



MARINE MAMMAL COMMISSION

23 August 2018

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by Port of Kalama (POK) seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act (the MMPA) to take small numbers of marine mammals by harassment. The taking would be incidental to construction of the Kalama Manufacturing and Marine Export Facility on the Columbia River in Washington. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 14 August 2018 notice (83 Fed. Reg. 40257)¹ announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

POK plans to construct a new marine terminal for loading methanol on the Columbia River. Operators would install up to 320 24-in concrete piles using an impact hammer and 16 12- or 18-in steel piles using both a vibratory and an impact hammer. They also would install and remove temporary steel piles using a vibratory hammer throughout the project. POK expects activities to take 153 days, weather permitting. It would limit pile-driving and -removal activities to daylight hours only during the timeframe from 1 September to 31 January.

NMFS preliminarily has determined that, at most, the proposed activities temporarily would modify the behavior of small numbers of harbor seals, California sea lions, and Steller sea lions. NMFS anticipates that any impact on the affected species and stocks would be negligible. NMFS also does not anticipate any take of marine mammals by death or serious injury and believes that the potential for disturbance will be at the least practicable level because of the proposed mitigation measures. The proposed mitigation, monitoring, and reporting measures include—

- using a sound attenuation device (e.g., bubble curtain) during impact driving of steel piles and implementing performance standards² for the bubble curtain;

¹ The original notice published on 25 July 2018 (83 Fed. Reg. 35220). Based on its omission of instructions regarding public comment in the original notice, NMFS published a revised *Federal Register* notice. At the same time, it incorporated the Commission's informal comments regarding several errors and omissions in the original notice. However, the numbers of PSOs required to monitor for marine mammals during the various activities is still incorrect in the revised proposed authorization. NMFS indicated the final authorization would include the correct information.

² Based on POK's biological opinion for listed fish.

- using one to three qualified land-based protected species observers to monitor the Level A and B harassment zones³ for 30 minutes before, during, and for 30 minutes after the proposed activities;
- using standard soft-start, delay, and shut-down procedures;
- using delay and shut-down procedures, if a species for which authorization has not been granted or if a species for which authorization has been granted but the authorized takes have been met, approaches or is observed within the Level A and/or B harassment zone⁴;
- ceasing pile-driving and -removal activities if any marine mammal comes within 10 m of the equipment;
- reporting injured and dead marine mammals to the Office of Protected Resources and West Coast Regional Stranding Coordinator using NMFS's phased approach and suspending activities, if appropriate; and
- submitting a final report.

The Commission concurs with NMFS's preliminary finding and recommends that NMFS issue the incidental harassment authorization, subject to inclusion of the proposed mitigation, monitoring, and reporting measures.

Appropriateness of the Level A harassment zones

To estimate the extents of the Level A harassment zones, POK and ultimately NMFS assumed that pinnipeds would be subjected to only 1 hour of pile driving activities each day. The 1-hour duration was based on a lack of specific haul-out sites in the immediate project area and the assumption that pinnipeds would be transiting through the area and would not be present for a full 8-hour day of pile driving⁵. That assumption may be true for otariids that are transiting the area when going to and from Bonneville Dam. However, that assumption is not necessarily true for harbor seals.

POK's application indicated that harbor seals reside year-round in the Columbia River, and they are observed frequently in the vicinity of the project area. Specifically, they congregate to feed at the mouths of the Kalama and Cowlitz Rivers (approximately 1 mile upstream and 3.5 miles downstream of the project site, respectively) during the winter months. Anecdotal reports indicate that some harbor seals are resident and occur year-round near the mouths of the rivers. Further, shoals near the confluence of the Cowlitz and Columbia Rivers are documented haul-out sites for harbor seals. Thus, POK indicated that harbor seals could be moving through the project area to the mouth of the Kalama or Cowlitz Rivers, could remain in the project area for several days, or could travel back and forth between the two river mouths, passing through the area multiple times. As such, assuming that harbor seals would be subjected to only 1 hour of pile driving per day is not substantiated.

³ All Level A harassment zones and the Level B harassment zone for impact pile driving would be monitored on all activity days. However, given that vibratory pile driving or removal would occur on nearly all 153 days, the Level B harassment zone for those activities would be monitored on the first two days of vibratory pile driving or removal and every third day thereafter.

⁴ NMFS inadvertently omitted this standard measure from the proposed authorization. NMFS indicated it would be included in the final authorization.

⁵ With up to 8 piles installed per day.

In general, Level A harassment zones for impact pile driving are much larger than for vibratory pile driving. POK indicated that impact driving would be necessary for installation of concrete piles and may be necessary for proofing or for a portion of the installation of steel piles, if vibratory installation is insufficient. The Commission agrees with NMFS's assumption that only 1 hour of impact pile driving may be necessary for installation of steel piles, but does not agree that same assumption should apply to installation of concrete piles. POK and NMFS should have assumed that harbor seals could be subjected to impact driving of concrete piles for 8 hours per day rather than 1 hour per day. Based on either the 8-hour per day or 8-piles driven per day scenario, the Level A harassment zones would increase from 40 to 160 m. Such a zone is still less than the estimated extent of the Level A harassment zone for impact driving of steel piles (i.e., 252 m). Further, the Level A harassment zone for vibratory installation should be revised as well if that activity could occur for up to 8 hours per day, which would result in a revised Level A harassment zone of 66 rather than 16 m. Therefore, the Commission recommends that NMFS revise its Level A harassment zones for harbor seals during impact driving of concrete piles and vibratory driving of steel piles based on 8 hours of activities or 8 piles to be driven per day. This approach is consistent with the manner in which NMFS has been estimating the extents of the Level A harassment zones since finalizing its Technical Guidance in 2016.

The Commission believes that NMFS needs to further investigate the appropriate timeframes over which sound exposure levels should be accumulated when estimating the extents of the Level A harassment zones—an issue that was not investigated and resolved prior to NMFS finalizing its Technical Guidance. The Commission recommends that NMFS make this issue a *priority* to resolve in the near future. The Commission understands that NMFS is convening a committee of NMFS scientists and acousticians to address the issue. The Commission believes that committee would benefit greatly from the expertise of external scientists and acousticians as well. As such, the Commission recommends that NMFS consult with both its own⁶ and external scientists and acousticians to determine the appropriate accumulation time that action proponents should use to determine the extent of the Level A harassment zones based on the associated SEL_{cum} thresholds for the various types of sound sources, including stationary sound sources, when simple area x density methods are employed. The Commission continues to contend that estimated swimming speeds and behavior patterns (including residency patterns of species such as harbor seals)⁷ of various species should be considered and multiple scenarios should be evaluated using animat modeling to better resolve this issue.

Abbreviated *Federal Register* notices

Given that much of the information relevant to this proposed authorization for conducting activities at POK had been included and reviewed in previous documents, NMFS published the required information⁸ via an abbreviated *Federal Register* notice referencing those earlier documents. The Commission has opposed NMFS's recent proposal to allow renewals of incidental harassment

⁶ Including staff in the Marine Mammal and Sea Turtle Conservation Division of the Office of Protected Resources and staff in the Office of Science and Technology.

⁷ Results from monitoring reports, including animal responses, submitted in support of incidental harassment authorizations issued by NMFS also may inform this matter.

⁸ Including any changes to the proposed activities or assumptions made and results from the draft monitoring report.

authorizations without an opportunity for additional public review and comment, as discussed herein. The Commission believes that NMFS's proposed renewal process is inconsistent with the requirements of section 101(a)(5)(D), which limit such authorizations to "periods of not more than 1 year" and, unless subject to public notice and comment opportunities concurrent with consideration of a renewal, would undercut the MMPA's requirements for public involvement. The abbreviated process being followed in this instance preserves the full opportunity for public review and comment. As such, it is preferable to NMFS's proposed renewal process and does not appear to be unduly burdensome on either the applicant or NMFS. Therefore, the Commission recommends that NMFS, in lieu of adopting its proposed renewal process for extending authorizations beyond their original one-year period of validity without providing a new opportunity for public review and comment, use abbreviated *Federal Register* notices and reference existing documents to streamline the incidental harassment authorization process, as is being done in this instance. The abbreviated process clearly meets the public notice and comment requirements of the MMPA and provides the necessary separation between the original and subsequent authorization(s) so that no one can credibly contend that NMFS is impermissibly extending an authorization beyond the statutory one-year limit.

Proposed one-year authorization renewals

NMFS has indicated that it may issue a second one-year⁹ incidental harassment authorization renewal for this and other future authorizations on a case-by-case basis without additional public notice or comment opportunity when (1) another year of identical, or nearly identical activities, as described in the 'Specified Activities' section of the *Federal Register* notice is planned or (2) the originally planned activities would not be completed by the time the incidental harassment authorization expires and a renewal would allow for completion of the authorized activities beyond the timeframe described in the 'Dates and Duration' section of the notice. NMFS would consider issuing a renewal only if—

- the request for renewal is received no later than 60 days prior to the expiration of the current authorization;
- the activities to be conducted either are identical to the previously analyzed and authorized activities or include changes so minor (e.g., reduction in pile size) that they do not affect the previous analyses, take estimates, or mitigation and monitoring requirements;
- a preliminary monitoring report provides the results of the required monitoring to date and those results do not indicate impacts of a scale or nature not previously analyzed or authorized;
- the status of the affected species or stocks and any other pertinent information, including the mitigation and monitoring requirements, remain the same and appropriate; and
- the original determinations under the MMPA remain valid.

The Commission agrees that NMFS should take appropriate steps to streamline the authorization process under section 101(a)(5)(D) of the MMPA to the extent possible. However, the Commission is concerned that the renewal process proposed in the *Federal Register* notice is

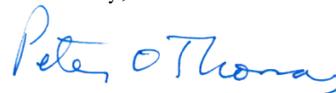
⁹ NMFS informed the Commission that the renewal would be issued as a one-time opportunity, after which time a new authorization application would be required. NMFS has yet to specify this in any *Federal Register* notice detailing the new proposed renewal process but should do so.

inconsistent with the statutory requirements. Section 101(a)(5)(D) clearly states that proposed authorizations are subject to publication in the *Federal Register* and elsewhere and that there be a presumably concurrent opportunity for public review and comment. NMFS's proposed renewal process would bypass the public notice and comment requirements when it is considering the renewal.

As discussed in the previous section and as has been done in this current instance, NMFS recently implemented an abbreviated authorization process by publishing the required information¹⁰ via an abbreviated *Federal Register* notice and by referencing the relevant documents. The abbreviated process preserves the full opportunity for public review and comment, does not appear to be unduly burdensome on either the applicant or NMFS, and is much preferred over NMFS's proposed renewal process¹¹. Thus, the Commission recommends that NMFS refrain from implementing its proposed renewal process and instead use abbreviated *Federal Register* notices and reference existing documents to streamline the incidental harassment authorization process. If NMFS adopts the proposed renewal process notwithstanding the Commission's recommendation, the Commission further recommends that NMFS provide the Commission and the public with a legal analysis supporting its conclusion that the process is consistent with the requirements under section 101(a)(5)(D) of the MMPA. Furthermore, if NMFS decides to bypass the notice and comment process in advance of issuing a renewal, it should nevertheless publish notice in the *Federal Register* whenever such a renewal has been issued.

Please contact me if you have questions regarding the Commission's recommendations.

Sincerely,

A handwritten signature in blue ink that reads "Peter O. Thomas". The signature is written in a cursive style with a large initial "P".

Peter O. Thomas, Ph.D.,
Executive Director

¹⁰ Including any changes to the proposed activities or assumptions made and results from the draft monitoring report.

¹¹ See the Commission's [30 April 2018 letter](#) detailing this matter.



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August 1, 2018

Director Donna S. Wieting
Dale Youngkin
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National Marine Fisheries Service
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Sent via email to: noaa.nepa@noaa.gov; donna.wieting@noaa.gov; dale.youngkin@noaa.gov

Re: NMFS's Proposed CE and IHA for the Kalama Methanol Export Dock

National Marine Fisheries Service:

Columbia Riverkeeper (Riverkeeper) submits these comments on NMFS's proposal to rely on a NEPA Categorical Exclusion (CE) when issuing an Incidental Harassment Authorization (IHA) for a dock in the lower Columbia River for use by the Kalama methanol refinery and export proposal. *See Taking Marine Mammals Incidental to Port of Kalama Expansion Project on the Lower Columbia River*, 83 Fed. Reg. 35220 (July 25, 2018).

Riverkeeper represents over 16,000 members and supporters working to protect and restore the Columbia River. Riverkeeper's members and supporters work, live, and recreate in and along the Columbia River and the surrounding landscape near Kalama, WA—the location of Northwest Innovation Works and the Port of Kalama's proposed methanol refinery and export terminal. The methanol refinery and terminal would undermine local and regional efforts to protect water quality, recover endangered and threatened species, support vibrant fishing communities, protect human health and safety, transition to a low-carbon economy, and combat climate change. Riverkeeper and our partners have spent the last decade successfully defending the Columbia River estuary from this and many other similar fossil fuel export proposals.

Using a CE to grant the IHA for methanol dock construction, as proposed, would contradict NOAA's NEPA guidance. The Companion Manual for NOAA Administrative Order 216-6A (Companion Manual) explains that a "CE may only be applied to a proposed action when . . . the proposed action is not part of a larger action . . ." Companion Manual, p. 4. Clearly, the dock construction activities authorized by the proposed IHA would be part of a

much larger action. As Riverkeeper's enclosed comments to the U.S. Army Corps of Engineers (Corps) explain—and as the Corps has agreed—construction of the methanol dock is part of a larger set of related actions designed to facilitate the construction of the methanol refinery and export terminal. *See* Exhibit 1, pp. 3–5. And though the appropriate scope of NEPA review is determined by the project's "reasonably foreseeable" impacts (and not the scope of NMFS' regulatory authority under the MMPA, as suggested by NMFS staff), 40 C.F.R. § 1508.8, Riverkeeper points out that the shipping traffic induced by the methanol export facility could have important impacts on species protected by the MMPA. *See* Exhibit 2, pp. 13–24. Ignoring the Companion Manual's prohibition against using a CE for an action, like this one, that is part of larger action would be arbitrary and capricious. *See* 5 U.S.C. § 706(2)(A).

Using a CE to grant the IHA for methanol dock construction would also waste time and administrative resources. The Corps and the U.S. Department of Energy (DOE) are currently preparing an EA—likely followed by an EIS—for precisely the same project: construction of the methanol dock and refinery. It makes no sense for NMFS to spend time issuing a CE for a project that is currently undergoing more thorough NEPA review by other federal agencies. Moreover, the in-water construction activities that the proposed IHA would authorize cannot proceed without Corps authorization, which requires the completion of the Corps' NEPA process. Rather than issuing a CE for harassment caused by construction activities that cannot and will not take place in 2018, NMFS should participate in the Corps' ongoing NEPA process and base NMFS' IHA decision on the forthcoming, and more informative, NEPA documents.

In conclusion, Riverkeeper would like to thank NMFS staff for today asserting its intent to withdraw and re-issue the Federal Register notice on this proposed IHA/CE (to address questions about the proper avenue for submitting public comments). Riverkeeper strongly recommends that NMFS take the withdrawal/re-issuance of the public notice as an opportunity to coordinate with the Corps and DOE regarding NEPA review of the Kalama methanol refinery and export terminal. By joining in that more comprehensive NEPA review that is currently under way—instead of using a premature CE—NMFS may be able to reduce its administrative burden and avoid disagreements about the propriety of its NEPA process. If you have any questions about this letter or Riverkeeper's interest in the project, or would like addition information, please do not hesitate to contact me.

Sincerely,



Miles Johnson
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Exhibits:

- Exhibit 1: Riverkeeper Comments to Corps on NWP-2014-177/2 (Kalama Manufacturing and Marine Export Facility) and NWP-2015-111 (Kalama Lateral Project) (November 5, 2015).
- Exhibit 2: Comments on the Port of Kalama and Cowlitz County's Draft SEPA Environmental Impact Statement for Northwest Innovation Works' Methanol Refinery and Export Terminal (April 18, 2016).



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November 5, 2015

U.S. Army Corps of Engineers, Regulatory Branch
Attn: Melody White
Post Office Box 2946
Portland, OR 97208-2946

Sent Via Email to: Melody.J.White@usace.army.mil.

RE: Comments on NWP-2014-177/2 (Kalama Manufacturing and Marine Export Facility) and NWP-2015-111 (Kalama Lateral Project).

Dear Ms. White,

Columbia Riverkeeper ("Riverkeeper") submits these comments to the U.S. Army Corps of Engineers ("Corps") regarding the Joint Public Notice ("JPN") for NWP-2014-177/2, the Kalama Manufacturing and Marine Export Facility (hereinafter, "the methanol refinery"), and NWP-2015-111, the Kalama Lateral Project (hereinafter, "the pipeline"). Riverkeeper's comments relate to the Corps' responsibilities and decisions under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and the National Environmental Policy Act ("NEPA").

Riverkeeper is a nonprofit public interest group with approximately 8,000 members and supporters working to protect and restore the water quality of the Columbia River and all life connected to it, from the headwaters to the Pacific Ocean. To achieve these objectives, Riverkeeper operates scientific, educational, and advocacy programs aimed at protecting water quality and habitat in the Columbia River Basin. Riverkeeper's members and supporters fish, boat, swim, work, and live in and along the Columbia River near and downstream from Kalama, the location of NWIW's proposed methanol refinery and export terminal.

Riverkeeper is concerned by Northwest Innovation Works LLC's ("NWIW") plans to construct a 90-acre methanol refinery, export terminal, pipeline, and associated facilities in and along the lower Columbia River. NWIW requires the authorizations described in the JPN in order to construct and operate its project. NWIW's proposed methanol refinery is the latest in a disturbing trend of fossil fuel export terminals that would industrialize and pollute the lower Columbia River. For the reasons explained below, Riverkeeper requests that the Corps prepare a full Environmental Impact Statement ("EIS") detailing the significant direct, indirect, and cumulative impacts of the proposed new berth, methanol refinery, and pipeline. Riverkeeper also asserts that the activities described in the JPN do not comply with Section 404 of the Clean Water Act and, in the case of NWP-2014-177/2, Section 10 of the Rivers and Harbors Act.

1. THE COLUMBIA RIVER ESTUARY.

NWIW proposes building a methanol refinery and export terminal in the Columbia River estuary, an area at the center of a regional and national effort to restore endangered and threatened salmonids. This effort includes the Corps' obligations under the Federal Columbia River Power System ("FCRPS") Biological Opinion ("BiOp"). The Columbia River estuary is a federally-designated Estuary of National Significance under the Clean Water Act's National Estuary Program.¹ In 2006, the U.S. Environmental Protection Agency ("EPA") designated the Columbia River as one of seven Priority Large Aquatic Ecosystems.² The Columbia River estuary is an "ecologically critical area," 40 C.F.R. § 1508.27(b)(3), that is essential to the survival juvenile salmon and steelhead, waterfowl, and many other species.³

Public and private entities have invested billions of dollars to restore endangered and threatened salmonids in the Columbia River Basin.⁴ This includes significant investment in riparian and wetland restoration projects in the estuary. The National Marine Fisheries Service ("NMFS") has described the ecological value of the Columbia River estuary, stating:

"The lower Columbia River estuary provides vital habitat for anadromous salmonids throughout the Columbia River basin, and is of particular importance from a threatened and endangered species recovery perspective. The estuary is designated as critical habitat for 17 species of ESA-listed fish and EFH [Essential Fish Habitat] for Pacific salmon."

The federal government has funded—and will continue to fund for the foreseeable future—a significant portion of the salmon restoration efforts in the Columbia River estuary. NWIW's project would compromise this investment in order to ship fracked North American natural gas overseas as methanol.

2. NEPA REQUIRES THE CORPS TO PREPARE AN EIS.

The National Environmental Policy Act ("NEPA") is America's basic "charter for protection of the environment." 40 C.F.R. § 1500.1(a). NEPA serves two purposes: it (1) ensures that the agency will carefully consider detailed information concerning significant

¹ U.S. Environmental Protection Agency (EPA), National Estuary Program in Region 10 (online at: <http://yosemite.epa.gov/R10/ECOCOMM.NSF/6da048b9966d22518825662d00729a35/c7a2ab5e252f309688256fb600779ea6!OpenDocument>).

² EPA, *Columbia River Basin: State of the River Report for Toxics* (Jan. 2009) (online at: http://www2.epa.gov/sites/production/files/documents/columbia_state_of_the_river_report_jan2009.pdf).

³ NMFS, *Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead* (2011); Fresh *et al.*, *NOAA Technical Memorandum NMFS-NWFSC-69: Role of the Estuary in the Recovery of Columbia River Basin Salmon and Steelhead* (2005); 78 Fed. Reg. 2,726 (Jan. 14, 2013) (*Proposed Critical Habitat Designation for Lower Columbia Coho Salmon*).

⁴ Thom, R. *et al.*, *Columbia River Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (Jan. 2013).

environmental impacts of the proposed project, and (2) “guarantees that the relevant information will be made available” so that the public may play a role in the decision-making process. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). By focusing attention on the environmental consequences of proposed actions, NEPA “ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Id.* An EIS is fundamental for the public, tribes, and state and federal agencies to understand a proposed project’s impact on the environment and public health.

a. The Corps’ NEPA analysis must consider all direct, indirect, and cumulative impacts of NWIW’s terminal, refinery, and pipeline.

The Council on Environmental Quality’s (“CEQ”) regulations governing the scope of NEPA analyses require agencies like the Corps to analyze the direct, indirect, and cumulative impacts of each proposed action. 40 C.F.R. § 1508.25(c). The Project’s direct impacts are generally those that will result from the construction, maintenance, and use of the structures—pipeline, dock, and collector well—over which the Corps has permitting authority.

The Corps’ NEPA document must address the indirect impacts of the pipeline and berth, including the impacts resulting from the construction and operation of the methanol refinery and the procurement and sale of North American natural gas to the refinery. 40 C.F.R. § 1508.25(c)(2). Indirect effects, for NEPA purposes, are those effects “which are caused by the action and are later in time or farther removed in distance, but are still *reasonably foreseeable*.” 40 C.F.R. § 1508.8(b) (emphasis added). Indirect effects include the ways that human use of an area changes as a result of the proposed action, and the consequential effects of those changed uses on air, water, and ecosystems. *Id.* The reasonably foreseeable indirect impacts of NWIW’s proposal to refine North American natural gas into methanol for export to Asia include:

- Construction and operation of the 90-acre methanol facility at the Port of Kalama and associated air and water pollution that will result;
- Increased Panamax vessel traffic in the Columbia River and Pacific Ocean and associated impacts on salmon habitat, marine mammals, and river users;
- Greenhouse gas emissions and other impacts associated with generating and delivering the electricity that the refinery would use;
- Increased hydraulic fracking to extract natural gas and associated impacts to water quality and quantity, habitat destruction and fragmentation, and greenhouse gas emissions from leaking natural gas during extraction, and;
- Increased domestic natural gas and electricity prices due to decreases in natural gas supply.

Accordingly, the Corps' NEPA review must address these reasonably foreseeable impacts of NWIW's proposal to refine and export methanol.

The Corps must also explain the cumulative environmental impacts of this project *and* the numerous other fossil fuel shipping projects proposed in the Columbia River Estuary. The CEQ's regulations require the Corps to analyze the cumulative environmental impact of each proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. 40 C.F.R. §§ 1508.7, 1508.25(c)(3). In recent years, various companies have proposed or begun shipping fossil fuels—including crude oil, coal, methanol, liquefied propane gas ("LPG"), and liquefied natural gas ("LNG")—through the Columbia River Estuary. These projects include, but are not limited to:

- Global Partners' shipments of Bakken crude oil from the expanded Port Westward dock;
- Ambre Energy's proposed Morrow Pacific Project to export coal;⁵
- Tesoro-Savage's proposal to construct and operate a very large crude oil terminal at Vancouver, Washington;⁶
- NuStar Energy's proposal to construct and operate crude oil terminal at Vancouver, Washington;
- Millennium Bulk Terminal's proposed coal export terminal at Longview, Washington;⁷
- Oregon LNG's proposed LNG export terminal at Warrenton, Oregon;⁸
- Waterside Energy's proposal to build a crude oil refinery at Longview, Washington;
- Waterside Energy's proposal to build an LPG export terminal at Longview, Washington;
- NWIW's proposal to construct a methanol refinery at Port Westward, Oregon, that would be largely identical to the proposed refinery at Kalama.⁹

⁵ See Section II, *supra*.

⁶ The Columbian, *Port of Vancouver runs afoul of meetings law* (July 30, 2013) (online at: <http://www.columbian.com/news/2013/jul/30/vancouver-port-meetings-law-oil-terminal-tesoro/>).

⁷ Letter from Millennium Bulk Terminals LLC to the Corps (Feb. 13, 2012) (online at: <http://millenniumbulk.com/wp-content/uploads/2012/05/February-13-2012-Letter-to-Michelle-Walker.pdf>).

⁸ 77 Fed. Reg. 59,603 (September 28, 2012) (FERC notice of intent to prepare an EIS for Oregon LNG's proposed LNG export project).

⁹ See Port of St. Helens, *Resolution 2014-13* (February 12, 2014) (Authorizing a lease option agreement for property at Port Westward with NWIW).

All of these projects are either presently occurring or reasonably foreseeable, and all have the potential to impact the Columbia River in similar ways. Accordingly, NEPA compels the Corps to assess and describe the cumulative impact that all of these fossil fuel shipping activities would have on the Columbia River.

Riverkeeper recognizes that the Port of Kalama and Cowlitz County are compiling an EIS for the methanol refinery pursuant to Washington's State Environmental Policy Act ("SEPA"). See RCW 43.21C.030(c). The information and analyses in the SEPA EIS may be useful to the Corps when preparing the Corps' NEPA document. However, the Port and County's review does not replace the Corps obligation under federal law to produce a single NEPA document that discusses and discloses the full range of impacts that would occur as a result of NWIW's proposal.

Riverkeeper is also aware that the Federal Energy Regulatory Commission ("FERC") has prepared and published a NEPA Environmental Assessment ("EA") and recommended Finding of No Significant Impact ("FONSI") for the pipeline over which FERC has primary regulatory authority. Riverkeeper is not asking the Corps to re-do analyses conducted by FERC, and relying on information contained in the pipeline EA may be appropriate. Riverkeeper strongly disagrees, however, with the FERC's use of an EA/FONSI to authorize the pipeline. The pipeline's indirect and cumulative impacts are extensive, and the fact that FERC largely ignored those impacts will not excuse the Corps from addressing them in the Corps' NEPA document.

b. The Corps must prepare an Environmental Impact Statement to evaluate the environmental impacts of the methanol refinery and export project.

An EIS is the appropriate way to study and describe the significant and far-reaching impacts of NWIW's proposal. An agency must prepare an EIS when substantial questions exist about whether the proposed project "may" significantly degrade the environment. *Native Ecosystems Council v. U.S. Forest Service*, 428 F.3d 1233, 1239 (9th Cir. 2005) (emphasis in original); see also 42 U.S.C. § 4332(2)(C). "This is a low standard." *Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549, 562 (9th Cir. 2006); *California Wilderness Coalition v. U.S.*, 631 F.3d 1072, 1097 (9th Cir. 2011).

The CEQ's NEPA regulations contain ten 'intensity' factors that the Corps must consider when evaluating whether a project's impacts may be significant, requiring an EIS. 40 C.F.R. § 1508.27(b); *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 361 F.3d 1108, 1124 (9th Cir. 2004). These factors include:

- The degree to which the proposed action affects public health or safety. 40 C.F.R. § 1508.27(b)(2).

- The unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. 40 C.F.R. § 1508.27(b)(3).
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. 40 C.F.R. § 1508.27(b)(7).
- The degree to which the action may cause loss or destruction of significant scientific, cultural, or historical resources. 40 C.F.R. § 1508.27(b)(8).
- The degree to which the action may adversely affect an endangered or threatened species or its designated critical habitat. 40 C.F.R. § 1508.27(b)(9).
- Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment. 40 C.F.R. § 1508.27(b)(10).

40 C.F.R. § 1508.27(b). As explained below, these factors apply to methanol refining, terminal construction, and shipping in the Columbia River Estuary. The presence of just one of these factors may compel the preparation of an EIS. *Ocean Advocates v. U.S. Army Corps of Engineers*, 402 F.3d 846, 865 (9th Cir. 2005).

i. Impacts are ‘significant’ because the proposed action affects public health and safety to a high degree.

The Corps should prepare an EIS because the direct, indirect, and cumulative impacts of this proposal would significantly affect public health and safety. CEQ’s second ‘intensity’ factors is “[t]he degree to which the proposed action affects public health or safety.” 40 C.F.R. § 1508.27(b)(2).

The direct impact of the proposal with the most immediate threat to public safety is the construction of a 24-inch high-pressure gas pipeline line through residential areas, farms, and under Interstate 5. Pressurized natural gas is flammable and explosive. The proposed pipeline would run within one or two hundred feet of several homes, and the Mt. Pleasant Cemetery.

The indirect impacts of the proposal on human health and safety include air and water pollution from the refinery,¹⁰ as well as water pollution associated with increased fracking to supply the terminal with natural gas. Increased vessel traffic from this project and others like it would also subject workers and local residents to dangerous air pollution from immense Panamax-class vessels.¹¹

¹⁰ Washington state agencies have not drafted air or water permits or SEPA documents for the refinery. The Corps’ EIS must nevertheless explain what air and water pollution will occur.

¹¹ See Section 4.c, *infra*.

The indirect and cumulative impacts of this proposal on human health and safety include the effects of global warming, discussed at Section 4.k, below.

ii. *Impacts are ‘significant’ because the project may adversely affect the Columbia River Estuary’s unique ecological, cultural, and historic resources.*

The Corps should prepare an EIS because the project could devastate the Columbia River Estuary and its unique ecological and cultural resources. CEQ’s third and eighth ‘intensity’ factors counsel in favor of preparing an EIS when the proposed project would negatively impact unique ecological, cultural, or historic resources. 40 C.F.R. § 1508.27(b)(3), (8). Specifically, intensity factor three contemplates an EIS when a project is proposed in an area close “to historic or cultural resources, park lands, prime farmlands, wetlands, . . . or ecologically critical areas.” 40 C.F.R. § 1508.27(b)(3). Similarly, intensity factor eight considers the degree to which the proposed project “may cause loss or destruction of significant scientific, cultural, or historical resources.” 40 C.F.R. § 1508.27(b)(8). Building and operating a pipeline, methanol refinery, and new dock in the midst of the Columbia River Estuary’s unique ecological, social, and cultural resources deserves analysis in an EIS.

The Columbia River supports a vibrant tradition of subsistence, commercial, and sport salmon fishing. Salmon fishing in the estuary and lower Columbia River is a cultural and economic practice with a rich history reaching back many generations. Building a massive new dock and increasing Panamax-class vessel transit will degrade important salmon habitat and disrupt fishing practices, damaging these significant cultural and historical resources. The Corps should therefore use an EIS to analyze the impacts of dock construction and Panamax ship traffic on salmon and salmon fishing in the lower Columbia. 40 C.F.R. §§ 1508.27(b)(3) & (8).

The lower Columbia River and estuary is an “ecologically critical area,” 40 C.F.R. § 1508.27(b)(3), that is essential to the survival juvenile salmon and steelhead, waterfowl, and many other species.¹² The lower river is lined with wetlands, riparian areas, and park lands¹³ which could all be impacted by increased vessel traffic or invasive species brought in by methanol tankers. Further, a fuel oil spill at the dock, or from a Panamax vessel in the river, could devastate the ecologically critical areas downstream and upstream from Kalama. Before subjecting the unique and irreplaceable Columbia River Estuary to these threats, the Corps should analyze the potential impacts in an EIS. 40 C.F.R. §§ 1508.27(b)(3) & (8).

¹² NMFS, *Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead* (2011); Fresh *et al.*, *NOAA Technical Memorandum NMFS-NWFSC-69: Role of the Estuary in the Recovery of Columbia River Basin Salmon and Steelhead* (2005); 78 Fed. Reg. 2,726 (January 14, 2013) (Proposed Critical Habitat Designation for Lower Columbia Coho Salmon).

¹³ *E.g.* Julia Butler Hansen Refuge for the Columbian White-Tailed Deer, Lewis and Clark National Wildlife Refuge.

The pipeline aspect of the project would also disrupt 18.4 acres of prime farm lands in the Kalama area, roughly from Milepost 2.4 to 2.8.¹⁴ FERC's EA downplays the impacts to prime farmland. But FERC's ignores the likelihood that this prime farmland—like much of the farmland along the lower Columbia—contains a system of underground drainage tiles and pipes. Using trenching or HDD to bring a large natural gas pipeline through an area containing an underground drainage system could be massively disruptive to this area of prime farmland.

iii. The cumulative impact of this project and other, similar projects is 'significant.'

NWIW's proposed methanol refinery is just one of many proposed and existing fossil fuels shipping projects in the Columbia River. Even if the Corps somehow concludes that the direct and indirect impacts of constructing and operating the dock, methanol refinery, pipeline were not 'significant' for NEPA purposes, the cumulative impact of NWIW's proposal and all of the similar proposals along the Columbia River is undoubtedly significant. CEQ's seventh 'intensity' factor directs agencies to prepare an EIS when the cumulative impacts of a proposed project would be significant. 40 C.F.R. § 1508.27(b)(7). As explained in Section 2.a. above, there are numerous proposals for crude oil, coal, methanol, LPG, and LNG shipping in the lower Columbia. Cumulatively, these projects would drastically increase the shipping traffic on the Columbia River, in- and over-water construction in the Columbia, dredging in the Columbia, greenhouse gas emissions, and the probability of an accident or spill in the Columbia River. These projects would also cumulatively harm to U.S. energy independence goals, increase domestic energy prices, and further weaken the U.S. manufacturing sector's ability to compete with foreign manufacturing. Taken together, the impact of all those projects in addition to NWIW's proposal will result in a cumulatively significant impact on the human environment in the lower Columbia.

The EIS cannot ignore the cumulative contribution of this project, and others like it, to climate change. NEPA requires a quantification of the "incremental impact[s] that [the proposed project's] emissions will have on climate change ... in light of other past, present, and reasonably foreseeable actions." *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216 (9th Cir. 2008); *see also Center for Biological Diversity v. National Highway Traffic Safety Administration*, 508 F.3d 508, 550 (9th Cir. 2007) ("The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."). Even if NWIW's project has an "individually minor" effect on the environment—which it probably does not—it and other similar projects are "collectively significant actions taking place over a period of time" that contribute significantly to climate change. 40 C.F.R. § 1508.7. NEPA requires analysis of the "actual environmental effects" resulting from those cumulative emissions. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216 (9th Cir. 2008).

¹⁴ See FERC, *EA for the Kalama Lateral Project*, Docket No. CP15-8-000, p.30 (July 2015).

Accordingly, the Corps must quantify and evaluate, in an EIS, the cumulative and incremental effects of climate change resulting from NWIW's proposal along with the effects of other fossil fuels shipping projects currently proposed and operating along the Columbia.

iv. Impacts are 'significant' because the project is likely to adversely affect threatened and endangered species.

The Corps should prepare an EIS because the project may seriously impact threatened or endangered species. CEQ's ninth 'intensity' factor favors the preparation of an EIS when a proposed project would substantially adversely affect an endangered or threatened species or its designated critical habitat. 40 C.F.R. § 1508.27(b)(9). The project has the potential to harm listed species of salmon and steelhead that rely on a healthy estuary environment for rearing and migration.

Multiple studies and publications have identified shallow-water and off-channel habitats in the Lower Columbia River and Estuary as vitally important for salmonid rearing and species recovery.¹⁵ Development or destruction of shallow-water habitats, and the construction of over-water structures like piers and docks, has significantly degraded the lower Columbia River's ability to support juvenile salmonids.¹⁶ Most recently, the NMFS issued a BiOp to the Corps on dock construction at Port Westward, Oregon.¹⁷ Although NWIW's proposed dock would be much larger than the Port Westward dock expansion, and entail significant dredging, that BiOp contains significant, current information about the impacts of dock construction and Panamax-class vessel traffic on endangered salmon.

Increased Panamax vessel traffic could lead to the wake-stranding, and death, of endangered juvenile salmonids, which frequent shallow, near-shore habitats in the estuary. Additionally, a fuel oil spill at the dock or elsewhere could negatively impact the estuary's salmon habitat. Along with ESA consultation, an EIS is the proper analytical tool to discuss the risks to threatened salmon and steelhead posed by this project.

v. The Corps should prepare an EIS because the proposal threatens to violate Federal laws protecting the environment.

NWIW's proposal for major new industrial development in and near the Columbia River may run afoul of federal environmental laws, including the Clean Water Act, the Rivers and Harbors Act, and the Endangered Species Act. An EIS is the appropriate analytical tool when a project's impacts are significant enough that the project threatens to violate a federal law imposed for the protection of the environment. 40 C.F.R. § 1508.27(b)(10). For instance,

¹⁵ See Note 12, *supra*.

¹⁶ *Id.*

¹⁷ See NMFS, *Endangered Species Act Biological Opinion for the Columbia Pacific Bio-Refinery Barge Dock Expansion* (June 8, 2015).

constructing a new 44,943 square-foot dock, increasing Panamax-class vessel traffic, and dredging 16 acres of the lower Columbia River may cause “take” of threatened or endangered salmon and steelhead in violation of Section 9 of the Endangered Species Act and may cause adverse modification of designated critical habitat in violation of Section 7 of the Endangered Species Act. Additionally, the project may violate the Clean Water Act Section 404(b)(1) guidelines’ requirement if there is a practicable alternative to the proposed discharge that would have a less adverse effect on the aquatic ecosystem—for instance, using or expanding the existing dock just upriver from the proposed new dock. *See* 40 C.F.R. § 230.12(a)(3)(i). Whether or not the Corps ultimately determines that NWIW’s proposal would violate a federal environmental law, the project nevertheless presents a close question on this issue. Therefore, the proposal’s serious impacts to the Columbia River ‘threaten’ to violate laws imposed for the protection of the environment within the meaning of 40 C.F.R. § 1508.27(b)(10), and the Corps should prepare an EIS.

3. NWIW’S PROJECT FAILS TO COMPLY WITH THE 404(b)(1) GUIDELINES.

The purpose of the Clean Water Act, 33 U.S.C. § 1251 *et seq.*, is to restore and maintain the chemical, physical, and biological integrity of waters of the United States. Section 404 of the Clean Water Act prohibits dredging or discharging fill material in a U.S. water without a permit from the Corps. 33 U.S.C. § 1344. The Environmental Protection Agency has promulgated regulations, called the “404 Guidelines,” that govern how the Corps issues Section 404 permits program. *See* 40 C.F.R. §§ 230.1–230.80.

The 404 Guidelines provide that “dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.” 40 C.F.R. § 230.1(c). For the reasons described in Section 4, below, the discharges of dredged and fill material contemplated by NWIW’s project would have an “unacceptable adverse impact” on the Columbia River ecosystem within the meaning of 40 C.F.R. § 230.1(c). The Corps must therefore deny Section 404 permit applications.

There appear to be less environmentally damaging alternatives to the massive dock and dredging project that NWIW, through the Port of Kalama, has proposed. The 404 Guidelines prohibit the Corps from issuing any permit “if there is a practicable alternative . . . which would have less adverse impact on the aquatic ecosystem.” 40 C.F.R. § 230.10(a). An alternative is “practicable” if it is “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” 40 C.F.R. § 230.10(a)(2). The permit applicant—not the Corps or public commenters—has the legal burden to explain why there are no practicable alternatives to the proposed action with less adverse impacts on the aquatic ecosystem. *Northwest Environmental Defense Center v. Wood*, 947 F. Supp. 1371, 1374

(D. Or. 1996). Failure to adequately explain why there are not practical alternatives with less adverse environmental impacts is grounds for a court to void the 404 permit.

While it is not Riverkeeper's duty to do so, Riverkeeper points out that there appears to be a fully serviceable deep-water dock (the "Steelscape Dock") just a few hundred feet upstream from the dock proposed by NWIW. The Port of Kalama describes the Steelscape Dock as "one berth with a length of 600 feet (900 feet with mooring dolphins), and connected to land via two trestles. Water depth at the terminal is 48 feet below Mean Lower Low Water (MLLW)."¹⁸ Using the Steelscape Dock for NWIW's vessels would necessarily have a "less adverse impact on the aquatic ecosystem," 40 C.F.R. § 230.10(a), than building a larger new dock and dredging 16 acres of new berth space. Alternatively, NWIW could use the berth recently permitted by the Corps for construction at Port Westward, Oregon.¹⁹ Unless the applicant can "clearly demonstrate[]," *Northwest Environmental Defense Center*, 947 F. Supp. at 1374, why using the Steelscape dock in its current condition (or with some modifications that entail less in- and over-water construction and dredging than the current proposal) would be impracticable, the Corps may not issue the 404 permit. 40 C.F.R. § 230.10(a).

Finally, the JPN provides no commitment to any particular dredge spoil disposal site.²⁰ The applicant's failure designate a preferred dredge spoil disposal site and methodology makes it impossible for the Corps to engage in the alternatives analysis required by 40 C.F.R. § 230.10(a). It will also make it difficult, or at least cumbersome, for the Corps to describe the environmental impacts of the dredge spoil disposal as required by NEPA.

4. NWIW'S PROJECT IS CONTRARY TO THE PUBLIC INTEREST.

Issuing the requested permits for NWP-2014-177/2 and NWP-2015-111 would be "contrary to the public interest." 30 C.F.R. § 320.4(a)(1). Pursuant to the Corps' regulations, a permit "is issued following a case-by-case evaluation of a specific project involving the proposed discharge(s) . . . and a determination that the proposed discharge is in the public interest pursuant to 33 CFR part 320." 33 C.F.R. § 323.2(g).

To determine whether a project is contrary to the public interest, the Corps balances the "benefits which reasonably may be expected to accrue from the proposal" against the "reasonably foreseeable detriments" "of the proposed activity *and its intended use . . .*" 30 C.F.R. § 320.4(a)(1). (emphasis added). When assessing whether the impacts of this "proposed activity" (dock expansion, dredging, and pipeline construction), and its "intended use" (methanol

¹⁸ Port of Kalama, *Comprehensive Plan and Scheme of Harbor Improvements*, p. 64 (June 1, 2015) (online at: <http://portofkalama.com/wp-content/uploads/2015/06/Port-of-Kalama-Comp-Plan-2015-Final.pdf>).

¹⁹ See Authorization for Corps No. NWP-2007-998-1.

²⁰ See JPN, pp.3-4.

refining and export), are contrary to the public interest, the Corps must consider “[a]ll factors which may be relevant” *Id.*

The public interest review is broad, capturing all issues that could impact the environment, human health, and natural resources, including but not limited to: “conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.” 30 C.F.R. § 320.4(a)(1). In making these public interest determinations, the Corps must consider “[a]ll factors which may be relevant to the proposal,” including “the cumulative effects” of the project. 33 C.F.R. § 320.4(a)(1).

NWIW’s proposal to construct a massive new dock and dredged berth in the Columbia River, and a 3-mile pipeline, near Kalama to facilitate refining natural gas into methanol for export is contrary to the public interest because the foreseeable detriments to the public far outweigh any potential benefits. Before completing the public interest determination, the Corps must fill in the informational gaps in about NWIW’s project. The JPN lacks basic information about the project’s size, design, and scope. The JPN fails to disclose how much natural gas, electricity, and water the refinery would consume, and what type of air and water pollution would result from refinery operations. The JPN also lacks information—fundamental to the public interest determination—about how this and other proposals to export natural gas to Asia would impact U.S. gas markets, energy prices, and U.S. manufacturing. Finally, the Corps must obtain reliable information about the global warming impacts of this project and other like it.

The impacts of NWIW’s proposal, described below, demonstrate that the project is not in the public interest:

a. Dredging Impacts.

Additional dredging in the lower Columbia River is the antithesis of salmon recovery and restoring estuarine habitats, as described in every local, state, and federal salmon recovery management plan. The FCRPS BiOp identifies the estuary as a significant survival bottleneck for upriver stocks of salmon, and is key rearing and migration habitat for lower river (originating below Bonneville) fish. Changes in currents, habitat, or food resources could adversely affect survival during passage as the fish transition from brackish to marine waters. Dredging of the navigation channel and harbors has already significantly altered the historical geomorphic and

ecological state of the lower Columbia River,²¹ and NWIW's project would continue that trend, to the detriment of Columbia River salmon and steelhead.

Dredging for NWIW's project would result in the permanent degradation of at least 16 acres²² of designated critical habitat for salmon and steelhead. NWIW's project will degrade habitat for 13 ESUs of Columbia River and Snake River salmon that are listed as threatened under the ESA, in addition to multiple other non-listed salmon and other listed species that rely on the estuary for rearing and migration.

Dredging to facilitate NWIW's proposed refinery will not occur in a vacuum. The Lower Columbia River is subject to extensive and ongoing dredging activities, including those conducted by the Corps to deepen and maintain the Columbia River navigational channel. Dredging projects within close proximity to the proposed new Kalama dock, include, but are not limited to, the following:

- Port of Longview Emergency Dredge and Disposal Project
- Weyerhaeuser Dredging Project (NWS-2011-00181)
- Port of Longview Berth Maintenance and Deepening (NWP-2000-39)
- Longview Fibre Dredging Project (NWS-2011-00637)
- Northwest Alloys' and Millennium Bulk Terminals' applications to dredge berths for coal export facilities.

The Corps must evaluate NWIW's proposal by accounting for the cumulative impacts of these and other past, present, and future dredging projects in the Lower Columbia River.

b. Dock Construction and Use.

Pile driving can have substantial adverse impact on underwater organisms. NWIW's proposed terminal would require the installation of approximately 320 24-inch concrete piles, 12 12-inch steel pipe piles, and 4 18-inch steel pipe piles.²³ These piles will be installed by impact hammer or by vibratory hammer.²⁴ The JPN fail to show that harm will not occur to organisms

²¹ Thom, *et al.*, *Columbia Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (January, 2013); see also NMFS, *Factors Contributing to the Decline of Chinook Salmon: An Addendum to the 1996 West Coast Steelhead Factors for Decline Report*, pp.9–10 (June, 1998) ("Land and water use practices, including . . . dredging. . . have, and will continue to substantially altered [sic] watershed functions and features necessary for productive use by anadromous salmonids.").

²² JPN at 3.

²³ JPN at 2.

²⁴ JPN at 3.

in the vicinity, especially pinnipeds and salmonids. Specifically, the JPN does not discuss using bubble curtains or other methods to mitigate or attenuate acoustic impacts on aquatic organisms. Given that the pile driving is estimated to last for approximately 120 days,²⁵ many endangered fish and other animals could be killed, or at the very least harmed, by this activity.

“Acoustic disturbances associated with pile driving are likely to disrupt the foraging behavior and reduce forage efficiency of juvenile salmonids. * * * Fishes with swimbladders (including salmonids) are sensitive to underwater impulsive sounds, i.e., sounds with a sharp sound pressure peak occurring in a short interval of time (Caltrans 2001). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. The pneumatic pounding may rupture capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2001). The injuries caused by such pressure waves are known as barotraumas, and include hemorrhage and rupture of internal organs, as described above, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or can occur several days later. A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single strike threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams.

Deployment of a bubble curtain is likely to attenuate the peak sound pressure levels by approximately 10 to 20 dB. However, a bubble curtain may not bring the sound pressure levels below biological thresholds, and some death or injuries of ESA-listed salmonids are still likely to occur. Even with the use of the bubble curtain, adverse effects to salmonids are expected in the vicinity of the pile driving. Yelverton et al. (1975) found a direct correlation between smaller body mass and the magnitude of injuries and mortalities from underwater blasts. Large juvenile and adult fishes are likely to be present during the summer in-water work window, rather than small juvenile fishes. Based on conservative estimates of sound exposure level and number of pile strikes per day, injury to juvenile listed salmonids could occur up to 368 feet from the pile driving (NMFS 2008). There may also be effects to salmonid behavior due to underwater noise up to 7,067 feet upstream and downstream from the pile driving (NMFS 2008).”²⁶

Overwater structures like NWIW’s proposed dock degrade habitat for, and directly increase the mortality of, juvenile salmonids. NWIW’s terminal will result in 44,943 square feet of new solid overwater coverage.²⁷ NMFS has explained to the Corps that: “[a]n effect of overwater structures is the creation of a light/dark interface that allows ambush predators to

²⁵ JPN at 4.

²⁶ NMFS, *Columbia Pacific Bio-Refinery Barge Dock Expansion BiOp* (Corps No. NWP-2007-998), pp.82–83 (June 8, 2015).

²⁷ JPN at 3.

remain in a darkened area (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around the structure are unable to see predators in the dark area under the structure and are more susceptible to predation.”²⁸ These impacts are significant and measurable: “Predation on ESA-listed salmon and steelhead is reasonably certain to increase with the addition of structures. Juvenile fish abundance has also been found to be reduced under piers and overwater structures when compared to open water or areas with piles but no overwater structures (Able *et al.* 1998), likely due to limitations in prey abundance and increased predation under structures.”²⁹ The Corps must consider the effect of constructing a new dock on juvenile salmonid survival, in addition to the cumulative impacts of the numerous existing and proposed overwater structures in the Columbia.

c. Water Pollution and Consumption

i. Stormwater

Stormwater pollution is a leading cause of water quality degradation in the United States. According to the National Research Council, “[s]tormwater runoff from the built environment remains one of the great challenges of water pollution control, as this source of contamination is a *principal contributor* to water quality impairment of waterbodies nationwide.”³⁰ Stormwater from construction sites can lead to discharges of sediment, turbidity, nitrogen, phosphorus, metals, trash and debris, nutrients, organic matter, pesticides, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, other toxic organics, substances that can modify pH, and pathogens.³¹ EPA acknowledges that the cumulative effects of these pollutants are significant.³²

The Corps’ public interest analysis must consider the detrimental impacts of polluted stormwater from refinery and dock construction. The 90-acre proposed refinery site is mostly pervious surfaces.³³ Constructing the refinery and dock would convert most or all of those 90 acres into impervious surfaces.³⁴ Stormwater pollution caused by construction of the refinery and dock will contribute to degraded water quality in the lower Columbia River. The Corps must afford careful consideration to the degraded state of the Columbia River estuary, 303(d) listings, and ESA listings. The Corps must consider the public interest in additional polluted stormwater when weighing the benefits and harms caused by NWIW’s proposal.

²⁸ NMFS, *SLOPES IV In-water and Over-water Structures BiOp*, p.85 (April 5, 2012).

²⁹ *Id.* at 86.

³⁰ National Research Council, *Urban Stormwater Management in the United States* (Oct. 15, 2008) (online at: http://www.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf (emphasis added)).

³¹ See EPA, *Environmental Impact and Benefits Assessment for Proposed Effluent Guidelines and Standards for the Construction and Development Category*, pp.3–6 (Nov. 2009) (online at: <http://www.epa.gov/guide/construction/>); see also 74 Fed. Reg. 62996, 63010–11 (December 1, 2009).

³² *Id.*

³³ See JPN Enclosures for NWP-2014-177/2, p.3.

³⁴ *Id.*

ii. Process wastewater

The Columbia River, and the communities that depend on it, face serious threats from toxic pollution and elevated temperature. Every day thousands of pipes buried under and along the Columbia River discharge toxic and other pollution from cities, industry, stormwater, and other sources. Pesticides and heavy metals also enter the river from non-point source pollution, such as runoff from agricultural lands and air deposition. NWIW's operations would almost certainly increase toxic and temperature pollution to an already overburdened river system. The public interest in fishable, swimmable rivers weighs in favor of denying the permits.

NWIW probably cannot demonstrate compliance with water quality standards for temperature. NWIW proposes that its "process wastewater will be treated on-site and discharged to the Columbia River" ³⁵ Most of the water NWIW would use would likely be for cooling, and therefore that water will contain temperature pollution at the time of discharge. Both Oregon and Washington consider the Columbia River to be water quality limited for temperature (*i.e.*, on the EPA-approved 303(d) lists) at the project site. As a new discharger into an impaired water body, NWIW's temperature discharges would fail to comply with the Clean Water Act, given the Ninth Circuit's ruling in *Friends of Pinto Creek v. EPA*, 504 F.3d 1007 (9th Cir. 2007).

iii. Water Consumption

The Corps' public interest analysis must account for the significant amount of water used by NWIW's refinery. According to the Water Supply Agreement between NWIW and the Port of Kalama, operating the refinery will consume up to 2.92 billion gallons of water each year. ³⁶ NWIW's use of billions of gallons of water every year to operate the methanol refinery must be accounted for in the public interest analysis. The Corps should assess and describe the source of this water, and whether the continuous use of this volume of water for energy export is in the public interest, especially in light of documented water shortages throughout the Columbia Basin as a result of climate change.

c. Air Pollution.

Numerous activities during the construction and operation of NWIW's refinery, terminal, and pipeline will cause increases in air pollutant levels in the region. These activities include operating construction equipment (including dredge ships), refinery operations, and increases in vehicle and vessel traffic. There is no publicly available analysis about how much, and what kind of, air pollution NWIW's refinery would generate, and no evidence about whether the project will exceed National Ambient Air Quality Standards.

³⁵ Exhibit 1, Port of Kalama, *Project Overview for Kalama Manufacturing and Export Facility*, p.5 (2014).

³⁶ Exhibit 2, *Water Supply Agreement between NWIW and the Port of Kalama*, p.2 (April 9, 2014).

Tanker vessels emit substantial amounts of air pollutants, including sulfur oxides (“SOx”), nitrogen oxides (“NOx”), and particulate matter (“PM”). PM consists of tiny particles suspended in air. PM has been linked to respiratory and cardiovascular problems, including coughing, painful breathing, aggravated asthma attacks, chronic bronchitis, decreased lung function, heart attacks, and premature death. Sensitive populations, include the elderly, children, and people with existing heart or lung problems, are most at risk from PM pollution. PM also reduces visibility,³⁷ and may damage important cultural resources.³⁸ NOx and SOx emissions can also have serious environmental impacts, nitrogen nutrient loading, acidification, smog caused by NOx and other precursor gases, and changes in visibility. Ships also emit substantial amounts of greenhouse gases, including black carbon—a component of PM emitted by older diesel engines—which contributes to climate change. Marine shipping was responsible for 3.6 percent of the United States’ black carbon emissions in 2002.³⁹

d. Noise & Light Pollution.

Noise and light levels during construction of the proposed pipeline, refinery, and terminal will reach levels that could be a nuisance to humans and cause harm to animals. Noise will originate from a variety of sources during construction, including increased vehicle traffic, engine driven construction equipment, pile driving, and blasting activities. Noise and light impacts from the operation of the refinery have not been disclosed to the public, but nevertheless must be evaluated in the Corps’ public interest determination. For instance, it appears that the refinery may intend to flare natural gas—as serious degradation of the Columbia River’s scenic beauty.⁴⁰

e. Energy Consumption & New Energy Infrastructure.

NWIW’s project would require huge amounts of energy to refine natural gas into methanol—at least 200 megawatts (“MW”), and possibly much more. For comparison, the proposed Jordan Cove LNG terminal would require a 420 MW gas-fired power plant, which the Oregonian concluded would be one of the biggest sources of greenhouse gases in Oregon.⁴¹ NWIW has not disclosed where this power would come from, but the Corps must evaluate the environmental impacts of generating the power that would fuel the methanol refinery. In

³⁷ EPA, *Visibility – Basic Information* (online at: <http://www.epa.gov/visibility/what.html>).

³⁸ See Bureau of Land Management, West Tavaputs EIS, p.3-19 (online at: [http://www.blm.gov/style/medialib/blm/ut/price_fo/oil_and_gas_2.Par.85007.File.dat/Chapter%203%20WTP%20FIS\[1\].pdf](http://www.blm.gov/style/medialib/blm/ut/price_fo/oil_and_gas_2.Par.85007.File.dat/Chapter%203%20WTP%20FIS[1].pdf)).

³⁹ Battye, W. and K. Boyer, *Methods for Improving Global Inventories of Black Carbon and Organic Carbon Particulates* (2002) (online at: <http://www.epa.gov/ttn/chief/conference/ei11/ghg/battye.pdf>).

⁴⁰ See Enclosure to JPN for NWP-2014-177/2, p.3.

⁴¹ Oregonian, *Jordan Cove LNG in Coos Bay could quickly become one of the largest greenhouse gas emitters in Oregon* (Nov. 18, 2014) (online at: http://www.oregonlive.com/business/index.ssf/2014/11/jordan_cove_lng_in_coos_bay_co.html).

addition, the Corps' public interest analysis must evaluate the impact of NWIW's required electric transmission line upgrades and associated impacts to terrestrial and aquatic ecosystems.

The Corps' public interest analysis must evaluate the impacts of NWIW's power source and transmission line upgrades. This includes air pollution, climate change, and other impacts caused by the generation of power for NWIW's refinery. If NWIW requires uninterrupted power to operate, the Corps must fully evaluate the impact of operating the facility with diesel or future gas-fired generation in the local area.

f. Pipeline Construction and Operation

i. Habitat Fragmentation

The Corps must assess the cumulative impacts of NWIW's proposed Pipeline route and existing and reasonably foreseeable future transmission, road, and pipeline right-of-ways that threaten habitat quality and wildlife. The Pipeline would impact aquatic and terrestrial wildlife habitat in numerous ways. Clearing forestland along the Pipeline right-of-way directly removes habitat, provides a conduit for the spread of wildfires, and provides increased access to off-road vehicle users (ORVs). The Corps must weigh the public interest in protecting fish and wildlife habitat in considering whether to issue permits for Pipeline construction.

Habitat fragmentation is one of the most pervasive and difficult-to-control threats to native ecosystems in the United States. It occurs when land uses break up contiguous blocks of habitat into smaller patches or when roads, transmission lines, pipelines, or other corridors penetrate blocks of habitat. The Pipeline will contribute to and create new habitat fragmentation, compromising the integrity of habitat interior in wetlands, forests, and other ecosystems. For example, habitat fragmentation can have negative effects on wildlife and ecosystems through direct habitat loss or indirectly through changes that occur as a result of the adjacent habitat type and the particular land use associated with it.

In addition, the Corps must consider the effects of Pipeline construction and right-of-ways on habitat disturbance, including increased exotic and invasive species. Impacts include, but are not limited to: providing access for plants and animals that thrive in disturbed environments and the associated detriment to species that require contiguous habitat; opening access to previously remote areas via the new roads and pipelines and the impact of increased human access on fish and wildlife; the spread of invasive plant species; disturbance of sensitive habitats and species of conservation concern, including threatened and endangered species; the increase in car, truck, and heavy machinery traffic; and the impact of pipelines and roads as acting as barriers to movement for many amphibian species and some small mammals.

ii. Road Construction & Long-Term Impacts.

Oregon LNG fails to address adequately the aquatic impacts from road use, road modifications, temporary extra work area construction and temporary and permanent access roads. Roads contribute to the disruption of hydrologic function and increase sediment delivery to streams. Roads also provide access to otherwise isolated habitat, and the activities that accompany access magnify their negative effects on aquatic habitats.

Road construction has the potential to produce myriad impacts to waters of the U.S., including:

- Soil erosion, compaction, loss of forest productivity;
- Pollution: sedimentation, thermal loading;
- Rapid water runoff: peak flows;
- Impaired floodplain function;
- Barrier to movement of wood and spawning gravel;
- Fragmentation: wildlife dispersal barrier;
- Human disturbance: weed vector, hunting pressure, loss of snags, litter, human fire ignition, etc.

Roads are also a conveyor belt for delivering chronic sediment to streams.⁴²

In recent decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that roads aggravate many of the most pervasive threats to biological diversity, including habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals. EPA describes the impacts of roads as follows:

“Stormwater discharges from logging roads, especially improperly constructed or maintained roads, may introduce significant amounts of sediment and other pollutants into surface waters and, consequently, cause a variety of water quality impacts. ...

⁴² Derrig, M., *Road Improvements for Watershed Restoration* (online at: <http://www.fsl.orst.edu/geowater/PEP/calfed/derrig/index.html>).

[S]ilviculture sources contributed to impairment of 19,444 miles of rivers and streams [nationwide]. ... forest roads can degrade aquatic ecosystems by increasing levels of fine sediment input to streams and by altering natural streamflow patterns. Forest road runoff from improperly designed or maintained forest roads can detrimentally affect stream health and aquatic habitat by increasing sediment delivery and stream turbidity. This can adversely affect the survival of dozens of sensitive aquatic biota (salmon, trout, other native fishes, amphibians and macroinvertebrates) where these species are located. Increased fine sediment deposition in streams and altered streamflows and channel morphology can result in increased adult and juvenile salmonid mortality where present (e.g., in the Northwest and parts of the East), a decrease in aquatic amphibian and invertebrate abundance or diversity, and decreased habitat complexity.

The physical impacts of forest roads on streams, rivers, downstream water bodies and watershed integrity have been well documented but vary depending on site-specific factors. Improperly designed or maintained forest roads can affect watershed integrity through three primary mechanisms: they can intercept, concentrate, and divert water (Williams, 1999).”⁴³

Temporary roads present most of the same risks posed by permanent roads.

iii. Waterway Crossings

Pipeline construction will require numerous stream and wetland crossings. The Corps’ public interest analysis must account for the direct, indirect, and cumulative impacts of Pipeline construction on water quality. The applications propose crossing waters using a combination of conventional trenching and HDD. Even when successful, these techniques have impacts in areas adjacent to rivers where staging and construction areas occur, and HDDs also require the disposal of materials extracted from the drill hole.

Additionally, HDD attempts frequently fail, causing drastic impacts to water quality and fish habitat. HDD failure includes the potential for hydraulic fracturing, or a “frac-out.” A frac-out occurs when an HDD fails, fractures a streambed or riverbed, and releases drilling lubricants into the stream. Because the proposed pipeline would use HDDs to cross perennial streams, the Corps must fully assess the potential and impacts of HDD failures.

For example, many HDD attempts along the 12-inch Coos County pipeline failed, resulting in “frac-outs,” situations in which large amounts of sediment and bentonite clay (used as a drilling lubricant) were released into streams. *See picture below.* Bentonite clay and sediment released through frac-outs can disrupt fish spawning habitat, increase turbidity, and potentially introduce other contaminants to impacted waterways.

⁴³ 77 Fed. Reg. 30474 (May 23, 2012) (EPA’s Notice of Intent to Revise Stormwater Regulations).



The Corps must also evaluate the biological impacts of a frac-out. Even if the HDD drilling lubricants, particularly bentonite clay, are non-toxic (which is dubious), it does mean these substances are not harmful. For example, as NMFS cautioned in a comment on the prior natural gas pipeline proposal, “a frac-out from horizontal directional drilling will cause bentonite, a very fine clay, to be released into the water column that has the potential, if fish are present, to clog their gills, causing them to suffocate. Whether it is a toxic compound or not, the particle size of the clay is of concern for fish.”⁴⁴ Bentonite clogs fish gills and fish habitat, leading to fish mortality and loss of spawning habitat.

iv. Pipeline Safety

The Corps must account for the risk of a natural gas pipeline explosion in the public interest analysis. The proposed pipeline will use odorless gas and have an as-yet-undescribed high-impact blast radius. As recent natural gas pipeline explosions demonstrate, even with modern safety standards and inspections, deadly pipeline explosions continue to occur. The picture below shows a natural gas pipeline, also owned by Williams, that exploded in Appomattox, VA, in 2008:

⁴⁴ NMFS, *Comment to FERC regarding Oregon LNG*, p.11 (July 18, 2008).



The Corps must account for the risks of loss of life, property destruction and damage, and wildfires from a pipeline explosion. In addition, the Corps must also account for the psychological impacts on local landowners and nearby residents.

g. Impacts to Tribes & Other Environmental Justice Communities.

On February 11, 1994, President Clinton issued Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” The Executive Order makes it the responsibility of each Federal agency to “make achieving environmental justice part of its mission in identify and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Accompanying this order was a Presidential Memorandum stating that “each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the [National Environmental Policy Act].”

From air pollution to impacts on subsistence fishing, Oregon LNG’s project raises significant environmental justice issues. The Corps must address these significant impacts in the public interest analysis. First and foremost, the Corps has treaty and constitutional duties to

consider the project's impacts on Columbia River treaty tribes. Riverkeeper will leave comments on these duties and obligations to the sovereign tribal nations.

The Corps' public interest analysis must evaluate how the construction of the refinery, terminal, and pipeline will impact cultural resources. This includes impacts to Native American cultural resources, and other cultural sites near the terminal, along the shipping route, the pipeline route, and in natural gas extraction areas. The Corps' public interest review will benefit from government-to-government consultation with Columbia River tribes and other tribes impacted by NWIW's project.

h. Impacts of Gas Export

The effect of NWIW's Kalama proposal will be to export North American gas to Asia. There is strong evidence that exporting gas—whether that gas has been condensed into LNG or refined into methanol—impairs the public interest. These impairments include: (1) regional and national economic dislocations and disruptions caused by natural gas extraction, including by the industry's boom-and-bust cycle, (2) national increases in gas and electricity prices and resulting shifts to more polluting fuels, (3) and environmental impacts of many sorts. These interests would be impaired by gas export stemming from NWIW's Kalama proposal, but these impairments are likely to be even more significant when considered cumulatively with NWIW's other gas export proposals at Tacoma and Port Westward, and with the LNG export terminals proposed at Warrenton and Coos Bay, Oregon. The Corps must examine the direct, indirect, and cumulative impacts of gas export as part of the NEPA and public interest analyses for NWIW's project.

i. Increased Shale Gas Production

The U.S. Energy Information Administration ("EIA"), and other informed commenters agree that exporting North American gas to Asia induces increased domestic gas production. Studies suggest that production increases closely correspond with the volume of exported gas. For example, the EIA, in a study of effects of U.S. exports commissioned by the DOE, estimated that **the majority of exported gas would come from increased production, primarily from shale gas.**⁴⁵ Specifically, the EIA predicts that "about 60 to 70 percent" of the volume of exported gas would be supplied by increases in domestic production, with the remainder supplied reductions in domestic consumption of current production, and that "about three quarters of this increased production is from shale sources."⁴⁶ The Corps should use these figures to calculate how much domestic gas production NWIW's Kalama project will induce individually, and the cumulative amount of domestic gas production that would be induced by NWIW's three

⁴⁵ EIA, *Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets*, pp.6, 11 (2014) (online at: <http://www.eia.gov/analysis/requests/fe/pdf/lng.pdf>).

⁴⁶ *Id.* at 6.

proposed methanol export projects and the two LNG export facilities currently proposed on the Oregon Coast.

Increased shale gas production in the U.S. will have significant and predictable negative impacts on the environment and the public interest. As the supreme court for Pennsylvania, a state at the epicenter of the U.S. shale gas boom, explained: “By any responsible account, the exploitation of the Marcellus Shale Formation will produce a detrimental effect on the environment, on the people, their children, and future generations, and potentially on the public purse” *Robinson Township v. Commonwealth*, 623 Pa. 564, 687 (2013). The basic impacts of extracting gas through fracking shale and other tight media are fairly well understood. They include, but are not limited to, massive water consumption, groundwater and drinking water contamination, increases in air toxics, the use of carcinogenic and toxic fracking chemicals, the release of significant amounts of methane (a pernicious global warming gas), and habitat fragmentation.⁴⁷

ii. Increased Gas and Energy Prices

NWIW’s Kalama project, especially when considered cumulatively with other gas export proposals, will increase domestic gas and energy prices. EIA concluded that LNG export would cause increases in domestic gas prices under a wide range of future.⁴⁸ While NWIW is proposing to export gas as methanol rather than LNG, EIA’s predictions about the resulting price hikes for domestic gas would appear to hold true. EIA further predicted that higher domestic gas costs would result in higher consumer electricity prices overall, as well as increased reliance on coal-fired energy combustion⁴⁹—with predictably negative health and environmental outcomes.

i. Flood Control Structure Impacts.

As the Joint Public Notice acknowledges, under the Rivers and Harbors Act, private parties such as NWIW or Northwest Pipeline LLC cannot alter federal flood control structures without permission from the Corps. 33 U.S.C. § 408 (Section 408). Most of the dikes and flood control structures along the Pipeline route were built, or are owned by, the Corps. Accordingly, Oregon LNG must secure permission under Section 408 from the Corps in order to construct the proposed pipeline segments. Section 408 permits and can require significant data collection and risk analysis by the Corps and the applicant. The Corps must incorporate information from the 408 process into the public interest analysis.

⁴⁷ See Earthworks, *Hydraulic Fracking 101* (last viewed October 30, 2015) (online at: https://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101#.VjPJg7erTIV).

⁴⁸ EIA, *Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets*, p.7 (2014).

⁴⁹ *Id.* at 12.

j. Vessel Traffic.

i. Engine Cooling & Ballast Water

The Corps must examine the impacts of methanol tanker engine cooling and ballast water on aquatic life. The Corps' analysis must also account for the financial and ecological costs of invasive species and examine the potential for introduction of invasive species from tankers.

Methanol tankers may harm or take ESA-listed species through entrainment. Entrainment occurs when fish are sucked into mechanical equipment, such as an ocean-going ship's ballast or cooling water systems. The Oregon Department of Fish and Wildlife and NMFS recommended maximum intake screen water velocities of 0.4 foot per second (fps) for fry and 0.8 fps for fingerlings to protect juvenile salmonids. Larval eulachon could also be entrained in the cooling water intakes of methanol tankers. The Corps must consider the impact on these fisheries resources from entrainment, and describe whether NWIW's vessels will comply with agency recommendations for cooling water intake structures and velocities.

Ballast water also has the potential to harbor non-native, nuisance organisms, which have the potential to cause economic and ecological degradation to affected nearshore areas. These organisms also could arrive on the hulls and exterior equipment (e.g., anchors and anchor chains) of methanol tankers. The Corps' public interest analysis must account for the deleterious impacts of ballast water and engine cooling water on in the Columbia River estuary.

ii. Wake Stranding

The Corps' public interest analysis must consider the increased risks of juvenile salmonid wake stranding caused by methanol tankers. Wake stranding occurs when waves from ship wakes lift young fish above the water line, stranding them on the shoreline and killing them. A 2013 U.S. Geological Survey report on wake stranding in the lower Columbia River describes the negative impacts of large vessels, stating: "Long period wake waves from deep draft vessels have been shown to strand small fish, particularly juvenile Chinook salmon, *Oncorhynchus tshawytscha*, in the lower Columbia River."⁵⁰ NMFS recently stated that increased in deep-draft ocean going vessel transits "will likely increase the incidence of stranding and death of all populations of juvenile salmonids and eulachon. Ship wake stranding is identified as a limiting factor for LCR Chinook salmon, Columbia River chum, LCR coho salmon, and LCR steelhead. Wake stranding is more severe for smaller individuals, and as such, ocean-type Chinook

⁵⁰ Kock, T., *Review of a model to assess stranding of juvenile salmon by ship wakes along the Lower Columbia River, Oregon and Washington* (2013) (online at: <http://pubs.er.usgs.gov/publication/ofr20131229>).

originating from LCR tributaries and CR chum are particularly vulnerable”⁵¹ In fact, one study showed that wake strandings occurred during 53% percent of the large ocean-going vessel transits past Barlow Point, just downstream from the project area.⁵² The Corps’ public interest analysis must factor in the loss of ESA-listed salmonids and other aquatic life from wake stranding caused by LNG tankers.

iii. Methanol Tanker Ship Strikes.

Ship strikes are a major cause of death for numerous marine species, including ESA-listed whales and turtles. A 2003 report identified 292 confirmed or possible ship strikes between 1975 and 2002, finding fin and humpback whales are the species most commonly found struck.⁵³ Sea turtles are also struck by ships. Most ship strikes to large whales result in death.⁵⁴ In its most recent Stock Assessment Report, NMFS has also documented numerous vessel-related mortalities and serious injuries for humpback whales, fin whales, killer whales, and other species on the West Coast, including some off of Oregon and Washington.⁵⁵ However, the number of documented ship strikes grossly underestimates actual incident and mortality numbers, as many of animals sink, are scavenged, or are otherwise never seen.⁵⁶ Recent studies have estimated that only 2 percent of cetaceans killed are ever recovered, and thus mortality estimates based on stranded animals vastly underestimate actual mortality.⁵⁷ Based on annual census records of Southern Resident killer whales, carcasses from confirmed deaths of known individuals are recovered only 6 percent of the time.⁵⁸

Riverkeeper encourages the Corps to fully consider the increased risk of marine mammal vessel strikes as a result of shipping associated with this project. The NMFS’ BiOp for construction of a Panamax-class vessel berth at Port Westward provides a baseline level of information about ship strikes.⁵⁹ While NMFS’ analysis only relates to ESA-listed species, Riverkeeper incorporates that document, which as prepared for and delivered to the Corps

⁵¹ NMFS, *Endangered Species Act Biological Opinion for the Columbia Pacific Bio-Refinery Barge Dock Expansion*, p.86 (June 8, 2015).

⁵² *Id.* at 85.

⁵³ Jensen and Silber, *Large Whale Ship Strike Database* (2003) (online at: www.nmfs.noaa.gov/pr/pdfs/shipstrike/lwssdata.pdf).

⁵⁴ *Id.*

⁵⁵ Caretta, *et al.*, *U.S. Pacific Marine Mammal Stock Assessments* (2011) (online at: <http://www.nmfs.noaa.gov/pr/pdfs/sars/po2011.pdf>).

⁵⁶ *Id.*

⁵⁷ Williams *et al.*, *Underestimating the damage: interpreting cetacean carcass recoveries in the context of the Deepwater Horizon/BP incident*, 4 *Conservation Letters* 3, p.288 (June/July 2011).

⁵⁸ Fisheries and Oceans Canada, *Recovery strategy for the northern and southern resident killer whales (Orcinus orca) in Canada* (2008) (online at: www.cbc.ca/bc/news/bc-081009-killer-whale-recovery-strategy.pdf); *see also* Kraus *et al.*, *North Atlantic right whales in crisis*, 309 *Science* 561–62 (2005) (online at: <http://www.sciencemag.org/content/309/5734/561>) (estimating that only approximately 17 percent of ship-struck North Atlantic right whale are detected).

⁵⁹ *See* NMFS, *Endangered Species Act Biological Opinion for the Columbia Pacific Bio-Refinery Barge Dock Expansion*, p.88–92 (June 8, 2015).

Northwest Portland Division, by reference. Riverkeeper also encourage the Corps to consider NWIW's project's shipping impacts cumulatively with other upcoming shipping-related projects, including proposed coal export, methanol, oil, LNG and propane terminals.

iv. Underwater Noise

Over the past 50 years, there has been a dramatic increase in ocean noise pollution from human sources including Navy active sonar, seismic surveys used for research and oil and gas exploration, and commercial shipping. Vessel traffic is the largest source of noise pollution in the marine environment, and the intense, low frequency noise pollution generated by ships can travel great distances through the water.⁶⁰ This low frequency propeller noise is also in the same lower-frequency range used for communication by whales, dolphins, and other marine animals.⁶¹

Numerous studies have documented the potential impacts of increasing ocean noise, which can mask communication and impede reproduction, feeding, navigation, and ultimately survival of marine animals.⁶² Further, a recent study documented that chronic stress in North Atlantic right whales is associated with exposure to low frequency noise from ship traffic, which can cause long-term reductions in fertility and decreased reproductive behavior, increased vulnerability to diseases, and permanent cognitive impairment.⁶³ Reducing ship speed can reduce noise levels.⁶⁴

k. Global warming.

Natural gas extraction is leaky, and natural gas is mostly methane—a highly potent greenhouse gas with eighty to one hundred times the global warming potential of carbon dioxide. In turn, even small leaks in the natural gas production and delivery system can have a large climate impact.

Refining natural gas into methanol and shipping it overseas for use in distant countries is energy-intensive. The Corps must examine climate change impacts of energy produced to power the refinery's significant energy demands. The applications fail to specify a source of, or necessary amount of, electricity generation for the refinery, but NWIW has indicated that the

⁶⁰ Hildebrand, J., *Impacts of anthropogenic sound*, In: Marine Mammal Research Conservation Beyond Crisis, Johns Hopkins University Press, Baltimore, Maryland, pp.101–24 (2005).

⁶¹ *Id.*

⁶² See NOAA, *Final Report of the NOAA International Symposium: Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology* (May 2004) (online at: www.nmfs.noaa.gov/pr/pdfs/acoustics/shipping_noise.pdf) (summarizing studies).

⁶³ Rolland, *et al.*, *Evidence that ship noise increases stress in right whales*, Proceedings of the Royal Society B (Feb. 8, 2012); Rolland, *et al.*, *The inner whale: hormones, biotoxins and parasites*, In: *The Urban Whale: North Atlantic Right Whales at the Crossroads*, Harvard University Press, Cambridge, MA (2007).

⁶⁴ Southall and Scholik-Schlomer, *Final report of the NOAA International Conference: "Potential Application of Vessel-Quieting Technology on Large Commercial Vessels,"* pp.1–2 (May, 2007) (noting the correlation between vessel speed and noise).

refinery would use at least 200 megawatts per day. The Corps must describe how this power would be generated and the global warming consequences of generating that electricity.

The Corps' public interest analysis must consider the lifecycle greenhouse gas emissions of NWIW's project and the attendant impacts on climate change. This includes greenhouse gas emissions from:

- producing natural gas and the resulting methane leakage in gas fields;
- fugitive emissions from piping and compressing natural gas;
- emissions for the refinery;
- emissions from generating the electricity necessary to operate the refinery, and;
- pollution from shipping methanol overseas in tankers powered by bunker fuel.

The impacts of climate change caused by greenhouse gases include “increased air and ocean temperatures, changes in precipitation patterns, melting and thawing of global glaciers and ice, increasingly severe weather events, such as hurricanes of greater intensity and sea level rise.”⁶⁵ A warming climate will also lead to loss of coastal land in densely populated areas, shrinking snowpack in Western states, increased wildfires, and reduced crop yields.⁶⁶ More frequent heat waves as a result of global warming have already affected public health, leading to premature deaths. And threats to public health are only expected to increase as global warming intensifies. For example, a warming climate will lead to increased incidence of respiratory and infectious disease, greater air and water pollution, increased malnutrition, and greater casualties from fire, storms, and floods.⁶⁷ Vulnerable populations—such as children, the elderly, and those with existing health problems—are the most at risk from these threats.

Global warming is one of the greatest ecological and humanitarian threats of the modern era. In 2007, the United Nations' Intergovernmental Panel on Climate Change (“IPCC”) released its frequently cited report reflecting the new scientific consensus that unrestrained greenhouse gas (GHG) emissions are causing global warming. As summarized by a United Nations press release:

The IPCC, which brings together the world's leading climate scientists and experts, concluded that major advances in climate modeling and the collection and analysis of data now give scientists “very high confidence”—at least a nine

⁶⁵ 76 Fed. Reg. 52,791–22 (Aug. 23, 2011).

⁶⁶ *Id.* at 66,532–33.

⁶⁷ EPA, *Climate Change, Health and Environmental Effects* (online at: <http://epa.gov/climatechange/effects/health.html>.)

out of ten chance of being correct—in their understanding of how human activities are causing the world to warm. This level of confidence is much greater than the IPCC indicated in their last report in 2001. The report confirmed that it is “very likely” that greenhouse gas emissions have caused most of the global temperature rise observed since the mid-twentieth century. Ice cores, going back 10,000 years, show a dramatic rise in greenhouse gases from the onset of the industrial age. The co-chair of the IPCC working group stated, “There can be no question that the increase in these greenhouse gases are dominated by human activity.”

The United Nations went on to summarize the key findings of the report:

The report describes an accelerating transition to a warmer world—an increase of three degrees Celsius is expected this century—marked by more extreme temperatures including heat waves, new wind patterns, worsening drought in some regions, heavier precipitation in others, melting glaciers and arctic ice, and rising global average sea levels.

More recent scientific analysis has demonstrated that the urgency to act on climate impacts is even greater than it was in 2007. The recent Copenhagen Climate Science Congress, attended by 2,000 scientists, concluded with this “Key Message 1:”

Recent observations confirm that, given high rates of observed emissions, the worst-case IPCC scenario trajectories (or even worse) are being realized. For many key parameters, the climate system is already moving beyond the patterns of natural variability within which our society and economy have developed and thrived. These parameters include global mean surface temperatures, sea-level rise, ocean and ice sheet dynamics, ocean acidification, and extreme climatic events. There is a significant risk that many of the trends will accelerate, leading to an increasing risk of abrupt or irreversible climatic shifts.⁶⁸

Numerous studies predict severe impact from climate change the Pacific Northwest, including dramatic reductions in snowpack, declining river flows, increased deaths from temperatures and air pollution, increased risk of wildfires, loss of salmon and shellfish habitat, lost hydropower generation, and flooding. The Oregon Department of Energy summarized these impacts:

Rain and Snow Patterns

Rainstorms and snowstorms could increase in severity, but less snow would build up in the mountains. Snowpacks might melt faster, increasing flooding. Less water would be

⁶⁸ International Scientific Congress, *Climate Change: Global Risks, Challenges, and Decisions* (Mar. 12, 2009).

available for recreation, irrigation, drinking and fish habitat. The concentration of pollutants in the water could increase during summer and fall.

Sea Level Rise

A rise in sea level could threaten beaches, sandy bluffs and coastal wetlands. Coast towns could experience more flooding, causing increased damage to roads, buildings, bridges and water and sewer systems.

Diminished Water Supplies and Crop Productivity

Oregon's crops and livestock could be affected by warmer temperatures, less water availability and drier soils. Some crops, such as wheat, might thrive in warmer temperatures, while others, such as potatoes, could be harmed. Less water available for irrigation would harm agriculture.

Ecosystems

Native species adapted to Oregon's climate could suffer if temperatures rise. Warmer streams and rivers would harm salmon and other native species and non-native species could replace them. The cultural practices of Oregon's tribes could be affected, as could the businesses and recreation practices of those who rely on the state's native species.

Based on the contribution of GHG emissions from NWIW's proposal, along with the cumulative global warming impacts of all fossil fuels shipping proposals on the Columbia, the project and its intended use are contrary to the public interest. 30 C.F.R. § 320.4(a)(1).

I. Economic & Human Use Impacts.

Dredging and dock construction will adversely affect the commercial and recreational fishing industries. In Oregon, Washington, and Idaho, thousands earn their livelihood from salmon and steelhead fishing.⁶⁹ The recreational fishing industry is worth millions, but the commercial salmon fishery is severely limited due to dwindling populations. The continued success of these industries, and the social and cultural traditions they support, depends on the recovery of healthy populations of fish and continued access to traditional fishing areas. As explained above, NWIW's proposed dredging, dock building, and increasing large vessel traffic would further degrade vital fish habitat. This will, in turn, degrade the opportunities for commercial and recreational fishing, as well as harming tribal fishing rights throughout the Columbia River Basin.

Fishermen, commercial shippers, and recreational boaters use the Columbia River Estuary and the shipping channel in the lower Columbia River extensively, and Panamax-class

⁶⁹ Ecotrust, *Economic Risk of the Morrow Pacific Project: Livelihood, Habitat, and Recreation*, p.4 (Mar. 20, 2014)).

methanol tankers transiting the ship channel would disrupt those uses. The shipping channel in the estuary and near the river mouth is a popular location for salmon and sturgeon fishing, and an important commercial transit corridor. The individual and cumulative impacts of Panamax vessel traffic would disrupt existing uses of the river and are contrary to the public interest.

m. Cumulative Impacts.

The Corps must consider the cumulative impacts of NWIW's project, including the cumulative effects of "conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, . . . considerations of property ownership and, in general, the needs and welfare of the people." 33 CFR § 320.4(a). The Corps' analysis, therefore, is not limited to the region directly adjacent to proposed dock and pipeline. Further, the cumulative impacts analysis must include the proposed WEP Pipeline, which would deliver gas to NWIW's project.

The Corps consideration of cumulative impacts must include the degraded state of the Columbia River. The Northwest Power and Conservation Council Columbia River Basin Fish and Wildlife 2014 Program Report, summarizes the degraded condition of the Columbia River, stating:

Salmon and steelhead runs, along with other native fish and wildlife in the basin, have declined significantly in the last 150 years. Recent years have seen some improvements in the number of adult salmon and steelhead passing Bonneville Dam; however, many of these are hatchery fish. Many human activities contributed to this decline, including land and water developments across the region that blocked traditional habitats and dramatically changed natural conditions in rivers where fish evolved.

These developments included the construction of dams throughout the basin for such purposes as hydroelectric power, flood control, commercial navigation, irrigation, and recreation. Fourteen of the largest multi-purpose dams are on the mainstem Columbia; the mainstem Snake River adds another dozen major projects. Water storage in the Columbia River totals approximately 30 percent of the average annual runoff, which fluctuates from year-to-year depending on the snowpack. With its many major federal and non-federal hydropower dams, the Columbia and its tributaries comprise one of the most intensively developed river basins for hydroelectric power in the world.

Hydroelectric dams in the basin produce, under normal precipitation, about 41 percent (14,000 average megawatts) of all the electricity generated in the Pacific Northwest.⁷⁰

⁷⁰ Northwest Power Planning Council, *Fish and Wildlife Program Fifth Power Plan* (2014) (online at: <https://www.nwcouncil.org/fw/program/2014-12/program/>).

As part of the cumulative effects analysis, the Corps must consider NWIW's impact on fish habitat in light of the already tenuous state of salmonids, green sturgeon, eulachon, and other species impacted by the project. The habitat in the Columbia River is significantly degraded. The Corps must also consider the cumulative economic effect of NWIW's project on the fishing industry and communities dependent upon the fishing economy. The direct harm to fish habitat will harm the fishing industry.

The Corps' cumulative impacts must also account for the reasonably foreseeable industrial development in the estuary. The Columbia River estuary is at the epicenter of a series of high-profile proposals to develop fossil fuel transport projects. These proposals involve transporting coal, crude oil, methanol, and propane through some of the most important salmon habitat in the continental United States, and would add over *1,500 outgoing deep draft vessels annually*, increasing vessel traffic by 117%. Examples of fossil fuel shipping proposals that the Corps must account for in the cumulative impacts analysis for these permits are listed in Section 2.a, above. The Corps' public interest analysis must account for the cumulative impacts of existing industrial development and associated vessel traffic, as well as reasonably foreseeable future projects.

5. NWIW'S PROJECT WILL HARM ESA-LISTED SPECIES AND ADVERSELY MODIFY DESIGNATED CRITICAL HABITAT.

The Corps may not approve the permit if it "jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of . . . critical habitat." 33 C.F.R § 230.10(b)(3); *see also* 16 U.S.C §1536(a)(2). As discussed in detail above, the proposed dock construction and dredging 16 acres of designated critical habitat would jeopardize the struggling populations of 13 ESUs of salmonids and other ESA-listed species. Additionally, this type of shipping terminal will increase in deep draft ship traffic, which will increase wake stranding of juvenile fish and increase vessel strikes and other harassment of endangered and threatened marine mammals, including several whale species and steller sea lions.⁷¹ For the reasons provided in this comment letter, the NWIW's project does not comply with 33 C.F.R § 230.10(b)(3) or 16 U.S.C §1536(a)(2).

CONCLUSION

Riverkeeper urges the Corps to deny permits for that would facilitate NWIW's project because the applications fail to demonstrate compliance with the Clean Water Act and the Rivers and Harbors Act. NWIW's project threatens the Columbia River estuary and significantly undermines efforts to restore endangered salmonids, including the Corps' obligations under the

⁷¹ NMFS, *Endangered Species Act Biological Opinion for the Columbia Pacific Bio-Refinery Barge Dock Expansion*, pp.85-93 (June 8, 2015).

FCRPS BiOp. Because NWIW's project is not in the public interest, and because there are alternatives that are would be less environmentally harmful, the Corps should deny these applications. Please direct any questions or correspondence to the undersigned.

Sincerely,



Miles Johnson
Clean Water Attorney
Columbia Riverkeeper
(541) 490 – 0487
miles@columbiariverkeeper.org

Exhibits:

- Exhibit 1: Project Overview for Kalama Manufacturing and Export Facility.
- Exhibit 2: Water Supply Agreement between NWIW and the Port of Kalama.



April 18, 2016

Ann Farr
Port of Kalama
110 W. Marine Drive
Kalama, WA 98625
SEPA@KalamaMfgFacilitySEPA.com

Sent Via Email

Re: Comments on the Port of Kalama and Cowlitz County's Draft Environmental Impact Statement for Northwest Innovation Works' Methanol Refinery and Export Terminal.

Greetings:

Columbia Riverkeeper, Center for Biological Diversity, Sierra Club, Oregon Physicians for Social Responsibility, Landowners and Citizens for a Safe Community, Save Our Wild Salmon, Wahkiakum Friends of the River, and Northwest Environmental Defense Center (collectively "Commenters") have reviewed the Draft Environmental Impact Statement ("DEIS") and supporting materials for the proposed Kalama methanol refinery and export terminal (the "Project"), and submit the following comments. The DEIS must be revised to address several fundamental deficiencies, set forth in detail below. Correcting the DEIS's many flaws will also require the Port and the Cowlitz County to reevaluate the unjustifiable yet oft-repeated conclusion that this Project does not present significant, adverse environmental and public health harms and risks. Rather, it is evident that this Project has the potential to cause adverse, though as of yet unstudied, impacts to the environment. The DEIS fails to adequately account for these impacts, rendering it entirely inadequate. Further, the Port and County should use SEPA's substantive authority, as well as separate authority from other applicable statutes and regulations, to deny the Project.

Incorporated by reference are Columbia Riverkeeper’s comments on the Clean Water Act §§ 404¹ and 401² permits for the pipeline and dock, and Washington Department of Fish and Wildlife’s³ comments on the pipeline, which contain additional relevant information about the impacts of NWIW’s Project. Also incorporated by reference is Citizens for a Healthy Bay’s technical memo reviewing the Kalama Methanol Refinery’s DEIS.

STATE ENVIRONMENTAL POLICY ACT

The State Environmental Policy Act (“SEPA”) is Washington’s core environmental policy and review statute. Like its federal counterpart, the National Environmental Policy Act (“NEPA”), SEPA broadly serves two purposes: first, to ensure that government decision-makers are fully apprised of the environmental consequences of their actions and, second, to encourage public participation in the consideration of environmental impacts. *Norway Hill Preservation and Prot. Ass’n v. King Co*, 87 Wn.2d 267, 279 (1976). For decades, SEPA has served these purposes effectively, requiring full environmental reviews for projects with significant environmental impacts.

In adopting SEPA, the Washington legislature declared the protection of the environment to be a core state priority. RCW 43.21C.010. SEPA declares that “[t]he legislature recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.” RCW 43.21C.020(3). This policy statement, which is stronger than a similar statement in the federal counterpart of NEPA, “indicates in the strongest possible terms the basic importance of environmental concerns to the people of the state.” *Leschi v. Highway Comm’n*, 84 Wn.2d 271, 279–80 (1974).

SEPA is more than a purely “procedural” statute that encourages informed and politically accountable decision-making. In enacting SEPA, the state legislature gave decision-makers the affirmative authority to deny projects where environmental impacts are significant, cannot be mitigated, and collide with local rules or policies. SEPA provides substantive authority for government agencies to condition or even deny proposed actions—even where they meet all other requirements of the law—based on their environmental impacts. RCW 43.21C.060. As one treatise points out, when this premise was challenged by project proponents early in SEPA’s history, “the courts consistently and emphatically responded that even if the action previously had been ministerial, it became *environmentally discretionary* with the enactment of SEPA.”⁴

¹ Exhibit 1, Comment of Columbia Riverkeeper to U.S. Army Corps of Engineers on CWA §404 Permit for NWIW’s Proposal (2015).

² Exhibit 2, Comment of Columbia Riverkeeper to Washington Department of Ecology on CWA §401 Certification for NWIW’s Proposal (2015).

³ Exhibit 3, Comments of WDFW to FERC on the Kalama Lateral Pipeline (2015).

⁴ Richard Settle, *SEPA: A Legal and Policy Analysis*, §18.01[2] (2014) (emphasis added).

Decision-makers have denied permits under this authority in a number of other contexts, many of which are similar to those of NWIW's proposed refinery and terminal.⁵

I. REASONABLE ALTERNATIVES

SEPA requires that an EIS contain a detailed discussion of alternatives to the proposed action. RCW 43.21C.030(c)(iii). SEPA's regulations provide that an EIS must consider as alternatives those "actions that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation." WAC § 197-11-440(5)(b). The discussion of alternatives in an EIS need not be exhaustive, but the EIS must present sufficient information for a reasoned choice among alternatives. *Toandos Peninsula Ass'n v. Jefferson Cy.*, 32 Wash. App. 473, 483 (1982).

A. Reasonable Alternatives not Considered

- The DEIS did not evaluate the possibility of using the existing deepwater berth and dock next to the Project site. The FEIS should analyze the possibility of using the existing dock for the Project. Personal communications with Steelscape employees indicated that this dock is used relatively infrequently to offload steel from deep draft vessels, and the berth is therefore probably not at capacity. There is no obvious reason why Northwest Innovation Works' ("NWIW") operations could not use the existing dock with minimal modifications. Using the existing dock would achieve the Project's objectives while reducing or eliminating environmentally harmful in-water work and reduce the need for additional over-water structure.
- The DEIS does not analyze the reasonable possibility of taking two seasons to complete the proposed in-water construction, so as to avoid in-water construction during late summer (when juvenile salmonids are present) and early spring (when eulachon are present).

II. SCOPE OF REVIEW

SEPA requires an environmental impact statement ("EIS") for any action that has a "probable significant, adverse environmental impact." RCW 43.21C.031(1). Significance means

⁵ *Polygon Corp. v. City of Seattle*, 90 Wn.2d 59, 69-70 (1978) (upholding denial of high-rise project based on aesthetic, property values, and noise impacts); *Victoria Tower P'ship v. City of Seattle*, 59 Wash. App. 592, 602 (1990) (upholding denial of 16-floor tower and mitigation to 8-floors); *State v. Lake Lawrence Pub. Lands Prot. Ass'n*, 92 Wn.2d 656, 659 (1979) (upholding denial of development of 14-acre parcel because of effects on bald eagles); *Cook v. Clallam Cnty.*, 27 Wash. App. 410, 414 (1980) (upholding permit denial of commercial development in rural area); *W. Main Associates v. City of Bellevue*, 49 Wash. App. 513, 521-23 (1987) (upholding denial of permits based on historic/cultural impacts, view impacts, shadow impacts, traffic impacts, and air impacts).

a reasonable likelihood of more than a moderate adverse impact on environmental quality.” WAC 197-11-794.

“A proposal’s effects include direct and indirect impacts caused by the proposal. Impacts include those effects resulting from growth caused by a proposal, as well as the likelihood that the present proposal will serve as precedent for future actions.” WAC 197-11-060(4)(d). The scope of impacts includes direct, indirect, and cumulative impacts. WAC 197-11-792. “The range of impacts to be analyzed in an EIS (direct, indirect, and cumulative impacts, WAC 197-11-792) may be wider than the impacts for which mitigation measures are required of applicants.” WAC 197-11-060(4)(e). It is implicit in SEPA that an “agency cannot close its eyes to the ultimate probable environmental consequences of its current action.” *Cheney v. City of Mountlake Terrace*, 87 Wn.2d 338, 344 (1976).

Importantly, the regulations specifically direct that an “agency shall not limit its consideration of a proposal’s impacts only to those aspects within its jurisdiction, including local or state boundaries.” WAC 197-11-060(4)(b). Indeed, SEPA constitutes a ringing affirmation of the connectedness of Washington with the rest of the planet. It speaks of “humankind” and “human beings” rather than just citizens of this state. RCW 43.21C.010. SEPA explicitly calls on responsible agencies to “recognize the world-wide and long-range character of environmental problems” and take steps to cooperate in “anticipating and preventing a decline in the quality of the world environment.” RCW 43.21C.030(f); *Eastlake Comm. Coun. v. Roanoke Assoc.*, 82 Wn.2d 475, 487 (1973) (observing “unusually vigorous statement of legislature purpose...to consider the total environmental and ecological factors to their fullest in deciding major matters”) (emphasis added). Those regulations also recognize that environmental impacts do not end at the state’s borders, and explicitly require consideration of the impacts of projects outside of the state’s jurisdiction. WAC 197-11-060(c); *Cathcart-Maltby-Clearview Comm. Council v. Snohomish Cty.*, 96 Wn.2d 201, 209 (1981) (SEPA “also mandates that extra-jurisdictional effects be addressed and mitigated, when possible.”).

Washington’s courts and hearings bodies are only starting to grapple with these important issues, but the conclusions so far are consistent: indirect impacts of fossil fuel transportation projects, including transportation of the fossil fuels to and from proposed terminals, must be considered in the SEPA process. For example, the Washington Shorelines Hearings Board recently invalidated a SEPA document for two proposed crude oil terminals for failing to adequately consider the cumulative and indirect impacts of rail and vessel traffic.⁶

A. Scope of Upstream Analysis

The natural gas that NWIW would consume does not magically appear at the end of a pipeline. Ecology and other agencies have been clear that the scope of EISs must include indirect impacts, some of which may appear distant from a project itself. The DEIS by and large ignores the impacts of extracting and transporting the raw material—natural gas—that the Project will consume. This does not satisfy SEPA.

⁶ *Quinault Indian Nation v. Hoquiam*, 2013 WL 6062377 (Nov. 12, 2013).

B. Scope of Downstream Analysis

First, the scope of review for marine impacts is illegally truncated, ending the analysis at the mouth of the Columbia.⁷ Methanol tankers servicing NWIW's proposed facility would not magically disappear and re-appear at the mouth of the Columbia. This limited scope of review for marine impacts illegally omits impacts to the Pacific ecosystem and along the route taken by vessels transporting methanol to identified customers in China.

Second, the DEIS contains no analysis of the impacts of methanol use in China. If NWIW's unsupported assertions that the methanol will all be converted into olefins to make plastic are true, the FEIS should analyze the environmental impacts of that process and assess the consequences of creating the amount of plastics that NWIW's methanol will facilitate and induce. The FEIS should also examine the likelihood that NWIW's methanol will be used as a gasoline additive in China. The world's "widest adoption of methanol-gasoline blending has occurred in China," and methanol accounts for more than five percent of China's national gasoline consumption.⁸

C. Cumulative Impacts

SEPA requires consideration of cumulative effects. WAC 197-110060(4)(e); WAC 197-11-330(3)(c) ("Several marginal impacts when considered together may result in a significant adverse impact."); *White v. Kitsap Cnty.*, SHB No. 09-019 at 17 (2009) (cumulative impacts of a proposed action together with the impacts of pending and future actions should be considered when making a threshold determination). In *Quinault Indian Nation v. Hoquiam*, the Shorelines Hearing Board overturned SEPA documents for two crude-by-rail facilities explicitly because they failed to consider the cumulative effects of increased rail and marine vessel traffic from each other, and a third crude-by-rail project.⁹

The DEIS fails to take the requisite "hard look" at the cumulative impacts of this and other projects with similar or overlapping impacts. The DEIS lists several other projects with similar impacts to aspects of NWIW's methanol refinery and export project and explains, in very general and qualitative terms, that the impacts of all of these projects together would be worse than the impacts of NWIW's project alone.¹⁰ This does not constitute a "reasonably thorough discussion" of the probable environmental consequences. *Weyerhaeuser v. Pierce Cnty.*, 124 Wn.2d 26, 38 (1994) (citations omitted).

⁷ See DEIS, p.6-12; see also DEIS, Appx. D, p.58.

⁸ Oil and Gas Journal, *Methanol proves low-cost, sustainable option for gasoline blending* (March 2, 2015) (online at: <http://www.ogj.com/articles/print/volume-113/issue-3/processing/methanol-proves-low-cost-sustainable-option-for-gasoline-blending.html>).

⁹ *Quinault Indian Nation v. Hoquiam*, SHB No. 13-012c, Order on Summary Judgment, p.18 (Dec. 9, 2013) ("agencies are required to consider the effects of a proposal's probable impacts combined with the cumulative impacts from other proposals").

¹⁰ See DEIS, pp.15-8-23.

To satisfy SEPA, and to assist a decision-maker or the public, the cumulative impacts analysis must go further. It must explain—in a meaningful, tangible way—how the Columbia River and the human environment in the study area would look and function if the proposed growth in fossil-fuel shipping and other related projects come to pass. The Washington Energy Facility Site Evaluation Council—the agency normally responsible for reviewing large fossil fuel export projects like this one—explained that:

cumulative effects analys[e]s should be conducted within the context of resource, ecosystem, and human community thresholds—levels of stress beyond which the desired condition degrades.¹¹

The cumulative impact assessment in the DEIS does not even attempt to meet this standard. It does not provide readers with any sense of whether impacts will cumulatively cross acceptable “resource, ecosystem, and human community thresholds.”¹² Nor does it disclose whether the “desired condition[s]” in Kalama, the Columbia River and estuary, or the Pacific Northwest will survive the cumulative effect of all the proposed fossil-fuel export projects. These failures prevent the DEIS from presenting the “reasonably thorough discussion” of environmental impacts that SEPA requires. *PT Air Watchers v. State, Dep’t of Ecology*, 179 Wash. 2d 919, 927 (2014).

This analytical failing permeates the entire cumulative impacts section of the DEIS. For purposes of illustration only, the FEIS should analyze whether the cumulative impacts of this and other projects would cross the following “resource, ecosystem, and community thresholds:”

- The threshold at which estuary habitat degradation caused by dredging, dock building, and vessel wake impacts causes perceptible, or unacceptable, impacts to salmon populations and to the tribal, commercial, and recreational fisheries that depend on them;
- The threshold at which ambient PM2.5 and toxic air pollution levels result in perceptible, or unacceptable, health outcomes for people working and living in the project vicinity;
- Threshold at which deep draft vessel traffic presents an unacceptable impediment to commercial and recreational fishing in the lower Columbia River and estuary;
- The threshold at which background noise levels caused by vessel traffic in the near-shore ocean will compromise cetacean survival and communication;
- The threshold at which GHG emissions will cause unacceptable impacts to local and regional climate and natural resources.

¹¹ Washington Energy Facility Site Evaluation Council (“EFSEC”), *DEIS for the Vancouver Energy Distribution Terminal*, p.5-1 (quoting guidance written by the Council on Environmental Quality, the federal agency responsible for interpreting NEPA).

¹² *Id.*

III. PURPOSE AND NEED

The DEIS makes no compelling case for this Project's need, and severely distorts the Project's purpose. The EIS must "specify[] the purpose and need to which the proposal is responding" WAC 197-11-440(4). First, the EIS repeatedly misstates the Project's purpose as "finding a cleaner alternative to methanol made from coal and oil." Besides never providing any actual information about whether gas-based methanol is actually cleaner, the real purpose of the Project is to make methanol from natural gas. Second, it is not clear that the "need" for this Project that was perceived to exist when it was first proposed still exists today. The price of methanol has declined significantly since NWIW proposed this Project, and the FEIS should address this market collapse and explain why the Project is still needed.

IV. TIMING OF COMMENT PERIOD

The timing of the release of the DEIS and the comment period undermines the quality and content of the DEIS. The Port and County closed the DEIS comment period before important information about the impacts of the Project could be made public through the County's land use and shorelines permitting processes, the Clean Air Act, and Clean Water Act permitting processes, the Federal Energy Regulatory Commission's process, and through the ongoing federal Endangered Species Act and National Environmental Policy Act processes. Because the final EIS would undoubtedly benefit from the information generated in these review and permitting processes, Commenters requests that the Port and County incorporate all information and documents from these processes into the Draft EIS and reopen it for public comment.

ADEQUACY OF DEIS ENVIRONMENTAL REVIEW

An EIS must evaluate the likely impacts related to the project. WAC 197-11-060(4). Decision makers must provide a "detailed statement" of environmental impacts. RCW 43.21C.030(2)(c). SEPA requires full disclosure and "detailed" consideration of all affected environmental values. At its heart, SEPA is an "environmental full disclosure law." *Norway Hill Preservation and Protection Association v. King Cnty. Council*, 87 Wn.2d 267 (1976). The *Norway Hill* court also highlighted the legislature's intent that "environmental values be given full consideration in government decision making," and its decision to implement this policy through the procedural provisions of SEPA which "specify the nature and extent of the information that must be provided, and which require its consideration, before a decision is made." *Id.* at 277-78.

Environmental reviews under SEPA must identify significant impacts on the natural and built environment. WAC 197-11-440(6)(e). Such reviews must use sufficient information and disclose areas where information is speculative or unknown. WAC 197-11-080(1), (2). Where there is scientific uncertainty, Washington courts have required agencies to disclose responsible opposing views and resolve differences. These requirements feed into the ultimate standard of review for EISs: adequacy is based on a rule of reason. *Cheney v. Mountlake Terrace*, 87 Wn.2d 338, 344 (1976). Courts require reasonably thorough information disclosure and discussion, good data and analysis to support conclusions, and sufficient information to make a reasoned decision.

Klickitat County Citizens Against Imported Waste v. Klickitat County, 122 Wn.2d 619, 633 (1993). Sufficiency of the data is also assessed under the “rule of reason,” which requires a “‘reasonably thorough discussion of the significant aspects of the probable environmental consequences’ of the agency’s decision.” *Weyerhaeuser v. Pierce Cnty.*, 124 Wn.2d 26, 38 (1994) (citations omitted).

In making the similar assessment under NEPA, federal courts require agencies to take a “hard look” at environmental impacts. More specifically, for review of the NEPA claims, the Court must “ensure that an agency has taken the requisite hard look at the environmental consequences of its proposed action, carefully reviewing the record to ascertain whether the agency decision is founded on a reasoned evaluation of the relevant factors.” *Te-Moak Tribe v. Interior*, 608 F.3d 592, 599 (9th Cir. 2010) (quoting *Greenpeace Action v. Franklin*, 14 F.3d 1324, 1332 (9th Cir. 1992) (internal quotation marks and citations omitted)). This review must be “searching and careful.” *Ocean Advocates v. U.S. Army Corps of Engineers*, 402 F.3d 846, 858 (9th Cir. 2005).

Washington Courts have employed the “hard look” doctrine directly or in other cases have required full disclosure and consideration of environmental values. *See Pub. Util. Dist. No. 1 of Clark Cnty. v. Pollution Control Hearings Bd.*, 137 Wash. App. 150, 158, 151 P.3d 1067, 1070 (2007); *Toward Responsible Dev. v. City of Black Diamond*, 179 Wash. App. 1012 review denied, 180 Wash. 2d 1017, 327 P.3d 54 (2014) (unpublished opinion) (“Courts review an EIS as a whole and examine all of the various components of [the] agency’s environmental analysis ... to determine, on the whole, whether the agency has conducted the required ‘hard look.’”); *see also Coalition for a Sustainable 520 v. U.S. Department of Transportation*, 881 F. Supp. 2d 1243, 1259 (W.D. Wash. 2012) (holding implicitly that “hard look” under NEPA sufficient for SEPA review). Where “hard look” is not discussed or employed directly, courts have required a “reasonably thorough discussion” of environmental impacts. *See Toward Responsible Dev. v. City of Black Diamond*, 179 Wash. App. (2014); *PT Air Watchers v. State, Dep’t of Ecology*, 179 Wash. 2d 919, 927, 319 P.3d 23, 27 (2014) (citing *Norway Hill*, 87 Wn.2d at 275) (requiring “full disclosure and consideration of environmental values”).

As discussed in the sections below, the DEIS fails to provide the necessary hard look and reasonably thorough discussion of environmental impacts throughout its many pages. This is an overarching failure.

I. THE DEIS DOES NOT ADEQUATELY ADDRESS THE LIKELIHOOD OR IMPACTS OF A METHANOL SPILL FROM A TANKER IN THE LOWER COLUMBIA RIVER OR ESTUARY.

A. No Meaningful Numeric Analysis of Spill Risk

The FEIS should contain a quantitative analysis of the likelihood of methanol spills in the Columbia River from vessel loading and transit. The FEIS could use, as a starting point for such

analysis, the spill risk analysis produced for the Vancouver Energy Distribution Terminal.¹³ The Kalama Methanol FEIS should also account for the fact that the level of vessel traffic in the Columbia River during the study period for that analysis was significantly less than the future level of vessel traffic in the Columbia River projected in the cumulative impacts analysis. Accordingly, the spill risk assessment for the Vancouver Energy Distribution Terminal underestimates the likelihood of vessel accidents because accidents occur more frequently when vessel traffic increases. Nevertheless, the EIS for the proposed methanol refinery can and should make numerical predictions about the frequency and severity of methanol spills caused by NWIW's Kalama project, and the cumulative number of methanol spills projected in the Columbia River from NWIW's Kalama and Port Westward refinery proposals. This analysis should be made available for public review and comment prior to a Final EIS.

B. No Meaningful Analysis of the Behavior of a Large Methanol Spill from Vessel into the Columbia River.

The DEIS does not contain any meaningful discussion of how a spill of methanol that might be reasonably expected to result from a tanker accident would behave and disperse in the Columbia River. The vessels servicing NWIW's refinery could carry up to 14 million gallons of methanol, and would use segmented compartments of 3 million gallons in volume to reduce spill volume. Accordingly, the DEIS should at least analyze the behavior and consequences of a 3 million gallon methanol spill into the Columbia River. Instead, the DEIS focuses on the consequences of a spill ten times smaller—apparently because another author had already prepared that analysis.

The DEIS does discuss modeling of a 3.3 million gallon spill *into the ocean*, but provides no real explanation or authority for the assertion that, for a spill into the Columbia River, the “dilution rate would be similarly rapid and the biodegradation rate similar to that shown for the open-sea release.”¹⁴ However, chemicals in water, including spilled methanol as well as dispersants and dispersed fuel, may behave differently depending on the degree of salinity. The degree of salinity in the lower Columbia River may not be predictable at any given time and at any given location. It is vital to know how methanol and the different substances used in spill response will behave in water depending on the degree of salinity, and how this, in turn, may affect habitats and species.

The EIS should model the dispersion and dilution of a 3 million gallon methanol spill into the Columbia River, and this analysis should be made available for public review and comment prior to a Final EIS.

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¹³ EFSEC, *Appendix J to DEIS for Vancouver Energy Distribution Terminal* (2015).

¹⁴ DEIS, p.8-16.

C. No Discussion of Ecological Damage Caused by a Methanol Spill from a Vessel into the Columbia River.

The DIES focuses on the safe drinking water threshold when describing the risks and impacts of a methanol spill, but ignores the possibility that a large spill could cause oxygen depletion leading to the death of fish and other aquatic life.

Methanol spills deplete oxygen in the water when aquatic microbes consume oxygen while metabolizing methanol. While this process degrades methanol, the oxygen depletion caused by biodegradation of a large methanol spill “could deplete the surface water of oxygen required to sustain aquatic life.”¹⁵ In fact, large spills of ethanol—which similarly consume oxygen during biodegradation—have been observed to result in large fish kills in two rivers.¹⁶ Again, the FEIS should model the release of a 3 million gallon methanol spill, explain the level of oxygen depletion that would result from the biodegradation of that methanol, and explain whether such oxygen depletion could be expected to impact aquatic life in the Columbia River.

D. No Discussion of Ecological Damage from Actions Taken in Response to Spills

The complex geography, hydrology, and ecology of the Columbia River make it an especially difficult environment in which to administer an emergency spill response that avoids causing further harm to sensitive habitats and species. It is vital to know how the complexities of the spill environment may interact with different spill response strategies, including specific mechanical, chemical, and biological applications, which could affect species in different ways.

The shifting current in the Columbia are of concern with regard to direction of flow. Installation of booms to protect sensitive areas from spilled methanol may be more or less effective, or even harmful, depending on location, timing, tidal cycle, and direction and volume of flow in the river. It is important to know whether habitat could actually be harmed by deployment of booms, especially if deployment occurs without regard to the dynamic nature of the river and bay environment.

Fuel oil spills near the mouth of the Columbia River, Puget Sound, or farther out from the coast may occur due to a tanker accident, or oil may be carried out to sea on river and tidal currents. Spill response, in addition to the spills themselves, may prove harmful to species such as whales, including species protected under the Endangered Species Act (see below), if the marine mammals swim through waters contaminated with either harmful dispersants or dispersed oil.

Use of dispersants is an important example of a spill response measure that might do more harm than good. Dispersants are used to break oils into smaller droplets that can break down more readily than oil in slicks. The use of dispersants involves a complex calculation of

¹⁵ DEIS, Appx. G2, p.8.

¹⁶ Exhibit 4, Massachusetts Department of Environmental Protection, *Large Volume Ethanol Spills—Environmental Impacts and Response Options*, p.4-9 (2011).

impacts as methanol, dispersants, and dispersed oil can all have toxic effects on aquatic species from plankton to fish to whales. Effects include direct mortality from ingestion, impacts on marine mammals from breathing dispersants, and impacts from the coating of birds' feathers with dispersants or dispersed oil. Moreover, the toxicity of many chemical agents, such as dispersants, that may be used during a spill response have not yet been evaluated by the EPA or National Marine Fisheries Service ("NMFS") for their impacts on listed species.

The use of chemical countermeasures in response to a spill event introduces substances into the environment that are potentially toxic to species. In-situ burning, dredging, field testing of spill response methods, and field training exercises all involve actions that might have adverse impacts on species, depending on the manner in which they are implemented. While federal, state, and local responses to spills often lessen the impacts of spills to wildlife, poorly planned or poorly implemented spill response activities can adversely affect wildlife and essential habitat. The DEIS makes no mention of the impacts that spill response measures from a spill of methanol might have on the environment. This renders the DEIS inadequate.

II. IMPACTS TO THE COLUMBIA RIVER, ESTUARY, AND COASTAL WATERS FROM NWIW'S PROPOSAL.

NWIW's proposal jeopardizes the lower Columbia River and estuary, an area at the center of a regional and national effort to restore both vibrant fisheries and endangered and threatened species. The Columbia River estuary is a federally-designated Estuary of National Significance under the Clean Water Act's National Estuary Program.¹⁷ The U.S. Environmental Protection Agency has designated the Columbia River as one of seven Priority Large Aquatic Ecosystems.¹⁸ The federal government, and public and private entities, have invested billions of dollars to restore endangered and threatened salmon in the Columbia River Basin.¹⁹

NWIW's project will degrade an ecosystem that is a local and regional treasure, a national priority for watershed health and salmon recovery. NMFS has described the ecological value of the Columbia River estuary, stating:

"The lower Columbia River estuary provides vital habitat for anadromous salmonids throughout the Columbia River basin, and is of particular importance from a threatened and endangered species recovery perspective. The estuary is designated as critical habitat for 17 species of ESA-listed fish and EFH [Essential Fish Habitat] for Pacific salmon."

¹⁷ EPA, National Estuary Program in Region 10 (online at: <http://yosemite.epa.gov/R10/ECOCOMM.NSF/6da048b9966d22518825662d00729a35/c7a2ab5e252f309688256fb600779ea6!OpenDocument>).

¹⁸ EPA, *Columbia River Basin: State of the River Report for Toxics* (Jan. 2009) (online at: http://www2.epa.gov/sites/production/files/documents/columbia_state_of_the_river_report_jan2009.pdf).

¹⁹ See Exhibit 5, Thom, R. *et al.*, *Columbia River Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (2013).

The federal government has funded—and will continue to fund for the foreseeable future—a significant portion of the salmon restoration efforts in the Columbia River estuary. NWIW’s project would compromise this investment in order to ship fracked North American natural gas overseas as methanol. This ignores one of the key tenets of SEPA: “the basic importance of environmental concerns to the people of the state.” *Leschi v. Highway Comm’n*, 84 Wn.2d 271, 279–80 (1974).

The lower Columbia River and estuary provides vital habitat for salmon originating throughout the Columbia River Basin, and is particularly important for threatened and endangered species recovery. There are numerous species in the area that would be affected by this Project.²⁰ Species protected under the Endangered Species Act include populations of salmon, bull trout, lamprey, eulachon, and green sturgeon.

The estuary is designated as critical habitat for 17 species of ESA-listed fish and Essential Fish Habitat for Pacific salmon. A growing body of evidence, much of it quite recent, explains the important role that shallow water estuarine habitats in the lower Columbia River estuary play in stabilizing production of Columbia River salmon and steelhead.²¹ Estuarine habitats provide high growth opportunities for out-migrating juvenile salmon and also provide protection from predators.

The lower Columbia River and estuary supports vibrant traditions of subsistence, commercial, and sport fishing for salmon, sturgeon, and other fish.²² The Buoy 10 fishery, spanning the mouth of the Columbia River, is one of the Pacific Northwest’s most renowned fisheries. Throughout the lower Columbia, an estimated 507,080 sport fishing trips for salmon and steelhead trips take place each year.²³ Despite significant declines in the salmon fishery, commercial fishing in the Columbia River estuary remains an important local cultural and economic practice. In addition to commercial and sport fishing on the Columbia River, a number of fishing vessels access ocean fisheries via the mouth of the Columbia River.²⁴ The DEIS fails to adequately consider impacts from the Project on these fisheries and the habitats they rely on.

²⁰ See DEIS, p.6-21.

²¹ Bottom *et al.*, *Estuarine habitat and juvenile salmon: current and historical linkages in the lower Columbia River and estuary* (2011); Roegner *et al.*, *Distribution, size, and origin of juvenile chinook salmon in shallow-water habitats of the lower Columbia River and estuary, 2002–2007*, 4 *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 450–472 (2012); Weitkamp *et al.*, *Seasonal and interannual variation in juvenile salmonids and associated fish assemblage in open waters of the lower Columbia River estuary*, 10 *Fishery Bulletin* 4 (2012).

²² Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife, *2014 Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and Other Species, and Miscellaneous Regulations* (Jan. 22, 2014).

²³ EFSEC, *DEIS for the Vancouver Energy Distribution Terminal*, pp.3-12–17 (2015).

²⁴ *Id.* at 2-18.

A. The DEIS Ignores the Project's Impacts on the Pacific Ocean.

By constricting the vessel study area, the DEIS gives readers the impression that the impacts of ship traffic on marine fauna will be insignificant or non-existent. Like the Columbia River and estuary, the marine route is home to many species that would be put at risk by this project. The nearshore Pacific ocean is critical habitat for species listed under the ESA, including leatherback sea turtle, green sturgeon, and eulachon. It is essential fish habitat for West Coast salmon, ground fish, forage fish, and coastal pelagic sharks. Many ESA-listed whale species live near or offshore the mouth of the Columbia River, including blue, fin, and sei whales, sperm whales, orcas, and humpbacks. Other whale species like the pygmy sperm whale and the common minke also live in the area. A NMFS Biological Opinion for one Columbia River crude oil terminal concluded that oil tankers exiting from the Columbia River are “substantially certain” to collide with, and acoustically disturb, threatened and endangered marine mammals and leatherback sea turtles.²⁵ Stopping the study area at the mouth of the Columbia obscures the risks and impacts of allowing up to 144 large tanker vessel transits per year in coastal waters and significantly under-sells the consequences of NWIW's proposed facility. The risks and impacts of such ship traffic are reasonably foreseeable and must be addressed in the FEIS.

1. The Applicant must analyze the impacts to marine mammals

The proposed project would increase the amount of tanker traffic moving through the mouth of the Columbia River and offshore of Oregon and Washington. The increase in tanker traffic associated with the proposed Project (up to 72 round trip ships per year) poses risks to marine mammals in several ways, including through elevated risk of ship strike, increased noise in the aquatic environment, elevated risk of exposure to toxic contaminants through spills, and the introduction of invasive species in ballast water. Several of the species put at risk by the proposed Project are protected under the Endangered Species Act (“ESA”) and/or Marine Mammal Protection Act (“MMPA”). Allowing activities that may harm these species opens up both the agency and private actors to liability under these acts. *See* 16 U.S.C. § 1538(a)(1)(B); 16 U.S.C. § 1362.

i. Elevated risk of ship strike.

Ship strikes involving large vessels are the “principal source of severe injuries to whales.”²⁶ Most ship strikes to large whales result in death.²⁷ Ship strike-related mortality is a documented threat to endangered Pacific coast populations of endangered fin, humpback, blue, sperm, and killer whales. In recent years, ship strikes have become an increasing problem for these critically endangered species along the Pacific Coast. For example, between 2001 and

²⁵ *See* Exhibit 6, NMFS, *Final Biological Opinion for Columbia Pacific Bio-Refinery Dock Expansion*, p.7 (June 8, 2015).

²⁶ Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., 2001, Collisions between ships and whales, *Marine Mammal Science*, 17(1): 35-75.

²⁷ Jensen, A.S. and Silber, G.K., 2004, Large Whale Ship Strike Database. U.S. Department of Commerce, *NOAA Technical Memorandum*. NMFS-OPR-25.

2010, 12 blue whales were reported stranded due to vessel collisions.²⁸ In 1998, NMFS identified ship strikes as one of the primary threats to the endangered blue whale in the Pacific.²⁹

Fin whales, which are routinely sighted in waters off the U.S. Pacific coast, were the most frequently struck species in the analysis conducted by Jensen and Silber (75 confirmed strikes, 26 percent of total strikes).³⁰ At least 18 fin whale mortalities and injuries due to ship strikes were conclusively documented off the coasts of California, Oregon, and Washington between 1993 and 2008.³¹ An examination of 130 whale strandings in Washington State from 1980 to 2006, similarly found fin whales to be very susceptible to ship strikes.³² The final NMFS recovery plan for fin whales ranks the threat posed by ship strikes as “potentially high,”³³

A spatial risk assessment was conducted in 2004 to identify areas where fin, humpback, and killer whales encounter areas of high shipping intensity.³⁴ The study found that relative risk was highest in confined areas (geographic bottlenecks), such as the mouth of the Columbia River where vessels would have to enter to reach the proposed facility. The study further found that the few known cases of collisions involving fin whales suggest that mortality due to ship strike for this species may already be approaching or even exceeding mortality limits under the most risk-averse management objectives.³⁵

Other species, however, are also facing increased risk of harm from ship strikes. For example, the NMFS draft recovery plan for southern resident killer whales documents rare but increasing cases of collisions between ships and individuals of that distinct population segment,³⁶ which was listed as endangered in 2005.³⁷

²⁸ National Marine Fisheries Service. 2010. Southwest Regional Office, California Marine Mammal Stranding Network Database.

²⁹ National Marine Fisheries Service. 1998. Recovery plan for the blue whale (*Balaenoptera musculus*). Prepared by Reeves R.R., P.J. Clapham, R.L. Brownell, Jr., and G.K. Silber for the National Marine Fisheries Service, Silver Spring, MD.

³⁰ Jensen, A.S. and G.K. Silber. 2004. Large Whale Ship Strike Database. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-OPR-25.

³¹ National Marine Fisheries Service. 2010. Recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD.

³² Douglas, Annie B., *et al.*, 2008, Incidence of ship strikes of large whales in Washington State, *Journal of the Marine Biological Association of the United Kingdom*.

doi:10.1017/S0025315408000295 (available at <http://www.cascadiaresearch.org/reports/Douglas%20et%20al%202008-Incidence%20of%20ship%20strikes%20of%20large%20whales.pdf>).

³³ National Marine Fisheries Service. 2010. Recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD. at I-26.

³⁴ Williams, R, O’Hara, P.J., 2010, Modelling ship strike risk to fin, humpback and killer whales in British Columbia, Canada, *Journal of Cetacean Research and Management*, 11:1-8.

³⁵ *Id.*

³⁶ NMFS, Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*) (2008).

³⁷ 70 Fed. Reg. 69903 (Nov. 18, 2005).

Given the foregoing, there can be no doubt that the significant increase in deep draft vessel traffic from the proposed Project will increase the risk of vessel strikes of marine mammals (as well as turtles). The Applicant, however, has failed to address this issue. The DEIS acknowledges that “[t]he additional 36 to 72 vessel transits per year on the Lower Columbia River have the potential to result in collisions of ships with marine mammals that occur within the vessel shipping route on the Lower Columbia River.” Yet, the DEIS claims, with reference only to the FERC 2008 FEIS for Bradwood Landing, that:

Propeller or collision injuries to marine mammals are most frequently caused by small, fast-moving vessels (FERC 2008). In contrast, the ships that would dock at the proposed project produce a bow wave because of their design and large displacement tonnage. This wave pushes in-water objects (including animals in the water) away from the vessel. Therefore, the proposed project would not result in significant adverse impacts to aquatic species as a result of ship strikes.³⁸

This conclusion is entirely illogical and without support. In fact, the 2008 Bradwood Landing FEIS that the Applicant cites provides no supporting citation for the claim that fast moving vessels are most typically associated with whale strikes, rendering that claim uncorroborated. That FEIS actually states that “[b]ecause the blockage ratio of the LNG carriers would be greater than that of most of the deep-draft ships currently traveling the Columbia River, the LNG carriers could potentially produce larger waves than most of the current ships operating at the same speed,” completely undermining the Applicant’s claim.³⁹

Moreover, the actual quote from the Bradwood FEIS is “[t]he ship strike database indicates that large and fast moving vessels (**greater than 12 knots**) are most typically associated with whale strikes.”⁴⁰ The Applicant conveniently left off the “12 knot” defining characteristic, which is quite telling, since the Bradwood FEIS goes on to state that:

Within the Columbia River navigation channel (CRM -3 to CRM 100) and in the marine waters approaching the entrance/exit of the navigation channel (at least out to CRM -8) the Columbia River Bar and River Pilots would determine the ship speed.... LNG carrier speeds would accordingly vary depending on current conditions, but would be limited to approximately **12 knots**. *Id.* (emphasis added).

This suggests that the tanker ships for this Project would likewise travel at a speed where ship strikes are indeed possible. The Bradwood FEIS provides no support for the claim made here that ships with a bow wave are unlikely to cause marine mammal strikes. In fact, that FEIS concluded that “statistically, LNG carriers associated with the Bradwood Landing Project would strike 1.25 fin whales. The likelihood of an LNG carrier striking a blue, sei, or humpback whale

³⁸ DEIS at 6-40.

³⁹ Bradwood Landing FEIS at 4-5.

⁴⁰ Bradwood Landing FEIS at 4-246 (emphasis added).

would be about 20 percent;” however, it conceded that “the actual number of whale strikes is undoubtedly much greater than reported.”⁴¹

Unlike the project proponent in Bradwood, the Applicant here has failed entirely to estimate or analyze the harm from whale strikes, rendering the DEIS entirely incomplete. Further, changing sea conditions, in part due to global climate change, may drastically increase the number of whale strikes that will occur in the future. This has already been documented in several studies. For example, in 2010, there were an unusually large number of blue whale sightings off of the coast of California due to abundant krill.⁴² Whale mortalities spiked as foraging whales gathered in busy shipping lanes off the coast. Changing ocean conditions can influence the productivity in the current system off the Pacific coast and change the abundance of prey for whales. Therefore, more whales may be at risk due to changing ocean conditions. The estimate of potential whale strikes must take this into account, and these impacts must be analyzed in the EIS.

ii. *Increasing chronic ocean noise levels in important marine habitats.*

The proposed Project would substantially increase the amount of ship-related noise in the water, posing a risk of harm to marine mammals. Sound is the key sense for dolphins and whales to find their way around, detect predators, find food and communicate. The sound frequency range within which whales communicate and echolocate corresponds to the frequency range of ship noise. Ships hundreds and even thousands of miles away interfere with the acoustic space of these animals. With more ship traffic, the ability for whales and dolphins to communicate, search for prey, and avoid predators will be compromised. These impacts were not even mentioned in the DEIS, which only discussed construction noise from pile driving.

Oceans are much louder today than they were a century ago, primarily due to increased anthropogenic noise.⁴³ Ocean noise pollution, predominantly from large shipping vessels, has created an “omnipresent hum” in our ocean.⁴⁴ Large commercial shipping vessels are the primary source of anthropogenic low-frequency sound contributing to ambient (background) noise in the ocean. Because very loud low-frequency sound can travel great distances in the deep

⁴¹ *Id.* at 4-247.

⁴² Sahagun, Louis. 2010. Marine mammal enthusiasts getting a show from blue whales. *Los Angeles Times* (Sept. 3, 2010); Zito, Kelly. 2010. Whale deaths blamed on busy ship traffic, krill. *San Francisco Chronicle* (Oct. 10, 2010).

⁴³ *Phase 1-CetSound*, NOAA, <http://cetsound.noaa.gov/cetsound>.

⁴⁴ For example, tests conducted near San Nicolas Island, one of the Channel Islands just south of the Channel Islands NMS, indicate that ambient noise pollution in that area has increased by 10-12 decibels over the past 40 years. McDonald *et al.* suggest that this increase, potentially reflected throughout the Northeast Pacific, is most likely due to changes in commercial shipping. McDonald, M.A., Hildebrand, J. and Wiggins, S.M., 2006, Increases in deep ocean ambient noise in the Northeast Pacific west of San Nicolas Island, California, *Journal of the Acoustical Society America*, 120(2): 711-718.

ocean, increasing noise impacts areas far beyond the source of the noise.⁴⁵ This poses a severe threat to marine mammals.

NOAA has recently begun mapping marine noise levels using its SoundMap and CetMap mapping tools.⁴⁶ These maps show that human-caused cumulative and ambient ocean noise pollution has increased ambient sound levels to over 100 decibels (dB) over the majority of the Pacific and Atlantic oceans.⁴⁷ This sound level is equivalent to attending a live rock concert or standing next to a running chainsaw.⁴⁸

Marine mammals use different song, chirp, and whistle frequencies for a variety of purposes, including echolocation for feeding, long-distance communication, environmental imaging, individual identification, and breeding.⁴⁹ Odontocetes, or toothed mammals such as dolphins and killer whales, produce broad-spectrum clicks and whistles that can range between 1 and 200 kilohertz (kHz).⁵⁰ Mysticetes, or baleen whales such as blue and right whales, have much lower-frequency calls, ranging between 0.2 and 10 kHz.⁵¹

⁴⁵ Hildebrand, J. 2005. Impacts of anthropogenic sound, *In: Marine Mammal Research: Conservation Beyond Crisis*. Edited by: J.E. Reynolds III, W.F. Perrin, R.R. Reeves, S. Montgomery and T.J. Ragen. Johns Hopkins University Press, Baltimore, Maryland, pp. 101-124.

⁴⁶ See <http://cetsound.noaa.gov/>

⁴⁷ *Summed Outputs—Sound Field Data Availability*, NOAA, http://cetsound.noaa.gov/SoundMaps/NorthAtlantic/Basin/Chronic/NA_OceanBasin_Chronic_Sum/NorthAtlantic_Sum_ThirdOctave/Atl_Sum_0050Hz_0005m_ThrdOct.png (last accessed Oct. 29, 2014) (Atlantic Ocean noise pollution levels); *Summed Outputs—Sound Field Data Availability*, NOAA, http://cetsound.noaa.gov/SoundMaps/NorthPacific/Basin/Chronic/NP_OceanBasin_Chronic_Sum/NorthPacific_Sum_ThirdOctave/Pac_Sum_0050Hz_0005m_ThrdOct.png (last accessed Oct. 29, 2014) (Pacific Ocean noise pollution levels).

⁴⁸ *Comparative Examples of Noise Levels*, INDUSTRIAL NOISE CONTROL, INC. (Feb. 2000), <http://www.industrialnoisecontrol.com/comparative-noise-examples.htm>.

⁴⁹ *Id.* at 42-44; Jason Gedamke, *Ocean Sound & Ocean Noise: Increasing Knowledge Through Research Partnerships*, NOAA 2 (2014), available at <http://cetsound.noaa.gov/Assets/cetsound/documents/MMC%20Annual%20Meeting%20Intro.pdf>; Clark, C.W. et al., *Acoustic Masking in Marine Ecosystems as a Function of Anthropogenic Sound Sources*, available at https://www.academia.edu/5100506/Acoustic_Masking_in_Marine_Ecosystems_as_a_Function_of_Anthropogenic_Sound_Sources.

⁵⁰ OCEAN NOISE AND MARINE MAMMALS, NAT'L RES. COUNCIL 41-42 (2003), available at http://www.nap.edu/openbook.php?record_id=10564&page=R1.

⁵¹ *Id.* at 42.

Anthropogenic noise pollution can mask marine mammal communications at almost all frequencies these mammals use.⁵² “Masking” is a “reduction in an animal’s ability to detect relevant sounds in the presence of other sounds.”⁵³ Ambient ship noise can cover important frequencies these animals use for more complex communications.⁵⁴ Some species, such as the highly endangered right whale, are especially vulnerable to masking.⁵⁵ Ship noise can completely and continuously mask right whale sounds at all frequencies.⁵⁶ NOAA has recognized that this masking may affect marine mammal survival and reproduction by decreasing these animals’ ability to “[a]ttract mates, [d]efend territories or resources, [e]stablish social relationships, [c]oordinate feeding, [i]nteract with parents, or offspring, [and] [a]void predators or threats.”⁵⁷ Studies have also found that chronic exposure to boat traffic and noise can cause whales to reduce their time spent feeding.⁵⁸

In addition to masking effects, marine mammals have displayed a suite of stress-related responses from increased ambient and local noise levels. These include “rapid swimming away from [] ship[s] for distances up to 80 km; changes in surfacing, breathing, and diving patterns; changes in group composition; and changes in vocalizations.”⁵⁹ Some avoidance responses to localized marine sounds may even lead to individual or mass strandings.⁶⁰ Louder anthropogenic sounds may also lead to permanent hearing loss in marine mammals.⁶¹

⁵² See, e.g., Hildebrand, J.A., *Impacts of Anthropogenic Sound, in MARINE MAMMAL RESEARCH: CONSERVATION BEYOND CRISIS* (Reynolds, J.E. III et al., eds. 2006); Weilgart, L., 2007, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 *CANADIAN J. ZOOLOGY* 1091-1116 (2007).

⁵³ *OCEAN NOISE AND MARINE MAMMALS*, *supra* note 51, at 96.

⁵⁴ *Id.* at 42, 100 (“An even higher level, an understanding threshold” may be necessary for an animal to glean all information from complex signals”).

⁵⁵ Clark, C.W. et al., *Acoustic Masking in Marine Ecosystems: Intuitions, Analysis, and Implication*, 395 *MARINE ECOLOGY PROGRESS SERIES* 201, 218-19 (2009), available at <http://www.int-res.com/articles/theme/m395p201.pdf>; Clark *et al.*, *supra* note 50, at *17, fig. 8.

⁵⁶ *Id.* (showing anthropogenic noise masking 100 percent of the frequencies right whales used over the majority of a six-hour study).

⁵⁷ Jason Gedamke, *supra* note 50, at 2; Clark, C.W., *et al.*, *supra* note 56, at *3.

⁵⁸ See *i.e.* Williams, R. D., et al., 2006, *Estimating relative energetic costs of human disturbance to killer whales (Orcinus orca)*, *Biological Conservation*, 133: 301-311.

⁵⁹ *OCEAN NOISE AND MARINE MAMMALS*, *supra* note 51, at 94.

⁶⁰ *Id.* at 132; BRANDON L. SOUTHALL ET AL., *FINAL REPORT OF THE INDEPENDENT SCIENTIFIC REVIEW PANEL INVESTIGATING POTENTIAL CONTRIBUTING FACTORS TO A 2008 MASS STRANDING OF MELON-HEADED WHALES 3 (PEPONOCEPHALA ELECTRA) IN ANTSOHIHY, MADAGASCAR*, *INT’L WHALING COMM’N* 4 (2013), available at <http://iwc.int/private/downloads/4b0mkc030sg0gogkg8kog4o4w/Madagascar%20ISRP%20FINAL%20REPORT.pdf>.

⁶¹ Kastak, D. et al., 2008, *Noise-Induced Permanent Threshold Shift in a Harbor Seal*, 123 *J. ACOUSTICAL SOC’Y OF AM.* 2986; Kujawa, S.G. & Liberman, M.C., 2009, *Adding Insult to Injury: Cochlear Nerve Degeneration After “Temporary” Noise-Induced Hearing Loss*, 29 *J. NEUROSCIENCE* 14,077.

NOAA and legislative leaders have recognized the threat to ocean species posed by increased anthropogenic ocean noise levels.⁶² On the issue of ocean noise, NOAA has stated:

Rising noise levels can negatively impact ocean animals and ecosystems in complex ways. Higher noise levels can reduce the ability of animals to communicate with potential mates, other group members, their offspring, or feeding partners. Noise can reduce an ocean animal's ability to hear environmental cues that are vital for survival, including those key to avoiding predators, finding food, and navigation among preferred habitats.

NOAA's approach to managing ocean noise aims to reduce negative physical and behavioral impacts to trust species, as well as conserve the quality of acoustic habitats.⁶³

Though difficult to detect, noise-induced stress is a serious threat for cetaceans.⁶⁴ In a noise exposure study using a captive beluga whale, increased levels of stress hormones were documented.⁶⁵ Stress due to noise can lead to long-term health problems, and may pose increased health risks for populations by weakening the immune system and potentially affecting fertility, growth rates and mortality.⁶⁶

Many species are already threatened by increasing ocean noise. The NMFS recovery plan for Southern resident killer whales (*Orcinus orca*) describes the disturbance from vessel traffic and the associated noise pollution as a potential threat to the species in Washington State and British Columbia, where population numbers have fallen to below 100 individuals.⁶⁷ The recovery plan identifies "sound and disturbance from vessel traffic" as factors that currently pose a risk for this population of Southern resident killer whales.⁶⁸ Killer whales rely on their highly developed acoustic sensory system for navigating, locating prey, and communicating with other individuals. Increased levels of anthropogenic sound have the potential to mask echolocation and other signals used by the species, as well as to temporarily or permanently damage hearing

⁶² See *Phase 2-NOAA's Ocean Noise Strategy* (<http://cetsound.noaa.gov/cetsound>); *Congressional Briefing on Marine Mammal Health and Stranding* (Sept. 24, 2014), http://www.mmc.gov/special_events/capitolhill_briefing/capitolhill_briefing_summary.shtml; see generally Jason Gedamke, *Supra Note 50*.

⁶³ *Underwater Noise and Marine Life*, NOAA, <http://cetsound.noaa.gov/index>.

⁶⁴ Weilgart, L., 2007, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 *CANADIAN J. ZOOLOGY* 1091-1116 (2007).

⁶⁵ Romano, T.A. *et al.*, 2004, *Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure*, *Canadian Journal of Aquatic Science*, 61: 1124-1134.

⁶⁶ *Id.*

⁶⁷ National Marine Fisheries Service (NMFS). 2008. *Recovery Plan for Southern Resident Killer Whales (Orcinus orca)*. National Marine Fisheries Service, Northwest Region, Protected Resources Division, Seattle, Washington.

⁶⁸ *Id.*

sensitivity. Exposure to sound may therefore be detrimental to survival by impairing foraging and other behavior.⁶⁹

Other species that communicate over vast distances in the ocean, such as blue and fin whales, will increasingly have trouble hearing one another as the ambient noise level continues to rise. The masking of reproductive calls may prevent widely distributed mates from finding each other and reproduction rates may fall as a consequence.⁷⁰ This could have a significant impact on the survival of species such as Southern resident killer whales and blue whales, which are listed as endangered species.

Hearing loss, classified as either “temporary threshold shift” or “permanent threshold shift,” is also a concern for animals exposed to the intense noise pollution produced by human activities. Hearing loss reduces the range in which communication can occur, interferes with foraging efforts and increases vulnerability to predators. Hearing loss may also change behaviors with respect to migration and mating and it may cause animals to strand, which is often fatal. For marine mammals such as whales and dolphins that rely heavily on their acoustic senses, both permanent and temporary hearing loss should be regarded as a serious threat.⁷¹

Furthermore, noise impacts to marine mammals are predicted to increase with global climate change, wherein the absorption of carbon dioxide by the ocean could create noisier oceans.⁷² When greenhouse gas reacts in the ocean, it lowers pH, creating more acidic waters. The more acidic the water, the less that sound waves are absorbed. Keith Hester, a researcher with the Monterey Bay Aquarium Research Institute, predicts sounds will travel 70% further by 2050 because of increased carbon dioxide acidifying our oceans.⁷³ A louder ocean will negatively affect cetaceans that rely on sound to navigate, communicate, find food, and avoid predators.

⁶⁹ *Id.*

⁷⁰ Weilgart, L., 2007, The impacts of anthropogenic ocean noise on cetaceans and implication for management. *Canadian Journal of Zoology*, 85 CANADIAN J. ZOOLOGY 1091-1116.

⁷¹ Hildebrand, J., 2005, Impacts of anthropogenic sound, *In: Marine Mammal Research: Conservation Beyond Crisis*. Edited by: J.E. Reynolds III, W.F. Perrin, R.R. Reeves, S. Montgomery and T.J. Ragen. Johns Hopkins University Press, Baltimore, Maryland, pp. 101-124.

⁷² Hester, K. C., *et al.*, 2008, Unanticipated consequences of ocean acidification: A noisier ocean at lower pH. *Geophysical Research Letters*, 35:31.

⁷³ *Id.*

The greatest source of human-caused marine noise by far is ship propeller cavitation—the sound poorly designed propellers make as they spin through the water.⁷⁴ Cavitation accounts for as much as 85 percent of human caused noise in the world’s oceans.⁷⁵ Cavitation may also increase due to hull designs that create non-homogenous wake fields behind ships.⁷⁶ And even well-designed propellers and hulls may begin to cavitate if they are not regularly cleaned and smoothed.⁷⁷

Another significant source of anthropogenic marine noise is on-board machinery, especially diesel engines.⁷⁸ Other onboard machines may also cause vibrations that migrate underwater.⁷⁹ Finally, ship noise increases at higher speeds, as this increases the degree and volume of cavitation and onboard machine sounds.⁸⁰ The Applicant has failed to discuss any of these sources of marine noise or the impacts to marine mammals in the DEIS, rendering it entirely incomplete.

iii. *If the Project is approved, the speed of tanker ships must be limited to reduce ship strikes and noise impacts.*

Reducing ship speed would mitigate several of the impacts of the proposed Project on marine mammals, since ships traveling at lower speeds will reduce significant threats due to ship strikes, noise pollution, air pollution, and greenhouse gas emissions.

Speed plays a significant role in risk of ship strikes.⁸¹ If a whale is swimming at mid-depth and hears an approaching ship, it will have difficulty in locating the direction of the ship because of the echoes off the bottom and surface. The loudness will not necessarily indicate how far away the ship is. If the whale then swims toward the surface directly ahead of the ship, the sound levels of that particular ship will become lower because of the downward diffraction, the Lloyd-mirror effect, near-field effects, and possible shielding from the hull. Thus, in terms of the acoustic stimulus associated with an approaching vessel, the quietest location will likely be at the surface, directly ahead of the ship.⁸²

⁷⁴ Joseph J. Cox, *Evolving Noise Reduction Requirements in the Marine Environment*, MARINE MAMMAL COMM’N: CONGRESSIONAL BRIEFING ON OCEAN NOISE, at 12 (2014), available at http://www.mmc.gov/special_events/capitalhill_briefing/cox_capitalhill_briefing_0914.pdf; GUIDELINES FOR THE REDUCTION OF UNDERWATER NOISE FROM COMMERCIAL SHIPPING TO ADDRESS ADVERSE IMPACTS ON MARINE LIFE, INT’L MARITIME ORGANIZATION 1-2 (2014) (definition of cavitation) [hereinafter GUIDELINES].

⁷⁵ Joseph J. Cox, *supra* note 75, at 12.

⁷⁶ GUIDELINES, *supra* note 75, at 4.

⁷⁷ GUIDELINES, *supra* note 75, at 5.

⁷⁸ GUIDELINES, *supra* note 75, at 4.

⁷⁹ *Id.*

⁸⁰ GUIDELINES, *supra* note 75, at 5.

⁸¹ *See generally*, Conn, P. B., and G. K. Silber, 2013, Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales, *Ecosphere*, 4(4):43.

⁸² Terhune, J.M. and Verboom, W.C., 1999, Right whales and ship noise, *Marine Mammal Science*, 15: 256-258.

The Applicant's DEIS fails to specify the speed at which tankers would be restricted to for this Project. Scientific research has shown that there is a direct correlation between vessel speed and ship strikes resulting in whale mortality,⁸³ and that slower speeds are necessary for avoiding harm to marine mammals.

Ship speed affects the likelihood of whale mortality in two ways. First, slower ship speeds provide whales with a greater opportunity to detect the approaching ship and avoid being hit by it. "To the extent that increasing vessel speed significantly increases accelerations experienced by a whale, limits on vessel speed will reduce the magnitude of the acceleration; may increase response time for a whale attempting to maneuver away from a vessel; and appear to be reasonable actions to consider in policy decisions aimed at reducing the overall threat of ship strikes."⁸⁴

Second, research shows that while slower speeds may not avoid all collisions between whales and ships, collisions at slower speeds are less likely to result in serious injury or death of the whale that has been struck.⁸⁵ Laist *et al.* (2001) reported in a historical analysis of ship strikes involving large cetaceans that "[a]mong collisions causing lethal or severe injuries, 89% (25 of 28) involved vessels moving at 14kn or faster and the remaining 11% (3 of 28) involved vessels moving at 10-14 kn; none occurred at speeds below 10 kn."⁸⁶

Similarly, Vanderlaan and Taggart (2007) report that "as vessel speed falls below 15 knots, there is a substantial decrease in the probability that a vessel strike to a large whale will prove lethal," but that only at speeds slower than 11.8 knots does the chance of a fatal injury to a large whale drop below 50 percent.⁸⁷ Pace and Silber (2005) noted that they found "clear evidence of a sharp rise in mortality and serious injury rate with increasing vessel speed."⁸⁸ Specifically, they found that probability of serious injury or mortality increased from 45 percent at 10 knots to 75 percent at 14 knots, exceeding 90 percent at 17 knots.

⁸³ Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., 2001, Collisions between ships and whales, *Marine Mammal Science*, 17(1): 35-75; Pace, R.M. and Silber, G.K., 2005, Abstract: Simple Analyses of ship and large whale collisions: Does speed kill?, *Sixteenth Biennial Conference on the Biology of Marine Mammals*, San Diego (Dec. 2005); Vanderlaan, A.S.M. and Taggart, C.T., 2007, Vessel Collisions with Whales: The probability of lethal injury based on vessel speed, *Marine Mammal Science*, 23(1): 144-156; Panigada, S., et al., 2006, Mediterranean fin whales at risk from fatal ship strikes, *Marine Pollution Bulletin*, 52: 1287-1298; Silber, G.K., Slutsky, J., and Bettridge, S., 2010, Hydrodynamics of a ship/whale collision, *Journal of Experimental Marine Biology and Ecology*, 391:10-19.

⁸⁴ Silber, G.K., Slutsky, J., and Bettridge, S., 2010, Hydrodynamics of a ship/whale collision, *Journal of Experimental Marine Biology and Ecology*, 391: 10-19.

⁸⁵ Laist, *supra* note 84.

⁸⁶ *Id.*

⁸⁷ Vanderlaan, A.S.M. and Taggart, C.T., 2007, Vessel Collisions with Whales: The probability of lethal injury based on vessel speed, *Marine Mammal Science*, 23(1): 144-156.

⁸⁸ Pace, *supra* note 84.

Terhune and Verboom recommended that to avoid striking whales, ship operators need to take evasive actions to avoid collisions.⁸⁹ Since successfully avoiding a collision depends in part on accurately predicting a whale's movement, the ship operator may not be able to maneuver a large vessel in such a way that a collision is successfully avoided. Slower moving vessels may provide more time for a whale to avoid being struck. Laist *et al.* (2001) report situations in which a last-second flight response on the whale's part may serve to avoid collisions. Studies suggest that slower moving vessels are easier for whales to avoid, even if acoustic signals were missed.⁹⁰

NMFS has found that no other measure was as essential or effective as the establishment of a mandatory 10-knot speed limit to reduce and prevent whale strikes.⁹¹ NMFS has found that instituting this speed limit would benefit humpback, fin, sperm, and sei whales, as well as sea turtles.⁹² Therefore, should this project be approved, a 10-knot speed limit should be included, along with reporting and monitoring mechanisms to ensure that the Applicant's ships adhere to this limitation.

Limiting the speed of tankers will also reduce noise impacts to marine mammals. As discussed above, vessel traffic is the largest source of noise pollution in the marine environment.⁹³ The intense, low frequency noise pollution generated by ships can travel great distances through the water.⁹⁴ Noise pollution from shipping results primarily from the formation and collapse of air bubbles as the propeller turns. This process, known as cavitation, creates very loud acoustic pollution in the same lower-frequency range used for communication by whales, dolphins and other marine animals.⁹⁵ Cavitation is the primary source of noise at high speeds.⁹⁶ As a result, one of the most efficient ways to reduce noise from cavitation is to reduce the speed of the vessel. For these reasons, is approved the proposed Project should include a mandatory speed limit to mitigate the noise impacts associated with tanker ships.

B. Impacts of Dock Construction and Operation.

Either of the proposed "action" alternatives would require the construction and dredging of a massive new dock in the lower Columbia River. This type of construction and structure is detrimental to various aquatic species, many of which are protected by federal or state law. In addition to the following comments on dock construction and Project operation, Commenters incorporate by reference the Comments of Columbia Riverkeeper on the Clean Water Act § 404

⁸⁹ *Id.*

⁹⁰ National Marine Fisheries Service (NMFS). 2008. FEIS to Implement Operational Measures to Reduce Ship Strikes to North Atlantic Right Whales (August 2008).

⁹¹ *Id.*

⁹² *Id.* at 4-19, 4-23.

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ Arveson, P. T., and Vendittis, D. J., 2000, Radiated noise characteristics of a modern cargo ship, *Journal of the Acoustical Society of America*, 107 (1): 118-129.

and § 401 permits by the U.S. Army Corps of Engineers and the Washington Department of Ecology, respectively.⁹⁷

1. Noise impacts from construction at the terminal site.

The proposed dock renovation work (and upland construction) could cause noise-induced behavior impacts, including indirect mortality, on Columbia River fish species. The DEIS explains that pile installation and removal would be accomplished using vibratory and impact hammers. Pile driving can have substantial adverse impact on underwater organisms; however, the DEIS fails to adequately assess those impacts.

NWIW's proposed terminal would require the installation of approximately 320 24-inch concrete piles, 12 12-inch steel pipe piles, and 4 18-inch steel pipe piles.⁹⁸ These piles will be installed by impact hammer or by vibratory hammer.⁹⁹ The U.S. Army Corps' Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for the project (hereinafter, "JPN") fails to show that harm will not occur to organisms in the vicinity, especially pinnipeds and salmonids. Specifically, the JPN does not discuss using bubble curtains or other methods to mitigate or attenuate acoustic impacts on aquatic organisms. Given that the pile driving is estimated to last for approximately 120 days,¹⁰⁰ many endangered fish and other animals could be killed, or at the very least harmed, by this activity.

As NMFS described:¹⁰¹

"Acoustic disturbances associated with pile driving are likely to disrupt the foraging behavior and reduce forage efficiency of juvenile salmonids. * * * Fishes with swimbladders (including salmonids) are sensitive to underwater impulsive sounds, i.e., sounds with a sharp sound pressure peak occurring in a short interval of time." (Caltrans 2001). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. The pneumatic pounding may rupture capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2001). The injuries caused by such pressure waves are known as barotraumas, and include hemorrhage and rupture of internal organs, as described above, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or can occur several days later. A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single

⁹⁷ Exhibits 1 and 2.

⁹⁸ Exhibit 7, U.S. Army Corps of Engineers, *Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for NWIW's Methanol Refinery and Export Terminal*, p.2 (October 9, 2015).

⁹⁹ JPN at 3.

¹⁰⁰ JPN at 4.

¹⁰¹ Exhibit 6, pp.82–83.

strike threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams.

Deployment of a bubble curtain is likely to attenuate the peak sound pressure levels by approximately 10 to 20 dB. However, a bubble curtain may not bring the sound pressure levels below biological thresholds, and some death or injuries of ESA-listed salmonids are still likely to occur. Even with the use of the bubble curtain, adverse effects to salmonids are expected in the vicinity of the pile driving. Yelverton et al. (1975) found a direct correlation between smaller body mass and the magnitude of injuries and mortalities from underwater blasts. Large juvenile and adult fishes are likely to be present during the summer in-water work window, rather than small juvenile fishes. Based on conservative estimates of sound exposure level and number of pile strikes per day, injury to juvenile listed salmonids could occur up to 368 feet from the pile driving (NMFS 2008). There may also be effects to salmonid behavior due to underwater noise up to 7,067 feet upstream and downstream from the pile driving (NMFS 2008)."

2. Impact of overwater structures on juvenile salmonids.

The DEIS ignores the impacts of over-water structure on juvenile salmonid survival. Overwater structures like NWIW's proposed dock degrade habitat for, and directly increase the mortality of, juvenile salmonids. NWIW's terminal will result in 44,943 square feet of new solid overwater coverage.¹⁰² NMFS has explained that: "[a]n effect of overwater structures is the creation of a light/dark interface that allows ambush predators to remain in a darkened area (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around the structure are unable to see predators in the dark area under the structure and are more susceptible to predation."¹⁰³ These impacts are significant and measurable: "Predation on ESA-listed salmon and steelhead is reasonably certain to increase with the addition of structures. Juvenile fish abundance has also been found to be reduced under piers and overwater structures when compared to open water or areas with piles but no overwater structures (Able *et al.* 1998), likely due to limitations in prey abundance and increased predation under structures."¹⁰⁴ An Army Corps of Engineers-sponsored literature review similarly concluded that:

Over-water structures may increase predation of juvenile Chinook salmon in several ways. First, piers and docks can provide cover and preferred habitat for ambush predators such as smallmouth bass. Second, they create shaded areas that can increase a predator's capture efficiency of prey. Third, they interrupt migration routes and timing of migrating salmonids. The additional time spent navigating around these structures increase exposure to predators in these areas. Finally, changes in substrate, aquatic vegetation, and ambient light caused by

¹⁰² JPN at 3.

¹⁰³ NMFS, *SLOPES IV In-water and Over-water Structures BiOp*, p.85 (April 5, 2012).

¹⁰⁴ *Id.* at 86.

overwater structures may indirectly increase predation through complex ecological pathways.¹⁰⁵

The DEIS must consider the effect of constructing a new dock on juvenile salmonid survival, in addition to the cumulative impacts of the numerous existing and proposed overwater structures in the Columbia.

3. Proposed ‘fish window’ would not protect juvenile salmonids.

The existing in-water work window approved by WDFW begins on November 1, in order to avoid impacts to juvenile salmonids that migrate through the Columbia River in the summer. Apparently because NWIW wants to take 6 entire months to dredge the berth and build the dock, NWIW proposes an in-water work window stretching from August 1 to December 31.¹⁰⁶ The FEIS should contain a thorough discussion of the benefits and rationale for the existing in-water work window (beginning Nov. 1), and a detailed explanation for the environmental costs of working outside that window.

C. Impacts of Vessel Traffic in the Estuary and Lower River

Between 36 and 72 large tanker vessels would call at Tesoro-Savage’s proposed facility each year. This increase in deep-draft vessel traffic would exacerbate the impacts of wake stranding of juvenile salmonids, erosion of wetlands and shoreline areas, potential to introduce invasive species, and the entrainment and impingement of native juvenile fish. Unfortunately, the DEIS does not provide sufficient detail about the significance or extent of these impacts to meaningfully inform the public or a decision-maker.

1. Wake stranding of juvenile salmonids

Vessel wakes from deep-draft tankers calling at NWIW’s proposed facility would kill and injure juvenile salmon and steelhead in the Columbia River and estuary. Wake stranding occurs when a wave caused by a vessel wake lifts an aquatic organism onto the shoreline. NMFS identifies ship wake stranding as a limiting factor for recovery of Lower Columbia River (“LCR”) Chinook salmon, Columbia River chum, LCR coho salmon, and LCR steelhead, with juvenile ocean-type Chinook originating from LCR tributaries and CR chum being particularly vulnerable.¹⁰⁷

The DEIS acknowledges that wake stranding will occur, but provides no concrete details about the extent of the problem. Some quantitative data exists about wake stranding: in 2004 and 2005, researchers monitored 126 deep-draft vessel transits at three beaches along the Lower

¹⁰⁵ Rondorf *et al.*, *Minimizing Effects of Over-Water Docks on Federally Listed Fish Stocks in McNary Reservoir: A Literature Review for Criteria*, p.10 (2010).

¹⁰⁶ DEIS, p. 2-41.

¹⁰⁷ Exh. 6, p.86.

Columbia River.¹⁰⁸ Along a 300-meter stretch of shoreline at Barlow Point (just downstream from Longview, Washington), researchers observed 26 different deep-draft vessel transits, which resulted in the total wake stranding of 351 juvenile chinook salmon (an average of 13.5 juvenile chinook stranded per deep-draft vessel transit).¹⁰⁹ Assuming that NWIW's deep-draft tankers are equally efficient at wake-stranding juvenile chinook salmon, the *minimum* projected 72 yearly one-way trips through the lower Columbia River generated by NWIW's proposal could strand 972 juvenile chinook every year—**on that 300-meter stretch of shoreline alone**. Not all shoreline areas are equally susceptible to wake stranding and directly extrapolating the Barlow Point numbers would probably not accurately predict total wake stranding in the Lower Columbia River. However, a verified model¹¹⁰ exists that could help estimate—even roughly—the impacts of wake stranding from NWIW's proposal, at least upstream of Rivermile 50. Because the data to perform this type of analysis is available, the FEIS should contain a quantitative estimate of the number of juvenile salmonids that would suffer wake stranding as a result of NWIW's project.

2. Entrainment and impingement of aquatic organisms in vessel water intakes.

The DEIS ignores the risk of impingement and entrainment of aquatic organisms in the water intakes of vessels calling on NWIW's facility. Entrainment is the direct uptake of aquatic organisms by the suction field generated by water intakes on vessels, while impingement refers to organisms becoming trapped against an intake screen. The FEIS should describe the water intake structures on the tanker vessels, explain the rate and amount of water taken in by each ship, and explain (through literature review or actual sampling) the densities at which larval fish and fish eggs (especially eulachon) are likely to be present in the Lower Columbia River and therefore susceptible to entrainment or impingement. None of these figures would be particularly difficult to ascertain, but without them, readers of the DEIS have very little information on the impacts of entrainment resulting from the Project.

III. PUBLIC HEALTH

The Port and County should prepare a Health Impact Assessment (“HIA”) for this Project. An HIA can evaluate the significant public health impacts of: diesel exhaust; passenger vehicle emissions; greenhouse gas emissions; noise; and spills and drinking water systems and supplies. Some of these impacts were not analyzed at all in the DEIS, and others were incompletely analyzed.

¹⁰⁸ Pearson *et al.*, *A study of stranding of juvenile salmon by ship wakes along the lower Columbia River using a before-and-after design—before-phase results* (2006).

¹⁰⁹ *Id.* at 9, 48.

¹¹⁰ See, e.g., Pearson and Skalski, *Factors affecting stranding of juvenile salmonids by wakes from ship passage in the Lower Columbia River*, 27 *River Research and Applications* 926–936 (2011); see also Kock *et al.*, *Review of a model to assess stranding of juvenile salmon by ship wakes along the Lower Columbia River, Oregon and Washington* (2013).

A. Air Quality

A key health impact of NWIW's Project is the direct and cumulative impact of small airborne particulate matter—largely from diesel exhaust—on people who live and work near the proposed refinery, and the people who would use the DEIS's oft-touted recreational access directly downstream from the project. According to Physicians for Social Responsibility¹¹¹:

The fine and ultrafine particles less than 2.5 microns (PM_{2.5}) are particularly important in triggering disease because they penetrate deeply into the alveoli of the lungs. Diesel particulate matter, submicronic in size, has particularly damaging potential (Li). Some inhaled particles are taken up by macrophages, resulting in lung inflammation. The final common pathway of the pathologic effects of exposure to particulate matter, as well as gas phase pollutants, appears to be inflammation. The effects of inflammation on various body organ systems are complex, but increased levels of particulate matter are associated with a number of ill health effects including: increased cancer rates, especially lung and breast, congenital lung, heart and immune system anomalies in children, increased rates of asthma, worsening of preexisting asthma and chronic obstructive pulmonary disease (COPD), higher rates of heart attacks and strokes, and higher rates in children (exposed prenatally) of neurodevelopmental disorders such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), lowered IQ, and adverse behaviors. Not surprisingly, the most vulnerable populations are pregnant women, children, people that already have pulmonary diseases like COPD or asthma, and the elderly.

(internal citations omitted).

The DEIS essentially dismisses the health risks of diesel particulate matter ("DPM") associated with the Project by attempting to discredit Washington's Acceptable Source Impact Level ("ASIL") standard for DPM as overly-protective.¹¹² However, according to the American Heart Association, there is *no* completely safe level of exposure to diesel particulate matter.¹¹³ And the World Health Organization ("WHO") reports that there is not a threshold below which no damage to human health is observed as a result of exposure to fine particulate matter.¹¹⁴ The fact that *any* amount of DPM harms human health undercuts the DEIS's attempt to discredit and trivialize Washington's ASIL.

The DEIS begrudgingly admits that background concentrations for PM_{2.5}—which would be largely composed of DPM—at the Project site are *already* more than 1,500 times higher than Washington's Acceptable Source Impact Level for DPM.¹¹⁵ The DEIS, however, never explains

¹¹¹ Exhibit 8, Oregon Physicians for Social Responsibility, *Airborne Particulate Matter and Public Health* (2015).

¹¹² See DEIS, pp.4-8 and 4-9.

¹¹³ *Id.* at 3; see also Exhibit 9, American Heart Association, *Danger in the Air: Air Pollution and Cardiovascular Disease* (2014).

¹¹⁴ *Id.* at 1.

¹¹⁵ DEIS, p.4-9.

by how much DPM levels will exceed the ASIL once NWIW's refinery begins operating, or by how much ambient DPM levels will exceed the ASIL once other proposed fossil-fuel export proposals on the Columbia begin operating. The ASIL is a relevant benchmark for human health in Washington, and the DEIS should at least describe the Project's direct and cumulative contributions to DPM with respect to the ASIL.

Even if the public and decision-makers accepted the DEIS's inappropriate invitation to ignore Washington's ASIL, the PM_{2.5} levels that would exist once NWIW's Project begins operating would be near or above other relevant benchmarks for human health. The WHO recommends that PM_{2.5} should not exceed an average of 25 micrograms per cubic meter of air (25 µg/m³) in a 24-hour period, and not exceed an average annual exposure of 10 µg/m³.¹¹⁶ The DEIS predicts that the existing background PM_{2.5} levels plus the PM_{2.5} from NWIW's operations, using the ULE technology, would reach 23 µg/m³ in a 24-hour period and average at least 7 µg/m³ annually.¹¹⁷ These projected levels come dangerously close to the levels that WHO found threaten human health. Unfortunately, the Appendix D of the DEIS does not model the PM emissions (or any emissions) for the CR alternative. This prevents decision-makers from accurately comparing the consequences of the two technological approaches.

Moreover, the DEIS completely fails to address the likely future contributions of DPM and PM_{2.5} from the many fossil fuel export projects that are currently proposed along and through the Lower Columbia River.¹¹⁸ These projects will increase DPM and other PM emissions at the Project site, which is sandwiched directly between BNSF's main rail line and the Columbia River shipping channel. Of particular concern is the proposed Millennium Bulk Terminals coal export proposal, which would bring four open-topped coal trains within a few hundred feet of the Project site each day. Diesel locomotives hauling coal can significantly contribute to ambient PM_{2.5} concentrations.¹¹⁹ The FEIS should model the DPM and PM_{2.5} levels at the Project site that would result from the operation of all proposed fossil fuel export terminals along the Lower Columbia, and compare the results to WHO and NAAQS standards for human health. Failure to do so would constitute a failure to take a hard look at the cumulative impacts of this project.

B. Drinking Water

The EIS should evaluate the risk posed to Kalama's drinking water wells by a major spill of methanol, fuel oil, or other chemical to the Columbia River near the project site. Kalama's drinking water comes from a Ranney well adjacent to the Kalama River, about two miles

¹¹⁶ See <http://www.who.int/mediacentre/factsheets/fs313/en/#>. The WHO-recommended levels—which reduce but do not eliminate health impacts from airborne particulate matter—are slightly lower than the applicable Clean Air Act standards cited in on page 4-3 of the DEIS.

¹¹⁷ DEIS, Appx. D, p.42.

¹¹⁸ See, e.g., DEIS, pp.15-2 through 15-7.

¹¹⁹ Exhibit 10, Jaffe *et al.*, *Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA*, Atmospheric Pollution Research (2015)

upstream of the confluence with the Columbia.¹²⁰ Both the Columbia River at the project site, and the site of Kalama's Ranney well, appear to be within areas that are tidally influenced.¹²¹ Accordingly, a strong incoming tide could potentially carry spilled methanol or other pollutants upstream and into the City of Kalama's drinking water intake system. The DEIS and the HIA should evaluate the possibility and consequences of a spill near the refinery site contaminating Kalama's drinking water.

C. Noise

Construction and operation of this facility would be noisy. Regarding noise impacts from construction, intermittent and unpredictable pile driving noise could negatively impact the surrounding community. Intermittent noise produces a more adverse reaction than continuous noise, and unpredictable noise results in even more adverse reactions than intermittent noise. The DEIS fails to propose mitigation for noise impacts due to pile drivers, for example, because construction noise is "exempt" from regulations. But this does not reduce the health and safety risks associated with these predicted high noise levels for Port employees and community members. How will these impacts be mitigated?

The DEIS's model calculated hourly Leqs as high as 58 dBA and Lmax levels as high as 82 dBA at residences in Prescott, Oregon, when impact pile driving occurs. Discrete impact levels would be much higher than hourly Leqs. If the Lmax level reaches 82 dBA, there will likely be serious impacts and angry neighbors. How will the negative impacts of this noise on human health and well-being be mitigated?

The next most affected group of residences may be those on the hillside northeast of the project site. These residents are predicted to experience pile driving hourly Leqs in the low 50s dBA and Lmax levels in the upper 70s dBA, exceeding the 70 dBA WAC limit.

Regarding noise impacts from operations, the DEIS lists options for mitigating noise impacts from cooling water pumps and the methanol loading pump, but does not say how the listed options would actually work. For example, one mitigation measure meant to decrease harm to Oregonians across the river is to move the cooling water pumps to the east side of the cooling tower, but this "would result in higher sound levels on the hillside to the northeast" of the plant (in Washington), resulting in increases over existing levels up to 10 dBA. This would result in "moderate" noise impacts to three receptors on that Washington hillside.¹²²

Noise from increased vessel transport is assumed in the DEIS to be the same as current noise levels. How can this be? More ships—both from NWIW's project and the cumulative increase in vessel traffic from other proposed fossil fuel terminals—necessarily means more noise from ships.

¹²⁰ City of Kalama, *Drinking Water Quality Annual Report* (2014) (online at: <http://www.cityofkalama.com/home/showdocument?id=521>).

¹²¹ <http://www.nwcouncil.org:81/fw/lf/Overview.asp?Report=Overview&SubbasinID=39>

¹²² DEIS, p.14-25.

Regarding compliance with Washington's 70 dBA noise limit for industrial noise sources, it appears that both the CR and the ULE alternatives would exceed this limit. The DEIS shifts responsibility to the Port of Kalama to work with NWIW and other industrial tenants to address noise levels in the event that an adjacent tenant raises concerns about noise impacts. If Washington's 70 dBA noise limit is exceeded, this raises concerns about the ability of people working nearby to perform work requiring concentration. Further, this raises concerns about the construction and operating company's workers and their hearing conservation program, not mentioned in the DEIS.

D. Fires and Explosions

The DEIS downplays the very real possibility of a serious accident involving gas or methanol, which—contrary to the overall impression given in the DEIS—is highly flammable and toxic. For instance:

- In November, 2012, at the NEXEO Solutions Chemical Plant Garland Texas, methanol was being unloaded from a rail car when an explosion occurred. 10,000 gallons of methanol burned. The area ¼ mile around the facility was evacuated due to the possibility that the fire could spread and cause more explosions.
- In June, 2013, in Geismar, Louisiana, an explosion and fire at the Williams Olefin Plant killed two and injured 70.
- In August, 2015, multiple explosions and fires destroyed the Tianjin Fuel Refinery and many nearby buildings in Rizhao, Shandong Province.
- In January, 2016, a methanol tank explosion and fire killed two employees and critically injured another at the Bethune Point Wastewater Treatment Plant in Florida.

IV. DIRECT IMPACTS FROM CONSTRUCTING THE REFINERY AND PIPELINE

A. Habitat impacts from Project construction.

According to the DEIS, the proposed pipeline route would “cross seven waterbodies (five of which are intermittent and non-fish-bearing), and four wetlands. The pipeline would traverse several forest types including conifer, deciduous, and mixed conifer-deciduous forest as well as Oregon white oak woodlands.”¹²³ It further asserts that “[h]abitats within the proposed pipeline alignment support the foraging, breeding, and resting activities of a variety of commonly occurring amphibians, reptiles, birds, and mammals.”

¹²³ DEIS, p.6-13.

The DEIS then goes on to describe, quite accurately, the potential for harm to habitat areas from constructing the Project. The DEIS describes¹²⁴ a litany of expected impacts, among them:

- “Clearing and grading of stream banks, removal of riparian vegetation, in-stream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased sedimentation and turbidity, increases in temperature, decreased dissolved oxygen concentrations, releases of chemical and nutrient pollutants from sediments, and introduction of chemical contaminants such as fuel and lubricants.”
- “Human activity and noise could result in temporary displacement from habitats on and adjacent to the construction right-of-way.”
- “Inadvertent release of drilling fluid to surface waters could also negatively affect fish resources.”
- “Construction and operation of the pipeline project would result in permanent and temporary impacts to vegetation. Forested vegetation (including the forested component of riparian vegetation) on lands used for operation would be permanently lost and converted to herbaceous vegetation.”
- “The permanent and long-term loss and conversion of forested vegetation would impact wildlife by altering habitat characteristics, and could impact soil characteristics, contours, surface water flow, and rates of erosion.”
- “The permanent and long-term loss of forest would also result in forest fragmentation, the creation of ‘edge effects,’ and an increase in the potential for the establishment and proliferation of noxious weeds.”
- “By using a HDD to place the pipeline below the waterbodies, most impacts on these waterbodies and the fisheries contained within them would be avoided. However, the use of a HDD could result in an inadvertent release of drilling fluids (bentonite and other inert/non-toxic additives), commonly referred to as a ‘frac-out.’ A frac-out into a waterbody could temporarily impact water quality (turbidity), fish habitat (sedimentation), and the rates of stress, injury, and mortality experienced by fish and other aquatic wildlife (FERC 2015).”
- “Constructing and operating the pipeline project would temporarily and permanently impact wildlife and wildlife habitat. Project related activities, including clearing and trenching and the general use of construction equipment, would temporarily decrease and permanently alter available wildlife habitat, change the characteristics of adjacent wildlife habitat, displace wildlife, and alter wildlife behavior, and could increase the rates of mortality, injury, and stress experienced by wildlife.”
- “Operating the project would permanently alter some habitats and could periodically disturb wildlife, which could also increase wildlife mortality, injury, and stress.”
- “Constructing and operating the project through the Carrolls Bluff Oaks priority habitat area would result in the loss of wildlife habitat (oaks). Similar to the loss of forested habitat on other lands, the rates of mortality, injury, and stress experienced by wildlife

¹²⁴ DEIS, pp.6-41–42.

could increase; however, this impact could be measurably greater because of the unique characteristics of the oak woodlands.”

There is, however, almost no analysis provided as to the actual harm that constructing and maintaining the pipeline would have on these habitat areas. For example, while the DEIS acknowledges that a frac-out during HDD is possible (which would harm aquatic habitat), there is no attempt to quantify the likelihood of frac-out occurrence, and only a general explanation of the potential impacts (i.e. fish injury and mortality) with no specifics as to the potential extent of harm, or details on how the Proponent would respond and resolve those impacts.

The Applicant has merely claimed that by using “standard construction BMPs for pipeline construction” it will “reduce impacts to plants and animals.”¹²⁵ This entirely unsupported statement is insufficient to meet the requirements of environmental analysis under Washington’s SEPA. BMPs may help reduce some impacts, such as sediment runoff, but they will do little or nothing to mitigate the temporary loss/disturbance and permanent loss of habitat that even the Applicant acknowledges would occur. Rather, the Applicant claims that “habitat for several terrestrial and avian wildlife species would be permanently and temporarily affected by the pipeline project; however, given the mobility of species concerned and the availability of similar habitat nearby, this impact should be minimal (FERC 2015).”¹²⁶ To suggest that the impacts of a large-scale construction project such as this would be “minimal” simply because species – including imperiled species protected under state and federal law – can merely move out of the way, is preposterous, and acceptance of this as an “analysis” of the impacts of the Project would render environmental review under SEPA meaningless.

Constructing the Project would have adverse impacts on habitat. The DEIS makes it clear that the Project would affect currently forested areas that support the foraging, breeding, and resting activities of a variety of commonly occurring amphibians, reptiles, birds, and mammals. Linear corridors created by buried pipelines like the proposed Project permanently fragment areas of continuous forest, decrease critical interior forest, and increase forest edge. Fragmentation of habitat has been recognized as “one of the most pervasive threats to native ecosystems”—indeed, roads and pipelines have a greater impact on fragmentation than well pads themselves.¹²⁷ As a result, the U.S. Geological Survey has acknowledged that “[f]ragmentation of forest and habitat is a primary concern resulting from current gas development.”¹²⁸

¹²⁵ DEIS, p.6-41.

¹²⁶ DEIS, p.6-42.

¹²⁷ Brittingham, M.C., *et al.*, *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats*, Environmental Science & Technology, 11037 (Sept. 4, 2014) (citing E.T. Slonecket, *et al.*, U.S. Geological Survey, *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pa., 2004-2010*, 9 (2012) (in Bradford and Washington counties, “forests became more fragmented primarily as a result of the new roads and pipelines associated with shale development, and development resulted in more and smaller forest patches with loss of core forest ... at twice the rate of overall forest loss.”)); *see also Pennsylvania Energy Impacts Assessment Report 1: Marcellus Shale Natural Gas and*

Forest fragmentation and habitat loss “are closely intertwined, with loss of habitat frequently associated with fragmentation of the remaining habitat, and fragmentation often associated with additional losses of interior or core habitats.”¹²⁹ Fragmentation is also associated with various ecological changes—including “changes in patch size and isolation, light, moisture, and temperature”—that directly and indirectly affect populations and communities.¹³⁰ The resulting smaller patches have a decreased ability to support viable populations of individual species.¹³¹ As a result, habitat loss and forest fragmentation can be major threats to biodiversity.¹³²

Constructing the proposed Project and related infrastructure would involve clearing and bulldozing a 100-foot-wide construction corridor and permanent maintenance of a cleared right of way for the pipeline. It would also presumably involve construction of access roads for pipeline construction and maintenance and clearing and excavation of staging areas somewhere within or in proximity to the proposed corridors. There will be unavoidable, but thus far unstudied and unquantified, impacts to forested areas.

Because the specific impacts of habitat loss and fragmentation depend on the needs and attributes of specific species and communities, Applicants must fully evaluate the significant, long-term impacts that fragmentation from the proposed pipeline corridor may have on each species and community, both within and adjacent to the proposed pipeline corridor.¹³³ Avoidance, minimization, or mitigation of these impacts is critical to ecological sustainability. Moreover, the EIS must assess whether mitigation measures fully account for and address the impacts that constructing and maintaining the facility and pipeline and related infrastructure will have with respect to these ecological disruptions. The EIS must disclose and assess all direct, indirect, and cumulative impacts of this disturbance and fragmentation of forests.

The EIS must further consider the potential impacts of increasing forest edge, including but not limited to potential impacts on terrestrial and avian species, as well as vegetation and soil dynamics (including loss of native soil integrity) associated with an increase in forest edge. In

Wind; E.T. Slonecket, *et al.*, U.S. Geological Survey, *Landscape Consequences of Natural Gas Extraction in Fayette and Lycoming Counties, Pennsylvania, 2004-2010* (2013).

¹²⁸ *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 9.

¹²⁹ *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11037.

¹³⁰ *Id.* (citing K. Harper, *et al.*, *Edge influence on forest structure and composition in fragmented landscapes*, *Conserv. Biol.* 2005, 19 (3), 768-82; S.K. Collinge, *Ecology of Fragmented Landscapes*, p. 340, The Johns Hopkins University Press: Baltimore, Md. (2009)).

¹³¹ *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 9.

¹³² *Id.* (citations omitted).

¹³³ *See Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 10.

order to assess fully the potential impacts of the edge effect, the EIS must properly account for the geographic extent and temporal frame of forest edge impacts. The EIS must evaluate any beneficial impacts of edge creation for certain species in conjunction with the negative impacts on other species.

The EIS must also disclose and analyze the geographic extent, including total acreage of interior forest habitat that would be impacted, by edge effect. Because expanding edges into natural ecosystems can affect the natural ecosystem for some distance in from the edge, the EIS must evaluate an impact area that extends at least 300 feet into adjacent forest; examining only the pipeline corridor and other areas in which soil may be moved or vegetation may be cleared grossly underestimates the area of impact. This analysis should include spatial data detailing interior forest resources along the proposed route and alternatives, as well as forest connectivity and riparian corridors. In addition, the EIS must acknowledge the current declining levels of interior forest habitat and the increase of forest edge conditions. The EIS must also acknowledge and deal with the reality that while interior forest requires decades to create, edge forest can be created overnight.

B. Wildlife impacts, including protected species.

The EIS must also examine impacts that the Project could have on native wildlife populations and communities—directly by habitat loss or indirectly through changes on adjacent habitats and land uses associated with them.¹³⁴ In the FERC EA for the pipeline portion of the Project, it states that:

The proposed pipeline would be located across two State of Washington priority habitats; the Carrolls Bluff Oaks (oak woodlands) and the Kalama Flats (wetlands). According to the WDFW, Oak Woodlands are distinct ecosystems that provide valuable habitat contributing to wildlife diversity. The Carroll Bluff Oaks (MP 2.1 – 2.4) site contains vernal streams, exposed rock outcroppings, unique plant communities, and supports concentrations of bandtailed pigeons. The Kalama Flats (MP 2.4 – 3.1) site supports cavity nesting ducks, small concentrations of swans, ducks, geese, and bandtailed pigeons. Additionally, four priority wildlife species may occur in the Project area, the bald eagle (*Haliaeetus leucocephalus*), eastern wild turkey (*Meleagris gallopavo silvestris*) Canada goose (*Branta Canadensis*), and elk (*Cervus elaphus*). Bald eagles have not been documented within 0.5 mile of Project workspace. Wild turkeys, Canadian geese, and elk have high recreational value both for consumptive and nonconsumptive purposes. Lastly, priority areas of breeding habitat for Canada goose and cavity nesting ducks; regular concentrations of elk; and a management buffer for the northern spotted owl would be crossed by the Project.¹³⁵

¹³⁴ See *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11037.

¹³⁵ FERC, Kalama Lateral Project Environmental Assessment (July, 2015) at 42.

The DEIS, however, fails to adequately examine impacts to these species. For example, even though the FERC EA clearly states that a management buffer for spotted owl (a threatened species) would be crossed by the Project, the Applicant's DEIS never even mentions that fact, but rather fails entirely to discuss any impacts to spotted owls, claiming only in Table 6-2 that the potential for occurrence is "Low – no suitable habitat on site." According to the Washington Forest Protection Association, buffer zones are intended to "develop into old-forest habitat over time," and to be important for "connecting landscapes of forests for spotted owls alongside stream corridors."¹³⁶ The DEIS admits that construction and operation activities for the Project will result in long-term and permanent loss of forested vegetation, resulting in forest fragmentation.¹³⁷ The lack of any discussion of such impacts to the spotted owl management buffer, and how those impacts may affect the spotted owl in the future, renders the DEIS entirely incomplete.

Similarly, the Applicant has failed to address potential impacts to bald eagles. While the DEIS acknowledges that the Bald and Golden Eagle Protection Act ("BGEPA") prohibits the taking of a bald eagle,¹³⁸ and that several bald eagle breeding sites are within 1 mile of the project site – and the site contains suitable perching and feeding habitat¹³⁹ – there is no discussion of how the Project would actually impact bald eagles. According to the DEIS, noise from pile-driving would not reduce to background level until a distance of 13,770 feet, or approximately 2.6 miles.¹⁴⁰ Since bald eagles are known to nest within a mile of the Project site, there is clearly potential for noise-related impacts. However, no attempt has been made to quantify or even discuss those impacts, or to show how the Project will not violate the BGEPA. Once again, the lack of any actual analysis renders the DEIS incomplete.

The Project has the potential to harm owls and eagles. A variety of human activities can potentially interfere with eagles and owls, affecting their ability to forage, nest, roost, breed, or raise young. If agitated by human activities, these species may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests

¹³⁶ Washington Forest Protection Association, Northern Spotted Owl Conservation (available at <http://www.northernspottedowl.org/jurisdictions/sosea.html>).

¹³⁷ DEIS at 6-41. The DEIS further acknowledges that "Project related activities, including clearing and trenching and the general use of construction equipment, would temporarily decrease and permanently alter available wildlife habitat, change the characteristics of adjacent wildlife habitat, displace wildlife, and alter wildlife behavior, and could increase the rates of mortality, injury, and stress experienced by wildlife (FERC 2015)." DEIS at 6-42.

¹³⁸ The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." This includes impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes a loss of productivity or nest abandonment.

¹³⁹ DEIS at 6-14.

¹⁴⁰ DEIS at 6-26.

can jeopardize eggs or young. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves.¹⁴¹

Disruption, destruction, or obstruction of roosting and foraging areas (such as the Project site) can also negatively affect these species. Disruptive activities in or near owl or eagle foraging areas can interfere with feeding, reducing chances of survival. For example, human activities near or within communal roost sites may prevent eagles from feeding or taking shelter, especially if there are not other undisturbed and productive feeding and roosting sites available. Activities that permanently alter communal roost sites and important foraging areas can altogether eliminate the elements that are essential for feeding and sheltering eagles.

The Applicant admits in the DEIS that construction activities are expected to result in “temporary avoidance of the site or vicinity” by special-status species.¹⁴² The DEIS provides no analysis of these impacts, claiming without support that the impacts would not be significant.¹⁴³ However, as discussed above there are known bald eagle nests within a mile of the proposed Project, and noise from pile-driving will travel 2.6 miles. There will further be other sources of noise and disturbance from construction activities. Where a human activity, such as the construction of the proposed Project, agitates or bothers roosting or foraging birds to the degree that causes injury or substantially interferes with breeding, feeding, or sheltering behavior and causes, or is likely to cause, a loss of productivity or nest abandonment, the conduct of the activity constitutes a violation of the ESA and/or BGEPA. The EIS must fully evaluate the Project for potential impacts to owl and eagle individuals and habitat. The Project has the potential to harm these birds through habitat loss, fragmentation, climate disruption and construction related impacts (i.e. noise), which may directly harm owls and eagles as well as the habitat areas they rely on for food sources.

The Project also has the potential to harm the ESA-listed streaked horned lark (threatened). In fact, the DEIS states that the potential for impacts to this species are high, since it breeds and winters in the Project vicinity.¹⁴⁴ The streaked horned lark has been extirpated throughout much of its range, including all of its former range in British Columbia, Canada, the San Juan Islands, the northern Puget lowlands, the Washington coast north of Grays Harbor, the Oregon coast, and the Rogue and Umpqua Valleys in southwestern Oregon. The current range of the streaked horned lark can be divided in to three regions: (1) the Puget lowlands in Washington, (2) the Washington coast and lower Columbia River islands (including dredge spoil deposition sites near the Columbia River in Portland, Oregon), and (3) the Willamette Valley in Oregon. Any further impacts to this species, and the habitat it depends on, could have dire consequences for this imperiled species.

¹⁴¹ See the US Fish and Wildlife Service, National Bald Eagle Management Guidelines (May, 2007) (available at <http://digitalmedia.fws.gov/cdm/ref/collection/document/id/1982>).

¹⁴² DEIS at 6-28.

¹⁴³ *Id.*

¹⁴⁴ DEIS at Table 6-2.

The DEIS, however, never fully addresses the loss of lark habitat. The Applicant claims that the current habitat for larks (3 acres of dredge spoils) will only remain suitable through the end of the 2015 nesting season as ground cover increases to render the area non-habitat, and that streaked horned larks currently nesting there “would be expected to find suitable habitat on islands in the vicinity.”¹⁴⁵ This, however, fails to assess the actual impacts to the species.

The Applicant appears to incorrectly assume that no dredge spoil deposits would take place in the vicinity of the Project after 2015. The Army Corps BA that is referenced states that no such activity is currently taking place because 3 pairs of streaked horned larks were detected in 2013 during surveys, and the site is expected to become unsuitable after the 2015 nesting season due to vegetation succession.¹⁴⁶ Rather than implying that the site would become useless as habitat in 2015, this suggests that depositing dredge spoils at this site will once again become viable after 2015. While no plans currently exist for such activities through 2019 (the Corps BA states that five-year placement plan does not include this area), that does not mean that no rehabilitation of nesting habitat for the larks will take place during the long life of the proposed Project. Indeed, according to the Corps, the Northport dredge deposit site “will remain in the Corps’ planning for long-term placement.”¹⁴⁷ The EIS must evaluate the Project’s impacts on future dredge deposits that would create habitat for the species.

Further, the Applicant has failed to provide any information on whether habitat for larks exists on or near the Project site other than what has been analyzed by the Army Corps. The Army Corps BA only covers dredge spoil sites created during navigational dredging; however, other land uses in the vicinity of the Project may have created additional habitat that would be impacted by the Project. It does not appear that any surveys have been conducted, so the actual impacts to the species have not been fully assessed. The DEIS also fails to mention the potential for increased predation from rats and mice due to the Project, which is a major factor in the species’ decline.¹⁴⁸ Moreover, rather than writing off the existing habitat as useless after 2015, the Applicant should consider how to maintain habitat for this listed species.

The EIS must also consider the impacts it would have on wildlife from climate change. As discussed above increased greenhouse gas emissions associated with the Project would exacerbate global climate change, leading to loss of sea ice and the species that depend on it,¹⁴⁹ sea level rise,¹⁵⁰ extreme weather events,¹⁵¹ ocean acidification,¹⁵² and loss of habitat and species

¹⁴⁵ DEIS at 6-18.

¹⁴⁶ U.S. Army Corps, Biological Assessment for the Continued Operations and Maintenance Dredging Program for the Columbia River Federal Navigation Channel (March 2014) at 49.

¹⁴⁷ *Id.* at 24.

¹⁴⁸ 78 Fed. Reg. at 61,482.

¹⁴⁹ A. Robinson, et al., *Multistability and critical thresholds of the Greenland ice sheet*, 2 NATURE CLIMATE CHANGE 429 (2012).

¹⁵⁰ S. Rahmstorf et al., *Recent climate observations compared to projections*, 316 SCIENCE 709 (2007).

¹⁵¹ Intergovernmental Panel on Climate Change (IPCC), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)* (2012) (available at <http://ipcc-wg2.gov/SREX/>); U.S. Global Change Research Program, *Global Climate Change Impacts in the US: Global Climate Change* (2009); Dim Coumou & Stefan Rahmstorf, *A Decade of Weather*

(such as the streaked horned lark).¹⁵³ The EIS must disclose specific impacts to species and habitat areas resulting from climate change, including changes in precipitation, increased severity of storms, increase in heat waves, drought, ozone formation, and wildfires -- all of which have the potential to adversely impact species, including protected species.

Finally, the EIS must consider the impacts of pesticide and herbicide use from the Project. These dangerous products, if used to remove invasive species or maintain rights-of-way, can have devastating impacts on sensitive species. The DEIS notes that “[w]eeds would be controlled by annual manual removal (hand pulling, cutting, and/or mowing). Appropriate herbicide treatments may also be applied if they are determined to be necessary by the project proponent. The invasive species management strategy would be an informal and evolving program....”¹⁵⁴ The decision to use these toxic substances should not be left to the discretion of the Project proponent, and the impacts of using herbicides – especially in wetland areas – must be fully analyzed in the EIS.

V. IMPACTS OF NATURAL GAS SUPPLY AND PRODUCTION

The project will require at least 270,000 dekatherms, or roughly 270,000 MMBtu, of natural gas per day.¹⁵⁵ The impacts of drilling, processing, and delivering this gas to the Project

Extremes, 2 NATURE CLIMATE CHANGE 491 (2012); National Oceanic and Atmospheric Administration, *Extreme Weather 2011* (available at <http://www.noaa.gov/extreme2011/>).

¹⁵² See, e.g., O. Hoegh-Guldberg et al., *Coral reefs under rapid climate change and ocean acidification*, 318 SCIENCE 1737 (2007); K. Caldeira and M.E. Wickett, *Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean*, 110 J. GEOPHYS. RES. C09S04, doi:10.1029/2004JC002671 (2005).

¹⁵³ Camille Parmesan & Gary Yohe, *A Globally Coherent Fingerprint of Climate Change Impacts Across Natural Systems*, 421 NATURE 37 (2003); Terry L. Root et al., *Fingerprints of Global Warming on Wild Animals and Plants*, 421 NATURE 57 (2003); Camille Parmesan, *Ecological and Evolutionary Responses to Recent Climate Change*, 37 ANNUAL REV. OF ECOLOGY EVOLUTION AND SYSTEMATICS 637 (2006); I-Ching Chen et al., *Rapid Range Shifts of Species Associated with High Levels of Climate Warming*, 333 SCIENCE 1024 (2011); Ilya M. D. Maclean & Robert J. Wilson, *Recent Ecological Responses to Climate Change Support Predictions of High Extinction Risk*, 108 PROC. OF THE NATL. ACAD. OF SCIENCES OF THE U.S. 12337 (2011); Rachel Warren et al., *Increasing Impacts of Climate Change upon Ecosystems with Increasing Global Mean Temperature rise*, 141 CLIMATIC CHANGE 106 (2011).

¹⁵⁴ DEIS at 6-52

¹⁵⁵ The DEIS states that the ULE alternative will require 270,000 dekatherms per day. DEIS at 1-16. It is unclear whether this figure refers only to feed gas, or if it also includes the 30,000 dekatherms needed for the onsite 101 megawatt powerplant included in the ULE design. DEIS at 7-3. The EIS must address, and clearly disclose, the *total* gas needs of the project, and clarify the relationship between these two values.

must be considered in the analysis of indirect and cumulative effects of the project.¹⁵⁶ Indeed, these effects are just as essential to the project, and just as closely linked, as the effects related to the generation of the electricity the project will purchase from the electric grid. In the NEPA context, EPA has argued, in comments on liquefied natural gas export proposals analogous to the methanol proposal here, that the environmental impact statement must address the indirect effects of producing and delivering natural gas to the liquefaction and export facility. In scoping comments for the Jordan Cove LNG project, EPA opined that in order to properly analyze indirect effects, “it is appropriate to consider available information about the extent to which drilling activity might be stimulated by the construction of an LNG export facility on the west coast, and any potential environmental effects associated with that drilling expansion.”¹⁵⁷

Producing the natural gas that would supply the Project would result in significant environmental impacts. Natural gas production—particularly from “unconventional” sources such as the shale gas formations that would likely provide the majority of the supply here—is a significant air pollution source, can disrupt ecosystems and watersheds, leads to industrialization of entire landscapes, disrupts communities, and presents challenging waste disposal issues. A subcommittee of the DOE’s Secretary of Energy’s Advisory Board highlighted “a real risk of serious environmental consequences” resulting from continued expansion of shale gas production.¹⁵⁸ In 2014, the National Energy Technology Laboratory released several reports detailing the adverse environmental impacts of natural gas production in general, and of modern hydraulic fracturing in particular.¹⁵⁹

¹⁵⁶ WAC 197-11-060(4)(d) (indirect effects), 197-11-792(2)(C); *Cheney v. City of Mountlake Terrace*, 87 Wash.2d 338, 344, 552 P.2d 184 (1976) (“Implicit in [SEPA] is the requirement that the decision makers consider more than what might be the narrow, limited environmental impact of the immediate, pending action. The agency cannot close its eyes to the ultimate probable environmental consequences of its current action.”).

¹⁵⁷ EPA, Scoping Comments – The Jordan Cove Energy Project LP, FERC Dkts. PF12-7 and PF12-17, 14 (Oct. 29, 2012); *see also* EPA, Scoping Comments – The Oregon LNG Export Project and Washington Expansion Project, FERC Dkts. PF12-18 and PF12-20 (Dec. 26, 2012). EPA reiterated these positions in comments on FERC’s draft EISs for these projects, and has consistently taken this position in comments on NEPA review for other liquefied natural gas export projects.

¹⁵⁸ DOE, Secretary of Energy’s Advisory Board, Shale Gas Production Subcommittee Second 90-Day Report 10 (Nov. 18, 2011); *see also* DOE, Shale Gas Production Subcommittee, First 90-Day Report (Aug. 18, 2011) (hereinafter “First 90-Day Report”).

¹⁵⁹ NETL, Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 (May 29, 2014), available at http://www.netl.doe.gov/File%20Library/Research/Oil-Gas/publications/NG_Literature_Review3_Post.pdf; National Energy Technology Laboratory, Life Cycle Analysis of Natural Gas Extraction and Power Generation, DOE/NETL-2014/1646 (May 29, 2014), available at [http://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Anal](http://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Analysis/NETL-NG-Power-LCA-29May2014.pdf)

For instance, fracking and other gas production operations are a significant source of air pollution. In particular, natural gas production is a major source of methane and other greenhouse gases. Natural gas systems are one of the nation's largest sources of methane pollution.¹⁶⁰ Emissions of methane are particularly important, because methane from fossil sources is a greenhouse gas that is 87 times more potent than carbon dioxide on a 20-year timeframe, and 36 times more potent on the 100-year timeframe.¹⁶¹ In addition, gas production is a major source of non-greenhouse gas air pollution. EPA acknowledges that “[t]here have been well-documented air quality impacts in areas with active natural gas development, with increases in emissions of methane, volatile organic compounds (VOCs) and hazardous air pollutants (HAPs).”¹⁶² Exposure to this pollution can cause eye, nose, and throat irritation, respiratory illnesses, central nervous system damage, birth defects, cancer, or premature death.¹⁶³ In Colorado, for example, an evaluation of birth defects in areas with high concentrations of oil and gas activity found that mothers who lived near many oil and gas wells were 30 percent more likely to have babies with heart defects.¹⁶⁴ Similarly, preliminary results from a study in Pennsylvania show impacts among newborns that could be linked to air pollution such as increases in low birth weight.¹⁶⁵

In many rural areas, the boom in oil and gas activity has been linked to unhealthy spikes in ozone concentrations.¹⁶⁶ In Wyoming, pollution from oil and gas production has caused areas to violate EPA's air quality standards for ozone.¹⁶⁷ These increased ozone levels were correlated

¹⁶⁰ See EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2014 (Apr. 15, 2016), <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf>.

¹⁶¹ IPCC, Climate Change 2013: Physical Science Basis, Anthropogenic and Natural Radiative Forcing, 714.

¹⁶² US EPA, Natural Gas Extraction - Hydraulic Fracturing, <http://www2.epa.gov/hydraulicfracturing#air>.

¹⁶³ John L. Adgate et al., “Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development,” *Environmental Science and Technology* (2014), available at <http://pubs.acs.org/doi/abs/10.1021/es404621d>.

¹⁶⁴ Lisa M. McKenzie et al., “Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado,” *Environmental Health Perspectives*, (2014) at 12, available at <http://ehp.niehs.nih.gov/1306722/>.

¹⁶⁵ Adgate et al. *supra* note 163.

¹⁶⁶ Detlev Helmig et al., “Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah Basin, Utah,” *Environmental Science & Technology*, March 27, 2014, available at <http://www.ncbi.nlm.nih.gov/pubmed/24624890>.

¹⁶⁷ EPA, Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 30088, 30157 (May 21, 2012); Wyoming Department of Environmental Quality, Technical Support Document I for Recommended 8-hour Ozone Designation of the Upper Green River Basin (March 26, 2009) at viii (explaining that Wyoming ozone pollution was “primarily due to local emissions from oil and gas . . . development activities: drilling, production, storage, transport, and treating.”), available at http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf

with subsequent increases in outpatient clinic visits for respiratory problems in Wyoming's Sublette County.¹⁶⁸ Researchers who looked at air pollution levels near fracking sites in Colorado also found an increased risk of chronic and sub-chronic effects mainly stemming from oil and gas related pollutants, which can harm the respiratory and neurological systems and lead to symptoms like shortness of breath, nosebleeds, headaches, dizziness, and chest tightness.¹⁶⁹

In addition to these air pollution impacts, gas production harms water resources. Gas production, and unconventional gas production in particular, can also harm water quality. Hydraulic fracturing of shale formations requires millions of gallons of water per well.¹⁷⁰ This process also risks contaminating surface or ground water with chemicals added to fracturing fluid or chemicals naturally occurring in the formation.¹⁷¹ As one recent survey explained, many of the chemicals used present health risks.

Examples [of fracking fluid additives] include methanol, ethylene glycol, naphthalene, xylene, toluene, ethylbenzene, formaldehyde, and sulfuric acid, some of which are known to be toxic, carcinogenic, and associated with reproductive harm. Many of these compounds are also regulated in other industries under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) as hazardous water pollutants. [¶] Many of the chemical compounds used in the process lack scientifically based maximum contaminant levels (MCLs), which render a quantification of their public health risk more difficult. . . . [¶] At certain concentrations or doses, more than 75% of the chemicals identified are known to negatively impact the skin, eyes, and other sensory organs, the respiratory system, the gastrointestinal system, and the liver; 52% have the potential to negatively affect the nervous system; and 37% of the chemicals are candidate endocrine disrupting chemicals.¹⁷²

One of the most troubling additives is diesel. The SEAB Shale Gas Subcommittee has singled out diesel as a fracturing fluid additive for its harmful effects, recommending a ban on use of diesel in fracturing fluid.¹⁷³ The minority staff of the House Committee on Energy and

¹⁶⁸ State of Wyoming Department of Health, "Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits — Sublette County, Wyoming, 2008–2011," 2013, available at health.wyo.gov/Media.aspx?mediaId=16318.

¹⁶⁹ McKenzie *et al.*

¹⁷⁰ DOE, Shale Gas Production Subcommittee, First 90-Day Report (Aug. 18, 2011).

¹⁷¹ Diminution of water quantity can also adversely affect water quality, as when reduced in-stream flows make streams less able to tolerate other sources of contamination.

¹⁷² Seth B. Shonkoff, et al., *Environmental Public Health Dimensions of Shale and Tight Gas Development*, Environmental Health Perspectives, 9-10 (April 16, 2014), <http://dx.doi.org/10.1289/ehp.1307866> (internal citations omitted).

¹⁷³ DOE, Shale Gas Production Subcommittee First 90-Day Report, at 25.

Commerce has determined that, despite diesel's risks, "between 2005 and 2009, oil and gas service companies injected 32.7 million gallons of diesel fuel or hydraulic fracturing fluids containing diesel fuel in wells in 20 states."¹⁷⁴

In addition to chemicals added to fracturing fluid, harmful chemicals naturally occur in the target formations, and these chemicals can be mobilized by the shale gas production process. Wastewater returned from the surface can occur harmful naturally occurring compounds such as benzene, toluene, ethylbenzene, and xylene.¹⁷⁵ Unconventional gas production can also introduce methane into water supplies, creating a safety hazard.

Shale gas production can introduce these harmful contaminants into surface and groundwater through a number of pathways: spills and leakages at the well pad, through a failure of the well casing or cement, or through other underground migration.¹⁷⁶ This migration might be most likely to occur through assistance of a pre-existing conduit such as an existing well or natural fault. Even in the absence of such a conduit, however, one study predicts that hydraulic fracturing could drive contaminants into aquifers in less than ten years.¹⁷⁷ This result is particularly troubling because, while a careful operator can reduce the risk of intersection with a fault or existing well, it is unclear whether any steps could be taken to avoid this contamination vector.

Numerous studies demonstrate that contamination occurs in practice. The National Energy Technology Laboratory summarized many of these studies.¹⁷⁸ Another study, reviewing drilling in Colorado, found that gas drilling correlated with increasing thermogenic methane and chloride levels in groundwater wells.¹⁷⁹ EPA has concluded that unconventional production likely led to groundwater contamination in Pavillion, Wyoming. In the Pavillion investigation, EPA's draft report concludes that "when considered together with other lines of evidence, the

¹⁷⁴ Letter from Reps. Waxman, Markey, and DeGette to EPA Administrator Lisa Jackson, 2 (Oct. 25, 2011), available at

<http://democrats.energycommerce.house.gov/sites/default/files/documents/Jackson-EPA-Hydraulic-Fracturing-2011-10-25.pdf>.

¹⁷⁵ Shonkoff 2014, *supra* n.172, at 19.

¹⁷⁶ NETL Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 83-93.

¹⁷⁷ Tom Myers, *Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers* (Apr. 17, 2012).

¹⁷⁸ NETL, Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 (May 29, 2014), available at http://www.netl.doe.gov/File%20Library/Research/Oil-Gas/publications/NG_Literature_Review3_Post.pdf

¹⁷⁹ Geoffrey Thyne, *Review of Phase II Hydrogeologic Study* (2008), prepared for Garfield County, Colorado, available at

[http://cogcc.state.co.us/Library/Presentations/Glenwood_Spgs_HearingJuly_2009/\(1_A\)_ReviewofPhase-II-HydrogeologicStudy.pdf](http://cogcc.state.co.us/Library/Presentations/Glenwood_Spgs_HearingJuly_2009/(1_A)_ReviewofPhase-II-HydrogeologicStudy.pdf).

data indicates likely impact to ground water that can be explained by hydraulic fracturing.”¹⁸⁰ EPA tested water from wells extending to various depths within the range of local groundwater. At the deeper tested wells, EPA discovered inorganics (potassium, chloride), synthetic organic (isopropanol, glycols, and tert-butyl alcohol), and organics (BTEX, gasoline and diesel range organics) at levels higher than expected.¹⁸¹ At shallower levels, EPA detected “high concentrations of benzene, xylenes, gasoline range organics, diesel range organics, and total purgeable hydrocarbons.”¹⁸² EPA determined that surface pits previously used for storage of drilling wastes and produced/flowback waters were a likely source of contamination for the shallower waters, and that fracturing likely explained the deeper contamination.¹⁸³ The U.S. Geological Survey, in cooperation with the Wyoming Department of Environmental Quality, also provided data regarding chemicals found in wells surrounding Pavillion.¹⁸⁴ Although the USGS did not provide analysis regarding the likely source of the contaminants found, an independent expert who reviewed the USGS and EPA data at the request of Sierra Club and other environmental groups concluded that the USGS data supports EPA’s findings.¹⁸⁵ EPA turned further investigation of contamination of Pavillion over to Wyoming, and did not finalize its draft report, but EPA stated that it “stands behind its work and data” in the draft report.¹⁸⁶

Here, the EIS must thoroughly discuss these indirect impacts. At a minimum, the EIS must provide a qualitative discussion of the nature of these impacts, and acknowledge that the project will contribute to these problems. In addition, in taking a “hard look” at these impacts, the EIS must use quantitative tools to assess them where possible. The National Energy Technology Laboratory has, for example, provided a methodology for assessing, for any particular volume of gas production, the amount and type of air pollution emitted, the volume of water required, and the volume of wastewater produced.¹⁸⁷ One strength of the Laboratory’s analysis is that, in addition to analyzing the impact of average existing U.S. gas production, the

¹⁸⁰ EPA, Draft Investigation of Ground Water Contamination near Pavillion, Wyoming, at xiii (2011), available at http://www.epa.gov/region8/superfund/wy/pavillion/EPA_ReportOnPavillion_Dec-8-2011.pdf.

¹⁸¹ *Id.* at xii.

¹⁸² *Id.* at xi.

¹⁸³ *Id.* at xi, xiii.

¹⁸⁴ USGS, *Groundwater-Quality and Quality-Control Data for two Monitoring Wells near Pavillion, Wyoming, April and May 2012*, USGS Data Series 718 p.25 (2012).

¹⁸⁵ Tom Myers, *Assessment of Groundwater Sampling Results Completed by the U.S. Geological Survey* (Sept. 30, 2012). Another independent expert, Rob Jackson of Duke University, has stated that the USGS and EPA data is “suggestive” of hydraulic fracturing as the source of contamination. Jeff Tollefson, *Is Fracking Behind Contamination in Wyoming Groundwater?*, *Nature* (Oct. 4, 2012). See also Tom Myers, *Review of DRAFT: Investigation of Ground Water Contamination near Pavillion Wyoming* (April 30, 2012) (concluding that EPA’s initial study was well-supported).

¹⁸⁶ <http://www2.epa.gov/region8/pavillion> (last accessed Aug. 2, 2013).

¹⁸⁷ National Energy Technology Laboratory, *Life Cycle Analysis of Natural Gas Extraction and Power Generation*, at 34 (greenhouse gas emissions), 50 (non-greenhouse gas air pollution), 55 (water consumption and wastewater production).

analysis addresses the impact of *marginal* gas production—*i.e.*, the impact of the additional production that might be added if U.S. gas demand were to increase.¹⁸⁸ On the other hand, recent research confirms that some of the assumptions used as inputs in the Laboratory’s analysis were optimistic; in particular, the Laboratory underestimated the amount of methane emitted per unit of gas production. EPA, which uses a similar “bottom-up” method of analysis based on assumptions about equipment counts and emission rates, has recently recognized significantly increased its estimate of methane emitted by natural gas extraction, processing, and transportation by 27%.¹⁸⁹ Even this revised figure, however, is far lower than estimates based on direct measurements of methane in the atmosphere.¹⁹⁰ Here, the EIS must use some method to take a hard look at the air pollution and other impacts of producing and delivering gas to the project site; if the revised EIS uses the National Energy Technology Laboratory’s methods, the EIS must nonetheless revise the inputs to that methodology.

Finally, the EIS must address whether available tools and information can predict where this additional production will occur, and how the gas demand created by the Project will influence overall U.S. gas supply. On the former point, it may be that the contracts with gas suppliers provide information that enables reasonable predictions as to where the supplied gas will come from. Even if such contracts provide no such information, more general modeling tools, such as the Environmental Information Administration’s National Energy Modeling System, may be able to predict, at a “play” or regional level, where this gas will be produced.¹⁹¹

¹⁸⁸ See *id.* at D-5. These values differ because, for example, fracked shale gas is likely to play a larger role in incremental gas production than in the average of existing production.

¹⁸⁹ Compare <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf> (page 3-68, table 3-43) with <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf> (page 3-70, table 3-45).

¹⁹⁰ Schneising, O, et al. (2014) Remote sensing of fugitive methane emissions from oil and gas production in North American tight geologic formations. *Earth’s Future*; Lavoie et al. (2015). Aircraft-based measurements of point source methane emissions in the Barnett Shale Basin. *ES&T*. [dx.doi.org/10.1021/acs.est.5b00410](https://doi.org/10.1021/acs.est.5b00410); Lyon et al. (2015). Constructing a spatially resolved methane emission inventory for the Barnett Shale region. *ES&T*. [dx.doi.org/10.1021/es506359c](https://doi.org/10.1021/es506359c); Marchese et al. (2015). Methane emissions from United States natural gas gathering and processing. *ES&T*. [dx.doi.org/10.1021/acs.est.5b02275](https://doi.org/10.1021/acs.est.5b02275); McKain et al. (2015). Methane emissions from natural gas infrastructure and use in the urban region of Boston, Massachusetts. *PNAS*. [dx.doi.org/10.1073/pnas.1416261112](https://doi.org/10.1073/pnas.1416261112); Zimmerle et al. (2015). Methane emissions from the natural gas transmission and storage system in the United States. *ES&T*. [dx.doi.org/10.1021/acs.est.5b01669](https://doi.org/10.1021/acs.est.5b01669).

¹⁹¹ Energy Information Administration, Assumptions to Annual Energy Outlook 2015 (Sept. 10, 2015), available at <https://www.eia.gov/forecasts/aeo/assumptions/>; Energy Information Administration, Oil and Gas Supply Module documentation, available at https://www.eia.gov/forecasts/aeo/assumptions/pdf/oil_gas.pdf; Energy Information Administration, Natural Gas Transmission Module documentation, available at <https://www.eia.gov/forecasts/aeo/assumptions/pdf/natgas.pdf>.

The EIS should also consider the effect of the Project on broader domestic energy markets. For example, in assessing the impact of liquefied natural gas exports, the Energy Information Administration predicted that a significant fraction of the additional demand created by exports would be supplied, not by increased gas production, but by shifting other existing gas consumers to coal, with different—but also severe—environmental consequences.¹⁹²

VI. SEISMIC HAZARDS

It is reasonable to expect that the proposed refinery will experience a very large earthquake within the lifetime of the project. The Cascadia Subduction Zone, where the eastward-moving Juan de Fuca tectonic plate plunges beneath the westward-moving North American plate close to the Oregon coast,¹⁹³ creates a severe hazard for earthquakes of magnitude 9.0 or even higher.¹⁹⁴ Experts estimate the recurrence time for earthquakes in the southern region of the Cascadia Subduction Zone, comprising Northern California and the Oregon coast, at 240 years over a period of 10,000 years.¹⁹⁵ Because the last event occurred in 1700, experts estimate a 42% likelihood of a severe seismic event within the next 50 years.¹⁹⁶

Soil underlying the dock,¹⁹⁷ the refinery, and the tank farm may liquefy in the event of a large earthquake. The site has been identified as having soils of moderate to high liquefaction susceptibility, as presented on Figure 3-3 of the DEIS. Geotechnical investigations conducted on and near the site indicate that sand and silt present below the groundwater levels are susceptible to liquefaction, and that liquefaction could occur down to approximately 80 to 100 feet underground.¹⁹⁸ Along the banks of the Columbia, including the project site, soil liquefaction

¹⁹² Energy Information Administration, *Effect of Increased Natural Gas Exports on Domestic Energy Markets* at 6, 12 (Jan. 2012), available at http://www.eia.gov/analysis/requests/fe/pdf/fe_lng.pdf

¹⁹³ Oregon Department of Land Conservation and Development, *Oregon Coastal Zone Management Program Tsunami Guide*, <http://www.oregon.gov/LCD/OCMP/docs/Publications/TsunamiGuide20140108.pdf> (April 2014).

¹⁹⁴ Goldfinger, Christopher *et al.*, *Turbidite Event History—Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone*, U.S. Geological Survey Professional Paper 1661-F, <http://pubs.usgs.gov/pp/pp1661f/>, (2014)

¹⁹⁵ *Id.* at 3.

¹⁹⁶ *Id.* By the year 2060, within the lifetime of the proposed facility, the southern portion of the Cascade Subduction Zone will have exceeded 85% of recurrence intervals if no major earthquake has yet occurred.

¹⁹⁷ With regard to how the dock would respond to a large earthquake, project consultants concluded that: “the entire soil column below the groundwater table and above elevation -60 ft is potentially liquefiable during [an earthquake greater than 7.5 magnitude]. The effects of liquefaction on the dock would include “seismically induced settlement, lateral spreading toward the river, reduction in pile capacity due to soil strength loss, and downdrag loads” DEIS, Appx. C2, pp.6–7.

¹⁹⁸ See DEIS, p.3-6.

could cause lateral spreading of 5 to 10 feet and ground settlement from 18 to 30 inches. DEIS pp.3-8, -16, and -18. Such soil movement could cause serious damage to structures at the project site. For example, soil liquefaction caused by earthquakes has damaged industrial port facilities in the United States, Japan, Peru, Chile, Mexico, and other countries over the past several decades.¹⁹⁹

The EIS inexcusably delays any serious discussion of if and how the proposed facility can be built to withstand a large earthquake. First, the EIS states that a “ground improvement program” will be designed—later on as the project is being built—to address systemic risk.²⁰⁰ This stands the SEPA process on its head: project decision makers and the public need to know, in advance of approving the proposal, whether and how it will be safely designed. Second, the EIS simply repeats that the facility will be “built to code.”²⁰¹ For the purposes of an EIS, the question is not whether the project will be built to code, but rather what is the effect of building it to code? The FEIS must include a detailed discussion on if and how the proposed project can be built to withstand a likely large earthquake, and if the applicable building codes ensure this level of safety.

VII. GREENHOUSE GAS EMISSIONS

The greenhouse gas (“GHG”) analysis contained in the DEIS is flawed in several respects, explained below. Increased GHG emissions associated with the Project would exacerbate global climate change, leading to sea level rise and associated human displacement, extreme weather events, increased ambient temperatures, altered precipitation patterns, ocean acidification, and loss of habitat and species. In particular, the high global warming potential of the project’s fugitive methane emissions (at the wellhead, along the pipeline route, and at the refinery) must be described in the FEIS. Finally, the DEIS does not acknowledge the resulting unavoidable and significant adverse environmental impacts from the project’s GHG emissions and offers no effective mitigation for those impacts.

The health impacts of climate change are numerous and increasing. Many world leaders and medical, public health, and scientific bodies have expressed deep concerns about climate change as a threat to human health and well-being and are speaking out about these threats with increasing urgency. Physicians for Social Responsibility,²⁰² the American Public Health Association,²⁰³ the international medical journal *The Lancet*,²⁰⁴ the Union of Concerned

¹⁹⁹ Werner et al. (1998) Experiences from Past Earthquakes (Chapter 2), in *Seismic Guidelines for Ports*, ASCE Press.

²⁰⁰ DEIS, p.3-16.

²⁰¹ See *id.*; see also DEIS, Appendix C1, p.3.

²⁰² Washington and Oregon Physicians for Social Responsibility, *Position Statement on Crude Oil Transport and Storage to Governors of Washington & Oregon* (2015).

²⁰³ American Public Health Association, *Policy on Climate and Health* (2015) (online at: <http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2015/12/03/15/34/public-health-opportunities-to-address-the-health-effects-of-climate-change>).

Scientists, and many other scientific groups have all expressed the urgency for attention to the health threats of climate and are speaking out about these threats with increasing urgency.

The recently released National Climate and Health Assessment describes how human health is already being affected by climate change. “Climate change is a significant threat to the health of the American people. The impacts of human-induced climate change are increasing nationwide. Rising greenhouse gas concentrations result in increases in temperature, changes in precipitation, increases in the frequency and intensity of some extreme weather events, and rising sea levels. These climate change impacts endanger our health by affecting our food and water sources, the air we breathe, the weather we experience, and our interactions with the built and natural environments. As the climate continues to change, the risks to human health continue to grow. Every American is vulnerable to the health impacts associated with climate change.”²⁰⁵

A. SEPA Standards for GHG Emissions Review

SEPA and its implementing regulations explicitly require consideration of direct and indirect climate impacts. *See* RCW 43.21C.030(f) (directing agencies to “recognize the world-wide and long-range character of environmental problems”); WAC 197-11-444 (listing “climate” among elements of the environment that must be considered in SEPA review). SEPA regulations also explicitly direct that environmental impacts outside the jurisdiction of the deciding agency should be considered. WAC 197-11-060(c). Crucially, agencies are required to assess both the direct and indirect impacts of the proposal.

In 2008, a governor-appointed working group provided a list of recommendations on how to ensure that climate change is considered in meeting SEPA’s directives.²⁰⁶ Notably, those recommendations identified the following categories of greenhouse gas (“GHG”) emissions to be considered pursuant to SEPA: a) off-site mining of materials purchased for the project; b) transportation of raw materials to the project, and transport of the final product offsite; c) use of products sold by proponent to consumers or industry, including “emissions generated from combustion of fuels manufactured or distributed by the facility.”

Ecology has issued SEPA Guidance for its own consideration of GHG emissions.²⁰⁷ That guidance makes clear that SEPA requires climate to be considered in its environmental analysis. Ecology’s Guidance proposes that SEPA documents consider whether the proposal will significantly contribute to GHG concentrations.²⁰⁸

²⁰⁴ [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)60854-6.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)60854-6.pdf)

²⁰⁵ U.S. Global Climate Change Research Program, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (2016) (online at: <https://health2016.globalchange.gov>)

²⁰⁶ Available at

http://www.ecy.wa.gov/climatechange/docs/sepa/20110603_SEPA_GHGinternalguidance.pdf.

²⁰⁷ Available at <http://www.ecy.wa.gov/climatechange/sepa.htm>.

²⁰⁸ *Id.* at 4.

B. Other GHG Emissions Not Accounted for in the DEIS.

Besides ignoring the GHG emissions associated with producing delivering natural gas to the facility site, discussed above, the DEIS also fails to adequately consider the GHG emissions from these other sources and activities:

- **Fugitive methane emissions at the Kalama Methanol Refinery and the 101 MW on-site gas generator.**
- **GHG emissions associated with generating 100MW of electricity off-site.** The DEIS assumes that the 100 MW that NWIW will consume from off-site generation will be produced with the average GHG impacts of all power produced in the Pacific Northwest.²⁰⁹ This assumption almost certainly underestimates the Project's actual impact. This is because the existing average incorporates significant amounts of hydroelectric and other renewable power, with minimal air emissions. These electricity generation sources are presumably already being used to the fullest possible capacity. Thus, any incremental, additional power generation needed to satisfy the Project's added electrical demand will come from other sources with higher average emissions. The EIS must reflect the emissions of this incremental generation. It may be possible to quantify these incremental emissions by subtracting hydroelectric sources out of the eGRID data used in the DEIS; by examining NWIW's contracts with Cowlitz Public Utility District, and the District's contracts with electricity generators, to identify the particular additional capacity that will supply the Project, or through some other method.
- **GHG emissions from vessels traveling to and from China to deliver methanol.** The DEIS severely underestimates the GHGs (including CO² and black carbon) produced by the vessels carrying methanol. First, the DEIS inexplicably stops counting GHG emissions from vessels at the mouth of the Columbia River.²¹⁰ Obviously, the vessels serving NWIW's Project go all the way to China—and they aren't sailing ships. Second, the DEIS should explain whether the analysis accounts for emissions from vessels coming to the methanol refinery: the EIS says that the GHG accounting considered “with vessel operation emissions associated with transport of the final manufactured product within Washington State waters.”²¹¹ Does that mean that vessels that are headed to the refinery but are not yet carrying “final manufactured product” are not counted in the analysis?

²⁰⁹ DEIS, p.4-18; Appx. D, p.58.

²¹⁰ DEIS, Appx. D, p.58.

²¹¹ DEIS, p.4-14. This assertion also appears to be factually incorrect: Washington State's waters extend three nautical miles from the coast, but the analysis of vessel emissions stops at the mouth of the Columbia River. *See* DEIS, Appx. D, p.58.

GHGs are fungible in the atmosphere such that the impacts to Washington State and the rest of the world do not depend on where the emissions occur. For that reason, it is imperative that all emissions caused by this project—regardless of location—are considered.

C. This Project Would Result in Unavoidable and Significant Adverse Environmental Impacts.

Finally, the DEIS's conclusion that the Project's GHG emissions represent an insignificant impact is simply wrong. Even without the *significant* omissions noted above, this single project would increase Washington's GHG emissions by roughly 1.1 to 1.6 percent.²¹² The conclusion that this dramatic statewide increase in GHG emissions is insignificant is unsupported and unsupportable—this is a sizeable contribution to the State's entire GHG level for only a single project.

All GHGs should be mitigated, and the final EIS must consider various mitigation options. Mitigation options must include: denial of the Project outright; prohibition on high-GHG sources like fracked gas; requirements that gas bought by NWIW be extracted using BMPs to reduce fugitive gas emissions, and requirement to purchase credits from a legitimate and verified source to offset all net GHG emissions proximately caused by the project. This Project would be responsible for a tremendous increase in GHG emissions, and without mitigation, these emissions create unavoidable and significant adverse environmental impacts.

VIII. WATER QUALITY IMPACTS

NWIW would discharge wastewater from the methanol refinery into the Columbia River. Pollutants in the wastewater would include heat, lead, chromium, copper, and zinc. The treated wastewater would violate water quality standards (*i.e.*, standards set to protect salmon and people that eat local fish). In turn, the facility seeks authorization for a toxic mixing zone—an area of the Columbia River where pollution from the terminal would violate water quality standards. The DEIS fails to analyze the impacts of toxic water pollution on designated uses.

Finally, the Columbia River is too hot. The massive die-off of sockeye salmon in 2015 demonstrates the heavy toll of heat pollution on the Columbia River and its salmon runs. Yet the facility would add a new heat source to the Columbia River, in a segment of the Columbia that has specifically been added to Washington's 303d list for temperature.²¹³ The DEIS fails to evaluate the impacts of this new heat source that would contribute to ongoing violations of water quality standards in the Columbia River.

²¹² DEIS, p.15-11.

²¹³ See https://fortress.wa.gov/ecy/wats/UIEpaSearch/ViewApprovedListing.aspx?LISTING_ID=21538 (“Continuous monitoring data from a study by Parametrix (2002 and 2004) indicates exceedances of the numeric temperature criteria of 20°C at RM 71.9 in 2002 and 2003.”).

CONCLUSION

For the reasons set forth above, the DEIS is legally and factually inadequate. The DEIS misses key impacts and fails to take a hard look at all the direct, indirect, and cumulative impacts of the proposed Project. The DEIS also incorrectly concludes that NWIW's ambitious proposal has no significant adverse impacts to the environment and public health that are not addressed by the paltry mitigation proposed. To the contrary, the adverse environmental and public health impacts that must be disclosed in the final EIS will demonstrate that the Project should be denied. If the County and the Port do not exercise their substantive SEPA authority to deny the Project, the County should use the final EIS as part of its evidence for denying NWIW's upcoming Shorelines Substantial Development and Land Use permits.

Sincerely,



Miles Johnson, Attorney for Columbia Riverkeeper

*Submitted on behalf of Columbia Riverkeeper,
Sierra Club, Center for Biological Diversity,
Oregon Physicians for Social Responsibility,
Landowners and Citizens for a Safe Community,
Wahkiakum Friends of the River,
Save Our Wild Salmon, and Northwest
Environmental Defense Center*

Exhibits

- Exhibit 1, Comment of Columbia Riverkeeper to U.S. Army Corps of Engineers on CWA §404 Permit for NWIW's Proposal (2015).
- Exhibit 2, Comment of Columbia Riverkeeper to Washington Department of Ecology on CWA §401 Certification for NWIW's Proposal (2015).
- Exhibit 3, Comments of WDFW to FERC on the Kalama Lateral Pipeline (2015).
- Exhibit 4, Massachusetts Department of Environmental Protection, *Large Volume Ethanol Spills—Environmental Impacts and Response Options* (2011).
- Exhibit 5, Thom, R. *et al.*, *Columbia River Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (2013).
- Exhibit 6, NMFS, *Final Biological Opinion for Columbia Pacific Bio-Refinery Dock Expansion* (2015).

- Exhibit 7, U.S. Army Corps of Engineers, *Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for NWIW's Methanol Refinery and Export Terminal* (2015).
- Exhibit 8, Oregon Physicians for Social Responsibility, *Airborne Particulate Matter and Public Health* (2015).
- Exhibit 9, American Heart Association, *Danger in the Air: Air Pollution and Cardiovascular Disease* (2014).
- Exhibit 10, Jaffe *et al.*, *Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA* (2015).



Submitted via email

September 13, 2018

Jolie Harrison, Chief, Permits and Conservation Division
Office of Protected Resources, National Marine Fisheries Service (“Fisheries Service”)
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Re: Application by Port of Kalama to Take Marine Mammals While Constructing and Operating the Methanol Export Terminal on the Lower Columbia River, 83 Fed. Reg. 40257 (Aug. 14, 2018)

Dear Ms. Harrison,

We submit these comments on behalf of the Center for Biological Diversity (“Center”) with respect to the Port of Kalama’s request to harass marine mammals incidental to construction of the Kalama Marine Manufacturing and Export Facility (“Project”), including a new marine terminal for the export of methanol. The Fisheries Service should not approve the incidental harassment of marine mammals until it ensures the Project as a whole has a negligible impact on marine mammal populations.

Our primary concern is that the scope of the authorization is arbitrarily narrow in light of the Project’s recognized impacts on marine mammals. Granting this authorization unquestionably would lead to unauthorized harassment and mortality of humpback, blue, fin, sperm, and killer whales, none of which are considered in the application or proposed agency authorization.

More specifically, the Fisheries Service previously considered the Project and concluded in its biological opinion that the Project would adversely affect blue, humpback, fin, and sperm whales,¹ yet none of these species are considered in the applicant’s request. The Biological Opinion also concluded the project would adversely affect several species of Chinook salmon and critical habitat, yet the applicant did not consider the resulting impacts to the critical endangered Southern Resident killer whales that feed on those salmon.

¹ National Marine Fisheries Service, Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, dated October 10, 2017. WCR-2015-3594 (“Biological Opinion”).

We urge the Fisheries Service to reconsider its proposed authorization for the Project because it will lead to unauthorized take of blue, humpback, fin, sperm and killer whales. In its analysis, the Fisheries Service must consider the most recent science regarding population abundance of and threats to blue and humpback whales, and the continuing decline in Southern Resident killer whales. The statement that “[n]o incidental take of ESA-listed species is expected to result from this activity, and none would be authorized,” irrationally excludes the Project’s take of blue, humpback, fin, sperm and killer whales. Further, the Fisheries Service should reinstate consultation for the Project given the science presented below showing that any take of humpback, blue or killer whales contributes to a total mortality from anthropogenic activities that exceeds the potential biological removal level (PBR).

We agree with Columbia Riverkeeper’s comments dated August 1, 2018, that relying on a Categorical Exclusion for a dock in the lower Columbia River for use by the Kalama methanol refinery and export proposal contradicts guidance under the National Environmental Policy Act. We also reiterate the concerns regarding the Project’s impacts to marine mammals in our comments dated April 18, 2016 (Exhibit A).

I. The Marine Mammal Protection Act allows the Service to authorize marine mammal take only if certain conditions are met.

Congress enacted the Marine Mammal Protection Act (MMPA) in 1972 in response to widespread concern that “certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man’s activities.”² The legislative history states that the purpose of the MMPA is to manage marine mammals “for their benefit and not for the benefit of commercial exploitation.”³ The primary mechanism by which the MMPA protects marine mammals is through a moratorium on takings.⁴ Under the MMPA, the term “take” is broadly defined to mean “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.”⁵ “Harassment” is further defined to include acts of “torment” or “annoyance” that have the “potential” to injure a marine mammal or marine mammal stock in the wild or have the potential to “disturb” them “by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.”⁶

The MMPA provides several narrow exceptions to the moratorium on take. Relevant here, the Service may, upon request, promulgate regulations or, if the taking is limited to harassment, provide notice of a proposed incidental take authorization allowing take of small numbers of marine mammals, provided certain conditions are met. An activity: (i) must be “specified” and limited to a “specific geographical region,” (ii) must result in the incidental take of only “small numbers of marine mammals of a species or population stock,” (iii) can have no more than a “negligible impact” on species and stocks, and (iv) cannot have “an unmitigatable adverse impact on the availability of such species or stock for taking for subsistence uses” by

² 16 U.S.C. § 1361(1).

³ H. Rep. No. 92-707, at 11 (1971), reprinted in 1972 U.S.C.C.A.N., pp. 4144, 4154.

⁴ 16 U.S.C. § 1371(a).

⁵ *Id.* §1362(13).

⁶ *Id.* § 1362(18); *see also* 50 C.F.R. § 216.3 (defining “Level A” and “Level B” harassment).

Alaska Natives.⁷ Although the MMPA does not define small numbers or negligible impact, the Ninth Circuit confirmed that the MMPA requires the Service to separately find both that only small numbers of marine mammals will be harmed and that the impacts to the species or stock will be negligible.⁸ In issuing an authorization, the Service must provide for the monitoring and reporting of such takings and must prescribe methods and means of affecting the “least practicable impact” on the species or stock and its habitat.⁹

II. Background Information on Humpback and Blue Whales

Humpback Whales

The humpback whale (*Megaptera novaeangliae*) was first listed as endangered in 1970 under the Endangered Species Conservation Act—the precursor to the Endangered Species Act—and as endangered under the Endangered Species Act upon its enactment in 1973.¹⁰ On September 8, 2016, the Service reclassified the globally listed humpback whale species into 14 different distinct population segments.¹¹ Two of the listed distinct population segments are found off the U.S. West Coast: Central America and Mexico.¹² The Service listed the Central America population as endangered and the Mexico population as threatened.¹³

Humpback whales in the Central America population generally migrate from their winter breeding grounds off Central America to their spring and summer feeding grounds off California, Oregon and Washington. The Central America population is endangered in part because of the continuing, ongoing threat of entanglement in fishing gear.¹⁴ Vessel strikes and entanglement in fishing gear are considered likely to moderately reduce the population size or growth rate of the Central America population.¹⁵ The Central America population is estimated to contain as few as 411 individuals.¹⁶

The Mexico population consists of whales that breed along the Pacific coast of mainland Mexico in winter, migrate through the Baja California Peninsula coast and feed across a broad geographic range from California to the Aleutian Islands in the summer and spring, with concentrations in California and Oregon.¹⁷ The Mexico population is estimated to have 3,264 whales.¹⁸ The Service determined the Mexico population is threatened by fishing gear entanglements, which are likely to have reduced the population or its growth.¹⁹

⁷ See 16 U.S.C. § 1371(a)(5)(D)(i).

⁸ *Center for Biological Diversity v. Salazar*, 695 F.3d 893 (9th Cir. 2012).

⁹ 16 U.S.C. § 1371(a)(5)(D)(ii)(I).

¹⁰ 35 Fed. Reg. 8491 (June 2, 1970); 35 Fed. Reg. 18,319 (Dec. 2, 1970).

¹¹ 81 Fed. Reg. 62,259 (Sept. 8, 2016).

¹² *Id.*

¹³ *Id.* at 62,269; 50 C.F.R. § 17.11.

¹⁴ 81 Fed. Reg. at 62,307.

¹⁵ *Id.*

¹⁶ *Id.* at 62,287.

¹⁷ *Id.* at 62,305.

¹⁸ *Id.*

¹⁹ *Id.* at 62,277, 62,306.

Blue Whales

The blue whale is the largest animal ever known to have lived on earth. Like humpback whales, blue whales were listed as endangered under the precursor to the ESA in 1970, and under the ESA in 1973.²⁰ The Fisheries Services has identified that the primary actions needed to recover blue whale populations is reducing human-caused injury and mortality, including ship strikes. Unlike many other large whales, blue whales have not shown signs of recovery over the last 20 years.²¹ Scientists believe blue whales typically spend the winter off Mexico and Central America and feed during the summer off the U.S. West Coast, though they can be found off the U.S. West Coast in every month of the year.

III. Increased vessel traffic leads to increased ship strikes and noise pollution that threatens humpback and blue whale's recovery.

The Fisheries Service's current analysis arbitrarily underestimates the Project's effects on humpback, and blue whales from ship strikes, which present a significant and measurable threat to the populations. The Project's Biological Opinion correctly analyzed not only the construction area for the proposed dock, but also all areas affected by vessel traffic, namely the area extending downstream through the Columbia River navigation channel and into the Pacific Ocean where effects from ship traffic will occur.²² The Fisheries Service concluded that the Project "will lead to increased long-term operation that will increase the amount of [vessel] traffic, and will result in some increased risk of ship strike, and a high likelihood of death, if struck, of listed species."²³ Nonetheless the Fisheries Service concluded that the risk posed by the Project is "minimal," in part because though ship strikes are often unreported, "they are a relatively rare event."²⁴

Since the Biological Opinion was written, new science suggests that ship strikes occur far more often than previously thought.²⁵ The 2017 stock assessment reports acknowledged the publication of this study:

Rockwood et al. (2017) reports a best conservative estimate of 18 blue and 22 humpback whale deaths per 6-month season. Based on these predictions and the average annual strike reports from 2006–2016 (1.0 for blue and 1.4 for humpback whale), they calculated that 95 percent of blue

²⁰ 35 Fed. Reg. 18,319 (Dec. 2, 1970); 50 C.F.R. § 17.11.

²¹ James V. Carretta, Karin. A. Forney, Erin M. Oleson, David W. Weller, Aimee R. Lang, Jason Baker, Marcia M. Muto, Brad Hanson, Anthony J. Orr, Harriet Huber, Mark S. Lowry, Jay Barlow, Jeffrey E. Moore, Deanna Lynch, Lilian Carswell, and Robert L. Brownell Jr. 2018. U.S. Pacific Marine Mammal Stock Assessments: 2017. US Department of Commerce. NOAA Technical Memorandum NMFS-SWFSC-602. [https:// doi.org/10.7289/V5/TM-SWFSC-602](https://doi.org/10.7289/V5/TM-SWFSC-602)

²² Biological Opinion at 17.

²³²³ *Id.* at 109.

²⁴ *Id.*

²⁵ Rockwood, R.C., Calambokidis, J. and Jahncke, J., 2017. High mortality of blue, humpback and fin whales from modeling of vessel collisions on the US West Coast suggests population impacts and insufficient protection. *PloS one*, 12(8), p.e0183052.

whale and 94 percent of humpback whale strike deaths go undocumented.²⁶

The Fisheries Service has incorporated the results of those vessel strike estimates into the draft 2018 SARs for both humpback and blue whales.²⁷ Given the PBR level of 11 humpback whales and 2.3 blue whales and the estimated mortality of 22 and 18 humpback and blue whales, respectively, these deaths are significant to whether the populations can recover.

The Fisheries Service considered tools to quantitatively calculate the risk of ship strikes to whales,²⁸ but did not do so. Given the research by Rockwood et al. (2017) showing that ship strike mortality exceeds the PBR levels for humpback and blue whales, it is imperative that the Fisheries Service complete this analysis prior to authorizing incidental take of marine mammals.

The Fisheries Service must analyze the incidental harassment expected to blue, humpback, and fin whales from the Project's increased noise pollution due to increased ship traffic. According the Biological Opinion, blue, humpback, and fin whales are all known to be sensitive to sounds within the frequency ranges of noise from vessels coming to and from the Project terminal.²⁹ The Fisheries Service expects whales to react to the vessel or its noise by changing direction of their movements or increasing swimming speed, which could increase individuals' energy budget.³⁰ This is precisely the harassment that ought to be included in the application for an incidental harassment authorization.³¹

Contrary to the Fisheries Service conclusion that these effects are not likely to appreciably reduce an individual's likelihood of survival or reproduction, many studies recognize that noise from global shipping traffic is a chronic, habitat-level stressor for whales.³² Anthropogenic noise pollution can mask marine mammal communications at almost all frequencies these mammals use.³³ The National Oceanic and Atmospheric Administration (NOAA) has recognized that this masking may affect marine mammal survival and reproduction by decreasing the ability to "[a]ttract mates, [d]efend territories or resources, [e]stablish social

²⁶ 83 Fed. Reg. 32093, 32097 (July 11, 2018) (reflecting comments from the scientific study's authors); SARs at 42.

²⁷ Letter from Donna S. Wieting, Director, Office of Protected Resources, National Marine Fisheries Service, to John Calambokidis, Acting Chair, Pacific Scientific Review Group, dated Aug. 27, 2018, available at <https://www.fisheries.noaa.gov/webdam/download/80198330>.

²⁸ Biological Opinion at 166 ("We reviewed Dransfield *et al* approach to humpback whale (*Megaptera novaeangela*) interaction with vessels, where the shipping lanes were mapped and the highly used habitat was available to overlay . . .").

²⁹ *Id.* at 111.

³⁰ *Id.* at 112.

³¹ Gedamke, J. et al. 2016, NOAA Ocean Noise Strategy Roadmap at 5, 121 (citing 16 U.S.C. § 1371(a)(5)(A) & (D)).

³² *See, e.g.,* Weilgart, L.S. 2007. A Brief Review of Known Effects of Noise on Marine Mammals, *International Journal of Comparative Psychology*, 20, 159-168.

³³ *See, e.g.,* John Hildebrand, *Impacts of Anthropogenic Sound on Cetaceans*, in MARINE MAMMAL RESEARCH: CONSERVATION BEYOND CRISIS (Reynolds, J.E. III et al., eds. 2006); L.S. Weilgart, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 CANADIAN J. ZOOLOGY 1091-1116 (2007).

relationships, [c]oordinate feeding, [i]nteract with parents, or offspring, [and] [a]void predators or threats.”³⁴ These are significant impacts to be monitored to a threshold, then mitigated.

NOAA’s SoundMap and CetMap mapping tools show that human-caused cumulative and ambient ocean noise pollution has increased ambient sound levels to over 100 decibels (dB) in waters off the coast of Oregon and Washington (see figure 1, below).³⁵ The growth of commercial ship noise could increase this by up to a factor of 1.9 by 2030.³⁶ Continued growth in the number of ships (container ships, oil tankers, and bulk carriers), quantity of goods carried, and the distances traveled feed into the dramatic increase in the predicted ocean noise level.³⁷

NOAA has recommended that it use its authorities to better manage the impacts of noise on trust resources, including through issuing incidental take authorizations that must include requirements for monitoring and reporting.³⁸ Mitigation of the impacts after targets are identified and monitoring mechanisms established could include consideration of current ship design, onboard machinery, emerging technologies, and operations (including ship speed).³⁹

³⁴ Gedamke, Jason. 2014. Ocean Sound & Ocean Noise: Increasing Knowledge Through Research Partnerships, NOAA, available at <http://cetsound.noaa.gov/Assets/cetsound/documents/MMC%20Annual%20Meeting%20Intro.pdf>; see also Clark *et al.* 2009.

³⁵ Phase 1-CetSound, NOAA, <http://cetsound.noaa.gov/cetsound> (last accessed Oct. 29, 2014).

³⁶ Kaplan, M.B. & Solomon, S. (2016). A coming boom in commercial shipping? The potential for rapid growth of noise from commercial ships by 2030. *Marine Policy*, 73(2016), 119–121.

³⁷ *Id.*

³⁸ Gedamke, J. et al. 2016, NOAA Ocean Noise Strategy Roadmap at 5, 121 (citing 16 U.S.C. § 1371(a)(5)(A) & (D)).

³⁹ International Maritime Organization (IMO) 2014. Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life. MEPC.1/Circ.833, 7 April 2014.

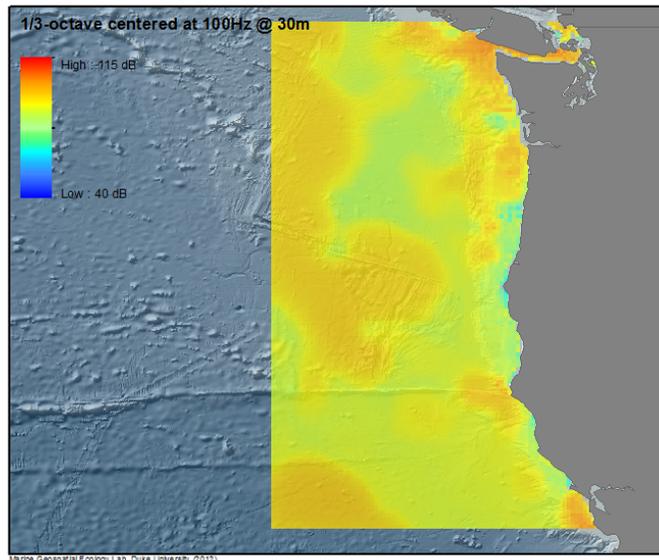


Figure 1. Predicted low frequency (one-third octave centered at 100 Hz) average annual noise levels at 30 m depth, summing contributions from a variety of human activities (http://cetsound.noaa.gov/sound_data).

IV. Southern Resident Killer Whales

The Fisheries Service must consider the Project’s impact on Chinook salmon because it is the preferred prey of the highly endangered Southern Resident killer whale. Columbia River Chinook salmon is one of the highest priority stocks needed to recover the Southern Resident killer whale population,⁴⁰ which has reached its lowest point in 30 years and is continuing to decline. Scientists now estimate the population at 75 animals after the loss of L92 in June 2018.⁴¹ Scientists have concluded that the Southern Resident killer whale population has no scope to withstand additional pressures.⁴²

NMFS has long recognized that prey availability impacts the whales’ reproductive rates, survival, and population growth.⁴³ The Recovery Plan for killer whales identified prey

⁴⁰ NOAA Fisheries West Coast Region and Washington Department of Fish and Wildlife, 2018. Southern Resident Killer Whale Priority Chinook Stocks Report, dated June 22, 2018; Wasser SK, Lundin JJ, Ayres K, Seely E, Giles D, Balcomb K, et al. (2017) Population growth is limited by nutritional impacts on pregnancy success in endangered Southern Resident killer whales (*Orcinus orca*). PLoS ONE 12(6): e0179824. <https://doi.org/10.1371/journal.pone.0179824>.

⁴¹ Center for Whale Research, *L92 - Missing Southern Resident killer whale is presumed dead*, June 15, 2018, <https://www.whaleresearch.com/l92>.

⁴² Lacy, R.C., Williams, R., Ashe, E., Balcomb III, K.C., Brent, L.J., Clark, C.W., Croft, D.P., Giles, D.A., MacDuffee, M. and Paquet, P.C., 2017. Evaluating anthropogenic threats to endangered killer whales to inform effective recovery plans. *Scientific reports*, 7(1), p.14119.

⁴³ National Marine Fisheries Service. 2008. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington.

availability as a “high” severity and “high” likelihood factor affecting recovery. In addition, the physical and biological features identified for the population’s critical habitat include “prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth.” Without adequate prey, Southern Residents have no capacity to recover.

The low availability of Chinook salmon is an important stressor and is causing reproductive failure in Southern Resident killer whales.⁴⁴ By measuring hormones through feces samples, scientists detected nutritional and disturbance stress and failed versus successful pregnancies in Southern Resident killer whales. Between 2008-2014, up to 69% of pregnancies that were detectable were unsuccessful.⁴⁵ Whales with successful pregnancies arrived in the Salish Sea in significantly better nutritional condition compared to whales that lost their pregnancies. Based on these results, scientists concluded that low availability of chinook salmon is an important stressor among Southern Resident killer whales as well as a significant cause of late pregnancy failure.⁴⁶ Recovering Fraser River and Columbia River chinook runs should be among the highest priorities for managers aiming to recover this endangered population of killer whales.⁴⁷

V. Conclusion

We reiterate our concern over the status of endangered whales affected by the Project. Humpback whales and blue whales’ recovery are at risk from anthropogenic activities including ship strikes. The perilous status of the Southern Resident killer requires that no new stressors be added. Increasing Chinook salmon availability is critical to avoiding extinction. The Fisheries Service should not approve the incidental harassment of marine mammals until it ensures the Project as a whole has a negligible impact on marine mammal populations. We request reinitiation of consultation based on the new science regarding the impact of unreported ship strike mortality on endangered whales and the continuing decline of the Southern Resident killer whales due to prey limitations.

Please contact me with any questions. Thank you for your consideration.

Sincerely,



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⁴⁴ Wasser SK, Lundin JI, Ayres K, Seely E, Giles D, Balcomb K, et al. (2017) Population growth is limited by nutritional impacts on pregnancy success in endangered Southern Resident killer whales (*Orcinus orca*). PLoS ONE 12(6): e0179824. <https://doi.org/10.1371/journal.pone.0179824>.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ *Id.*



April 18, 2016

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Sent Via Email

Re: Comments on the Port of Kalama and Cowlitz County's Draft Environmental Impact Statement for Northwest Innovation Works' Methanol Refinery and Export Terminal.

Greetings:

Columbia Riverkeeper, Center for Biological Diversity, Sierra Club, Oregon Physicians for Social Responsibility, Landowners and Citizens for a Safe Community, Save Our Wild Salmon, Wahkiakum Friends of the River, and Northwest Environmental Defense Center (collectively "Commenters") have reviewed the Draft Environmental Impact Statement ("DEIS") and supporting materials for the proposed Kalama methanol refinery and export terminal (the "Project"), and submit the following comments. The DEIS must be revised to address several fundamental deficiencies, set forth in detail below. Correcting the DEIS's many flaws will also require the Port and the Cowlitz County to reevaluate the unjustifiable yet oft-repeated conclusion that this Project does not present significant, adverse environmental and public health harms and risks. Rather, it is evident that this Project has the potential to cause adverse, though as of yet unstudied, impacts to the environment. The DEIS fails to adequately account for these impacts, rendering it entirely inadequate. Further, the Port and County should use SEPA's substantive authority, as well as separate authority from other applicable statutes and regulations, to deny the Project.

Incorporated by reference are Columbia Riverkeeper’s comments on the Clean Water Act §§ 404¹ and 401² permits for the pipeline and dock, and Washington Department of Fish and Wildlife’s³ comments on the pipeline, which contain additional relevant information about the impacts of NWIW’s Project. Also incorporated by reference is Citizens for a Healthy Bay’s technical memo reviewing the Kalama Methanol Refinery’s DEIS.

STATE ENVIRONMENTAL POLICY ACT

The State Environmental Policy Act (“SEPA”) is Washington’s core environmental policy and review statute. Like its federal counterpart, the National Environmental Policy Act (“NEPA”), SEPA broadly serves two purposes: first, to ensure that government decision-makers are fully apprised of the environmental consequences of their actions and, second, to encourage public participation in the consideration of environmental impacts. *Norway Hill Preservation and Prot. Ass’n v. King Co*, 87 Wn.2d 267, 279 (1976). For decades, SEPA has served these purposes effectively, requiring full environmental reviews for projects with significant environmental impacts.

In adopting SEPA, the Washington legislature declared the protection of the environment to be a core state priority. RCW 43.21C.010. SEPA declares that “[t]he legislature recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.” RCW 43.21C.020(3). This policy statement, which is stronger than a similar statement in the federal counterpart of NEPA, “indicates in the strongest possible terms the basic importance of environmental concerns to the people of the state.” *Leschi v. Highway Comm’n*, 84 Wn.2d 271, 279–80 (1974).

SEPA is more than a purely “procedural” statute that encourages informed and politically accountable decision-making. In enacting SEPA, the state legislature gave decision-makers the affirmative authority to deny projects where environmental impacts are significant, cannot be mitigated, and collide with local rules or policies. SEPA provides substantive authority for government agencies to condition or even deny proposed actions—even where they meet all other requirements of the law—based on their environmental impacts. RCW 43.21C.060. As one treatise points out, when this premise was challenged by project proponents early in SEPA’s history, “the courts consistently and emphatically responded that even if the action previously had been ministerial, it became *environmentally discretionary* with the enactment of SEPA.”⁴

¹ Exhibit 1, Comment of Columbia Riverkeeper to U.S. Army Corps of Engineers on CWA §404 Permit for NWIW’s Proposal (2015).

² Exhibit 2, Comment of Columbia Riverkeeper to Washington Department of Ecology on CWA §401 Certification for NWIW’s Proposal (2015).

³ Exhibit 3, Comments of WDFW to FERC on the Kalama Lateral Pipeline (2015).

⁴ Richard Settle, *SEPA: A Legal and Policy Analysis*, §18.01[2] (2014) (emphasis added).

Decision-makers have denied permits under this authority in a number of other contexts, many of which are similar to those of NWIW's proposed refinery and terminal.⁵

I. REASONABLE ALTERNATIVES

SEPA requires that an EIS contain a detailed discussion of alternatives to the proposed action. RCW 43.21C.030(c)(iii). SEPA's regulations provide that an EIS must consider as alternatives those "actions that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation." WAC § 197-11-440(5)(b). The discussion of alternatives in an EIS need not be exhaustive, but the EIS must present sufficient information for a reasoned choice among alternatives. *Toandos Peninsula Ass'n v. Jefferson Cy.*, 32 Wash. App. 473, 483 (1982).

A. Reasonable Alternatives not Considered

- The DEIS did not evaluate the possibility of using the existing deepwater berth and dock next to the Project site. The FEIS should analyze the possibility of using the existing dock for the Project. Personal communications with Steelscape employees indicated that this dock is used relatively infrequently to offload steel from deep draft vessels, and the berth is therefore probably not at capacity. There is no obvious reason why Northwest Innovation Works' ("NWIW") operations could not use the existing dock with minimal modifications. Using the existing dock would achieve the Project's objectives while reducing or eliminating environmentally harmful in-water work and reduce the need for additional over-water structure.
- The DEIS does not analyze the reasonable possibility of taking two seasons to complete the proposed in-water construction, so as to avoid in-water construction during late summer (when juvenile salmonids are present) and early spring (when eulachon are present).

II. SCOPE OF REVIEW

SEPA requires an environmental impact statement ("EIS") for any action that has a "probable significant, adverse environmental impact." RCW 43.21C.031(1). Significance means

⁵ *Polygon Corp. v. City of Seattle*, 90 Wn.2d 59, 69-70 (1978) (upholding denial of high-rise project based on aesthetic, property values, and noise impacts); *Victoria Tower P'ship v. City of Seattle*, 59 Wash. App. 592, 602 (1990) (upholding denial of 16-floor tower and mitigation to 8-floors); *State v. Lake Lawrence Pub. Lands Prot. Ass'n*, 92 Wn.2d 656, 659 (1979) (upholding denial of development of 14-acre parcel because of effects on bald eagles); *Cook v. Clallam Cnty.*, 27 Wash. App. 410, 414 (1980) (upholding permit denial of commercial development in rural area); *W. Main Associates v. City of Bellevue*, 49 Wash. App. 513, 521-23 (1987) (upholding denial of permits based on historic/cultural impacts, view impacts, shadow impacts, traffic impacts, and air impacts).

a reasonable likelihood of more than a moderate adverse impact on environmental quality.” WAC 197-11-794.

“A proposal’s effects include direct and indirect impacts caused by the proposal. Impacts include those effects resulting from growth caused by a proposal, as well as the likelihood that the present proposal will serve as precedent for future actions.” WAC 197-11-060(4)(d). The scope of impacts includes direct, indirect, and cumulative impacts. WAC 197-11-792. “The range of impacts to be analyzed in an EIS (direct, indirect, and cumulative impacts, WAC 197-11-792) may be wider than the impacts for which mitigation measures are required of applicants.” WAC 197-11-060(4)(e). It is implicit in SEPA that an “agency cannot close its eyes to the ultimate probable environmental consequences of its current action.” *Cheney v. City of Mountlake Terrace*, 87 Wn.2d 338, 344 (1976).

Importantly, the regulations specifically direct that an “agency shall not limit its consideration of a proposal’s impacts only to those aspects within its jurisdiction, including local or state boundaries.” WAC 197-11-060(4)(b). Indeed, SEPA constitutes a ringing affirmation of the connectedness of Washington with the rest of the planet. It speaks of “humankind” and “human beings” rather than just citizens of this state. RCW 43.21C.010. SEPA explicitly calls on responsible agencies to “recognize the world-wide and long-range character of environmental problems” and take steps to cooperate in “anticipating and preventing a decline in the quality of the world environment.” RCW 43.21C.030(f); *Eastlake Comm. Coun. v. Roanoke Assoc.*, 82 Wn.2d 475, 487 (1973) (observing “unusually vigorous statement of legislature purpose...to consider the total environmental and ecological factors to their fullest in deciding major matters”) (emphasis added). Those regulations also recognize that environmental impacts do not end at the state’s borders, and explicitly require consideration of the impacts of projects outside of the state’s jurisdiction. WAC 197-11-060(c); *Cathcart-Maltby-Clearview Comm. Council v. Snohomish Cty.*, 96 Wn.2d 201, 209 (1981) (SEPA “also mandates that extra-jurisdictional effects be addressed and mitigated, when possible.”).

Washington’s courts and hearings bodies are only starting to grapple with these important issues, but the conclusions so far are consistent: indirect impacts of fossil fuel transportation projects, including transportation of the fossil fuels to and from proposed terminals, must be considered in the SEPA process. For example, the Washington Shorelines Hearings Board recently invalidated a SEPA document for two proposed crude oil terminals for failing to adequately consider the cumulative and indirect impacts of rail and vessel traffic.⁶

A. Scope of Upstream Analysis

The natural gas that NWIW would consume does not magically appear at the end of a pipeline. Ecology and other agencies have been clear that the scope of EISs must include indirect impacts, some of which may appear distant from a project itself. The DEIS by and large ignores the impacts of extracting and transporting the raw material—natural gas—that the Project will consume. This does not satisfy SEPA.

⁶ *Quinault Indian Nation v. Hoquiam*, 2013 WL 6062377 (Nov. 12, 2013).

B. Scope of Downstream Analysis

First, the scope of review for marine impacts is illegally truncated, ending the analysis at the mouth of the Columbia.⁷ Methanol tankers servicing NWIW's proposed facility would not magically disappear and re-appear at the mouth of the Columbia. This limited scope of review for marine impacts illegally omits impacts to the Pacific ecosystem and along the route taken by vessels transporting methanol to identified customers in China.

Second, the DEIS contains no analysis of the impacts of methanol use in China. If NWIW's unsupported assertions that the methanol will all be converted into olefins to make plastic are true, the FEIS should analyze the environmental impacts of that process and assess the consequences of creating the amount of plastics that NWIW's methanol will facilitate and induce. The FEIS should also examine the likelihood that NWIW's methanol will be used as a gasoline additive in China. The world's "widest adoption of methanol-gasoline blending has occurred in China," and methanol accounts for more than five percent of China's national gasoline consumption.⁸

C. Cumulative Impacts

SEPA requires consideration of cumulative effects. WAC 197-110060(4)(e); WAC 197-11-330(3)(c) ("Several marginal impacts when considered together may result in a significant adverse impact."); *White v. Kitsap Cnty.*, SHB No. 09-019 at 17 (2009) (cumulative impacts of a proposed action together with the impacts of pending and future actions should be considered when making a threshold determination). In *Quinault Indian Nation v. Hoquiam*, the Shorelines Hearing Board overturned SEPA documents for two crude-by-rail facilities explicitly because they failed to consider the cumulative effects of increased rail and marine vessel traffic from each other, and a third crude-by-rail project.⁹

The DEIS fails to take the requisite "hard look" at the cumulative impacts of this and other projects with similar or overlapping impacts. The DEIS lists several other projects with similar impacts to aspects of NWIW's methanol refinery and export project and explains, in very general and qualitative terms, that the impacts of all of these projects together would be worse than the impacts of NWIW's project alone.¹⁰ This does not constitute a "reasonably thorough discussion" of the probable environmental consequences. *Weyerhaeuser v. Pierce Cnty.*, 124 Wn.2d 26, 38 (1994) (citations omitted).

⁷ See DEIS, p.6-12; see also DEIS, Appx. D, p.58.

⁸ Oil and Gas Journal, *Methanol proves low-cost, sustainable option for gasoline blending* (March 2, 2015) (online at: <http://www.ogj.com/articles/print/volume-113/issue-3/processing/methanol-proves-low-cost-sustainable-option-for-gasoline-blending.html>).

⁹ *Quinault Indian Nation v. Hoquiam*, SHB No. 13-012c, Order on Summary Judgment, p.18 (Dec. 9, 2013) ("agencies are required to consider the effects of a proposal's probable impacts combined with the cumulative impacts from other proposals").

¹⁰ See DEIS, pp.15-8-23.

To satisfy SEPA, and to assist a decision-maker or the public, the cumulative impacts analysis must go further. It must explain—in a meaningful, tangible way—how the Columbia River and the human environment in the study area would look and function if the proposed growth in fossil-fuel shipping and other related projects come to pass. The Washington Energy Facility Site Evaluation Council—the agency normally responsible for reviewing large fossil fuel export projects like this one—explained that:

cumulative effects analys[e]s should be conducted within the context of resource, ecosystem, and human community thresholds—levels of stress beyond which the desired condition degrades.¹¹

The cumulative impact assessment in the DEIS does not even attempt to meet this standard. It does not provide readers with any sense of whether impacts will cumulatively cross acceptable “resource, ecosystem, and human community thresholds.”¹² Nor does it disclose whether the “desired condition[s]” in Kalama, the Columbia River and estuary, or the Pacific Northwest will survive the cumulative effect of all the proposed fossil-fuel export projects. These failures prevent the DEIS from presenting the “reasonably thorough discussion” of environmental impacts that SEPA requires. *PT Air Watchers v. State, Dep’t of Ecology*, 179 Wash. 2d 919, 927 (2014).

This analytical failing permeates the entire cumulative impacts section of the DEIS. For purposes of illustration only, the FEIS should analyze whether the cumulative impacts of this and other projects would cross the following “resource, ecosystem, and community thresholds:”

- The threshold at which estuary habitat degradation caused by dredging, dock building, and vessel wake impacts causes perceptible, or unacceptable, impacts to salmon populations and to the tribal, commercial, and recreational fisheries that depend on them;
- The threshold at which ambient PM2.5 and toxic air pollution levels result in perceptible, or unacceptable, health outcomes for people working and living in the project vicinity;
- Threshold at which deep draft vessel traffic presents an unacceptable impediment to commercial and recreational fishing in the lower Columbia River and estuary;
- The threshold at which background noise levels caused by vessel traffic in the near-shore ocean will compromise cetacean survival and communication;
- The threshold at which GHG emissions will cause unacceptable impacts to local and regional climate and natural resources.

¹¹ Washington Energy Facility Site Evaluation Council (“EFSEC”), *DEIS for the Vancouver Energy Distribution Terminal*, p.5-1 (quoting guidance written by the Council on Environmental Quality, the federal agency responsible for interpreting NEPA).

¹² *Id.*

III. PURPOSE AND NEED

The DEIS makes no compelling case for this Project's need, and severely distorts the Project's purpose. The EIS must "specify[] the purpose and need to which the proposal is responding" WAC 197-11-440(4). First, the EIS repeatedly misstates the Project's purpose as "finding a cleaner alternative to methanol made from coal and oil." Besides never providing any actual information about whether gas-based methanol is actually cleaner, the real purpose of the Project is to make methanol from natural gas. Second, it is not clear that the "need" for this Project that was perceived to exist when it was first proposed still exists today. The price of methanol has declined significantly since NWIW proposed this Project, and the FEIS should address this market collapse and explain why the Project is still needed.

IV. TIMING OF COMMENT PERIOD

The timing of the release of the DEIS and the comment period undermines the quality and content of the DEIS. The Port and County closed the DEIS comment period before important information about the impacts of the Project could be made public through the County's land use and shorelines permitting processes, the Clean Air Act, and Clean Water Act permitting processes, the Federal Energy Regulatory Commission's process, and through the ongoing federal Endangered Species Act and National Environmental Policy Act processes. Because the final EIS would undoubtedly benefit from the information generated in these review and permitting processes, Commenters requests that the Port and County incorporate all information and documents from these processes into the Draft EIS and reopen it for public comment.

ADEQUACY OF DEIS ENVIRONMENTAL REVIEW

An EIS must evaluate the likely impacts related to the project. WAC 197-11-060(4). Decision makers must provide a "detailed statement" of environmental impacts. RCW 43.21C.030(2)(c). SEPA requires full disclosure and "detailed" consideration of all affected environmental values. At its heart, SEPA is an "environmental full disclosure law." *Norway Hill Preservation and Protection Association v. King Cnty. Council*, 87 Wn.2d 267 (1976). The *Norway Hill* court also highlighted the legislature's intent that "environmental values be given full consideration in government decision making," and its decision to implement this policy through the procedural provisions of SEPA which "specify the nature and extent of the information that must be provided, and which require its consideration, before a decision is made." *Id.* at 277-78.

Environmental reviews under SEPA must identify significant impacts on the natural and built environment. WAC 197-11-440(6)(e). Such reviews must use sufficient information and disclose areas where information is speculative or unknown. WAC 197-11-080(1), (2). Where there is scientific uncertainty, Washington courts have required agencies to disclose responsible opposing views and resolve differences. These requirements feed into the ultimate standard of review for EISs: adequacy is based on a rule of reason. *Cheney v. Mountlake Terrace*, 87 Wn.2d 338, 344 (1976). Courts require reasonably thorough information disclosure and discussion, good data and analysis to support conclusions, and sufficient information to make a reasoned decision.

Klickitat County Citizens Against Imported Waste v. Klickitat County, 122 Wn.2d 619, 633 (1993). Sufficiency of the data is also assessed under the “rule of reason,” which requires a “‘reasonably thorough discussion of the significant aspects of the probable environmental consequences’ of the agency’s decision.” *Weyerhaeuser v. Pierce Cnty.*, 124 Wn.2d 26, 38 (1994) (citations omitted).

In making the similar assessment under NEPA, federal courts require agencies to take a “hard look” at environmental impacts. More specifically, for review of the NEPA claims, the Court must “ensure that an agency has taken the requisite hard look at the environmental consequences of its proposed action, carefully reviewing the record to ascertain whether the agency decision is founded on a reasoned evaluation of the relevant factors.” *Te-Moak Tribe v. Interior*, 608 F.3d 592, 599 (9th Cir. 2010) (quoting *Greenpeace Action v. Franklin*, 14 F.3d 1324, 1332 (9th Cir. 1992) (internal quotation marks and citations omitted)). This review must be “searching and careful.” *Ocean Advocates v. U.S. Army Corps of Engineers*, 402 F.3d 846, 858 (9th Cir. 2005).

Washington Courts have employed the “hard look” doctrine directly or in other cases have required full disclosure and consideration of environmental values. *See Pub. Util. Dist. No. 1 of Clark Cnty. v. Pollution Control Hearings Bd.*, 137 Wash. App. 150, 158, 151 P.3d 1067, 1070 (2007); *Toward Responsible Dev. v. City of Black Diamond*, 179 Wash. App. 1012 review denied, 180 Wash. 2d 1017, 327 P.3d 54 (2014) (unpublished opinion) (“Courts review an EIS as a whole and examine all of the various components of [the] agency’s environmental analysis ... to determine, on the whole, whether the agency has conducted the required ‘hard look.’”); *see also Coalition for a Sustainable 520 v. U.S. Department of Transportation*, 881 F. Supp. 2d 1243, 1259 (W.D. Wash. 2012) (holding implicitly that “hard look” under NEPA sufficient for SEPA review). Where “hard look” is not discussed or employed directly, courts have required a “reasonably thorough discussion” of environmental impacts. *See Toward Responsible Dev. v. City of Black Diamond*, 179 Wash. App. (2014); *PT Air Watchers v. State, Dep’t of Ecology*, 179 Wash. 2d 919, 927, 319 P.3d 23, 27 (2014) (citing *Norway Hill*, 87 Wn.2d at 275) (requiring “full disclosure and consideration of environmental values”).

As discussed in the sections below, the DEIS fails to provide the necessary hard look and reasonably thorough discussion of environmental impacts throughout its many pages. This is an overarching failure.

I. THE DEIS DOES NOT ADEQUATELY ADDRESS THE LIKELIHOOD OR IMPACTS OF A METHANOL SPILL FROM A TANKER IN THE LOWER COLUMBIA RIVER OR ESTUARY.

A. No Meaningful Numeric Analysis of Spill Risk

The FEIS should contain a quantitative analysis of the likelihood of methanol spills in the Columbia River from vessel loading and transit. The FEIS could use, as a starting point for such

analysis, the spill risk analysis produced for the Vancouver Energy Distribution Terminal.¹³ The Kalama Methanol FEIS should also account for the fact that the level of vessel traffic in the Columbia River during the study period for that analysis was significantly less than the future level of vessel traffic in the Columbia River projected in the cumulative impacts analysis. Accordingly, the spill risk assessment for the Vancouver Energy Distribution Terminal underestimates the likelihood of vessel accidents because accidents occur more frequently when vessel traffic increases. Nevertheless, the EIS for the proposed methanol refinery can and should make numerical predictions about the frequency and severity of methanol spills caused by NWIW's Kalama project, and the cumulative number of methanol spills projected in the Columbia River from NWIW's Kalama and Port Westward refinery proposals. This analysis should be made available for public review and comment prior to a Final EIS.

B. No Meaningful Analysis of the Behavior of a Large Methanol Spill from Vessel into the Columbia River.

The DEIS does not contain any meaningful discussion of how a spill of methanol that might be reasonably expected to result from a tanker accident would behave and disperse in the Columbia River. The vessels servicing NWIW's refinery could carry up to 14 million gallons of methanol, and would use segmented compartments of 3 million gallons in volume to reduce spill volume. Accordingly, the DEIS should at least analyze the behavior and consequences of a 3 million gallon methanol spill into the Columbia River. Instead, the DEIS focuses on the consequences of a spill ten times smaller—apparently because another author had already prepared that analysis.

The DEIS does discuss modeling of a 3.3 million gallon spill *into the ocean*, but provides no real explanation or authority for the assertion that, for a spill into the Columbia River, the “dilution rate would be similarly rapid and the biodegradation rate similar to that shown for the open-sea release.”¹⁴ However, chemicals in water, including spilled methanol as well as dispersants and dispersed fuel, may behave differently depending on the degree of salinity. The degree of salinity in the lower Columbia River may not be predictable at any given time and at any given location. It is vital to know how methanol and the different substances used in spill response will behave in water depending on the degree of salinity, and how this, in turn, may affect habitats and species.

The EIS should model the dispersion and dilution of a 3 million gallon methanol spill into the Columbia River, and this analysis should be made available for public review and comment prior to a Final EIS.

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¹³ EFSEC, *Appendix J to DEIS for Vancouver Energy Distribution Terminal* (2015).

¹⁴ DEIS, p.8-16.

C. No Discussion of Ecological Damage Caused by a Methanol Spill from a Vessel into the Columbia River.

The DIES focuses on the safe drinking water threshold when describing the risks and impacts of a methanol spill, but ignores the possibility that a large spill could cause oxygen depletion leading to the death of fish and other aquatic life.

Methanol spills deplete oxygen in the water when aquatic microbes consume oxygen while metabolizing methanol. While this process degrades methanol, the oxygen depletion caused by biodegradation of a large methanol spill “could deplete the surface water of oxygen required to sustain aquatic life.”¹⁵ In fact, large spills of ethanol—which similarly consume oxygen during biodegradation—have been observed to result in large fish kills in two rivers.¹⁶ Again, the FEIS should model the release of a 3 million gallon methanol spill, explain the level of oxygen depletion that would result from the biodegradation of that methanol, and explain whether such oxygen depletion could be expected to impact aquatic life in the Columbia River.

D. No Discussion of Ecological Damage from Actions Taken in Response to Spills

The complex geography, hydrology, and ecology of the Columbia River make it an especially difficult environment in which to administer an emergency spill response that avoids causing further harm to sensitive habitats and species. It is vital to know how the complexities of the spill environment may interact with different spill response strategies, including specific mechanical, chemical, and biological applications, which could affect species in different ways.

The shifting current in the Columbia are of concern with regard to direction of flow. Installation of booms to protect sensitive areas from spilled methanol may be more or less effective, or even harmful, depending on location, timing, tidal cycle, and direction and volume of flow in the river. It is important to know whether habitat could actually be harmed by deployment of booms, especially if deployment occurs without regard to the dynamic nature of the river and bay environment.

Fuel oil spills near the mouth of the Columbia River, Puget Sound, or farther out from the coast may occur due to a tanker accident, or oil may be carried out to sea on river and tidal currents. Spill response, in addition to the spills themselves, may prove harmful to species such as whales, including species protected under the Endangered Species Act (see below), if the marine mammals swim through waters contaminated with either harmful dispersants or dispersed oil.

Use of dispersants is an important example of a spill response measure that might do more harm than good. Dispersants are used to break oils into smaller droplets that can break down more readily than oil in slicks. The use of dispersants involves a complex calculation of

¹⁵ DEIS, Appx. G2, p.8.

¹⁶ Exhibit 4, Massachusetts Department of Environmental Protection, *Large Volume Ethanol Spills—Environmental Impacts and Response Options*, p.4-9 (2011).

impacts as methanol, dispersants, and dispersed oil can all have toxic effects on aquatic species from plankton to fish to whales. Effects include direct mortality from ingestion, impacts on marine mammals from breathing dispersants, and impacts from the coating of birds' feathers with dispersants or dispersed oil. Moreover, the toxicity of many chemical agents, such as dispersants, that may be used during a spill response have not yet been evaluated by the EPA or National Marine Fisheries Service ("NMFS") for their impacts on listed species.

The use of chemical countermeasures in response to a spill event introduces substances into the environment that are potentially toxic to species. In-situ burning, dredging, field testing of spill response methods, and field training exercises all involve actions that might have adverse impacts on species, depending on the manner in which they are implemented. While federal, state, and local responses to spills often lessen the impacts of spills to wildlife, poorly planned or poorly implemented spill response activities can adversely affect wildlife and essential habitat. The DEIS makes no mention of the impacts that spill response measures from a spill of methanol might have on the environment. This renders the DEIS inadequate.

II. IMPACTS TO THE COLUMBIA RIVER, ESTUARY, AND COASTAL WATERS FROM NWIW'S PROPOSAL.

NWIW's proposal jeopardizes the lower Columbia River and estuary, an area at the center of a regional and national effort to restore both vibrant fisheries and endangered and threatened species. The Columbia River estuary is a federally-designated Estuary of National Significance under the Clean Water Act's National Estuary Program.¹⁷ The U.S. Environmental Protection Agency has designated the Columbia River as one of seven Priority Large Aquatic Ecosystems.¹⁸ The federal government, and public and private entities, have invested billions of dollars to restore endangered and threatened salmon in the Columbia River Basin.¹⁹

NWIW's project will degrade an ecosystem that is a local and regional treasure, a national priority for watershed health and salmon recovery. NMFS has described the ecological value of the Columbia River estuary, stating:

"The lower Columbia River estuary provides vital habitat for anadromous salmonids throughout the Columbia River basin, and is of particular importance from a threatened and endangered species recovery perspective. The estuary is designated as critical habitat for 17 species of ESA-listed fish and EFH [Essential Fish Habitat] for Pacific salmon."

¹⁷ EPA, National Estuary Program in Region 10 (online at: <http://yosemite.epa.gov/R10/ECOCOMM.NSF/6da048b9966d22518825662d00729a35/c7a2ab5e252f309688256fb600779ea6!OpenDocument>).

¹⁸ EPA, *Columbia River Basin: State of the River Report for Toxics* (Jan. 2009) (online at: http://www2.epa.gov/sites/production/files/documents/columbia_state_of_the_river_report_jan2009.pdf).

¹⁹ See Exhibit 5, Thom, R. *et al.*, *Columbia River Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (2013).

The federal government has funded—and will continue to fund for the foreseeable future—a significant portion of the salmon restoration efforts in the Columbia River estuary. NWIW’s project would compromise this investment in order to ship fracked North American natural gas overseas as methanol. This ignores one of the key tenets of SEPA: “the basic importance of environmental concerns to the people of the state.” *Leschi v. Highway Comm’n*, 84 Wn.2d 271, 279–80 (1974).

The lower Columbia River and estuary provides vital habitat for salmon originating throughout the Columbia River Basin, and is particularly important for threatened and endangered species recovery. There are numerous species in the area that would be affected by this Project.²⁰ Species protected under the Endangered Species Act include populations of salmon, bull trout, lamprey, eulachon, and green sturgeon.

The estuary is designated as critical habitat for 17 species of ESA-listed fish and Essential Fish Habitat for Pacific salmon. A growing body of evidence, much of it quite recent, explains the important role that shallow water estuarine habitats in the lower Columbia River estuary play in stabilizing production of Columbia River salmon and steelhead.²¹ Estuarine habitats provide high growth opportunities for out-migrating juvenile salmon and also provide protection from predators.

The lower Columbia River and estuary supports vibrant traditions of subsistence, commercial, and sport fishing for salmon, sturgeon, and other fish.²² The Buoy 10 fishery, spanning the mouth of the Columbia River, is one of the Pacific Northwest’s most renowned fisheries. Throughout the lower Columbia, an estimated 507,080 sport fishing trips for salmon and steelhead trips take place each year.²³ Despite significant declines in the salmon fishery, commercial fishing in the Columbia River estuary remains an important local cultural and economic practice. In addition to commercial and sport fishing on the Columbia River, a number of fishing vessels access ocean fisheries via the mouth of the Columbia River.²⁴ The DEIS fails to adequately consider impacts from the Project on these fisheries and the habitats they rely on.

²⁰ See DEIS, p.6-21.

²¹ Bottom *et al.*, *Estuarine habitat and juvenile salmon: current and historical linkages in the lower Columbia River and estuary* (2011); Roegner *et al.*, *Distribution, size, and origin of juvenile chinook salmon in shallow-water habitats of the lower Columbia River and estuary, 2002–2007*, 4 *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 450–472 (2012); Weitkamp *et al.*, *Seasonal and interannual variation in juvenile salmonids and associated fish assemblage in open waters of the lower Columbia River estuary*, 10 *Fishery Bulletin* 4 (2012).

²² Oregon Department of Fish and Wildlife and Washington Department of Fish and Wildlife, *2014 Joint Staff Report: Stock Status and Fisheries for Spring Chinook, Summer Chinook, Sockeye, Steelhead, and Other Species, and Miscellaneous Regulations* (Jan. 22, 2014).

²³ EFSEC, *DEIS for the Vancouver Energy Distribution Terminal*, pp.3-12–17 (2015).

²⁴ *Id.* at 2-18.

A. The DEIS Ignores the Project's Impacts on the Pacific Ocean.

By constricting the vessel study area, the DEIS gives readers the impression that the impacts of ship traffic on marine fauna will be insignificant or non-existent. Like the Columbia River and estuary, the marine route is home to many species that would be put at risk by this project. The nearshore Pacific ocean is critical habitat for species listed under the ESA, including leatherback sea turtle, green sturgeon, and eulachon. It is essential fish habitat for West Coast salmon, ground fish, forage fish, and coastal pelagic sharks. Many ESA-listed whale species live near or offshore the mouth of the Columbia River, including blue, fin, and sei whales, sperm whales, orcas, and humpbacks. Other whale species like the pygmy sperm whale and the common minke also live in the area. A NMFS Biological Opinion for one Columbia River crude oil terminal concluded that oil tankers exiting from the Columbia River are “substantially certain” to collide with, and acoustically disturb, threatened and endangered marine mammals and leatherback sea turtles.²⁵ Stopping the study area at the mouth of the Columbia obscures the risks and impacts of allowing up to 144 large tanker vessel transits per year in coastal waters and significantly under-sells the consequences of NWIW's proposed facility. The risks and impacts of such ship traffic are reasonably foreseeable and must be addressed in the FEIS.

1. The Applicant must analyze the impacts to marine mammals

The proposed project would increase the amount of tanker traffic moving through the mouth of the Columbia River and offshore of Oregon and Washington. The increase in tanker traffic associated with the proposed Project (up to 72 round trip ships per year) poses risks to marine mammals in several ways, including through elevated risk of ship strike, increased noise in the aquatic environment, elevated risk of exposure to toxic contaminants through spills, and the introduction of invasive species in ballast water. Several of the species put at risk by the proposed Project are protected under the Endangered Species Act (“ESA”) and/or Marine Mammal Protection Act (“MMPA”). Allowing activities that may harm these species opens up both the agency and private actors to liability under these acts. *See* 16 U.S.C. § 1538(a)(1)(B); 16 U.S.C. § 1362.

i. Elevated risk of ship strike.

Ship strikes involving large vessels are the “principal source of severe injuries to whales.”²⁶ Most ship strikes to large whales result in death.²⁷ Ship strike-related mortality is a documented threat to endangered Pacific coast populations of endangered fin, humpback, blue, sperm, and killer whales. In recent years, ship strikes have become an increasing problem for these critically endangered species along the Pacific Coast. For example, between 2001 and

²⁵ *See* Exhibit 6, NMFS, *Final Biological Opinion for Columbia Pacific Bio-Refinery Dock Expansion*, p.7 (June 8, 2015).

²⁶ Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., 2001, Collisions between ships and whales, *Marine Mammal Science*, 17(1): 35-75.

²⁷ Jensen, A.S. and Silber, G.K., 2004, Large Whale Ship Strike Database. U.S. Department of Commerce, *NOAA Technical Memorandum*. NMFS-OPR-25.

2010, 12 blue whales were reported stranded due to vessel collisions.²⁸ In 1998, NMFS identified ship strikes as one of the primary threats to the endangered blue whale in the Pacific.²⁹

Fin whales, which are routinely sighted in waters off the U.S. Pacific coast, were the most frequently struck species in the analysis conducted by Jensen and Silber (75 confirmed strikes, 26 percent of total strikes).³⁰ At least 18 fin whale mortalities and injuries due to ship strikes were conclusively documented off the coasts of California, Oregon, and Washington between 1993 and 2008.³¹ An examination of 130 whale strandings in Washington State from 1980 to 2006, similarly found fin whales to be very susceptible to ship strikes.³² The final NMFS recovery plan for fin whales ranks the threat posed by ship strikes as “potentially high,”³³

A spatial risk assessment was conducted in 2004 to identify areas where fin, humpback, and killer whales encounter areas of high shipping intensity.³⁴ The study found that relative risk was highest in confined areas (geographic bottlenecks), such as the mouth of the Columbia River where vessels would have to enter to reach the proposed facility. The study further found that the few known cases of collisions involving fin whales suggest that mortality due to ship strike for this species may already be approaching or even exceeding mortality limits under the most risk-averse management objectives.³⁵

Other species, however, are also facing increased risk of harm from ship strikes. For example, the NMFS draft recovery plan for southern resident killer whales documents rare but increasing cases of collisions between ships and individuals of that distinct population segment,³⁶ which was listed as endangered in 2005.³⁷

²⁸ National Marine Fisheries Service. 2010. Southwest Regional Office, California Marine Mammal Stranding Network Database.

²⁹ National Marine Fisheries Service. 1998. Recovery plan for the blue whale (*Balaenoptera musculus*). Prepared by Reeves R.R., P.J. Clapham, R.L. Brownell, Jr., and G.K. Silber for the National Marine Fisheries Service, Silver Spring, MD.

³⁰ Jensen, A.S. and G.K. Silber. 2004. Large Whale Ship Strike Database. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-OPR-25.

³¹ National Marine Fisheries Service. 2010. Recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD.

³² Douglas, Annie B., *et al.*, 2008, Incidence of ship strikes of large whales in Washington State, *Journal of the Marine Biological Association of the United Kingdom*.

doi:10.1017/S0025315408000295 (available at <http://www.cascadiaresearch.org/reports/Douglas%20et%20al%202008-Incidence%20of%20ship%20strikes%20of%20large%20whales.pdf>).

³³ National Marine Fisheries Service. 2010. Recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD. at I-26.

³⁴ Williams, R, O’Hara, P.J., 2010, Modelling ship strike risk to fin, humpback and killer whales in British Columbia, Canada, *Journal of Cetacean Research and Management*, 11:1-8.

³⁵ *Id.*

³⁶ NMFS, Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*) (2008).

³⁷ 70 Fed. Reg. 69903 (Nov. 18, 2005).

Given the foregoing, there can be no doubt that the significant increase in deep draft vessel traffic from the proposed Project will increase the risk of vessel strikes of marine mammals (as well as turtles). The Applicant, however, has failed to address this issue. The DEIS acknowledges that “[t]he additional 36 to 72 vessel transits per year on the Lower Columbia River have the potential to result in collisions of ships with marine mammals that occur within the vessel shipping route on the Lower Columbia River.” Yet, the DEIS claims, with reference only to the FERC 2008 FEIS for Bradwood Landing, that:

Propeller or collision injuries to marine mammals are most frequently caused by small, fast-moving vessels (FERC 2008). In contrast, the ships that would dock at the proposed project produce a bow wave because of their design and large displacement tonnage. This wave pushes in-water objects (including animals in the water) away from the vessel. Therefore, the proposed project would not result in significant adverse impacts to aquatic species as a result of ship strikes.³⁸

This conclusion is entirely illogical and without support. In fact, the 2008 Bradwood Landing FEIS that the Applicant cites provides no supporting citation for the claim that fast moving vessels are most typically associated with whale strikes, rendering that claim uncorroborated. That FEIS actually states that “[b]ecause the blockage ratio of the LNG carriers would be greater than that of most of the deep-draft ships currently traveling the Columbia River, the LNG carriers could potentially produce larger waves than most of the current ships operating at the same speed,” completely undermining the Applicant’s claim.³⁹

Moreover, the actual quote from the Bradwood FEIS is “[t]he ship strike database indicates that large and fast moving vessels (**greater than 12 knots**) are most typically associated with whale strikes.”⁴⁰ The Applicant conveniently left off the “12 knot” defining characteristic, which is quite telling, since the Bradwood FEIS goes on to state that:

Within the Columbia River navigation channel (CRM -3 to CRM 100) and in the marine waters approaching the entrance/exit of the navigation channel (at least out to CRM -8) the Columbia River Bar and River Pilots would determine the ship speed.... LNG carrier speeds would accordingly vary depending on current conditions, but would be limited to approximately **12 knots**. *Id.* (emphasis added).

This suggests that the tanker ships for this Project would likewise travel at a speed where ship strikes are indeed possible. The Bradwood FEIS provides no support for the claim made here that ships with a bow wave are unlikely to cause marine mammal strikes. In fact, that FEIS concluded that “statistically, LNG carriers associated with the Bradwood Landing Project would strike 1.25 fin whales. The likelihood of an LNG carrier striking a blue, sei, or humpback whale

³⁸ DEIS at 6-40.

³⁹ Bradwood Landing FEIS at 4-5.

⁴⁰ Bradwood Landing FEIS at 4-246 (emphasis added).

would be about 20 percent;” however, it conceded that “the actual number of whale strikes is undoubtedly much greater than reported.”⁴¹

Unlike the project proponent in Bradwood, the Applicant here has failed entirely to estimate or analyze the harm from whale strikes, rendering the DEIS entirely incomplete. Further, changing sea conditions, in part due to global climate change, may drastically increase the number of whale strikes that will occur in the future. This has already been documented in several studies. For example, in 2010, there were an unusually large number of blue whale sightings off of the coast of California due to abundant krill.⁴² Whale mortalities spiked as foraging whales gathered in busy shipping lanes off the coast. Changing ocean conditions can influence the productivity in the current system off the Pacific coast and change the abundance of prey for whales. Therefore, more whales may be at risk due to changing ocean conditions. The estimate of potential whale strikes must take this into account, and these impacts must be analyzed in the EIS.

ii. *Increasing chronic ocean noise levels in important marine habitats.*

The proposed Project would substantially increase the amount of ship-related noise in the water, posing a risk of harm to marine mammals. Sound is the key sense for dolphins and whales to find their way around, detect predators, find food and communicate. The sound frequency range within which whales communicate and echolocate corresponds to the frequency range of ship noise. Ships hundreds and even thousands of miles away interfere with the acoustic space of these animals. With more ship traffic, the ability for whales and dolphins to communicate, search for prey, and avoid predators will be compromised. These impacts were not even mentioned in the DEIS, which only discussed construction noise from pile driving.

Oceans are much louder today than they were a century ago, primarily due to increased anthropogenic noise.⁴³ Ocean noise pollution, predominantly from large shipping vessels, has created an “omnipresent hum” in our ocean.⁴⁴ Large commercial shipping vessels are the primary source of anthropogenic low-frequency sound contributing to ambient (background) noise in the ocean. Because very loud low-frequency sound can travel great distances in the deep

⁴¹ *Id.* at 4-247.

⁴² Sahagun, Louis. 2010. Marine mammal enthusiasts getting a show from blue whales. *Los Angeles Times* (Sept. 3, 2010); Zito, Kelly. 2010. Whale deaths blamed on busy ship traffic, krill. *San Francisco Chronicle* (Oct. 10, 2010).

⁴³ *Phase 1-CetSound*, NOAA, <http://cetsound.noaa.gov/cetsound>.

⁴⁴ For example, tests conducted near San Nicolas Island, one of the Channel Islands just south of the Channel Islands NMS, indicate that ambient noise pollution in that area has increased by 10-12 decibels over the past 40 years. McDonald *et al.* suggest that this increase, potentially reflected throughout the Northeast Pacific, is most likely due to changes in commercial shipping. McDonald, M.A., Hildebrand, J. and Wiggins, S.M., 2006, Increases in deep ocean ambient noise in the Northeast Pacific west of San Nicolas Island, California, *Journal of the Acoustical Society America*, 120(2): 711-718.

ocean, increasing noise impacts areas far beyond the source of the noise.⁴⁵ This poses a severe threat to marine mammals.

NOAA has recently begun mapping marine noise levels using its SoundMap and CetMap mapping tools.⁴⁶ These maps show that human-caused cumulative and ambient ocean noise pollution has increased ambient sound levels to over 100 decibels (dB) over the majority of the Pacific and Atlantic oceans.⁴⁷ This sound level is equivalent to attending a live rock concert or standing next to a running chainsaw.⁴⁸

Marine mammals use different song, chirp, and whistle frequencies for a variety of purposes, including echolocation for feeding, long-distance communication, environmental imaging, individual identification, and breeding.⁴⁹ Odontocetes, or toothed mammals such as dolphins and killer whales, produce broad-spectrum clicks and whistles that can range between 1 and 200 kilohertz (kHz).⁵⁰ Mysticetes, or baleen whales such as blue and right whales, have much lower-frequency calls, ranging between 0.2 and 10 kHz.⁵¹

⁴⁵ Hildebrand, J. 2005. Impacts of anthropogenic sound, *In: Marine Mammal Research: Conservation Beyond Crisis*. Edited by: J.E. Reynolds III, W.F. Perrin, R.R. Reeves, S. Montgomery and T.J. Ragen. Johns Hopkins University Press, Baltimore, Maryland, pp. 101-124.

⁴⁶ See <http://cetsound.noaa.gov/>

⁴⁷ *Summed Outputs—Sound Field Data Availability*, NOAA, http://cetsound.noaa.gov/SoundMaps/NorthAtlantic/Basin/Chronic/NA_OceanBasin_Chronic_Sum/NorthAtlantic_Sum_ThirdOctave/Atl_Sum_0050Hz_0005m_ThrdOct.png (last accessed Oct. 29, 2014) (Atlantic Ocean noise pollution levels); *Summed Outputs—Sound Field Data Availability*, NOAA, http://cetsound.noaa.gov/SoundMaps/NorthPacific/Basin/Chronic/NP_OceanBasin_Chronic_Sum/NorthPacific_Sum_ThirdOctave/Pac_Sum_0050Hz_0005m_ThrdOct.png (last accessed Oct. 29, 2014) (Pacific Ocean noise pollution levels).

⁴⁸ *Comparative Examples of Noise Levels*, INDUSTRIAL NOISE CONTROL, INC. (Feb. 2000), <http://www.industrialnoisecontrol.com/comparative-noise-examples.htm>.

⁴⁹ *Id.* at 42-44; Jason Gedamke, *Ocean Sound & Ocean Noise: Increasing Knowledge Through Research Partnerships*, NOAA 2 (2014), available at <http://cetsound.noaa.gov/Assets/cetsound/documents/MMC%20Annual%20Meeting%20Intro.pdf>; Clark, C.W. et al., *Acoustic Masking in Marine Ecosystems as a Function of Anthropogenic Sound Sources*, available at https://www.academia.edu/5100506/Acoustic_Masking_in_Marine_Ecosystems_as_a_Function_of_Anthropogenic_Sound_Sources.

⁵⁰ OCEAN NOISE AND MARINE MAMMALS, NAT'L RES. COUNCIL 41-42 (2003), available at http://www.nap.edu/openbook.php?record_id=10564&page=R1.

⁵¹ *Id.* at 42.

Anthropogenic noise pollution can mask marine mammal communications at almost all frequencies these mammals use.⁵² “Masking” is a “reduction in an animal’s ability to detect relevant sounds in the presence of other sounds.”⁵³ Ambient ship noise can cover important frequencies these animals use for more complex communications.⁵⁴ Some species, such as the highly endangered right whale, are especially vulnerable to masking.⁵⁵ Ship noise can completely and continuously mask right whale sounds at all frequencies.⁵⁶ NOAA has recognized that this masking may affect marine mammal survival and reproduction by decreasing these animals’ ability to “[a]ttract mates, [d]efend territories or resources, [e]stablish social relationships, [c]oordinate feeding, [i]nteract with parents, or offspring, [and] [a]void predators or threats.”⁵⁷ Studies have also found that chronic exposure to boat traffic and noise can cause whales to reduce their time spent feeding.⁵⁸

In addition to masking effects, marine mammals have displayed a suite of stress-related responses from increased ambient and local noise levels. These include “rapid swimming away from [] ship[s] for distances up to 80 km; changes in surfacing, breathing, and diving patterns; changes in group composition; and changes in vocalizations.”⁵⁹ Some avoidance responses to localized marine sounds may even lead to individual or mass strandings.⁶⁰ Louder anthropogenic sounds may also lead to permanent hearing loss in marine mammals.⁶¹

⁵² See, e.g., Hildebrand, J.A., *Impacts of Anthropogenic Sound, in MARINE MAMMAL RESEARCH: CONSERVATION BEYOND CRISIS* (Reynolds, J.E. III et al., eds. 2006); Weilgart, L., 2007, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 *CANADIAN J. ZOOLOGY* 1091-1116 (2007).

⁵³ *OCEAN NOISE AND MARINE MAMMALS*, *supra* note 51, at 96.

⁵⁴ *Id.* at 42, 100 (“An even higher level, an understanding threshold” may be necessary for an animal to glean all information from complex signals”).

⁵⁵ Clark, C.W. et al., *Acoustic Masking in Marine Ecosystems: Intuitions, Analysis, and Implication*, 395 *MARINE ECOLOGY PROGRESS SERIES* 201, 218-19 (2009), available at <http://www.int-res.com/articles/theme/m395p201.pdf>; Clark *et al.*, *supra* note 50, at *17, fig. 8.

⁵⁶ *Id.* (showing anthropogenic noise masking 100 percent of the frequencies right whales used over the majority of a six-hour study).

⁵⁷ Jason Gedamke, *supra* note 50, at 2; Clark, C.W., *et al.*, *supra* note 56, at *3.

⁵⁸ See *i.e.* Williams, R. D., et al., 2006, *Estimating relative energetic costs of human disturbance to killer whales (Orcinus orca)*, *Biological Conservation*, 133: 301-311.

⁵⁹ *OCEAN NOISE AND MARINE MAMMALS*, *supra* note 51, at 94.

⁶⁰ *Id.* at 132; BRANDON L. SOUTHALL ET AL., *FINAL REPORT OF THE INDEPENDENT SCIENTIFIC REVIEW PANEL INVESTIGATING POTENTIAL CONTRIBUTING FACTORS TO A 2008 MASS STRANDING OF MELON-HEADED WHALES 3 (PEPONOCEPHALA ELECTRA) IN ANTSOHIHY, MADAGASCAR*, *INT’L WHALING COMM’N* 4 (2013), available at <http://iwc.int/private/downloads/4b0mkc030sg0gogkg8kog4o4w/Madagascar%20ISRP%20FINAL%20REPORT.pdf>.

⁶¹ Kastak, D. et al., 2008, *Noise-Induced Permanent Threshold Shift in a Harbor Seal*, 123 *J. ACOUSTICAL SOC’Y OF AM.* 2986; Kujawa, S.G. & Liberman, M.C., 2009, *Adding Insult to Injury: Cochlear Nerve Degeneration After “Temporary” Noise-Induced Hearing Loss*, 29 *J. NEUROSCIENCE* 14,077.

NOAA and legislative leaders have recognized the threat to ocean species posed by increased anthropogenic ocean noise levels.⁶² On the issue of ocean noise, NOAA has stated:

Rising noise levels can negatively impact ocean animals and ecosystems in complex ways. Higher noise levels can reduce the ability of animals to communicate with potential mates, other group members, their offspring, or feeding partners. Noise can reduce an ocean animal's ability to hear environmental cues that are vital for survival, including those key to avoiding predators, finding food, and navigation among preferred habitats.

NOAA's approach to managing ocean noise aims to reduce negative physical and behavioral impacts to trust species, as well as conserve the quality of acoustic habitats.⁶³

Though difficult to detect, noise-induced stress is a serious threat for cetaceans.⁶⁴ In a noise exposure study using a captive beluga whale, increased levels of stress hormones were documented.⁶⁵ Stress due to noise can lead to long-term health problems, and may pose increased health risks for populations by weakening the immune system and potentially affecting fertility, growth rates and mortality.⁶⁶

Many species are already threatened by increasing ocean noise. The NMFS recovery plan for Southern resident killer whales (*Orcinus orca*) describes the disturbance from vessel traffic and the associated noise pollution as a potential threat to the species in Washington State and British Columbia, where population numbers have fallen to below 100 individuals.⁶⁷ The recovery plan identifies "sound and disturbance from vessel traffic" as factors that currently pose a risk for this population of Southern resident killer whales.⁶⁸ Killer whales rely on their highly developed acoustic sensory system for navigating, locating prey, and communicating with other individuals. Increased levels of anthropogenic sound have the potential to mask echolocation and other signals used by the species, as well as to temporarily or permanently damage hearing

⁶² See *Phase 2-NOAA's Ocean Noise Strategy* (<http://cetsound.noaa.gov/cetsound>); *Congressional Briefing on Marine Mammal Health and Stranding* (Sept. 24, 2014), http://www.mmc.gov/special_events/capitolhill_briefing/capitolhill_briefing_summary.shtml; see generally Jason Gedamke, *Supra Note 50*.

⁶³ *Underwater Noise and Marine Life*, NOAA, <http://cetsound.noaa.gov/index>.

⁶⁴ Weilgart, L., 2007, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 *CANADIAN J. ZOOLOGY* 1091-1116 (2007).

⁶⁵ Romano, T.A. *et al.*, 2004, *Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure*, *Canadian Journal of Aquatic Science*, 61: 1124-1134.

⁶⁶ *Id.*

⁶⁷ National Marine Fisheries Service (NMFS). 2008. *Recovery Plan for Southern Resident Killer Whales (Orcinus orca)*. National Marine Fisheries Service, Northwest Region, Protected Resources Division, Seattle, Washington.

⁶⁸ *Id.*

sensitivity. Exposure to sound may therefore be detrimental to survival by impairing foraging and other behavior.⁶⁹

Other species that communicate over vast distances in the ocean, such as blue and fin whales, will increasingly have trouble hearing one another as the ambient noise level continues to rise. The masking of reproductive calls may prevent widely distributed mates from finding each other and reproduction rates may fall as a consequence.⁷⁰ This could have a significant impact on the survival of species such as Southern resident killer whales and blue whales, which are listed as endangered species.

Hearing loss, classified as either “temporary threshold shift” or “permanent threshold shift,” is also a concern for animals exposed to the intense noise pollution produced by human activities. Hearing loss reduces the range in which communication can occur, interferes with foraging efforts and increases vulnerability to predators. Hearing loss may also change behaviors with respect to migration and mating and it may cause animals to strand, which is often fatal. For marine mammals such as whales and dolphins that rely heavily on their acoustic senses, both permanent and temporary hearing loss should be regarded as a serious threat.⁷¹

Furthermore, noise impacts to marine mammals are predicted to increase with global climate change, wherein the absorption of carbon dioxide by the ocean could create noisier oceans.⁷² When greenhouse gas reacts in the ocean, it lowers pH, creating more acidic waters. The more acidic the water, the less that sound waves are absorbed. Keith Hester, a researcher with the Monterey Bay Aquarium Research Institute, predicts sounds will travel 70% further by 2050 because of increased carbon dioxide acidifying our oceans.⁷³ A louder ocean will negatively affect cetaceans that rely on sound to navigate, communicate, find food, and avoid predators.

⁶⁹ *Id.*

⁷⁰ Weilgart, L., 2007, The impacts of anthropogenic ocean noise on cetaceans and implication for management. *Canadian Journal of Zoology*, 85 CANADIAN J. ZOOLOGY 1091-1116.

⁷¹ Hildebrand, J., 2005, Impacts of anthropogenic sound, *In: Marine Mammal Research: Conservation Beyond Crisis*. Edited by: J.E. Reynolds III, W.F. Perrin, R.R. Reeves, S. Montgomery and T.J. Ragen. Johns Hopkins University Press, Baltimore, Maryland, pp. 101-124.

⁷² Hester, K. C., *et al.*, 2008, Unanticipated consequences of ocean acidification: A noisier ocean at lower pH. *Geophysical Research Letters*, 35:31.

⁷³ *Id.*

The greatest source of human-caused marine noise by far is ship propeller cavitation—the sound poorly designed propellers make as they spin through the water.⁷⁴ Cavitation accounts for as much as 85 percent of human caused noise in the world’s oceans.⁷⁵ Cavitation may also increase due to hull designs that create non-homogenous wake fields behind ships.⁷⁶ And even well-designed propellers and hulls may begin to cavitate if they are not regularly cleaned and smoothed.⁷⁷

Another significant source of anthropogenic marine noise is on-board machinery, especially diesel engines.⁷⁸ Other onboard machines may also cause vibrations that migrate underwater.⁷⁹ Finally, ship noise increases at higher speeds, as this increases the degree and volume of cavitation and onboard machine sounds.⁸⁰ The Applicant has failed to discuss any of these sources of marine noise or the impacts to marine mammals in the DEIS, rendering it entirely incomplete.

iii. *If the Project is approved, the speed of tanker ships must be limited to reduce ship strikes and noise impacts.*

Reducing ship speed would mitigate several of the impacts of the proposed Project on marine mammals, since ships traveling at lower speeds will reduce significant threats due to ship strikes, noise pollution, air pollution, and greenhouse gas emissions.

Speed plays a significant role in risk of ship strikes.⁸¹ If a whale is swimming at mid-depth and hears an approaching ship, it will have difficulty in locating the direction of the ship because of the echoes off the bottom and surface. The loudness will not necessarily indicate how far away the ship is. If the whale then swims toward the surface directly ahead of the ship, the sound levels of that particular ship will become lower because of the downward diffraction, the Lloyd-mirror effect, near-field effects, and possible shielding from the hull. Thus, in terms of the acoustic stimulus associated with an approaching vessel, the quietest location will likely be at the surface, directly ahead of the ship.⁸²

⁷⁴ Joseph J. Cox, *Evolving Noise Reduction Requirements in the Marine Environment*, MARINE MAMMAL COMM’N: CONGRESSIONAL BRIEFING ON OCEAN NOISE, at 12 (2014), available at http://www.mmc.gov/special_events/capitalhill_briefing/cox_capitalhill_briefing_0914.pdf; GUIDELINES FOR THE REDUCTION OF UNDERWATER NOISE FROM COMMERCIAL SHIPPING TO ADDRESS ADVERSE IMPACTS ON MARINE LIFE, INT’L MARITIME ORGANIZATION 1-2 (2014) (definition of cavitation) [hereinafter GUIDELINES].

⁷⁵ Joseph J. Cox, *supra* note 75, at 12.

⁷⁶ GUIDELINES, *supra* note 75, at 4.

⁷⁷ GUIDELINES, *supra* note 75, at 5.

⁷⁸ GUIDELINES, *supra* note 75, at 4.

⁷⁹ *Id.*

⁸⁰ GUIDELINES, *supra* note 75, at 5.

⁸¹ *See generally*, Conn, P. B., and G. K. Silber, 2013, Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales, *Ecosphere*, 4(4):43.

⁸² Terhune, J.M. and Verboom, W.C., 1999, Right whales and ship noise, *Marine Mammal Science*, 15: 256-258.

The Applicant's DEIS fails to specify the speed at which tankers would be restricted to for this Project. Scientific research has shown that there is a direct correlation between vessel speed and ship strikes resulting in whale mortality,⁸³ and that slower speeds are necessary for avoiding harm to marine mammals.

Ship speed affects the likelihood of whale mortality in two ways. First, slower ship speeds provide whales with a greater opportunity to detect the approaching ship and avoid being hit by it. "To the extent that increasing vessel speed significantly increases accelerations experienced by a whale, limits on vessel speed will reduce the magnitude of the acceleration; may increase response time for a whale attempting to maneuver away from a vessel; and appear to be reasonable actions to consider in policy decisions aimed at reducing the overall threat of ship strikes."⁸⁴

Second, research shows that while slower speeds may not avoid all collisions between whales and ships, collisions at slower speeds are less likely to result in serious injury or death of the whale that has been struck.⁸⁵ Laist *et al.* (2001) reported in a historical analysis of ship strikes involving large cetaceans that "[a]mong collisions causing lethal or severe injuries, 89% (25 of 28) involved vessels moving at 14kn or faster and the remaining 11% (3 of 28) involved vessels moving at 10-14 kn; none occurred at speeds below 10 kn."⁸⁶

Similarly, Vanderlaan and Taggart (2007) report that "as vessel speed falls below 15 knots, there is a substantial decrease in the probability that a vessel strike to a large whale will prove lethal," but that only at speeds slower than 11.8 knots does the chance of a fatal injury to a large whale drop below 50 percent.⁸⁷ Pace and Silber (2005) noted that they found "clear evidence of a sharp rise in mortality and serious injury rate with increasing vessel speed."⁸⁸ Specifically, they found that probability of serious injury or mortality increased from 45 percent at 10 knots to 75 percent at 14 knots, exceeding 90 percent at 17 knots.

⁸³ Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., 2001, Collisions between ships and whales, *Marine Mammal Science*, 17(1): 35-75; Pace, R.M. and Silber, G.K., 2005, Abstract: Simple Analyses of ship and large whale collisions: Does speed kill?, *Sixteenth Biennial Conference on the Biology of Marine Mammals*, San Diego (Dec. 2005); Vanderlaan, A.S.M. and Taggart, C.T., 2007, Vessel Collisions with Whales: The probability of lethal injury based on vessel speed, *Marine Mammal Science*, 23(1): 144-156; Panigada, S., et al., 2006, Mediterranean fin whales at risk from fatal ship strikes, *Marine Pollution Bulletin*, 52: 1287-1298; Silber, G.K., Slutsky, J., and Bettridge, S., 2010, Hydrodynamics of a ship/whale collision, *Journal of Experimental Marine Biology and Ecology*, 391:10-19.

⁸⁴ Silber, G.K., Slutsky, J., and Bettridge, S., 2010, Hydrodynamics of a ship/whale collision, *Journal of Experimental Marine Biology and Ecology*, 391: 10-19.

⁸⁵ Laist, *supra* note 84.

⁸⁶ *Id.*

⁸⁷ Vanderlaan, A.S.M. and Taggart, C.T., 2007, Vessel Collisions with Whales: The probability of lethal injury based on vessel speed, *Marine Mammal Science*, 23(1): 144-156.

⁸⁸ Pace, *supra* note 84.

Terhune and Verboom recommended that to avoid striking whales, ship operators need to take evasive actions to avoid collisions.⁸⁹ Since successfully avoiding a collision depends in part on accurately predicting a whale's movement, the ship operator may not be able to maneuver a large vessel in such a way that a collision is successfully avoided. Slower moving vessels may provide more time for a whale to avoid being struck. Laist *et al.* (2001) report situations in which a last-second flight response on the whale's part may serve to avoid collisions. Studies suggest that slower moving vessels are easier for whales to avoid, even if acoustic signals were missed.⁹⁰

NMFS has found that no other measure was as essential or effective as the establishment of a mandatory 10-knot speed limit to reduce and prevent whale strikes.⁹¹ NMFS has found that instituting this speed limit would benefit humpback, fin, sperm, and sei whales, as well as sea turtles.⁹² Therefore, should this project be approved, a 10-knot speed limit should be included, along with reporting and monitoring mechanisms to ensure that the Applicant's ships adhere to this limitation.

Limiting the speed of tankers will also reduce noise impacts to marine mammals. As discussed above, vessel traffic is the largest source of noise pollution in the marine environment.⁹³ The intense, low frequency noise pollution generated by ships can travel great distances through the water.⁹⁴ Noise pollution from shipping results primarily from the formation and collapse of air bubbles as the propeller turns. This process, known as cavitation, creates very loud acoustic pollution in the same lower-frequency range used for communication by whales, dolphins and other marine animals.⁹⁵ Cavitation is the primary source of noise at high speeds.⁹⁶ As a result, one of the most efficient ways to reduce noise from cavitation is to reduce the speed of the vessel. For these reasons, is approved the proposed Project should include a mandatory speed limit to mitigate the noise impacts associated with tanker ships.

B. Impacts of Dock Construction and Operation.

Either of the proposed "action" alternatives would require the construction and dredging of a massive new dock in the lower Columbia River. This type of construction and structure is detrimental to various aquatic species, many of which are protected by federal or state law. In addition to the following comments on dock construction and Project operation, Commenters incorporate by reference the Comments of Columbia Riverkeeper on the Clean Water Act § 404

⁸⁹ *Id.*

⁹⁰ National Marine Fisheries Service (NMFS). 2008. FEIS to Implement Operational Measures to Reduce Ship Strikes to North Atlantic Right Whales (August 2008).

⁹¹ *Id.*

⁹² *Id.* at 4-19, 4-23.

⁹³ *Id.*

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ Arveson, P. T., and Vendittis, D. J., 2000, Radiated noise characteristics of a modern cargo ship, *Journal of the Acoustical Society of America*, 107 (1): 118-129.

and § 401 permits by the U.S. Army Corps of Engineers and the Washington Department of Ecology, respectively.⁹⁷

1. Noise impacts from construction at the terminal site.

The proposed dock renovation work (and upland construction) could cause noise-induced behavior impacts, including indirect mortality, on Columbia River fish species. The DEIS explains that pile installation and removal would be accomplished using vibratory and impact hammers. Pile driving can have substantial adverse impact on underwater organisms; however, the DEIS fails to adequately assess those impacts.

NWIW's proposed terminal would require the installation of approximately 320 24-inch concrete piles, 12 12-inch steel pipe piles, and 4 18-inch steel pipe piles.⁹⁸ These piles will be installed by impact hammer or by vibratory hammer.⁹⁹ The U.S. Army Corps' Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for the project (hereinafter, "JPN") fails to show that harm will not occur to organisms in the vicinity, especially pinnipeds and salmonids. Specifically, the JPN does not discuss using bubble curtains or other methods to mitigate or attenuate acoustic impacts on aquatic organisms. Given that the pile driving is estimated to last for approximately 120 days,¹⁰⁰ many endangered fish and other animals could be killed, or at the very least harmed, by this activity.

As NMFS described:¹⁰¹

"Acoustic disturbances associated with pile driving are likely to disrupt the foraging behavior and reduce forage efficiency of juvenile salmonids. * * * Fishes with swimbladders (including salmonids) are sensitive to underwater impulsive sounds, i.e., sounds with a sharp sound pressure peak occurring in a short interval of time." (Caltrans 2001). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. The pneumatic pounding may rupture capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2001). The injuries caused by such pressure waves are known as barotraumas, and include hemorrhage and rupture of internal organs, as described above, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or can occur several days later. A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single

⁹⁷ Exhibits 1 and 2.

⁹⁸ Exhibit 7, U.S. Army Corps of Engineers, *Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for NWIW's Methanol Refinery and Export Terminal*, p.2 (October 9, 2015).

⁹⁹ JPN at 3.

¹⁰⁰ JPN at 4.

¹⁰¹ Exhibit 6, pp.82–83.

strike threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams.

Deployment of a bubble curtain is likely to attenuate the peak sound pressure levels by approximately 10 to 20 dB. However, a bubble curtain may not bring the sound pressure levels below biological thresholds, and some death or injuries of ESA-listed salmonids are still likely to occur. Even with the use of the bubble curtain, adverse effects to salmonids are expected in the vicinity of the pile driving. Yelverton et al. (1975) found a direct correlation between smaller body mass and the magnitude of injuries and mortalities from underwater blasts. Large juvenile and adult fishes are likely to be present during the summer in-water work window, rather than small juvenile fishes. Based on conservative estimates of sound exposure level and number of pile strikes per day, injury to juvenile listed salmonids could occur up to 368 feet from the pile driving (NMFS 2008). There may also be effects to salmonid behavior due to underwater noise up to 7,067 feet upstream and downstream from the pile driving (NMFS 2008).”

2. Impact of overwater structures on juvenile salmonids.

The DEIS ignores the impacts of over-water structure on juvenile salmonid survival. Overwater structures like NWIW’s proposed dock degrade habitat for, and directly increase the mortality of, juvenile salmonids. NWIW’s terminal will result in 44,943 square feet of new solid overwater coverage.¹⁰² NMFS has explained that: “[a]n effect of overwater structures is the creation of a light/dark interface that allows ambush predators to remain in a darkened area (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around the structure are unable to see predators in the dark area under the structure and are more susceptible to predation.”¹⁰³ These impacts are significant and measurable: “Predation on ESA-listed salmon and steelhead is reasonably certain to increase with the addition of structures. Juvenile fish abundance has also been found to be reduced under piers and overwater structures when compared to open water or areas with piles but no overwater structures (Able *et al.* 1998), likely due to limitations in prey abundance and increased predation under structures.”¹⁰⁴ An Army Corps of Engineers-sponsored literature review similarly concluded that:

Over-water structures may increase predation of juvenile Chinook salmon in several ways. First, piers and docks can provide cover and preferred habitat for ambush predators such as smallmouth bass. Second, they create shaded areas that can increase a predator’s capture efficiency of prey. Third, they interrupt migration routes and timing of migrating salmonids. The additional time spent navigating around these structures increase exposure to predators in these areas. Finally, changes in substrate, aquatic vegetation, and ambient light caused by

¹⁰² JPN at 3.

¹⁰³ NMFS, *SLOPES IV In-water and Over-water Structures BiOp*, p.85 (April 5, 2012).

¹⁰⁴ *Id.* at 86.

overwater structures may indirectly increase predation through complex ecological pathways.¹⁰⁵

The DEIS must consider the effect of constructing a new dock on juvenile salmonid survival, in addition to the cumulative impacts of the numerous existing and proposed overwater structures in the Columbia.

3. Proposed ‘fish window’ would not protect juvenile salmonids.

The existing in-water work window approved by WDFW begins on November 1, in order to avoid impacts to juvenile salmonids that migrate through the Columbia River in the summer. Apparently because NWIW wants to take 6 entire months to dredge the berth and build the dock, NWIW proposes an in-water work window stretching from August 1 to December 31.¹⁰⁶ The FEIS should contain a thorough discussion of the benefits and rationale for the existing in-water work window (beginning Nov. 1), and a detailed explanation for the environmental costs of working outside that window.

C. Impacts of Vessel Traffic in the Estuary and Lower River

Between 36 and 72 large tanker vessels would call at Tesoro-Savage’s proposed facility each year. This increase in deep-draft vessel traffic would exacerbate the impacts of wake stranding of juvenile salmonids, erosion of wetlands and shoreline areas, potential to introduce invasive species, and the entrainment and impingement of native juvenile fish. Unfortunately, the DEIS does not provide sufficient detail about the significance or extent of these impacts to meaningfully inform the public or a decision-maker.

1. Wake stranding of juvenile salmonids

Vessel wakes from deep-draft tankers calling at NWIW’s proposed facility would kill and injure juvenile salmon and steelhead in the Columbia River and estuary. Wake stranding occurs when a wave caused by a vessel wake lifts an aquatic organism onto the shoreline. NMFS identifies ship wake stranding as a limiting factor for recovery of Lower Columbia River (“LCR”) Chinook salmon, Columbia River chum, LCR coho salmon, and LCR steelhead, with juvenile ocean-type Chinook originating from LCR tributaries and CR chum being particularly vulnerable.¹⁰⁷

The DEIS acknowledges that wake stranding will occur, but provides no concrete details about the extent of the problem. Some quantitative data exists about wake stranding: in 2004 and 2005, researchers monitored 126 deep-draft vessel transits at three beaches along the Lower

¹⁰⁵ Rondorf *et al.*, *Minimizing Effects of Over-Water Docks on Federally Listed Fish Stocks in McNary Reservoir: A Literature Review for Criteria*, p.10 (2010).

¹⁰⁶ DEIS, p. 2-41.

¹⁰⁷ Exh. 6, p.86.

Columbia River.¹⁰⁸ Along a 300-meter stretch of shoreline at Barlow Point (just downstream from Longview, Washington), researchers observed 26 different deep-draft vessel transits, which resulted in the total wake stranding of 351 juvenile chinook salmon (an average of 13.5 juvenile chinook stranded per deep-draft vessel transit).¹⁰⁹ Assuming that NWIW's deep-draft tankers are equally efficient at wake-stranding juvenile chinook salmon, the *minimum* projected 72 yearly one-way trips through the lower Columbia River generated by NWIW's proposal could strand 972 juvenile chinook every year—**on that 300-meter stretch of shoreline alone**. Not all shoreline areas are equally susceptible to wake stranding and directly extrapolating the Barlow Point numbers would probably not accurately predict total wake stranding in the Lower Columbia River. However, a verified model¹¹⁰ exists that could help estimate—even roughly—the impacts of wake stranding from NWIW's proposal, at least upstream of Rivermile 50. Because the data to perform this type of analysis is available, the FEIS should contain a quantitative estimate of the number of juvenile salmonids that would suffer wake stranding as a result of NWIW's project.

2. Entrainment and impingement of aquatic organisms in vessel water intakes.

The DEIS ignores the risk of impingement and entrainment of aquatic organisms in the water intakes of vessels calling on NWIW's facility. Entrainment is the direct uptake of aquatic organisms by the suction field generated by water intakes on vessels, while impingement refers to organisms becoming trapped against an intake screen. The FEIS should describe the water intake structures on the tanker vessels, explain the rate and amount of water taken in by each ship, and explain (through literature review or actual sampling) the densities at which larval fish and fish eggs (especially eulachon) are likely to be present in the Lower Columbia River and therefore susceptible to entrainment or impingement. None of these figures would be particularly difficult to ascertain, but without them, readers of the DEIS have very little information on the impacts of entrainment resulting from the Project.

III. PUBLIC HEALTH

The Port and County should prepare a Health Impact Assessment (“HIA”) for this Project. An HIA can evaluate the significant public health impacts of: diesel exhaust; passenger vehicle emissions; greenhouse gas emissions; noise; and spills and drinking water systems and supplies. Some of these impacts were not analyzed at all in the DEIS, and others were incompletely analyzed.

¹⁰⁸ Pearson *et al.*, *A study of stranding of juvenile salmon by ship wakes along the lower Columbia River using a before-and-after design—before-phase results* (2006).

¹⁰⁹ *Id.* at 9, 48.

¹¹⁰ See, e.g., Pearson and Skalski, *Factors affecting stranding of juvenile salmonids by wakes from ship passage in the Lower Columbia River*, 27 *River Research and Applications* 926–936 (2011); see also Kock *et al.*, *Review of a model to assess stranding of juvenile salmon by ship wakes along the Lower Columbia River, Oregon and Washington* (2013).

A. Air Quality

A key health impact of NWIW's Project is the direct and cumulative impact of small airborne particulate matter—largely from diesel exhaust—on people who live and work near the proposed refinery, and the people who would use the DEIS's oft-touted recreational access directly downstream from the project. According to Physicians for Social Responsibility¹¹¹:

The fine and ultrafine particles less than 2.5 microns (PM_{2.5}) are particularly important in triggering disease because they penetrate deeply into the alveoli of the lungs. Diesel particulate matter, submicronic in size, has particularly damaging potential (Li). Some inhaled particles are taken up by macrophages, resulting in lung inflammation. The final common pathway of the pathologic effects of exposure to particulate matter, as well as gas phase pollutants, appears to be inflammation. The effects of inflammation on various body organ systems are complex, but increased levels of particulate matter are associated with a number of ill health effects including: increased cancer rates, especially lung and breast, congenital lung, heart and immune system anomalies in children, increased rates of asthma, worsening of preexisting asthma and chronic obstructive pulmonary disease (COPD), higher rates of heart attacks and strokes, and higher rates in children (exposed prenatally) of neurodevelopmental disorders such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), lowered IQ, and adverse behaviors. Not surprisingly, the most vulnerable populations are pregnant women, children, people that already have pulmonary diseases like COPD or asthma, and the elderly.

(internal citations omitted).

The DEIS essentially dismisses the health risks of diesel particulate matter ("DPM") associated with the Project by attempting to discredit Washington's Acceptable Source Impact Level ("ASIL") standard for DPM as overly-protective.¹¹² However, according to the American Heart Association, there is *no* completely safe level of exposure to diesel particulate matter.¹¹³ And the World Health Organization ("WHO") reports that there is not a threshold below which no damage to human health is observed as a result of exposure to fine particulate matter.¹¹⁴ The fact that *any* amount of DPM harms human health undercuts the DEIS's attempt to discredit and trivialize Washington's ASIL.

The DEIS begrudgingly admits that background concentrations for PM_{2.5}—which would be largely composed of DPM—at the Project site are *already* more than 1,500 times higher than Washington's Acceptable Source Impact Level for DPM.¹¹⁵ The DEIS, however, never explains

¹¹¹ Exhibit 8, Oregon Physicians for Social Responsibility, *Airborne Particulate Matter and Public Health* (2015).

¹¹² See DEIS, pp.4-8 and 4-9.

¹¹³ *Id.* at 3; see also Exhibit 9, American Heart Association, *Danger in the Air: Air Pollution and Cardiovascular Disease* (2014).

¹¹⁴ *Id.* at 1.

¹¹⁵ DEIS, p.4-9.

by how much DPM levels will exceed the ASIL once NWIW's refinery begins operating, or by how much ambient DPM levels will exceed the ASIL once other proposed fossil-fuel export proposals on the Columbia begin operating. The ASIL is a relevant benchmark for human health in Washington, and the DEIS should at least describe the Project's direct and cumulative contributions to DPM with respect to the ASIL.

Even if the public and decision-makers accepted the DEIS's inappropriate invitation to ignore Washington's ASIL, the PM_{2.5} levels that would exist once NWIW's Project begins operating would be near or above other relevant benchmarks for human health. The WHO recommends that PM_{2.5} should not exceed an average of 25 micrograms per cubic meter of air (25 µg/m³) in a 24-hour period, and not exceed an average annual exposure of 10 µg/m³.¹¹⁶ The DEIS predicts that the existing background PM_{2.5} levels plus the PM_{2.5} from NWIW's operations, using the ULE technology, would reach 23 µg/m³ in a 24-hour period and average at least 7 µg/m³ annually.¹¹⁷ These projected levels come dangerously close to the levels that WHO found threaten human health. Unfortunately, the Appendix D of the DEIS does not model the PM emissions (or any emissions) for the CR alternative. This prevents decision-makers from accurately comparing the consequences of the two technological approaches.

Moreover, the DEIS completely fails to address the likely future contributions of DPM and PM_{2.5} from the many fossil fuel export projects that are currently proposed along and through the Lower Columbia River.¹¹⁸ These projects will increase DPM and other PM emissions at the Project site, which is sandwiched directly between BNSF's main rail line and the Columbia River shipping channel. Of particular concern is the proposed Millennium Bulk Terminals coal export proposal, which would bring four open-topped coal trains within a few hundred feet of the Project site each day. Diesel locomotives hauling coal can significantly contribute to ambient PM_{2.5} concentrations.¹¹⁹ The FEIS should model the DPM and PM_{2.5} levels at the Project site that would result from the operation of all proposed fossil fuel export terminals along the Lower Columbia, and compare the results to WHO and NAAQS standards for human health. Failure to do so would constitute a failure to take a hard look at the cumulative impacts of this project.

B. Drinking Water

The EIS should evaluate the risk posed to Kalama's drinking water wells by a major spill of methanol, fuel oil, or other chemical to the Columbia River near the project site. Kalama's drinking water comes from a Ranney well adjacent to the Kalama River, about two miles

¹¹⁶ See <http://www.who.int/mediacentre/factsheets/fs313/en/#>. The WHO-recommended levels—which reduce but do not eliminate health impacts from airborne particulate matter—are slightly lower than the applicable Clean Air Act standards cited in on page 4-3 of the DEIS.

¹¹⁷ DEIS, Appx. D, p.42.

¹¹⁸ See, e.g., DEIS, pp.15-2 through 15-7.

¹¹⁹ Exhibit 10, Jaffe *et al.*, *Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA*, Atmospheric Pollution Research (2015)

upstream of the confluence with the Columbia.¹²⁰ Both the Columbia River at the project site, and the site of Kalama's Ranney well, appear to be within areas that are tidally influenced.¹²¹ Accordingly, a strong incoming tide could potentially carry spilled methanol or other pollutants upstream and into the City of Kalama's drinking water intake system. The DEIS and the HIA should evaluate the possibility and consequences of a spill near the refinery site contaminating Kalama's drinking water.

C. Noise

Construction and operation of this facility would be noisy. Regarding noise impacts from construction, intermittent and unpredictable pile driving noise could negatively impact the surrounding community. Intermittent noise produces a more adverse reaction than continuous noise, and unpredictable noise results in even more adverse reactions than intermittent noise. The DEIS fails to propose mitigation for noise impacts due to pile drivers, for example, because construction noise is "exempt" from regulations. But this does not reduce the health and safety risks associated with these predicted high noise levels for Port employees and community members. How will these impacts be mitigated?

The DEIS's model calculated hourly Leqs as high as 58 dBA and Lmax levels as high as 82 dBA at residences in Prescott, Oregon, when impact pile driving occurs. Discrete impact levels would be much higher than hourly Leqs. If the Lmax level reaches 82 dBA, there will likely be serious impacts and angry neighbors. How will the negative impacts of this noise on human health and well-being be mitigated?

The next most affected group of residences may be those on the hillside northeast of the project site. These residents are predicted to experience pile driving hourly Leqs in the low 50s dBA and Lmax levels in the upper 70s dBA, exceeding the 70 dBA WAC limit.

Regarding noise impacts from operations, the DEIS lists options for mitigating noise impacts from cooling water pumps and the methanol loading pump, but does not say how the listed options would actually work. For example, one mitigation measure meant to decrease harm to Oregonians across the river is to move the cooling water pumps to the east side of the cooling tower, but this "would result in higher sound levels on the hillside to the northeast" of the plant (in Washington), resulting in increases over existing levels up to 10 dBA. This would result in "moderate" noise impacts to three receptors on that Washington hillside.¹²²

Noise from increased vessel transport is assumed in the DEIS to be the same as current noise levels. How can this be? More ships—both from NWIW's project and the cumulative increase in vessel traffic from other proposed fossil fuel terminals—necessarily means more noise from ships.

¹²⁰ City of Kalama, *Drinking Water Quality Annual Report* (2014) (online at: <http://www.cityofkalama.com/home/showdocument?id=521>).

¹²¹ <http://www.nwcouncil.org:81/fw/lf/Overview.asp?Report=Overview&SubbasinID=39>

¹²² DEIS, p.14-25.

Regarding compliance with Washington's 70 dBA noise limit for industrial noise sources, it appears that both the CR and the ULE alternatives would exceed this limit. The DEIS shifts responsibility to the Port of Kalama to work with NWIW and other industrial tenants to address noise levels in the event that an adjacent tenant raises concerns about noise impacts. If Washington's 70 dBA noise limit is exceeded, this raises concerns about the ability of people working nearby to perform work requiring concentration. Further, this raises concerns about the construction and operating company's workers and their hearing conservation program, not mentioned in the DEIS.

D. Fires and Explosions

The DEIS downplays the very real possibility of a serious accident involving gas or methanol, which—contrary to the overall impression given in the DEIS—is highly flammable and toxic. For instance:

- In November, 2012, at the NEXEO Solutions Chemical Plant Garland Texas, methanol was being unloaded from a rail car when an explosion occurred. 10,000 gallons of methanol burned. The area ¼ mile around the facility was evacuated due to the possibility that the fire could spread and cause more explosions.
- In June, 2013, in Geismar, Louisiana, an explosion and fire at the Williams Olefin Plant killed two and injured 70.
- In August, 2015, multiple explosions and fires destroyed the Tianjin Fuel Refinery and many nearby buildings in Rizhao, Shandong Province.
- In January, 2016, a methanol tank explosion and fire killed two employees and critically injured another at the Bethune Point Wastewater Treatment Plant in Florida.

IV. DIRECT IMPACTS FROM CONSTRUCTING THE REFINERY AND PIPELINE

A. Habitat impacts from Project construction.

According to the DEIS, the proposed pipeline route would “cross seven waterbodies (five of which are intermittent and non-fish-bearing), and four wetlands. The pipeline would traverse several forest types including conifer, deciduous, and mixed conifer-deciduous forest as well as Oregon white oak woodlands.”¹²³ It further asserts that “[h]abitats within the proposed pipeline alignment support the foraging, breeding, and resting activities of a variety of commonly occurring amphibians, reptiles, birds, and mammals.”

¹²³ DEIS, p.6-13.

The DEIS then goes on to describe, quite accurately, the potential for harm to habitat areas from constructing the Project. The DEIS describes¹²⁴ a litany of expected impacts, among them:

- “Clearing and grading of stream banks, removal of riparian vegetation, in-stream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased sedimentation and turbidity, increases in temperature, decreased dissolved oxygen concentrations, releases of chemical and nutrient pollutants from sediments, and introduction of chemical contaminants such as fuel and lubricants.”
- “Human activity and noise could result in temporary displacement from habitats on and adjacent to the construction right-of-way.”
- “Inadvertent release of drilling fluid to surface waters could also negatively affect fish resources.”
- “Construction and operation of the pipeline project would result in permanent and temporary impacts to vegetation. Forested vegetation (including the forested component of riparian vegetation) on lands used for operation would be permanently lost and converted to herbaceous vegetation.”
- “The permanent and long-term loss and conversion of forested vegetation would impact wildlife by altering habitat characteristics, and could impact soil characteristics, contours, surface water flow, and rates of erosion.”
- “The permanent and long-term loss of forest would also result in forest fragmentation, the creation of ‘edge effects,’ and an increase in the potential for the establishment and proliferation of noxious weeds.”
- “By using a HDD to place the pipeline below the waterbodies, most impacts on these waterbodies and the fisheries contained within them would be avoided. However, the use of a HDD could result in an inadvertent release of drilling fluids (bentonite and other inert/non-toxic additives), commonly referred to as a ‘frac-out.’ A frac-out into a waterbody could temporarily impact water quality (turbidity), fish habitat (sedimentation), and the rates of stress, injury, and mortality experienced by fish and other aquatic wildlife (FERC 2015).”
- “Constructing and operating the pipeline project would temporarily and permanently impact wildlife and wildlife habitat. Project related activities, including clearing and trenching and the general use of construction equipment, would temporarily decrease and permanently alter available wildlife habitat, change the characteristics of adjacent wildlife habitat, displace wildlife, and alter wildlife behavior, and could increase the rates of mortality, injury, and stress experienced by wildlife.”
- “Operating the project would permanently alter some habitats and could periodically disturb wildlife, which could also increase wildlife mortality, injury, and stress.”
- “Constructing and operating the project through the Carrolls Bluff Oaks priority habitat area would result in the loss of wildlife habitat (oaks). Similar to the loss of forested habitat on other lands, the rates of mortality, injury, and stress experienced by wildlife

¹²⁴ DEIS, pp.6-41–42.

could increase; however, this impact could be measurably greater because of the unique characteristics of the oak woodlands.”

There is, however, almost no analysis provided as to the actual harm that constructing and maintaining the pipeline would have on these habitat areas. For example, while the DEIS acknowledges that a frac-out during HDD is possible (which would harm aquatic habitat), there is no attempt to quantify the likelihood of frac-out occurrence, and only a general explanation of the potential impacts (i.e. fish injury and mortality) with no specifics as to the potential extent of harm, or details on how the Proponent would respond and resolve those impacts.

The Applicant has merely claimed that by using “standard construction BMPs for pipeline construction” it will “reduce impacts to plants and animals.”¹²⁵ This entirely unsupported statement is insufficient to meet the requirements of environmental analysis under Washington’s SEPA. BMPs may help reduce some impacts, such as sediment runoff, but they will do little or nothing to mitigate the temporary loss/disturbance and permanent loss of habitat that even the Applicant acknowledges would occur. Rather, the Applicant claims that “habitat for several terrestrial and avian wildlife species would be permanently and temporarily affected by the pipeline project; however, given the mobility of species concerned and the availability of similar habitat nearby, this impact should be minimal (FERC 2015).”¹²⁶ To suggest that the impacts of a large-scale construction project such as this would be “minimal” simply because species – including imperiled species protected under state and federal law – can merely move out of the way, is preposterous, and acceptance of this as an “analysis” of the impacts of the Project would render environmental review under SEPA meaningless.

Constructing the Project would have adverse impacts on habitat. The DEIS makes it clear that the Project would affect currently forested areas that support the foraging, breeding, and resting activities of a variety of commonly occurring amphibians, reptiles, birds, and mammals. Linear corridors created by buried pipelines like the proposed Project permanently fragment areas of continuous forest, decrease critical interior forest, and increase forest edge. Fragmentation of habitat has been recognized as “one of the most pervasive threats to native ecosystems”—indeed, roads and pipelines have a greater impact on fragmentation than well pads themselves.¹²⁷ As a result, the U.S. Geological Survey has acknowledged that “[f]ragmentation of forest and habitat is a primary concern resulting from current gas development.”¹²⁸

¹²⁵ DEIS, p.6-41.

¹²⁶ DEIS, p.6-42.

¹²⁷ Brittingham, M.C., *et al.*, *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats*, Environmental Science & Technology, 11037 (Sept. 4, 2014) (citing E.T. Slonecket, *et al.*, U.S. Geological Survey, *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pa., 2004-2010*, 9 (2012) (in Bradford and Washington counties, “forests became more fragmented primarily as a result of the new roads and pipelines associated with shale development, and development resulted in more and smaller forest patches with loss of core forest ... at twice the rate of overall forest loss.”)); *see also Pennsylvania Energy Impacts Assessment Report 1: Marcellus Shale Natural Gas and*

Forest fragmentation and habitat loss “are closely intertwined, with loss of habitat frequently associated with fragmentation of the remaining habitat, and fragmentation often associated with additional losses of interior or core habitats.”¹²⁹ Fragmentation is also associated with various ecological changes—including “changes in patch size and isolation, light, moisture, and temperature”—that directly and indirectly affect populations and communities.¹³⁰ The resulting smaller patches have a decreased ability to support viable populations of individual species.¹³¹ As a result, habitat loss and forest fragmentation can be major threats to biodiversity.¹³²

Constructing the proposed Project and related infrastructure would involve clearing and bulldozing a 100-foot-wide construction corridor and permanent maintenance of a cleared right of way for the pipeline. It would also presumably involve construction of access roads for pipeline construction and maintenance and clearing and excavation of staging areas somewhere within or in proximity to the proposed corridors. There will be unavoidable, but thus far unstudied and unquantified, impacts to forested areas.

Because the specific impacts of habitat loss and fragmentation depend on the needs and attributes of specific species and communities, Applicants must fully evaluate the significant, long-term impacts that fragmentation from the proposed pipeline corridor may have on each species and community, both within and adjacent to the proposed pipeline corridor.¹³³ Avoidance, minimization, or mitigation of these impacts is critical to ecological sustainability. Moreover, the EIS must assess whether mitigation measures fully account for and address the impacts that constructing and maintaining the facility and pipeline and related infrastructure will have with respect to these ecological disruptions. The EIS must disclose and assess all direct, indirect, and cumulative impacts of this disturbance and fragmentation of forests.

The EIS must further consider the potential impacts of increasing forest edge, including but not limited to potential impacts on terrestrial and avian species, as well as vegetation and soil dynamics (including loss of native soil integrity) associated with an increase in forest edge. In

Wind; E.T. Slonecket, *et al.*, U.S. Geological Survey, *Landscape Consequences of Natural Gas Extraction in Fayette and Lycoming Counties, Pennsylvania, 2004-2010* (2013).

¹²⁸ *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 9.

¹²⁹ *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11037.

¹³⁰ *Id.* (citing K. Harper, *et al.*, *Edge influence on forest structure and composition in fragmented landscapes*, *Conserv. Biol.* 2005, 19 (3), 768-82; S.K. Collinge, *Ecology of Fragmented Landscapes*, p. 340, The Johns Hopkins University Press: Baltimore, Md. (2009)).

¹³¹ *Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 9.

¹³² *Id.* (citations omitted).

¹³³ *See Landscape Consequences of Natural Gas Extraction in Bradford and Washington Counties, Pennsylvania, 2004-2010* at 10.

order to assess fully the potential impacts of the edge effect, the EIS must properly account for the geographic extent and temporal frame of forest edge impacts. The EIS must evaluate any beneficial impacts of edge creation for certain species in conjunction with the negative impacts on other species.

The EIS must also disclose and analyze the geographic extent, including total acreage of interior forest habitat that would be impacted, by edge effect. Because expanding edges into natural ecosystems can affect the natural ecosystem for some distance in from the edge, the EIS must evaluate an impact area that extends at least 300 feet into adjacent forest; examining only the pipeline corridor and other areas in which soil may be moved or vegetation may be cleared grossly underestimates the area of impact. This analysis should include spatial data detailing interior forest resources along the proposed route and alternatives, as well as forest connectivity and riparian corridors. In addition, the EIS must acknowledge the current declining levels of interior forest habitat and the increase of forest edge conditions. The EIS must also acknowledge and deal with the reality that while interior forest requires decades to create, edge forest can be created overnight.

B. Wildlife impacts, including protected species.

The EIS must also examine impacts that the Project could have on native wildlife populations and communities—directly by habitat loss or indirectly through changes on adjacent habitats and land uses associated with them.¹³⁴ In the FERC EA for the pipeline portion of the Project, it states that:

The proposed pipeline would be located across two State of Washington priority habitats; the Carrolls Bluff Oaks (oak woodlands) and the Kalama Flats (wetlands). According to the WDFW, Oak Woodlands are distinct ecosystems that provide valuable habitat contributing to wildlife diversity. The Carroll Bluff Oaks (MP 2.1 – 2.4) site contains vernal streams, exposed rock outcroppings, unique plant communities, and supports concentrations of bandtailed pigeons. The Kalama Flats (MP 2.4 – 3.1) site supports cavity nesting ducks, small concentrations of swans, ducks, geese, and bandtailed pigeons. Additionally, four priority wildlife species may occur in the Project area, the bald eagle (*Haliaeetus leucocephalus*), eastern wild turkey (*Meleagris gallopavo silvestris*) Canada goose (*Branta Canadensis*), and elk (*Cervus elaphus*). Bald eagles have not been documented within 0.5 mile of Project workspace. Wild turkeys, Canadian geese, and elk have high recreational value both for consumptive and nonconsumptive purposes. Lastly, priority areas of breeding habitat for Canada goose and cavity nesting ducks; regular concentrations of elk; and a management buffer for the northern spotted owl would be crossed by the Project.¹³⁵

¹³⁴ See *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11037.

¹³⁵ FERC, Kalama Lateral Project Environmental Assessment (July, 2015) at 42.

The DEIS, however, fails to adequately examine impacts to these species. For example, even though the FERC EA clearly states that a management buffer for spotted owl (a threatened species) would be crossed by the Project, the Applicant's DEIS never even mentions that fact, but rather fails entirely to discuss any impacts to spotted owls, claiming only in Table 6-2 that the potential for occurrence is "Low – no suitable habitat on site." According to the Washington Forest Protection Association, buffer zones are intended to "develop into old-forest habitat over time," and to be important for "connecting landscapes of forests for spotted owls alongside stream corridors."¹³⁶ The DEIS admits that construction and operation activities for the Project will result in long-term and permanent loss of forested vegetation, resulting in forest fragmentation.¹³⁷ The lack of any discussion of such impacts to the spotted owl management buffer, and how those impacts may affect the spotted owl in the future, renders the DEIS entirely incomplete.

Similarly, the Applicant has failed to address potential impacts to bald eagles. While the DEIS acknowledges that the Bald and Golden Eagle Protection Act ("BGEPA") prohibits the taking of a bald eagle,¹³⁸ and that several bald eagle breeding sites are within 1 mile of the project site – and the site contains suitable perching and feeding habitat¹³⁹ – there is no discussion of how the Project would actually impact bald eagles. According to the DEIS, noise from pile-driving would not reduce to background level until a distance of 13,770 feet, or approximately 2.6 miles.¹⁴⁰ Since bald eagles are known to nest within a mile of the Project site, there is clearly potential for noise-related impacts. However, no attempt has been made to quantify or even discuss those impacts, or to show how the Project will not violate the BGEPA. Once again, the lack of any actual analysis renders the DEIS incomplete.

The Project has the potential to harm owls and eagles. A variety of human activities can potentially interfere with eagles and owls, affecting their ability to forage, nest, roost, breed, or raise young. If agitated by human activities, these species may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests

¹³⁶ Washington Forest Protection Association, Northern Spotted Owl Conservation (available at <http://www.northernspottedowl.org/jurisdictions/sosea.html>).

¹³⁷ DEIS at 6-41. The DEIS further acknowledges that "Project related activities, including clearing and trenching and the general use of construction equipment, would temporarily decrease and permanently alter available wildlife habitat, change the characteristics of adjacent wildlife habitat, displace wildlife, and alter wildlife behavior, and could increase the rates of mortality, injury, and stress experienced by wildlife (FERC 2015)." DEIS at 6-42.

¹³⁸ The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." This includes impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes a loss of productivity or nest abandonment.

¹³⁹ DEIS at 6-14.

¹⁴⁰ DEIS at 6-26.

can jeopardize eggs or young. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves.¹⁴¹

Disruption, destruction, or obstruction of roosting and foraging areas (such as the Project site) can also negatively affect these species. Disruptive activities in or near owl or eagle foraging areas can interfere with feeding, reducing chances of survival. For example, human activities near or within communal roost sites may prevent eagles from feeding or taking shelter, especially if there are not other undisturbed and productive feeding and roosting sites available. Activities that permanently alter communal roost sites and important foraging areas can altogether eliminate the elements that are essential for feeding and sheltering eagles.

The Applicant admits in the DEIS that construction activities are expected to result in “temporary avoidance of the site or vicinity” by special-status species.¹⁴² The DEIS provides no analysis of these impacts, claiming without support that the impacts would not be significant.¹⁴³ However, as discussed above there are known bald eagle nests within a mile of the proposed Project, and noise from pile-driving will travel 2.6 miles. There will further be other sources of noise and disturbance from construction activities. Where a human activity, such as the construction of the proposed Project, agitates or bothers roosting or foraging birds to the degree that causes injury or substantially interferes with breeding, feeding, or sheltering behavior and causes, or is likely to cause, a loss of productivity or nest abandonment, the conduct of the activity constitutes a violation of the ESA and/or BGEPA. The EIS must fully evaluate the Project for potential impacts to owl and eagle individuals and habitat. The Project has the potential to harm these birds through habitat loss, fragmentation, climate disruption and construction related impacts (i.e. noise), which may directly harm owls and eagles as well as the habitat areas they rely on for food sources.

The Project also has the potential to harm the ESA-listed streaked horned lark (threatened). In fact, the DEIS states that the potential for impacts to this species are high, since it breeds and winters in the Project vicinity.¹⁴⁴ The streaked horned lark has been extirpated throughout much of its range, including all of its former range in British Columbia, Canada, the San Juan Islands, the northern Puget lowlands, the Washington coast north of Grays Harbor, the Oregon coast, and the Rogue and Umpqua Valleys in southwestern Oregon. The current range of the streaked horned lark can be divided in to three regions: (1) the Puget lowlands in Washington, (2) the Washington coast and lower Columbia River islands (including dredge spoil deposition sites near the Columbia River in Portland, Oregon), and (3) the Willamette Valley in Oregon. Any further impacts to this species, and the habitat it depends on, could have dire consequences for this imperiled species.

¹⁴¹ See the US Fish and Wildlife Service, National Bald Eagle Management Guidelines (May, 2007) (available at <http://digitalmedia.fws.gov/cdm/ref/collection/document/id/1982>).

¹⁴² DEIS at 6-28.

¹⁴³ *Id.*

¹⁴⁴ DEIS at Table 6-2.

The DEIS, however, never fully addresses the loss of lark habitat. The Applicant claims that the current habitat for larks (3 acres of dredge spoils) will only remain suitable through the end of the 2015 nesting season as ground cover increases to render the area non-habitat, and that streaked horned larks currently nesting there “would be expected to find suitable habitat on islands in the vicinity.”¹⁴⁵ This, however, fails to assess the actual impacts to the species.

The Applicant appears to incorrectly assume that no dredge spoil deposits would take place in the vicinity of the Project after 2015. The Army Corps BA that is referenced states that no such activity is currently taking place because 3 pairs of streaked horned larks were detected in 2013 during surveys, and the site is expected to become unsuitable after the 2015 nesting season due to vegetation succession.¹⁴⁶ Rather than implying that the site would become useless as habitat in 2015, this suggests that depositing dredge spoils at this site will once again become viable after 2015. While no plans currently exist for such activities through 2019 (the Corps BA states that five-year placement plan does not include this area), that does not mean that no rehabilitation of nesting habitat for the larks will take place during the long life of the proposed Project. Indeed, according to the Corps, the Northport dredge deposit site “will remain in the Corps’ planning for long-term placement.”¹⁴⁷ The EIS must evaluate the Project’s impacts on future dredge deposits that would create habitat for the species.

Further, the Applicant has failed to provide any information on whether habitat for larks exists on or near the Project site other than what has been analyzed by the Army Corps. The Army Corps BA only covers dredge spoil sites created during navigational dredging; however, other land uses in the vicinity of the Project may have created additional habitat that would be impacted by the Project. It does not appear that any surveys have been conducted, so the actual impacts to the species have not been fully assessed. The DEIS also fails to mention the potential for increased predation from rats and mice due to the Project, which is a major factor in the species’ decline.¹⁴⁸ Moreover, rather than writing off the existing habitat as useless after 2015, the Applicant should consider how to maintain habitat for this listed species.

The EIS must also consider the impacts it would have on wildlife from climate change. As discussed above increased greenhouse gas emissions associated with the Project would exacerbate global climate change, leading to loss of sea ice and the species that depend on it,¹⁴⁹ sea level rise,¹⁵⁰ extreme weather events,¹⁵¹ ocean acidification,¹⁵² and loss of habitat and species

¹⁴⁵ DEIS at 6-18.

¹⁴⁶ U.S. Army Corps, Biological Assessment for the Continued Operations and Maintenance Dredging Program for the Columbia River Federal Navigation Channel (March 2014) at 49.

¹⁴⁷ *Id.* at 24.

¹⁴⁸ 78 Fed. Reg. at 61,482.

¹⁴⁹ A. Robinson, et al., *Multistability and critical thresholds of the Greenland ice sheet*, 2 NATURE CLIMATE CHANGE 429 (2012).

¹⁵⁰ S. Rahmstorf et al., *Recent climate observations compared to projections*, 316 SCIENCE 709 (2007).

¹⁵¹ Intergovernmental Panel on Climate Change (IPCC), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)* (2012) (available at <http://ipcc-wg2.gov/SREX/>); U.S. Global Change Research Program, *Global Climate Change Impacts in the US: Global Climate Change* (2009); Dim Coumou & Stefan Rahmstorf, *A Decade of Weather*

(such as the streaked horned lark).¹⁵³ The EIS must disclose specific impacts to species and habitat areas resulting from climate change, including changes in precipitation, increased severity of storms, increase in heat waves, drought, ozone formation, and wildfires -- all of which have the potential to adversely impact species, including protected species.

Finally, the EIS must consider the impacts of pesticide and herbicide use from the Project. These dangerous products, if used to remove invasive species or maintain rights-of-way, can have devastating impacts on sensitive species. The DEIS notes that “[w]eeds would be controlled by annual manual removal (hand pulling, cutting, and/or mowing). Appropriate herbicide treatments may also be applied if they are determined to be necessary by the project proponent. The invasive species management strategy would be an informal and evolving program....”¹⁵⁴ The decision to use these toxic substances should not be left to the discretion of the Project proponent, and the impacts of using herbicides – especially in wetland areas – must be fully analyzed in the EIS.

V. IMPACTS OF NATURAL GAS SUPPLY AND PRODUCTION

The project will require at least 270,000 dekatherms, or roughly 270,000 MMBtu, of natural gas per day.¹⁵⁵ The impacts of drilling, processing, and delivering this gas to the Project

Extremes, 2 NATURE CLIMATE CHANGE 491 (2012); National Oceanic and Atmospheric Administration, *Extreme Weather 2011* (available at <http://www.noaa.gov/extreme2011/>).

¹⁵² See, e.g., O. Hoegh-Guldberg et al., *Coral reefs under rapid climate change and ocean acidification*, 318 SCIENCE 1737 (2007); K. Caldeira and M.E. Wickett, *Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean*, 110 J. GEOPHYS. RES. C09S04, doi:10.1029/2004JC002671 (2005).

¹⁵³ Camille Parmesan & Gary Yohe, *A Globally Coherent Fingerprint of Climate Change Impacts Across Natural Systems*, 421 NATURE 37 (2003); Terry L. Root et al., *Fingerprints of Global Warming on Wild Animals and Plants*, 421 NATURE 57 (2003); Camille Parmesan, *Ecological and Evolutionary Responses to Recent Climate Change*, 37 ANNUAL REV. OF ECOLOGY EVOLUTION AND SYSTEMATICS 637 (2006); I-Ching Chen et al., *Rapid Range Shifts of Species Associated with High Levels of Climate Warming*, 333 SCIENCE 1024 (2011); Ilya M. D. Maclean & Robert J. Wilson, *Recent Ecological Responses to Climate Change Support Predictions of High Extinction Risk*, 108 PROC. OF THE NATL. ACAD. OF SCIENCES OF THE U.S. 12337 (2011); Rachel Warren et al., *Increasing Impacts of Climate Change upon Ecosystems with Increasing Global Mean Temperature rise*, 141 CLIMATIC CHANGE 106 (2011).

¹⁵⁴ DEIS at 6-52

¹⁵⁵ The DEIS states that the ULE alternative will require 270,000 dekatherms per day. DEIS at 1-16. It is unclear whether this figure refers only to feed gas, or if it also includes the 30,000 dekatherms needed for the onsite 101 megawatt powerplant included in the ULE design. DEIS at 7-3. The EIS must address, and clearly disclose, the *total* gas needs of the project, and clarify the relationship between these two values.

must be considered in the analysis of indirect and cumulative effects of the project.¹⁵⁶ Indeed, these effects are just as essential to the project, and just as closely linked, as the effects related to the generation of the electricity the project will purchase from the electric grid. In the NEPA context, EPA has argued, in comments on liquefied natural gas export proposals analogous to the methanol proposal here, that the environmental impact statement must address the indirect effects of producing and delivering natural gas to the liquefaction and export facility. In scoping comments for the Jordan Cove LNG project, EPA opined that in order to properly analyze indirect effects, “it is appropriate to consider available information about the extent to which drilling activity might be stimulated by the construction of an LNG export facility on the west coast, and any potential environmental effects associated with that drilling expansion.”¹⁵⁷

Producing the natural gas that would supply the Project would result in significant environmental impacts. Natural gas production—particularly from “unconventional” sources such as the shale gas formations that would likely provide the majority of the supply here—is a significant air pollution source, can disrupt ecosystems and watersheds, leads to industrialization of entire landscapes, disrupts communities, and presents challenging waste disposal issues. A subcommittee of the DOE’s Secretary of Energy’s Advisory Board highlighted “a real risk of serious environmental consequences” resulting from continued expansion of shale gas production.¹⁵⁸ In 2014, the National Energy Technology Laboratory released several reports detailing the adverse environmental impacts of natural gas production in general, and of modern hydraulic fracturing in particular.¹⁵⁹

¹⁵⁶ WAC 197-11-060(4)(d) (indirect effects), 197-11-792(2)(C); *Cheney v. City of Mountlake Terrace*, 87 Wash.2d 338, 344, 552 P.2d 184 (1976) (“Implicit in [SEPA] is the requirement that the decision makers consider more than what might be the narrow, limited environmental impact of the immediate, pending action. The agency cannot close its eyes to the ultimate probable environmental consequences of its current action.”).

¹⁵⁷ EPA, Scoping Comments – The Jordan Cove Energy Project LP, FERC Dkts. PF12-7 and PF12-17, 14 (Oct. 29, 2012); *see also* EPA, Scoping Comments – The Oregon LNG Export Project and Washington Expansion Project, FERC Dkts. PF12-18 and PF12-20 (Dec. 26, 2012). EPA reiterated these positions in comments on FERC’s draft EISs for these projects, and has consistently taken this position in comments on NEPA review for other liquefied natural gas export projects.

¹⁵⁸ DOE, Secretary of Energy’s Advisory Board, Shale Gas Production Subcommittee Second 90-Day Report 10 (Nov. 18, 2011); *see also* DOE, Shale Gas Production Subcommittee, First 90-Day Report (Aug. 18, 2011) (hereinafter “First 90-Day Report”).

¹⁵⁹ NETL, Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 (May 29, 2014), available at http://www.netl.doe.gov/File%20Library/Research/Oil-Gas/publications/NG_Literature_Review3_Post.pdf; National Energy Technology Laboratory, Life Cycle Analysis of Natural Gas Extraction and Power Generation, DOE/NETL-2014/1646 (May 29, 2014), available at [http://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Anal](http://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Analysis/NETL-NG-Power-LCA-29May2014.pdf)

For instance, fracking and other gas production operations are a significant source of air pollution. In particular, natural gas production is a major source of methane and other greenhouse gases. Natural gas systems are one of the nation's largest sources of methane pollution.¹⁶⁰ Emissions of methane are particularly important, because methane from fossil sources is a greenhouse gas that is 87 times more potent than carbon dioxide on a 20-year timeframe, and 36 times more potent on the 100-year timeframe.¹⁶¹ In addition, gas production is a major source of non-greenhouse gas air pollution. EPA acknowledges that “[t]here have been well-documented air quality impacts in areas with active natural gas development, with increases in emissions of methane, volatile organic compounds (VOCs) and hazardous air pollutants (HAPs).”¹⁶² Exposure to this pollution can cause eye, nose, and throat irritation, respiratory illnesses, central nervous system damage, birth defects, cancer, or premature death.¹⁶³ In Colorado, for example, an evaluation of birth defects in areas with high concentrations of oil and gas activity found that mothers who lived near many oil and gas wells were 30 percent more likely to have babies with heart defects.¹⁶⁴ Similarly, preliminary results from a study in Pennsylvania show impacts among newborns that could be linked to air pollution such as increases in low birth weight.¹⁶⁵

In many rural areas, the boom in oil and gas activity has been linked to unhealthy spikes in ozone concentrations.¹⁶⁶ In Wyoming, pollution from oil and gas production has caused areas to violate EPA's air quality standards for ozone.¹⁶⁷ These increased ozone levels were correlated

¹⁶⁰ See EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2014 (Apr. 15, 2016), <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf>.

¹⁶¹ IPCC, Climate Change 2013: Physical Science Basis, Anthropogenic and Natural Radiative Forcing, 714.

¹⁶² US EPA, Natural Gas Extraction - Hydraulic Fracturing, <http://www2.epa.gov/hydraulicfracturing#air>.

¹⁶³ John L. Adgate et al., “Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development,” *Environmental Science and Technology* (2014), available at <http://pubs.acs.org/doi/abs/10.1021/es404621d>.

¹⁶⁴ Lisa M. McKenzie et al., “Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado,” *Environmental Health Perspectives*, (2014) at 12, available at <http://ehp.niehs.nih.gov/1306722/>.

¹⁶⁵ Adgate et al. *supra* note 163.

¹⁶⁶ Detlev Helmig et al., “Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah Basin, Utah,” *Environmental Science & Technology*, March 27, 2014, available at <http://www.ncbi.nlm.nih.gov/pubmed/24624890>.

¹⁶⁷ EPA, Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 30088, 30157 (May 21, 2012); Wyoming Department of Environmental Quality, Technical Support Document I for Recommended 8-hour Ozone Designation of the Upper Green River Basin (March 26, 2009) at viii (explaining that Wyoming ozone pollution was “primarily due to local emissions from oil and gas . . . development activities: drilling, production, storage, transport, and treating.”), available at http://deq.state.wy.us/out/downloads/Ozone%20TSD_final_rev%203-30-09_jl.pdf

with subsequent increases in outpatient clinic visits for respiratory problems in Wyoming's Sublette County.¹⁶⁸ Researchers who looked at air pollution levels near fracking sites in Colorado also found an increased risk of chronic and sub-chronic effects mainly stemming from oil and gas related pollutants, which can harm the respiratory and neurological systems and lead to symptoms like shortness of breath, nosebleeds, headaches, dizziness, and chest tightness.¹⁶⁹

In addition to these air pollution impacts, gas production harms water resources. Gas production, and unconventional gas production in particular, can also harm water quality. Hydraulic fracturing of shale formations requires millions of gallons of water per well.¹⁷⁰ This process also risks contaminating surface or ground water with chemicals added to fracturing fluid or chemicals naturally occurring in the formation.¹⁷¹ As one recent survey explained, many of the chemicals used present health risks.

Examples [of fracking fluid additives] include methanol, ethylene glycol, naphthalene, xylene, toluene, ethylbenzene, formaldehyde, and sulfuric acid, some of which are known to be toxic, carcinogenic, and associated with reproductive harm. Many of these compounds are also regulated in other industries under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) as hazardous water pollutants. [¶] Many of the chemical compounds used in the process lack scientifically based maximum contaminant levels (MCLs), which render a quantification of their public health risk more difficult. . . . [¶] At certain concentrations or doses, more than 75% of the chemicals identified are known to negatively impact the skin, eyes, and other sensory organs, the respiratory system, the gastrointestinal system, and the liver; 52% have the potential to negatively affect the nervous system; and 37% of the chemicals are candidate endocrine disrupting chemicals.¹⁷²

One of the most troubling additives is diesel. The SEAB Shale Gas Subcommittee has singled out diesel as a fracturing fluid additive for its harmful effects, recommending a ban on use of diesel in fracturing fluid.¹⁷³ The minority staff of the House Committee on Energy and

¹⁶⁸ State of Wyoming Department of Health, "Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits — Sublette County, Wyoming, 2008–2011," 2013, available at health.wyo.gov/Media.aspx?mediaId=16318.

¹⁶⁹ McKenzie *et al.*

¹⁷⁰ DOE, Shale Gas Production Subcommittee, First 90-Day Report (Aug. 18, 2011).

¹⁷¹ Diminution of water quantity can also adversely affect water quality, as when reduced in-stream flows make streams less able to tolerate other sources of contamination.

¹⁷² Seth B. Shonkoff, et al., *Environmental Public Health Dimensions of Shale and Tight Gas Development*, Environmental Health Perspectives, 9-10 (April 16, 2014), <http://dx.doi.org/10.1289/ehp.1307866> (internal citations omitted).

¹⁷³ DOE, Shale Gas Production Subcommittee First 90-Day Report, at 25.

Commerce has determined that, despite diesel's risks, "between 2005 and 2009, oil and gas service companies injected 32.7 million gallons of diesel fuel or hydraulic fracturing fluids containing diesel fuel in wells in 20 states."¹⁷⁴

In addition to chemicals added to fracturing fluid, harmful chemicals naturally occur in the target formations, and these chemicals can be mobilized by the shale gas production process. Wastewater returned from the surface can occur harmful naturally occurring compounds such as benzene, toluene, ethylbenzene, and xylene.¹⁷⁵ Unconventional gas production can also introduce methane into water supplies, creating a safety hazard.

Shale gas production can introduce these harmful contaminants into surface and groundwater through a number of pathways: spills and leakages at the well pad, through a failure of the well casing or cement, or through other underground migration.¹⁷⁶ This migration might be most likely to occur through assistance of a pre-existing conduit such as an existing well or natural fault. Even in the absence of such a conduit, however, one study predicts that hydraulic fracturing could drive contaminants into aquifers in less than ten years.¹⁷⁷ This result is particularly troubling because, while a careful operator can reduce the risk of intersection with a fault or existing well, it is unclear whether any steps could be taken to avoid this contamination vector.

Numerous studies demonstrate that contamination occurs in practice. The National Energy Technology Laboratory summarized many of these studies.¹⁷⁸ Another study, reviewing drilling in Colorado, found that gas drilling correlated with increasing thermogenic methane and chloride levels in groundwater wells.¹⁷⁹ EPA has concluded that unconventional production likely led to groundwater contamination in Pavillion, Wyoming. In the Pavillion investigation, EPA's draft report concludes that "when considered together with other lines of evidence, the

¹⁷⁴ Letter from Reps. Waxman, Markey, and DeGette to EPA Administrator Lisa Jackson, 2 (Oct. 25, 2011), available at

<http://democrats.energycommerce.house.gov/sites/default/files/documents/Jackson-EPA-Hydraulic-Fracturing-2011-10-25.pdf>.

¹⁷⁵ Shonkoff 2014, *supra* n.172, at 19.

¹⁷⁶ NETL Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 83-93.

¹⁷⁷ Tom Myers, *Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers* (Apr. 17, 2012).

¹⁷⁸ NETL, Environmental Impacts of Unconventional Natural Gas Development and Production, DOE/NETL-2014/1651 (May 29, 2014), available at http://www.netl.doe.gov/File%20Library/Research/Oil-Gas/publications/NG_Literature_Review3_Post.pdf

¹⁷⁹ Geoffrey Thyne, *Review of Phase II Hydrogeologic Study* (2008), prepared for Garfield County, Colorado, available at

[http://cogcc.state.co.us/Library/Presentations/Glenwood_Spgs_HearingJuly_2009/\(1_A\)_ReviewofPhase-II-HydrogeologicStudy.pdf](http://cogcc.state.co.us/Library/Presentations/Glenwood_Spgs_HearingJuly_2009/(1_A)_ReviewofPhase-II-HydrogeologicStudy.pdf).

data indicates likely impact to ground water that can be explained by hydraulic fracturing.”¹⁸⁰ EPA tested water from wells extending to various depths within the range of local groundwater. At the deeper tested wells, EPA discovered inorganics (potassium, chloride), synthetic organic (isopropanol, glycols, and tert-butyl alcohol), and organics (BTEX, gasoline and diesel range organics) at levels higher than expected.¹⁸¹ At shallower levels, EPA detected “high concentrations of benzene, xylenes, gasoline range organics, diesel range organics, and total purgeable hydrocarbons.”¹⁸² EPA determined that surface pits previously used for storage of drilling wastes and produced/flowback waters were a likely source of contamination for the shallower waters, and that fracturing likely explained the deeper contamination.¹⁸³ The U.S. Geological Survey, in cooperation with the Wyoming Department of Environmental Quality, also provided data regarding chemicals found in wells surrounding Pavillion.¹⁸⁴ Although the USGS did not provide analysis regarding the likely source of the contaminants found, an independent expert who reviewed the USGS and EPA data at the request of Sierra Club and other environmental groups concluded that the USGS data supports EPA’s findings.¹⁸⁵ EPA turned further investigation of contamination of Pavillion over to Wyoming, and did not finalize its draft report, but EPA stated that it “stands behind its work and data” in the draft report.¹⁸⁶

Here, the EIS must thoroughly discuss these indirect impacts. At a minimum, the EIS must provide a qualitative discussion of the nature of these impacts, and acknowledge that the project will contribute to these problems. In addition, in taking a “hard look” at these impacts, the EIS must use quantitative tools to assess them where possible. The National Energy Technology Laboratory has, for example, provided a methodology for assessing, for any particular volume of gas production, the amount and type of air pollution emitted, the volume of water required, and the volume of wastewater produced.¹⁸⁷ One strength of the Laboratory’s analysis is that, in addition to analyzing the impact of average existing U.S. gas production, the

¹⁸⁰ EPA, Draft Investigation of Ground Water Contamination near Pavillion, Wyoming, at xiii (2011), available at http://www.epa.gov/region8/superfund/wy/pavillion/EPA_ReportOnPavillion_Dec-8-2011.pdf.

¹⁸¹ *Id.* at xii.

¹⁸² *Id.* at xi.

¹⁸³ *Id.* at xi, xiii.

¹⁸⁴ USGS, *Groundwater-Quality and Quality-Control Data for two Monitoring Wells near Pavillion, Wyoming, April and May 2012*, USGS Data Series 718 p.25 (2012).

¹⁸⁵ Tom Myers, *Assessment of Groundwater Sampling Results Completed by the U.S. Geological Survey* (Sept. 30, 2012). Another independent expert, Rob Jackson of Duke University, has stated that the USGS and EPA data is “suggestive” of hydraulic fracturing as the source of contamination. Jeff Tollefson, *Is Fracking Behind Contamination in Wyoming Groundwater?*, *Nature* (Oct. 4, 2012). See also Tom Myers, *Review of DRAFT: Investigation of Ground Water Contamination near Pavillion Wyoming* (April 30, 2012) (concluding that EPA’s initial study was well-supported).

¹⁸⁶ <http://www2.epa.gov/region8/pavillion> (last accessed Aug. 2, 2013).

¹⁸⁷ National Energy Technology Laboratory, *Life Cycle Analysis of Natural Gas Extraction and Power Generation*, at 34 (greenhouse gas emissions), 50 (non-greenhouse gas air pollution), 55 (water consumption and wastewater production).

analysis addresses the impact of *marginal* gas production—*i.e.*, the impact of the additional production that might be added if U.S. gas demand were to increase.¹⁸⁸ On the other hand, recent research confirms that some of the assumptions used as inputs in the Laboratory’s analysis were optimistic; in particular, the Laboratory underestimated the amount of methane emitted per unit of gas production. EPA, which uses a similar “bottom-up” method of analysis based on assumptions about equipment counts and emission rates, has recently recognized significantly increased its estimate of methane emitted by natural gas extraction, processing, and transportation by 27%.¹⁸⁹ Even this revised figure, however, is far lower than estimates based on direct measurements of methane in the atmosphere.¹⁹⁰ Here, the EIS must use some method to take a hard look at the air pollution and other impacts of producing and delivering gas to the project site; if the revised EIS uses the National Energy Technology Laboratory’s methods, the EIS must nonetheless revise the inputs to that methodology.

Finally, the EIS must address whether available tools and information can predict where this additional production will occur, and how the gas demand created by the Project will influence overall U.S. gas supply. On the former point, it may be that the contracts with gas suppliers provide information that enables reasonable predictions as to where the supplied gas will come from. Even if such contracts provide no such information, more general modeling tools, such as the Environmental Information Administration’s National Energy Modeling System, may be able to predict, at a “play” or regional level, where this gas will be produced.¹⁹¹

¹⁸⁸ See *id.* at D-5. These values differ because, for example, fracked shale gas is likely to play a larger role in incremental gas production than in the average of existing production.

¹⁸⁹ Compare <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf> (page 3-68, table 3-43) with <http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf> (page 3-70, table 3-45).

¹⁹⁰ Schneising, O, et al. (2014) Remote sensing of fugitive methane emissions from oil and gas production in North American tight geologic formations. *Earth’s Future*; Lavoie et al. (2015). Aircraft-based measurements of point source methane emissions in the Barnett Shale Basin. *ES&T*. [dx.doi.org/10.1021/acs.est.5b00410](https://doi.org/10.1021/acs.est.5b00410); Lyon et al. (2015). Constructing a spatially resolved methane emission inventory for the Barnett Shale region. *ES&T*. [dx.doi.org/10.1021/es506359c](https://doi.org/10.1021/es506359c); Marchese et al. (2015). Methane emissions from United States natural gas gathering and processing. *ES&T*. [dx.doi.org/10.1021/acs.est.5b02275](https://doi.org/10.1021/acs.est.5b02275); McKain et al. (2015). Methane emissions from natural gas infrastructure and use in the urban region of Boston, Massachusetts. *PNAS*. [dx.doi.org/10.1073/pnas.1416261112](https://doi.org/10.1073/pnas.1416261112); Zimmerle et al. (2015). Methane emissions from the natural gas transmission and storage system in the United States. *ES&T*. [dx.doi.org/10.1021/acs.est.5b01669](https://doi.org/10.1021/acs.est.5b01669).

¹⁹¹ Energy Information Administration, Assumptions to Annual Energy Outlook 2015 (Sept. 10, 2015), available at <https://www.eia.gov/forecasts/aeo/assumptions/>; Energy Information Administration, Oil and Gas Supply Module documentation, available at https://www.eia.gov/forecasts/aeo/assumptions/pdf/oil_gas.pdf; Energy Information Administration, Natural Gas Transmission Module documentation, available at <https://www.eia.gov/forecasts/aeo/assumptions/pdf/natgas.pdf>.

The EIS should also consider the effect of the Project on broader domestic energy markets. For example, in assessing the impact of liquefied natural gas exports, the Energy Information Administration predicted that a significant fraction of the additional demand created by exports would be supplied, not by increased gas production, but by shifting other existing gas consumers to coal, with different—but also severe—environmental consequences.¹⁹²

VI. SEISMIC HAZARDS

It is reasonable to expect that the proposed refinery will experience a very large earthquake within the lifetime of the project. The Cascadia Subduction Zone, where the eastward-moving Juan de Fuca tectonic plate plunges beneath the westward-moving North American plate close to the Oregon coast,¹⁹³ creates a severe hazard for earthquakes of magnitude 9.0 or even higher.¹⁹⁴ Experts estimate the recurrence time for earthquakes in the southern region of the Cascadia Subduction Zone, comprising Northern California and the Oregon coast, at 240 years over a period of 10,000 years.¹⁹⁵ Because the last event occurred in 1700, experts estimate a 42% likelihood of a severe seismic event within the next 50 years.¹⁹⁶

Soil underlying the dock,¹⁹⁷ the refinery, and the tank farm may liquefy in the event of a large earthquake. The site has been identified as having soils of moderate to high liquefaction susceptibility, as presented on Figure 3-3 of the DEIS. Geotechnical investigations conducted on and near the site indicate that sand and silt present below the groundwater levels are susceptible to liquefaction, and that liquefaction could occur down to approximately 80 to 100 feet underground.¹⁹⁸ Along the banks of the Columbia, including the project site, soil liquefaction

¹⁹² Energy Information Administration, *Effect of Increased Natural Gas Exports on Domestic Energy Markets* at 6, 12 (Jan. 2012), available at http://www.eia.gov/analysis/requests/fe/pdf/fe_lng.pdf

¹⁹³ Oregon Department of Land Conservation and Development, *Oregon Coastal Zone Management Program Tsunami Guide*, <http://www.oregon.gov/LCD/OCMP/docs/Publications/TsunamiGuide20140108.pdf> (April 2014).

¹⁹⁴ Goldfinger, Christopher *et al.*, *Turbidite Event History—Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone*, U.S. Geological Survey Professional Paper 1661-F, <http://pubs.usgs.gov/pp/pp1661f/>, (2014)

¹⁹⁵ *Id.* at 3.

¹⁹⁶ *Id.* By the year 2060, within the lifetime of the proposed facility, the southern portion of the Cascade Subduction Zone will have exceeded 85% of recurrence intervals if no major earthquake has yet occurred.

¹⁹⁷ With regard to how the dock would respond to a large earthquake, project consultants concluded that: “the entire soil column below the groundwater table and above elevation -60 ft is potentially liquefiable during [an earthquake greater than 7.5 magnitude]. The effects of liquefaction on the dock would include “seismically induced settlement, lateral spreading toward the river, reduction in pile capacity due to soil strength loss, and downdrag loads” DEIS, Appx. C2, pp.6–7.

¹⁹⁸ See DEIS, p.3-6.

could cause lateral spreading of 5 to 10 feet and ground settlement from 18 to 30 inches. DEIS pp.3-8, -16, and -18. Such soil movement could cause serious damage to structures at the project site. For example, soil liquefaction caused by earthquakes has damaged industrial port facilities in the United States, Japan, Peru, Chile, Mexico, and other countries over the past several decades.¹⁹⁹

The EIS inexcusably delays any serious discussion of if and how the proposed facility can be built to withstand a large earthquake. First, the EIS states that a “ground improvement program” will be designed—later on as the project is being built—to address systemic risk.²⁰⁰ This stands the SEPA process on its head: project decision makers and the public need to know, in advance of approving the proposal, whether and how it will be safely designed. Second, the EIS simply repeats that the facility will be “built to code.”²⁰¹ For the purposes of an EIS, the question is not whether the project will be built to code, but rather what is the effect of building it to code? The FEIS must include a detailed discussion on if and how the proposed project can be built to withstand a likely large earthquake, and if the applicable building codes ensure this level of safety.

VII. GREENHOUSE GAS EMISSIONS

The greenhouse gas (“GHG”) analysis contained in the DEIS is flawed in several respects, explained below. Increased GHG emissions associated with the Project would exacerbate global climate change, leading to sea level rise and associated human displacement, extreme weather events, increased ambient temperatures, altered precipitation patterns, ocean acidification, and loss of habitat and species. In particular, the high global warming potential of the project’s fugitive methane emissions (at the wellhead, along the pipeline route, and at the refinery) must be described in the FEIS. Finally, the DEIS does not acknowledge the resulting unavoidable and significant adverse environmental impacts from the project’s GHG emissions and offers no effective mitigation for those impacts.

The health impacts of climate change are numerous and increasing. Many world leaders and medical, public health, and scientific bodies have expressed deep concerns about climate change as a threat to human health and well-being and are speaking out about these threats with increasing urgency. Physicians for Social Responsibility,²⁰² the American Public Health Association,²⁰³ the international medical journal *The Lancet*,²⁰⁴ the Union of Concerned

¹⁹⁹ Werner et al. (1998) Experiences from Past Earthquakes (Chapter 2), in *Seismic Guidelines for Ports*, ASCE Press.

²⁰⁰ DEIS, p.3-16.

²⁰¹ See *id.*; see also DEIS, Appendix C1, p.3.

²⁰² Washington and Oregon Physicians for Social Responsibility, *Position Statement on Crude Oil Transport and Storage to Governors of Washington & Oregon* (2015).

²⁰³ American Public Health Association, *Policy on Climate and Health* (2015) (online at: <http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2015/12/03/15/34/public-health-opportunities-to-address-the-health-effects-of-climate-change>).

Scientists, and many other scientific groups have all expressed the urgency for attention to the health threats of climate and are speaking out about these threats with increasing urgency.

The recently released National Climate and Health Assessment describes how human health is already being affected by climate change. “Climate change is a significant threat to the health of the American people. The impacts of human-induced climate change are increasing nationwide. Rising greenhouse gas concentrations result in increases in temperature, changes in precipitation, increases in the frequency and intensity of some extreme weather events, and rising sea levels. These climate change impacts endanger our health by affecting our food and water sources, the air we breathe, the weather we experience, and our interactions with the built and natural environments. As the climate continues to change, the risks to human health continue to grow. Every American is vulnerable to the health impacts associated with climate change.”²⁰⁵

A. SEPA Standards for GHG Emissions Review

SEPA and its implementing regulations explicitly require consideration of direct and indirect climate impacts. *See* RCW 43.21C.030(f) (directing agencies to “recognize the world-wide and long-range character of environmental problems”); WAC 197-11-444 (listing “climate” among elements of the environment that must be considered in SEPA review). SEPA regulations also explicitly direct that environmental impacts outside the jurisdiction of the deciding agency should be considered. WAC 197-11-060(c). Crucially, agencies are required to assess both the direct and indirect impacts of the proposal.

In 2008, a governor-appointed working group provided a list of recommendations on how to ensure that climate change is considered in meeting SEPA’s directives.²⁰⁶ Notably, those recommendations identified the following categories of greenhouse gas (“GHG”) emissions to be considered pursuant to SEPA: a) off-site mining of materials purchased for the project; b) transportation of raw materials to the project, and transport of the final product offsite; c) use of products sold by proponent to consumers or industry, including “emissions generated from combustion of fuels manufactured or distributed by the facility.”

Ecology has issued SEPA Guidance for its own consideration of GHG emissions.²⁰⁷ That guidance makes clear that SEPA requires climate to be considered in its environmental analysis. Ecology’s Guidance proposes that SEPA documents consider whether the proposal will significantly contribute to GHG concentrations.²⁰⁸

²⁰⁴ [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)60854-6.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)60854-6.pdf)

²⁰⁵ U.S. Global Climate Change Research Program, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (2016) (online at: <https://health2016.globalchange.gov>)

²⁰⁶ Available at

http://www.ecy.wa.gov/climatechange/docs/sepa/20110603_SEPA_GHGinternalguidance.pdf.

²⁰⁷ Available at <http://www.ecy.wa.gov/climatechange/sepa.htm>.

²⁰⁸ *Id.* at 4.

B. Other GHG Emissions Not Accounted for in the DEIS.

Besides ignoring the GHG emissions associated with producing delivering natural gas to the facility site, discussed above, the DEIS also fails to adequately consider the GHG emissions from these other sources and activities:

- **Fugitive methane emissions at the Kalama Methanol Refinery and the 101 MW on-site gas generator.**
- **GHG emissions associated with generating 100MW of electricity off-site.** The DEIS assumes that the 100 MW that NWIW will consume from off-site generation will be produced with the average GHG impacts of all power produced in the Pacific Northwest.²⁰⁹ This assumption almost certainly underestimates the Project's actual impact. This is because the existing average incorporates significant amounts of hydroelectric and other renewable power, with minimal air emissions. These electricity generation sources are presumably already being used to the fullest possible capacity. Thus, any incremental, additional power generation needed to satisfy the Project's added electrical demand will come from other sources with higher average emissions. The EIS must reflect the emissions of this incremental generation. It may be possible to quantify these incremental emissions by subtracting hydroelectric sources out of the eGRID data used in the DEIS; by examining NWIW's contracts with Cowlitz Public Utility District, and the District's contracts with electricity generators, to identify the particular additional capacity that will supply the Project, or through some other method.
- **GHG emissions from vessels traveling to and from China to deliver methanol.** The DEIS severely underestimates the GHGs (including CO² and black carbon) produced by the vessels carrying methanol. First, the DEIS inexplicably stops counting GHG emissions from vessels at the mouth of the Columbia River.²¹⁰ Obviously, the vessels serving NWIW's Project go all the way to China—and they aren't sailing ships. Second, the DEIS should explain whether the analysis accounts for emissions from vessels coming to the methanol refinery: the EIS says that the GHG accounting considered "with vessel operation emissions associated with transport of the final manufactured product within Washington State waters."²¹¹ Does that mean that vessels that are headed to the refinery but are not yet carrying "final manufactured product" are not counted in the analysis?

²⁰⁹ DEIS, p.4-18; Appx. D, p.58.

²¹⁰ DEIS, Appx. D, p.58.

²¹¹ DEIS, p.4-14. This assertion also appears to be factually incorrect: Washington State's waters extend three nautical miles from the coast, but the analysis of vessel emissions stops at the mouth of the Columbia River. *See* DEIS, Appx. D, p.58.

GHGs are fungible in the atmosphere such that the impacts to Washington State and the rest of the world do not depend on where the emissions occur. For that reason, it is imperative that all emissions caused by this project—regardless of location—are considered.

C. This Project Would Result in Unavoidable and Significant Adverse Environmental Impacts.

Finally, the DEIS's conclusion that the Project's GHG emissions represent an insignificant impact is simply wrong. Even without the *significant* omissions noted above, this single project would increase Washington's GHG emissions by roughly 1.1 to 1.6 percent.²¹² The conclusion that this dramatic statewide increase in GHG emissions is insignificant is unsupported and unsupportable—this is a sizeable contribution to the State's entire GHG level for only a single project.

All GHGs should be mitigated, and the final EIS must consider various mitigation options. Mitigation options must include: denial of the Project outright; prohibition on high-GHG sources like fracked gas; requirements that gas bought by NWIW be extracted using BMPs to reduce fugitive gas emissions, and requirement to purchase credits from a legitimate and verified source to offset all net GHG emissions proximately caused by the project. This Project would be responsible for a tremendous increase in GHG emissions, and without mitigation, these emissions create unavoidable and significant adverse environmental impacts.

VIII. WATER QUALITY IMPACTS

NWIW would discharge wastewater from the methanol refinery into the Columbia River. Pollutants in the wastewater would include heat, lead, chromium, copper, and zinc. The treated wastewater would violate water quality standards (*i.e.*, standards set to protect salmon and people that eat local fish). In turn, the facility seeks authorization for a toxic mixing zone—an area of the Columbia River where pollution from the terminal would violate water quality standards. The DEIS fails to analyze the impacts of toxic water pollution on designated uses.

Finally, the Columbia River is too hot. The massive die-off of sockeye salmon in 2015 demonstrates the heavy toll of heat pollution on the Columbia River and its salmon runs. Yet the facility would add a new heat source to the Columbia River, in a segment of the Columbia that has specifically been added to Washington's 303d list for temperature.²¹³ The DEIS fails to evaluate the impacts of this new heat source that would contribute to ongoing violations of water quality standards in the Columbia River.

²¹² DEIS, p.15-11.

²¹³ See https://fortress.wa.gov/ecy/wats/UIEpaSearch/ViewApprovedListing.aspx?LISTING_ID=21538 (“Continuous monitoring data from a study by Parametrix (2002 and 2004) indicates exceedances of the numeric temperature criteria of 20°C at RM 71.9 in 2002 and 2003.”).

CONCLUSION

For the reasons set forth above, the DEIS is legally and factually inadequate. The DEIS misses key impacts and fails to take a hard look at all the direct, indirect, and cumulative impacts of the proposed Project. The DEIS also incorrectly concludes that NWIW's ambitious proposal has no significant adverse impacts to the environment and public health that are not addressed by the paltry mitigation proposed. To the contrary, the adverse environmental and public health impacts that must be disclosed in the final EIS will demonstrate that the Project should be denied. If the County and the Port do not exercise their substantive SEPA authority to deny the Project, the County should use the final EIS as part of its evidence for denying NWIW's upcoming Shorelines Substantial Development and Land Use permits.

Sincerely,



Miles Johnson, Attorney for Columbia Riverkeeper

*Submitted on behalf of Columbia Riverkeeper,
Sierra Club, Center for Biological Diversity,
Oregon Physicians for Social Responsibility,
Landowners and Citizens for a Safe Community,
Wahkiakum Friends of the River,
Save Our Wild Salmon, and Northwest
Environmental Defense Center*

Exhibits

- Exhibit 1, Comment of Columbia Riverkeeper to U.S. Army Corps of Engineers on CWA §404 Permit for NWIW's Proposal (2015).
- Exhibit 2, Comment of Columbia Riverkeeper to Washington Department of Ecology on CWA §401 Certification for NWIW's Proposal (2015).
- Exhibit 3, Comments of WDFW to FERC on the Kalama Lateral Pipeline (2015).
- Exhibit 4, Massachusetts Department of Environmental Protection, *Large Volume Ethanol Spills—Environmental Impacts and Response Options* (2011).
- Exhibit 5, Thom, R. *et al.*, *Columbia River Estuary Ecosystem Restoration Program, 2012 Synthesis Memorandum* (2013).
- Exhibit 6, NMFS, *Final Biological Opinion for Columbia Pacific Bio-Refinery Dock Expansion* (2015).

- Exhibit 7, U.S. Army Corps of Engineers, *Joint Public Notice of Application for a Department of the Army Permit and a Washington Department of Ecology Water Quality Certification for NWIW's Methanol Refinery and Export Terminal* (2015).
- Exhibit 8, Oregon Physicians for Social Responsibility, *Airborne Particulate Matter and Public Health* (2015).
- Exhibit 9, American Heart Association, *Danger in the Air: Air Pollution and Cardiovascular Disease* (2014).
- Exhibit 10, Jaffe *et al.*, *Diesel particulate matter and coal dust from trains in the Columbia River Gorge, Washington State, USA* (2015).

jean public <jeanpublic1@gmail.com>

Jul 27 (4 days ago)

to me, Pew, INFORMATION, info, Kieran, humanelines, PETA

public comment on federal register

the govt authorities in the columbia river area because of commercial fishermen pressure have it in for the seals and sea lions trying to stay alive by eating some salmon. the commerical fish profitters want all the salmon to themselves. they are venaland letahl to all sea life and dont want it to be alive at all. and they completely and totally pressure the govt agencies, who dont give a shit about animal lives anyway, to kill them with these projects. i am totally against this project. it is not necessary. they should not be allowed to kill even one seal or sea lion or stellar. they should be so careful. i can see that the lax negligent rules they have set up for themselves means nobody is watching to stop the lethality and killing that will be gon on. we need a govt agency that stands up for animal lives. the lousy evil govt agencies we have all work for big corporations and we know they are busily killing animal all over this world the big corporations dont care about the sea, the forests or anything at all except MONEY GRUBBING. AND OUR GOVT AGENCIES WORK RIGHT ALONG DOING WHATEVER THE CORPORATIONS WANT. OUR WORLD IS BEING RUINED BY ALLOWING THIS KIND OF ATTITUDE FROM OUR GOVT AGENCIES. WE NEED TO SEE THA THEY CHANGE AND RECOGNIZE WILDIFE AS A BLESSING FOR ALL OF US THA TGOD PUT ON EARTH TO HELP US AND STOP THE RAMPANT DESECRATION OF THE SEA, THE LAND, THE FORESTS, THE WILDLIFE, THE BIRDS EVERYTHING. WE HAVE EVIL GOVT AGENCIES KILLING THEM ALL. WE NEED TO CHANGE OUR GOVT AND INSIST THAT THEY STOP THIS LETHALITY. THIS PROJECT SHOULD NOT BE BUILT. THIS COMMETN IS FOR THE PUBLIC RECORD. I SEE THAT THE KILLING INVOLVED WITH IT IS TOO MASSIVE. PLEASE RECEIPT. JEAN PUBLIEE JEANPUBLIC1@GMAIL.COM

On Wed, Jul 25, 2018 at 9:13 AM, Jean Public <jeanpublic1@yahoo.com> wrote:
Federal Register Volume 83, Number 143 (Wednesday, July 25, 2018)]
[Notices]
[Pages 35220-35225]
From the Federal Register Online via the Government Publishing Office
[\[www.gpo.gov\]](http://www.gpo.gov)
[FR Doc No: 2018-15837]

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XG133

Takes of Marine Mammals Incidental to Specified Activities;
Taking Marine Mammals Incidental to Port of Kalama Expansion Project on
the Lower Columbia River

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and
Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request
for comments.

SUMMARY: NMFS received a request from the Port of Kalama (POK) to issue an incidental harassment authorization (IHA) previously issued to the POK to incidentally take three species of marine mammal, by Level B harassment only, during construction activities associated with an expansion project at the Port of Kalama on the Lower Columbia River, Washington. The current IHA was issued in 2017 and is in effect until August 31, 2018 (2017-2018 IHA). However, the project has been delayed such that none of the work covered by the 2017-2018 IHA has been initiated and, therefore, the POK requested that an IHA be issued to conduct their work beginning on or about September 1, 2018 (2018-2019 IHA). NMFS is seeking public comment on its proposal to issue the 2018-2019 IHA to cover the incidental take analyzed and authorized in the 2017-2018 IHA. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to POK to incidentally take, by Level B harassment, small numbers of marine mammals during the specified activities. The authorized take numbers and related analyses would be the same as for the 2017-2018 IHA, and the required mitigation, monitoring, and reporting would remain the same as authorized in the 2017-2018 IHA referenced above. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than August 24, 2018.

ADDRESSES: An electronic copy of the final Authorization issued in 2017 and supporting material along with an updated IHA request memo from POK may be obtained by visiting <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities>. In case of problems accessing these documents, please call the contact listed below (see FOR FURTHER INFORMATION CONTACT).

FOR FURTHER INFORMATION CONTACT: Dale Youngkin, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined "negligible impact" in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably

expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term ``take'' means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines ``harassment'' as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has

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the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

In compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), as implemented by the regulations published by the Council on Environmental Quality (40 CFR parts 1500-1508), NMFS prepared an Environmental Assessment (EA) to consider the direct, indirect and cumulative effects to the human environment resulting from the POK Expansion project. NMFS made the EA available to the public for review and comment in order to assess the impacts to the human environment of issuance of the 2017-2018 IHA to the POK. Also in compliance with NEPA and the CEQ regulations, as well as NOAA Administrative Order 216-6, NMFS signed a Finding of No Significant Impact (FONSI) on October 24, 2016 for issuance of the 2017-2018 IHA. These NEPA documents are available at

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities>.

Since this IHA covers the same work covered in the 2017-2018 IHA, NMFS has reviewed our previous EA and FONSI, and has preliminarily determined that this action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review. We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the 2018-2019 IHA request.

History of Request

On September 28, 2015, we received a request from the POK for authorization of the taking, by Level B harassment only, of marine mammals incidental to the construction associated with the Port of Kalama Expansion Project, which involved construction of the Kalama Marine Manufacturing and Export Facility including a new marine terminal for the export of methanol, and installation of engineered log jams, restoration of riparian wetlands, and the removal of existing

wood piles in a side channel as mitigation activities. The specified activity is expected to result in the take of three species of marine mammals (harbor seals, California sea lions, and Steller sea lions). A final version of the application, which we deemed adequate and complete, was submitted on December 10, 2015. We published a notice of a proposed IHA and request for comments on March 21, 2016 (81 FR 715064). After the public comment period and before we issued the final IHA, POK requested that we issue the IHA for 2017 instead of the 2016 work season. We subsequently published the final notice of our issuance of the IHA on December 12, 2016 (81 FR 89436), effective from September 1, 2017-August 31, 2018. In-water work associated with the project was expected to be completed within the one-year timeframe of the IHA.

On June 21, 2018, POK informed NMFS that work relevant to the specified activity considered in the MMPA analysis for the 2017-2018 IHA was postponed and would not be completed. POK requested that the IHA be issued to be effective for the period from September 1, 2018-August 31, 2019. In support of that request, POK submitted an application addendum affirming that no change in the proposed activities is anticipated and that no new information regarding the abundance of marine mammals is available that would change the previous analysis and findings.

Description of the Activity and Anticipated Impacts

The 2017-2018 IHA covered the construction of a marine terminal and dock/pier for the export of methanol, and associated compensatory mitigation activities for the purposes of offsetting habitat effects from the action. The marine terminal will be approximately 45,000 square feet in size, supported by 320 concrete piles (24-inch precast octagonal piles to be driven by impact hammer) and 16 steel piles (12 x 12-inch and 4 x 18-inch anticipated to be driven by vibratory hammer, and impact hammering will only be done to drive/proof if necessary). The compensatory mitigation includes installation of 8 engineered log jams (ELJs), which will be anchored by untreated wooden piles driven by impact hammer at low tides (not in water). The compensatory mitigation also includes removal of approximately 320 untreated wooden piles from an abandoned U.S. Army Corps of Engineers (USACE) dike in a nearby backwater area. The piles will be removed either by direct pull or vibratory extraction. Finally, the compensatory mitigation includes wetland restoration and enhancement by removal of invasive species and replacement with native wetland species.

NMFS refers the reader to the documents related to the 2017-2018 IHA for more detailed description of the project activities. These previous documents include the Federal Register notice of the issuance of the 2017-2018 IHA for the POK's Port of Kalama Expansion Project (81 FR 89436, December 12, 2016), the Federal Register notice of the proposed IHA (81 FR 15064, March 21, 2016), POK's application (and 2018 application addendum), and all associated references.

Detailed Description of the Action--A detailed description of the pile driving activities at the Port of Kalama is found in these previous documents and the updated 2018-2019 IHA application addendum. The location, timing (e.g., seasonality), and nature of the pile driving operations, including the type and size of piles and the methods of pile driving, are identical to those described in the previous Federal Register notices referenced above.

Description of Marine Mammals--A description of the marine mammals in the area of the activities is found in the previous documents

referenced above, which remain applicable to this IHA as well. In addition, NMFS has reviewed recent Stock Assessment Reports, information on relevant Unusual Mortality Events, and recent scientific literature. Since the submittal of the 2015 IHA application, the USACE has published updated data on pinniped presence at the Bonneville Dam (Tidwell et al., 2017). This information reveals that in both 2016 and 2017 the numbers of pinnipeds present at Bonneville Dam were within the range of historical variability. The latest USACE data does not suggest a trend that would require a modification to the take estimates or to the effects analysis (see Table 1 below for a summary of monitoring data by year from Tidwell et al., 2017). Therefore, NMFS has preliminarily determined that the updated information does not affect our analysis of impacts for the 2018-2019 IHA.

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Table 1--Minimum Estimated Number of Individual Pinnipeds Observed at Bonneville Dam Tailrace Areas and the Hours of Observation During the Focal Sampling Period, 2002 to 2017

[From Tidwell et al., 2017]

Year	Total pinnipeds	Total hours observed	California sea lions	Steller lions
2002	0	662	30	
2003	3	1,356	104	
2004	3	516	99	
2005 *	4	1,109	81	
2006	11	3,650	72	
2007	9	4,433	71	
2008	39	5,131	82	
2009	26	3,455	54	
2010	75	3,609	89	
2011	89	3,315	54	
2012	73	3,404	39	
2013	80	3,247	56	
2014	65	2,947	71	

2015.....			2,995	195	a
69	0	264			
2016.....			1,974	149	a
54	0	203			
2017.....			1,142	92	a
63	1	156			

* Observations did not begin until March 18 in 2005.
 \a\ In 2015, 2016, and 2017 the minimum estimated number of Steller sea lions was 55, 41, and 32, respectively.

These counts were less than the maximum number of Steller sea lions observed on one day, so Tidwell et al. (2017) used the maximum number observed on one day as the minimum number. This difference was driven by a focus on California sea lions and lack of branding or unique markers on Steller sea lions.

Potential Effects on Marine Mammals--A description of the potential effects of the specified activities on marine mammals and their habitat is found in the previous documents referenced above, and remain applicable to this proposed IHA. There is no new information on potential effects that would change our analyses or determinations under the 2018-2019 IHA.

Estimated Take--A description of the methods and inputs used to estimate take anticipated to occur and, ultimately, the take that was authorized is found in the previous documents referenced above. The methods of estimating take for this proposed IHA are identical to those used in the 2017-2018 IHA, as is the density of marine mammals. The source levels, also remain unchanged from the 2017-2018 IHA, and NMFS' 2016 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016) was used to address new acoustic thresholds in the notice of issuance of the 2017-2018 IHA. As stated above, since the submittal of the application for the 2017-2018 IHA (in effect from September 1, 2017 through August 31, 2018), the USACE has published updated data on pinniped presence at the Bonneville Dam, and this data does not suggest a trend that would require a modification to the take estimates or effects analysis. Consequently, the proposed authorized take for this proposed 2018-2019 IHA is identical to the 2017-2018 IHA, as presented in Table 2 below.

Table 2--Estimated Take Proposed for Authorization and Proportion of Population Potentially Affected

Percentage of stock potentially affected	Population trend	Estimated take by Level B harassment	Abundance of stock
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Harbor seal.....		1,530	24,732
6.2 Stable.			

California sea lion.....	372	153,337
0.2 Stable.		
Steller sea lion.....	372	59,968
0.6 Increasing.		

Description of Mitigation, Monitoring and Reporting Measures--A description of mitigation, monitoring, and reporting measures is found in the previous documents referenced above, and remain unchanged for this proposed IHA. In summary, mitigation includes implementation of shut down procedures if any marine mammal approaches or enters the Level A harassment zone for impact pile driving. One trained observer shall monitor to implement shutdowns and collect information at each active impact pile driving location. In addition, two shore-based observers (one upstream of the project, and another downstream of the project), whose primary responsibility shall be to record pinnipeds in the disturbance zone and to alert barge-based observers to the presence of pinnipeds, thus creating a redundant alert system for prevention of injurious interaction as well as increasing the probability of detecting pinnipeds in the disturbance zone.

At least three observers shall be on duty during vibratory pile driving activity for the first two days, and thereafter on every third day to allow for estimation of Level B takes. The first observer shall be positioned on a work platform or barge where the entirety of a 10 m shutdown zone can be monitored. Shore based observers shall be positioned to observe the disturbance zone from the bank of the river. Protocols will be implemented to ensure that coordinated communication of sightings occurs between observers in a timely manner.

Pile driving activities shall only be conducted during daylight hours. If the shutdown zone is obscured by fog or poor lighting conditions, pile driving

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will not be initiated until the entire shutdown zone is visible. Work that has been initiated appropriately in conditions of good visibility may continue during poor visibility. The shutdown zone will be monitored for 30 minutes prior to initiating the start of pile driving, during the activity, and for 30 minutes after activities have ceased. If pinnipeds are present within the shutdown zone prior to pile driving, the start will be delayed until the animals leave the shutdown zone of their own volition, or until 15 minutes elapse without re-sighting the animal(s).

Soft start procedures shall be implemented at the start of each day's impact pile driving and at any time following cessation of impact driving for a period of thirty minutes or longer. If steel piles require impact installation or proofing, a bubble curtain will be used for sound attenuation.

Determinations

The POK proposes to conduct activities in 2018-2019 that are identical to those covered in the currently 2017-2018 IHA. As described above, the number of estimated takes of the same stocks of harbor seals (OR/WA Coast stock), California sea lion (U.S. stock), and Steller sea lion (Eastern DPS) is the same for this proposed IHA as those

authorized in the 2017-2018 IHA, which were found to meet the negligible impact and small numbers standards. The authorized take of 1,200 harbor seals; 70 California sea lions, and 68 Steller sea lions represent 4.8 percent, >0.1 percent, and 0.1 percent of these stocks of marine mammals by Level B harassment, respectively. This proposed IHA includes identical required mitigation, monitoring, and reporting measures as the 2017-2018 IHA, and there is no new information suggesting that our prior analyses or findings should change.

Based on the information contained here and in the referenced documents, NMFS has preliminarily determined the following: (1) The authorized takes will have a negligible impact on the affected marine mammal species or stocks; (2) the required mitigation measures will effect the least practicable impact on marine mammal species or stocks and their habitat; (3) the authorized takes represent small numbers of marine mammals relative to the affected species or stock abundances; and (4) the POK's activities will not have an unmitigable adverse impact on taking for subsistence purposes, as no relevant subsistence uses of marine mammals are implicated by this action.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 et seq.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed species is expected to result from this activity, and none would be authorized. Therefore, NMFS has determined that consultation under section 7 of the ESA is not required for this action.

Proposed Authorization

NMFS proposes to issue an IHA to POK for in-water construction work activities beginning September 2018 through August 2019, with the proposed mitigation, monitoring, and reporting requirements. The proposed IHA language is provided next.

This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

The Port of Kalama (POK), 110 West Marine Drive, Kalama, Washington, 98625, is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1371(a)(5)(D)) and 50 CFR 216.107 to take marine mammals, by harassment, incidental to conducting in-water construction work for the Port of Kalama Expansion Project contingent upon the following conditions:

1. This Authorization is effective for one year from the date of issuance.

2. Timing of Activities

- (a) Timing of activities anticipated to result in take of marine mammals shall be conducted between September 1, 2018 and January 31, 2019;

- (b) Timing of Activities Not Anticipated to Result in Take of Marine Mammals;

(i) Dredging would be conducted between September 1, 2018 and December 31, 2018;

(ii) Construction/installation of engineered log jams (ELJ) may be conducted year-round;

(iii) Construction that will take place below the Ordinary High Water Mark (OHWM), but outside of the wetted perimeter of the river (in the dry) may be conducted year-round; and

(iv) Removal of wooden piles from former trestle in the freshwater intertidal backwater channel portion of the project site (compensatory mitigation measure of removal of 157 wooden piles) may be conducted year-round.

3. This Authorization is valid only for activities associated with in-water construction work for the Port of Kalama Expansion Project on approximately 100 acres (including uplands) at the northern end of the Port of Kalama's North Port site (Lat. 46.049, Long. -122.874), located at approximately river mile 72 along the lower Columbia River along the east bank in Cowlitz County, Washington.

4. Briefings shall be conducted between construction supervisors, crews, marine mammal observer team, and Port of Kalama staff prior to the start of all pile driving/removal work and when new personnel join the work in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

5. (a) The number and species authorized for taking are: 1,530 harbor seals (*Phoca vitulina richardsi*), 372 California sea lions (*Zalophus californianus*), and 372 Steller sea lions (*Eumatopius jubatus*).

(b) The Authorization for taking by harassment is limited to the following acoustic sources and activities:

(i) Impact pile driving; and

(ii) Vibratory pile driving activities (including vibratory removal of temporary construction piles

(c) The taking of any marine mammal in a manner prohibited under this Authorization must be reported within 24 hours of the taking to the National Marine Fisheries Service (NMFS) West Coast Regional Administrator at (206) 526-6150 and the NMFS Chief of the Permits and Conservation Division at (301) 427-8401.

6. The taking, by Level B harassment only, is limited to the species listed, and by the numbers listed, under condition 4(a) above. The taking by Level A harassment or death of the species identified in 4(a) or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this Authorization.

7. Mitigation

(a) Activities authorized for take of marine mammals by this Authorization shall occur only during daylight hours.

(b) A bubble curtain shall be used for sound attenuation if steel piles require impact installation or proofing.

(c) Exclusion Zone and Level B Harassment Zones of Influence;

(i) Exclusion zones out to distances encompassing the Level A harassment

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zones shall be implemented to avoid Level A take of marine mammals (40 m (131 ft) for impact driving of concrete piles; 252 m (828 ft) for impact driving of steel piles; and 16.5 m (54 ft) for vibratory driving

of steel piles); and

(ii) Disturbance zones shall be established as 117 m (384 ft) for impact driving of concrete piles; 1,848 m (6,063 ft) for impact driving of steel piles; and line of sight to nearest shoreline (5.7 km (18,700 ft) maximum) for vibratory driving of steel piles;

(d) Monitoring of marine mammals shall take place starting 30 minutes before pile driving begins and shall continue until 30 minutes after pile driving ends.

(e) Soft Start

(i) Soft start procedures shall be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer; and

(ii) Soft start procedures require that the contractor provides an initial set of three strikes at reduced energy followed by a 30-second waiting period, then two subsequent reduced energy strike sets.

(f) Shutdown Measures

(i) POK shall implement shutdown measures if a marine mammal is sighted within, or is perceived to be approaching, the exclusion zones identified in 5(c) (i) above and the associated construction or pile driving activities shall immediately cease. Pile driving or in-water construction work shall not be resumed until the exclusion zone has been observed as being clear of marine mammals for at least 15 minutes; and

(ii) If marine mammals are present within the exclusion zones established in 5(c) (i) above prior to the start of in-water construction activities, these activities would be delayed until the animals leave the exclusion zone of their own volition, or until 15 minutes elapse without resighting the animal, at which time it may be assumed that the animal(s) have left the exclusion zone.

8. Monitoring

Marine Mammal Observers--POK shall employ observers to conduct marine mammal monitoring for its construction project. Observers shall have the following minimum qualifications:

(i) Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with the ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target;

(ii) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);

(iii) Experience or training in the field identification of the marine mammals that could potentially be encountered;

(iv) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

(v) Writing skills sufficient to prepare a report of observations that shall include such information as the number and types of marine mammals observed; the behavior of marine mammals in the project area during construction; the dates and times when observations were conducted; the dates and times when in-water construction activities were conducted; the dates and times when marine mammals were present at or within the defined disturbance zone; and the dates and times when in-water construction activities were suspended to avoid incidental harassment by disturbance from construction noise; and

(vi) Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area.

(b) Individuals meeting the minimum qualifications identified in 7(a), above, shall be present on site (on land or dock) at all times during pile driving activities conducted for the project.

(c) During all impact pile driving activities, observers shall be stationed to allow a clear line of sight of the exclusion zone (10 m (33 ft) except for steel piles, which shall be 18 m (59 ft)) and the entire disturbance zone as identified in Table 2 (attached).

(d) Marine mammal observers shall monitor for the first two days of vibratory pile driving, and thereafter on every third day of vibratory pile driving. Monitoring shall be conducted by three observers during vibratory pile driving activities. One observer shall be stationed in the general vicinity of the pile being driven and shall have clear line of sight views of the entire inner harbor. Another observer shall be stationed at an accessible location downstream (such as northern tip of Prescott Beach County Park) and would observe the northern (downstream) portion of the disturbance zone. A third observer shall be stationed at an accessible location upstream and would observe the southern (upstream) portion of the disturbance zone.

(e) Marine mammal observers shall scan the waters within each monitoring zone activity using binoculars (Vector 10 X 42 or equivalent), spotting scopes (Swarovski 20-60 zoom or equivalent; Washington Department of Fish and Wildlife 2000), and visual observation.

(f) Marine mammal presence within the Level B harassment zones of influence (disturbance zones) shall be monitored, but pile driving activity shall not be stopped if marine mammals are found present unless they enter or approach the exclusion zone. Any marine mammal observed within the disturbance zone shall be documented and counted as a Level B take. Monitoring during vibratory pile driving shall occur during the first two days of activity and during every three days thereafter to estimate the number of individuals present within the Level B harassment area.

(g) If waters exceed a sea-state which restrict the observers' ability to make observations within the Level A injury exclusion zone, relevant activities shall cease until conditions allow the resumption of monitoring. Vibratory pile installation would continue under these conditions.

(h) The waters shall be scanned 30 minutes prior to commencing pile driving activities and during all pile driving activities. If marine mammals enter or are observed within the designated exclusion zones during, or 15 minutes prior to, impact pile driving, the monitors shall notify the on-site construction manager to not begin, or cease, work until the animal(s) leave of their own volition, or have not been observed within the zone for 15 minutes.

9. Reporting

(a) POK shall provide NMFS with a draft monitoring report within 90 days of the expiration of this Authorization, or within conclusion of the construction work, whichever comes first. This report shall detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed.

(b) If comments are received from NMFS (West Coast Regional Administrator or NMFS Office of Protected Resources) on the draft report within 30 days, a final report shall be submitted to NMFS within 30 days thereafter. If not comments are received from NMFS within 30 days after receipt of the draft report, the draft report shall be considered final.

(c) In the unanticipated event that the construction activities

clearly cause the take of a marine mammal in a manner prohibited by this Authorization, such as an injury, serious injury, or mortality (Level A take), POK shall immediately cease all operations and immediately report the incident to the NMFS Chief of the Permits and Conservation

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Division, Office of Protected Resources and the NMFS West Coast Regional Stranding Coordinators. The report must include the following information:

- (i) Time, date, and location (latitude and longitude) of the incident;
- (ii) Description of the incident;
- (iii) Status of all sound sources used in the 24 hours preceding the incident;
- (iv) Environmental conditions (wind speed, wind direction, sea state, cloud cover, visibility, water depth);
- (v) Description of the marine mammal observations in the 24 hours preceding the incident;
- (vi) Species identification or description of the animal(s) involved;
- (vii) The fate of the animal(s); and
- (viii) Photographs or video footage of the animal(s), if equipment is available.

(d) Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with POK to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. POK may not resume their activities until notified by NMFS via letter, email, or telephone.

(e) In the event that POK discovers an injured or dead marine mammal, and the marine mammal observer determines that the cause of injury or death is unknown and the death is relatively recent (less than a moderate state of decomposition), POK shall immediately report the incident to the NMFS Chief of Permits and Conservation Division, Office of Protected Resources, and the NMFS West Coast Regional Stranding Coordinator. The report must include the same information identified above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS shall work with POK to determine whether modifications in the activities are appropriate

(f) In the event that POK discovers an injured or dead marine mammal, and the marine mammal observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), POK shall report the incident to the NMFS Chief of Permits and Conservation Division, Office of Protected Resources, and the NMFS West Coast Regional Stranding Coordinator within 24 hours of the discovery. POK shall provide photographs or video footage (if available) or other documentation of the stranded animal(s) to NMFS and the Marine Mammal Stranding Network. POK may continue its operations under such a case.

10. This Authorization may be modified, suspended, or withdrawn if the holder fails to abide by the conditions prescribed herein or if NMFS determines that the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHA for the proposed POK construction activities. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

On a case-by-case basis, NMFS may issue a one-year renewal IHA without additional notice when (1) another year of identical or nearly identical activities as described in the Specified Activities section is planned, or (2) the activities would not be completed by the time the IHA expires and renewal would allow completion of the activities beyond that described in the Dates and Duration section, provided all of the following conditions are met:

A request for renewal is received no later than 60 days prior to expiration of the current IHA;

The request for renewal must include the following:

(1) An explanation that the activities to be conducted beyond the initial dates either are identical to the previously analyzed activities or include changes so minor (e.g., reduction in pile size) that the changes do not affect the previous analyses, take estimates, or mitigation and monitoring requirements; and

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized;

Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures remain the same and appropriate, and the original findings remain valid.

Dated: July 19, 2018.

Donna S. Wieting,
Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 2018-15837 Filed 7-24-18; 8:45 am]

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