology.org/PDF/37_3/37_3_197-204.pdf

Chapin F.S., S.F. Trainor, P. Cochran, H Huntington, C. Markon, M. McCammon et al. January. 2013. National Climate Assessment and Development Advisory Committee. U.S. Global Change Research Program. Draft Climate Assessment Report Released for Public Comment. Chapter 22. Alaska and the Arctic. Available at: http://ncadac.globalchange.gov/download/NCAJan11-2013-publicreviewdraft-chap22-alaska.pdf

Dragoo, D. E., H.M. Renner, and D.B. Irons. 2012. Breeding status, population trends and diets of seabirds in Alaska. 2009. U.S. Fish and Wildlife Service Report AMNWR 2012/01.Homer, Alaska. Available from: http://alaskamaritime.fws.gov/whatwedo/bioprojects/pdf/summ_2009.pdf

Foy, R.J., M. Carls, M. Dalton, T. Hurst, W.C. Long, M.F. Sigler, R.P. Stone, et al. 2012. Ocean Acidification: Monitoring and Measuring the Physiological and Population Response of Living Marine Resources in Alaska. Alaska Fisheries Science Center. AFSC Quarterly Research Report July, August, September 2012. Available from: http://www.afsc.noaa.gov/Quarterly/jas2012/JAS12-Feature2.pdf

Galbraith, H.; Jones, R.; Park, R.; Clough, J.; Herrod-Julius, S.; Harrington, B.; Page, G. 2005. Global climate change and sea level rise: potential losses of intertidal habitat for shorebirds. In: Ralph, C. John; Rich, Terrell D., editors 2005. Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference. 2002 March 20-24; Asilomar, California, Volume 2 Gen. Tech. Rep. PSW-GTR-191. Albany, CA: U.S. Dept. of Agriculture, Forest Service, Pacific Southwest Research Station: p. 1119-1122.

Available at: http://research.fit.edu/sealevelriselibrary/documents/doc_mgr/470/Global_Potential_Losses_of_Shorebird_Habitats_-_Galbraith_et_al._2005.pdf

Hildebrand, J. A. 2005. Impacts of anthropogenic sound. *In* J. E. Reynolds, III, W. F. Perrin, R. R. Reeves, S. Montgomery, and T. J. Ragen (Eds.), Marine mammal research: conservation beyond crisis (pp. 101-124). Baltimore: Johns Hopkins University Press. Available from: http://escholarship.org/uc/item/8997q8wj#page-6

IPCC. 2007. Climate Change 2007: Synthesis Report. *An assessment of the Intergovernmental Panel on Climate Change*. Bernstein, L. and the Core Writing Team (eds.). World Meteorological Organization. Available from: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

IPPC. 2013. Climate Change 2013: the Physical Science Basis. Contribution of Working Group I to the Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5). Submitted by the Co-Chairs of Working Group I, Stocker, T. and D. Qin. Available from: http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_All.pdf

Jenkins, M., February 2009. *Steering Ships Through a Treacherous Waterway*. Smithsonian.com. Available at http://www.smithsonianmag.com/science-nature/Running-the-Bar.html

Kurle, C.M.,D.A. Croll, and B.R. Tershy. 2007. Introduced rats indirectly change marine rocky intertidal communities from algae- to invertebrate-dominated. *In* Proceedings of the National Academies of Sciences of the United States. Available from: http://www.pnas.org/content/105/10/3800.full

Johnson, P. and A. Matz. Environmental Contaminants and Climate Change in Alaska. U.S. Fish and Wildlife Service. Available from: http://alaska.fws.gov/fisheries/contaminants/pdf/climate_change_contam_poster.pdf

Johnson, R. and R.M. Bustin. 2006. Coal dust dispersal around a marine coal terminal (1977–1999), British Columbia: The fate of coal dust in the marine environment. International Journal of Coal Geology. Vol 68 (57-69). Available at: http://www.sciencedirect.com/science/article/pii/S0166516206000206

Landers, D.H., S.L. Simonich, D.A. Jaffe, L.H. Geiser, D.H. Campbell, A.R. Schwindt, et

al. 2008. The Fate, Transport, and Ecological Impacts of Airborne Contaminants in Western National Parks (USA). EPA/600/R-07/138. U.S. Environmental Protection Agency, Office of Research and Development, NHEERL, Western Ecology Division, Corvallis, Oregon. Available online at http://www.nature.nps.gov/air/Studies/air_toxics/WACAPreport.cfm

Marine Exchange of Alaska. Vessel Tracking System. Marine Exchange of Alaska's Vessel Tracking System – Introduction. Available from: http://www.mxak.org/vtrack/vtrack_intro.html

Markon, C.J., S.F. Trainor, and F.S. Chapin III, eds. 2012. The United States National Climate Assessment—Alaska Technical Regional Report: U.S. Geological Survey Circular 1379. Available from: http://pubs.usgs.gov/circ/1379/

Mora C, Wei C-L, Rollo A, Amaro T, Baco AR, et al. (2013) Biotic and Human Vulnerability to Projected Changes in Ocean Biogeochemistry over the 21st Century. PLoS Biol 11(10): e1001682. doi:10.1371/journal.pbio.1001682

National Oceanic and Atmospheric Administration. Endangered and Threatened Species; 5-Year Reviews for 17 Evolutionarily Significant Units and Distinct Population Segments of Pacific Salmon and Steelhead. 50448 Federal Register. Vol. 76, No. 157. Monday, August 15, 2011. Proposed Rules. Available at: http://www.gpo.gov/fdsys/pkg/FR-2011-08-15/pdf/2011-20453.pdf

National Oceanic and Atmospheric Administration. Northeast Fisheries Science Center. Where Do Salmon Go in the Ocean? Available at: http://www.nefsc.noaa.gov/faq/fishfaq2d.html

National Oceanic and Atmospheric Administration, NOAA Arctic Research Program. 2012. Arctic Report Card 2012. Available from: http://www.arctic.noaa.gov/reportcard/

National Transportation Safety Board. 2006. Marine Accident Brief, Accident No.: DCA-05-MM-008, Vessel, *M/V Selendang Ayu*. Available from: http://www.ntsb.gov/doclib/reports/2006/MAB0601.pdf

Power, T. M. and D.S. Power. 2013. The Impact of Powder River Basin Coal Exports on Global Greenhouse Gas Emissions. Report prepared for the Energy Foundation, San Francisco, California. Available from: http://www.powereconconsulting.com/WP/assets/GHG-Impact-PRB-Coal-Export-Power-Consulting-May-2013_Final.pdf

Shakova, N., I. Semiletov, I. Leifer, A. Salyuk, P. Rekant, D. Kosmach. 2010.

Geochemical and geophysical evidence of methane release over the East Siberian Arctic shelf. Journal of Geophysical Research: Oceans (1978–2012). Volume 115, Issue C8. Available from: http://onlinelibrary.wiley.com/doi/10.1029/2009JC005602/abstract

Sigler, M. F., R.J. Foy, J.W. Short, M. Dalton, L.B. Eisner, T.P. Hurst, et al. 2008. Forecast fish, shellfish and coral population responses to ocean acidification in the north Pacific Ocean and Bering Sea: An ocean acidification research plan for the Alaska Fisheries Science Center. AFSC Processed Rep. 2008-07, 35 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv. Available from: http://www.afsc.noaa.gov/Publications/ProcRpt/PR2008-07.pdf

Skinner, S.K. and W.K. Riley.1989. The Exxon Valdez Oil Spill, A Report to the President. Prepared by the National Response Team. Available from: http://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/oil_spills/ExxonValdez_NRT_1989_report_to_president.pdf

Smith, M., N. Walker, C. Free, M. Kirchhoff, N. Warnock, A. Weinstein, A. et al. September 2012. Marine Important Bird Areas in Alaska Identifying Globally Significant Sites Using Colony and At-Sea Survey Data. Available from: http://ak.audubon.org/sites/default/files/documents/marine_ibas_report_final_sep_2012.pdf

Stabeno, P.J, R.K. Reed, and J.M. Napp. January, 2002. Transport Through Unimak Pass, Alaska (for submission to Deep-Sea Research II: Topical Studies in Oceanography; Contribution No. 2223 from NOAA/Pacific Marine Environmental Laboratory). Available from: http://www.pmel.noaa.gov/foci/sebscc/special_issue/manuscripts/stabeno_unimak_rev.pdf

Stabeno, P.J., J.D. Schumacher, and K. Ohtani, K. 1999. The physical oceanography of the Bering Sea. In: Loughlin, T.R. and K. Ohtani (Eds.), Dynamics of the Bering Sea: A Summary of Physical, Chemical, and Biological Characteristics, and a Synopsis of Research on the Bering Sea. North Pacific Marine Science Organization (PICES), University of Alaska Sea Grant, AK-SG-99-03, 1–28. Available from: http://www.pmel.noaa.gov/pubs/outstand/stab1878/stab1878.shtml

State of Alaska Department of Fish and Game. 2002. Alaska Aquatic Nuisance Species Management Plan. Available from: http://www.adfg.alaska.gov/static/species/nonnative/invasive/pdfs/ak_ansmp.pdf

State of Alaska Department of Natural Resources. Chuitna Coal Project. Available from: http://dnr.alaska.gov/mlw/mining/largemine/chuitna/index.cfm

Timonen, H., Ambrose, J. L., and Jaffe, D. A.: Oxidation of elemental Hg in anthropogenic and marine airmasses, Atmos. Chem. Phys., 13, 2827-2836, doi:10.5194/acp-13-2827-2013, 2013. Available at: http://www.atmos-chem-phys.net/13/2827/2013/acp-13-2827-2013.html

Transportation Board of the National Academies of Sciences. 2008. Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing A Comprehensive Risk Assessment. Committee on the Risk of Vessel Accidents and Spills in the Aleutian Islands: A Study to Design a Comprehensive Assessment. Available from: http://onlinepubs.trb.org/onlinepubs/sr/sr293.pdf

University of Alaska Fairbanks, School of Fisheries and Ocean Sciences. 2009. New findings show increased ocean acidification in Alaska waters. Available from: http://www.sfos.uaf.edu/news/story/?ni=280

U.S. Fish and Wildlife Service. Alaska Maritime National Wildlife Refuge. http://alaskamaritime.fws.gov/

U.S. Fish and Wildlife Service. Arctic National Wildlife Refuge. http://www.fws.gov/alaska/nwr/arctic/

U.S. Fish and Wildlife Service. Arctic National Wildlife Refuge. Climate Change and its Impacts. Available from: http://arctic.fws.gov/ctclimatechange09.htm

U.S. Fish and Wildlife Service. Division of Economics. October 2103. Banking on Nature: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation. Available from: http://www.doi.gov/news/loader.cfm?csModule=security/getfile&pageid=380921

U.S. Fish and Wildlife Service. Gray's Harbor National Wildlife Refuge. http://www.fws.gov/refuge/grays_harbor/

U.S. Fish and Wildlife Service, National Wildlife Refuge, Alaska Region. http://www.fws.gov/alaska/nwr/nwr.htm

U.S. Fish and Wildlife Service. Washington Maritime National Wildlife Refuge Complex. http://www.fws.gov/washingtonmaritime/

U.S. Fish and Wildlife Service. Willapa National Wildlife Refuge Complex. http://www.fws.gov/willapa/complex/

Washington State Department of Ecology, (2013). *Vessel Entries and Transits for Washington Waters: VEAT 2012*. Available at: https://fortress.wa.gov/ecy/publications/publications/1308001.pdf

Weilgart, L.S. 2007. A Brief Review of Known Effects of Noise on Marine Mammals. International Journal of Comparative Psychology. 20, 159-168. Available from: http://www.comparativepsychology.org/ijcp-vol20-2-3-2007/07.Weilgart_PDF.pdf

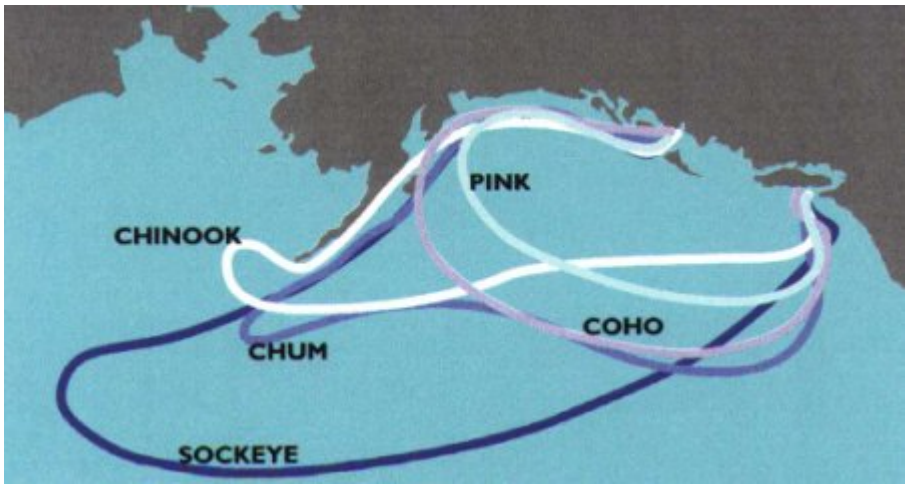
Welch, D. W. and H.R. Carlson. June 1996. DFO-NMFS Research on Juvenile Salmon. Salmon on the High Seas. The Westcoast Fisherman. Available at: http://www.goldseal.ca/wildsalmon/salmon_migration.asp?pattern=research

Western Hemisphere Shorebird Reserve Network. http://www.whsrn.org/western-hemisphere-shorebird-reserve-network

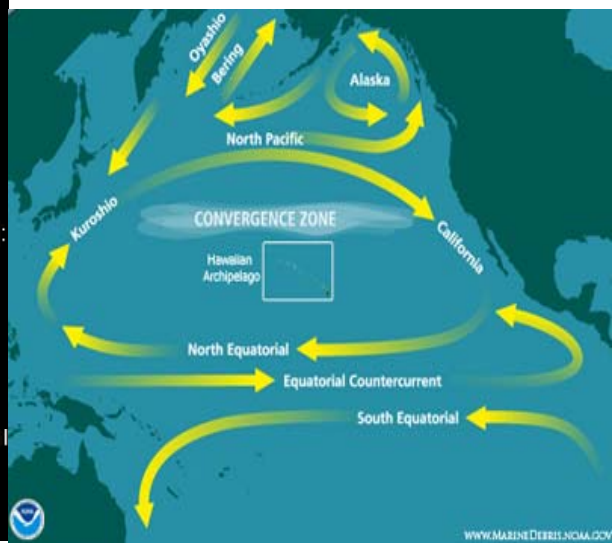
Whiteman, G., C, Hope and P. Wadhams. 2013. Climate science: Vast costs of Arctic change. Nature 499, 401-403, Available from: http://www.nature.com/nature/journal/v499/n7459/full/499401a.html

World Meteorological Organization. November 2013. WMO Greenhouse Gas Bulletin: The State of Greenhouse Gases in the Atmosphere Based on Global Observations through 2012. Available at: http://www.wmo.int/pages/prog/arep/gaw/ghg/documents/GHG_Bulletin_No.9_en.pdf

Attachment A



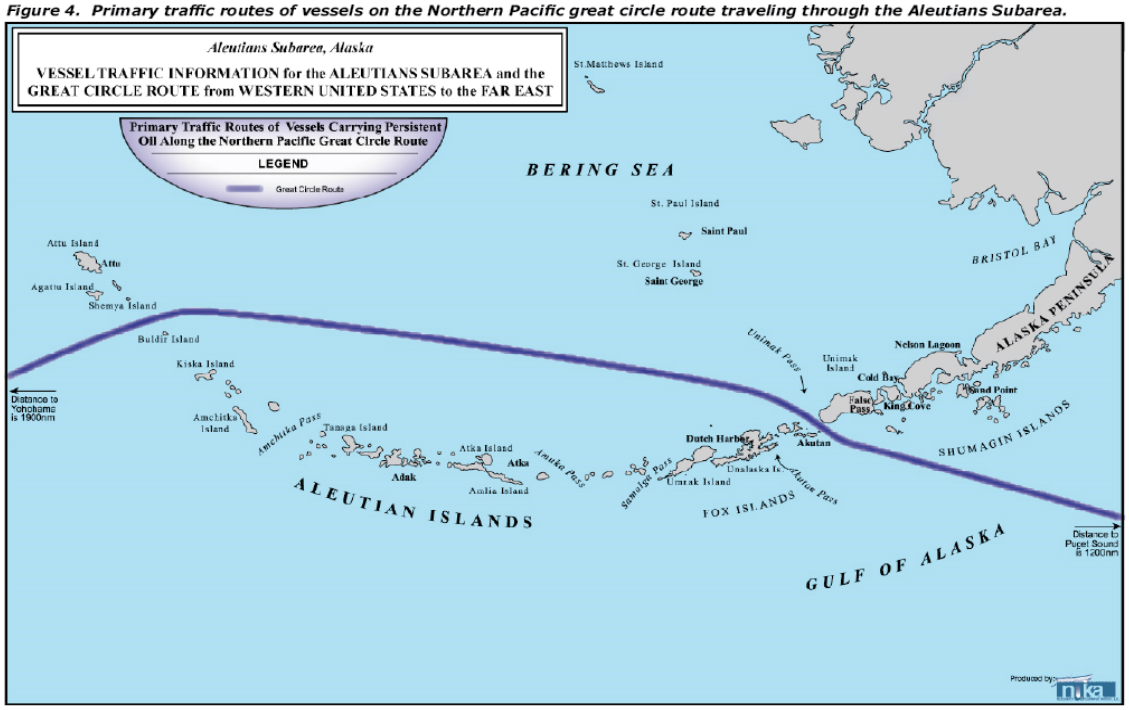
Salmon Migration Pattern. Source: Welch, D. W. and H.R. Carlson. June 1996. DFO-NMFS Research on Juvenile Salmon. Salmon on the High Seas. The Westcoast Fisherman. Available at: http://www.goldseal.ca/wildsalmon/salmon_migration.asp?pattern=research

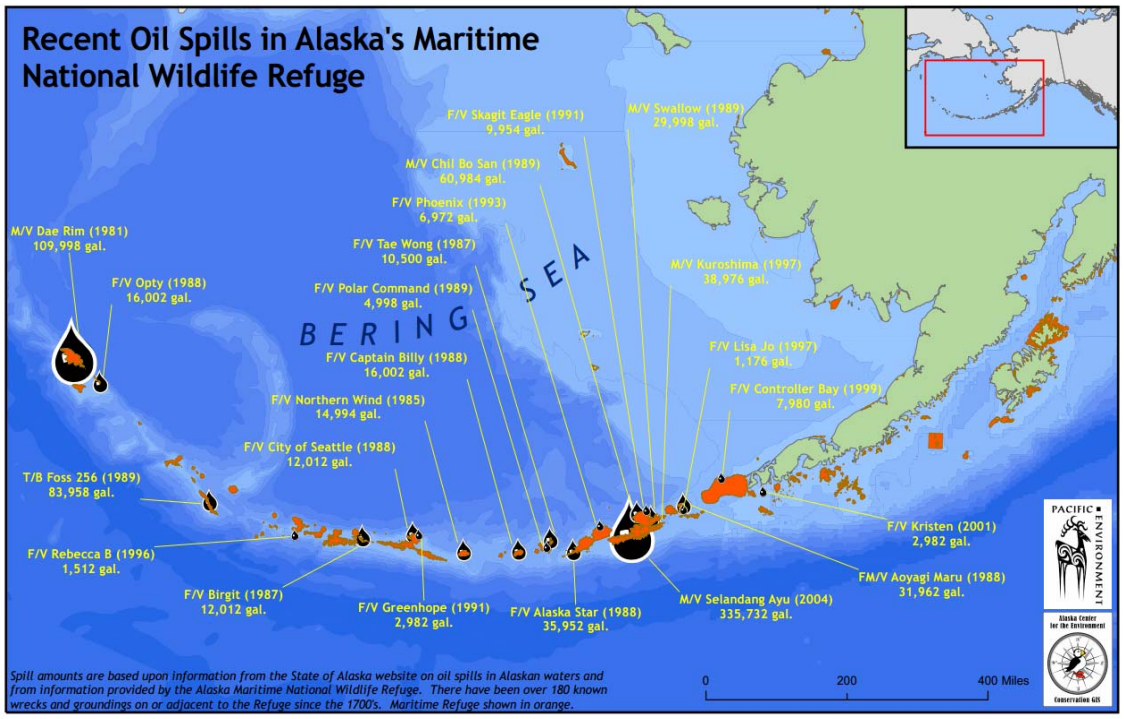


Source: Left, National Centers for Coastal Ocean Science, NOAA. U.S. Global Ocean Ecosystems Dynamics (GLOBEC) Northeast Pacific. Available at: http://www.cop.noaa.gov/stressors/climatechange/current/fact-globecpne.aspx. Right: Map from NOAA Marine Debris Information illustrating the oceanographic features in the North Pacific Ocean. Available at: http://marinedebris.noaa.gov/marinedebris101/movement.html

Attachment B

Figure 4. Primary traffic routes of vessels on the Northern Pacific great circle route traveling through the Aleutians Subarea.



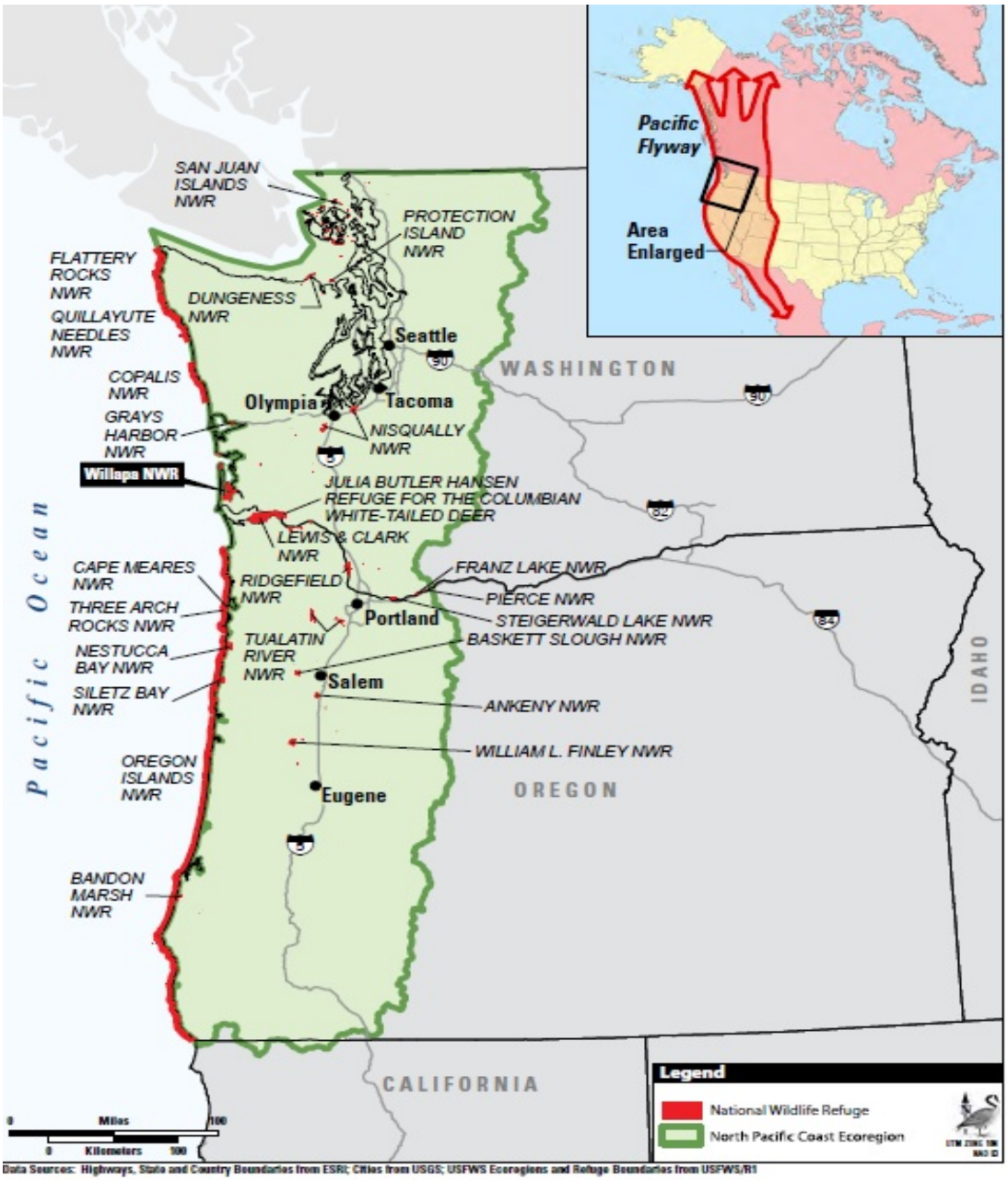


Source: Aleutian Risk Assessment. Top map, http://www.aleutiansriskassessment.com/passing.htm; bottom map http://www.aleutiansriskassessment.com/documents/akmnwr_spills.pdf

Attachment C

Map showing Alaska's National Wildlife Refuges
Source: U.S. Fish and Wildlife Service, National Wildlife Refuge, Alaska Region. Available at: http://www.fws.gov/alaska/nwr/map.htm

Attachment D

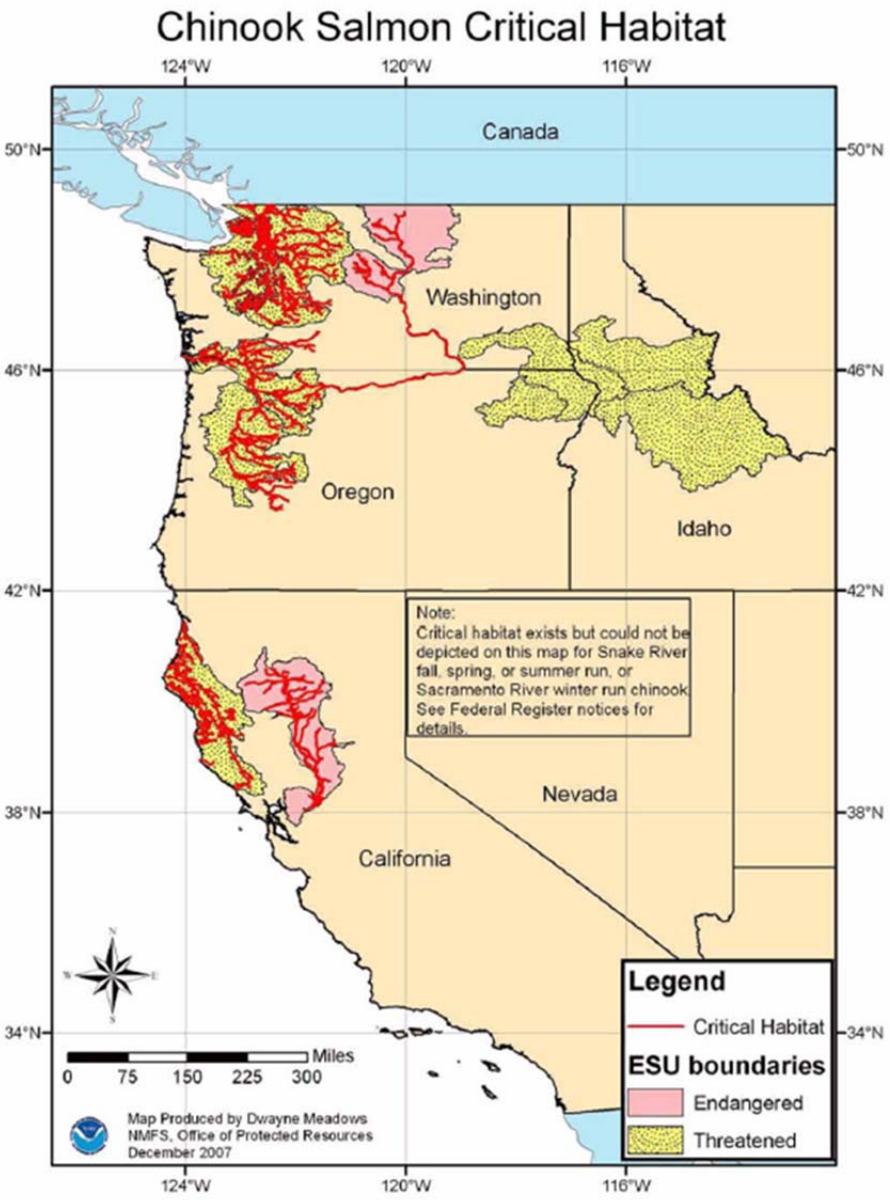


Map of Washington and Oregon National Wildlife Refuges with inset of Pacific Flyway
Source: Willapa National Wildlife Refuge Final Comprehensive Conservation Plan, 2011, p. 1-3.
http://www.fws.gov/uploadedFiles/Willapa%20NWR%20CCP%20Volume%201%20reduced.pdf

Attachment E

Map of K Pod's travels. Winter Tracking of K25, NOAA's Northwest Fisheries Science Center, 2013. Available at**:** http://www.youtube.com/watch?v=8ApK0SYothA

Attachment F



Source: National Marine Fisheries Service. NOAA. Available at: http://www.nmfs.noaa.gov/pr/pdfs/criticalhabitat/chinooksalmon.pdf

Attachment G

Photo of Red Knots and map of breeding range in Alaska. Source: Alaska Department of Fish and Game. http://www.adfg.alaska.gov/index.cfm?adfg=redknot.main