OREGON SHORES
CONSERVATION COALITION

March 21, 2019

City of Coos Bay Planning Commission
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Re: City of Coos Bay Land Use Application #187-18-000153
Concurrent Land Use Applications by Jordan Cove Energy Project L.P.
Coos Bay Estuary Navigation Reliability Improvements
Comments of Oregon Shores Conservation Coalition

Dear Chair Coles and Planning Commission members:

Please accept these comments from the Oregon Shores Conservation Coalition and its members (collectively "Oregon Shores") to be included in the evidentiary record for Land Use Application #187-18-000153. Oregon Shores is a non-profit organization dedicated to protecting the natural communities, ecosystems, and landscapes of the Oregon coast while preserving the public's access to these priceless treasures in an ecologically responsible manner. Our mission includes assisting local residents in land use matters and other regulatory processes affecting their coastal communities, and engaging Oregonians and visitors alike in a wide range of stewardship activities that serve to protect our state's celebrated public coastal heritage. For nearly half a century, we have been a key public interest participant in legal and policy matters related to land use and shoreline management at the local and state level. Oregon Shores has been tracking and working to address the numerous adverse environmental and social impacts likely to arise from the proposed Jordan Cove LNG facility, the Pacific Connector Gas Pipeline, and the construction activities associated with the two in the Coos Bay estuary and its surrounding communities for over a decade.

Oregon Shores requests that the Planning Commission leave the record open to allow for submission of additional information and rebuttal of information presented for at least seven days. Please notify us of any further decisions, reports, or notices issued in relation to these concurrent applications. Oregon Shores will provide further comments as appropriate and allowed within the open record periods.

I. Background of the concurrent land use applications before the City of Coos Bay

A. Coos Bay

Coos Bay is the extensive estuary of the Coos and Millicoma rivers. Occupying approximately 20 square miles, the bay is the second largest drowned river valley on the Oregon Coast, and largest entirely within Oregon. Tidelands cover approximately 4,569 acres including 2,738 acres of tidal marsh and 1,400 acres of eelgrass beds. Its primary features include the main, expansive bay, an extensive arch of water around a peninsula, and major arms including South Slough, near the entrance of the bay, and Haynes Inlet, which extends northeasterly from the main body of the bay. Jordan Cove, site of the proposed Liquefied Natural Gas export facility of the same name, is an embayment on the western (North Spit) side of the outer bay.

The natural environment of the Coos Bay estuary hosts a diversity of plants and animals. The extensive shallow tidal flats provide habitat for fish and shellfish species. The estuary is critical nursery habitat for the commercially important Dungeness crab. It supports the life-cycle of iconic salmonid species, including Oregon Coast Coho (Oncorhynchus kisutch), winter steelhead (Oncorhynchus mykiss irideus), fall Chinook salmon (Oncorhynchus tshawytscha), and coastal cutthroat trout (Oncorhynchus clarki clarki). Coos Bay is also home to ESA-listed species, including but not limited to Oregon Coast Coho and green sturgeon.

Coos Bay also supports a variety of beneficial uses as designated in the South Coast region as a whole, including fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and commercial navigation and transportation. Coos Bay is central to Oregon's commercial fishing industry—especially the consistently lucrative Dungeness crab fishery. Economic contributions from commercial fishing and crabbing go beyond harvesting and seafood-processing, and include tourism and visitors, boat-building and gear manufacturing, safety, research and education. Recreational fisheries, including shellfish harvest and crabbing, are also important economic drivers in Coos Bay. Several of the most important shellfish beds are located in close proximity to the Pipeline route along the edge of the North Spit (western side of lower Coos Bay).

B. The Proposed "Navigation Reliability Improvements," Generally

Jordan Cove Energy Project L.P. ("JCEP" or "Applicant") proposes to develop a natural gas liquefaction facility and export terminal (LNG Terminal) on the North Spit of Coos Bay. The LNG Terminal would receive a maximum of 1.2 million dekatherms[1] per day of largely fracked natural gas via the proposed Pacific Connector Gas Pipeline ("PCGP" or "Pipeline") and cool it into its liquid form in preparation for export to overseas markets. The proposed Pipeline is a 36-inch subsurface interstate natural gas pipeline extending 229 miles from Malin, Oregon to

[1] A dekatherm is a unit of energy used primarily to measure natural gas.

the coast at Coos Bay's North Spit in North Bend, Oregon. Its sole purpose is to transport natural gas extracted from locations in Western Canada and possibly locations in the western United States to the proposed LNG Terminal facility. The LNG Terminal will produce a maximum of 7.8 million tons of LNG for export each year. The proposed Project—including the LNG Terminal, Pipeline, and related components—is known as Jordan Cove.

Over the past decade, Jordan Cove has failed to garner many of the required approvals, permits, and compliance determinations from local, state, and federal agencies. In some cases, authorizations were denied on the basis of the Applicant's inability to demonstrate a public need for its proposed activities and/or inability to demonstrate that proposed activities could be implemented without serious adverse impacts on protected conservation, environmental, recreational, and public safety uses.

Should the proposed LNG Terminal be developed, it will increase vessel traffic in the Coos Bay Deep Draft Navigation Channel ("DDNC" or "Channel) in the form of large LNG export tankers. To accommodate this type of vessel, JCEP proposes to make "navigation efficiency and reliability improvements" to the City of Coos Bay ("City")-designated DDNC by dredging three submerged areas lying adjacent to the existing Channel.[2] The Applicant asserts that the dredging "will allow for vessel transit under a broader weather window to enable JCEP to export the full capacity of the optimized design production of 7.8 metric tonnes [*sic*] per annum ("mtpa") from JCEP's liquefied natural gas ("LNG") terminal on the nearby North Spit."[3] At issue for the purposes of this public hearing are the following four concurrent land use applications (together, "Application) submitted by JCEP seeking local land use authorization to make these substantial Channel modifications:[4]

1. Post-acknowledgment amendments to the Coos Bay Estuary Management Plan ("CBEMP") map to change the zoning designation of approximately 3.3 acres located approximately 2,700 feet from the end of the North Bend airport runway within the Coos Bay estuary ("Navigation Reliability Improvement Site" or "NRI Site") from 52-NA (Natural Aquatic) to DDNC-DA (Development Aquatic);

2. A post-acknowledgment text amendment of the CBEMP, which is part of the City of Coos Bay Comprehensive Plan ("CBCP"), to take a reasons exception to Statewide Planning Goal 16 ("Goal 16") to authorize the rezone of the NRI Site to DDNC-DA;

[2] Jordan Cove Energy Project L.P. ("JCEP"), "In the Matter of Requests to Improve the Navigation Efficiency and Reliability of the Coos Bay Deep Draft Navigation Channel Pursuant to the Following Applications: (1) Map Amendment to the Coos Bay Estuary Management Plan to Change the Designation of Approximately 3.3 Acres from 52-NA to DDNC-DA; (2) Text Amendment to the City of Coos Bay Comprehensive Plan to take a Reasons Exception to Statewide Planning Goal 16 to Authorize this Map Amendment; (3) Estuarine and Coastal Shoreline Uses and Activities Permit For "New And Maintenance Dredging" in the DDNC-DA Estuarine Zone; and (4) Estuarine and Coastal Shoreline Uses and Activities Permit to Allow an Accessory Temporary Dredge Transport Pipeline in the 52-NA, 53-CA, 54-DA, and 55-CA Estuarine Zones and an Accessory Buoy in the 52-NA Estuarine Zone," 1-2, City of Coos Bay Land Use Application #187-18-000153, (Feb. 21, 2018) [hereinafter *JCEP Appl. Narrative*].

[3] *JCEP Appl. Narrative* 2.

[4] *JCEP Appl. Narrative* 2.

3. Estuarine and Coastal Shoreline Uses and Activities Permit in the DDNC-DA estuarine zone to allow new and maintenance dredging at the rezoned NRI Site;

4. Estuarine and Coastal Shoreline Uses and Activities Permit in the 52-NA, 53-CA, 54-DA, and 55-CA estuarine zones to allow a temporary pipeline to transport the dredge spoils from the NRI Site to approved disposal sites and a buoy as accessory uses to the primary dredging activity. The Applicant states that it is not seeking approval of the dredged materials disposal (DMD) activity in conjunction with the present Application.[5]

The City has engaged Lane Council of Governments ("LCOG") to process this application.[6] In addition to the proposed NRI request presently before the City, the Applicant is concurrently seeking to rezone three other estuary management units within Coos County's ("County") jurisdiction.

Oregon Shores provides these comments in order to underscore the apparent deficiencies in the concurrent application request. Upon the current record, the Applicant has not demonstrated compliance with the applicable approval criteria set forth in the Statewide Planning Goals ("Goals"), the Oregon Revised Statutes ("ORS"), the CBEMP, the CBCP, and the City of Coos Bay Development Code ("CBDC"). Our comments support the view that the Applications fail to provide the minimum information necessary to be evaluated for compliance with applicable standards and criteria.

II. The Applicant fails to meet applicable criteria under Chapter 17.360 of the CBDC and the Statewide Planning Goals to justify its proposed CBEMP Map amendments.

It appears that the Applicant first submitted its Application to the City at some time prior to Feb. 2, 2017.[7] The Application currently before the Planning Commission is dated Feb. 4, 2019, and constitutes an "amended and restated application submittal" which the Applicant has requested that the LCOG "accept in place of [its] original submittal."[8] JCEP seems to be referencing an older version of CBDC in its amended discussion of applicable approval criteria for the proposed Comprehensive Plan Map Amendment.[9] Oregon Shores' discussion of CBDC requirements with respect to JCEP's proposed map amendment relies on the applicable CBDC criteria listed in the LCOG's Mar. 14, 2019 Staff Report, which makes reference to CBDC provisions as updated pursuant to Ordinance 508 (passed Jan. 15, 2019). The Applicant bears the responsibility for stating and addressing all applicable decision criteria. To the extent the Applicant is relying on 2017 criteria, it has not demonstrated why the City's code allows this 2019 Application to be deemed accepted as of 2017.

JCEP's overall proposed project seeks to change the designation of more than 20 total acres of the Coos Bay estuary to DDNC-DA, including highly valuable estuarine areas currently designated "natural" and "conservation" management units pursuant to Goal 16 (Estuarine

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[5] *Id.*
[6] City of Coos Bay Planning Comm'n, *Notice of Public Hearing: Land Use application 187-18-000153*, 1 (Mar. 1, 2019).
[7] *See* LCOG Staff Report, (Mar. 14, 2019).
[8] *See JCEP Appl. Cover Letter*.
[9] *JCEP Appl. Narrative* at 5-7.

Resources). The proposal presently within the jurisdiction of the City seeks to change the designation of 3.3 acres located in the 52-NA (Natural Aquatic) management segment to DDNC-DA, along with a corresponding CBEMP map amendment to reflect the change. To justify this rezone and map amendment, the Applicant must demonstrate compliance with requisite provisions in the CBDC and the Goals. Each are discussed following a description of the 52-NA management segment.

A. The 52-NA Management Segment

The Coos Bay Comprehensive Plan ("CBCP") is the highest authority for all land use development within the City of Coos Bay. It incorporates the requirements of the Statewide Planning Goals, and is further implemented by the CBDC. The review authority must refer to and rely upon the Coos Bay comprehensive plan (CBCP) for guidance "above all other city texts or maps" should any ambiguity or conflict arise. Under the CBEMP, which is incorporated as Volume 3 of the CBCP, the proposed NRI site is located in a management segment currently zoned as 52-NA (Management Classification: Natural Aquatic). All uses and activities allowed within each management segment must be consistent with the direction set forth in a respective segment's "Management Objectives" statements.[10]

The 52-NA management segment is located in the Lower Bay. This unit extends north to the deep-draft navigation channel beginning at a line extending northwest from the configuration change in the shoreline that parallels Runway 4-22. 52-NA ends at a line extending west from a point at the approximate center of Section 17 and surrounds the disposal islands southwest of Runway 4-22. Its current Management Objective statement is as follows:

> <u>This aquatic unit contains extensive eelgrass beds with associated fish and waterfowl habitat, and shall accordingly be managed to maintain these resources in their natural condition in order to protect their productivity.</u>
>
> Dredging of a small channel on the north side of the proposed airport fill shall be necessary as a form of mitigation to maintain tidal currents.
>
> Maintenance only of the existing sewage treatment plant outfall shall be permitted. [11]

New and maintenance dredging in 52-NA as currently zoned are prohibited uses, apart from "as a form of mitigation to maintain tidal currents."[12] Given this prohibition, JCEP proposes to rezone a highly productive portion of 52-NA to DDNC-DA (a Development Aquatic segment which does allow new and maintenance dredging activities) in order to allow LNG tankers to commence their turn from the Lower Jarvis Range to Jarvis Turn Range channels "sooner."[13] Under Goal 16, dredging is a prohibited activity in "Natural" management units, which are meant to be managed to preserve natural resources and dynamic natural processes with an absolute minimum of development. As such, a Goal 16 exception is required for the Applicant's proposed rezone of 52-NA. Absent an exception, JCEP's proposed rezones would not comply with the CBCP.

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[10] *Id.*
[11] CBCP Vol. 3, 3-142 (emphasis added).
[12] CBCP Vol. 3, 3-143 (emphasis added).
[13] *See JCEP Appl. Narrative* 4.

B. CBDC Provisions – Ch. 17.360.010-Comprehensive Plan Amendment.

Title 17 of the Coos Bay Municipal Code contains the City's Development Code.[14] In relevant part, it states that no structure "shall be constructed, improved, altered, enlarged or moved[…]after the effective date of the ordinance codified in [Title 17], except in conformity with conditions prescribed by this [Title 17]."[15] Ch. 17.110.070(1) sets forth a general hierarchy by which the City's review authority is required to interpret land use plans, policies, maps, and standards. "In case of ambiguity or conflict, the review authority shall refer to and rely upon the Coos Bay comprehensive plan (CBCP) for guidance above all other city texts or maps."[16]

The Applicant is requesting an amendment of the CBCP map to change the CBCP designation of the NRI Site from 52-NA to DDNC-DA. Hence, CBDC Chapter 17.360, which governs Plan Amendments and Zone Changes, establishes the approval criteria for Applicant's proposed amendment of the CBEMP map to change the zoning designation of NRI Site at issue. Further, the Application will be subject to a Type III process with Council Approval.[17]

Ch. 17.360.010-Comprehensive Plan Amendment

Pursuant to CBDC Ch. 17.360.010(1), the boundaries of the comprehensive plan map designations and the comprehensive plan text may be amended as provided in CBDC 17.360.020 (Initiation of Amendment).[18] 17.360.010(2) states that the City may amend its comprehensive plan and/or plan map. Specifically:

> The approval body shall consider the cumulative effects of the proposed comprehensive plan and/or map amendments on other zoning districts and uses within the general area. Cumulative effects include sufficiency of capital facilities services, transportation, zone and location compatibility, and other issues related to public health and safety and welfare the decision-making body determines to be relevant to the proposed amendment.[19]

The Applicant asserts that "the cumulative effects" of its proposed amendment would be "to facilitate an increase in safety and efficiency of navigation in the Channel." It further states that the cumulative effect of the Application is to "augment transportation in the Bay." As discussed throughout, JCEP fails to provide evidence sufficient to evaluate the claim that its proposed activities would "facilitate an increase in safety and efficiency of Navigation in the Channel." First, the Application materials omit any data regarding the safety issues and Channel constraints facing the commercial fleet currently using the Lower Bay, and whether the Channel modifications would improve navigational hazards for the typical vessel in the fleet. In fact, evidence suggests that any benefit of the proposed Channel modifications would accrue solely to the LNG Tanker vessels the Applicant proposes to operate. The Applicant asserts that the Channel modifications would enable LNG tankers (which are significantly larger than any that

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[14] *See* Ch. 17.110.010 Title.
[15] *See* Ch. 17.110.020 Applicability.
[16] 17.110.070(1) Hierarchy of plans and regulations – General Hierarchy.
[17] *See* Ch. 17.130.100 Type III procedure; *See also JCEP Appl. Cover Letter* 2.
[18] Ch. 17.360.010(1) Comprehensive plan amendment.
[19] Ch. 17.360.010(2) Comprehensive plan amendment.

currently operate within the estuary) to navigate the DDNC in windier conditions. As discussed in Part III of these comments, the JCEP fails to establish on the basis of the current Application that modifications enabling LNG vessels to transit under windier conditions would actually result in safer navigation in the Lower Bay. Second, JCEP fails to include information relevant to analyzing the impact its proposed new and maintenance dredging may have on adjacent zoning districts and uses, especially with regard to the Federal Navigation Channel (FNC) abutting the 52-NA management segment.

The Applicant further asserts that its proposed activities “will not have cumulative effects on the sufficiency of capital facilities services, or health and welfare.” Similarly, JCEP fails to provide evidence sufficient to evaluate this claim. To the contrary, the very nature of the Applicant’s proposed dredging, maintenance dredging, and accessory activities tends to suggest the opposite conclusion. As discussed in the analysis of Goal 9 and Goal 12 below, the singular apparent purpose of these proposed activities is to enable the Applicant to operate LNG tankers in the Lower Bay. The increase LNG vessel traffic, associated exclusion zones, and timing restrictions have the potential to cause death or serious bodily harm to the crew of the vessels with the commercial fleet currently operating out of the City of Coos Bay and Charleston. Additionally, each activity risks increasing turbidity, water temperature, fatalities to benthic organisms, and threats to vital eelgrass beds—each of which has the potential to negatively affect commercially valuable estuarine organisms that presently serve as economic drivers to the region.

Absent further information, the Planning Commission cannot consider the cumulative effects of the proposed activities as required by CBDC 17.360.010. Therefore, the City cannot conclude that the Application satisfies this criterion.

C. CBCP Policies

Chapter 17.360.060(1) contains the applicable Approval Criteria for a Type III review such as the matter at issue. For a Type III review, the City Council shall approve the proposal upon finding that:

(a) The proposed amendment is consistent with the applicable policies of the comprehensive plan or that a significant change in circumstances requires an amendment to the plan or map;

(b) The proposed amendment is in the public interest; and

(c) Approval of the amendment will not result in a decrease in the level of service for capital facilities and services identified in the Coos Bay capital improvement plan(s).[20]

Each of the three criteria for approval is discussed below.

[20] Ch. 17.360.060(1)(a)-(c) Approval criteria.

1. Approval Criteria (a): The proposed amendment is consistent with the applicable policies of the comprehensive plan or that a significant change in circumstances requires an amendment to the plan or map.

The Applicant does not demonstrate that a "significant change in circumstances" exists such that its proposed amendment would be justified pursuant to Chapter 17.360.060(1)(a). Hence, it must demonstrate that its proposed amendment is consistent with applicable policies contained in Sec. 7.1, 7.5, and 8.3 of the CBCP.

Section 7.1 Natural Resources and Hazards Strategies

Sec. 7 of CBCP Vol. 1 (Identification Of Problems, Planning Issues, Goals, and Plan Implementation Strategies) identifies general community problems and specific planning issues related to nine basis topics that range from "natural resources and hazards" to "housing" and "economic development."[21] These problem statements are followed by the City's adopted strategies to solve these specific needs.[22] "The strategies are policy; moreover, they are written to cite the reasons and justification of the policies and how they will be put into effect."[23]

CBCP Sec. 7.1 identifies two problems. First, Community growth and development has the potential for infringing upon and impacting the area's natural resources. Second, natural hazards, which are known to occur in the Bay area, may threaten existing development and pose a constraint to future growth. The Goal of CBCP Sec. 7.1 (Natural Resources and Hazards) requires the City of Coos Bay to "exercise sound land use practices to conserve and protect the quality of all its natural resources and safeguard the life and property of its citizens from natural hazards and disasters."[24] The LCOG has indicated that NRH Strategies 8 and 9 are applicable to the present matter.

NRH.8 **Coos Bay shall encourage the preservation and protection of riparian vegetation as an important fish and wildlife habitat and as a viable means of flood control by enactment of appropriate property development ordinances providing protection by establishing buffer strips along waterways, along designated HUD floodways, with the exception of navigable waterways. This strategy recognizes that such land use practices are necessary (1) to preserve the area's natural resources, and (2) to eliminate unnecessary drainage and erosion problems often accompanying development.**

JCEP discloses that it anticipates "possible temporary, but not permanent, impacts to shoreline habitat, including to riparian vegetation, where JCEP plans to offload dredged material for processing."[25] It provides no data to meaningfully evaluate this claim. Further, the opposite conclusion is likely to be true. As discussed throughout these comments, the Applicant's new and maintenance dredging activities will increase turbidity, water temperatures, and noise pollution in Coos Bay, all of which have the potential to impose serious and potentially

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[21] CBCP Vol. 1, Sec. 7 – Introduction.
[22] *Id.*
[23] *Id.*
[24] CBCP Vol. 1, Sec. 7.5 – Natural Resources and Hazards.
[25] *JCEP Appl. Narrative* 8.

irreparable harm on estuarine organisms not only during the construction of the NRI but also on an ongoing basis during the eventual operation of the LNG Terminal. The Applications at issue do not contain an up-to-date construction or projected maintenance dredging schedule for the proposed LNG Terminal. Publicly available data suggests that the average lifespan of an LNG Terminal such as one the Applicant's proposed new and maintenance dredging activities are meant to facilitate is about twenty years—making the adverse impacts of maintenance dredging to allow LNG Tanker transit both significant and possibly permanent.

The Applicant further states that "these temporary impacts would be limited to a corridor approximately 10 feet wide," and asserts that locating this corridor "in the field (location by the dredging contractor)" would "minimize impacts to vegetation and aquatic resources." The Applicant's materials similarly lack sufficient data to meaningfully evaluate the aforementioned methods JCEP proposes to use during NRI construction to "minimize impacts to vegetation and aquatic resources." There are a number of different types of dredging methods (including mechanical and hydraulic dredging), and each pose different adverse impacts to natural resources.[26] Further, because the Applicant has not identified the methods to be used in the removal of 505,500 cubic yards of rock and 53,900 cubic yards of sand, the Applicant's explanation of methods to minimize adverse impacts is inadequate. For example, if blasting is required for rock removal, it will have significant impacts that differ from those resulting from dredging. The Planning Commission should require the Applicant to disclose the proposed removal methods to allow for analysis of the possible adverse impacts including acoustic, water quality, and benthic habitat loss. Additionally, although JCEP states that it is not requesting approval for DMD within the Applications at issues, the materials lack sufficient data to evaluate JCEP's plan to contain potential spills when offloading dredged materials for processing.

Finally, the Applicant contends that "NRH.8 does not affirmatively obligate JCEP to take any action, but rather obligates the City to 'encourage' preservation of riparian vegetation." But the strategies accompanying Sec. 7 "Problem Statements" are "written to cite the reasons and justification of the policies and how they will be put into effect." As such, the Applicant should demonstrate that its proposals are consistent with the City's implementation of Policy NRH.8—especially with respect to the preservation of riparian vegetation and the elimination of unnecessary drainage and erosion problems related to its activities—prior to any recommendation of approval by the Planning Commission.

For the reasons discussed above, the Planning Commission cannot conclude that the Applicant's proposed activities comply with strategy NRH.8. As such, the City cannot find that the Application complies with NRH.8.

NRH.9 **Coos Bay shall cooperation with local, state, and federal agencies in conserving and protecting fish and wildlife habitat, open spaces, and aesthetic and scenic values encompassed by areas enclosed by the Coos Bay-North Bend Water Board, Empire Lakes, and Mingus Park. This strategy is not intended to prohibit development in these areas, but rather to ensure that if development occurs it takes into consideration the ability of the land to support such development, i.e., soils, topography, habitat, natural processes, etc. This strategy**

[26] *See JCEP Appl. Narrative* 5.

recognizes that these areas are particularly sensitive and valuable resources.

The Planning Commission should take into consideration the potential adverse and irreparable harms the Applicant's proposed activities pose to the highly sensitive and valuable nature of estuarine resources in 52-NA prior to any recommendation of approval to the City Council, discussed throughout these comments.

Section 7.5 Economic Development

Sec. 7.5's Vision recognizes that the City of Coos Bay "is developing a vibrant, dynamic economy capitalizing on its waterfront and proximity to a geographically unique area" and "is poised as the region's hub to support industrial growth."[27] The City's commercial and industrial economic development is a "balance of increasing the amount and occupancy of useable industrial land and *maintaining a focus* on services, hospitality, the retirement community and related support services."[28]

Goal #1, Policy 1.5 Support and cooperate with community and regional partners to encourage economic growth.

JCEP discloses that its navigation reliability improvements for the Channel "will primarily benefit large vessels that are navigating to and from the International Port of Coos Bay ("Port")."[29] The Applicant contends that the Port "is an important regional entity that facilitates mass export and import of goods and commodities overseas and thus serves as a key driver of economic development throughout southwest Oregon."[30] While it may be true that the Port serves as a key economic driver in Southwest Oregon, the Applicant fails to provide sufficient information to evaluate whether its proposed activities would encourage economic growth in the City of Coos Bay in accordance with the vision of Policy 7.5. In fact, the fact that its improvements would primarily benefit LNG tanker transit suggests the opposite conclusion. Publicly available information exists to suggest that the average LNG vessel is significantly larger than the average vessel making up the current commercial fleet operating out of the City. As discussed below, the exclusion zones and timing restrictions associated with the Applicant's proposed operation of LNG tankers have the potential to impose negative economic impacts on commercial crabbing and fishing boats, thereby hampering the growth of these consistently lucrative economic drivers in the region. Hence, approval of JCEP's proposed uses and activities would seem to undermine the objectives of Sec. 7.5 Goal #4 ("work to retain, expand, and strengthen existing local businesses").

For these reasons and those discussed in the analysis of Goal 9 below, the Applicant fails to provide sufficient information to establish that approving the Application and facilitating the NRI would "support community and regional partners and encourage economic growth."

Goal #6, Policy 6.1, 6.2 Maximize the potential uses and benefits the waterfront and deep-water port offers to the city and region as a

[27] CBCP Vol. 1, Sec. 7.5 Economic Development.
[28] *Id.*
[29] *JCEP Appl. Narrative* 8.
[30] *Id.*

whole; Support the Port of Coos Bay in its development efforts for transportation linkage and to develop a deep-draft channel to accommodate large cargo vessels and increase shipping activities and water-dependent uses.

As discussed throughout these comments, the Applicant fails to provide sufficient evidence to evaluate its claim that its proposed uses and activities will "facilitate increased navigational safety and efficiency for large vessels." Further, evidence suggests that the exclusion zones and timing restrictions associated with LNG vessel transit will cause severe delays to the commercial crabbing fleet operating out of Coos Bay, risking significant harm to economic prospects and even vessel fatalities. As such, the Planning Commission cannot conclude that the Application materials comply with Sec. 7.5, Goal 6 of the CBCP.

Section 8.3 Land Use and Community Development Planning Strategies

Section 8.3's Problem Statement makes the following observations:

> Municipal land use and community development strategies are serious public decisions that can have far-reaching fiscal, social, and environmental impacts. The appropriateness, effectiveness, and public acceptability of the strategies depend largely upon the rationale for and justification of the strategies. *Strategies are most easily justified when they are the culmination of a logical, defensible planning process. Yet, human nature sometimes makes short-term, superficial solutions more attractive than well-thought-out, justified community strategies.*[31]

The Goal of Sec. 8.3. requires the City to "continue to utilize the land use and community development planning process which culminated in the creation of this comprehensive plan."[32] Tracking the language of Goal 2 (discussed below), it recognizes that this planning process "provides for a rational policy framework – supported by an adequate factual base – that functions as the basis for all decisions and actions related to the use of land."[33]

LU.4 Coos Bay shall not make major revisions to this Comprehensive Plan more frequently than every two years, if at all possible. "Major revisions" are those that have widespread and immediate impact beyond the subject area under consideration. The city recognizes that wholesale approval of frequent major revisions could ruin the integrity of this Plan.

The Applicant asserts, without sufficient supporting evidence, that its Application does not request "major revisions" to the CBCP. As discussed in the below analysis of LU.5, the opposite conclusion is likely correct. The purpose of the Applicant's proposed text amendment is to change the designation of a Natural Aquatic management unit. Natural Aquatic management units are meant to be managed to preserve natural resources and dynamic natural processes with an absolute minimum of development. The CBCP as presently acknowledged recognizes 52-NA as having significant fish and wildlife habitats including but not limited to

[31] CBCP Vol. 1, Sec. 8.3 – Land Use and Community Development Planning (emphasis added).
[32] *Id.*
[33] *Id.*

crabs, clams, a large variety of juvenile fish, and a large variety of benthic invertebrates. Contrary to the Applicant's characterization of 52-NA as "isolated," it is a highly productive segment of the Coos Bay estuarine ecosystem that has purposefully been left undeveloped in accordance with the requirements of Goal 16 (discussed below). Any change in designation warrants careful consideration of the numerous potential adverse impacts the Applicant's proposed uses will impose on protected commercial and recreational uses by the City of Coos Bay. For these reasons, the Application's proposal to rezone 52-NA to DDNC-DA arguably constitutes a major revision as envisioned by LU.4.

LU.5 Coos Bay may make minor changes to this Comprehensive Plan on an infrequent basis as need and justification arises. "Minor changes" are those which do not have significant impact beyond the immediate area of the property under consideration. The city recognizes that wholesale approval of frequent minor changes could ruin the integrity of this Plan.

The Applicant asserts, without sufficient supporting evidence, that "approval of the Application will not…have a widespread, immediate, or significant impact beyond the NRI Site, and it will not require additional changes to the Plan." As discussed above in part II.A. of these comments, 52-NA is a highly valuable estuarine district that provides vital eelgrass habitat to important estuarine organisms. As stated above, the CBCP as presently acknowledged recognizes 52-NA as having significant fish and wildlife habitats including but not limited to crabs, clams, a large variety of juvenile fish, and a large variety of benthic invertebrates. The Applicant has not provided the data required to evaluate the extent of the harms (increases in turbidity, water temperature, salinity, etc.) its proposed dredging activities will impose on this district. In fact, the very aquatic nature of this district means that any adverse impact arising from the Applicant's proposed activities could accrue to the larger estuarine ecosystem. Further, as discussed below, the Applicant has not justified the need for its proposed amendment sufficient to warrant adoption of a reasons exception to Goal 16.

For the reasons stated above, the City should find that the Applicant's amendment constitutes a "major revision" of the CBCP, as described in LU.4.

LU.7 Coos Bay shall anticipate that conflicts may arise between the various plan implementation strategies contained in the plan when applying the policies to specific situations. To resolve these conflicts, if and when such may occur, Coos Bay shall consider the long term environmental, economic, social, and energy consequences expected to result from applying one strategy in place of others, then to select and apply the strategy that results in maximum public benefit as supported by findings of fact. This strategy is based on the recognition that a viable conflict resolution process is essential to the success of any comprehensive plan.

JCEP does not provide sufficient evidence to support its claim that approval of the Application will not cause any conflicts between various CBCP implementation strategies. Further, as discussed in part II and III of these comments, the Application is inconsistent with all applicable policies of the CBCP and the Goal exception criteria of the OAR.

Because the proposal to amend the CBCP designation of management segment 52-NA to DDNC-DA is inconsistent with the applicable policies of the CBCP, the City should deny the Application.

2. Approval Criteria (b): The proposed amendment is in the public interest.

As discussed throughout these comments, the Applicant fails to demonstrate that it proposed amendment will result in "increased navigational safety and efficiency for large vessels in the Channel." Further, publicly available evidence suggests that the proposed NRI may substantially interfere with the navigational safety and efficiency of the average vessel in the commercial fleet currently operating in the Lower Bay. Finally, as discussed in part II.D. of these comments, the Applicant fails to evidence its claim that its proposal will result in an "economic boon" to the City and the region. Again, given the harm its proposed activities will likely impose on commercial crabbing vessels, the opposite conclusion is likely to be true. Far from being in the public's interest, it is unclear from the Application how the proposed amendment will provide a benefit to any use or activity outside of the proposed operations of the Applicant—a private corporation based in Calgary, Canada whose object is to export goods overseas. As such, the City cannot conclude that the Application complies with this criterion.

3. Approval Criteria (c): Approval of the amendment will not result in a decrease in the level of service for capital facilities and services identified in the Coos Bay capital improvement plan(s).

The Applicant fails to provide evidence sufficient to evaluate its claim that approval of its Application "will not result in a decrease in the level-of-service for any identified capital facilities and/or services identified in the Coos Bay capital improvement plan."[34] Absent such data, the City cannot find that the Application complies with this criterion.

For the above reasons, the Applicant fails to demonstrate consistency with the applicable approval criteria contained in Chapter 17.360.060(1). As such, the City should deny its proposed requests.

D. Statewide Planning Goals.

The Applicant correctly notes that post-acknowledgement plan amendments ("PAPAs"), such as the present proposed rezoning of the NRI site and associated CBEMP map amendment, must comply with Oregon's Statewide Planning Goals under ORS 197.175(2)(a).[35] The Applicant bears the burden of proof in showing that its proposed rezoning of the three NRI Sites complies with all applicable criteria and standards. The Planning Commission's recommendation to approve the proposed rezoning must either explain why the rezoning is consistent with the Goals or adopt findings explaining why the Goal is not applicable.

[34] *JCEP Appl. Narrative* 11.
[35] ORS 197.175 – Cities' and counties' planning responsibilities

The Applicant asserts that Goals 1, 2, 6, 7, 9, 11, 12, 13, 14, and 16 are applicable to its proposed rezoning of the NRI Sites. It argues that Goals 3, 4, 5, 8, 10, 15, 17, 18, and 19 are not applicable. Oregon Shores will provide additional comment on the Goals as appropriate and allowed. General comments are provided for the purposes of clarity and preservation.

Goal 1: Citizen Involvement

"To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process."

Consistent with the objective of Goal 1, Oregon Shores stresses the need to keep the evidentiary record open following the hearing in order to allow for meaningful community input on the Concurrent Applications currently before the Planning Commission and throughout the full Type III review including City Council consideration and final decision-making.

Goal 2: Land Use Planning

"To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions."

Goal 2 outlines the basic procedures of Oregon's statewide planning program: land use decisions must be made in accordance with an acknowledged comprehensive plan, comprehensive plans must be based on factual information to be acknowledged, and proper implementation ordinances must be adopted to effectuate plan policies. Further, it requires that local plans and ordinances be coordinated with those of other jurisdictions and agencies, and that plans be reviewed periodically and amended as needed.[36]

The sections of the CBDC and ORS discussed in these comments both implement and effectuate the policies of the CBCP. Hence, the Applicant correctly asserts that the standards and limitations contained therein provide the applicable policy framework and land use planning process to assess the appropriateness of its proposed rezones and map amendments. Goal 2 also contains the rules and procedures for taking exceptions to the goals. As discussed throughout these comments, the Concurrent Application materials fail to demonstrate that the proposed rezone of the NRI site and associated CBEMP map amendment satisfy the applicable criteria. These deficiencies show that the proposed rezoning and associated CBEMP map amendment is inconsistent with the objectives of Goal 2.

Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces.

"To protect natural resources and conserve scenic and historic areas and open spaces."

The Applicant asserts that the NRI Site does not include any inventoried Goal 5 resources and approval will not impact any Goal 5 inventoried resources. But the Applicant fails to provide any information to support this assertion. In fact, publicly available evidence suggests the

[36] *Id.*

opposite conclusion to be true. There are known inventoried Goal 5 resources, including the Henderson Marsh (a Goal 5 Major Marsh) and the Coos Head (an outstanding scenic resource) in the vicinity of the Coos Bay estuary which could be impacted by the Applicant's proposed uses and activities. The Applicant should address consistency with Goal 5. Proposed general condition of approval #5 is insufficient to address compliance with Goal 5.

Goal 6: Air, Water, and Land Resources Quality

"To maintain and improve the quality of the air, water and land resources of the state."

Goal 6 states that "[a]ll waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards."[37] It further requires that:

> With respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

In short, Goal 6 instructs local governments "to consider protection of air, water and land resources from pollution and pollutants when developing comprehensive plans."[38] For the purposes of Goal 6, waste and process discharges refer to "to solid waste, thermal, noise, atmospheric or water pollutants, [industry-related] contaminants, or products therefrom."[39]

JCEP asserts, without sufficient supporting evidence, that its proposed map amendments do not alter existing City protections provided by the CBEMP restricting dredging activities. The proposed rezoning of the NRI Site and corresponding CBEMP map amendment require a Goal 16 exception prior to approval. In other words, JCEP is contending that its proposed Goal 16 exception "will not undermine the CBCP's implementation of [Goal 6] guidelines." However, JCEP's ensuing discussion, as well as statements it has made in other applicable forums on the NRI, appear to suggest that the opposite conclusion is more probable. The Applicant has stated that it anticipates that completing the NRI will have effects upon air, water and land resources in the County. Similar to the materials before the City, the Applicant concluded absent relevant data that "these effects will be temporary, insignificant, or both, and JCEP will complete the NRI using methods to protect these resources" or to otherwise minimize broad harmful impacts. As discussed above, the Applicant's new and maintenance dredging activities will increase turbidity,[40] water temperatures, and noise pollution in Coos Bay, all of which will impose serious and potentially irreparable harm on estuarine organisms during the

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[37] Full text of Goal 6 available at https://www.oregon.gov/lcd/OP/Documents/goal6.pdf.
[38] DLCD, *Goal 6: Air, Water, and Land Resources Quality*, https://www.oregon.gov/lcd/OP/Pages/Goal-6.aspx (last accessed Feb. 18, 2019).
[39] *See* Goal 6; *See also* DLCD, *Goal 6: Air, Water, and Land Resources Quality*, https://www.oregon.gov/lcd/OP/Pages/Goal-6.aspx (last accessed March 1, 2019).
[40] Turbidity is the cloudiness or haziness in water caused by an increase in particulate sedimentation akin to smoke in the air. It is a key test of water quality.

construction and operation of the LNG Terminal. The Applications at issue do not contain an up-to-date construction or projected maintenance dredging schedule for the proposed LNG Terminal. The Applicant's materials also lack sufficient data to meaningfully evaluate the methods JCEP proposes to use during NRI construction to "protect these resources." There are a number of different types of dredging methods, and each pose different adverse impacts to natural resources. Additionally, the Applications lack sufficient data to evaluate JCEP's plan for dredged material transport and processing. Absent additional evidence and analysis of the potential adverse impacts associated with new and maintenance dredging, the Planning Commission cannot conclude the proposed rezoning request is consistent with Goal 6.

Goal 6 requires local comprehensive plans and implementing measures to be consistent with applicable state and federal regulations.[41] As such, the proposed rezone of the NRI site within the City's jurisdiction, the associated CBEMP map amendment, and the Goal 16 exception required to effectuate them must similarly be consistent with applicable state and federal regulations. The Applicant asserts, "In a post-acknowledgment plan amendment proceeding, the Planning Commission is only required to find that it is reasonable to expect that federal and state environmental standards will be met in the future when permits for the dredging are sought."[42] Because the Application materials provide no further discussion on this standard, it is unclear whether the Planning Commission could find that it is reasonable to expect that JCEP's proposed dredging activities will satisfy the applicable federal and state environmental standards. Although JCEP may not be precluded as a matter of law from obtaining the requisite state and federal approvals of dredging activities at the NRI sites, the Planning Commission should take into consideration the fact that JCEP has consistently failed for over a decade to demonstrate that it qualifies for such approvals to the satisfaction of the Federal Energy Regulatory Commission (FERC), the Oregon Department of Environmental Quality (DEQ), and most recently, the Oregon Department of State Lands. As a result, proposed condition of approval #3 is insufficient to address compliance with Goal 6.

Goal 7: Areas Subject to Natural Hazards

"To protect people and property from natural hazards."

The proposed NRI site is located within the Coos Bay Estuary. The Coos Bay Estuary is subject to known natural hazards, including earthquakes, tsunamis, and flooding. The Applicant correctly states that Goal 7 requires local governments to identify and plan for natural hazard areas, and coordinate their natural hazard plans and programs with state agencies. However, JCEP asserts that its Application complies with Goal 7 "because it will not increase the likelihood of damage to people or property within the City from natural hazards," without any meaningful discussion of the aforementioned inventoried hazards or the applicable CBMC provisions themselves. Absent such an analysis, the Planning Commission cannot on the basis of the current record conclude that the proposed map amendment is consistent with Goal 7.

Goal 8: Recreational Needs

[41] *Goals Summary* – Goal 6.
[42] *JCEP Appl. Narrative* 10 (citing *Nicita v. City of Oregon City*, 74 Or LUBA 176 (2016)).

"To satisfy the recreational needs of the citizens of the state and visitors, and where appropriate, to provide for the siting of necessary recreational facilities including destination resorts."

The applicant asserts that Goal 8 does not apply because the application does not involve recreational needs. But the Coos Bay estuary, where the NRI Site is located, is of critical importance to the recreational needs of citizens and visitors to Coos Bay. Recreational fishing, crabbing, and shellfishing, as well as general recreational boating and other outdoor activities would likely suffer significant impacts as a result of the construction and ongoing operations proposed in the application. The Applicant should demonstrate consistency with Goal 8.

Goal 9: Economic Development

"To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare, and prosperity of Oregon's citizens."

It is unclear from Applicant's analysis which Goal 9 policy objectives are applicable to its proposed development, and how said development goes about fulfilling the criteria outlined in Goal 9. Given JCEP's reliance on Goal 9 to establish "demonstrated need" per the requirements of a "reasons" exception to Goal 16, it must provide the Planning Commission sufficient information to evaluate its consistency with Goal 9 prior to any approval of the proposed NRI.

Setting aside the very real likelihood that the proposal to construct that the Pipeline may be denied other necessary permits to go forward (eliminating the need for the LNG Terminal itself), the Applicant provides no specific details to substantiate its claims that the NRI site will be "a boon to the economic prospects for the City of Coos Bay and the state." Its proposed new and maintenance dredging activities pose significant adverse impacts to commercially important estuarine organisms such as Dungeness crabs and oysters. Evidence exists to suggest that the construction and operational activities of the proposed LNG Terminal will adversely impact the Estuary's lucrative Dungeness Crab fishery, commercial oyster production, and other aquaculture as well as other important economic opportunities that presently serve as economic drivers for the Coos Bay region and the State of Oregon.

The Applicant asserts that completion of its proposed NRI site will "increase safety and efficiency of transit" in the DDNC. Even if the assertion may be true that the NRI will enable transiting <u>LNG tankers</u> to operate in windier conditions, the Applicant fails to demonstrate that the new and maintenance dredging associated with the NRI site will improve navigation conditions for commercial vessels other than those JCEP is proposing to operate. Additionally, the Application does not include data relevant to estimating the timing restrictions that transiting LNG tankers would impose on other commercial vessels. Both the exclusion zone and timing restrictions associated with LNG vessels have the potential to cause extreme delays for the commercial crabbing and fishery fleet, and negatively impact their economic prospects. Finally, there is no evidence that the current Channel is limiting the economic opportunities for City of Coos Bay as a whole, rather than for the Applicant's own self-interest. On the current record, the proposed amendment is inconsistent with the objectives of Goal 9.

Goal 12: Transportation

"To provide and encourage a safe, convenient and economic transportation system."

It is unclear from Applicant's analysis which Goal 12 policy objectives are applicable to its proposed development, and how said development goes about fulfilling the criteria outlined in Goal 12. Given JCEP's reliance on Goal 12 to establish "demonstrated need" per the requirements of a reasons exception to Goal 16, it must provide the Planning Commission sufficient information to evaluate its consistency with Goal 12 prior to any approval of the proposed NRI.

As discussed in the above analysis of Goal 9, the information on the current record does not support a conclusion that the NRI itself will increase efficiency and reduce delay for vessels other than the LNG tankers the Applicant proposes to operate. The Applicant does not provide sufficient information to evaluate how much energy is "currently wasted when when…vessels wait outside the Channel" outside the Channel's present operational window, and whether the proposed NRI would tend to reduce such wait times for vessels currently in the commercial fleet (i.e. those other than LNG tankers). In fact, the Application tends to show that the all of the proposed NRIs (before the County and the City) are a response to JCEP's singular private need for channel dredging, and would not generally improve navigation for the commercial fleet and recreational boats currently operating in the Lower Bay. Exclusion zones and timing restrictions associated with LNG vessel transit have not been addressed the Applicant. Hence, LNG vessel traffic itself could cause the very delays and inefficiencies for the commercial and recreational fleet based in Charleston harbor the Applicant purports to avoid with its proposed NRI. Far and above the negative impacts to economic prospects discussed in relation to Goal 9, these delays and inefficiencies could cause death or serious bodily harm to the crews of commercial and recreational vessels while navigating across the bar. Finally, the Applicant fails to address the impacts to City and regional transportation networks (both on land and in the Channel) from the construction associated with the proposed activities. On the current record, the Planning Commission cannot conclude that the proposed development is consistent the objectives of Goal 12.

Goal 13: Energy Conservation

"To conserve energy."

Goal 13 directs local governments to manage land use so as to maximize the conservation of all forms of energy. The Applicant's proposal itself is inherently inconsistent with the aims of Goal 13. The completion of the proposed NRI would substantially increase vessel traffic in Coos Bay, resulting in an overall increase in consumption of fossil fuels. Further, the primary purpose of the proposed NRI is to enable large LNG tankers to navigate out of Coos Bay and export LNG (a non-renewable fuel resource) to consumers in foreign markets.

Setting aside this inherent inconsistency, the Applicant fails to demonstrate compliance with the standards set by Goal 13. JCEP asserts that the NRI will "facilitate maximal energy conservation by increasing the safety and efficiency of vessel transit of the Channel, and by increasing the Channel's operational window." The evidence contained in the Concurrent Applications is insufficient to evaluate these claims. As discussed in the analyses of Goal 9 and

Goal 12 above, there is no evidence to suggest that an increase in "efficiency in material transportation" and corresponding reduction in "energy waste" will be a benefit shared by any vessel operator other than the Applicant. Additionally, JCEP does not provide an analysis of the potential adverse impacts LNG tanker transit will impose on the crabbing and fishing boats which currently travel across the bar. Evidence suggests that crabbing boats will be substantially delayed by transiting LNG vessels. As the Applicant itself acknowledges, causing commercial crabbing and fishing vessels to wait outside the Channel will use fuel as well as add time and expense (in the form of opportunity costs to recovering landings) to overall transit.

All of the activities associated with the construction and completion of the proposed NRI would tend to increase the consumption of energy, rendering the proposed amendment inconsistent with the objective of Goal 13.

Goal 16: Estuarine Resources

"To recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands; and to protect, maintain, where appropriate develop, and where appropriate restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries."

The proposed activity is inconsistent with Goal 16, and therefore a Goal 16 exception is required to rezone the proposed NRI site located with 52-NA to DDNC-DA. For the reasons detailed in Part III of these comments, the Applicant's proposed rezone fails to meet the criteria required to warrant an exception to Goal 16.

For the above reasons, the City cannot find that the Application complies with the Goals.

III. The Applicant fails to meet the criteria required for an amendment of the CCCP in order to take a "reasons" exception to Goal 16.

The Application seeks to amend the CBEMP to apply the DDNC-DA (development aquatic) management unit to the proposed NRI site located within 52-NA in order to allow dredging necessary for LNG vessel passage. Goal 16 allows dredging for such purposes in development management units ("water transport channels where dredging may be necessary"). However, such dredging activities are prohibited in natural or conservation management units. Hence, an exception to this goal is required. Applicant proposes a "reasons" exception to Goal 16 exception to rezone NRI site #4 to DDNC-DA.

OAR 660-004-0020 details the criteria applicant must meet before the Planning Commission can recommend that the City Council adopt an amendment to the CBCP in order to take a reasons exception to Goal 16. ORS 197.732 contains Oregon's statutory guidelines for the Goal 2 exception process and its criteria parallel the criteria set forth in OAR 660-004-0020. The four requirements for a goal exception are:

(a) Reasons justify why the state policy embodied in the applicable goals should not apply.

(b) Areas that do not require a new exception cannot reasonably accommodate the use.

(c) The long-term environmental, economic, social and energy consequences resulting from the use at the proposed site with measures designated to reduce adverse impacts are not significantly more adverse than would typically result from the same proposal being located in areas requiring a goal exception other than the proposed site.

(d) The proposed uses are compatible with other adjacent uses or will be so rendered through measures designed to reduce adverse impacts.

Because the proposed exception fails to demonstrate compliance with applicable provisions of OAR 660-004-0020, it cannot demonstrate compliance with OAR 197.732.

In order to find that reasons justify a goal exception, there must be sufficient information provided in the record and reasoning to support each of the criteria. As the Oregon Court of Appeals explained: "an exception must be just that – exceptional."[43] The Applicant's proposal that the City of Coos Bay set forth within the CBCP the justification for a Goal 16 exception at the proposed NRI site warrants careful consideration to assess consistency with this "exceptional" standard. As shown below, the Applicant's proposal falls short of meeting this bar.

A. First Goal Exception Requirement: Reasons Justify Why the State Policy Embodied in the Goals Should not Apply.

OAR 660-004-0020. Goal 2, Part II(c), Exception Requirements

(2) The four standards in Goal 2 Part II(c) required to be addressed when taking an exception to a goal are described in subsections (a) through (d) of this section, including general requirements applicable to each of the factors:

(a) "Reasons justify why the state policy embodied in the applicable goals should not apply." The exception shall set forth the facts and assumptions used as the basis for determining that a state policy embodied in a goal should not apply to specific properties or situations, including the amount of land for the use being planned and why the use requires a location on resource land;

OAR 660-004-0020(2)(a) requires the Applicant identify "reasons" as to why Goal 16 criteria regarding estuarine resources should not apply to the NRI Site. OAR 660-004-0022 identifies the types of "reasons" that may be used to justify the exception.

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[43] *1000 Friends of Oregon v. LCDC*, 69 Or App 717, 731 (1984).

OAR 660-004-0022(1). Reasons Necessary to Justify an Exception Under Goal 2, Part II(c)

Under OAR 660-004-0022(1), if a use is not specifically provided for, the reasons shall justify why the state policy embodied in the applicable goals should not apply. Acceptable reasons include:

> (a) There is a demonstrated need for the proposed use or activity, based on one or more of the requirements of Goals 3 to 19; and either
>
> > (A) A resource upon which the proposed use or activity is dependent can be reasonably obtained only at the proposed exception site and the use or activity requires a location near the resource. An exception based on this paragraph must include an analysis of the market area to be served by the proposed use or activity. That analysis must demonstrate that the proposed exception site is the only one within that market area at which the resource depended upon can reasonably be obtained; or
> >
> > (B) The proposed use or activity has special features or qualities that necessitate its location on or near the proposed exception site.

OAR 660-004-0022(1)(a) requires the Applicant to establish a "demonstrated need" for the proposed use or activity based on the requirements of one or more of Goals 3 to 19. The Applicant asserts the "demonstrated need" for the NRI is based primarily on Goals 9 (Economic Development) and 12 (Transportation). As discussed in Part III.B. of these comments, the Applicant fails to explicitly identify policy criteria in Goals 9 and 12 applicable to its proposed development, and fails to provide sufficient information to evaluate the proposed NRI project's consistency with the primary objective of each Goal. A general desire to "boost the local economy" or a vague statement about reducing traffic delays do not establish "demonstrated need" sufficient to warrant a "reasons" exception to Goal 16.

It is unclear from the evidence presented whether the proposed NRI will reduce delays for the average vessel currently navigating the DDNC. JCEP states that "minimizing delay is a pressing need because companies that utilize the port of Coos Bay have identified potential new customers in Asia that desire to export cargo using bulk carriers that are slightly larger than the ships typically calling today." It further states that "various marine terminal businesses within Coos Bay require assurances that terminals can efficiently accommodate larger dimension bulk carriers in the future." Given that the Port already supports a variety of shipping customers, JCEP must provide details about which companies require export via bulk carries and which marine terminal businesses require assurances before any robust evaluation can be made regarding the demonstrated need for the proposed NRI.

JCEP states that the "NRI will allow companies to secure emerging opportunities to efficiently export products with today's larger vessels, including bulk carriers of up to 229.9 meters (983.3 feet) in length, 49 meters (160.8 feet) in beam, and 11.9 meters (39 feet) in draft." This is a reduction in parameters from the vessel size the Applicant previously stated would be enabled by the proposed NRI. It is unclear which studies and simulations support this reduction.

Such information must be provided prior to an evaluation of whether reasons justify seeking an exception to Goal 16.

With respect to the Liquefied Natural Gas ("LNG") facility that JCEP proposes to develop in the lower bay, JCEP and the Coos Bay Pilots Association believe the NRI is essential to achieve the required number of LNG vessel transits needed to lift the JCEP design annual LNG production volume. The Applicant asserts that "excessive delays in LNG carrier transit in the Channel, to and from the LNG terminal, could result in a shore storage tank topping situation, requiring JCEP to curtail LNG production."[44] JCEP estimates that dredging to complete navigation efficiency and reliability improvements at the NRI Sites "will allow JCEP to export the full capacity of the optimized design production of 7.8 mtpa from JCEP's LNG terminal on the North Spit." However, the application does not state why the design capacity of the proposed LNG liquefaction plant must produce 7.8 mtpa in order to attain the project purpose. For a previous version of the LNG facility in Coos Bay with the same purpose as the present proposal, the Applicant considered 6.8 mtpa of LNG a sufficient quantity to satisfy the need and purpose of the project. A permit to excavate the proposed NRI should not be issued unless the Applicant adequately demonstrates the project's purpose and need could not be met by constructing a facility with a production capacity that does not require modifications to the DDNC.

No evidence presented by the Applicant suggests the conclusion that continuing existing shipping and commercial activities in the Bay would be unduly constrained absent the proposed NRI. Further, the Applicant fails to show that the NRI will fulfill a "demonstrated need for…enhanced shipping within the Bay." There is insufficient evidence on the basis of this record to assess compliance with the policy objectives of Goals 9 and 12. For these reasons, JCEP fails to establish a "demonstrated need" sufficient to justify a reasons exception to Goal 16.

OAR 660-004-0022(8). Goal 16 – Other Alterations or Uses.

> (8) Goal 16 – Other Alterations or Uses: An exception to the requirement limiting dredge and fill or other reductions or degradations of natural values to water-dependent uses or to the natural and conservation management unit requirements limiting alterations and uses is justified, where consistent with ORS chapter 196, in any of the circumstances specified in subsections (a) through (e) of this section:

The Application seeks an exception to allow proposed new and maintenance dredging in areas that are currently designated, in accordance with Goal 16, as natural and conservation management units. None of the reasons set forth in OAR 660-004-0022(8) apply to the Applicant's proposed use. The applicant does not propose maintenance of an existing dike (per OAR 660-004-0022(8)(a)), maintenance dredging of the existing navigation channel (per OAR 660-004-0022(8)(b)), fill for a new navigational structure necessary for the continued functioning of the Channel (per OAR 660-004-0022(8)(c)), construction of a boat ramp or public fishing pier (per OAR 660-004-0022(8)(d)), or expansion of an existing public non-water-dependent use or a nonsubstantial fill for a private non-water-dependent use (per OAR 660-004-0022(8)(e)). In sum, the proposed deviation from currently acknowledged natural aquatic

[44] *JCEP Appl. Narrative* 24.

management unit requirements to allow dredge and fill is not justified under OAR 660- 004-0022(8).

OAR 660-004-0022(8)(b). Dredging to maintain adequate depth to permit continuation of the present level of navigation in the area to be dredged.

Applicant cites OAR 660-004-0022(8)(b) as a reason justifying its proposed NRI. As discussed above, the Applicant fails to establish a "demonstrated need" for what it previously termed "enhanced navigation" pursuant to OAR 660-004-0022(1)(a)(A). OAR 660-004-0022(8)(b) is a reason justifying dredging to maintain adequate depth to permit *continuation* of the *present level* of navigation in the area to be dredged.[45] This provision is only applicable to maintenance dredging, not to an expansion of a channel into new areas presently designated for natural aquatic management. Additionally, there is no evidence that the current Channel is inoperable without dredging in the adjacent natural management areas or that the proposed NRI is required for continued use of the existing Channel. As such, JCEP's proposed dredging to "permit continuation of the *presently authorized level*" of navigation (as opposed to the "*present level*" of navigation as allowed by OAR 660-004-0022(8)(b)) in the 3.3-acre area located within 52-NA does not qualify for the reason described by OAR 660-004-0022(8)(b) sufficient to justify a reasons exception under Goal 16.

Further, even with respect to navigation for potential future LNG tankers, it is not clear that dredging the deeper channel wider at the turns will increase safety margins for pilots. Should the proposed NRI be approved, Pilots would make crossings using the same margins of safety as are presently used in the Channel. The sole difference is that those margins could potentially be achieved in higher wind conditions than would be possible in the Channel's current state. In other words, while the turns are wider, they will be taken at higher wind speeds, resulting in the same margin of safety from the pilot's perspective. Without additional data, the Planning Commission cannot evaluate whether allowing bar crossings by LNG vessels under windier conditions would actually result in safer navigation.

Inherent in the project's purpose, however, is that the proposed dredging will result in new and extensive LNG tanker traffic. As discussed above in the analysis of Goal 12, the precise location and extent of NRI and channel dredging in the Coos Bay estuary will have immediate and direct implications for shipping safety. Vessel routing from the open ocean over the bar, up the estuary to the marine slip is a hazardous maneuver that impairs navigation for the current commercial fleet under the best circumstances. The route itself contains numerous important turns and components, and there is very little room for error. The entrance and first river bend, as well as the entrance to the marine slip, are both precise maneuvers. The Applicant does not provide sufficient information to assess whether its proposed expansion of the Channel would ease the difficulty of these turns. As discussed above, one notable omission appears to be the precise length and width of their proposed design vessel—the LNG tanker itself. Given the average length of a typical LNG tanker, it would appear that even with the proposed Channel modifications, design vessels will still be required to make their turns in a shorter distance than normal industry guidance. Without further information, the Planning Commission cannot assess whether the proposed NRI would actually improve shipping safety.

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[45] *See* OAR 660-004-0022(8)(b) (emphasis added).

OAR 660-004-0022(8)(f). In each of the situations set forth in subsections (7)(a) to (e) of this rule, the exception must demonstrate that the proposed use and alteration (including, where applicable, disposal of dredged materials) will be carried out in a manner that minimizes adverse impacts upon the affected aquatic and shoreland areas and habitats.

As discussed above, the Goal 16 exception is not justified under OAR 660-004-0022(8). Even if it were deemed to fall within one of these reasons, more information regarding potential adverse impacts arising from its proposed NRI, as well as on the methods that Applicant will use to minimize such impacts on affected aquatic and shoreland areas and habitats, must be provided before any conclusion can be made regarding the criterion contained within OAR 660- 004-0022(8)(f). Specifically, more details regarding what JCEP asserts are "best management practices" (including cutter head suction, clamshell, and hopper dredging) associated with dredging to reduce turbidity effects, an assessment of the potential risk of oil spills and any other toxic discharge related to its dredging and accessory activities, and techniques for "localizing" noise pollution associated with dredging to the "immediate dredging area" are crucial to a robust evaluation of whether the Applicant's proposed uses and activities comply with the applicable standards. Deferring this analysis through proposed condition of approval #1 is insufficient absent evidence that these measure will be adequate to protect aquatic resources.

For these reasons, the City cannot find that the Application satisfies this standard.

B. Second Goal Exception Requirement: Areas that Do Not Require a New Exception Cannot Reasonably Accommodate the Use.

OAR 660-002-0020(2)(b) requires a showing that areas that do not require an exception cannot reasonably accommodate the use. As discussed in detail above, the Applicant has not demonstrated a need for the proposed NRI. Because the current Channel is functional for navigation, the existing Channel can accommodate the use and the Applicant cannot meet the requirements of subsection (2)(b).

C. Third Goal Exception Requirement: The Long-Term Environmental, Economic, Social and Energy Consequences Resulting from the Use at the Proposed Site are Not Significantly More Adverse than Would typically Result from the Same Proposal Located in Other Areas that Would Require A Goal Exception.

OAR 660-002-0020(2)(c) requires the applicant to demonstrate "the characteristics of each alternative area considered by the jurisdiction in which an exception might be taken, the typical advantages and disadvantages of using the area for a use not allowed by the Goal, and the typical positive and negative consequences resulting from the use at the proposed site with measures designed to reduce adverse impacts." Further,

> "The exception shall include the reasons why the consequences of the use at the chosen site are not significantly more adverse than would typically result from the same proposal being located in areas requiring a goal exception other than the proposed site. Such reasons shall include but are not limited to a description of: the facts used to determine which resource land is least productive, the ability to sustain resource uses near the

proposed use, and the long-term economic impact on the general area caused by irreversible removal of the land from the resource base.

For the same reasons set forth above, the Applicant has not demonstrated compliance with this criterion. Furthermore, absent more detailed information regarding the proposed methods of dredging, blasting, or other removal within the NRI zone, the Planning Commission cannot complete an analysis of the comparative adverse impacts.

D. Fourth Goal Exception Requirement: The Proposed Uses are Compatible with Other Adjacent Uses or Will Be So Rendered through Measures Designed to Reduce Adverse Impacts.

As discussed above, there are significant existing recreational and commercial uses adjacent to the NRI sites including shellfish beds and crabbing areas. The Application addresses only the Channel as an adjacent use, and does not address any of the other adjacent uses of the areas in the Coos Bay estuary adjacent to the Channel and the proposed NRI sites including those designated for natural and conservation uses. The Application fails to meet this criterion.

For the reasons stated above, the Applicant has not demonstrated that a Goal 16 exception is justified for the proposed uses and activities.

IV. The Applicant's request for Estuarine and Coastal Shorelands Uses and Activities Permit fails to demonstrate compliance with the requisite criteria.

Because the Concurrent Application fail to demonstrate that the comprehensive plan amendment is permissible, its Estuarine and Coastal Shorelands Uses and Activities Permits to (1) allow new and maintenance dredging at the rezoned NRI site and (2) allow a temporary pipeline to transport the dredge spoils from the NRI Site to approved disposal sites and a buoy as accessory uses to the primary activity are both unjustified. Oregon Shores will submit further comment regarding the Uses and Activities Permits, applicable CBDC provisions contained with Chapter 17.352, and applicable CBEMP policies once the plan map amendment and zoning change have been resolved. General comment is provided here for preservation purposes. Applicant provides evidence insufficient to meaningfully evaluate the impacts of the proposed NRI on the adjacent Federal Navigation Channel (FNC). Of specific concern is the impact of the proposed dredging on the use of the FNC by large vessels. Dredging will be located immediately adjacent to the FNC and dredge plans involving cables crossing the whole channel are proposed. While large vessels may be able to routinely navigate around active dredging, active dredging is an additional hazard and strain on resources that must be comprehensively assessed prior to any conclusion about the appropriateness of the DDNC-DA designation in areas adjacent to the FNC. Accommodations for smaller vessels are burdensome for mariners, especially recreational users and commercial fisheries. If the Planning Commission reaches consideration of the Uses and Activities Permits, it should conclude that additional information and study of the proposal is necessary.

V. Conclusion

On the basis of the present record, the Planning Commission should recommend denial of these applications.

Sincerely,

Phillip Johnson

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Potential Impact of

Jordan Cove LNG Terminal construction on

the Nursery Habitat of Dungeness crab.

January 2016

Sylvia Yamada Ph.D.

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The **Dungeness crab** (***Cancer magister***) supports an important commercial and sport fishery from Alaska to California. Total annual landings in recent years exceeded 25,000 tons (55 million pounds) (FAO statistics, 2012). In Oregon, the 2014 Dungeness fishing season yielded 14.4 million pounds, $50 million to crabbers and an estimated $100 million to the Oregon economy (Oregon Dungeness Crab Commission in Fisherman's News On line). The Dungeness fishery is the most valuable commercial fishery in Oregon (Rasmusen 2013).

The life cycle of Dungeness crab is complex, depending on both estuarine and near-shore habitats. Typically, mating occurs in shallow water, and females migrate offshore to brood and hatch their eggs. The early larval stages feed and rear in the near-shore water column, after which the final larval stage rides tidal currents back to shore and settles out in shallow estuarine habitats. The final larval stage molts into a ~5 -7 mm wide first crab stage. The highest densities of juvenile Dungeness crabs are found in estuaries, which provide warm water, high biological productivity and protection from predators. Sand substrate and eelgrass beds are preferred habitat for these young crabs, which bury in the sand and hide in the eelgrass to escape predators. Size measurements of crabs trapped at Russell Point in Coos Bay (below the Highway 101 McCullough Bridge) show that Dungeness crabs in their first two years of life (100 mm carapace width and smaller) are extremely abundant in the mid-to low intertidal areas such as pools and eelgrass beds (Figure 1).

In my research documenting the status of the non-native European Green crab in Coos Bay, I encounter young Dungeness crabs in all my study sites. I selected a sub-set of my sites closest to the proposed Jordan Cove Energy Project: the north and south sides of Trans Pacific Lane and the beach adjacent to the Roseburg Forest Product watchman's booth. The results from over 600 trap-days, show that young Dungeness crabs are consistently abundant from 2002 to 2014 at all sites, with an average catch of 15 per trap (Table 1). These trapping results confirm the findings by Emmett and Durkin (1985) that estuaries are important nursery habitats for Dungeness crabs. These need to be kept in mind when a trench is dug In Haynes Inlet, the Trans Pacific Parkway is be expanded and an upland area is cut out to create a berth for ocean-going vessels. Not only will the turbidity during the construction phase be of concern to the ecological community, the on-going dredging to maintain the berth and shipping channels will continue to be a disturbance to the ecosystem. It will result in habitat loss for native species, including the valuable Dungeness crab. In one study between 45 to 85 % of the Dungeness crabs died during a simulated dredging operation (Chang and Levings, 1978). Marine habitat modification by construction of the Jordan Cove Energy Project could impact the important Oregon Dungeness fishery.

Sylvia Yamada is a marine ecologist who has studied native crabs and the European green crab in Oregon and Washington for over 20 years.

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Emmett, R.L. and Durkin, J.T. 1985. The Columbia River Estuary: An Important Nursery for Dungeness Crabs, *Cancer magister*. *Marine Fisheries Review*. 47(3), 21-25.

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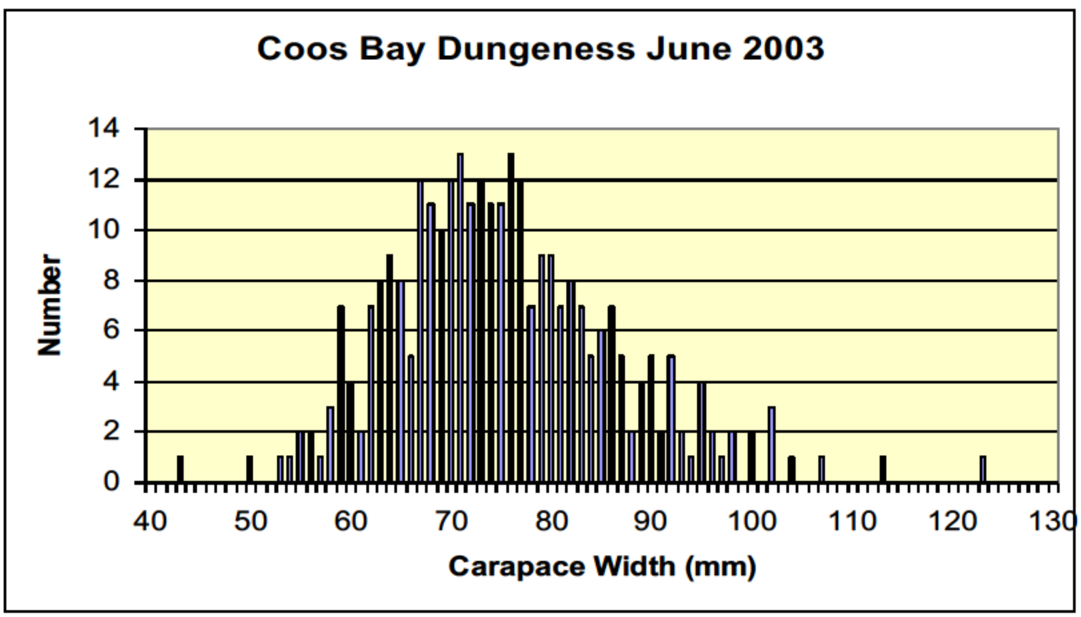


Figure 1. Size frequency distribution of Dungeness crabs trapped in pools and eelgrass at Russell Point, below the Highway 101 McCullough Bridge, in June 2003. Adult crabs are greater than 100 mm in carapace width. It is estimated that 2 year classes are represented.

Table 1. Trapping Data for study sites along Trans Pacific Lane and Roseburg Forest Product causeway from 2002-2014.

	Date	Trap Type	Zone	European green crab *Carcinus maenas*	Ha ry shore crab *Hemigrapsus oregonensis*	Purp e shore crab *Hemigrapsus nudus*	Dungeness crab *Cancer magister*	*Cancer magister* (Recru ts <50mm)	Red rock crab *Cancer productus*	stag horn scu p n	# Traps
Roseburg Lumber	6/25/2002	Fish	Site	0	0	0	45	0.5	0.1	0	10
Roseburg Lumber	6/16/2003	Fish	*low*	0	0	0	12.2	0	0.7	1.5	10
TransPacific S	7/10/2005	Fish	*low*	0	0	0	6.14	1.14	0	1.86	7
North	7/10/2005	Fish	*low*	0	0	0	0	5.7	0	1.1	10
South	3/25/2005	minnow	*Mid*	0	0	0	0	0	0	2.4	10
North	7/10/2005	minnow	*mid*	0	0.2	0	0	0.6	0	0.8	5
South	7/10/2005	minnow	*mid*	0	0	0	0	0.4	0	0.6	5
Trans-Pacific Bridge	9/1/2005	Fish	*Low*	0	0	0	6.6	0	3	1	5
	9/1/2005	Minnow	*high*	0	0	0	0.2	0	0	0.4	4
Trans-Pacific Ln.	6/8/2006	Fish	*Low*	0	0	0	4.9	0	0	2.6	10
	9/13/2006	Fish		0	0.4	0	0.2	0	0	0.2	5
	6/8/2006	Minnow	*high*	0	0	0	0.7	0	0	2.3	10
Trans Pacific Br.	9/13/2006	Minnow		0.2	0	0	0	0	0	0.2	5
TransPacific Ln. N	5/25/2007	Fish	Mid	0.5	0.2	0	1	0.1	0	0.8	10
	7/14/2007	Fish		0.4	1.47	0	23.53	0	0	0.2	15
	9/26/2007	Fish		0	0	0	4.75	0	0	0	8
TransPacific Ln. S	5/25/2007	Fish	Mid	0.09	0	0	0.82	0	0	0.36	11
	7/14/2007	Fish		0.27	0.07	0	9	0	0.07	1	15
	9/26/2007	Fish		0	0	0	2.71	0	0	0.14	7
TransPacific Bridge	5/25/2007	Fish	Mid	0	0	0	1.33	0	0	0	6
	9/25/2007	minnow	high	0	0	0	1.6	0	0	0.4	5
TransPacific Ln. N	6/18/2008	Fish	Mid	0.1	0.2	0	7.4	0	0	7.8	10
	6/19/2008	Fish		0	0	0	1.75	0	0	3.25	8
	9/18/2008	Fish		0	0.1	0	23.4	0	0	0.7	10
TransPacific Ln. S	6/18/2008	Fish	Mid	0.5	0	0	17.2	0	0	2.2	10
	6/19/2008	Fish		0.37	0	0	17.63	0	0	1.37	8
	9/18/2008	Fish		0.1	0	0	22.6	0	0	0.3	10
TransPacific Ln. N	7/8/2009	Fish	Mid	0.13	0	0	9.88	0	0	0.38	8

	7/9/2009	Fish		0.1	0.2	0	11.3	0	0	0.3	10
	07/0/09	Fish		0.1	0	0	11.7	0	0	0.5	10
TransPacific Ln. S	7/8/2009	Fish	Mid	0	0	0	24.38	0	0	0.25	8
	7/9/2009	Fish		0.1	0	0	30.2	0	0	0.9	10
	7/10/2009	Fish		0.4	0	0	16.6	0.1	0	0.5	10
	7/11/2009	Fish		0.4	0	0	13.1	0	0	2.7	10
TransPacific Ln. N	3/19/2010	Fish	Mid	0	0.4	0	0.7	0	0	0	10
	3/20/2010	Fish		0	0.1	0	0.1	0.2	0	0	10
	3/21/2010	Fish		0	0.3	0	0.3	0.4	0	0	10
	6/25/2010	Fish		0	0	0	35.7	0	0	1.1	9
	6/26/2010	Fish		0	0	0	75.9	0	0	0.4	10
TransPacific Ln. S	3/19/2010	Fish	Mid	0	0	0	1.9	0.9	0	0	10
	3/20/2010	Fish		0.1	0	0	1.7	0	0	0	10
	3/21/2010	Fish		0	0	0	2.5	0.1	0	0	10
	6/25/2010	Fish		0	0	0	90.6	0	0	0	10
	6/26/2010	Fish		0	0	0	69.9	0	0	1.6	20
TransPacific Ln. N	7/17/2011	Fish	Mid	0	0.6	0	4.73	0.27	0	0.73	15
	10/17/2011	Fish		0	0	0	5.3	0	0	0.2	10
TransPacific Ln. S	7/16/2011	Fish	Mid	0.03	0.09	0	1.5	0.06	0	1.53	34
	7/17/2011	Fish		0	0.13	0	2.07	0.47	0	1.2	15
TransPacific Ln. N	6/27/2012	Fish	Mid	0	0	0	89.2	0	0	0.4	5
TransPacific Ln. S	6/25/2012	Fish	Mid	0	0	0	9.75	0	0	0.75	12
	6/27/2012	Fish		0.11	0	0	5.2	0	0	0.67	9
TransPacific Ln. S	3/22/2013	Fish	Mid	0	0	0	1.75	0	0	0	20
	3/23/2013	Fish		0	0	0	6.79	0	0	0	19
	7/12/2013	Fish		0	0	0	7.37	0	0	1.6	30
	7/13/2013	Fish		0	0	0	5.24	0	0	1.48	25
TransPacific Ln N	7/12/2014	Fish		0	0	0	40.33	0	0	0.5	12
	7/13/2014	fish		0	0	0	24.9	0	0	0.4	12
TransPacific Ln. S	7/12/2014	Fish		0	0	0	47.27	0	0	0	15
	7/13/2014	fish		0	0	0	23.83	0	0	0	12
Average				0.068	0.075	0	14.955	0.067	0.065	0.874	
Total # Traps											649

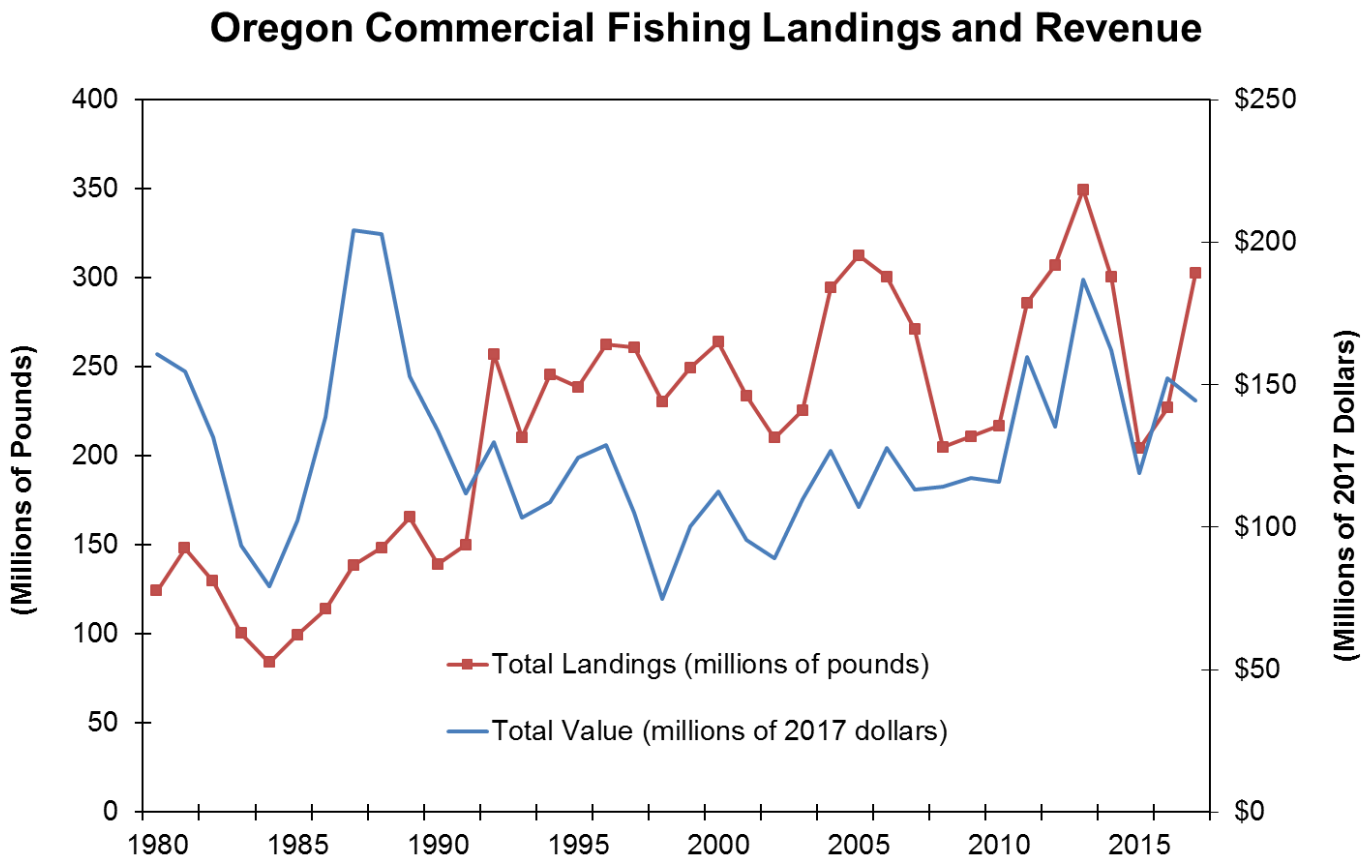
Oregon's Commercial Fishing in 2017

May 2, 2018 by *Erik Knoder*

Oregon's commercial fishing industry fell to about an average level in 2017. Harvests have been averaging $147 million (2017 dollars) per year since 2010 – after adjusting for inflation. Total landed value was $144 million in 2017. This was down from $152 million in 2016. The decrease was mainly due to the drop in the pink shrimp harvest, and the salmon harvest also fell. The pacific whiting (hake) harvest rose, and the crab and groundfish harvest also increased in 2017. Other fisheries combined for a modest decrease. Overall revenue dropped even though landed volume was up for the year.

Crab harvests in 2017 rose to 19 million pounds, the best harvest since 2013. A late start to the season and lower prices worked to offset some of the gain from higher populations, but the crab harvest was worth $58.7 million in 2017 versus $55.7 million the year before. Dungeness crab is usually Oregon's most valuable fishery, and it was again in 2017.

Salmon landings fell sharply in 2017 to 1.2 million pounds. This was less than 40 percent of the average of recent years. Prices increased slightly to $4.65 per pound, but the total landed value was only $5.6 million, a drop of $2.8 million from the previous year.



Source: PacFin and the Oregon Department of Fish and Wildlife

The pink shrimp season was hit with a double whammy in 2017. The harvest was only 23 million pounds, a decrease of 12 million pounds from 2016. On top of that, shrimp prices fell by 16 cents per pound, so total value landed dropped 49 percent to $12.7 million. Oregon pink shrimp was certified as a sustainable fishery by the Marine Stewardship Council in 2007 and reassessed as sustainable in 2011.

The amount of whiting landed rose 78 percent in 2017 to 201 million pounds. Whiting accounted for about two-thirds by weight of all wild seafood landed in Oregon. Prices stayed at eight cents per pound so total landed value for this fishery increased to $16.4 million total. Much of Oregon's whiting is made into surimi for use in making artificial crab meat.

The value of groundfish landed increased 11 percent in 2017 to $35.7 million. The amount landed actually increased 36 percent, but a drop in prices limited revenue.

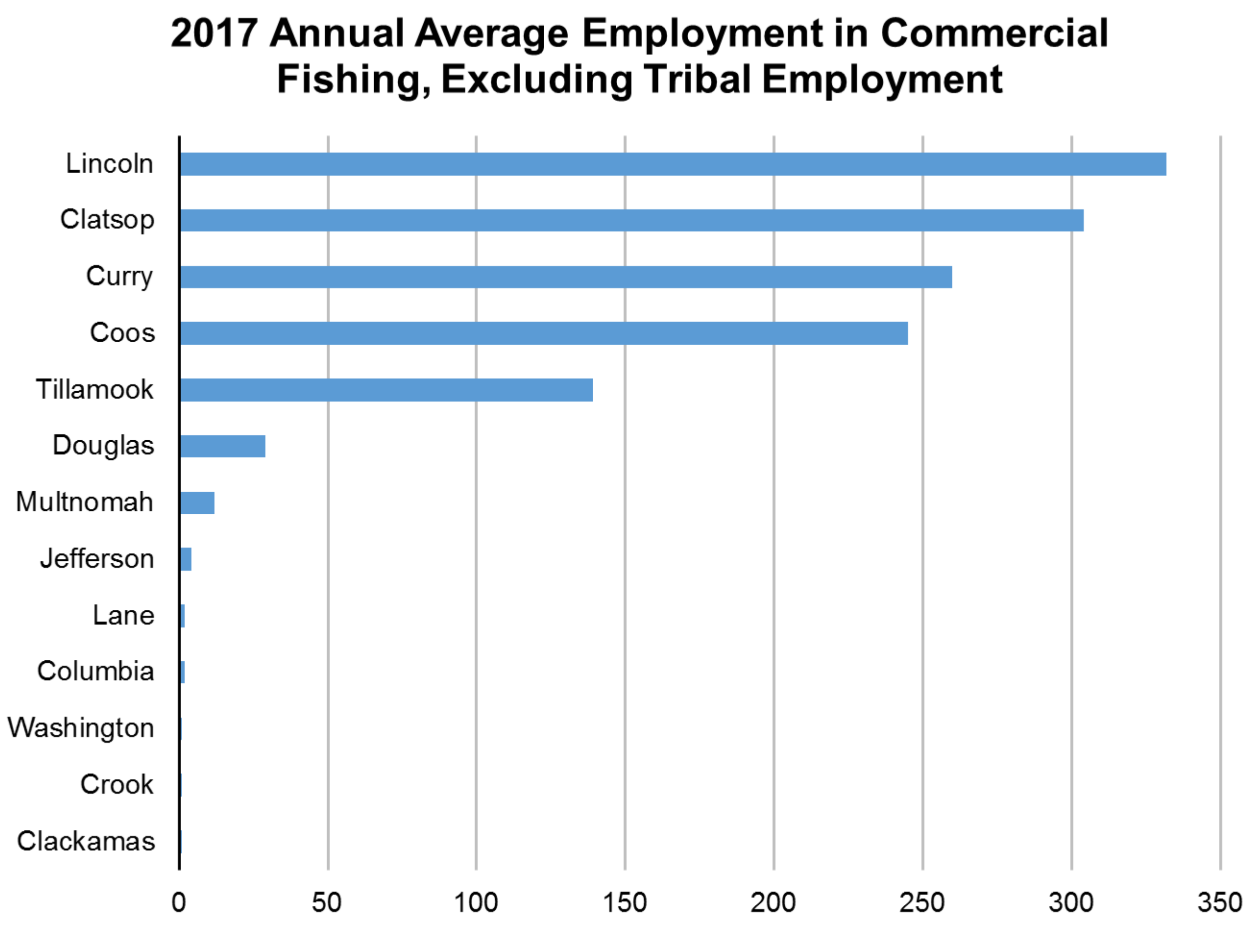
The albacore tuna harvest fell for the third straight year. The harvest fell about 35 percent, but the price climbed to $2.28 per pound, so the total value dropped by only 14 percent in 2017 to $10.8 million. Albacore has become an important fishery in recent years, especially for smaller boats that depended on salmon.

Some smaller fisheries had notable changes. The anchovy harvest decreased from $1.2 million in 2016 to zero after ODFW limited harvests to protect the stock. The sardine fishery remained closed in 2017. Squid harvests also went to zero in 2017 from $1.1 million in 2016. This fishery is usually very small or nonexistent. The Pacific cod harvest dropped by $440,000 and razor clams were down by $350,000. Slime eels (hagfish) harvests rebounded by $273,000 in 2017. Much of the harvest is exported. Sea urchin harvests were up by $213,000 and gaper clam harvest rose by $95,000.

Employment

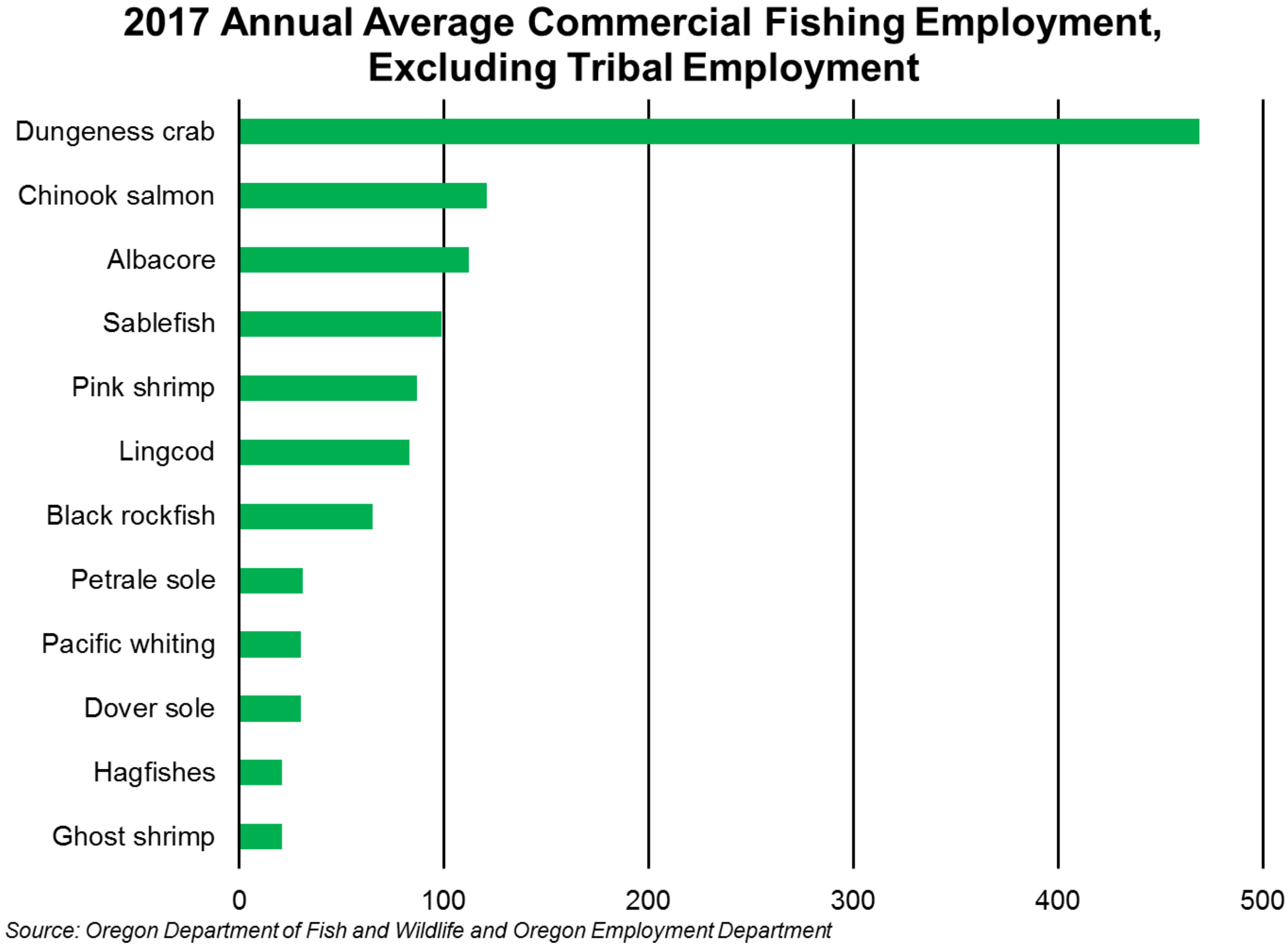
There were an estimated 1,330 commercial fishers in Oregon on an annual average basis in 2017. This was down from 1,438 in 2016, and was not too surprising given the decrease in harvests.

Estimating employment in fishing is more difficult than measuring the harvests. Legislation in 1999 allowed most fishermen to be exempt from unemployment insurance coverage – the primary source of employment data. The Oregon Employment Department now estimates the number of fishers based on a combination of survey data and the number of commercial fish landings made. This method was new for 2014 and resulted in a lower employment estimate than before.



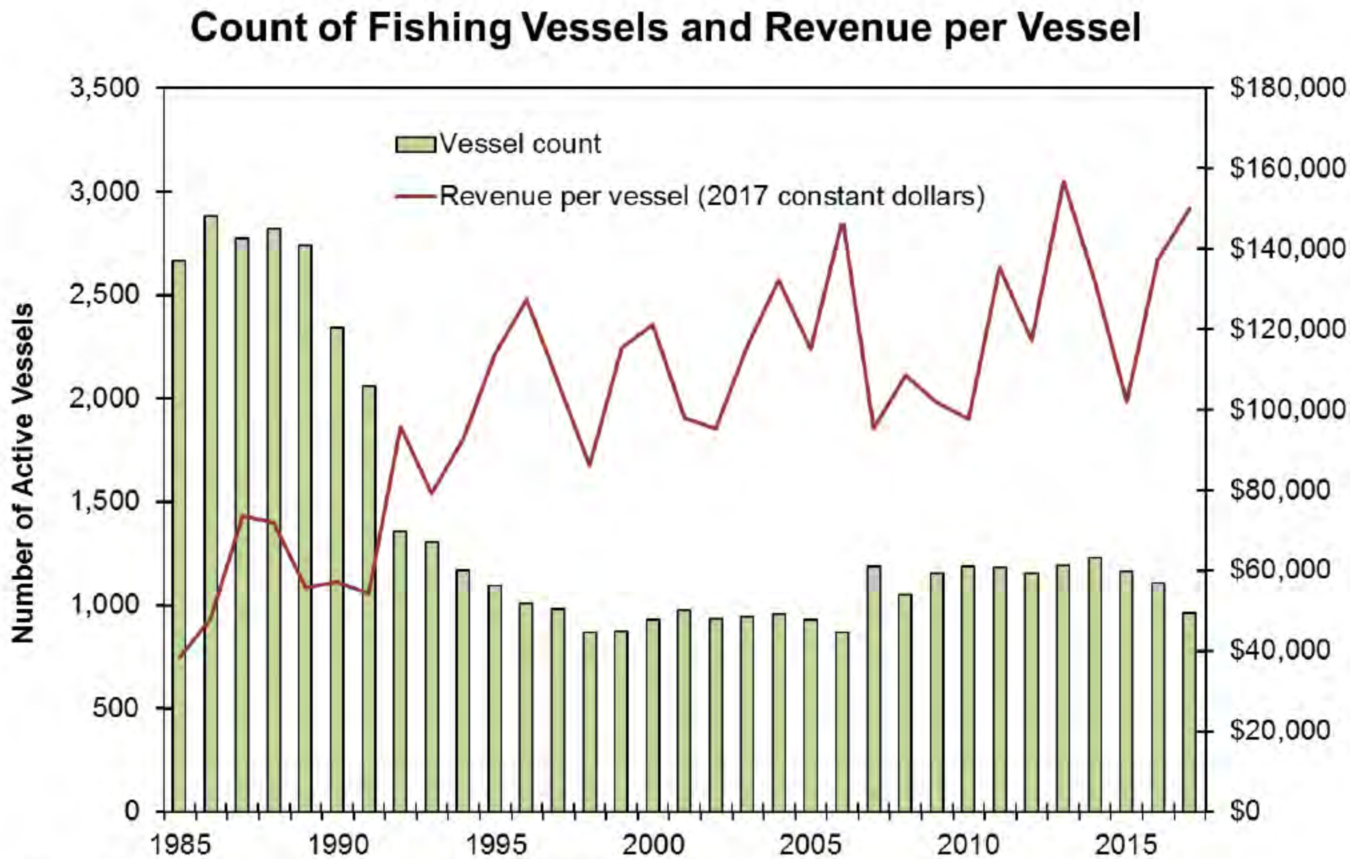
Source: Oregon Department of Fish and Wildlife, Oregon Employment Department

The estimated number of fishers varied from a high of 1,784 in July to a low of 520 in November. Five coastal counties – Clatsop, Lincoln, Coos, Curry, and Tillamook – had 96 percent of the total employment, based on where landings occur. Perhaps even more surprising is that some interior counties, such as Jefferson and Washington, had any commercial fishing employment. These jobs are often based on crayfish harvests. The most important fisheries for employment are crab, salmon, and albacore tuna. Commercial fishers harvested more than 100 different species in 2017.



Revenue

Although the number of fishing vessels has declined from historic highs, it has become more stable over the past decade. Fishing is slowly generating more revenue per boat, with plenty of fluctuations. There were 963 vessels with at least one landing in 2017, down from 1,108 in 2016. They averaged about $150,000 each in landed value in Oregon, up 9 percent from the previous year. Each vessel supported about 1.4 fishers on an annual average basis; many vessels have landings only part of the year.



Source: PacFin and Oregon Department of Fish and Wildlife

In addition to direct employment, commercial fishing provides the resource for seafood processors. There were 32 seafood processors in Oregon that had employees in 2017, two more than in the previous year. The annual average direct employment for the entire industry was 1,172. Some processors also use temporary help firms to round out their staffing, but these employees are counted in the business services industry. The processing industry paid more than $40 million in wages in 2017, which clearly shows the benefit of adding value to raw natural products.

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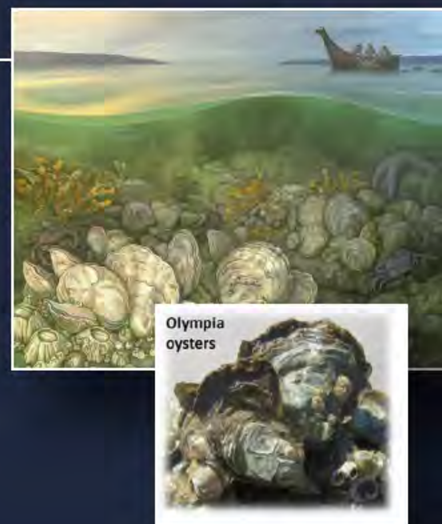
Native Oysters in the Coos Estuary



Summary:

- *Olympia oyster populations appear to be stable and even increasing. A 2006 survey shows native oysters present in multiple Coos estuary subsystems including particularly dense patches in the Upper Bay.*
- *However, native oysters are present in much smaller numbers today than in the early 20th century.*
- *Researchers are re-introducing adult oysters in the Coos estuary and investigating the biology and ecology of naturally occurring Olympia oysters.*

(Source: Groth and Rumrill 2009)

Evaluation

Status of Native Oysters is stable and improving and should continue to be monitored.

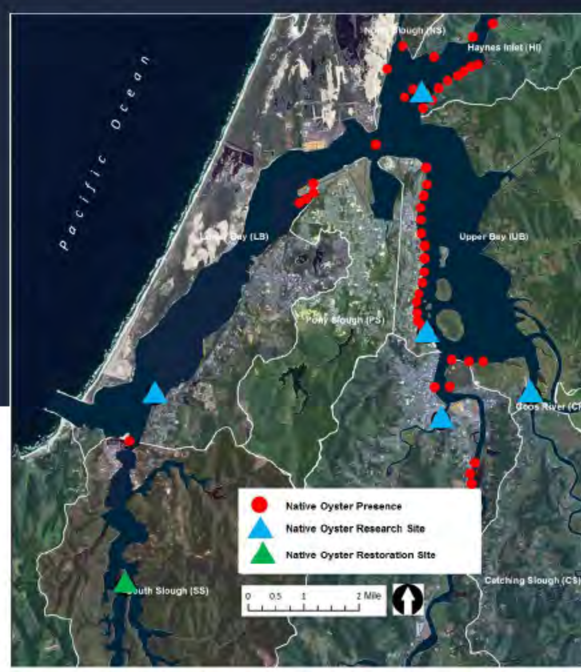


Figure 1. Status of native oysters in the Coos estuary in the South Slough, Lower Bay, North Slough, Haynes Inlet, Upper Bay and Isthmus Slough subsystems.

What's happening?

The Olympia oyster (*Ostrea lurida*) is the only oyster native to the U.S. West Coast, and was once abundant in estuaries from Baja California to Sitka, Alaska. Interestingly, the oyster was not present in Coos Bay at the time Europeans settled in the area, but shells found in dredge spoils and shell middens indicate that they were present in the area historically and were harvested by Native Americans. One hypothesis is that a tsunami and/or fire caused a huge input of sediment into the bay, smothering the oyster population.

In the 1980s, Olympia oysters were discovered growing in Coos Bay once again. Genetic similarities between Olympia oysters in Coos Bay and those in Willapa Bay, WA suggest that the local reappearance of this species was likely the result of an introduction event from Willapa (Stick 2011). It is likely that they arrived as juveniles attached to the shells of (non-native) Pacific oysters grown commercially in Willapa Bay and transported to Coos Bay. These juvenile Olympia oysters may have then spawned and their larvae settled elsewhere in the bay, setting up a new population.

Presently, the Olympia oyster population here appears to be stable and even increasing. A 2006 survey shows the oyster to be present mainly in the upper part of the bay, with particularly dense patches along the waterfront of Coos Bay, North Bend, and Eastside (Figures 1 and 2). An increasing number of researchers have become interested in restoring Olympia oyster populations (Figure 3). Researchers at the South Slough Reserve are attempting to recreate an oyster population in the South Slough estuary. They are also partnering with the Oregon Institute of Marine Biology (OIMB) to conduct research into the biology and ecology of the oysters in Coos Bay (see below).

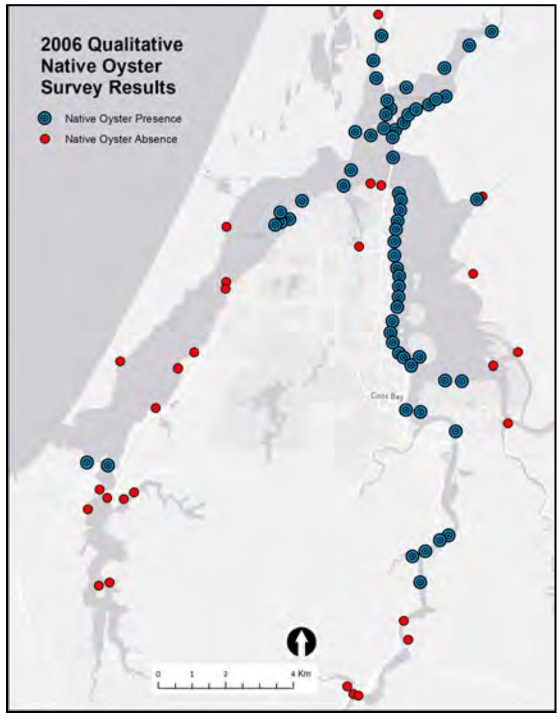


Figure 2. 2006 qualitative native oyster survey results Data: Groth and Rumrill (2009)

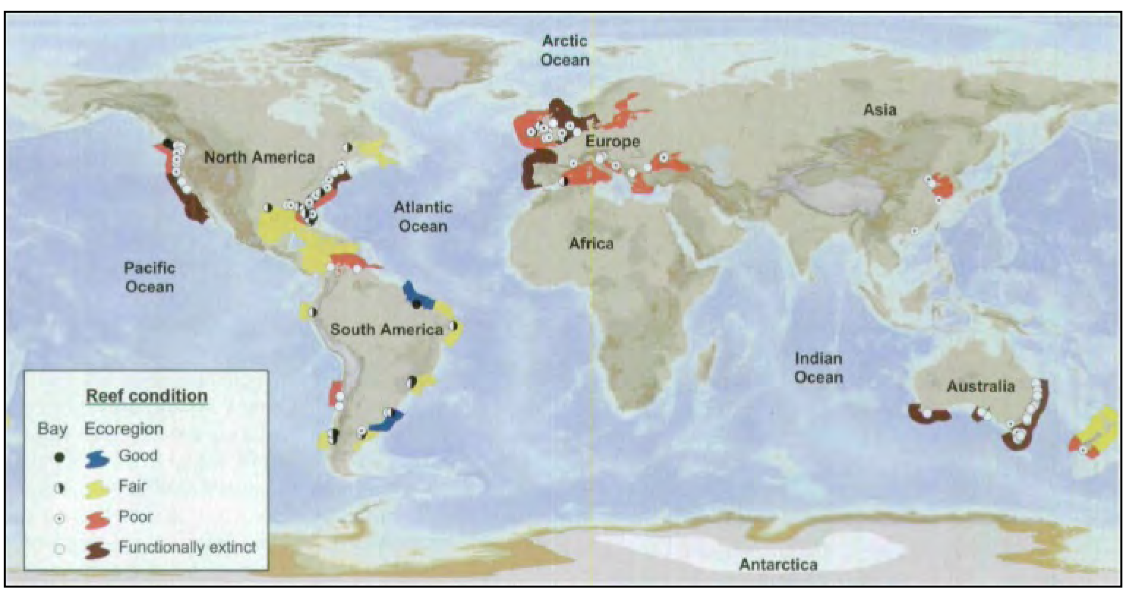
Figure 3. Volunteers aid in the restoration of native populations of Olympia oysters (*O. lurida*) in Coos Bay

Why is it happening?

The disappearance of Olympia oysters in Coos Bay is most likely the result of a natural disaster. One hypothesis is that a tsunami and/or fire caused a huge input of sediment into the bay, smothering the local oyster population. In recent history, populations of Olympia oysters outside the Coos Bay area have also experienced a pattern of decline. Around the turn of the 20th century, Olympia oysters were heavily harvested along the West Coast, mainly for the San Francisco market. This overharvesting, as well as the increased development of estuarine areas, loss of hard substrate, sedimentation, and pollution caused the Olympia oyster population to decline dramatically.

The decline of oyster populations on the West Coast in the 20th century is indicative of a larger global trend (Figure 4). Several factors have contributed to the decline of oyster reefs across the globe. The extensive harvest of wild oyster populations has commonly led to the loss of reef structure, which exacerbates the impact of additional stresses such as anoxia, sedimentation, disease, and non-native species (Beck et al. 2011). Other anthropogenic influences including the modification of coastlines, changes to freshwater inflow regimes, sedimentation, nutrient loading, and pollution have further contributed to the decline of oysters across the globe (Beck et al. 2011; NRC 2004). A loss of 85 percent of the world's oyster reefs relative to historic abundance levels is estimated, and over a third (37 percent) of existing oyster reefs in bays across the globe are considered functionally extinct (Beck et. al. 2011).
The conservation of oysters on a global as well as local scale is important, because oysters provide many ecosystem services, including water filtration, shoreline stabilization, and habitat for many animals (e.g., fish, crabs, and birds)(Beck et al. 2011). There

Figure 4. Condition of the world's oyster reefs. < 50% lost = Good; 50% to 89% lost = Fair; 90% to 99% lost = Poor; > 99% lost = functionally extinct. GRAPHIC: Beck et al. (2011)



are also beneficial secondary effects that are associated with these ecosystem services. For example, water filtration can serve to remove excess nutrients, thereby reducing likelihood of harmful algal blooms that have many ecological as well as economic consequences (Beck et al. 2011). In order to protect these valuable ecosystem services and promote biodiversity in the Coos estuary, two main oyster restoration projects have been spearheaded. These projects are supported by NOAA's Community-based Restoration Program (CRP) and the National Estuarine Research Reserve System (NERRS) Science Collaborative program.

What's being done?

The CRP has supported several research projects investigating the biology and ecology of native oysters, many of which were led or assisted by community members and college student interns. One project involved collecting oyster juveniles, or spat, on shell bags in Coos Bay and then transferring these bags to South Slough (see Figure 3). Researchers then monitored the growth and survival of these juveniles for about a year. The juveniles survived well and grew, on average, about 10 mm between January and July.

Although the CRP projects were completed in 2009, South Slough Reserve science staff members continue to monitor these shell bags, and are currently in the process of moving them from their current location at Younker Point to a more suitable area near Long Island Point. Monitoring living adults in South Slough will provide data on the feasibility of restoring oysters to this area; the adults may also serve as local sources of natural occurring Olympia oyster larvae for use in future restoration efforts, if needed.

A thorough understanding of the reproductive development of Olympia oysters in Coos Bay is a critical component of the advancement of local restoration efforts. As a means towards that end, the South Slough Reserve and OIMB are partners in several Olympia oyster research projects supported by the NERRS Science Collaborative program. Graduate students at OIMB are currently investigating sexual development and timing of oyster larval brooding and release; mechanisms of oyster larval retention in the bay; oyster larval abundance vs. settlement throughout Coos Bay; and oyster growth and survival throughout the bay.

The results of this research have provided important insights into the life history of native oysters in the Bay. Oates (2013) found that intertidal oysters in Coos Bay have a reproductive period of approximately three to four months, and reproduction corresponds to water temperatures of approximately 15-19° C (59-66° F). These findings corroborate previously conducted research (Hori 1933; Hopkins 1937; Imai et al. 1954). In addition to temperature, brooding closely corresponds to high chlorophyll-a concentrations, suggesting a positive relationship between food availability and reproductive output of oysters (Oates 2013).

Temperature and chlorophyll-a concentrations alone, however, fail to completely explain the timing of reproductive events of native oysters in Coos Bay. Oysters exposed to low salinity regimes in Coalbank Slough experienced repressed levels of gametogenesis, suggesting that the reproductive success of native oysters in Coos Bay may be critically dependent on salinity parameters (Oates 2013). Further research suggests that other abiotic factors such as tidal mixing and changes in precipitation regimes may also affect recruitment patterns and larval distribution in juvenile Olympia oysters (Prichard 2013). More research is required in order to fully understand the effects of salinity and other ambient parameters (e.g., dissolved oxygen or pH) on the reproductive success of native oysters in Coos Bay.

Additional research provides restoration practitioners with guidelines concerning the settlement preferences of native juvenile oysters in Coos Bay. Sawyer (2011) found that juvenile Olympic oysters were generally non-selective in their settlement preference when provided with a variety of hard substrata, including both live and dead species of native Olympic oysters and non-native Pacific oysters (*Crassostrea giggas*). However, juveniles did demonstrate a clear preference for settlement on the bottom of shells.

These findings indicate that the type of substrate provided for settlement is unlikely to limit the success of local restoration efforts. They further indicate that restoration efforts may benefit by suspending settlement substrata in the water column in order to allow for easy access to bottom of shells. Interestingly, the non-selective settlement tendencies of Olympic oysters implies that the commercial harvest of Pacific oysters represents a potential "recruitment sink" in that juvenile Olympic oysters that have settled on mature Pacific oysters become, in effect, bycatch upon the harvest of these individuals (Sawyer 2011).

Restoration decisions involving the placement of settlement substrata relative to the location of existing adults will benefit from a further understanding of the spatial preferences of juvenile Olympia oysters. As a means to this end, Prichard (2013) has studied recruitment patterns and larval distributions in Coos Bay. Her research suggests that juvenile Olympia oysters tend to settle in close proximity to previously established populations of adults, suggesting that these oysters have relatively limited larval distributions. Research investigating the timing of settlement of Olympia oysters in Coos Bay is on-going, and restoration efforts will also benefit from a well-developed understanding of the temporal settlement preferences of these oysters (R. Rimler, pers. comm., Nov. 2013).

The genetic practices of restoration projects are likely to directly affect the degree to which native oysters may successfully reestablish themselves in Coos Bay. The genetic distance between populations of Olympia oysters is a function of the geographic distance between those populations; that is to say that Olympia oysters in California, for example, are genetically distinct from oysters of the same species in Coos Bay (Stick 2011). The marked exception to this finding is the population of Olympia oysters in Willapa Bay, WA, which is genetically very similar to the population of oysters in Coos Bay despite the geographic distance between these two sites (Stick 2011). As previously mentioned, this is likely the result of a previously occurring introduction event from Willapa Bay to Coos Bay. In order to assure the long-term viability of restoration efforts in Coos Bay, the implications of collecting broodstock from geographically distant sources should be carefully considered until it can be determined whether these populations are locally adapted (Stick 2011).

Work to further understand the status of contaminants in the Bay that may be harmful to native oyster stocks has also been undertaken by the Oregon Department of Environmental Quality (ODEQ). Butyltins, which are chemicals found in anti-fouling boat bottom paints, are of particular concern because they have been shown to cause shell deformities and decreased reproductive capacity in oysters (Wolniakowski et al. 1987). In the late 1980s, ODEQ documented high concentrations of Butyltins in the waters of Coos Bay as well as in the tissues of locally produced Pacific oysters (Wolniakowski et al. 1987). Research has documented steady declines in local Butyltin levels since the late 1980s, suggesting that the on-going management and regulation has been relatively effective in abating this pollutant in Coos Bay (Elgethun et al. 1999). The local distribution of detected Butyltins did not closely correspond to the locations of their origin, suggesting that concentration of Butyltins may be more a function of estuary bathymetry and tidal flushing patterns than proximity to point sources (Elgethun et al. 1999).

Peteiro and Shanks (2014) have studied migratory patterns in larval Olympia oysters. Their findings suggest that larval oysters in Coos Bay have some capacity to perform tidal-timed migrations, but their swimming ability is usually overcome by current speeds. These results indicate that the effectiveness of tidal-timed migrations in the estuary may be limited by local hydrology, and strategies for maximizing larval retention may benefit from detailed studies on local hydrodynamics.

Background

Oysters are bivalves, a type of mollusk characterized by two opposing shells, or valves. They are related to clams, mussels, and other commonly known and often edible mollusks. They feed by filtering small particles from seawater. Many oysters, like other bivalves, release sperm and eggs separately in the water, where they meet and fertilize to form

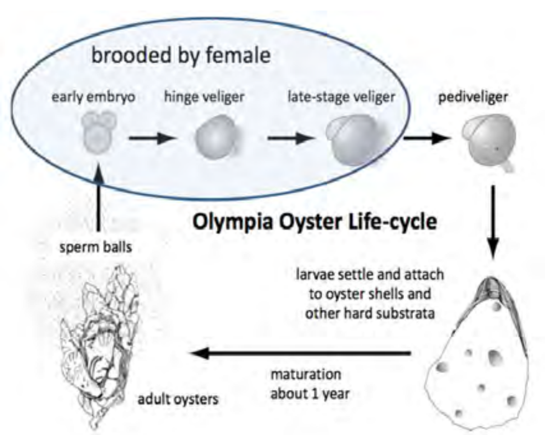


Figure 5. Life history of the Olympia oyster. GRAPHIC: Swanson n.d.

embryos outside the body of the mother. But Olympia oysters retain eggs within the mother's shell. They "brood" their embryos for several weeks before releasing the young, now called larvae, into the water column (see Figure 5).

All oysters and most bivalves produce larvae, which are generally less than a millimeter in length. The larvae swim, eat, and develop in the water for several weeks to several months. They then search for a hard surface on which to settle and metamorphose into a juvenile oyster.

Young oysters tend to settle near other oysters, forming large aggregations, or beds. These beds help stabilize the muddy bottom of the estuary and may improve habitat conditions for eelgrass, an important estuarine plant. Once settled, oysters are cemented to the substrate and remain attached to the substrate for the rest of their lives. The hard, complex surfaces provided by groups of oysters provide a unique habitat in which other estuarine animals can hide, settle, or lay eggs. In this way, a substantial oyster population could increase species diversity.

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HISTORY OF OLYMPIA OYSTERS (*OSTREA LURIDA* CARPENTER 1864) IN OREGON ESTUARIES, AND A DESCRIPTION OF RECOVERING POPULATIONS IN COOS BAY

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ABSTRACT Historical evidence indicates that Olympia oysters (*Ostrea lurida*)† are indigenous to at least three of Oregon's estuaries. Populations of *O. lurida* occur in Yaquina Bay, Netarts Bay, and Coos Bay, although only the population in Yaquina Bay seems likely to have been continuous since prewestern settlement. The historical occurrence of Olympia (native) oysters in Yaquina and Netarts Bays is confirmed by numerous records of fishery landings. In contrast, historic populations in Coos Bay are inferred by the presence of large shell deposits buried in sediments throughout the polyhaline (salinity >18 30) region of the estuary. Other Oregon estuaries (such as Tillamook, Alsea, and Umpqua/Winchester Bay) may have had ambient environmental conditions suitable to support self sustaining populations of *O. lurida*, but none of these estuaries are currently inhabited by natural populations, nor do they exhibit clear historical records of occupation in the past. We conducted searches of background information on many estuaries to summarize knowledge about the status of *O. lurida* populations in Oregon. The information presented here is based on a literature search, analysis of internal agency documents, and personal contacts with individuals most familiar with specific estuaries. As a case study, the Oregon Department of Fish & Wildlife (ODFW) repeated intertidal field surveys previously conducted in 1997 in an effort to document changes in *O. lurida* populations within Coos Bay. Field surveys conducted in 2006 followed methods that were similar to the 1997 intertidal surveys. Using previously published results as a baseline, we found that populations of native oysters exhibited spatial expansion throughout the mesohaline and polyhaline regions of the estuary, and that the intertidal oysters occurred at increased densities, over a wider range of sizes, and over a broader range of habitats. Further recovery of *O. lurida* populations in other regions of Coos Bay is most likely limited by the availability of suitable substratum for attachment and growth of the juvenile oysters.

KEY WORDS: Olympia oyster, Native oyster, Yaquina Bay, Coos Bay, Netarts Bay, Oregon, *Ostrea conchaphila*, *Ostrea lurida*, oyster populations

INTRODUCTION

Olympia oysters (*Ostrea lurida*) were once abundant and ecologically important components of estuarine communities throughout the Pacific Northwest biogeographic region. Living beds of oysters occurred within the lower intertidal and subtidal regions of the estuaries where they most likely provided several key ecosystem services including: (a) maintenance of a hardened substratum that served as benthic habitat for many species; (b) biofiltration of phytoplankton and sediment particles from the water column; (c) pelagic benthic coupling resulting in the secondary production of molluscan tissue and other organic materials; and (d) increased biotic diversity and foraging areas for invertebrates, fish, and shorebirds. In addition, the dense beds of Olympia oysters also provided local indigenous people with an important source of food, and larger scale harvests of *O. lurida* constituted an economically valuable commercial fishery in Washington, California, and parts of Oregon (Gordon et al. 2001, Baker 1995). Regional popularity of the native oysters as a targeted fishery species led to massive removal of shells from the benthic substratum and over harvests in the late 1800s, and these practices contributed to a region wide collapse in many Pacific coast estuaries during the late 19th and early 20th centuries.

Upon the arrival of European settlers to coastal Oregon (1850s), populations of Olympia oysters were only found in Yaquina Bay and Netarts Bay (Marriage 1954, Baker 1995). Extensive shell deposits were observed in Coos Bay, however, and provide clear evidence that large populations of *O. lurida* occurred in the past. No living oysters were found in Coos Bay at the time of European settlement (Dall 1897). Based on water quality parameters and proximity to larval supply, other bays such as Tillamook, Alsea, Siletz, Siuslaw, Umpqua, Coquille, and others may have, over the course of geologic history, been suitable for *O. lurida* populations. However, conclusive evi dence of the historical presence of *O. lurida* in these other estuaries is lacking. The overall purpose of this project was to document the historical and recent occurrence of *O. lurida* in Oregon estuaries, and to describe the spatial extent and recovery of Olympia oyster populations within Coos Bay.

HISTORICAL AND RECENT OCCURRENCE OF OLYMPIA OYSTERS IN OREGON ESTUARIES

Estuaries with Confirmed Populations of Olympia Oysters

Netarts Bay

Netarts Bay is a small (930 ha), marine dominated, bar built estuary located along the northern shoreline of Oregon (Fig. 1). The mouth of the estuary has not been stabilized by jetties, and the shallow tidal basin contains extensive sand flats, mudflats, and eelgrass beds as well as primary and secondary tidal channels. The watershed drainage basin for Netarts Bay is

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†The taxonomy of the Olympia oyster has been in dispute since Harry (1985) proposed synonymy of *Ostrea lurida* Carpenter 1864 and *Ostrea conchaphila* Carpenter 1857. Polson et al. (2009) provide molecular evidence that the Olympia oyster refers to the nominal species, *Ostrea lurida* Carpenter 1864. In view of their genetic data, and for consistency, the original taxon, *Ostrea lurida*, is used throughout this volume to refer to the Olympia oyster, which is distributed from approximately Baja California (Mexico) to southeast Alaska.

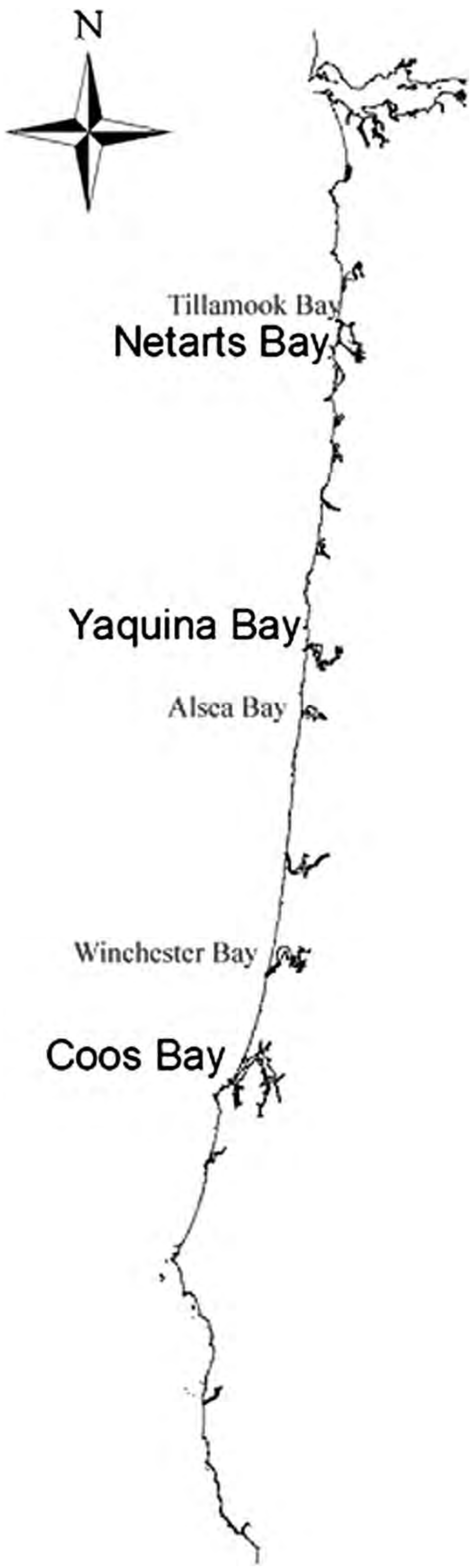

Figure 1. Map of Oregon estuaries indicating the location of confirmed populations of *O. lurida* in Netarts Bay, Yaquina Bay, and Coos Bay. The map also indicates the location of other estuaries (Tillamook Bay, Alsea Bay, Winchester Bay) that may be suitable for populations of Olympia oysters.

approximately 3,626 ha, and input of freshwater occurs through numerous small creeks.

Netarts Bay historically supported a commercial fishery for *O. lurida* beginning in the 1860s, but overall landings and duration of the fishery were always substantially lower than that of Yaquina Bay. Commercial harvest of Olympia oysters took place in the upper region of Netarts Bay where water quality parameters are most favorable (Stout 1976, Bonacker et al. 1979). In the 1930s native oysters were believed to exist in low numbers in Netarts Bay, and the remaining populations may have been affected by localized introduction in 1957 of *Oce nebra japonica* (Dunker 1860), a nonindigenous gastropod predator, (Stout 1976) concurrent with the introduction of Pacific oysters (*Crassostrea gigas*) from Japan. Olympia oysters were found to be "present in very small numbers upbay" in the mid century (Marriage 1954), and the oysters were considered to be "locally extinct" by 1979, although many areas of the upper bay where oysters would be expected to survive were not surveyed (Kraeg 1979). Qualitative surveys of Netarts Bay conducted by the Oregon Department of Fish and Wildlife in 1992 did not discover any living oysters (J. Johnson, pers. comm.). An attempt was made by ODFW to re establish the oysters in Netarts Bay over the period from 1993 1998. The reintroduction effort included establishment of approximately 9 million spat set on 150 sacks of nonindigenous Pacific oyster (*C. gigas*) cultch (ODFW, unpublished records). This effort likely re established ephemeral populations of *O. lurida* that were detected in 2004 during surveys carried out by The Nature Conservancy (TNC). A field experiment was undertaken within Netarts Bay in 2005 to 2006 to investigate the ecological effect of cultch (i.e., *O. lurida* juveniles on nonliving *C. gigas* shell) on native oyster survival, growth, and eelgrass abundance (Archer 2008). Currently, TNC is continuing their efforts to restore populations of Olympia oysters in Netarts Bay (D. Vander Schaaf, pers comm.).

Yaquina Bay

Yaquina Bay is a moderately sized (1,700 ha), drowned river mouth estuary located along the central Oregon coast (Fig. 1). The mouth of the bay is protected by rock jetties and rip rap, and the estuarine tidal basin contains a primary navigational channel, extensive sand flats and mudflats, sub sidiary sloughs, and an elongated riverine region. The water shed drainage basin for Yaquina Bay is about 65,526 ha, and the Yaquina River provides the primary source of freshwater inputs.

Environmental conditions within Yaquina Bay have been suitable over long time periods to allow for persistent popula tions of *O. lurida*. The most productive commercial harvests of native oysters were limited to a three mile stretch of polyha line (salinity >18 30) and mesohaline (salinity >5 18) waters (Fasten 1931). Oyster stocks within this confined region of the estuary were considerable in the past, and success of the oyster harvest contributed to colonization of the Newport area by European settlers (Dimick 1939). Harvests of Olympia oysters began to decrease in the 1890s, and significant commercial operations ended in the 1940s. Populations of *O. lurida* were not supplemented in Yaquina Bay throughout the years of the commercial fishery. The eventual decline of Olympia oysters in Yaquina Bay is attributed primarily to over fishing, although other factors such as pollution and habitat loss were also factors

(Dimick et al. 1941). Various habitat enhancement efforts have taken place in Yaquina Bay from the early years of the fishery to the present. Like many habitat enhancement projects related to *O. lurida*, they focused on the addition of cultch as a means to replace habitat loss associated with harvest and removal of shell rubble.

The presence of *O. lurida* in Yaquina Bay is well documented in historical accounts to the present, indicating adequate larval supplies and the persistence of self sustaining populations (Dimick et al. 1941, Baker 1995). Occurrence of natural populations of *O. lurida* has recently been confirmed by a coast wide survey to document peak densities of Olympia oysters in the intertidal zone (M. Polson, pers. comm.). Efforts to enhance populations of *O. lurida* in Yaquina Bay have been undertaken by the United States Army Corps of Engineers (mid 1990s) and by the Confederated Tribe of Siletz (2005 2006, S. Van De Wetering, pers. comm.).

Coos Bay

Coos Bay is a large (5,383 ha), drowned river mouth estuary located along the shoreline of south central Oregon (Fig. 1). The mouth of the bay is protected by a rocky headland, rock jetties, and rip rap. The estuarine tidal basin contains a primary navigational channel, extensive sand flats and mudflats, several subsidiary inlets and sloughs, and an elongated riverine region. The watershed drainage basin for Coos Bay is about 157,470 ha, and the Coos and Millicoma Rivers provide the primary source of freshwater inputs.

The shoreline and bottom of Coos Bay contain massive shell deposits of *O. lurida*. However, no live *O. lurida* were observed at the time of European settlement (1850s). Absence of living oysters has been attributed to a local extinction event (Baker 1995, Baker et al. 2000); the Olympia oysters were most likely decimated by the excessive inputs of sediments that resulted from a "big fire" in 1846 (Dimick et al. 1941), and/or because of sedimentation associated with a subduction zone earthquake and tsunami in 1700 (Nelson et al. 1996). Contemporary re establishment of Olympia oysters in Coos Bay has been described by Baker (1995) and Baker et al. (2000).

A few living individuals of *O. lurida* were found in 1986 in Haynes Inlet (northern region of Coos Bay) near commercial aquaculture plats (*Crassostrea gigas*). Small individuals of *O. lurida* were commonly observed on the bottom of Isthmus Slough (southern region of upper Coos Bay) in 1988 (Carlton 1989, Baker 1995). By 1997, self sustaining populations of *O. lurida* had also become established within the East Arm of Coos Bay (Baker et al. 2000). Because that time, the populations of *O. lurida* in Coos Bay have expanded in spatial distribution and abundance. To date, these populations have reached intertidal densities of >60/m^2 (documented by quantitative surveys along transect lines), although higher localized densities have been observed during qualitative surveys (S. Groth, pers. obs.).

No deliberate attempts to further establish or enhance populations of *O. lurida* have occurred in Coos Bay subsequent to their recent return. Anecdotal evidence exists for unsuccessful introductions of *O. lurida* in the early 1900s (Baker et al. 2000) and mid 1960s. These attempts have not been quantified or fully substantiated. A new project supported by the NOAA Community Based Restoration Program will investigate factors that contribute to recovery of Olympia oysters in the South Slough estuary (S. Rumrill, pers. obs.). The project will evaluate the survivorship, growth, and ecological interactions for an experimental population of *O. lurida* in the polyhaline region of the South Slough tidal channel.

Estuaries with Potential for Populations of Olympia Oysters

We are confident that populations of *O. lurida* occurred historically within Netarts Bay, Yaquina Bay, and Coos Bay (Baker 1995). Given the tendency of *O. lurida* populations to undergo localized extinction followed by re establishment, it is clear that further evaluation is needed to provide diagnostic evidence of oyster presence or absence for other Oregon estuaries. Many other Oregon estuaries were examined for possible existence of historic populations of *O. lurida*, based on a review of their characterization and suitability for aquaculture of *C. gigas* (Osis & Demory 1976). Contradictory information was discovered for some estuaries. In particular, it is possible that Olympia oysters were historically harvested from Tillamook Bay. The close proximity of Tillamook Bay to Netarts Bay may be responsible for documented exportation of Olympia oysters during the period of intensive commercial harvest of *O. lurida* in Oregon. It is known that oysters were harvested from Netarts Bay, and then transported and shipped through Tillamook Bay, thereby providing a logical avenue for their documented records of export through Tillamook Bay (Stout 1976). No evidence of the natural presence of *O. lurida* populations was found for any estuaries other than Yaquina, Netarts, and Coos Bays (Baker 1995, this study).

SPATIAL EXTENT AND RECOVERY OF OLYMPIA OYSTERS IN COOS BAY

Description of Study Sites in Coos Bay

The Coos estuary (Coos Bay) is the sixth largest estuary along the Pacific coast of the contiguous United States (Proctor et al. 1980). As the largest estuary located completely within Oregon state lines, the Coos estuary is an important coastal industrial center and shipping port with direct commercial ties to San Francisco, the Columbia River, Puget Sound, and other major port facilities throughout the Pacific rim (Fig. 1). The Coos estuary is classified by the Oregon Department of Land Conservation and Development as a Deep Draft Development Estuary (Cortright et al. 1987; Jennings, et al. 2003) and its entrance is stabilized and protected by a pair of 1 km rock jetties. The navigational channel within the Coos estuary is routinely dredged to maintain adequate depths for commercial shipping, and the shoreline contains special zoning units for: (a) urban and industrial development, (b) conservation of natural resources, and (c) natural management of significant fish and wildlife habitats. Like many other Pacific northwest estuarine systems, the Coos estuary is a drowned river mouth that was inundated by tidal waters during the most recent transgression of sea level (beginning *ca.* 20,000 y ago; Thompson et al. 1993; Rumrill 2006).

Pony Point

The Pony Point study site (43°25′26.16″N/124°14′20.74″W) is located in the polyhaline region of the estuary near the lower bay range extent of Olympia oysters in Coos Bay (Fig.2, Fig. 3). The upper intertidal substratum is characterized by large basalt rip rap that secures adjacent fill deposited to form the runway

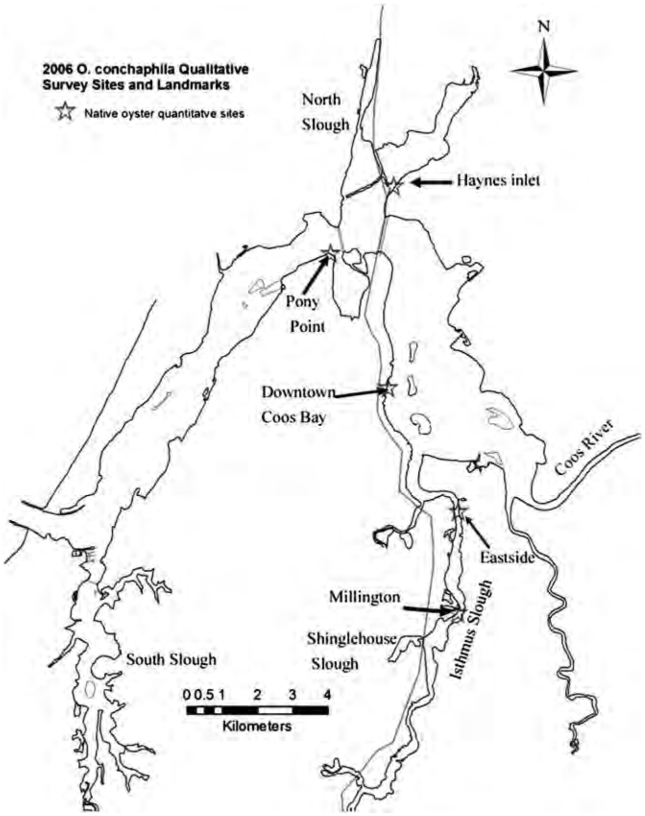

Figure 2. Coos Bay estuary, OR. Map indicates the location of local landmarks and five study sites examined in 2006 during quantitative surveys of *O. lurida* populations.

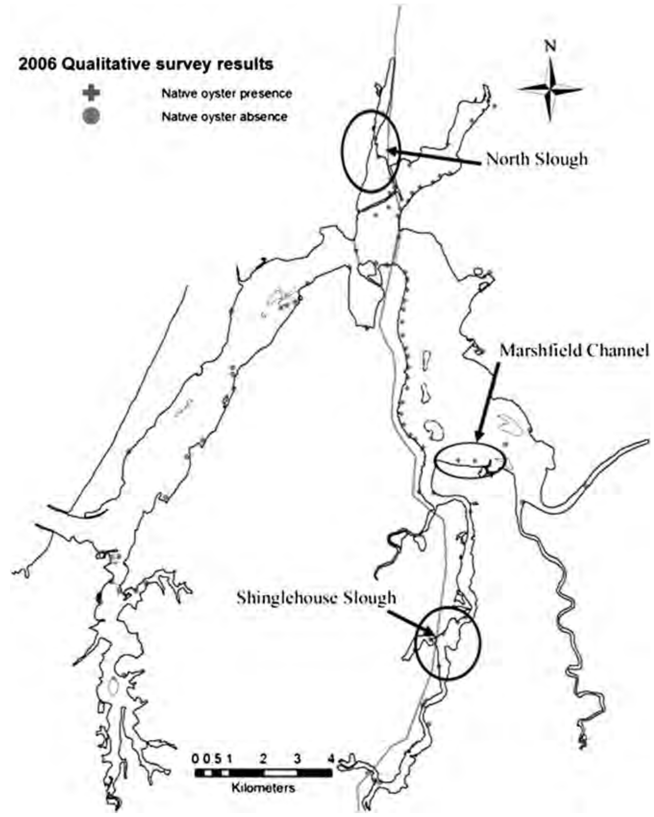

Figure 3. Coos Bay estuary, OR. Map indicates the distribution of *O. lurida* noted during qualitative surveys conducted throughout the bay in 2006. Circles indicate locations where substantial changes in distribution were observed in North Slough, Marshfield Channel, and Shinglehouse Slough.

for the local airport. Dense eelgrass beds (*Zostera marina*) occur in muddy sand in the lower intertidal area north of the airport. Rocky rip rap is the primary substrate used by *O. lurida* at this location and a diverse community of invertebrates co occurs, including arthropods (*Cancer magister*, *C. productus*, *Carcinus maenas*, *Hemigrapsus oregonensis*, *Neotrypaea californiensis*, and *Pachygrapsus crasspes*), bivalves (*Tresus capax, Clinocar dium nuttallii*, *C. gigas*, *Mya arenaira*, *Macoma* sp., *Mytilus* sp.), and gastropods (*Euspira lewisii*, *Nucella* sp.).

Haynes Inlet

The Haynes Inlet study site (43°26′38.79″N/124°12′48.85″W) is located in the polyhaline region of the estuary within a subestuary at the northern bend of Coos Bay (Fig. 2, Fig. 3). The intertidal substratum is characterized by sandstone and rip rap along the shoreline adjacent to tide flats used for commer cial oyster production. Hard surfaces (shell rubble, gravel, rip rap and rock) that are the preferred substratum for settlement of *O. lurida* in Coos Bay are not readily available in Haynes Inlet. Macro invertebrates common to this area include arthro pods (*C. magister*, *C. productus*, *C. maenas*, *H. oregonensis*, and *N. californiensis)*, bivalves (*C. nuttallii*, *C. gigas*, *M. arenaira*, *Macoma* sp., *Mytilus* sp.), and gastropods (*Nucella* sp.).

Downtown Coos Bay

The Coos Bay study site (43°23′30.17″N/124°13′2.42″W) is located in the mesohaline/polyhaline region of the estuary near the City of Coos Bay (Fig. 2,Fig. 3). The intertidal zone is characterized by steeply sloped rip rap banks adjacent to a deep (>30′ deep) dredged navigational channel. The preferred sub stratum for settlement of *O. lurida* at this site is primarily rip rap, and the narrow lower intertidal area below the rip rap is extremely soft mud and likely not suitable to support Olympia oysters. Invertebrates common to this area include arthropods (*C. magister, C. maenas*, *H. oregonensis*, and *N. californiensis)*; bivalves (*C. gigas*, *M. arenaira*, *Macoma* sp., *Mytilus* sp.); and gastropods (*Nucella* sp.).

Eastside

The Eastside study site (43°21′38.98″N/124°11′33.28″W) is located in the mesohaline/polyhaline region of the estuary near the municipality of Eastside (Fig. 2, Fig. 3). The narrow intertidal zone is characterized by a shallow gradient slope between the banks and deep channel where the substratum is a mixture of gravel, rock, and mud. The preferred substratum for settlement of *O. lurida* at this site is primarily gravel discarded from an adjacent quarry storage area. Invertebrates common to this area include arthropods (*C. magister, C. maenas*, *H. oregonensis*, and *N. californiensis)*; bivalves (*C. gigas*, *M. arenaira*, *Macoma* sp., *Mytilus* sp.); and gastropods (*Nucella* sp.).

Millington

The Millington study site (43°19′56.69″N/124°11′31.59″W) is located in Isthmus Slough (mesohaline region of the estuary) near the municipality of Millington (Fig. 2, Fig. 3). This site, and nearby Shinglehouse Slough, establish the upper bay range limit for Olympia oysters in Coos Bay. The narrow intertidal zone is characterized by soft sediments and woody debris that transitions quickly to the deep navigational channel. The pre ferred substratum for settlement of *O. lurida* at this site is primarily wood bark and other wood materials discarded from local lumber operations. Invertebrates common to this area include arthropods (*C. magister, C. maenas*, *H. oregonensis*, and *N. californiensis)*; bivalves (*C. gigas*, *M. arenaira*, *Macoma* sp., *Mytilus* sp.); and gastropods (*Nucella* sp.).

Survey Methods

We used three survey methods to document changes in the distribution, abundance, and size of *O. lurida* in Coos Bay.

Qualitative Surveys

The goal of this sampling effort was to revisit previous study sites to determine any changes in the distributional range of *O. lurida* populations in Coos Bay. Study sites were chosen strategically throughout Coos Bay based on previously described oyster habitat and areas that offered potentially suitable habitats. During each qualitative survey, the intertidal zone was thoroughly examined at times when the low tides were below 0′ Mean Lower Low Water (MLLW). In addition to the study sites described above, we also included 20 sites examined in previous surveys to establish the baseline distribution of oysters in Coos Bay (Baker et al. 2000).

Quantitative Surveys

The goal of this sampling effort was to re examine the abundance of *O. lurida* at different locations throughout Coos Bay. Quantitative surveys of oyster densities were conducted in the intertidal zone following previous methods (Baker et al. 2000) at the five study sites described above (Pony Point, Haynes Inlet, Downtown Coos Bay, Eastside, and Millington; Figure 2). At each site a 10 m transect line was laid out along the intertidal zone, parallel to shoreline, and six 0.25 m^2 quadrats were placed at random intervals along the line. All adult oysters (shell length $\geq$ 20 mm) that occurred within the quadrats were counted and measured. Juvenile oysters (<20 mm) were omitted from the quantitative surveys because of the lack of compara bility based on time of year and because of time constraints required to complete the surveys within a single low tide event. Notably, juvenile oysters, (<20 mm) were a significant compo nent (~97% of total) of the oyster population surveyed in 1997 and were excluded from 2006 surveys because of time constraints.

Index Survey

The goal of this sampling effort was to establish a repeatable index of oyster density in an area of high abundance for future monitoring. The oyster index area was established at the Eastside (Isthmus Slough) study site where populations of *O. lurida* occur consistently on the gravel substrata (Fig. 2). A 50 m section of the eastern shoreline of Isthmus Slough was examined and identified as suitable oyster habitat. Randomly chosen transects (0.5 m width) were run perpendicular to the 50 m line beginning at the highest oyster found and ending at the water line. All field surveys were performed at tides lower than 1.0 MLLW, and all oysters ($\geq$20 mm) within transects were counted. The Downtown Coos Bay study site (Fig. 2) was initially explored as a potential index site, but this area proved unsuitable because of the extremely high and patchy densities of oysters, primarily caused by the highly variable availability of rock as a suitable substrata.

Changes in Oyster Distribution, Abundance, and Size

Distribution in Coos Bay

The spatial distribution of *O. lurida* within Coos Bay in 2006 was generally similar to the distribution described earlier by Baker (1987) and by Baker et al. (2000), with a few notable changes. In 1986 and 1997, the lower bay distribution of *O. lurida* ended near the North Bend airport (near the Pony Point study site; Fig. 2) and the upper bay range limit was found in Isthmus slough near Millington (Fig. 2). In 2006, the lower bay range extended to rip rap at the end of the airport runway and the upper bay range had increased slightly to include Shingle house Slough and a short distance further up Isthmus Slough (Fig. 2).

Notable Areas of Population Change

Haynes Inlet and North Slough

Two subestuaries are located in the northern portion of Coos Bay, roughly where the bay is separated into the western and eastern arms. The re established population of *O. lurida* was first discovered in Haynes Inlet (Baker et al. 2000). The oysters are evenly distributed and occur at densities that are similar to those found in the quantitative surveys. High densities of *O. lurida* are limited to locations where substrate is suitable. Hard substrate (i.e., sandstone, shell, bark, basalt, and gravel) is readily available throughout this area and lends to the even distribution. Adult *O. lurida* were absent in North Slough during the surveys conducted in 1997, but they were present in the qualitative surveys conducted in 2006 when their range extended 2.8 km upstream.

Marshfield Channel

In the area east of the entrance of Isthmus Slough oysters are currently found commonly attached to decaying bark, the primary available substrate of the area. Fossil shells of *O. lurida* are dense in the fill material and banks of this area, but live oysters were absent here in 1997. Optimal settlement substrate is lacking throughout this area.

Shinglehouse Slough

In 2006, a dense intertidal population of Olympia oysters was found within Shinglehouse Slough in an area noted in 1997 as "marginal/incidental." This area is the site where a highway bridge was replaced in 1988 and substantial amounts of gravel were added below the bridge to help stabilize the sediments. The gravel provides a suitable substratum for *O. lurida* and the oysters were attached directly to the small rocks embedded in the soft mud.

South Slough

The South Slough tidal inlet forms the primary subestuary of lower Coos Bay. Several large adult *O. lurida* were observed attached to floating docks located throughout the Charleston

Boat Basin during the qualitative surveys conducted in 2006. In a result similar to the 1997 surveys, these adults were the only living *O. lurida* found in the lower bay area. Although other areas in South Slough are potentially suitable for *O. lurida* (i.e., Collver Point, Joe Ney Slough, Long Island Point), oysters were absent. South Slough National Estuarine Research Reserve is currently undertaking a project to evaluate the viability of habitats further upstream in areas that are potentially suitable for settlement and recovery of oyster populations on benthic substrata.

Changes in Oyster Abundance

Quantitative surveys of oyster abundance in Coos Bay conducted in 2006 revealed much higher densities of *O. lurida* than those found previously (Table 1). In general, large oysters (≥20 mm) had become much more abundant within the mid region of their range (Eastside, Coos Bay), and they also increased in abundance at the upper region (Millington and Haynes Inlet) extensions of the bay (Fig. 2).

The most notable areas of population change occurred in Millington and at the Eastside/Downtown Coos Bay study site (Fig. 2).

Millington

During the 1997 surveys this area was noted for the absence of living oysters. In 2006, we observed that a small but apparently viable population had become established on the woody debris embedded in the soft mud. Very little substratum that is suitable for settlement of *O. lurida* occurs at this site, and further recovery of the oyster populations appears to be limited by the availability of hard surfaces.

Eastside/Downtown Coos Bay

Dense populations of *O. lurida* were observed in 2006 throughout the intertidal areas of lower Isthmus Slough and the downtown shoreline of Coos Bay wherever suitable sub strate was available. Oyster densities of 46.7 per m^2 and 61.3 per m^2 were observed at the Eastside and Downtown Coos Bay locations, respectively. These high densities of oysters are typical of the adjoining areas and are greater than the densities observed in 1997 (Table 1, Baker et al. 2000).

Changes in oyster sizes

Populations of adult oysters observed in our 2006 quantita tive surveys included a broader range of smaller size classes in comparison with the sizes of oysters measured in 1997 (Fig. 4). In 2006, the average shell length for adult oysters (≥20 mm) was 32.8 (S.D. 7.4) mm compared with 38.1 (S.D. 4.5) mm in 1997. Despite the small number of adult shells measured in 1997 (n = 17) compared with the larger number measured in 2006 (n = 177), a single factor ANOVA of the size frequencies of oyster shell lengths (20 mm bins) revealed that the difference between the populations was highly significant (F = 8.3755; $P = 0.0042$). Pearson's coefficient of skewness also differed substantially between the populations measured in 1997 (0.0775) when the modal shell length was 44.0 mm, and the population measured in 2006 (0.0662) when the modal shell length was 33.0 mm. Negative skew in favor of smaller size classes in 2006 indicates that the populations of *O. lurida* probably experienced sub stantial and repeated episodes of recruitment during the pre ceding years.

Index Survey

The oyster index survey site established near Eastside (Fig. 2) yielded an average *O. lurida* density of 56.4 oysters per m^2. This high density of adult oysters is comparable to the high densities of *O. lurida* observed nearby at the Eastside study site and at the Coos Bay study site (Table 1). Our initial measurements of high and consistently occurring oyster densities at this site establish the baseline for future measurements of *O. lurida* populations within the mesohaline region of the estuary.

DISCUSSION

Beds of *O. lurida* were historically abundant in the Coos estuary and South Slough (Oregon) where they were used extensively as a food source by the indigenous people. Several shell middens that contain native oysters occur along the shoreline of the South Slough (Moss & Erlandson 1995) and they have radiocarbon ages of about 400 ± 60 y before present. Olympia oyster shells are commonly included in the dredged materials removed from the estuarine channels. Beds of *O. lurida* probably became locally extinct in Coos Bay and South Slough prior to written history caused by basin wide changes in

TABLE 1.

Comparison of the densities of *O. lurida* at various study sites in Coos Bay between intertidal surveys conducted in 1996–97 and 2006.

	1996 1997	2006
	Large oysters (≥20 mm)	Large oysters (≥20 mm)
Study Site	Density (#/m^2)	Density (#/m^2)
Millington	0	2.7
Eastside	0.7	46.7
Downtown Coos Bay	6.7	61.3
Haynes Inlet	0.7	4.7
Pony Point	5.3	3.3

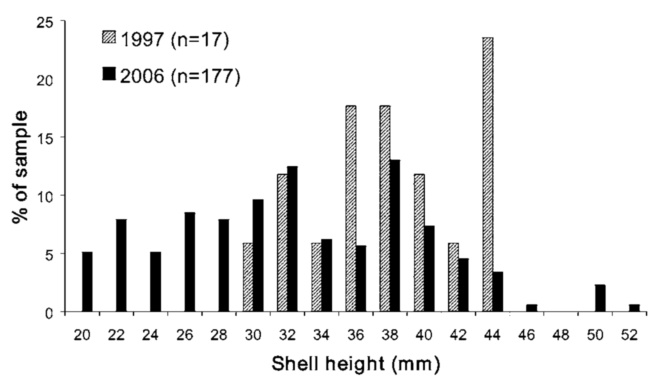

Figure 4. Comparison of the size distribution of adult *O. lurida* from surveys conducted in 1997 and 2006. Oyster sizes for the 1997 surveys are adapted from Baker et al. (2000). Note: Shell height is synonymous with shell length.

the inputs and distribution of fine sediments associated with fire and/or a tsunami (Nelson et al. 1996, Rumrill 2006). Over the first century after colonization of the shoreline of the Coos estuary by euro western settlers (*ca.* 1850 1950), aquatic and estuarine habitats within portions of Coos Bay were chronically degraded by growing urbanization and the cumulative effects of sedimentation, log storage, bark decay, dredging, deposition of dredge spoils, diking, filling, domestic and industrial pollution, commercial mariculture, and by the colonization of estuarine habitats by nonindigenous aquatic species. Despite these alter ations and degradation of the shoreline, and reduction of the entire wet surface area of the Coos estuary by 26% (Borde et al. 2003), water column and benthic habitat conditions have improved considerably over the past 30 years within particular regions of the tidal basin; conditions are now conducive to the recovery of Olympia oysters. In 1988, after several years of inadvertent inoculations *via* commercial shellfish culture activ ities, discontinuous populations of Olympia oysters became re established at low intertidal and subtidal elevations within the polyhaline (salinity 22 28 ppt) region of the Coos estuary (Baker et al. 2000). Baker hypothesized that changes in *O. lurida* range were dependent on changes to salinity intrusion, primarily attributed to deepening of the navigational channel. Additional channel deepening occurred roughly simultaneous with the previous surveys and may be responsible for the increased spatial distribution of *O. lurida* observed in 2006. It is anticipated that further changes to the navigational channel will result in alterations in salinity intrusion and thus may dictate future changes in the distribution and range of *O. lurida* populations.

Although isolated populations of Olympia oysters have become marginally established a within the Coos estuary, widespread recovery of *O. lurida* has not occurred because of several potentially limiting factors. These factors include: (a) suboptimal biotic and physical conditions that may hamper feeding, survivorship, growth, and reproduction; (b) inadequate production and larval retention; (c) decreased availability of adequate shell substratum for settlement; (d) poor survival of postsettled juveniles; and (e) predation, competition, and ecological interactions with other established Olympia and nonnative species. It is anticipated that once these hurdles are understood and perhaps overcome, it may be possible to initiate recovery of Olympia oyster beds in Coos Bay and South Slough in a manner that will allow the oyster populations to become self sustaining. Re establishment of self sustaining populations of *O. lurida* is desirable because, in addition to the recovery of the oysters, the growing physical structure of the oyster beds will serve to restore some of the lost ecological functions to the estuarine tidal basin, and the living oyster beds may reach a point in the future where they can provide substantial benefits for diverse communities of invertebrates, fish, shorebirds, and humans.

CONCLUSION

Populations of *O. lurida* currently exhibit spatial expansion and increased abundance in parts of Coos Bay, and also provide evidence of recruitment by juveniles into the established pop ulations of adults. Olympia oysters seem to have become a viable species and it is possible that they may continue to expand their distribution and fulfill their former role in the estuarine ecosys tem at some time in the future. However, our field observations indicate that the availability of suitable substratum is likely a key limiting factor that hinders further recovery in Coos Bay. The potential of oyster populations to recover in Netarts and Yaquina Bay is currently being explored *via* enhancement projects. These projects include ecological assessment work that will provide guidance for the future of Olympia oysters in Oregon's historically productive bays and estuaries.

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A Guide to Olympia Oyster Restoration and Conservation

ENVIRONMENTAL CONDITIONS AND SITES THAT SUPPORT SUSTAINABLE POPULATIONS

CALIFORNIA STATE UNIVERSITY FULLERTON

Smithsonian Institution

Coastal Conservancy

NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

UCDAVIS

SAN FRANCISCO STATE UNIVERSITY

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Synopsis

This guide identifies key environmental conditions that affect Olympia oysters. A qualitative evaluation of 28 embayments along much of the range of the species identifies the areas at risk due to low population sizes or unreliable recruitment, and characterizes patterns of exposure to stressors. The most frequently encountered stressors were sedimentation and predation. Competition, cold water temperatures, warm air temperatures, and freshwater inputs were also common concerns at many bays. Quantitative site evaluations incorporating oyster attributes and environmental conditions were conducted at six estuaries in California and Oregon to prioritize sites for conservation value and restoration potential. Development of an online site evaluation tool allows end-users to conduct similar evaluations in new regions, thereby guiding future restoration and management efforts.

Executive Summary

High densities of Olympia oysters at China Camp State Park, San Francisco Bay, California.

The Olympia oyster *(Ostrea lurida)* has declined at many estuaries in its native range along the Pacific coast from Baja California to British Columbia. In the past decade, efforts have begun to conserve, enhance or restore Olympia oyster populations. The purpose of this guide is to inform these initiatives, with emphasis on environmental conditions that will foster success.

Sustainable oyster populations exhibit a suite of attributes, including large adult population size, high density on hard substrates, high and reliable rate of juvenile recruitment, diversity of size classes, and high survival rate.

Numerous environmental factors affect these attributes of sustainable oyster populations. Based on results from field monitoring and laboratory experiments, combined with a thorough literature review and our own expert opinions, we determined how sensitive Olympia oysters are to a variety of potential stressors. We found that Olympia oysters are highly sensitive to sedimentation and freshwater inputs, and moderately sensitive to excessively cold water temperature, high air temperature, food limitation, predation, and hypoxia. In contrast, sensitivity to a variety of other environmental factors currently appears to be relatively low; these factors include high water temperature, contaminants, competition, acidification, sea level rise, pathogens and diseases.

In addition to examining sensitivities of Olympia oysters to a variety of environmental factors, we characterized their exposure to these stressors. This is an important distinction, because oysters may be quite sensitive to an environmental factor and yet this is not relevant for management if they are rarely exposed to this factor in a given location. We solicited assessments by local experts of exposure to stressors in 28 embayments across much of the range of the species.

Researcher examining oysters in Nootka Sound, Vancouver Island, British Columbia.

Sedimentation was by far the most commonly encountered stressor, affecting populations in 71% of the embayments examined. Predation by drills and by other species was the next most common, identified as significant at 43% of embayments. Competition, cold water temperatures, warm air temperatures, and freshwater inputs also frequently pose threats to oysters (at 25–39% of embayments). Other stressors appear to be less common across this broad range; hypoxia, food limitation, contaminants, disease, warm water temperatures and acidification were identified as important at fewer than 20% of embayments, although at these places they may play a significant role.

This evaluation of 28 embayments provides an unprecedented synthesis of stressors faced by Olympia oysters across much of the range of the species. This comparison also yields insights into the status of oyster populations. The regional comparison identified that 21% of embayments experience many years with zero or near-zero recruitment of juveniles, which poses a threat to their long-term sustainability. Adult population sizes were also estimated. At 39% of embayments, there are estimated to be more than 1 million oysters present. While this is perhaps still a fraction of historical population sizes, these larger populations are likely to be fairly stable. At 43% of the embayments, populations were estimated at between 10,000 and 1 million individuals, which may raise some concern for their sustainability without management intervention. At 18% of embayments, estimates indicated that fewer than 10,000 oysters were present. These areas are excellent candidates for additional conservation and restoration efforts.

Into the cold bay
Place oysters where they can best
Survive stressful times

In addition to the broad comparisons among embayments, we also conducted much more detailed evaluations of sites within some of them. We incorporated quantitative field data on oyster attributes and environmental conditions into tables that served to prioritize sites for oyster conservation or restoration. We conducted such site evaluations at six estuaries in Oregon and California. We also developed an online site evaluation tool (available at www.climate-and-oysters.org) that can be applied by any user to assess other sites with new data.

This approach to quantifying the relative conservation value and restoration potential of multiple sites can be used to inform management actions. Agencies, nongovernmental organizations, community groups, or others considering the launch of a new restoration project can determine whether a particular site is likely to yield success. Funding agencies can use scores to help evaluate multiple restoration proposals and regulatory agencies can use the scores to direct policy protecting valuable existing populations.

In summary, this guide supports Olympia oyster conservation and restoration by enhancing the understanding of the attributes of sustainable oyster populations, the environmental conditions that most strongly affect them, and the embayments and specific sites that best support them.

Background

Purpose and development of this guide

The purpose of this guide is to inform restoration and conservation of Olympia oysters *(Ostrea lurida)*. It was prepared by an interdisciplinary team funded by NOAA's National Estuarine Research Reserve Science Collaborative from 2011 to 2015. We first completed a guide for Central California in close collaboration with stakeholders and with substantial new data from field monitoring and laboratory experiments (Wasson et al. 2014). The current guide is an update of the earlier one, including evaluation of embayments along much of the range of the species, and incorporating input from oyster researchers and literature from other regions to increase generality. The intended audience includes oyster restoration practitioners, restoration scientists, and organizations involved in planning, funding, or permitting restoration and conservation.

Top: dense oyster recruitment on the San Francisco Bay Living Shorelines Project. Above: spreading shell for restoration in Netarts Bay, Oregon.

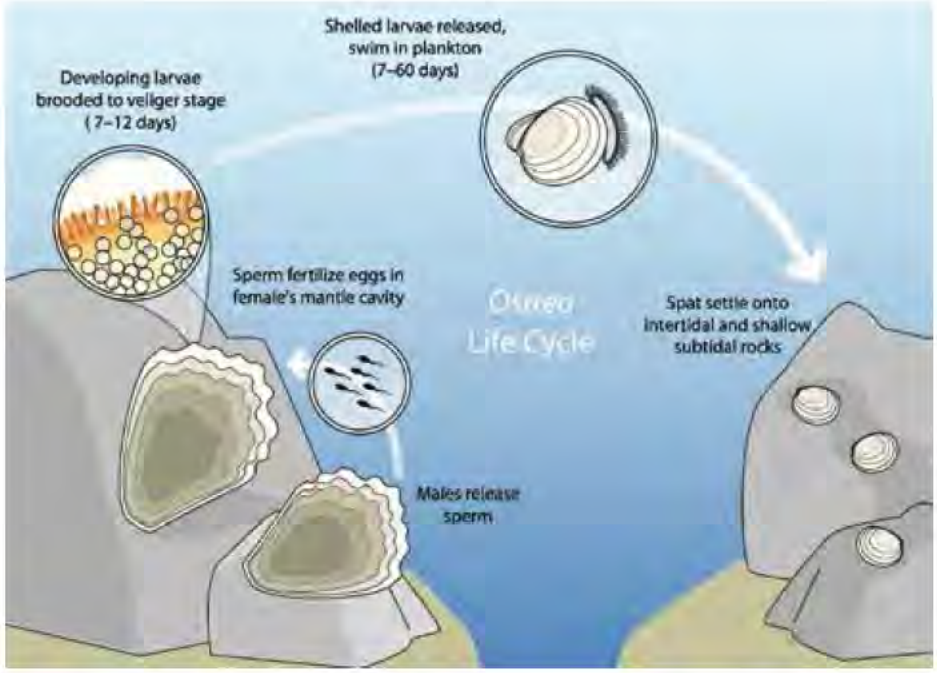
We characterized oyster populations and environmental factors that affected them at two spatial scales. Most broadly, we compared oysters and environmental stressors across much of the range of the species, to identify key opportunities and threats. At a much narrower spatial scale, but with greater depth, we also conducted site evaluations intended to aid end-users in prioritizing sites within particular embayments. We conducted site evaluations in Central California (Wasson et al. 2014), Southern California (Appendix 1) and southern Oregon (Appendix 2).

This is not a "how to" manual for field restoration methods, nor does it address the human processes that are essential for restoration and conservation (permitting, community support, public outreach, etc.). Guides that address these issues are sorely needed and would complement the current effort.

Olympia oysters: challenges and opportunities

LIFE-CYCLE AND ECOLOGY

Olympia oysters are primarily estuarine and generally not found on the open coast (Baker 1995). In Central California, they are most abundant around the 0-meter tide mark, Mean Lower Low Water (MLLW), and in Southern California at −0.3 m (authors' unpublished data), but have been reported from as high as 1 m above MLLW to depths of 10 m (Baker 1995). They require hard substrate on which to settle. They are sequential hermaphrodites—typically, but not always, starting out as males—and may switch sexes twice within the course of a year (Moore et al. in prep.). Females brood larvae in their mantles for 7–12 days (Coe 1931, Hopkins



Schematic of Olympia oyster life cycle. Adult males release sperm that is taken up by nearby females. Eggs are fertilized within the mantle cavity and developing larvae are brooded to the veliger stage, released into the plankton, and transported with tides and currents. Larvae settle irreversibly onto hard substrate as juvenile oysters and grow to sexual maturity within months to a year. (Julia C. Blum)

1936, Strathmann 1987), after which they are released to swim in the plankton for 5 days (authors' personal observations) to 4 weeks (Breese 1953).

Large adult oysters sharing space with bay mussels at the Berkeley Marina, San Francisco Bay.

TRENDS IN DISTRIBUTION AND ABUNDANCE

Olympia oysters range from Central Baja California, Mexico, to British Columbia, Canada (Polson and Zacherl 2009). Abundance varies enormously from scant, but persistent, populations consisting of a handful of individuals, to locations with nearly 100 percent cover of oysters on hard substrates at MLLW (authors' personal observations). In most locations, the size of the pre-European-contact population is unknown. However, there were sufficient populations in many locations, including San Francisco Bay prior to the Gold Rush, to support a commercial fishery (Conte and Dupuy 1982; reviewed in Zu Ermgassen et al. 2012). Based on a review of the former extent of commercial oyster grounds from the earliest available records (mid-1800s to early 1900s), Zu Ermgassen et al. (2012) estimated oyster grounds in Puget Sound, Humboldt Bay, San Francisco Bay, Elkhorn Slough and Mission Bay to be at 1% of historic levels.

CONSERVATION AND RESTORATION

The earliest efforts to restore Olympia oysters began in Puget Sound in 1999 (Peter-Contesse and Peabody 2005) and included seeding oyster shell and large-scale deployment of Pacific oyster shell for natural set. Current smaller-scale projects in Oregon and in Central and Southern California range from deploying small structures to assess recruitment patterns and best methods, to larger-scale mixed-species restoration projects with both physical and biological objectives in a "living shorelines" model.

Rocky substrate with oysters in San Francisco Bay.

Winter storm, downpour
Bay oysters shut their valves tight
Long wait to exhale

It is worth noting that the term "restoration" is used rather broadly, to describe efforts to increase regional numbers of Olympia oysters, back towards levels that were presumed to be considerably higher historically and prehistorically along the entire coast (Zu Ermgassen et al. 2012). At the level of specific sites, there is usually no information about historic oyster densities. Moreover, human activities have changed conditions such as sedimentation and freshwater inputs so that the best locations for oysters today may differ from the best historic sites. Thus, at the level of an individual site, a project may more accurately be described as oyster "enhancement" rather than "restoration".

Sedimentation rates have also increased at many estuaries, such that oysters can no longer survive on tiny bits of natural hard substrate on the bottom or the low-relief oyster reefs that Olympias may have once made. Thus, some restoration efforts provide large artificial hard substrates raised above the sediments, which result in quite different oyster habitat than was historically present.

Climate change is a challenge that must be understood and addressed as a part of restoration. Current model projections suggest rising air and water temperatures, acidification of surface waters and more frequent and severe flood events. These are likely to affect both existing oyster populations and restoration efforts. Climate change stressors may interact with and perhaps act synergistically with each other and with other anthropogenic stressors such as invasive species (for example, predatory oyster drills and potential space competitors such as the Pacific oyster *Crassostrea gigas*), high nutrient levels, and pathogens and disease. Climate change effects are not likely to be the same in all locations, nor are other anthropogenic stressors equally important everywhere. Conservation and restoration efforts require a better understanding of the importance of local environmental factors, both now and in the future.

Intertidal community with oysters.

Information sources for this guide

Stressor experiments on oysters at Bodega Marine Lab, California.

IDENTIFICATION OF KEY OYSTER ATTRIBUTES AND ENVIRONMENTAL STRESSORS

We relied heavily on our earlier guide (Wasson et al. 2014) for assessments of oyster attributes and environmental stressors. That in turn was based on extensive new field data collection and analysis at sites in central California, and laboratory experiments on stressors, both of which are described in detail in the original guide and associated appendices (Wasson et al. 2014), as well as a recent publication (Cheng et al. 2015). Both the original and current guide also involved syntheses of the existing published literature, unpublished data and observations of the authors, and personal communications from colleagues. Earlier reviews (Couch and Hassler 1989, Baker 1995, White et al. 2009) provided an excellent base for identification of key environmental factors. Many of the oyster attributes and environmental factors we included are the same as the "universal metrics" recommended for oyster restoration monitoring (Baggett et al. 2014), though we emphasize those most relevant to Olympia oysters.

EXPERT ASSESSMENTS OF WEST COAST EMBAYMENTS

We invited oyster researchers working along the entire range of the species to evaluate embayments with regard to oyster populations and environmental conditions. The assessments were not quantitative, but rather involved determining whether oyster attributes or stressors fell into "high," "medium" or "low" categories. Broad definitions of these categories (see Table 1) helped provide consistency among assessments by different experts. These expert assessments provide a basis for examining geographic patterns in status of Olympia oyster populations and in expression of stressors.

SITE EVALUATIONS

The data and approach used for site evaluations of Southern California and southern Oregon are detailed in Appendices 1 and 2, respectively. Our earlier site evaluations of Central California are detailed in Wasson et al. 2014.

Azevedo Pond in Elkhorn Slough, California.

Location of embayments where experts conducted assessments of oyster attributes and environmental stressors. Note that multiple regions within San Francisco Bay, Puget Sound, and the Strait of Georgia were assessed.

Field monitoring at the Berkeley Marina, San Francisco Bay.

Attributes of Sustainable Oyster Populations

OVERVIEW

Successful Olympia oyster populations exhibit a suite of biological attributes that we characterized and describe below. These are attributes that can be assessed at the level of individual sites, as a part of site evaluations. Two of these attributes (population size and reliability of recruitment) are also included in our comparison of entire embayments.

The attributes we have focused on include two "universal metrics" recommended for oyster restoration monitoring (Baggett et al. 204), oyster density and size frequency distribution. However, other metrics that apply to larger, reef-forming oysters such as reef height and area are not useful for Olympia oysters and were not included. Conversely, we included metrics not part of the universal recommendations, but very important to Olympia oysters such as recruitment—recruitment failure is common in this species, perhaps because of relatively low population sizes.

MODERATE-TO-HIGH ADULT DENSITIES (importance: *very high*)

The density of adult oysters at a site can serve as a cumulative indicator of its appropriateness for conservation or restoration; moderate to high adult densities result from one or more years of significant recruitment and survival. Current oyster density data are important for prioritizing conservation areas, yet some populations fluctuate from year to year and it is better to have multiple years of data for greater confidence. High oyster densities on existing substrate can be used to assess suitability for restoration at that site, provided there is existing hard substrate to begin with. In a survey of 24 locations across the species' entire range, Polson and Zacherl (2005) recorded a wide range of densities from one individual to 146.8 /m^2 , but we recorded much higher densities at several sites in San Francisco Bay in 2012–13, up to 961/ m^2 in San Francisco Bay. Densities in Newport Bay and San Diego Bay are generally much lower (up to 55/m^2 and 219/m^2, respectively). Similarly, Coos Bay sites we evaluated were generally lower (up to 76.4/m^2), although recent survey work at a mitigation site found densities as high as 1000/m^2 (S. Groth personal communication).

TOTAL ABUNDANCE AT SITE (importance: *very high)*

An order-of-magnitude estimate of the total number of oysters living at a site is a good indicator of its relative conservation value. In some cases, adult density per square meter of hard substrate may not represent density at larger scales (e.g., hectares), because there is very limited hard substrate. A site that has a million oysters within a hectare should have greater conservation value than a site that has a thousand oysters per hectare, and far greater than one that has ten oysters per hectare, even if all those sites have the same density per square meter. Therefore, it is important to establish where to draw the line around a site of interest and whether or not to include the full tidal range encompassing all colonized hard substrate. For assessments in Central California, we limited the total

Monitoring a remarkably dense population of Olympia oysters in Nootka Sound, Vancouver Island, British Columbia.

area for each site calculation to a 1-m wide band extending 300 m alongshore and centered around study transects at the tidal elevation of maximum oyster density. We were then able to use our density measurements (above) to generate order of magnitude estimates of total population. Site-level oyster population estimates in all California study bays ranged from fewer than 100 to 10,000s of individuals, with a high of estimate 100,000s of individuals at a single site in San Francisco Bay.

Broad assessments of abundance at the level of entire embayments are also useful for comparisons. Table 1 reveals that in 39% of embayments assessed, Olympia oyster populations are estimated to be above 1 million individuals. At 43%, populations are estimated at between 10,000 and 1 million oysters. However, at 18%, abundance of Olympia oysters is estimated at fewer than 10,000 individuals, which is of concern for long-term stability and persistence.

OYSTER SIZES: BROAD SIZE DISTRIBUTION (importance: *high)* AND LARGE SIZES (importance: *medium)*

The presence of oysters distributed among a broad range of size classes is a good indicator of a healthy population, indicating a combination of recent recruitment, growth, and long-term survival. Each is an important aspect of a sustainable population, but it is time-consuming and sometimes logistically challenging to measure each separately. Because recruitment can vary from year to year, the best estimates of size distribution will include several years of data. At the very least, estimates ought to be made after the recruitment season, to include newly settled juveniles. Consistent absence of particular size classes does suggest potential limitations for populations. For example, absence of small sizes might suggest recruitment limitation or absence of large size classes might indicate a lack of long-term survival. However, although a broad range of sizes is regularly seen at high quality sites in Central California, not all Olympia oyster populations show persistent evidence of previous recruitment, particularly if growth to adult size happens very quickly and subsequent growth of those same individuals is limited. We measured oysters in quadrats

Top: measuring oysters. Above: multiple age classes.

along our study transects, categorized these into 10 mm size classes, and generated a size-class diversity index using a formula typically used to compare species diversity, the Gini-Simpson index. Our sites ranged from an index of 0.25 at a location in Elkhorn Slough where all oysters were from a single recruitment event, so that size diversity was very low, to an index of 0.876, at a site in San Francisco Bay where there were many oysters in multiple size classes. Newport Bay and Southern Oregon sites were all between 0.50 and 0.77.

In addition, when we included data on the largest oysters, the table was more accurate in ranking sites that we know from previous research have had consistent recruitment and moderate to high densities of oysters over time periods longer than the current study. We used the mean of the upper quartile of oyster sizes measured in our quadrats. Across study sites, the average sizes of the largest oysters ranged from 12 mm—a site in San Francisco heavily impacted by oyster drill predation—to 66 mm at an Elkhorn Slough site. Across all bays, largest oysters were typically between 30 and 50 mm, although oysters at most Elkhorn Slough sites tended to be above 50 mm.

RECRUITMENT RATE: HIGH RECRUIT DENSITY (importance: *high)* AND RELIABLE RECRUITMENT (importance: *medium)*

Recruitment is absolutely necessary for a site to support a sustainable oyster population in the long run. Several factors influence whether or not there is high and reliable recruitment at a site, including processes affecting larval transport and retention, and the number and proximity of other colonized sites that could serve as larval sources. Estimating recruitment rate may be especially important for sites without adults where restoration actions are being considered. However, potential restoration sites that exhibit low recruitment may not need to be eliminated if seeding those sites with settled oysters is a viable option, and if this can be done at a large enough scale that a new, self-sustaining population can be formed, producing and retaining sufficient larvae. In central California, we counted recruits to standardized settlement tiles, deployed and retrieved quarterly, to arrive at a measure of recruits/unit area/day. We also calculated the coefficient of variation (CV) quarterly per site to generate a measure of reliability of recruitment; a low CV indicates a relatively consistent rate while a large one inconsistent recruitment. In Central California, quarterly average recruit density ranged from 0 at several Elkhorn Slough sites to 88 recruits/m^2/day at a San Francisco Bay site. In Southern California sites, where recruitment rate was calculated between June and October, rates ranged from 24–42 recruits/m^2/day in Newport Bay and from 136–1349 recruits/m^2/day in San Diego; measurements from southern Oregon calculated for a similar time period ranged from 3–39 recruits/m^2/day. Recruitment CV ranged from 0.5 at a Newport Bay site to ~3 at several Elkhorn sites and one in San Francisco Bay, all of which had recruitment in only one of two study years.

Table 1: Synopsis of Oyster Population Attributes and Stressors Across Range of Olympia Oyster

	OYSTER ATTRIBUTES		STRESSORS[3]														
	POPULATION SIZE[1]	RECRUITMENT[2]	SEDIMENTATION	PREDATION BY DRILLS	PREDATION BY OTHER SPECIES	WATER TEMP. TOO LOW	COMPETITION BY PACIFIC OYSTERS	COMPETITION BY OTHER SPECIES	AIR TEMP. TOO HIGH	LOW SALINITY	FOOD LIMITATION	DISEASE/ PATHOGENS	ACIDIFICATION	WATER TEMP. TOO HIGH	CONTAMINANTS	HYPOXIA	SOURCES
CALIFORNIA																	
San Diego Bay	G	G	G	G	lG	G	lY	lG	lG	G	lG	G	lG	lG	lG	lG	S. Briley & H. Henderson, personal communication
Newport Bay	Y	G	Y	G	lG	G	lG	lG	lY	G	lG	G	lG	lG	lG	lG	S. Briley & D. Zacherl, personal communication
Alamitos Bay	Y	G	Y	G	lG	G	lG	lG	lY	G	lG	G	lG	lG	lG	lG	S. Briley & D. Zacherl, personal communication
Elkhorn Slough	R	R	R	G	G	lY	G	lG	G	G	lY	G	G	G	lG	R	Wasson 2010, Wasson et al. 2014, Wasson, personal communication
SAN FRANCISCO BAY																	
South Bay	G	Y	R	Y	lG	G	G	lG	G	Y	lY	G	G	G	G	G	Grosholz et al. 2008, Zabin et al. 2010, Wasson et al. 2014
Central Bay	G	Y	R	G	lG	lG	G	lG	G	Y	lY	G	G	G	G	G	Grosholz et al. 2008, Zabin et al. 2010, Wasson et al. 2014
North Bay	G	Y	R	G	lG	lY	G	lG	G	R	lY	G	G	G	G	G	Grosholz et al. 2008, Zabin et al. 2010, Wasson et al. 2014
Tomales Bay	Y	R	G	Y	G	lY	G	G	G	G	G	G	Y	G	G	lG	Kimbro et al. 2009, E. Grosholz, personal communication
Humboldt Bay	Y	lY	R	R	lY	lY	G	G	lG	lY	lY	lY	lG	lG	lG	lG	D. Couch & K. Ramey, personal communication
OREGON																	
South Slough	R	lR	lR	G	lG	G	lG	lG	G	lG	lG	lG	lG	G	lG	lG	A. Helms & B. Yednock, personal communication
Coos Bay	G	lY	lY	G	lG	lG	lG	lG	G	lY	lG	lY	lG	G	lG	G	A. Helms & B. Yednock, personal communication
Yaquina Bay	Y	Y	Y	lY	lR	lY	lY	lR	G	lY	lY	lR	lY	G	Y	G	D. Vander Schaaf, personal communication
Netarts Bay	Y	R	Y	lY	lR	lY	lY	lR	G	G	lY	lY	R	G	G	G	D. Vander Schaaf, personal communication
WASHINGTON																	
Willapa Bay	G	G	Y	Y	Y	lY	Y	Y	lY	G	G	G	lG	G	G	G	Trimble et al. 2009, J. Ruesink, personal communication
PUGET SOUND																	
Henderson Inlet	R	Y	Y	Y	Y	lG	G	Y	lG	G	G	G	lG	lG	lG	lG	B. Allen, personal communication
Totten Inlet	G	G	Y	Y	Y	lG	G	Y	lG	G	G	G	lG	lG	lG	lG	B. Allen, personal communication
Noth Bay, Case Inlet	G	G	G	lG	lY	lY	G	lG	lY	G	G	G	lG	G	G	G	White et al. 2009, J. Ruesink, personal communication
Belfair, Hood Canal	lR	lY	Y	Y	Y	lY	Y	lG	lY	G	G	lG	lG	G	G	G	J. Ruesink and S. Valdez, personal communication
Dabob/Quilcene, Hood Canal	lR	lG	lG	lG	lR	lY	Y	lG	lY	G	G	lG	lG	G	G	G	J. Ruesink and S. Valdez, personal communication
Port Gamble Bay	Y	lG	lY	lG	lG	lG	lY	lY	lG	G	G	lG	lG	lG	lG	lG	B. Allen, personal communication
Discovery Bay	Y	lG	lY	lY	lY	lG	lG	lY	lG	G	G	G	lG	lG	lY	lG	B. Allen, personal communication
Dyes Inlet	G	G	Y	Y	Y	lG	G	Y	lG	G	G	G	lG	lG	lG	lG	B. Allen, personal communication
Liberty Bay	G	G	Y	Y	Y	lG	G	Y	lG	G	G	G	lG	lG	lG	lG	B. Allen, personal communication
Fidalgo Bay	Y	R	lG	G	G	lR	G	lG	G	G	G	G	G	G	G	G	P. Dinnel, personal communication
BRITISH COLUMBIA																	
STRAIT OF GEORGIA																	
Victoria area	lG	lY	Y	G	G	lG	G	lY	G	Y	G	lG	lY	G	G	G	J. Carolsfeld, personal communication
Nanaimo area	Y	Y	G	G	G	lG	G	G	Y	G	G	G	G	Y	G	G	S. Dudas, personal communication
Baynes Sound area	Y	Y	G	G	G	lG	G	G	Y	G	G	G	G	Y	G	G	S. Dudas, personal communication
Quadra/Cortes Island area	Y	lR	lG	lG	lG	lG	lG	lG	lG	lG	G	lG	lG	lG	lG	lG	S. Dudas, personal communication

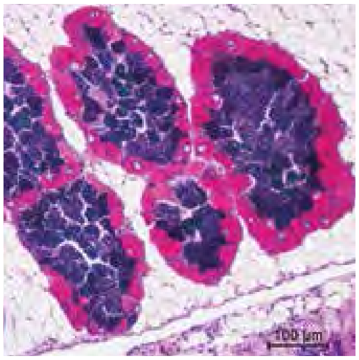
1. Population size estimate for estuary/region (intertidal and subtidal combined, even though latter is very uncertain)
<10,000 <1 million >1 million

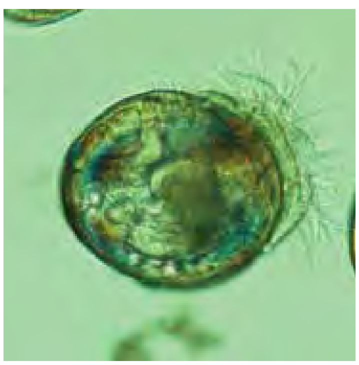
2. Recruitment assessment
- many years with zero or near zero recruitment
- occasional years with zero or near zero recruitment
- no years with zero or near zero recruitment

(for entire estuary/region)

3. Stressor assessment: negative effects include low recruitment, dieoffs of adults, or absence of oysters at otherwise favorable sites
- stressor affects >10% of population every year or >25% every 5 years
- significant problems, but not regularly or affecting much of the bay
- no evidence of significant problem

Lighter colors indicate lower levels of certainty.





From top to bottom: life stages of the oyster: gonads, brooded larvae, free-swimming veligers, "spat"—settled young oysters.

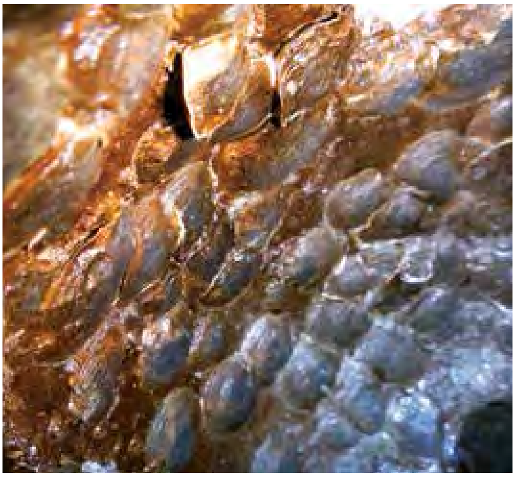
Across the range of the Olympia oyster, there is reliable recruitment at some embayments (Table 1). However, at 61% of them, there are at least some years with zero or near zero recruitment. At Elkhorn Slough, Tomales Bay, South Slough, Netarts Bay, Fidalgo Bay and in the northern Strait of Georgia, there are many years with zero recruitment. Such populations may be at risk of local extinction, particularly if changing climate conditions lead to increased numbers of consecutive years with zero recruitment. The sites with unreliable recruitment were ones that did not have large (over 1 million oysters) population sizes (Table 1).

HIGH JUVENILE SURVIVAL RATE (importance: *high)*

Juvenile stages are particularly susceptible to predation and other stressors that could lead to mortality. Survival to the adult stage is critical for reproduction and the overall sustainability of a population. In many cases, high rates of juvenile survival will be reflected in a broad range of oyster sizes present at a site (with the abovementioned exceptions). Thus, while survival rates are not critical to measure *in situ,* doing so allows for a more precise understanding of why certain size classes might be missing at a site. In central California, we allowed oysters to recruit to tiles in the field and then tracked the survival and growth of these oysters. For locations that did not have natural recruitment, we deployed tiles from nearby locations that had recruitment. Across embayments measurements of survival were made on oysters of different ages and over different time scales, making direction comparisons impossible. Early survival was high in San Diego (typically 99.9%/day for 90 days) and at most Central California sites (99.9% to 99.45%/day). Survival of juveniles on tiles in Coos Bay ranged from 45 to 79% at three sites across a study period of six months (January to July) (Rimler 2014). The methods used for the site evaluation table were too different to compare among embayments.

HIGH JUVENILE GROWTH RATE (importance: *low to high)*

As noted above, juvenile oysters are generally more susceptible to predators and environmental stressors than are adult oysters, suggesting the clear benefits of growing quickly after settlement. High juvenile growth rates indicate favorable conditions (such as available food and sufficiently high salinity and dissolved oxygen) and should lead to healthy adult populations. However, sites with high food resources and warm water, which can promote growth, may also suffer from low dissolved oxygen. Additionally, low juvenile growth rate does not necessarily indicate poor field conditions. Growth may be limited by high recruitment densities rather than by a lack of food or by other unfavorable conditions. Marking and remeasuring oysters is time-consuming. Size-class distribution calculations, as mentioned above, provide indirect measurements of growth and survival. Such calculations could be substituted for direct measurement in sites with existing oyster populations. For sites without oysters or with few oysters, deploying settled oysters on tiles, as we did, to observe growth and mortality, can indicate whether conditions at a site are appropriate for restoration with seeded oysters. Across embayments growth



Top: tracking survival and growth of oysters on monitoring tiles. Middle: Olympia oyster spat on Pacific oyster shell. Above: juvenile Olympia oysters on eelgrass.

measurements were made on oysters of different ages and over different time scales, making direction comparisons impossible. For Central California, growth ranged from 0.037 mm/day at one San Francisco Bay site to 0.11 mm/day at four Elkhorn Slough and one San Francisco sites across six quarters. At San Diego Bay sites, growth of ~30 day old oysters was 0.24 to 0.39 mm/day over a two month period. In Southern Oregon growth ranged from 0.03 to 0.14 mm/day from April to July.

HIGH LARVAL CONTRIBUTION TO REGION (importance: *medium to high)*

Sites that support significant adult populations also might export larvae and be of particular conservation value to the regional population. Ideally, this information would be included in evaluating sites for conservation. Measurements of fecundity and larval connectivity can help to identify what sites might most contribute to regional larval supply, but a thorough understanding of larval sources and sinks also requires an understanding of tidal currents and other transport processes around and between sites. At present this represents a major data gap in consideration of specific sites for restoration as well as for understanding the importance of oyster populations within regions.

Using shell chemistry analysis, we were able to evaluate the relative contributions of larvae produced in regions within San Francisco Bay to other regions in the Bay in 2012. Due to low adult densities and/or low fecundity at some sites, only six sites were evaluated in this portion of our research. For the locations we evaluated, our estimates ranged from 3 million larvae exported from a South Bay site to more than 26 million exported larvae from a North Bay site (Wasson et al. 2014). Carson (2010) used shell chemistry analysis to determine the origin of newly settled spat and thus the connectivity between sites in San Diego Bay, Mission Bay, and Agua Hedionda and Batiquitos in north San Diego County. Over the course of the whole recruitment season, sites in San Diego Bay and North County supplied more than half of their own recruits, while newly settled spat in Mission Bay were almost all from the other locations. However, Carson noted that the proportions of self-recruits and the relative contributions from each bay varied between the first and second half of the summer. Source and sink dynamics also likely vary between years, so the results of these two studies should not be considered definitive.

Larvae floating free
Attach to hard surfaces
Forever settled

Environmental Stressors

OVERVIEW

The distribution and abundance of Olympia oysters are affected by numerous environmental factors. We identified those environmental factors most important to Olympia oysters. Three of these—temperature, salinity, and dissolved oxygen—are ones considered "universal metrics" to monitor for any oyster restoration project (Baggett et al. 2014).

Through our data from field monitoring and laboratory experiments, combined with a thorough review of the literature and our team's expert opinion, we determined the *sensitivity* of Olympia oysters to a variety of potential stressors. Sensitivity is the degree of responsiveness to a realistic level of the environmental factor, for instance, high mortality rates or high recruitment failure in response to a potential stressor is considered high sensitivity, while limited sublethal effects would represent low sensitivity. Below, we explain how we determined sensitivity, highlighting the data or literature used to make the assessment. However, this categorization of sensitivities should not be considered final and comprehensive; as new studies are conducted our understanding will evolve. For instance, as a result of collaboration with colleagues from a broader geographic area, our evaluations of sensitivity have already been updated from our earlier efforts for Central California (Wasson et al. 2014).

In addition to assessing sensitivity of Olympia oysters, we also evaluated their *exposure* to environmental stressors. Exposure is the actual experience that oysters have with the stressor in the field. The distinction between sensitivity and exposure is important. For instance, Olympia oysters are quite sensitive to

Table 2: Overview of Olympia Oyster Sensitivity and Exposure to Different Stressors

STRESSORS	SENSITIVITY	EXPOSURE
Sedimentation	High	High
Low salinity	High	Medium
Predation	Medium	Medium
Water temperature too low	Medium	Medium
Air temperature too high	Medium	Medium
Food limitation	Medium	Medium
Hypoxia	Medium	Low
Competition	Low	Medium
Water temperature too high	Low	Medium
Acidification	Low	Medium
Sea level rise	Low	Medium
Contaminants	Low	Medium
Disease/Pathogens	Low	Medium

KEY: LOW MEDIUM HIGH

HIGH: For sensitivity, this indicates teh stressor can have strong negative effects on oysters; for exposure, indicates it was considered a concern at ≥50% of surveyed bays

MEDIUM: For sensitivity, this indicates the stressor can have moderate negative effects on oysters; for exposure, indicates it was considered a concern at ≥25% of surveyed bays

LOW: For sensitivity, this indicates the stressor has few negative effects on oysters; for exposure, indicates it was considered a concern at <25% of surveyed bays

Sensitivity assessments were based on literature review, field data, and laboratory experiments. *Exposure* assessments were based on the evaluation of 28 bays by local experts (Table 1).

Top: large cobble provides hard substrate in Elkhorn Slough, California. Above: oysters in muddy conditions in Alamitos Bay, Southern California.

prolonged periods of low salinity. However, this is only relevant to those places that receive significant freshwater input, such as northern San Francisco Bay. The interannual variation in the amount of freshwater flow leads Olympia oyster populations to expand upstream in dry years into areas that are then inundated with fresher water in wetter years, causing mass mortality. Patterns of exposure at 28 embayments are characterized in Table 1. A summary of both sensitivity and exposure is provided in Table 2. We considered overall exposure to be high if concerns were identified (yellow or red colors) at ≥50% of embayments that were assessed; medium if ≥25% of embayments identified concerns, and low if <25% of embayments identified concerns.

Below, we review a series of environmental factors relevant to oysters. For each we first discuss sensitivity, then methods for quantifying stressor levels, and then exposure.

SEDIMENTATION (sensitivity: *high;* exposure: *high)*

Sensitivity: Olympia oysters cannot survive extended durations of burial in soft sediments. Exact tolerances to burial are not known for this species, but sedimentation has been identified as a stressor (Blake and Bradbury 2013). Other oyster species have been shown to be able to survive short-term burial (Hinchey et al. 2006), but longer-term burial can reduce recruitment and increase mortality (Lenihan 1999). Grain size is an important aspect of sedimentation (Thrush et al. 2004); while significant accumulation of fine-grained sediment could limit water circulation and challenge feeding and respiration, even complete sediment burial in coarser-grained sands may not be detrimental. Sediment types and deposition and movement rates interact with availability of larger hard substrates at a site. If the only hard substrates available to oysters at a site are limited numbers of shells of other oysters, then they cannot survive much deposition of fine sediments. However, at sites with large hard substrates, such as natural boulders or artificial rip rap, oysters can be raised above the sediment sufficiently to avoid burial. For instance, the majority of Elkhorn Slough consists of mudflats with deep fine sediments. Oysters are entirely absent from these areas, except where artificial hard substrates are available for attachment, allowing them to avoid burial (Wasson 2010). In Willapa Bay, removal of extensive accumulated shell mounds during harvesting of Olympia oysters a century or more ago may continue to hamper recovery of Olympia oyster populations, because oysters that settle on smaller, less stable substrates are more prone to burial (Trimble et al. 2009). Oysters are thus highly sensitive to sedimentation, and generally absent from areas with deep fine sediments, but this sensitivity can be mitigated with sufficiently large hard substrates. Many restoration efforts provide hard substrate for oysters through addition of bare Pacific oyster half shell, reef balls, and other techniques. One example is the Coastal Conservancy's San Francisco Bay Living Shorelines Project, which constructed reefs in 2012 with mounds of clean Pacific oyster shell, and with artificial reef methods such as structures made from cement mixed with mined oyster shell and sand. Up to 3 million native oysters have settled onto these shell bags and cement structures.

Constructed reefs with Pacific shell bags provide hard substrate in San Francisco Bay.

Assessment method: To determine potential negative effects of sedimentation on oysters at a site, both sediment depth and availability of hard substrates at the appropriate tidal elevation must be assessed. Wasson (2010) plotted the relationship between sediment depth and substrate size needed to sustain live oysters for Elkhorn Slough, but this relationship probably differs somewhat among embayments. As a general guide, the diameter of hard substrates available should be comparable to the depth of fine sediments. For example, if there are 2 cm of fine sediments at a site, then small bits of shell 2 cm in size probably can support oysters. However, if the mud is 50 cm deep, rocks 50 cm in size are needed to prevent burial and support live oysters. Other dynamic factors, such as seasonal deposition or strong currents that can turn rocks, can complicate this rule of thumb.

In stormy winters
Many oysters do perish
Empty shells linger

Exposure: Table 1 reveals that exposure to sedimentation is high, with moderate or high stressor levels reported at 71% of embayments. Thus sedimentation limits the potential distribution and abundance of oysters at many embayments. However, at some estuaries, such as San Diego Bay, there is such extensive man-made hard substrate (armored shores, cobble, rip rap) that sedimentation is not considered an important threat at many sites. In the northern part of the range, oysters are often found in less muddy habitats where they can survive on small bits of natural hard substrate.

LOW SALINITY (sensitivity: *high;* exposure: *medium)*

Sensitivity: Salinity places basic physiological constraints on all marine and estuarine organisms (Hochachka and Somero 2002), and is a fundamental determinant of where species can live in an estuary (Remane and Schlieper 1971). Although Olympia oysters tolerate a range of salinity levels, low salinity exposure is stressful, can reduce reproduction (Oates 2013), and cause death in severe cases (Gibson 1974). In a laboratory experiment, we found that juvenile Olympia oysters suffered significant mortality when exposed to salinity levels below 10 for five or more days (Cheng et al. 2015). However, our field data from Central California showed a strong negative correlation between exposure to salinity below 25 and several oyster attributes, including average size, recruitment rate, and growth (Wasson et al. 2014). Thresholds may show local adaptation and vary across regions.

Die-off of oysters at China Camp, San Francisco Bay, after prolonged heavy winter rains in 2006.

Assessment method: Salinity can be best measured with *in situ* sondes continuously collecting data, but can also be assessed with less frequent spot samples (weekly or monthly). The salinity data must then be related to thresholds relevant to oysters, which could potentially vary between locations.

Exposure: Low salinity limits the distribution or abundance of oysters at about a quarter of embayments (Table 1). For instance, in San Francisco Bay, high freshwater flow in wet years following precipitation events and snowmelt can lead to low salinity conditions and subsequent massive die-offs in oyster populations that settled during dry years (Zabin et al. 2010). In Coos Bay, oyster reproduction was lower at a site with lower salinity (Oates 2013). However other estuaries, such as Elkhorn Slough and Humboldt Bay (D. Couch, personal communication) oysters are found in strongly marine-influenced areas, with rapid flushing of freshwater and thus little exposure of oysters to prolonged salinity stress. In other embayments, spatial salinity patterns may be fairly consistent across years, such that there are brackish or freshwater areas where no oysters occur, and consistently higher salinities in the areas where oysters do occur.

PREDATION (sensitivity: *medium;* exposure: *medium)*

Sensitivity: Olympia oysters may be quite sensitive to some types of predation. In particular, studies from West Coast estuaries have shown that introduced species such as Atlantic oyster drills *(Urosalpinx cinerea)* and Japanese oyster drills *(Ocenebra inornata)* can have substantial local impacts on oyster populations (Willapa Bay, Buhle and Ruesink 2009, Tomales Bay, Kimbro et al. 2009, Humboldt Bay, Koeppel 2011, Puget Sound, Blake and Bradbury 2013). However, the importance of drill predation within a bay appears to be highly variable, due at least in part to variability of drill abundance (Buhle and Ruesink 2009, Kimbro et al. 2009, Koeppel 2011). For example, *U. cinerea* is well established in some parts of San Francisco Bay, and appears to impact populations where it is especially abundant, but it is present in low abundance or absent from many other locations. Additionally, recent work at one site in San Francisco Bay found that drill predation varied with tidal elevation: drills killed ~60% of adult oysters at +7 cm MLLW within two months, while oysters at +37 cm were not preyed upon (Kiriakopolos et al. 2014).

Crabs, particularly larger cancrid crabs, may also prey on native oysters, and pose a significant source of mortality in some locations. Koeppel (2011) reported evidence of crab predation (chipped/crushed shells) from two study sites in Humboldt Bay; in follow-up feeding trials in the laboratory *Cancer productus* readily consumed oysters attached to tiles while *Romaleon antennarium* did not. In contrast, positive effects of crabs on oysters have been found elsewhere as crabs prey on oyster drills, reducing predation pressure on oysters (Buhle and Ruesink 2009, Kimbro et al. 2009). Seastars can also exert high predation pressure in fairly marine sites (Ruesink, personal communication) Other predators, such as rays, birds and small mammals may also prey on native oysters, but to our knowledge such predation has not been quantified. Human collection of Olympia oysters is likely not a major factor in most locations, but this might

Monitoring at Elkhorn Slough, California.

change if native oyster populations become more abundant in easily accessible locations and may occur occasionally (anecdotal information reported to Zabin at Elkhorn Slough 2012).

Assessment method: Oyster drill abundance can be quantified in field transects of oyster beds. Drill densities may not correlate exactly with per capita effects on oysters, because these are also affected by availability of other prey types and potential predators of drills, as noted above. Predation by crabs, rays, birds and small mammals is harder to quantify. Manipulative experiments—such as comparing mortality in caged vs. uncaged oysters—are needed to shed light on strength of predation effects at a site.

Exposure: Significant effects of drills on oysters have been noted in 43% of embayments assessed, but drills are entirely absent from others, such as many Southern California bays, Elkhorn Slough, South Slough and Coos Bay in Oregon, and at British Columbia sites (Table 1). Predation by other species is also considered significant at 43% of embayments, with a variety of predators involved, although in many cases these impacts have not been experimentally tested or quantified. Ray and duck predation have been frequently observed at Humboldt Bay (D. Couch, personal communication); predation by crabs has been observed in Netarts Bay (D. Vander Schaaf, personal communication) and extremely high predation pressure from seastars has been observed at one site in Puget Sound, Dabob/Quilcene in Hood Canal (J. Ruesink, personal communication). Elsewhere in Puget Sound, predation by the crabs *Cancer productus* and *Cancer gracilis* and the sea stars *Pisaster brevispinus* and *Evasterias troschellii* has been observed (B. Allen, personal communication). In Totten Inlet, Henderson Inlet, and Port Gamble Bay and other historic Pacific oyster culture sites in Puget Sound a predatory

Non-native oyster drills prey on native oysters.

Non-native green crab with Olympia oysters in Nootka Sound, British Columbia.

flatworm introduced with Pacific oysters *(Koinostylochus ostreophagus)* has been noted (Blake and Bradbury 2013, B. Allen, personal communication).

WATER TEMPERATURE TOO LOW (sensitivity: *medium;* exposure: *medium)*
WATER TEMPERATURE TOO HIGH (sensitivity: *low;* exposure: *low)*

Sensitivity: Temperature is a major driver of virtually all physiological processes, such as respiration, metabolism, filtration, and excretion (Hochachka and Somero 2002). Excessively cold water can hamper oyster reproduction and growth. Numerous studies have correlated onset of reproduction or larval settlement with particular temperatures; for instance recently Oates (2013) found gametogenesis to occur at temperatures greater than 14.5°C in Coos Bay, Oregon, while other recent studies documented reproduction at a range from 12–21°C, but higher temperatures led to much faster production of larvae following reproductive onset (Santos et al. 1993). However, temperature thresholds for reproduction not only vary across different embayments but also may not show clear patterns within a system (Seale and Zacherl 2009). Our laboratory experiments showed significantly increased growth of juvenile oysters at 24 vs. 20°C (Cheng et al. 2015). Our field data from central California showed positive correlations between percentage of days with temperatures >12°C measured at a site and several oyster attributes, including growth rate, average size, recruitment rates, and adult density (Wasson et al. 2014). On the other hand, excessively warm water can have negative effects on oysters. However, such thresholds appear to occur at quite high temperatures; experiments in central California have shown that Olympia oysters have an LT50 (50% mortality) between 38 and 39°C (Brown et al. 2004, Cheng, unpublished data). Thresholds may vary across the range of the species.

Assessment method: Water temperature can best be assessed by continuous measurements taken by *in situ* instruments. To evaluate temperature conditions for oysters, these measurements can be related to thresholds. Such thresholds would probably differ across a latitudinal gradient.

For instance, for our evaluations of sites in Central California, we quantified the percentage of measurements taken that were above 12°C, because this threshold provided most significant statistical relationships with oyster attributes (Wasson et al. 2014). In Coos Bay, 15°C was used based on locally observed thresholds for reproduction (Pritchard 2014). In Newport Bay, temperature was recorded from three study sites only and critical thresholds were not known. We used the average warm-season temperature and ranked lower a site with an average of <17°C compared with others where the average was ~19°C.

Liberty Bay, Puget Sound, Washington, following enhancement project.

Exposure: Exposure to lower than optimal water temperatures is common across the range of the oyster, since fastest reproduction and growth occurs above 20°C, yet few sites have average temperatures this high. Low water temperatures were listed as a concern for 39% of embayments. One might suspect that these were mostly northern sites, but in fact there is no particular latitudinal pattern. In some more southern embayments such as Tomales Bay, sites near the mouth of the bay can have very cold summer temperatures due to strong oceanic influence and low residence time, while some more northern embayments such as in the Strait of Georgia have less direct marine influence and shallow depths that allow for substantial warming in the breeding season.

Historical data and near-term models suggest that increased sea surface temperatures have occurred and will continue to occur in estuaries worldwide (Cloern et al. 2011). Near-term warming of estuarine waters will probably be beneficial for oyster growth and reproduction, based on existing experimental work. Exposure to greater than optimal water temperatures appears to be rare in most embayments (Table 1).

AIR TEMPERATURE TOO HIGH (sensitivity: *medium;* exposure: *medium)*

Sensitivity: Air temperatures during low tide can reach and exceed oysters' thermal maximum, while water temperatures rarely reach these high levels. Our lab experiments showed that Olympia oysters can withstand high air temperatures during low tide exposure, with some mortality beginning to occur at 40°C (Wasson et al. 2014). When paired with another stressor, such as low salinity, high air temperature can have more pronounced lethal effects (Wasson et al. 2014). Oysters may also be sensitive to low air temperatures and the northern limit of the species may be set by freezing (Baker 1995), but we lack data on sensitivity and have not included this stressor here. In various bays in Oregon and Washington, significant negative effects of low air temperature have been observed, (B. Allen, personal communication).

Olympia oysters on hard substrate in Elkhorn Slough, California.

Blazing heat and air
Meet a patch of oysters bare
How will they now fare?

Assessment method: To precisely quantify low tide air temperatures, *in situ* temperature loggers deployed near the oysters are ideal. Percentage of days above a threshold, such as 40°C, can be calculated. Thresholds may show local adaptation and vary across regions.

Exposure: In our site evaluations in Central California and Oregon, we found air temperatures rarely to exceed 30°C during low tide exposure. In these areas, the lowest tides (with longest air exposure) mostly occur near dawn or dusk, resulting in low measured air temperatures at low tide. However in Washington estuaries, summer low tides often occur close to midday. In Willapa Bay, exposure to high air temperatures results in significant mortality of juvenile oysters at higher tidal elevations (Trimble et al. 2009). High air temperatures were also identified as a concern at the most southern embayments. Thus in the regional comparison (Table 1), exposure to high air temperature does not follow a clear latitudinal gradient, but rather shows some expression in both southern and northern sites, but not at intermediate ones. Such exposure is projected to increase with climate change.

Oysters in a high flow habitat in Newport Bay, California, which may enhance feeding and oxygenation.

FOOD LIMITATION (sensitivity: *medium;* exposure: *medium)*

Sensitivity: Phytoplankton (single-celled planktonic algae) serves as food for filter-feeding oysters. Both food concentration and feeding time can be limiting, for example in intertidal areas with periods of aerial exposure compared with constantly submerged subtidal areas (Kimbro et al. 2009, Deck 2011). Limited food supply can result in reduced growth, shifts in size frequency, and reduced or delayed reproductive ability in other oyster species (e.g. Hofmann et al. 1994, Powell et al. 1995). Food limitation also may lead to reduced growth and weight, and delayed time to settlement in Olympia oyster larvae (Hettinger et al. 2013). Chlorophyll concentrations also correlate with reproduction in the field in Oregon (Oates 2013). Our field data from Central California indicate that levels of chlorophyll *a* are positively correlated with oyster performance (Wasson et al. 2014).

Assessment method: To estimate phytoplankton abundance at sites, one can measure the abundance of chlorophyll *a*, a plant pigment that is commonly used as a proxy for phytoplankton biomass. Exact thresholds are not known, but concentrations below 5 µg/L during summer-fall are probably too low, and concentrations $>$10 µg/L are desirable.

Exposure: Little is known about whether food is limiting for Olympia oysters at many sites across their range. In Central California, some sites had levels ($<$5 µg/L) that may be too low to sustain successful oyster populations (Wasson et al. 2014). Food limitation was identified as a potential stressor at seven embayments in California and Oregon. Exposure to food limitation was not listed as a concern at the other 75% of embayments that were evaluated (Table 1), presumably because productivity is high in these places.

LOW OXYGEN (sensitivity: *medium;* exposure: *low)*

Sensitivity: Hypoxia is the depletion of oxygen from water, typically defined as a dissolved oxygen threshold below 2–5 mg/L (by different standards). Estuaries and near-shore systems often exhibit hypoxia as a result of eutrophication. Eutrophication stimulates the primary production of plants, which then die and are decomposed via microbial consumption, which depletes the water column of oxygen. Overproduction of plants (e.g., algae) can also reduce dissolved oxygen at night when plants respire. Worldwide, hypoxia appears to be expanding in frequency and areal extent (Diaz and Rosenberg 2008). Our experimental results suggest that diel-cycling hypoxia (modeled after the conditions at Elkhorn Slough) is not lethal, but has substantial sublethal effects on growth (Cheng et al. 2015). Periodic die-offs have been observed at Elkhorn Slough at sites with restricted tidal exchange following unusually long anoxic periods (Wasson, unpublished data).

Assessment method: Ideally, dissolved oxygen concentrations should be measured with *in situ* sondes collecting data continuously. One can then quantify hypoxia through measures such as the percentage of measurements where

Oysters raised in the lab, subjected to low dissolved oxygen (top) and normal levels (bottom).

dissolved oxygen was lower than 5 mg/L. However, many monitoring programs only collect grab samples during the daytime. We have found that variance from 100% saturated oxygen conditions (both increases or decreases) in daytime measurements correlate quite well with duration of nighttime hypoxia. So measures of average variance from fully saturated oxygen conditions (such as 9 mg/L) can be used as a proxy for hypoxia.

Exposure: Across embayments, hypoxia was only identified as a high threat for oysters at Elkhorn Slough (Table 1), an estuary very heavily affected by agricultural nutrient loading. Oxygen levels are expected to decrease as climate warms (Levin and Breitburg 2015), so this stressor may increase in frequency and may occur in new locations.

COMPETITION (sensitivity: *low;* exposure: *medium)*

Sensitivity: Other species co-occurring with Olympia oysters on hard substrates may compete with them for space on which to settle or grow, or for food. Our field data from Central California showed no negative correlation between space covered by other sessile species and oyster density, recruitment, or growth at/near MLLW (Wasson et al. 2014). The main groups of species present at MLLW were the green algae *Ulva* spp., red filamentous algae, and barnacles. Many sites were high in bare hard substrate availability. Previous work indicates that the effects of competition are variable, and more likely to have an impact on early life stages of Olympia oysters. The presence of competitors reduced total recruitment in San Francisco Bay and reduced recruit size in Tomales Bay, though effects varied by site (Deck 2011). Competitive effects increased at some sites at lower tidal heights, but this was not consistent across sites or bays. Only minimal effects were observed on other aspects of oyster life stages. Wasson (2010) found no correlation between recruit size or survival and distance to the nearest competitor near MLLW in Elkhorn Slough. However, greater low intertidal and subtidal coverage by fouling species was observed, which could indicate potential effects at lower height. In the Pacific Northwest, Trimble et al. (2009) found that high cover of sessile invertebrate species, mainly barnacles and ascidians, reduced juvenile survival and growth, and tidal height did not affect this. In Puget Sound, barnacles, jingle shells and bryozoans compete for space, potentially limiting oyster recruitment (B. Allen, personal communication).

Competition with the introduced Pacific oyster *Crassostrea gigas* has been demonstrated in Willapa Bay to negatively impact Olympia oyster growth and increase mortality (Buhle and Ruesink 2009, Trimble et al. 2009). Although the potential impacts of *C. gigas* on *O. lurida* are not known for San Diego Bay, concerns about potential competition as well as a desire to not enhance *C. gigas* populations have been a factor in the design of restoration projects there. Indeed, many restoration practitioners are worried about inadvertently increasing populations of nonnative species through the provision of new hard substrates intended for native oysters.

Tube worms co-occur with oysters in Elkhorn Slough, California.

Assessment method: Percent coverage of potential competing species can be assessed in field transects along with oysters. Another simple proxy for effect of competition is percent coverage by bare space on hard substrates—if this is high, competition is presumably not a major factor. To truly determine the effects of potential competitors on oysters, manipulative experiments are required.

Exposure: Multiple factors, including the identity and abundance of potential competing species, environmental stressors, predation, and the timing of recruitment and growth of potential competitors, will determine the degree to which competition is a factor in any given location. Competition with *C. gigas* was identified as being of moderate importance in a number of bays in California, Oregon and Washington, but unimportant elsewhere (See Table 1). Competition with other species was indicated as being potentially of high importance at Netarts and Yaquina, and of moderate importance at various bays in Oregon, Washington, and British Columbia.

ACIDIFICATION: LOW pH/ALKALINITY (sensitivity: *low;* exposure: *low)*

Sensitivity: One of the better-studied consequences of global change is the increasing acidity of ocean water due to the greater concentration of carbon dioxide (CO_2) in the atmosphere. Aragonite is the form of calcium carbonate used by most larval bivalves to build their shells; one aspect of more acidic water is that aragonite is less available to larvae, resulting in small, thinner or malformed shells and/or death (Ekstrom et al. 2015). Experimental studies of Olympia oysters have demonstrated some negative effects of acidification (Hettinger et al. 2012, 2013), though these were mostly sublethal and not as strong as effects demonstrated on other oyster species. Many estuaries, such as San Francisco Bay and Tomales Bay, have relatively large seasonal and diurnal fluctuations in pH and carbonate saturation as the result of inputs from both watershed (river inflow) and nearshore oceans (via upwelling), and the influence of plant metabolism (daily cycles of photosynthesis and respiration)

Monitoring Olympia oysters among Pacific oysters and mussels in Newport Bay, Southern California.

(Smith and Hollibaugh 1997). Consequently, organisms in these locations, including oysters, often already experience a very wide range of pH and carbonate saturation conditions, and we are not aware of any evidence to suggest that oysters currently are negatively impacted by these fluctuating conditions in much of the range. At some estuaries, such as Netarts Bay, acidification is a new stressor for *Crassostrea gigas,* leading to lower larval production and growth (Barton et al. 2012), and may also affect *Ostrea lurida* (D. Vander Schaaf, personal communication), although the brooding habits of this species may offer greater protection to larvae.

Assessment method: Measurements of pH by water quality instruments provide a reasonable estimate of acidification, but the precision of typical sensors is too low to detect subtle trend changes. Calculations can be made of frequency or duration of low pH events. More precise pH sensors, and at least occasional assessment of alkalinity and dissolved inorganic carbon is ideal, although the required instruments are expensive.

Exposure: Across embayments, acidification was currently ranked as a low threat to oysters, with the exception of Netarts Bay where it was ranked high, and Tomales, Yaquina and Victoria, where it was ranked of moderate importance (Table 1). Acidification has been shown to negatively impact growth and potentially increase mortality in larval Pacific oysters in hatcheries in Oregon (see Barton et al. 2012). Although we are unaware of documented impacts to Olympia oysters under current conditions, acidification may impact native oysters more strongly in the future. Potentially, exposure to acidification will increase as increasing atmospheric CO_2 results in increasing water-column pCO_2, along with future changes in river inflows and upwelling inputs (Cayan et al. 2008, Checkley and Barth 2009), although the complexity of carbonate chemistry in the coastal zone makes predicting impacts difficult (Waldbusser and Salisbury 2014).

Monitoring restoration at Netarts Bay, Oregon, a site where Pacific oysters have been threatened by acidification.

Live oyster surrounded by oil at Angel Island, San Francisco Bay, following 2009 Cosco Busan oil spill.

CONTAMINANTS (sensitivity: *low;* exposure: *low)*

Sensitivity: Polluted water, notably the discharge of high amounts of sulfite wastes from paper mills in the Pacific Northwest, once had major impacts on native oysters (Blake and Bradbury 2013), and the dumping of untreated sewage may have harmed oysters in San Francisco Bay as well as shut down oyster farming operations due to public health concerns (multiple reports, reviewed by Baker 1995).

Despite the persistent presence of contaminants at many sites, oysters do not appear to be very sensitive to them, generally. In California, Olympia oyster populations exist in habitats formerly considered "polluted," such as near a wastewater treatment outfall in Humboldt Bay, CA, in marina basins in San Francisco Bay, and in an area formerly contaminated with heavy metals and polychlorinated biphenyls near Stege Marsh, Richmond, CA (Couch and Hassler 1989, Hwang et al. 2013). In many locations, heavy metals and other long-lasting pollutants that are the legacy of now-closed industry may be taken up by oysters. For example, a sample of 20 apparently healthy oysters taken in 2006 from an oyster restoration site in San Rafael (San Francisco Bay) indicated very high levels of copper, suggesting the presence of a substantial source of this pollutant nearby (Gerhart, personal communication). However, oysters continue to thrive at this site and at other restoration sites nearby.

Assessment method: Contaminant sampling methods for sediments and oyster tissue differ by the contaminant in question. Many estuaries are contaminated by a range of PAHs, heavy metals and legacy pesticides as well as emerging contaminants. Quantifying the bioavailability and toxicity of these compounds, let alone their interactive effects, is very expensive and technically challenging.

Exposure: Current environmental laws have reduced the use and release of contaminants, such as organic biocides (Axiak et al. 1995), polycyclic aromatic hydrocarbons, and heavy metals (Connor 1972), which were previously found to affect oyster populations. Contaminants were considered a low threat across embayments, with the exception of Yaquina Bay and Discovery Bay, where this stressor was ranked a moderate threat (See Table 1).

PATHOGENS AND DISEASES (sensitivity: *variable;* exposure: *low)*

Sensitivity: Overall, oyster diseases and pathogens currently do not appear to be a major factor influencing native oyster populations in Central California. While individual oysters may suffer from infections, rates are low overall and no observed population diebacks have been linked to disease.

However, it would be unwise to entirely dismiss disease as a potential stressor for Olympia oysters. Eastern oysters in the Chesapeake and Delaware bays were apparently disease-free for decades until the introduction of oysters from the Gulf of Mexico led to emergence of two new diseases in the 1950s. Oyster disease agents are certainly present, having been reported from both commercially grown Pacific oysters and native oysters in multiple bays along the coast, including Elkhorn Slough, and Tomales and Humboldt bays in California, and Netarts, Yaquina, and Alsea bays in Oregon (Mix and Sprague 1974, Friedman et al. 2005, Burge et al. 2007, Moore et al. 2011). Olympia oysters may become more susceptible to disease as restoration moves forward and population density increases. Additionally, disease prevalence and impact may increase as a result of other stressors associated with climate change, such as increasing water temperatures, which have been linked to herpes outbreaks in commercial oyster species in Tomales Bay (Burge et al. 2007).

Assessment method: An overview of assessment methods for oyster diseases and pathogens is provided by Baggett et al. (2014). Microscopic examination of stained histological sections and/or genetic analyses are appropriate for detecting various pathogens or diseases. If oyster density is considered too low to sacrifice animals for pre-restoration health surveys at the restoration location, information from the nearest population(s) that can be sampled is useful. Additionally, seed oysters from nearby populations with known health history may be deployed at the proposed site. To understand population-level effects, one must quantify percentage of individuals infected, intensity of individual infections and outcomes for those individuals.

Exposure: Overall, exposure to disease appears to be low according to the expert assessments (Table 1). We review highlights of potential disease concerns from south to north.

Monitoring at Nootka Sound, Vancouver Island, British Columbia.

Reef balls deployed in Elkhorn Slough (top) and San Francisco Bay (bottom).

From Southern California to Tomales Bay, disease was not considered a significant factor affecting Olympia oysters in any embayment (Table 1). The most recent published surveys of disease in Olympia oysters in the San Francisco Bay Area (Friedman et al. 2005; Moore et al. 2011) reported that potentially pathogenic bacteria, viruses, and protists are present only in a minority of oysters, and typically at levels lower than those associated with disease. These studies showed little evidence for presence of disease except for disseminated neoplasia in Drakes Estero, and Candlestick Point, Oyster Point, and Coyote Point in San Francisco Bay (Friedman et al. 2005, et al. 2008, Moore et al. 2011). The levels measured at these four sites are unlikely to seriously affect oyster populations or negatively affect restoration efforts (Grosholz et al. 2008).

In Humboldt Bay, there is evidence of the occurrence of Denman Island disease, and oyster experts coded this as a moderate concern because of potential mortality in older oysters following cold temperatures (D. Couch and K. Ramey, personal communication). However, there is no evidence from any site that Denman Island disease causes significant population level effects on Olympia oysters (J. Moore, personal communication).

In Coos Bay, disease was considered a moderate stressor because 17% of Olympia oysters tested for diseases showed tissue irregularities, focal hemocytosis, and nuclear degeneration (Rumrill 2010). In Netarts and Yaquina bays concerns about *Vibrio tubyashi* led to scores of moderate and high stressor levels for diseases (D. Vander Schaaf, personal communication).

Disease was not considered an important stressor at any embayment in Washington or British Columbia. While several disease agents were recently identified in surveys of Olympia oysters in British Columbia, these were generally detected at low prevalence and intensity and were not believed to have significant health impacts (Meyer et al. 2010).

San Francisco Bay Living Shorelines Project constructed reefs at the San Rafael Shoreline.

Sunset low tide monitoring at Point Orient, San Francisco Bay.

SEA LEVEL RISE (sensitivity: *low;* exposure: *low)*

Sensitivity: Olympia oysters are not very sensitive to projected sea level rise. One potential impact of sea level rise could be increased local resuspension of sediment due to greater wave action and tidal currents associated with deeper waters. This could result in stressors associated with increased sediment burial in shallower areas. However, more hard substrate may be available for oysters as sea levels rise, both because existing hard substrates protecting human infrastructure may become submerged, and due to further shoreline hardening to protect human land uses from sea level rise. Given the drawbacks of traditional shoreline hardening, measures such as living shorelines—creating habitat for multiple species—are increasingly being incorporated into thoughtfully planned nature-based solutions.

Assessment method: One can assess hard substrate availability at different elevations to determine potential effects of projected sea level rise on habitat availability for oysters.

Exposure: Rates of sea level rise on the northeast Pacific coast have been relatively slow compared to other regions, but are anticipated to accelerate soon (Bromirski et al. 2011). Exposure to sea level rise also depends on change in land surface elevation, which can be affected at a regional scale by factors such as geologic uplift, or at a local scale by factors such as groundwater overdraft leading to subsidence.

INTERACTIONS BETWEEN STRESSORS

Environmental stressors often occur in combination. It is therefore important to understand not only the impacts of individual stressors but also the effects of combinations of multiple stressors on Olympia oysters. Multiple stressors can produce additive effects (i.e., equal to the sum of the stressor impacts), or interactive ones (i.e., either more detrimental or less detrimental than would be expected by simply adding the effects of the stressors).

We used field studies in Central California, combined with previous work, to measure baseline patterns of potential environmental stressors in relation to oyster demographics. We used several multivariate analyses of a broad suite of environmental variables (including air and water temperature, salinity, and dissolved oxygen) and oyster demographic parameters (density, growth rate, size, recruitment rate) to identify which stressor or combinations of stressors explained the most variation in oyster demography.

We used laboratory experiments to more closely investigate causal relationships between multiple stressors and Olympia oyster survival and performance. In the first experiment, we examined interactions between warm water temperatures and low oxygen levels applied as simultaneous stressors. Following a recovery period, we applied low salinity stress, so that interactions between all three stressors could be examined. Here, we found no evidence for interactive effects, but rather, these stressors were additive (Cheng et al. 2015). In the second experiment, we assessed the effects of low salinity and high air

Tank experiments examining multiple stressors at the Bodega Marine Lab in California.

temperature simultaneously, and with different amounts of time between applying the two stressors. When applied simultaneously, we saw synergistic effects (detrimental effects beyond what would be predicted by simply adding the effects of low salinity and air temperature). When oysters were given recovery time between stressors, this synergistic response disappeared (Wasson et al. 2014). Previous studies have found interactive effects to be generally more common than additive effects (Crain et al. 2008, Darling and Cote 2008), but we found that results are dependent on the specific stressors and their timing. Although some stressors like low salinity and high air temperature may co-occur (for example, during springtime in some parts of San Francisco Bay) and produce synergistic effects, realistic recovery time between stressors may lead to effects that are more additive in nature.

Many of the environmental factors discussed above also interact with tidal elevation. For instance, feeding time is longer at lower elevations, so phytoplankton concentrations need not be as high to support subtidal populations as high intertidal ones. Exposure to warm air increases with increasing tidal elevation, while coverage of most sessile invertebrates decreases with increasing tidal elevation. For rigorous comparisons among sites, it is thus important to examine biological and environmental conditions across similar tidal elevations; in our assessments of Central California sites, we focused on Mean Lower Low Water because this is where oyster densities are typically highest. For practitioners elsewhere using our site evaluation tool to rank sites for their restoration potential, it is important to consider the role of tidal elevation. For instance, a site that receives a low score because of frequent high air temperatures may be a fine place to do a subtidal restoration project. Considerations of interactions between environmental factors and tidal elevations is thus essential.

Rocky intertidal habitat at Strawberry (Brickyard Cove), San Francisco Bay.

Site Evaluations

Background and Goals

Resource managers and restoration practitioners indicated a need for tools to help rank sites in terms of their suitability for native oyster restoration and conservation (Wasson et al. 2013). Site evaluations have been conducted by other researchers in some regions, including Puget Sound (Blake and Bradbury 2013) and British Columbia (Stanton et al. 2011). However, there was no quantitative methodology for comparing sites in terms of their restoration potential or conservation value. We thus developed quantitative metrics and report-card style summary tables to evaluate sites. With extensive grant funding, we were able to conduct thorough field monitoring data and evaluate 21 sites in Central California (Wasson et al. 2014). Subsequently, we were able to conduct scaled-back evaluations of sites in Southern California (Appendix 1) and southern Oregon (Appendix 2) using existing data for those regions. Furthermore, we developed an online version of the site evaluation tables as a tool for scientists and practitioners working in other estuaries (available at www.climate-and-oysters.org).

Our Approach to Site Evaluation

The site evaluation tables score sites based on oyster performance and on measurements of key environmental parameters. To create the tables, we used the same oyster attributes described above, and all the environmental stressors with high and medium oyster sensitivities discussed above (with the exception of sedimentation, not relevant to most of our sites, which had ample large hard substrates preventing sediment burial, or would have them as a result of restoration projects).

For each parameter for which data were available, we converted raw data to a score. This conversion was based on thresholds we set using expert judgment. For instance, one parameter was oyster drill density. If there were zero oyster drills per square meter, this was assigned a 100, the best score. If there were more than five oyster drills per square meter, this was assigned a 0, the worst score. Intermediate densities received intermediate scores (25 for 3–5 drills, 50 for 1–2 drills, and 75 for between 0–1 drills per square meter). Thresholds were different for Oregon, Central California, and Southern California, and depended on the range of the raw data and/or knowledge of key thresholds at each location, with the goal being to rank sites relative to one another within each region. We shaded cells in the tables, with light colors for low scores and dark colors for high scores, to make patterns easily distinguishable at a glance (Appendix 1, 2, and Wasson et al. 2014).

We assigned weightings to each parameter in the tables. In particular key oyster attributes such as density and recruitment were weighted highly relative to other parameters, since they are the most reliable indicators of oyster success. Relationships between environmental factors such as temperature and oysters are weaker (and were not quantified for Southern California, Coos Bay or South Slough) and thus were weighted lower. The weightings are clearly shown in the tables so the process of obtaining a total score is transparent. In the online tool, users can adjust the weightings themselves.

We calculated overall scores using all the weighted parameters. The tables include three different overall scores at the bottom: 1) a score indicating suitability of the site for restoration through addition of hard substrates; 2) a score indicating suitability of the site for restoration through addition of hard substrates seeded with juvenile oysters, sufficient to establish a self-sustaining population supplying larvae to this area, and 3) a score indicating value of this area for conservation of existing oyster populations. Details on all the parameters included their weighting, and calculation of the overall scores are included in the notes associated with the tables (Appendix 1, 2 and Wasson et al. 2014 [including their appendices 2,4]).

Site Evaluation Case Studies

CENTRAL CALIFORNIA

We evaluated twelve sites in San Francisco Bay and nine sites in Elkhorn Slough (Wasson et al. 2014). On the whole, sites in San Francisco Bay scored higher than those at Elkhorn Slough, generally due to higher scores for oyster parameters. Top scoring sites were Berkeley Marina, Strawberry (Brickyard Cove), Point Pinole, and San Rafael Shoreline in San Francisco Bay and South Marsh and Kirby Park at Elkhorn Slough. Major stressors differed between the two bays, with more sites in San Francisco Bay experiencing periodic low salinity, higher air temperatures, and relatively low chlorophyll *a*; while low dissolved oxygen was the major stressor at Elkhorn Slough, with low chlorophyll *a* and low water temperatures mainly at a few marine-influenced sites near the mouth of the estuary. At both estuaries, mid-estuary sites generally scored higher than other sites, which is consistent with our working knowledge of the sites. Although North Bay sites in San Francisco Bay also scored high during this relatively short study period, these sites are more vulnerable to low salinity events. Over the nearly 10 years we have been working in San Francisco Bay, we have seen populations at these sites decline steeply during years of heavy rain. Sites in the South Bay, which have oyster drill populations and warmer air temperatures, such as Eden Landing and Coyote Point, scored lower. At Elkhorn Slough, several sites with little to no recruitment and/or adult oysters, such as Vierra and Moss

Urbanized conditions in San Francisco Bay (near right) compared to rural conditions at Elkhorn Slough, California (far right).

Landing, also received low overall scores, as did some upper estuary and tidally muted sites with low recruitment and poor water quality.

SOUTHERN CALIFORNIA

Fourteen sites, seven each in Newport Bay and San Diego Bay, were evaluated using data collected between 2010 and 2014 as part of several research projects. Not all data were collected at all sites, but measurements of some critical oyster parameters were similar enough to allow comparisons.

Overall, greater variability between sites existed within San Diego Bay, whereas the sites in Newport Bay were more similar in all oyster attributes studied. San Diego sites as a rule had much higher recruitment rates (one to two orders of magnitude) than Newport Bay sites, and thus had higher restoration scores overall. San Diego sites also had high juvenile growth rates compared with Central California, although these were somewhat skewed by the short time period (70 days) over which these new settlers were tracked; there was also high survivorship of juveniles over this same time period. These parameters were not available for Newport Bay. Adult densities were low at four sites in San Diego; two sites had no adults and two sites had fewer than 10 individuals/m^2. This was due to a paucity of hard substrate at these locations. All sites in San Diego received high to medium high scores for restoration success due to high recruitment rates, rapid juvenile growth and good juvenile survival, although data on potential critical environmental parameters were missing. Three sites—Chula Vista Wildlife Refuge, J Street Marina, and Coronado Cays—received the highest restoration scores, with Chula Vista scoring the highest of the three due to high densities of adult oysters (291/m^2). Chula Vista also received the highest conservation score due its large oyster population (estimated in 10,000s).

Monitoring site in Newport Bay, Southern California.

Olympia oyster restoration in South Slough, Oregon.

None of the Newport Bay sites received a high score for restoration success, but neither did any site rank poorly—rather, all sites scored medium high. All sites had moderate to moderately high scores for adult densities, sizes and size-class distributions, and the three sites for which recruitment was tracked also had moderate scores. Two sites received high scores for conservation, 15th Street, and Newport Aquatic Center, but the latter was evaluated on the basis of its population estimate only (15,000 individuals) as other data were unavailable. Water temperature was the only environmental parameter measured for Newport Bay and only for three sites, so potential environmental stressors for this bay could not be quantified.

SOUTHERN OREGON

We evaluated three locations in the northeastern portion of the Coos estuary (referred to as Coos Bay), and two sites in South Slough, which comprises the major southern arm of the Coos estuary (Appendix 2). In Coos Bay, large deposits of recent fossil Olympia oyster shells have been found in dredge spoils and American Indian shell middens, but oyster populations became locally extinct prior to European settlement. Only after accidental introductions in the 1980s through aquaculture activities did they become reestablished in the estuary (Baker et al. 2000). The sites in Coos Bay consist of fairly established oyster populations stemming from this re-introduction. In South Slough, Olympia oysters were absent until they were reintroduced through a project that began in 2008. As a result, in general, Coos Bay sites had higher adult densities than the South Slough sites.

The highest scoring site for restoration in Coos Bay was Downtown, although Haynes Inlet received only a slightly lower score. Downtown had the highest adult and recruit densities and larval abundance. For habitat attributes, Downtown also had the highest availability of hard substrate, which was a potential limiting factor for other sites. All Coos Bay sites had substantial freshwater inputs, with daily salinity averages below 25 for up to 76 percent of the year, but this seemed compatible with substantial oyster populations, perhaps due to local adaptation to lower salinity. Coalbank Slough had the highest risk of low pH events, but pH at this site was highly variable. Average chlorophyll *a* concentrations measured at Haynes Inlet and Coalbank Slough were moderate and may contribute to higher oyster performance at these sites whereas average chlorophyll *a* concentrations in South Slough were lower. At nearby weather stations, high air temperature events were rare. Sedimentation in South Slough appears to be high and may impact future restoration seeding operations.

Top: monitoring tiles at Kirby Park in Elkhorn Slough, California. Bottom: students with The Watershed Project.

Challenges and Limitations to Site Evaluations

It is important to keep in mind that the site evaluation tables are based strictly on biological/ecological measurements and do not take into account other important considerations in site selection, such as community support, access, funding, and permit procedures.

Even from a strictly scientific perspective, there is still much to learn about native oyster population biology and ecology in our region, and of course there are many unknowns as we project into the future, given a changing climate. In many cases, data are available only for short time spans that likely do not represent the full range of conditions at a site over longer periods, or, particularly for many of the physical parameters, detailed data are only available at larger spatial scales, yet conditions may vary with microclimates at the site level. Many of the physical parameters likely to be important to oysters are difficult and/or costly to measure. Also unknown is the degree to which oysters may display adaptation to local conditions, such that the relative importance of any given physical parameter might vary between embayments. Additionally, we don't yet know the degree to which populations are connected, which could mean that the critical factor of recruitment rate may be partially decoupled from site-level conditions. While oyster attributes, such as size or density, are easily measured, our understanding of the relative importance even of these parameters to the sustainability of oyster populations in a given region is also limited. Thus, in the creation of these tables, we relied on our expert opinion to weigh the relative importance of oyster performance data and the likelihood of extreme climate events at our study sites, particularly in converting raw data into weighted ranks. As such, the tables represent a combination of empirically derived data and judgment calls.

Thus, site scores should be considered advisory only and are intended to provide guidance for restoration by comparing sites within regions, rather than as an absolute ranking across all locations. For some sites, it is also possible that modifications to the restoration approach could help ameliorate stressors. For example, substrates could be deployed in the shallow subtidal rather than in the intertidal zone to reduce heat stress at a site with frequent very-high air temperatures.

Online Site Evaluation Tool

We have created an online site evaluation tool in Excel that allows users to populate a table with their own data (available at www.climate-and-oysters.org). There are separate sheets for assessing conservation value of sites for existing oyster populations vs. restoration potential (with and without seeding). Users can adjust the weight of different parameters as they see fit. The table allows for assessments to be conducted with considerably fewer parameters than we included in our original evaluations (Wasson et al. 2014), which in most locations is likely to be the case.

Installing monitoring tiles in San Francisco Bay.

At an absolute minimum, we recommend collecting data on adult oyster densities and diversity of size classes for restoration sites being considered (these are also two of the four "universal metrics" recommended for oyster restoration monitoring by Baggett et al. 2014). To determine a site's conservation value the extent of shoreline with hard substrate at the appropriate tidal height should be assessed. This, together with density, can provide an estimate of abundance of oysters at the site. Data on recruitment rates, derived by deploying clean substrate at the start of recruitment season, should be collected if at all possible; ideally these data should be collected over several years, as recruitment can be highly variable at some locations. Recruitment to deployed substrate and subsequent measurements of growth and survival should be evaluated for sites that do not have hard substrate but are being considered for restoration involving substrate addition. If possible, data on environmental variables should also be incorporated. Across embayments, the most critical factors to assess appear to be: 1) the longer-term risk of low salinity exposure; 2) exposure to high air temperatures, 3) risk of predation by oyster drills and other species, and 4) competition with *Crassostrea gigas* and other sessile organisms. Data from a nearby monitoring station can often be used to determine whether there is a risk of extended freshwater events during wet years, and to calculate maximum daily summer air temperatures (although exposure to air temperatures will be mitigated by tides and influenced by micro-climates at the site level.) Chlorophyll and water temperature data are also regularly available from water monitoring programs and yield important information. Assessing whether oyster drills and other potential predators and competitors are abundant at the site can also be done fairly easily.

Placing shell bags for restoration at Netarts Bay, Oregon.

Management Applications of Site Evaluation Tools

The site evaluation tools developed here can be applied to two main types of management questions:

Student volunteers with The Watershed Project monitor conditions at Point Pinole, California.

1. **Conservation: Which sites currently support healthy and abundant existing oyster populations that are most likely to be sustainable in the long-term?**

   Example of management decisions: strategic planners and resource agency staff involved in permitting determine which sites/populations need special protection from development or nearby disturbance; regulatory agency considers oyster needs when designating a new marine protected area.

2. **Restoration/Enhancement**

   a. **Which sites are best for success and long-term sustainability of oyster restoration or enhancement projects?**

   Examples of management decisions: funding agency decides between competing projects in different locations; strategic planner for estuarine restoration picks target areas; restoration group decides where to propose next project.

   b. **Is an oyster restoration or enhancement project done at site X likely to be successful?**

   (This question is very similar to 2a, but in this case applied to a single site as a "yes/no" question about doing restoration, rather than involving prioritization between multiple sites.)

   Example of management decision: restoration group decides whether to propose project at a particular site; funder decides whether to fund; conservation land trust or resource management organization decides whether to invest in oyster restoration at a particular property they own.

Elegant oysters,
unique history and lore.
Habitats prevail!

Conclusions

This guide has synthesized data from recent laboratory experiments and field monitoring, and the published literature. We have used this information to characterize the attributes of sustainable Olympia oyster populations, and to identify the stressful environmental factors that affect them most strongly across the range of the species.

Overall, the most frequently encountered stressors across 28 embayments were sedimentation and predation. Competition, cold water temperatures, warm air temperatures, and freshwater inputs were also common concerns at many bays. These types of stressors are natural components of marine ecosystems. However, they have been exacerbated by human activities; for instance, a major predator in some embayments is a non-native snail introduced with aquaculture, and some land uses in estuarine watersheds (hydraulic mining, agriculture) have increased sedimentation rates in some estuaries. Global climate change may also increase exposure to these stressors, for instance increasing storm intensity and freshwater inputs or increasing frequency of exposure to high air temperatures or acidified waters.

We examined interactions between different stressors under laboratory conditions and found that the types of responses observed depended on the stressor and the timing of application. We documented some linear, additive relationships between stressors, and some that were non-linear and synergistic. It is clear that decreasing stressor levels through ecosystem management (such as reducing hypoxia resulting from nutrient loading) will support oysters, but it is hard to predict whether such stressor reduction will increase resilience to other stressors, such as those related to climate change.

Top: Isthmus Slough, Oregon. Bottom: Olympia oysters in Nootka Sound, Vancouver Island, British Columbia.

We have developed a site evaluation tool and used it to assess restoration and conservation potential of Olympia oysters in two Oregon and four California estuaries. As more investigations are conducted and restoration projects are implemented, understanding of oyster sustainability will evolve, and these guidelines will need updating. We hope that in the coming years, the recommendations provided here will support improved oyster conservation and restoration.

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From waters unknown
New lives spring into being
Next generation

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Abbreviations: T *(top),* M *(middle),* B *(bottom),* L *(left),* C *(center),* R *(right)*

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PAGE 16: T AND M (3) Jim Moore, B Chela Zabin
PAGE 17: T Anna Deck, M Puget Sound Restoration Fund, R Thomas Parker
PAGE 19: T Kerstin Wasson, B Danielle Zacherl
PAGE 20: Stephanie Kiriakopolos
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PAGE 32: TL Bruce Lyon, ML AND B Stephanie Kiriakopolos
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PAGE 40: T Marilyn Latta, B The Nature Conservancy
PAGE 41: Christopher Lim
PAGE 42: T John Bragg, B Brian Kingzett
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Haikus: These originated as a joking response to a request to reduce our research into short, succinct paragraphs. It turned out they were fun to do.

Appendices

Appendix 1
Southern California Site Evaluations: Newport and San Diego Bays

Appendix 2
Southern Oregon Site Evaluations: Coos Bay and South Slough

Appendix 1. Southern California Site Evaluations: Newport and San Diego Bays

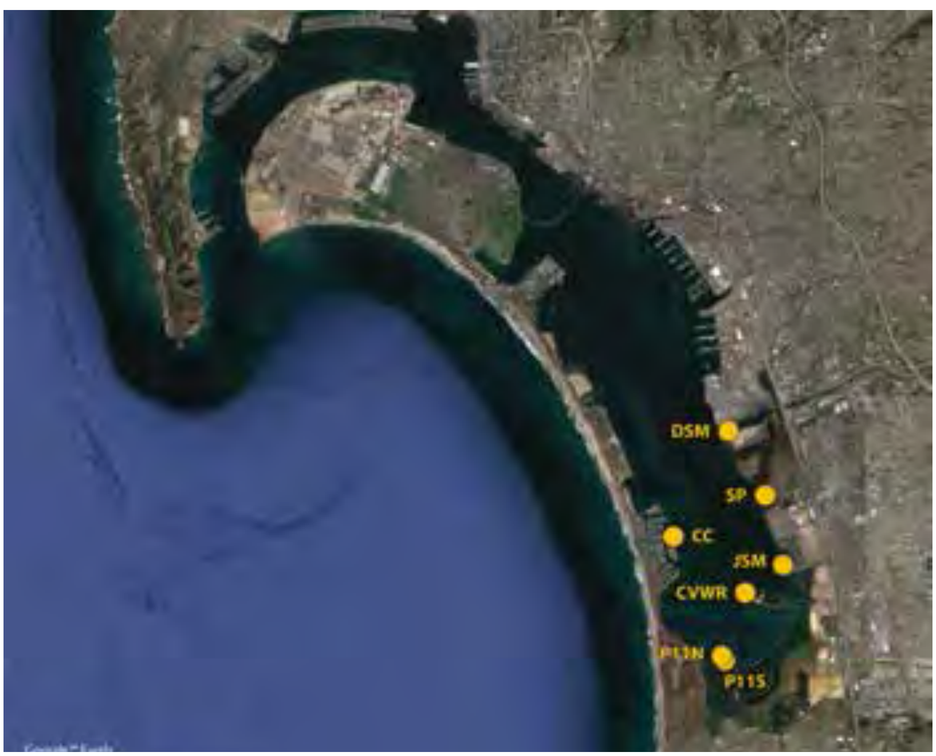
Overview

Seven sites in Newport Bay and in San Diego Bay were evaluated using the Site Evaluation Tables. The method of Wasson et al. 2014 was modified for these sites, because few environmental data were available and differences in data collection and the range of key oyster parameters required some revisions to scoring. The site locations and data collection and processing methods are described below, followed by a summary of the site evaluation results.

Table 1. List of field sites, site codes, and location by bay.

Bay	*Site Name*	*Site Code*	*GPS Coordinates*
Newport	Highway 1	HWY1	33.6178 -117.9049
Newport	Coney Island	CI	33.6196 -117.8922
Newport	15th Street	15th	33.6083, -117.9204
Newport	Rocky Point	RP	33.6295 -117.8859
Newport	Lido Island Site 1	LI 1	33.6131 -117.9157
Newport	Lido Island Site 2	LI 2	33.6113 -117.9119
Newport	Newport Aquatic Center	NAC	33.6232 -117.8933
San Diego	Chula Vista Wildlife Reserve	CVWR	32.6143 -117.1138
San Diego	D Street Marsh	DSM	32.6471 -117.1162
San Diego	Signature Park	SP	32.6333 -117.1076
San Diego	J Street Marina	JSM	32.6203 -117.1042
San Diego	Coronado Cays	CC	32.6264 -117.1294
San Diego	Pond 11 North	P11N	32.6027 -117.1180
San Diego	Pond 11 South	P11S	32.6025 -117.1179

Map 1. Newport Bay field sites.



Map 2. San Diego Bay field sites.

Field Parameters

Table 2. List of parameters measured as part of this guide. Please refer to Table 1 for site codes. Timescales: Q = Quarterly, M = Monthly, B = Biweekly, C = Continuous, P = Periodically

Oyster Attributes	*Sites and Timescale*
Adult density	Newport sites (P, Oct - Apr); San Diego sites (P, May - Dec)
Size	Only Newport sites, except NAC (P, Oct - Feb)
Growth rate	Only San Diego Bay sites (~M, May-Sept), except PIIS
Survival rate	Only San Diego Bay sites (~M, May-Sept), except PIIS
Recruitment rate	All sites (B) except HWY1, LI 1, LI 2, NAC

Table 3. List of environmental factors, sites where data were collected, and the timescale for data collection.

Environmental Factors	
Available substrate	All sites (P)
Water Temperature	15th, CI, RP (C)

Field Methods

Oyster Attributes

<u>Adult oyster density</u>

We monitored oyster density at Newport Bay sites between October and April from 2010 to 2013 and at San Diego Bay sites between May and December of 2013. At each site, we laid out a 50 X 2 m transect centered near 0 to +0.5 m mean lower low water (MLLW) and then counted the total number of oysters within 30 randomly placed 0.25 m^2 quadrats along the transect. Density data were also used in calculations for population estimates on hard substrate over a 2 x 150 m area at each site.

<u>Adult oyster size</u>

At all Newport Bay sites except Newport Aquatic Center, adult oyster sizes were surveyed October - November 2010 and January-February 2011. At haphazard points along the transect (see Adult Oyster Density, above), the longest dimension of all native oysters encountered was measured (n = 17 to 57 individuals). These data were used to generate the mean upper quartile. Size distribution data were sorted into 10 mm bins and used to calculate a size-class diversity index:

Gini-Simpson Index = 1 – Simson's index (D_s)

$D_s = \sum p_i^2$

P_i = proportion of individuals in each group

Recruitment

We monitored recruitment by deploying four 15 x 15 cm red unglazed ceramic tiles near 0 m MLLW in all San Diego sites from June to October 2013 and at 15th Street, Coney Island and Rocky Point (Newport Bay) year-round from 2006 to 2014. From June to October tiles were collected in each bay approximately every two weeks, and we used these data to calculate recruitment rate. The total number of oysters was counted on each tile using a dissecting microscope to calculate a recruitment rate for each two-week period. The average recruitment rate was determined by averaging the rate from each collection period. The reliability of recruitment over the years was calculated for Newport Bay sites as the coefficient of variation of recruitment rate.

Juvenile growth and survival

At San Diego sites two additional recruitment tiles were deployed (see Recruitment, above), on May 30, 2013 and were collected and returned to the field ~monthly through September 2013 to measure growth and survival rates. Ten oysters per tile were identified after tile collection in June 2013 and their starting lengths were measured. In July and early September 2013, tiles were collected and oysters remaining from the original 10 were measured for growth and survival. Growth and survival rates were averaged between the two collection periods for each site.

Environmental Factors

Available substrate

In each bay, we used a 50 cm x 50 cm gridded quadrat along a transect (see Adult Oyster Density, above), to determine habitat percent cover. For each quadrat, we recorded habitat cover at 49 data points (e.g., mud, sand, dead shell, *Mytilus* spp., *O. lurida,* etc.) and from this calculated habitat percent cover. We combined habitat types into hard and soft substrate, and used average percent cover of hard substrate multiplied by oyster density to generate population size estimates.

Water temperature

In Newport Bay, Onset TidbiT temperature loggers were attached to recruitment tees near MLLW at 15th Street, Coney Island and Rocky Point. Loggers collected continuous data every 15 minutes from December 2009 through May 2012. As a rough estimate of water temperature, values above 29°C were excluded to eliminate air temperatures. The average daily warm period temperature was determined as the average of daily temperature means during April – September over each year.

Modifications to the Site Evaluation Table

We made several modifications to the online version of Site Evaluation Table (Wasson et al. 2014). Because recruitment was recorded only for June-October for San Diego, we used average recruitment rate for that period only for both Newport Bay and San Diego. This resulted in significantly higher recruitment rates than the year-round rate reported for Central California. To reflect this we recalibrated the scoring bins, generally using order of magnitude differences in the raw data. Growth rates were calculated only for new settlers and only over a very short time period (~70 days), during which growth would be expected to be quite high. In contrast, the Central California data included older, larger oysters tracked over longer time periods. We adjusted scores for this parameter, reflecting the spread of the data. We also dropped scores for two sites, Coronado Cays and Signature Park, where fewer than 10 of the individuals being measured survived. We also decided to report water temperatures as the warm period daily average (April – September). We had data on water temperature for only three sites. Based on the assumption that warmer sites are generally better than cooler sites (Wasson et al. 2014), we scored the two warmer sites 100 and the cooler site at 75. It should be noted, however, that there is no indication from the data collected that the cooler site is impacting oyster performance.

Site Evaluations

Fourteen sites were evaluated in the two Southern California bays. Overall, greater variability between sites existed within San Diego Bay, whereas the seven sites in Newport Bay were more consistent in all oyster attributes studied. Chula Vista Wildlife Reserve scored among the highest in conservation value, largely due to the highest adult density of all the southern California sites surveyed. Other top scoring conservation sites included Pond 11 South and J Street Marina in San Diego Bay and Newport Aquatic Center and 15th Street in Newport Bay, although all Newport Bay sites displayed relatively high conservation scores. However, it should be noted that the high score generated for Newport Aquatic Center is based on two parameters (population estimate and drill predation) and Pond 11 South on three parameters (population estimate, recruitment rate, and drill predation). San Diego sites demonstrate exceptionally high larval recruitment, much higher than Newport Bay sites. High recruitment, along with high juvenile survival and growth rates, resulted in all San Diego sites receiving high or medium high scores as potential restoration sites. All of these can be considered a high priority for restoration through the addition of hard substrate. The top restoration sites in Newport Bay were Newport Aquatic Center, 15th Street, Rocky Point, Highway 1 and Coney Island, with the two Lido sites showing slightly lower restoration scores; generally Newport sites scored lower than San Diego sites for restoration. Newport Aquatic Center already has a large oyster population; on this basis, the other high ranking sites might be preferentially selected for restoration. All sites received a boost in overall scores in the Seeding Score tab, but given the relatively high rates of recruitment in both bays, seeding is clearly not indicated as a restoration method.

However, there are several additional factors present at these sites not incorporated into the site evaluation metrics. First is the amount of available area for potential restoration. Most of the Newport Bay shoreline in particular is heavily armored by man-made substrates including rip rap, sea walls and pilings. Though oysters may perform well at certain sites, there may be little space available for hard substrate addition, particularly Newport Aquatic Center. Another factor of growing concern is the prevalence of the non-native oyster, *Crassostrea gigas*. Densities of *C. gigas* are higher in San Diego Bay than in Newport Bay and in San Diego Bay in particular, densities of *C. gigas* at some sites (Coronado Cays and J Street Marsh) are quite high. It is unclear if high *C. gigas* densities are having a negative impact on native oysters, however, in an effort to reduce potential competition between the two oyster species, restoration practitioners have deployed oyster restoration efforts at tidal elevations lower than the height where *C. gigas* are found in greater abundance (+ 0.75 to 1 m MLLW). Therefore, it is still unclear if high *C. gigas* populations would negatively impact native oyster restoration success or whether restoration plans may be altered to limit any potential negative impacts.

Newport Bay Site Evaluation Table (detailed version available from www.oysters-and-climate.org)

	Rocky Point	Newport Aquatic Center	Coney Island	HWY 1	Lido Island Site 1	Lido Island Site 2	15th Street
ADULT OYSTER DENSITY	50	50	50	50	50	50	50
OYSTER POPULATION SIZE	75	100	75	75	75	75	100
ADULT OYSTER SIZE	50		50	50	50	50	50
DIVERSITY OF SIZE CLASSES	50		75	75	50	50	75
RECRUIT DENSITY	50		50				50
RELIABLE RECRUITMENT	100		50				100
WATER TEMPERATURE	100		100				75
DRILL PREDATION	100	100	100	100	100	100	100
OVERALL SCORES							
Restoration (natural recruitment)	69	71	68	68	62	62	70
Restoration (with seeding)	71	80	70	71	64	64	72
Conservation	71	100	74	75	73	73	89

San Diego Bay Site Evaluation Table (detailed version available from www.oysters-and-climate.org)

	D Street Marsh	Signature Park	Coronado Cays	J Street Marina	CVWR	Pond 11 North	Pond 11 South
ADULT OYSTER DENSITY	0	0	25	50	75	25	50
OYSTER POPULATION SIZE	0	0	50	75	100	25	75
RECRUIT DENSITY	75	75	100	75	75	100	100
SURVIVAL RATE	100	100	100	100	100	100	
GROWTH RATE	75			75	50	100	
DRILL PREDATION	100	100	100	100	100	100	100
OVERALL SCORES							
Restoration (natural recruitment)	66	64	79	78	81	81	82
Restoration (with seeding)	77	77	87	83	80	90	87
Conservation	0	0	72	79	91	61	85

Appendix 2. Southern Oregon Site Evaluations: Coos Bay and South Slough

Overview

We (A. Helms, B. Yednock) evaluated three sites in the northeastern portion of the Coos estuary (referred to as Coos Bay), and one site in South Slough, which comprises the major southern arm of the Coos estuary. The majority of the data used to evaluate the three sites in Coos Bay came from previously published manuscripts (Groth and Rumrill 2009) and student theses (Pritchard 2014, Rimler 2014, Oates 2013). A small amount of unpublished data that were collected in 2014 by staff and interns of South Slough National Estuarine Research Reserve at one of the Coos Bay sites (Coalbank Slough) and at two Olympia oyster reintroduction sites in South Slough were also included in the site evaluation tables. With the exception of South Slough, where oysters were absent until they were reintroduced through a project that began in 2008, the sites in Coos Bay consist of fairly established oyster populations stemming from the reappearance of Olympia oysters to the Coos estuary in the late 1980s. As a result, in general, Coos Bay sites have higher adult densities than the South Slough sites. The site locations and data collection and processing methods are described below, followed by a summary of the site evaluation results.

Site selection and use of field data in site evaluations

We selected three sites (Downtown Coos Bay, Haynes Inlet, and Coalbank Slough) for restoration evaluations because these sites had data available for both adult oysters and recruits, including growth and survival rates, in addition to larval abundance. Each of these three sites also paired with water quality sonde stations in Coos Bay that were between 1.2 to 3 km away. There were three additional sites from the Groth and Rumrill 2009 study in Coos Bay (Millington, Eastside, Pony Point) where adult density measures were available but no recruitment, growth, or survival measurements were made. From Pritchard (2013) and Rimler (2013), there were three additional Coos Bay sites (Empire, Catching Slough, and Airport) with recruitment and larval abundance data, but adult oyster measurements were not made as part of their work. Therefore, these latter 6 sites were not included in this evaluation.

We selected two reintroduction sites (South Slough-Valino Island and South Slough-Long Island) in the South Slough estuary for evaluating their appropriateness for restoration, based on seeding. The Seeding Score is calculated with a formula that makes recruitment rate less important, to determine if it is appropriate for restoration with seeding by aquaculture spat. Environmental conditions for both sites were characterized by data from the same nearby continuous water quality monitoring station. These two sites do not have naturally established adult oyster populations like the Coos Bay sites that were evaluated for restoration. The adults at these two sites were generated from a reintroduction project that began in 2008 with Olympia oyster cultch from a hatchery along with settled juveniles from the hatchery (2009); both were transplanted to Younker Point in Coos Bay for growth and survival studies. Burial by sediments was responsible for the relocation of the oysters from the reintroduction project site at Younker Point to the two seeding sites, Valino Island and Long Island, located further up the estuary and across from each other separated by the main channel. Oysters were transplanted to the current two locations in 2012 and monitoring began in 2014.

We selected one site, Downtown, to evaluate for its current conservation value based on it having the highest density of adults and recruits and the highest larval abundance of the three sites evaluated for restoration. It also has comparatively more available hard substrate than the other sites, which is an important factor. This evaluation required a new parameter *adult oyster population size*, which had not been quantified for any Coos Bay sites. Based on adult oyster densities from Groth and Rumrill (2009) at this site along with a quick field assessment we conducted in May of 2015, we roughly estimated that there are likely more than 1000 oysters along 300 m of intertidal shoreline. Despite oysters being very patchy along the shoreline, there are areas of higher density including the field site where Rimler 2014 conducted her research.

Field Sites

Table 1. List of oyster field sites, site codes, and locations by sub-basin

Embayment	*Site Name*	*Site Code*	*GPS Coordinates*
Coos Bay	Downtown Coos Bay	DN	43.37853 N, 124.21559 W
Coos Bay	Haynes Inlet	HI	43.44070 N, 124.22086 W
Coos Bay	Coalbank Slough Coalbank-Railroad Bridge Coalbank-Edgewater Hotel	CB CB-RB CB-EH	43.35590 N, 124.2091 W 43.36021 N, 124.20616 W 43.36006 N, 124.20689 W
South Slough	South Slough-Valino Island South Slough-Long Island	SS-VA SS-LI	43.30775 N, 124.31962 W 43.30716 N, 124.3186 W

Table 2. List of continuous water quality and meteorological stations, station institution, and location by bay.

Embayment	*Station Name*	*Station Code*	*Station Institution*	*GPS Coordinates*	*Distance from oyster field site*
Coos Bay	Kokwel Wharf	KW	Coquille Indian Tribe	43.4034055 N, 124.219477 W	2.9 km (DN)
Coos Bay	North Point	NP	NERR, Partnership for Coastal Watersheds	43.42575 N, 124.222703 W	1.6 km (HI)
Coos Bay	Isthmus Slough	IS	NERR, Partnership for Coastal Watersheds	43.327808 N, 124.200409 W	3 km (CB)
South Slough	Valino Island	VA	NERR SWMP	43.3172374 N, 124.3216473 W	1.2 km (SS)
Coos Bay	North	KOTH	Southwest Oregon	43.4171° N,	3.3 km (HI)

	Bend Airport		Regional Airport	124.2460° W	5.1 km (DN) 7.6 km (CB)
South Slough	Charleston Met	CM	NERR SWMP	43.3450 N, 124.3287 W	4.4 km (SS)

Field Parameters

Table 3. List of oyster attributes, sites where data were collected, and the timescale for data collection.

Oyster Attributes	*Sites*	*Timescale*
Adult density	DN, HI CB-RB, CB-EH, SS-VA, SS-LI	2006 2014
Size	DN CB-RB, CB-EH, SS-VA, SS-LI	2006 2014
Size Frequency	DN CB-RB, CB-EH, SS-VA, SS-LI	2006 2014
Growth rate	DN, HI, CB SS-VA, SS-LI	Jan - July 2013 Jan – May 2009
Survival rate	DN, HI, CB	Jan - July 2013
Recruitment rate	DN, HI, CB	July-Nov 2012, May-Aug2013
Larval abundance	DN, HI, CB	July-Nov 2012, May-Aug 2013

Environmental Parameters

Table 4. List of environmental factors, sites where data were collected, and the timescale for data collection.

Environmental Factors	*Sites*	*Timescale*
Water temperature	KW NP, IS VA	Sept 2013-March 2015 Oct 2013-March 2015 Jan 2010-Dec 2014
Dissolved oxygen	KW NP, IS VA	Sept 2013-March 2015 Oct 2013-March 2015 Jan 2010-Dec 2014
Salinity	KW NP, IS VA	Sept 2013-March 2015 Oct 2013-March 2015 Jan 2010-Dec 2014
pH	KW NP, IS VA	Sept 2013-March 2015 Oct 2013-March 2015 Jan 2010-Dec 2014
Air temperature	KOTH, CM	Jan 2013-Dec 2014
Substrate availability	DN, HI, CB	2012-2013
Chlorophyll a	VA HI, CB	2010-2013 2013

Field Methods

Oyster Attributes

Adult oyster density and size

Means for adult density per m^2 for Downtown and Haynes Inlet were used from Groth and Rumrill (2009). Mean adult size for Downtown was also used from Groth and Rumrill (2009) and only included measurements for oysters >20 mm; size data were unavailable for Haynes Inlet. Data for mean adult density per m^2 and adult size measurements were collected at Coalbank Slough and South Slough in 2014 as part of an oyster restoration monitoring project. For these surveys, data were collected at 2 m intervals along three 10 m transects at each of the two sites in South Slough and two sites in Coalbank Slough. A maximum of 10 oysters within a ½ m^2 quadrat were measured. Five density observations were also made for each transect at 2 m intervals. Data from the two sites in Coalbank Slough (CB-RB and CB-EH) were combined to represent the size and density of adult oysters in Coalbank Slough. The site (CB) where recruitment data were collected by Rimler (2014) is approximately 500 meters from CB-RB and CB-EH.

Diversity of size classes

Data from Groth and Rumrill (2009) were used to evaluate size-class diversity for Downtown. Because only oysters >20 mm in length were measured in the study, this sample represents the largest oysters, so this measurement needs to be interpreted carefully. Size data from the 2014 monitoring surveys at the Coalbank Slough and South Slough sites were used to assess size class diversity for those locations (no size limit was used for those oyster measurements). Oyster sizes were placed into 10 mm bins and used to generate a size-class diversity index (Gini-Simpson).

Gini-Simpson Index = 1 – Simpson index (D_s)
$D_s = \sum p_i^2$
P_i = proportion of individuals in each group

Growth and survival

Data for these attributes came from Rimler (2014). For this study 7 to 8 oysters (17.5 – 27.5 mm in height) were epoxied to each of four 10 cm x 10 cm unglazed ceramic tiles that were deployed at each site from 1/10/2013 until 7/10/2013. Tiles were retrieved and oysters were measured and assessed for survival four times during the deployment period. Mean growth rate per day from January to July is reported in the site evaluation tables. A survival rate (% survival from January-July) was calculated from the same data and reported in the site evaluation tables. The growth rate for the South Slough sites shown in the seeding score site evaluation table was calculated from data presented in Rumrill (2010) and based on measurements of oysters growing on shell bags that were sampled four times from January to May in 2009.

Recruitment

Recruitment data also came from Rimler (2014) in which eight replicate 10 cm x 10 cm unglazed tile plates were deployed at each site from 8/3/2012 to 11/14/2012 and 6/10/2013 to 11/18/2013. Plates were retrieved and replaced approximately every two weeks during the deployment period. The number of recruits was counted in a randomly selected subsection of each plate and used to calculate the mean number of recruits per

100 cm^2. For the site evaluation tables, we converted the means reported in Rimler (2014) to mean number per m^2 per day.

Larval abundance

Mean larval abundance data came from Pritchard (2014). For this study, larval traps were deployed at the same time and adjacent to the settlement plates used by Rimler (2014). Traps consisted of a funnel (7 cm x 5 cm), a PVC tube (61 cm x 5 cm), and a PVC stake fully inserted into the sediment. D-stage, umbo-stage, and settler abundances were counted from each of five replicate traps approximately every two weeks. Peak mean abundance of umbo-stage larvae (reported in the site evaluation tables) was calculated from collections in 2012 and 2013 and averaged across years.

Environmental Factors

Water temperature, salinity, dissolved oxygen, pH

YSI EXO2 or 6600V2 water quality sondes were deployed at permanent monitoring locations in Coos Bay and South Slough. Water quality sondes collect water temperature, specific conductivity, salinity, dissolved oxygen, pH, turbidity, and water depth data continuously every 15 minutes. Data collection and management follow standardized National Estuarine Research Reserve System-wide Monitoring Program (NERR SWMP) protocols (http://cdmo.baruch.sc.edu).

Chlorophyll *a*

For Haynes Inlet and Coalbank Slough, Oates (2013) collected chlorophyll *a* data by monthly grab samples with three replicates averaged for monthly values, however only the highest and lowest monthly values were reported in the thesis. Therefore, we present in the site evaluation table the highest monthly average for chlorophyll *a* at those sites. For the South Slough sites, chlorophyll *a* values were used from the NERR SWMP monthly nutrient program (2010-2014) which collects monthly triplicate grab samples. For comparability with the restoration sites, we also only present the highest monthly average and we only used summer months.

Air temperature

Air temperature data for the Restoration Site Evaluation Table were recorded by the North Bend, OR airport meteorological station (KOTH) and reported as daily maximum mean values. Air temperature data for the seeding sites in South Slough were recorded by the NERR SWMP meteorological station (CM) and were calculated as daily maximum mean values from 15 min averages; the data logger records measurements every 5 seconds and these are averaged over a 15 min interval.

Available substrate

The type and amount of available substrate was qualitatively described in Rimler (2014) for the three sites included in the Restoration Site Evaluation Table: Downtown, Haynes Inlet, Coalbank Slough. Because sites were described relative to each other, qualitative information was used to create categories and related scores for each category.

Modifications to the Site Evaluation Table

In general, we followed the methods of Wasson et al. (2014) for site evaluations, in terms of parameters included and thresholds used to assign scores. However, we omitted *Reliable Recruitment* and *Larvae Exported* as parameters because data for these parameters were not available for any of our sites. We included *Adult Oyster Size*, *Diversity of Size Classes*, and *Chlorophyll* a as parameters for sites when sufficient data were available. We added parameters for *Larval Abundance*, *Risk of Low pH Events*, and *Hard Substrate Availability* because these are important factors for assessing oyster success and data were available for these parameters for all of our sites. Generally, bins were selected based on the distribution and variability in available datasets to maximize our ability to rank sites relative to one another. For *Survival Rate* and *Low Dissolved Oxygen*, we changed the scoring bin thresholds, because our units of measurement for these parameters differed from those of Wasson et al. (2014). For *Growth Rate*, we reduced all bin thresholds by 50% because data were only available for two quarters (i.e. six months) for our sites, whereas Wasson et al. (2014) averaged growth across all quarters of a year. For the *Low Dissolved Oxygen* parameter, we also used a different assessment metric since we had continuous sonde measurements; percent of data observations where DO fell below 5 mg/L were calculated. Bins for dissolved oxygen were selected to capture large site differences between the number of observations below 5 mg/L. For example, sites had a range including 0, 6, 1,035, and 3,333 instances where DO fell below 5 mg/L; these raw observations were adjusted by total number of observations in the dataset, which varied by site. For *Salinity Range,* we changed the threshold to percent days per year where average salinity was less than 15 ppt (from 25 ppt used in Wasson et al. (2014)). Evidence supports this lower threshold for Coos Bay and South Slough. Gibson (1974) found that salinities of 15 ppt and lower demonstrated deleterious effects on oyster populations in Oregon and Oates (2013) found low salinity effects on various reproductive condition indices at salinities lower than 15 ppt. However, our sites experience a wide range of salinity from 2.7 to 33.3 ppt, primarily from seasonal freshwater inputs, and oyster presence in these low salinity areas indicates oysters may be adapted to local conditions. We also changed the threshold for *Water Temperature* from 12°C to 15°C based on site-specific data on oyster temperature requirements; 15°C is thought to be a critical reproductive temperature; below this temperature spawning may not occur (Pritchard 2013). For the *Chlorophyll a* parameter, we used the highest monthly average concentration from each site because this was a common measure available for all sites.

Results of site evaluations

Restoration potential

Three sites (Downtown, Haynes Inlet, Coalbank Slough) were evaluated for restoration potential. The highest scoring site for restoration in Coos Bay was Downtown, although Haynes Inlet resulted in only a slightly lower score. Downtown had as much as 16 times higher densities of adults and 3 times the larval abundance as Haynes Inlet and Coalbank Slough. In addition, Downtown had the highest availability of hard substrate (e.g. rip-rap, rock, rubble, pilings), which is a potential limiting factor for other sites. It appears salinity may not be a major stressor for oysters at Coos Bay sites where daily averages were below 15 ppt for up to 39 percent of the year. All of the Coos Bay sites that we evaluated are located in the mid to upper estuary where they can experience long periods of high freshwater riverine input during the rainy season (November– April). In particular, Coalbank

Slough had the highest percentage of years with consecutive low salinity events (6 events lasting up to 11 days) followed by Downtown with 1 event (lasting 4 days) over the 1.5 year period; Haynes Inlet had no prolonged low salinity events. Olympia oysters are generally absent from the lower reaches of the estuary where salinities are highest, with the exception of the Charleston Marina and (after reintroduction) South Slough.

Coalbank Slough and Haynes Inlet experienced lower dissolved oxygen (DO) concentrations than Downtown but overall low DO events were uncommon at all sites with < 2.5 % of values falling below 5 mg/L. Water temperatures were higher at Downtown and Coalbank Slough than at Haynes Inlet, most likely due to the location of Haynes Inlet which is lower in the estuary, although all sites had similar scoring for water temperature. Low pH events may be a stressor for oysters in upper estuary/riverine sites, although this stressor needs to be evaluated for local effects in estuaries. Coalbank Slough had the highest risk of low pH events and is located the furthest up the estuary, but pH at this site is highly variable. Average chlorophyll concentrations measured at Haynes Inlet and Coalbank were moderate and may contribute to higher oyster performance at these sites. At all sites, high air temperature events (> 30°C) were rare (<1% days/yr), therefore this stressor doesn't currently seem to be a concern.

Additional data from three sites in Coos Bay (Airport, Empire, and Catching Slough) are available from the Pritchard and Rimler theses but the data are not presented here as these have more data gaps than the sites we included in our restoration potential evaluation tables. Density data for another location in Coos Bay (Isthmus Slough mitigation site) are also available from the work of Scott Groth (Oregon Department of Fish and Wildlife) where densities of up to 1000/m^2 were observed. Including additional sites and filling in data gaps will be an important step for future revisions of the Coos Bay appendix of the Guide.

Restoration potential with seeding

We evaluated two reintroduction sites in South Slough to determine the restoration potential of these sites with seeding. Both sites scored similarly overall (56 & 58%). Although Valino Island (SS-VI) had slightly higher adult oyster density and size than Long Island (SS-LI), it had a lower diversity index which resulted in a slightly lower overall score. Since the sites were located very close together and relocated oysters were placed at both new sites randomly, we also considered the averaged metrics from the two sites for a combined score. The environmental factors that may contribute to potential stress for oysters were low chlorophyll levels, some low DO events (2% of observations fell below 5 mg/L), as well as prolonged low salinity events (20% of the year). However, as with the Coos Bay sites, salinity may not be a stressor for native oysters in South Slough since salinity is seasonally variable and can range from 11.3-33.3 ppt. The salinity range metric at Valino Island scored high with only 1 % of days per year averaging less than 15 ppt. Also, there are commercial oyster (*Crassostrea gigas*) operations near Long Island as well as at locations further up the estuary. On the other hand, sedimentation may be a stressor for oysters in South Slough, although it hasn't formally been assessed. The fact that high sedimentation rates required the relocation of outplanted oysters to a new site in South Slough suggests sedimentation may impact future seeding operations.

Conservation value
Downtown Coos Bay was evaluated for its value as a conservation site because it has the highest recruitment rates and larval abundances of all the sites that were evaluated. It also has suitable substrate, which would favor recruitment and reduce pressure from sedimentation. The overall oyster conservation score for Downtown (71%) is reasonably high, suggesting it may be an important site to focus conservation efforts. However, it should be noted that the adult oyster population size was a rough estimate from a brief survey to count oyster densities and that more data should be collected at this site. Overall, this site scored fairly high for the environmental parameters, with the exception of prolonged low salinity events. However, as mentioned earlier, the presence of oysters in Coos Bay at locations with low and/or variable salinities suggests native oysters may be locally adapted to these conditions. Similarly, recruits and larval abundances are all high at the Downtown site so they do not appear to be affected by low salinity.

	COOS BAY			SOUTH SLOUGH		
	Downtown Coos Bay	Haynes Inlet	Coalbank Slough	South Slough combined	Valino Island	Long Island
ADULT OYSTER DENSITY	50	25	50	50	50	50
OYSTER POPULATION SIZE	75					
ADULT OYSTER SIZE	50		25	50	50	50
DIVERSITY OF SIZE CLASSES	50		75	75	50	75
RECRUIT DENSITY	75	75	50			
LARVAL ABUNDANCE	75	25	50			
SURVIVAL RATE	75	50	75			
GROWTH RATE	25	75	25	25	25	25
WATER TEMPERATURE	75	50	75	50	50	50
AIR TEMPERATURE	100	100	100	100	100	100
CHLOROPHYLL		25	25	25	25	25
LOW DISSOLVED OXYGEN	100	75	50	50	50	50
SALINITY RANGE	75	75	25	75	75	75
RISK OF LOW SALINITY EVENTS	0	100	0	50	50	50
RISK OF LOW PH EVENTS	75	100	25	75	75	75
HARD SUBSTRATE AVAILABILITY	75	50	50			
DRILL PREDATION	100	100	100	100	100	100
OVERALL SCORES						
Restoration (natural recruitment)	67	66	50			
Restoration (with seeding)				58	56	58
Conservation	71					

References

Oates, M.S. (2013) Observations of gonad structure and gametogenic timing in a recovering population of *Ostrea lurida* (Carpenter 1864) Masters thesis, University of Oregon, Department of Biology. 66 pp.

Pritchard, C. (2014) Distribution of Larval Bivalves in the Coos Bay Estuary, Oregon.

Rimler, R. (2014) Larval Supply, Settlement, and Post-Settlement Performance as Determinants of the Spatial Distribution of Olympia Oysters (*Ostrea lurida*) in Coos Bay, OR.

Rumrill, S. (2010) Restoration of Native Olympia Oysters within the South Slough estuary. Final Project Report for NOAA Restoration Center Community-based Restoration Program. 31 pp.

Gibson, G.G. (1974) Oyster mortality study summary report 1966-72. Fish Commission of Oregon. Management and Research Division: Newport, Oregon. 37 pp.

Groth, S., & Rumrill, S. (2009) History of Olympia oysters (*Ostrea lurida* Carpenter 1864) in Oregon estuaries, and a description of recovering populations in Coos Bay. *Journal of Shellfish Research*, *28*(1), 51-58.

HEARLEY Henry O

From:	Courtney Johnson <courtney@crag.org>
Sent:	March 21, 2019 3:10 PM
To:	CALLISTER Jacob (LCOG); HEARLEY Henry O
Cc:	Anuradha Sawkar; Philip Johnson; Oregon Shores Conservation Coalition
Subject:	Oregon Shores Conservation Coalition comments on JCEP- NRI applications
Attachments:	Oregon Shores Comment LU Appl-187-18-000153_3.21.2019.pdf

Dear Mr. Hearley and Mr. Callister,

Please find attached comments from Oregon Shores Conservation Coalition to be included in the record for the Jordan Cove Energy Project Land Use Application #187-18-000153, scheduled for public hearing before the City of Coos Bay Planning Commission tonight.

Please confirm you have received this email and its attachment.
Thank you for your assistance,

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest's Natural Legacy.

HEARLEY Henry O

From:	Courtney Johnson <courtney@crag.org>
Sent:	April 25, 2019 9:09 AM
To:	CALLISTER Jacob (LCOG); HEARLEY Henry O
Cc:	Anuradha Sawkar; Philip Johnson; Oregon Shores Conservation Coalition
Subject:	Oregon Shores Conservation Coalition supplemental comments on JCEP- NRI applications (1 of 3)
Attachments:	Oregon Shores Supp Evid Land Use Appl 187-18-000153.pdf; Part 1 Oregon Shores Supp Evidence Land Use Appl #187-18-000153 .pdf

Dear Mr. Hearley and Mr. Callister,

Please find attached supplemental materials to be included in the record for the Jordan Cove land use application #187-18-000153. I have split the attachments into three files for transmittal.

This is email 1 of 3.

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest's Natural Legacy.

HEARLEY Henry O

From: Courtney Johnson <courtney@crag.org>
Sent: April 25, 2019 7:58 AM
To: CALLISTER Jacob (LCOG); HEARLEY Henry O
Cc: Anuradha Sawkar; Phillip Johnson; Oregon Shores Conservation Coalition
Subject: Oregon Shores Conservation Coalition supplemental comments on JCEP- NRI applications (2 of 3)
Attachments: Part 2 Oregon Shores Supp Evidence Land Use Appl #187-18-000153.pdf

Dear Mr. Hearley and Mr. Callister,

Please find attached supplemental materials to be included in the record for the Jordan Cove land use application #187-18-000153. I have split the attachments into three files for transmittal.

This is email 2 of 3.

Please confirm receipt of these emails.

Thank you for your help,

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest's Natural Legacy.

HEARLEY Henry O

From:	Courtney Johnson <courtney@crag.org>
Sent:	April 25, 2019 9:07 AM
To:	CALLISTER Jacob (LCOG); HEARLEY Henry O
Cc:	Anuradha Sawkar; Philip Johnson; Oregon Shores Conservation Coalition
Subject:	Oregon Shores Conservation Coalition supplemental comments on JCEP- NRI applications (3 of 3)
Attachments:	Part 3 Oregon Shores Supp Evidence Land Use Appl #187-18-000153.pdf

Dear Mr. Hearley and Mr. Callister,

Please find attached supplemental materials to be included in the record for the Jordan Cove land use application #187-18-000153. I have split the attachments into three files for transmittal.

This is email 3 of 3.

Please confirm receipt of these emails and their attachments.

Thank you!

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest's Natural Legacy.

HEARLEY Henry O

From: Courtney Johnson <courtney@crag.org>
Sent: April 25, 2019 9:41 AM
To: HEARLEY Henry O
Subject: Re: Oregon Shores Conservation Coalition supplemental comments on JCEP- NRI applications (1 of 3)

Thanks Henry! And thank you for confirming you received all three emails.

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest's Natural Legacy.

On Apr 25, 2019, at 9:38 AM, HEARLEY Henry O <HHEARLEY@Lcog.org> wrote:

Hi Courtney,

Passing along our revised notice of cancellation of the City Council hearing on May 21 and new date of June 18.

Let me know if you have any further questions or concerns.

Thanks,
Henry

From: Courtney Johnson <courtney@crag.org>
Sent: April 25, 2019 9:09 AM
To: CALLISTER Jacob (LCOG) <jcallister@lcog.org>; HEARLEY Henry O <HHEARLEY@Lcog.org>
Cc: Anuradha Sawkar <anu@crag.org>; Philip Johnson <orshores@teleport.com>; Oregon Shores Conservation Coalition <phillip@oregonshores.org>
Subject: Oregon Shores Conservation Coalition supplemental comments on JCEP- NRI applications (1 of 3)

Dear Mr. Hearley and Mr. Callister,

Please find attached supplemental materials to be included in the record for the Jordan Cove land use application #187-18-000153. I have split the attachments into three files for transmittal.

This is email 1 of 3.

Courtney Johnson
Executive Director & Staff Attorney
Crag Law Center
3141 E Burnside Street
Portland, Oregon 97214
(503) 525-2728

Protecting and Sustaining the Pacific Northwest’s Natural Legacy.

<Notice_of_cancelled_hearing_and_new_council_hearing_in_june.pdf>

OREGON SHORES
CONSERVATION COALITION

April 25, 2019

Mr. Henry Hearley
Assistant Planner
Lane Council of Governments (LCOG)
859 Willamette Street, Suite 500
Eugene, OR, 97401

Via Email to: hhearley@lcog.org

Re: City of Coos Bay Land Use Application #187-18-000153
Concurrent Land Use Applications by Jordan Cove Energy Project L.P.
Coos Bay Estuary Navigation Reliability Improvements
Comments of Oregon Shores Conservation Coalition

Dear Mr. Hearley:

Please accept these supplemental materials from the Oregon Shores Conservation Coalition and its members (collectively "Oregon Shores") to be included in the evidentiary record for Land Use Application #187-18-000153. They are provided pursuant to the open record periods established at the public hearing for Application #187-18-000153 held on Thurs. Mar. 21, 2019 and ORS 197.763. We previously submitted comments for inclusion within the evidentiary record for the public hearing. Oregon Shores hereby adopts in full and incorporates by reference our previous comment in the record for Land Use Application #187-18-000153. Please continue to notify us of any further decisions, reports, or notices issued in relation to these Concurrent Applications. Oregon Shores will continue to provide comments as appropriate within the established open record periods.

The attached materials are relevant to the applicable approval criteria for the proposed Navigation Reliability Improvements ("NRIs"), including the Oregon Statewide Planning Goals ("Goals"), the Oregon Revised Statutes ("ORS"), the Coos Bay Estuary Management Plan ("CBEMP"), the City of Coos Bay Comprehensive Plan ("CBCP"), and the City of Coos Bay Development Code ("CBDC"). They further underscore the apparent deficiencies in the

Concurrent Application requests. Of specific importance is the Oregon Department of State Lands' ("DSL") April 10, 2019 letter to the Applicant requesting that it address a number of substantive issues raised by the public regarding the proposed dredging activities within the 52-NA CBEMP district as well as the proposed NRIs under the County's jurisdiction. Many of the issues on which the DSL is requesting further information mirror those raised by Oregon Shores with respect to the proposed NRIs under review by the City, and should be addressed by the Applicant prior to any final decision in this matter.

Document Title	**Pages**
Sylvia Yamada, Potential Impact of Jordan Cove LNG Terminal Construction on the Nursery Habitat of Dungeness Crab, Jan. 2016.	4
Erik Knoder, Oregon's Commercial Fishing in 2017, Or. Emp't Dep't, May 2, 2018.	6
Public Comments on the Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 404 Permit (U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697)	113
Public Comments on the Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 401 State Water Quality Certification (U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697), Aug. 8, 2018	137
Public Comment on DSL APP0060697 (Jordan Cove Energy Project and Pacific Connector Gas Pipeline) Application for Removal-Fill Permit, Jan. 30, 2019	123
FERC map of existing LNG terminals	1
Natural Resources Canada webpage listing 13 proposed west coast LNG terminals.	3
Port of Coos Bay webpages describing navigation and shipping	7
Oregon Dep't of State Lands ("DSL"), DSL Removal-Fill Permit Application No. 60697-RF: Jordan Cove Energy Project, Multiple Counties, (Apr. 10, 2019)	9

Thank you for considering these materials.

Sincerely,

Phillip Johnson
Executive Director
Oregon Shores Conservation Coalition
P.O. Box 33
Seal Rock, OR 97376
(503) 754-9303
phillip@oregonshores.org

Potential Impact of

Jordan Cove LNG Terminal construction on

the Nursery Habitat of Dungeness crab.

January 2016

Sylvia Yamada Ph.D.

yamadas@science.oregonstate.edu

The **Dungeness crab** (***Cancer magister***) supports an important commercial and sport fishery from Alaska to California. Total annual landings in recent years exceeded 25,000 tons (55 million pounds) (FAO statistics, 2012). In Oregon, the 2014 Dungeness fishing season yielded 14.4 million pounds, $50 million to crabbers and an estimated $100 million to the Oregon economy (Oregon Dungeness Crab Commission in Fisherman's News On line). The Dungeness fishery is the most valuable commercial fishery in Oregon (Rasmusen 2013).

The life cycle of Dungeness crab is complex, depending on both estuarine and near-shore habitats. Typically, mating occurs in shallow water, and females migrate offshore to brood and hatch their eggs. The early larval stages feed and rear in the near-shore water column, after which the final larval stage rides tidal currents back to shore and settles out in shallow estuarine habitats. The final larval stage molts into a ~5 -7 mm wide first crab stage. The highest densities of juvenile Dungeness crabs are found in estuaries, which provide warm water, high biological productivity and protection from predators. Sand substrate and eelgrass beds are preferred habitat for these young crabs, which bury in the sand and hide in the eelgrass to escape predators. Size measurements of crabs trapped at Russell Point in Coos Bay (below the Highway 101 McCullough Bridge) show that Dungeness crabs in their first two years of life (100 mm carapace width and smaller) are extremely abundant in the mid-to low intertidal areas such as pools and eelgrass beds (Figure 1).

In my research documenting the status of the non-native European Green crab in Coos Bay, I encounter young Dungeness crabs in all my study sites. I selected a sub-set of my sites closest to the proposed Jordan Cove Energy Project: the north and south sides of Trans Pacific Lane and the beach adjacent to the Roseburg Forest Product watchman's booth. The results from over 600 trap-days, show that young Dungeness crabs are consistently abundant from 2002 to 2014 at all sites, with an average catch of 15 per trap (Table 1). These trapping results confirm the findings by Emmett and Durkin (1985) that estuaries are important nursery habitats for Dungeness crabs. These need to be kept in mind when a trench is dug In Haynes Inlet, the Trans Pacific Parkway is be expanded and an upland area is cut out to create a berth for ocean-going vessels. Not only will the turbidity during the construction phase be of concern to the ecological community, the on-going dredging to maintain the berth and shipping channels will continue to be a disturbance to the ecosystem. It will result in habitat loss for native species, including the valuable Dungeness crab. In one study between 45 to 85 % of the Dungeness crabs died during a simulated dredging operation (Chang and Levings, 1978). Marine habitat modification by construction of the Jordan Cove Energy Project could impact the important Oregon Dungeness fishery.

Sylvia Yamada is a marine ecologist who has studied native crabs and the European green crab in Oregon and Washington for over 20 years.

References:

Chang, B., Levings, C. 1978. Effects of burial on the heart cockle *Clinocardium nuttalii* and the Dungenes crab *Cancer magister*. *Estuarine, Coastal and Shelf Scie*nce. 7, 4009-412.

Emmett, R.L. and Durkin, J.T. 1985. The Columbia River Estuary: An Important Nursery for Dungeness Crabs, *Cancer magister*. *Marine Fisheries Review*. 47(3), 21-25.

Fisherman's News On line Sept 24, 2014 http://fnonlinenews.blogspot.com/2014/09/oregons-crabbers-riding-market-value.html

Rasmuson, L.K. 2013. The Biology, Ecology and Fishery of the Dungeness crab, *Cancer magister*. In Michael Lesser, editor: *Advances in Marine Biology*, Vol 65, Burlington: Academic Press, pp. 95-148. ISBN: 978-0-12-410498-3 Elsevier Ltd. Academic Press.

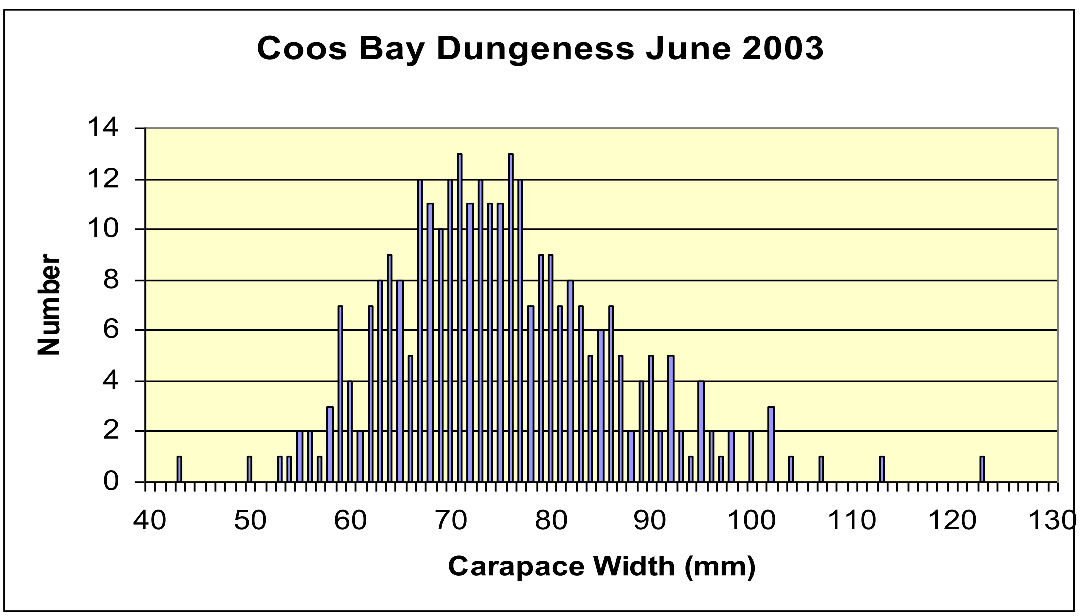


Figure 1. Size frequency distribution of Dungeness crabs trapped in pools and eelgrass at Russell Point, below the Highway 101 McCullough Bridge, in June 2003. Adult crabs are greater than 100 mm in carapace width. It is estimated that 2 year classes are represented.

Table 1. Trapping Data for study sites along Trans Pacific Lane and Roseburg Forest Product causeway from 2002-2014.

	Date	Trap Type	Zone	European green crab *Carcinus maenas*	Hairy shore crab *Hemigrapsus oregonensis*	Purple shore crab *Hemigrapsus nudus*	Dungeness crab *Cancer magister*	*Cancer magister* (Recruits <50mm)	Red rock crab *Cancer productus*	stag-horn sculpin	# Traps
Roseburg Lumber	6/25/2002	Fish	Site	0	0	0	45	0.5	0.1	0	10
Roseburg Lumber	6/16/2003	Fish	*low*	0	0	0	12.2	0	0.7	1.5	10
TransPacific S	7/10/2005	Fish	*low*	0	0	0	6.14	1.14	0	1.86	7
North	7/10/2005	Fish	*low*	0	0	0	0	5.7	0	1.1	10
South	3/25/2005	minnow	*Mid*	0	0	0	0	0	0	2.4	10
North	7/10/2005	minnow	*mid*	0	0.2	0	0	0.6	0	0.8	5
South	7/10/2005	minnow	*mid*	0	0	0	0	0.4	0	0.6	5
Trans-Pacific Bridge	9/1/2005	Fish	*Low*	0	0	0	6.6	0	3	1	5
	9/1/2005	Minnow	*high*	0	0	0	0.2	0	0	0.4	4
Trans-Pacific Ln.	6/8/2006	Fish	*Low*	0	0	0	4.9	0	0	2.6	10
	9/13/2006	Fish		0	0.4	0	0.2	0	0	0.2	5
	6/8/2006	Minnow	*high*	0	0	0	0.7	0	0	2.3	10
Trans Pacific Br.	9/13/2006	Minnow		0.2	0	0	0	0	0	0.2	5
TransPacific Ln. N	5/25/2007	Fish	Mid	0.5	0.2	0	1	0.1	0	0.8	10
	7/14/2007	Fish		0.4	1.47	0	23.53	0	0	0.2	15
	9/26/2007	Fish		0	0	0	4.75	0	0	0	8
TransPacific Ln. S	5/25/2007	Fish	Mid	0.09	0	0	0.82	0	0	0.36	11
	7/14/2007	Fish		0.27	0.07	0	9	0	0.07	1	15
	9/26/2007	Fish		0	0	0	2.71	0	0	0.14	7
TransPacific Bridge	5/25/2007	Fish	Mid	0	0	0	1.33	0	0	0	6
	9/25/2007	minnow	high	0	0	0	1.6	0	0	0.4	5
TransPacific Ln. N	6/18/2008	Fish	Mid	0.1	0.2	0	7.4	0	0	7.8	10
	6/19/2008	Fish		0	0	0	1.75	0	0	3.25	8
	9/18/2008	Fish		0	0.1	0	23.4	0	0	0.7	10
TransPacific Ln. S	6/18/2008	Fish	Mid	0.5	0	0	17.2	0	0	2.2	10
	6/19/2008	Fish		0.37	0	0	17.63	0	0	1.37	8
	9/18/2008	Fish		0.1	0	0	22.6	0	0	0.3	10
TransPacific Ln. N	7/8/2009	Fish	Mid	0.13	0	0	9.88	0	0	0.38	8

	7/9/2009	Fish		0.1	0.2	0	11.3	0	0	0.3	10
	07/0/09	Fish		0.1	0	0	11.7	0	0	0.5	10
TransPacific Ln. S	7/8/2009	Fish	Mid	0	0	0	24.38	0	0	0.25	8
	7/9/2009	Fish		0.1	0	0	30.2	0	0	0.9	10
	7/10/2009	Fish		0.4	0	0	16.6	0.1	0	0.5	10
	7/11/2009	Fish		0.4	0	0	13.1	0	0	2.7	10
TransPacific Ln. N	3/19/2010	Fish	Mid	0	0.4	0	0.7	0	0	0	10
	3/20/2010	Fish		0	0.1	0	0.1	0.2	0	0	10
	3/21/2010	Fish		0	0.3	0	0.3	0.4	0	0	10
	6/25/2010	Fish		0	0	0	35.7	0	0	1.1	9
	6/26/2010	Fish		0	0	0	75.9	0	0	0.4	10
TransPacific Ln. S	3/19/2010	Fish	Mid	0	0	0	1.9	0.9	0	0	10
	3/20/2010	Fish		0.1	0	0	1.7	0	0	0	10
	3/21/2010	Fish		0	0	0	2.5	0.1	0	0	10
	6/25/2010	Fish		0	0	0	90.6	0	0	0	10
	6/26/2010	Fish		0	0	0	69.9	0	0	1.6	20
TransPacific Ln. N	7/17/2011	Fish	Mid	0	0.6	0	4.73	0.27	0	0.73	15
	10/17/2011	Fish		0	0	0	5.3	0	0	0.2	10
TransPacific Ln. S	7/16/2011	Fish	Mid	0.03	0.09	0	1.5	0.06	0	1.53	34
	7/17/2011	Fish		0	0.13	0	2.07	0.47	0	1.2	15
TransPacific Ln. N	6/27/2012	Fish	Mid	0	0	0	89.2	0	0	0.4	5
TransPacific Ln. S	6/25/2012	Fish	Mid	0	0	0	9.75	0	0	0.75	12
	6/27/2012	Fish		0.11	0	0	5.2	0	0	0.67	9
TransPacific Ln. S	3/22/2013	Fish	Mid	0	0	0	1.75	0	0	0	20
	3/23/2013	Fish		0	0	0	6.79	0	0	0	19
	7/12/2013	Fish		0	0	0	7.37	0	0	1.6	30
	7/13/2013	Fish		0	0	0	5.24	0	0	1.48	25
TransPacific Ln N	7/12/2014	Fish		0	0	0	40.33	0	0	0.5	12
	7/13/2014	fish		0	0	0	24.9	0	0	0.4	12
TransPacific Ln. S	7/12/2014	Fish		0	0	0	47.27	0	0	0	15
	7/13/2014	fish		0	0	0	23.83	0	0	0	12
Average				0.068	0.075	0	14.955	0.067	0.065	0.874	
Total # Traps											649

Oregon’s Commercial Fishing in 2017

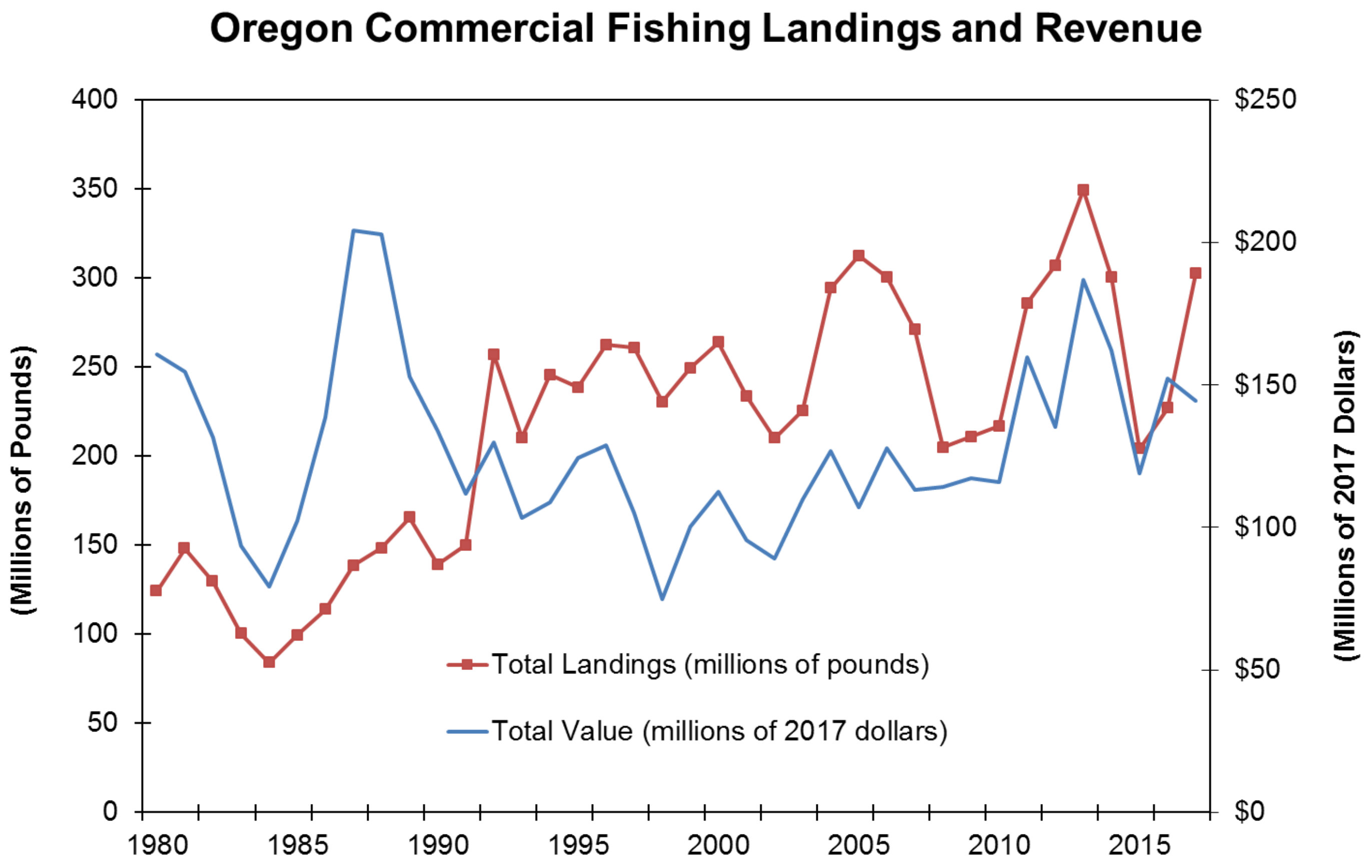
May 2, 2018

by *Erik Knoder*

Oregon’s commercial fishing industry fell to about an average level in 2017. Harvests have been averaging $147 million (2017 dollars) per year since 2010 – after adjusting for inflation. Total landed value was $144 million in 2017. This was down from $152 million in 2016. The decrease was mainly due to the drop in the pink shrimp harvest, and the salmon harvest also fell. The pacific whiting (hake) harvest rose, and the crab and groundfish harvest also increased in 2017. Other fisheries combined for a modest decrease. Overall revenue dropped even though landed volume was up for the year.

Crab harvests in 2017 rose to 19 million pounds, the best harvest since 2013. A late start to the season and lower prices worked to offset some of the gain from higher populations, but the crab harvest was worth $58.7 million in 2017 versus $55.7 million the year before. Dungeness crab is usually Oregon’s most valuable fishery, and it was again in 2017.

Salmon landings fell sharply in 2017 to 1.2 million pounds. This was less than 40 percent of the average of recent years. Prices increased slightly to $4.65 per pound, but the total landed value was only $5.6 million, a drop of $2.8 million from the previous year.



Source: PacFin and the Oregon Department of Fish and Wildlife

The pink shrimp season was hit with a double whammy in 2017. The harvest was only 23 million pounds, a decrease of 12 million pounds from 2016. On top of that, shrimp prices fell by 16 cents per pound, so total value landed dropped 49 percent to $12.7 million. Oregon pink shrimp was certified as a sustainable fishery by the Marine Stewardship Council in 2007 and reassessed as sustainable in 2011.

The amount of whiting landed rose 78 percent in 2017 to 201 million pounds. Whiting accounted for about two-thirds by weight of all wild seafood landed in Oregon. Prices stayed at eight cents per pound so total landed value for this fishery increased to $16.4 million total. Much of Oregon’s whiting is made into surimi for use in making artificial crab meat.

The value of groundfish landed increased 11 percent in 2017 to $35.7 million. The amount landed actually increased 36 percent, but a drop in prices limited revenue.

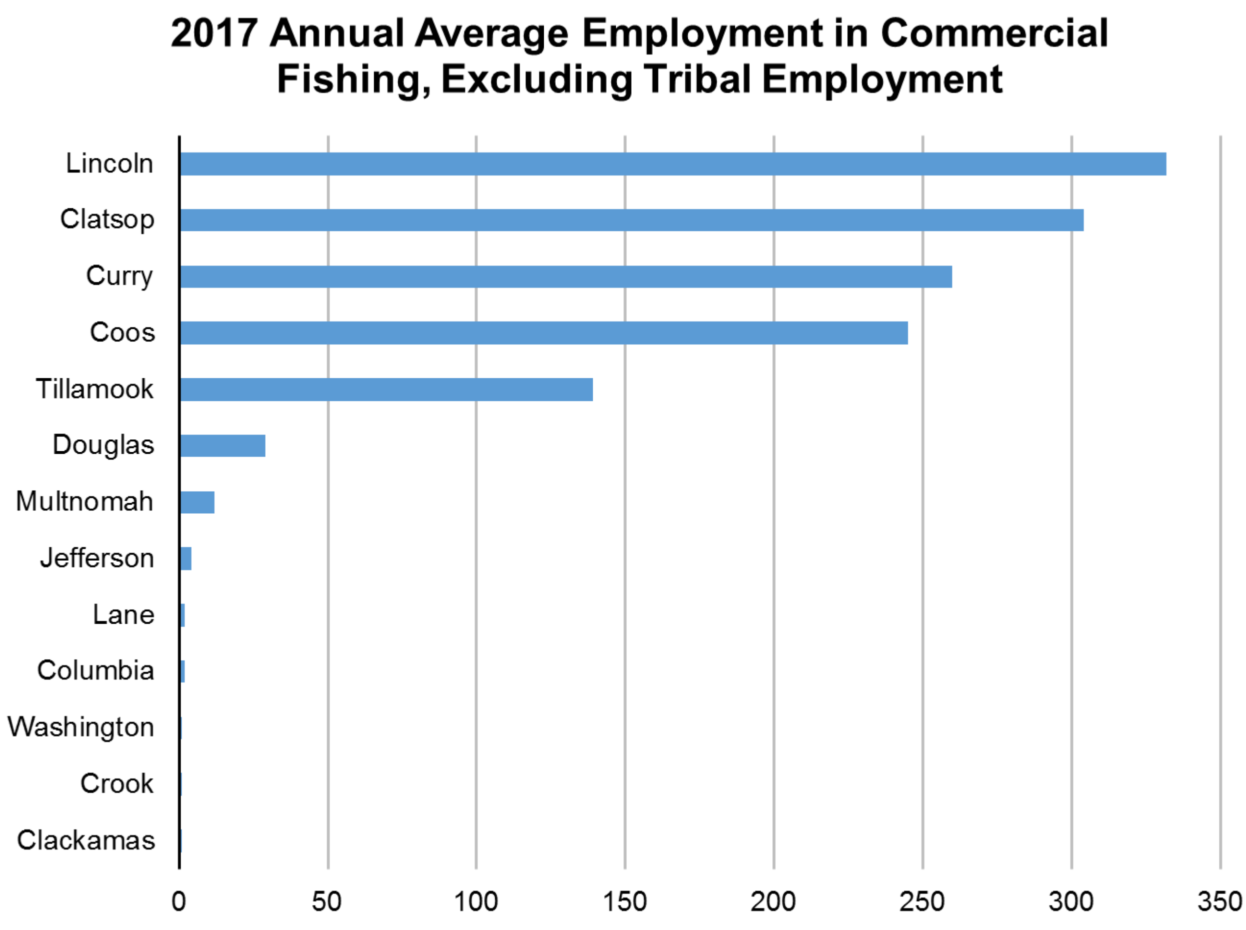
The albacore tuna harvest fell for the third straight year. The harvest fell about 35 percent, but the price climbed to $2.28 per pound, so the total value dropped by only 14 percent in 2017 to $10.8 million. Albacore has become an important fishery in recent years, especially for smaller boats that depended on salmon.

Some smaller fisheries had notable changes. The anchovy harvest decreased from $1.2 million in 2016 to zero after ODFW limited harvests to protect the stock. The sardine fishery remained closed in 2017. Squid harvests also went to zero in 2017 from $1.1 million in 2016. This fishery is usually very small or nonexistent. The Pacific cod harvest dropped by $440,000 and razor clams were down by $350,000. Slime eels (hagfish) harvests rebounded by $273,000 in 2017. Much of the harvest is exported. Sea urchin harvests were up by $213,000 and gaper clam harvest rose by $95,000.

Employment

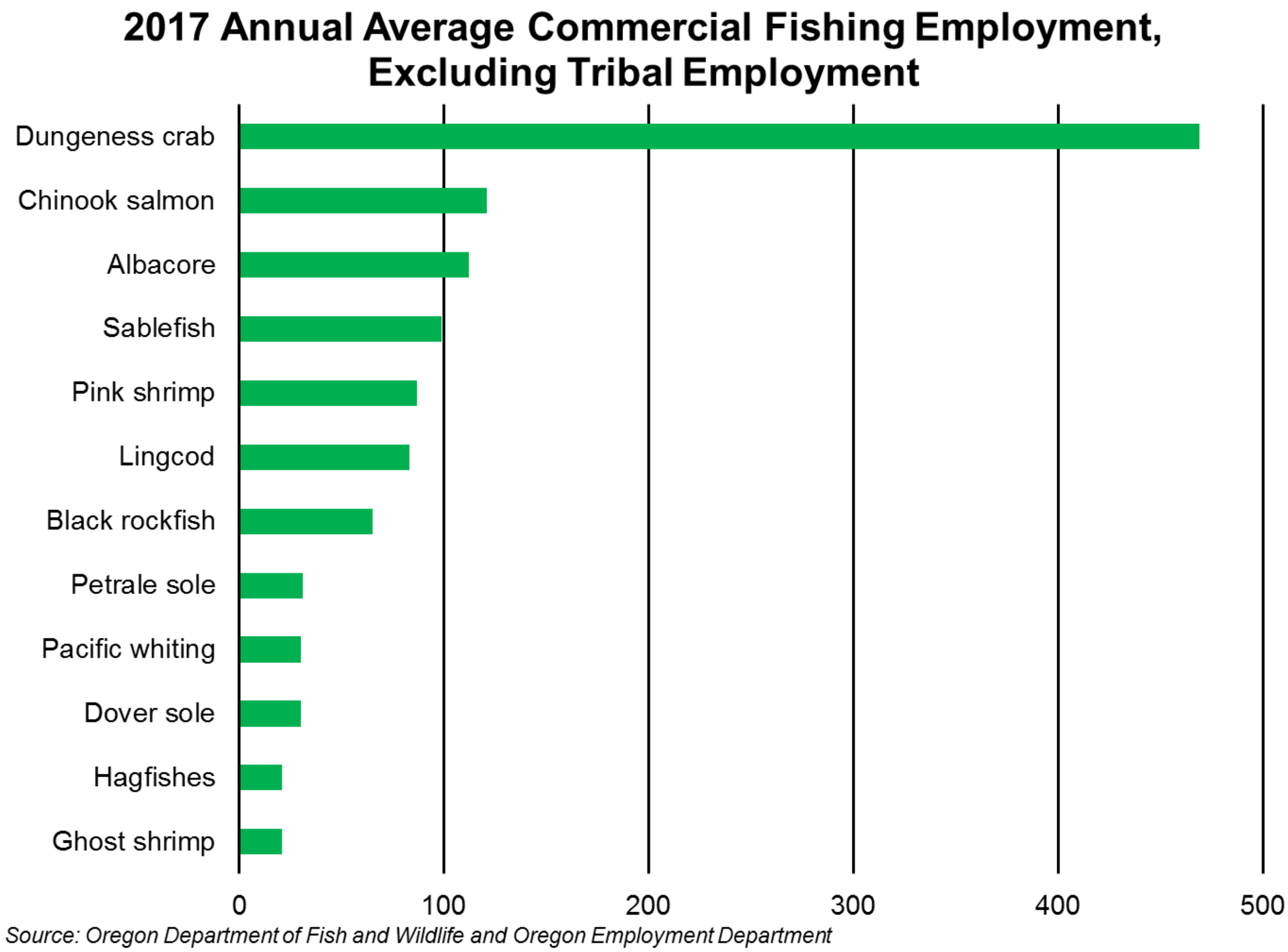
There were an estimated 1,330 commercial fishers in Oregon on an annual average basis in 2017. This was down from 1,438 in 2016, and was not too surprising given the decrease in harvests.

Estimating employment in fishing is more difficult than measuring the harvests. Legislation in 1999 allowed most fishermen to be exempt from unemployment insurance coverage – the primary source of employment data. The Oregon Employment Department now estimates the number of fishers based on a combination of survey data and the number of commercial fish landings made. This method was new for 2014 and resulted in a lower employment estimate than before.



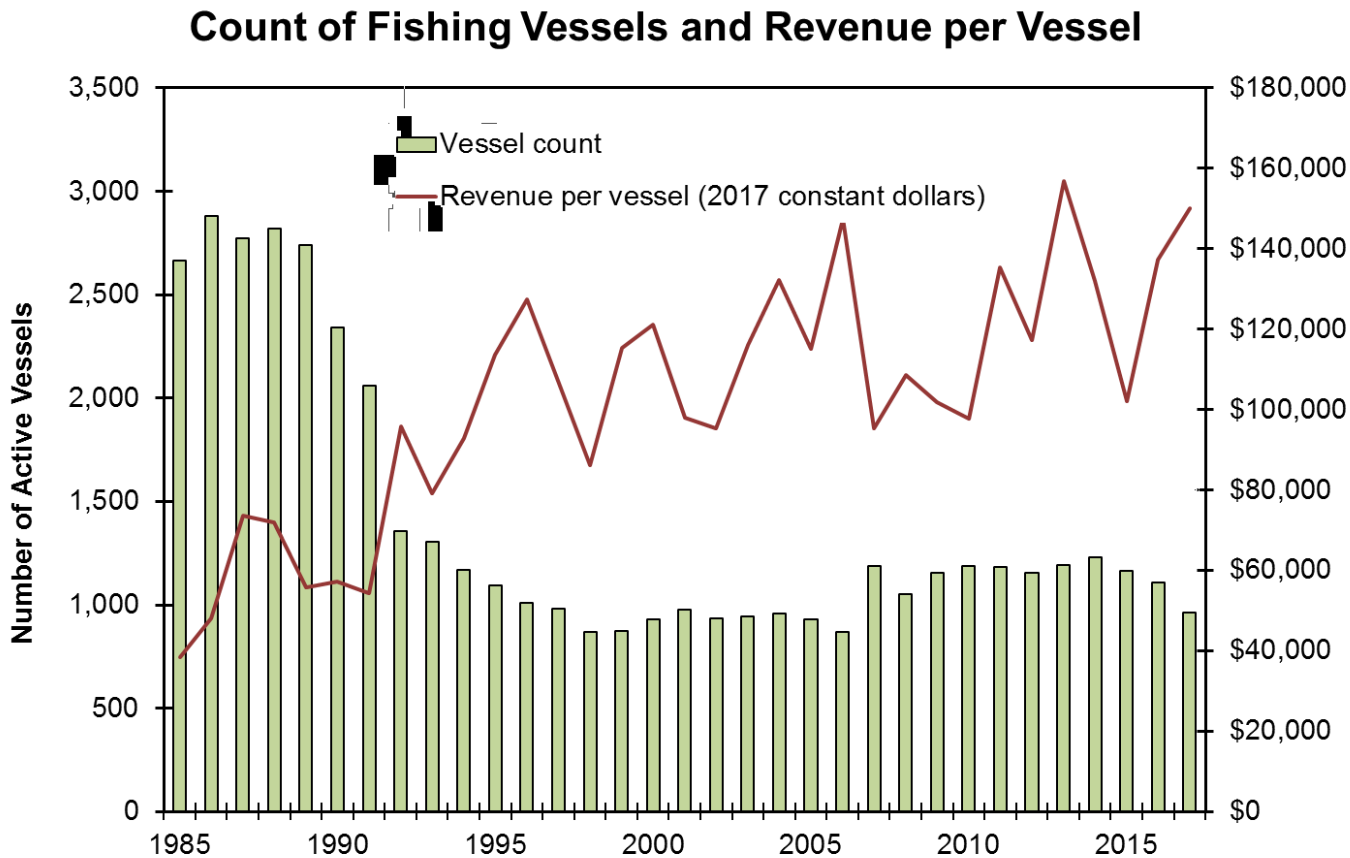
Source: Oregon Department of Fish and Wildlife, Oregon Employment Department

The estimated number of fishers varied from a high of 1,784 in July to a low of 520 in November. Five coastal counties – Clatsop, Lincoln, Coos, Curry, and Tillamook – had 96 percent of the total employment, based on where landings occur. Perhaps even more surprising is that some interior counties, such as Jefferson and Washington, had any commercial fishing employment. These jobs are often based on crayfish harvests. The most important fisheries for employment are crab, salmon, and albacore tuna. Commercial fishers harvested more than 100 different species in 2017.



Revenue

Although the number of fishing vessels has declined from historic highs, it has become more stable over the past decade. Fishing is slowly generating more revenue per boat, with plenty of fluctuations. There were 963 vessels with at least one landing in 2017, down from 1,108 in 2016. They averaged about $150,000 each in landed value in Oregon, up 9 percent from the previous year. Each vessel supported about 1.4 fishers on an annual average basis; many vessels have landings only part of the year.



Source: PacFin and Oregon Department of Fish and Wildlife

In addition to direct employment, commercial fishing provides the resource for seafood processors. There were 32 seafood processors in Oregon that had employees in 2017, two more than in the previous year. The annual average direct employment for the entire industry was 1,172. Some processors also use temporary help firms to round out their staffing, but these employees are counted in the business services industry. The processing industry paid more than $40 million in wages in 2017, which clearly shows the benefit of adding value to raw natural products.

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Public Comments on the Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 404 Permit (U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697)

Submitted to the Oregon Department of Environmental Quality on behalf of:

Rogue Riverkeeper
Rogue Climate
Oregon Coast Alliance
Northwest Environmental Defense Center
Oregon Wild
Center for Sustainable Economy
Citizens for Renewables/Citizens Against LNG
Oregon Physicians for Social Responsibility
Pipeline Awareness Southern Oregon
University of Oregon Climate Justice League
350 Eugene
Food & Water Watch
Jordan Cove Resistance Douglas County
350 Seattle
350 Corvallis
Honor the Earth
Western Environmental Law Center
Bob Barker, Affected Landowner
Center for Biological Diversity
Stop Fracked Gas PDX
Cascadia Wildlands
Friends of Living Oregon Waters (FLOW)
Douglas County Global Warming Coalition
Hair on Fire Oregon
Ron Schaaf and Deb Evans, Affected Landowners
Oregon Shores Conservation Coalition
Earthworks
Pacific Coast Federation of Fishermen's Associations (PCFFA)
Institute for Fisheries Resources
Waterkeeper Alliance
Oregon Women's Land Trust
Umpqua Watersheds
Oregon Unitarian Universalist Voices for Justice
Unitarian Universalist Fellowship of Corvallis
Onward Oregon
OPAL Environmental Justice Oregon
Oregon Just Transition Alliance
350 Salem
Signal Fire
Sierra Club
Columbia Riverkeeper
Our Revolution Southern Oregon
Craig and Stacey McLaughlin, Affected Landowners
350 PDX
Klamath-Siskiyou Wildlands Center
Engineers for a Sustainable Future

August 8, 2018

U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697 Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 404 Permit

Tyler Krug
U.S. Army Corps of Engineers
North Bend Field Office
2201 North Broadway Suite C
North Bend, OR 97459

Comments submitted electronically to NWP-2017-41@usace.army.mil

August 8, 2018

RE: U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697 Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 404 Permit

Dear Mr. Krug:

Please accept these comments on the U.S. Army Corps of Engineers ("Corps") permit application number NWP-2017-41 and Oregon Department of Land Conservation and Development ("DLCD") application number APP0060697. We submit these comments on behalf of

Rogue Riverkeeper, Rogue Climate, Oregon Coast Alliance, Northwest Environmental Defense Center, Oregon Wild, Center for Sustainable Economy, Citizens For Renewables/Citizens Against LNG, Oregon Physicians for Social Responsibility, Pipeline Awareness Southern Oregon, University of Oregon Climate Justice League, 350 Eugene, Food & Water Watch, Jordan Cove Resistance Douglas County , 350 Seattle, 350 Corvallis, Honor the Earth, Western Environmental Law Center, Bob Barker, Center for Biological Diversity, Stop Fracked Gas PDX, Cascadia Wildlands, Friends of Living Oregon Waters (FLOW), Douglas County Global Warming Coalition, Hair on Fire Oregon, Ron Schaaf and Deb Evans, Oregon Shores Conservation Coalition, Earthworks, Pacific Coast Federation of Fishermen's Associations (PCFFA), Institute for Fisheries Resources, Waterkeeper Alliance, Oregon Women's Land Trust, Umpqua Watersheds, Oregon Unitarian Universalist Fellowship of Corvallis, Oregon Unitarian Universalist Voices for Justice, Onward Oregon, OPAL Environmental Justice Oregon, Oregon Just Transition Alliance, 350 Salem, Signal Fire, Sierra Club, Columbia Riverkeeper, Our Revolution Southern Oregon, Craig and Stacey McLaughlin, Affected Landowners, 350 PDX, Klamath-Siskiyou Wildlands Center, and Engineers for a Sustainable Future.

Members of the Coalition have direct and personal interests in the proceeding, including rights to property, safety, and to a livable environment, and these interests would be directly and adversely impacted by project approval. Commenters here have been recognized as parties to the proceeding and have submitted lengthy, detailed comments on previous rounds of the proposed project including, but not limited to, the Draft Environmental Impact Statements ("DEIS") in 2008 and Final Environmental Impact Statements ("FEIS") in 2009 submitted for the import project round 1 and the DEIS and FEIS in 2015 for the export project round 2, local land use proceedings in Douglas and Coos Counties, and scoping comments on the current third round of the project to the Federal Energy Regulatory Commission ("FERC").

In light of the Corps decision to be a cooperating agency and tier to the FERC NEPA process, it is incumbent on the Corps to also consider the issues raised throughout the NEPA process, including the DEIS and FEIS comments and subsequent letters to FERC. Commenters hereby adopt in full and incorporate by reference our scoping comments and interventions with FERC as they apply to the Corps permitting, and expect that further NEPA documents and comments will be fully and properly considered by the Corps. Additional supporting documents are included as appendices and should be adopted in full and incorporated by reference.

Over the last decade, scores of individuals, organizations, and agencies have spent an enormous amount of time and resources analyzing and battling a project that is not in the public's interest and that significantly threatens Oregon's rivers, lakes, and streams. The following comments identify issues we ask the Corps to thoroughly analyze under its authority through the Clean Water Act under the 404(b)(1) guidelines and the public interest review under the Section 10 of the Rivers and Harbors Act. [1, 2] The Corps must deny the Clean Water Act 404 permit and Section 10 Rivers and Harbors Act permit (hereafter "404/10 permit") because the project does not comply with the 404(b)(1) guidelines, is not in the public interest, will negatively impact wetlands, interferes with access to or use of navigable waters, will not obtain the required state and local authorizations or certifications, will impair floodplain function and values, will harm Oregon's and the nation's economy, and the application lacks sufficient information to make a reasonable judgment. The Coalition urges the Corps to deem the Joint Permit Application ("JPA") legally and factually insufficient and deny the 404/10 permit for this project.

I. Introduction

A. The Jordan Cove Energy Project and Pacific Connector Pipeline

1. Project History

a. Import Project (2004-2010)

In 2004, the Jordan Cove Energy Project ("JCEP"), along with the 234-mile Pacific Connector Pipeline ("PCP"), was first proposed as an import facility. In 2006, Jordan Cove filed an application for the project with FERC. In December 2009, the County Planning Commission granted a Conditional Use Permit ("CUP") for the construction of the Pacific Connector Gas Pipeline for import only of natural gas. That month, FERC granted the Pacific Connector Certificate for the construction of the Pacific Connector Gas Pipeline to import natural gas. Also in 2009, FERC initiated the EIS process under NEPA for the project. Comments on the DEIS were submitted in June 2009. Many of the undersigned organizations submitted comments on the EIS process.

b. Export Project Round 2 (2011-2016)

[1] 40 C.F.R. § 230; *See* 33 U.S.C. § 1344(b).
[2] 33 C.F.R § 320.4(a)(1)

In July 2011, Jordan Cove applied to the Department of Energy for authorization to export Liquefied Natural Gas (LNG), in violation of its Douglas County CUP import only restriction. In September 2011, Jordan Cove again violated the restriction by filing another application with Federal agencies to export LNG. After Jordan Cove filed a request for extension, Douglas County granted the request in October 2011, in violation of CUP 09-045's import only condition.

In April 2012, FERC vacated its approval of the December 17, 2009 order to construct pipeline facilities. In December 2012, Douglas County granted a second extension on a CUP with conditions that the terminal was to be used for natural gas import only and required a FERC Certificate. No new application was filed with FERC.

On May 21, 2013, Jordan Cove filed an application under section 3 of the Natural Gas Act ("NGA") and Parts 153 and 380 of the Commission's regulations for the Jordan Cove Energy Project (CP13-483-000) and Pacific Connector Pipeline. On June 6, 2013 Pacific Connector filed an application to FERC under NGA section 7(c) and Part 157 of the Commission's regulations for a certificate of public convenience and necessity to construct and operate a 232-mile Pacific Connector Pipeline (CP13-492-000) to export natural gas.

On May 7, 2014, FERC sent a data request to Pacific Connector requesting the current status of Jordan Cove's negotiations with liquefaction contracts for the LNG terminal and Pacific Connector's actions to enter an open season and enter into precedent agreements for pipeline capacity. FERC submitted multiple data requests to Pacific Connector over the next year. Concurrently, FERC initiated the EIS process under NEPA between 2014 and 2015.
On May 20, 2015, FERC sent a third data request to Pacific Connector, stating that:

> The Commission's Certificate Policy Statement requires the Commission to balance the public benefits of a pipeline proposal against its potential adverse impacts, and that Pacific Connector must show that the public benefits of its proposal outweigh the project's adverse impacts.[3]

On September 30, 2015, FERC issued the FEIS for JCEP and PCP (CP13-483-000 and CP13-492-000). On October 14, 2015, FERC staff submitted a fourth data request to Pacific Connector regarding the existence of firm commitments for service on the pipeline, potential liquefaction and transportation customers, whether the company entered into precedent agreements, and when the open season would be held. On March 11, 2016, FERC issued an order denying applications for certificate and Section 3 Natural Gas Act authorization:

> Here, Pacific Connector has presented little or no evidence of need for the Pacific Connector Pipeline. Pacific Connector has neither entered into any precedent agreements for its project, nor conducted an open season, which might (or might not) have resulted in "expressions of interest" the company could have claimed as indicia of demand. As it stands, Pacific Connector states that the pipeline will benefit the public by delivering gas supply from the Rocky Mountains and Canada

[3] FEDERAL ENERGY REGULATORY COMMISSION *Order Denying Applications For Certificate and Section 3 Authorization 8* (2016) hereinafter FERC Denial.

> to the Jordan Cove LNG Terminal and by providing an additional source of gas supply to communities in southern Oregon (though, again, it has presented no evidence of demand for such service). Pacific Connector also contends that construction of the pipeline and LNG terminal will create temporary construction jobs and full-time operation jobs and millions of dollars in property, sales, and use taxes to state and local governments. Finally, Pacific Connector contends that the Commission has previously found that the benefits provided by pipelines that deliver feed gas to export terminals outweigh the minimal adverse impacts and such projects are required by the public convenience and necessity.[4]

Ultimately, in its March 11, 2016 order denying the certificate for the project, FERC stated:

> We find the generalized allegations of need proffered by Pacific Connector ***do not outweigh the potential for adverse impact*** on landowners and communities… Because the record does not support a finding that the public benefits of the Pacific Connector Pipeline outweigh the adverse effects on landowners, we deny Pacific Connector's request for certificate authority to construct and operate its project[5]

In April 2016, Jordan Cove appealed FERC's decision. On December 9, 2016, FERC upheld its decision to deny the certificate for the project.

c. Export Project Round 3 (2017 – Present)

In January 2017, Jordan Cove submitted a pre-filing request to FERC for the Jordan Cove Energy Project and Pacific Connector Pipeline project. In March 2017, Jordan Cove held Open Houses regarding the project. In June 2017, FERC initiated the scoping period for JCEP and PCP and held scoping hearings in Coos Bay, Douglas County, and Klamath Falls. On September 24, 2017, Jordan Cove submitted the final application to FERC. On October 23, 2017, Jordan Cove submitted a Joint Permit Application to the U.S. Army Corps of Engineers for the Clean Water Act and, to the best of our knowledge, emailed the Department of Environmental Quality a copy of the application.

On February 6, 2018, Jordan Cove submitted "a combined electronic Section 401 Water Quality Package to DEQ for the Jordan Cove Energy Project (JCEP) and Pacific Connector Gas Pipeline (PCGP) projects" as a "supplement to the Section 404/10 permit application provided to the U.S. Army Corps of Engineers (USACE) on October 23, 2017" and copied the Corps.[6] This package included materials submitted in October 2017 and additional materials. On November 3, 2017, Jordan Cove submitted a removal-fill permit application to the Department of State Lands ("DSL"). On December 1, 2017, DSL found that the application was incomplete. On May 8, 2018, Jordan Cove submitted current and new materials to DEQ. To the best of our ability, when our comments refer to these Joint Permit Application ("JPA") documents, we identify them

[4] *Id.* at 17.

[5] *Id.* at 18. Emphasis added.

[6] Letter from David Evans and Associates to Oregon DEQ (Feb. 6, 2018). (SUBJECT: Jordan Cove Energy Project / Pacific Connector Gas Pipeline - 401 Water Quality Package (NWP-2017/41).

specifically by date. On May 22, 2018, the Corps and DEQ initiated a public comment period for Jordan Cove's application for a Clean Water Act Section 404 removal-fill permit and Clean Water Act Section 401 state water quality certification.

2. Jordan Cove Energy Project Today

Jordan Cove proposes to site, construct, and operate a LNG terminal that would receive a maximum of 1.2 million dekatherms per day of natural gas and produce a maximum of 7.8 million tons of LNG for export each year. The LNG terminal will cool natural gas into its liquid form to transport from Coos Bay.[7] The JCEP is composed of:

- LNG terminal site
- Slip and access channel
- Materials Offloading Facility (MOF)
- Navigation Reliability Improvements (NRIs)
- Meteorological Station
- Industrial Wastewater Pipeline (IWWP)
- Trans Pacific Parkway (TPP) / US 101 Widening
- APCO Sites 1 and 2
- Kentuck Site
- Eelgrass Mitigation Site
- Temporary Construction Areas
- LNG Carrier Operation

The LNG terminal is composed of Ingram Yard, South Dunes site, the Access and Utility Corridor, and the Roseburg Forest Products property. This terminal and associated facilities would cover 538 acres of land, including 5.2 acres of open water and 169 acres of wetlands.[8]At the LNG terminal site, the Ingram Yard will store LNG tanks and liquefaction equipment. The South Dunes site includes the Workforce Housing Facility, metering station, administrative building, and the Southwest Oregon Regional Safety Center ("SORSC"). The Roseburg Forest Products property will be used as a temporary construction staging area and for upland dredge disposal, contained with an on-site berm. The LNG terminal itself consists of a connection to the Pacific Connector Pipeline metering station, gas inlet facilities, a gas conditioning plant, liquefaction facilities, two full-containment LNG storage tanks, an LNG loading line, LNG loading facilities, and a marine slip and access channel for LNG carriers. According to the applicants, construction and operation of the LNG terminal may impact water quality through upland site preparation and facilities construction, placement of permanent infrastructure, construction and operational stormwater runoff, potential construction and operational fuel and chemical spills, hydrostatic testing, wastewater discharge, dredge soil disposal and dewatering/decanting, and operation of construction vehicles and equipment.[9]

[7] Technical Memorandum from Betz, Sarah and Derik Vowels (Feb. 2, 2018) (Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting) hereinafter Technical Memorandum..
[8] Public Notice Application for Permit to Alter Federally Authorized Projects, NWP-2017-41 3 (May 22, 2018) hereinafter Public Notice.
[9] Technical Memorandum, *supra* note 5, at 3.

Construction of the marine slip would require excavating 38 acres from uplands. The slip and access channel combined would equal 60 acres and result in the permanent loss of 14.5 acres of shallow subtidal and intertidal habitat, 0.6 acres of estuarine saltmarsh habitat, and 1.9 acres of submerged aquatic vegetation habitat. Additionally, the applicants propose to dredge 5.7 million cubic yards of material to create the slip basin and access channel. Dredged material would be disposed of at the LNG terminal, Roseburg Forest Products Site, South Dunes Site, or Kentuck Site. Dredging for the temporary berth would require dredging approximately 45,000 cubic yards of material. Dredging of the existing navigation channel would remove 700,000 cubic yards of material and would construct a temporary pipeline of over 8.3 miles on the bottom of the channel to remove the dredged material. Widening of the Trans Pacific Parkway/Highway 101 intersection would require permanently filling in 0.51 acres of intertidal habitat. Future maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years.[10]

Construction of the Kentuck mitigation site will reconstruct and enhance 100 acres of tide channels, mudflats, saltmarsh, and freshwater wetlands. At the eelgrass mitigation site, the applicants propose establishing approximately 9 acres of eelgrass beds at different densities.

3. Pacific Connector Pipeline Today

Jordan Cove also proposes to construct a 36-inch underground 229-mile natural gas pipeline from Malin, Oregon to the coast at Coos Bay, Oregon. As noted by DEQ and the Corps in the Public Notice, the pipeline will necessitate direct impacts to waters at 485 locations, including 326 perennial and/or intermittent waterways, seven lakes and/or ponds, two estuarine waters, and 150 wetlands.[11] However, in the JPA under Resource Report 2, the applicants state the following:

> The Pipeline will cross 326 waterbodies within these Fifth Field Watersheds; 61 of these are not crossed by the centerline (29 streams, 10 ponds, 21 ditches, and 1 estuarine feature) but are within the right-of-way or workspaces. Of the 326 waterbodies crossed, 66 are perennial, 148 are intermittent, 98 are ditches, 10 are lakes or stock ponds, and 4 are estuarine (Coos Bay/2 HDD crossings, the HDD pullback at MP 0.0, and the Coos River).[12]

It is unclear whether all impacted waterways have been identified by the applicants.

Over the 229-mile pipeline route, the applicants propose to cross Coos Bay, the South Coast watershed (Coos and Coquille Subbasins), the Umpqua watershed, the Rogue watershed, and the

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[10] Public Notice, *supra* note 6, at 3-6.
[11] *Id.* at 7.
[12] Pacific Connector, *Pacific Connector Gas Pipeline, LP: Project Resource Report 2 Water Use and Quality.* P. 7; Part 2 Attachment C. PCP A-B Part 6 p. 217 (2017), http://pacificconnectorgp.com/wp-content/uploads/2017/09/2.2.1-PCGP-RR2-Text-App-A.2-F.2.pdf hereinafter PCP RR2.

Klamath watershed (Upper Klamath and Lost Subbasins). Overall pipeline construction would impact 30,778 feet (5.83 miles) of wetlands and 3,028 feet of waterways. Approximately 48,675 cubic yards of material would be excavated and discharged into wetlands and 9,519 cubic yards of material would be excavated and discharged into waterways.[13]

Horizontal Directional Drilling (HDD) is proposed for Coos Bay, the Coos River, the Rogue, and the Klamath Rivers. Within Coos Bay, Jordan Cove proposes to install the 36-inch pipeline across the bay using two horizontal directional drills of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after rejecting the use of HDD for the Coos Bay crossing. The currently proposed pipeline alignment would require not one but two HDD crossings of Coos Bay, for a total of over 14,000 feet.[14] All other waterways will be crossed using a dry open-cut method. Construction right-of-ways at each crossing would require clearing a 75-foot buffer.

Table 1. Summary of Waterways Impacted by Pipeline

County	Impacted Waters Identified by Applicants
Coos	44 perennial and/or intermittent waterways, 2 estuarine waters, and 29 wetlands
Douglas	86 perennial and/or intermittent waterways, 1 pond, and 38 wetlands
Jackson	89 perennial and/or intermittent waterways, 2 lakes and/or ponds, and 22 wetlands
Klamath	107 perennial and/or intermittent waterways, 4 ponds, and 61 wetlands

B. The Clean Water Act and the Rivers and Harbors Act

1. The Clean Water Act

The purpose of the Clean Water Act ("CWA") is to restore and maintain the chemical, physical, and biological integrity of waters of the United States.[15] Section 404 of the CWA prohibits the discharge of fill material without a permit.[16] Permits for the projects must be denied because project activities involve 404 discharges that would not comply with EPA's 404(b)(1) guidelines by:

- failing to include practicable alternatives (*See* Section II A);
- causing or contributing to violations of state water quality standards (*See* Section II B);
- violating applicable toxic effluent standard or prohibition under Clean Water Act Section 307 (*See* Section II C);

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[13] Public Notice, *supra* note 6, at 7 – 8.

[14] GeoEngineers Memorandum, Coos Bay West HDD Crossing 2 (Sept. 14, 2017).

[15] 33 U.S.C § 1251.

[16] *Id.* § 1344.

- jeopardizing the continued existence of species listed under the Endangered Species Act ("ESA") or adversely modifying or destroying designated Critical Habitat (*See* Section II D);
- causing or contributing to significant degradation of the waters of the United States (*See* Section II E);
- failing to minimize the potential adverse impacts of the discharge on the aquatic ecosystem (*See* Section II F);
- negatively impacting wetlands (*See* Section IV);
- interfering with access to or use of navigable waters (*See* Section V);
- failing to obtain the required state or local authorizations or certifications (*See* Section VI);
- impairing floodplain values (*See* Section VII);
- harming Oregon's and the nation's economies (*See* Section VIII);
- missing sufficient information to make a reasonable judgment (*See* Section IX); and
- failing to be in the public interest (*See* Section III).

As will be discussed throughout these comments, the Corps should not authorize the Section 404/10 permit for the project because project activities involve 404 discharges that would not comply with EPA's 404(b)(1) guidelines.

2. The Rivers and Harbors Act and "Public Interest" Review

a. Rivers and Harbors Act Section 10

The Jordan Cove project must also align with the public interest requirement found in Section 10 of the Rivers and Harbors Act. Under this requirement, the "decision whether to issue a permit will be based upon an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest."[17] This "public interest" review lies at the heart of the Corps' analysis and must guide the agency's review of the Jordan Cove project. The public interest review is intended to be broad, capturing all relevant issues that could impact the environment, human health and natural resources. The Corps states:

> Evaluation of the probable impact which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur, are therefore determined by the outcome of this general balancing process. That decision should reflect the national concern for both protection and utilization of important resources.[18]

The Corps' regulations include a non-exhaustive list of factors that may be relevant for each individual project. Such factors include "conservation, economics, aesthetics, general

[17] 33 C.F.R § 320.4(a)(1)
[18] *Id.* § 320.4(a)(1).

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."[19]

Consistent with the mandate that the Corps consider "all those factors that become relevant," this non-exhaustive list of factors includes issues beyond those directly related to the impacts of in-water work.[20] By requiring an analysis of "cumulative impacts" using the factors listed above, the Corps' regulations clearly require a broad analysis of the public interest that captures all impacts associated with the project and not just those that result directly from the permitted activities. As will be discussed in further detail in Section II, the Corps should not authorize the 404/10 permit for the project in light of the public interest balancing of benefits and reasonably foreseeable detrimental impacts to the nation's waterways as a result of the proposed activities.

b. Rivers and Harbors Act Section 14 ("Section 408")

Additionally, under Section 14 of the Rivers and Harbors Act, the Corps is authorized to review and approve the use or alteration of federally authorized projects if the project "will not be injurious to the public interest" and "will not impair the usefulness of such work."[21] Referred to as "Section 408," 33 U.S.C. 408 specifically states:

> It shall not be lawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct by fastening vessels thereto or otherwise, or in any manner whatever impair the usefulness of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States, or any piece of plant, floating or otherwise, used in the construction of such work under the control of the United States, in whole or in part, for the preservation and improvement of any of its navigable waters or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks, nor remove for ballast or other purposes any stone or other material composing such works: Provided, That the Secretary of the Army may, on the recommendation of the Chief of Engineers, grant permission for the temporary occupation or use of any of the aforementioned public works when in his judgment such occupation or use will not be injurious to the public interest: Provided further, That the Secretary may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any of the aforementioned public works when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work.[22]

This permit request addresses the Federal Navigation Channel ("FNC") in Coos Bay and Coos River, the federal pile dike structures, and the 40-acre multi-use U.S. Army Corps of Engineers

[19] *Id.*
[20] *Id.*
[21] 33 U.S.C. § 408(a).
[22] 33 U.S.C. § 408(a).

real estate easement at the LNG terminal tank site. Although the HDD pipeline crossing of the Coos River is not being evaluated under section 408, we urge the Corps to review this proposed activity under this section.

Under EC 1165-2-216, the Corps' guidance requires the agency to conduct a technical review of Section 408 requests that consists of:

> i) Impair the Usefulness of the Project Determination. The objective of this determination is to ensure that the proposed alteration will not limit the ability of the project to function as authorized and will not compromise or change any authorized project conditions, purposes or outputs. ***All appropriate technical analyses*** including geotechnical, structural, hydraulic and hydrologic, real estate, and operations and maintenance requirements, ***must be conducted and the technical adequacy of the design must be reviewed***. If at any time it is concluded that the usefulness of the authorized project will be negatively impacted, any further evaluation under 33 USC 408 should be terminated.
>
> ii) Injurious to the Public Interest Determination. Proposed alterations will be reviewed to ***determine the probable impacts, including cumulative impacts, on the public interest.*** Evaluation of the probable impacts that the proposed alteration to the USACE project may have on the public interest requires a careful weighing of all those factors that are relevant in each particular case. The benefits that reasonably may be expected to accrue from the proposal must be compared against its reasonably foreseeable detriments. The decision whether to approve an alteration will be determined by the consideration of whether benefits are commensurate with risks. If the potential detriments are found to outweigh the potential benefits, then it may be determined that the proposed alteration is injurious to the public interest. This determination is not the same as the "contrary to the public interest determination" that is undertaken pursuant to Sections 10/404/103. Factors that may be relevant to the public interest depend upon the type of USACE project being altered and may include, but are not limited to, such things as conservation, economic development, historic properties, cultural resources, environmental impacts, water supply, water quality, flood hazards, floodplains, residual risk, induced damages, navigation, shore erosion or accretion, and recreation. This evaluation should consider information received from the interested parties, including tribes, agencies, and the public.
>
> iii) Legal and Policy Compliance Determination. A determination will be made as to whether the proposal meets all legal and policy requirements. District Office of Counsel concurrence is required. The compliance determination for any Section 10/404/103 permit decision associated with the proposed alteration is separate from and will not be included in this compliance determination.[23]

[23] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 14.

In other words, in its Section 408 review, the Corps must require appropriate technical analyses, including but not limited to geotechnical, hydrologic, and hydraulic analyses to evaluate whether the construction and operation of the JCEP and related facilities would impair the usefulness of the Federal Navigation Channel, federal pile dike structures, and the 40-acre multi-use U.S. Army Corps of Engineers real estate easement at the LNG terminal tank site to function as authorized or change project conditions. As discussed specifically in Section IX and throughout the comments, the applicants have not provided adequate information that would allow the Corps to make a reasonable judgment regarding potential impairments to the usefulness of the Federal Navigation Channel, federal pile dike structures, and the 40-acre multi-use U.S. Army Corps of Engineers real estate easement at the LNG terminal tank site.

Additionally, the Corps' guidance requires a public interest review "to determine the probable impacts, including cumulative impacts, on the public interest."[24] Further, "if the potential detriments are found to outweigh the potential benefits, then it may be determined that the proposed alteration is injurious to the public interest."[25] As discussed in more detail in Section III, the Corps should not authorize the Section 408 permit request in light of the public interest balancing of benefits and reasonably foreseeable detrimental impacts to Coos Bay and the Coos River as part of the Federal Navigation Channel, federal pile dike structures, and the 40-acre multi-use U.S. Army Corps of Engineers real estate easement.

Finally, the Corps' guidance requires a legal and policy compliance determination. As part of the process requirements for a Section 408 request, the Corps must require documentation, including environmental compliance documentation.[26] As stated in EC 1165-2-216:

> A decision on a Section 408 request is a federal action, and therefore subject to the National Environmental Policy Act (NEPA) and other environmental compliance requirements. While ensuring compliance is the responsibility of USACE, the requester is responsible for providing all information that the district identifies as necessary to satisfy all applicable federal laws, executive orders, regulations, policies, and ordinances. NEPA and other analysis completed to comply with other environmental statutes (e.g. Endangered Species Act) should be commensurate with the scale and potential effects of the activity that would alter the USACE project. The district will work with the requester to determine the requirements, which will be scaled to the likely impacts of the proposed alteration and should convey the relevant considerations and impacts in a concise and effective manner.[27]

[24] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 14.
[25] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 14.
[26] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 10.
[27] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 10.

The Corps should fully evaluate the issues raised throughout the NEPA process, including the DEIS and FEIS comments for previous rounds (2009-2015) and subsequent letters to FERC. Further, the Corps should ensure that the applicants have provided "all information that the district identifies as necessary to satisfy all applicable federal laws, executive orders, regulations, policies, and ordinances."[28]

In conclusion, the Section 408 permit should be rejected under the public interest test, for the same reasons given regarding the public interest test under the CWA 404(b)(1) Guidelines in Section II and in Section III of these comments. Further, the applicants have failed to provide information as discussed in Section IX and in the Clean Water Act 401 Comments provided in Appendix 1, both regarding technical analyses and environmental compliance, that would enable to Corps to make a reasonable judgment regarding whether the project "will not be injurious to the public interest" and "will not impair the usefulness of such work."[29]

II. The Corps Must Deny the 404/10 Permit Because the Project Does Not Comply with the 404(b)(1) Guidelines.

Section 404(b)(1) of the CWA requires the Corps to follow binding 404(b)(1) guidelines established by the Environmental Protection Agency ("EPA"), in conjunction with the Corps, when developing a permit.[30] The purpose of the 404(b)(1) guidelines is that dredged or fill material is not discharged into the aquatic ecosystem unless it is demonstrated that doing so would not result in an adverse impacts within the ecosystem.[31]Additionally, the policy provides that "[f]rom a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines."[32] The guiding principle is that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.[33] Special aquatic sites are "areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values."[34] In general, these sites significantly influence or "positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region."[35]

The Corps cannot authorize the Clean Water Act 404/10 permit for the Jordan Cove Terminal and Pacific Connector Pipeline Projects because the projects do not comply with multiple requirements of the Corps' 404(b)(1) Guidelines. The degree of analysis required under the

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[28] U.S. Army Corps of Engineers. Water Resources Policies and Authorities Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408. EC 1165-2-216. 21 June 2016. P. 10.
[29] 33 U.S.C. § 408(a).
[30] 40 C.F.R. § 230; *See* 33 U.S.C. § 1344(b).
[31] 40 C.F.R. § 230.1(c).
[32] *Id.* at 230.1(d).
[33] *Id.*
[34] *Id.* § 230.10(a)(3).
[35] 40 C.F.R. § 230.3(q-1); *See id.* § 230.10(a)(3).

404(b)(1) Guidelines is commensurate with the impacts to the aquatic environment. The guidelines prohibit the discharge of dredge or fill materials into U.S. waters if there is a practicable alternative to the proposed discharge, which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.[36] Similarly, the discharge may not "cause or contribute[] . . . to violations of any applicable State water quality standard."[37] Nor may the discharge "cause or contribute to significant degradation of the waters of the United States."[38] Finally, appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem must be taken.[39]

The proposed action would cause unacceptable adverse impacts both individually and in combination with known and/or probable impacts of other activities affecting the ecosystems of concern. It is difficult to conceive of a project with greater unacceptable impacts to Southern Oregon. As a result, the Guidelines and the implementing regulations require the Corps to deny the 404 permit "unless it can be demonstrated that such discharge will not have an unacceptable adverse impact" on aquatic ecosystems.[40] The Corps must deny the 404/10 permit for the JCEP and PCP because the project does not comply with the 404(b)(1) Guidelines.

A. The Project Fails to Include Practicable Alternatives

No discharge of dredged or fill material is permitted if there is a practicable alternative to the proposed discharge which would result in less adverse impacts.[41]An alternative is considered 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."[42]

In this case, the proposed discharge is to a special aquatic site that is not essential to the project purpose. When that occurs, the burden shifts and practicable alternatives that do not involve special aquatic sites are presumed to be available.[43] Based on the available facts and the existing laws and regulations in place, there are practicable alternatives to the proposed discharge. Therefore, the Corps should not permit the proposed discharge.

1. The Applicant's Purpose and Need Statement Artificially Limits Alternatives

In evaluating whether a given alternative site is practicable, the Corps may legitimately consider such facts as cost to the applicant and logistics.[44] In addition, the Corps has a duty to consider the

[36] *Id.* § 230.10(a).
[37] *Id.* § 230.10(b)(1).
[38] *Id.* § 230.10(c).
[39] *Id.* § 230.10(d).
[40] 40 C.F.R § 230.1(c).
[41] *Id.* §230.10(a)
[42] *Id.* §40 CFR 230.10(a)(2);. See also 40 CFR § 230.5(c) ("examine practicable alternatives…"); § 230.5(j) ("Identify appropriate and practicable changes to the project plan to minimize the environmental impact…").
[43] 40 C.F.R § 230.10(a)(3).
[44] *See Friends of the Earth v. Hintz*, 800 F.2d 822, 833-34 (9th Cir. 1986).

applicant's purpose. An applicant cannot define a project in order to preclude the existence of any alternative sites and thus make what is practicable appear impracticable. The court in *Hintz* quite properly suggested that the applicant's purpose must be "legitimate."[45]

The Corps has a unique duty to identify and consider the *underlying* Purpose and Need for the project. According to Corps direction:

> If the scope of analysis for the NEPA document (see paragraph 7b) covers only the proposed specific activity requiring a Department of the Army permit, then the underlying purpose and need for that specific activity should be stated. (For example, "The purpose and need for the pipe is to obtain cooling water from the river for the electric generating plant.") If the scope of analysis covers a more extensive project, only part of which may require a DA permit, then the underlying purpose and need for the entire project should be stated. (For example, "The purpose and need for the electric generating plant is to provide increased supplies of electricity to the (named) geographic area.") Normally, the applicant should be encouraged to provide a statement of his proposed activity's purpose and need from his perspective (for example, "to construct an electric generating plant"). However, whenever the NEPA document's scope of analysis renders it appropriate, the Corps also should consider and express that activity's underlying purpose and need from a public interest perspective (to use that same example, "to meet the public's need for electric energy"). Also, while generally focusing on the applicant's statement, the Corps, will in all cases, exercise independent judgment in defining the purpose and need for the project from both the applicant's and the public's perspective.[46]

An overly restrictive purpose and need, as appears here, would not be compliant with the Corps' Section 404 analysis. Here, the public notice states only the applicant's stated purpose, which is building a 7.8 mpta LNG deep-water export terminal, to export gas derived from a point near the intersection of the Northwest and Ruby pipeline systems to Asia.

The purpose and need in the public notice is notably different from other expressions of purpose that the applicant has made. In the applicant-provided Biological Assessment ("BA"), the purpose and need is stated as follows:

> To provide LNG to markets around the Pacific Rim through construction and operation of a new export terminal on the Pacific Coast, where natural gas from supply basins in Western Canada and the Rockies would be delivered through new and existing natural gas pipeline systems.[47]

There is a difference between a purpose to provide LNG from two specific pipelines *to* Asian markets and a purpose to export LNG *from* western Canada and the U.S. Rockies to market around the Pacific Rim. The Corps should fully examine the purpose and need, as identified by

[45] *Id.* at 833.
[46] Appendix B to Part 325. NEPA Implementation Procedures for the Regulatory Program.
[47] JCEP BA (2017) at ES-2.

the applicants, to determine if it is overly restrictive, and thus limiting or eliminating otherwise practicable alternatives.

2. The Project Design Criteria are Overly Restrictive

Adequate information has not been provided to enable substantive comment on project design criteria, and further comment on other aspects of the project (e.g. alternatives) is hindered by the fact that project design criteria are not discussed here. We are concerned that the project design criteria will be dictated by the applicant so as to artificially eliminate consideration of practicable alternatives. The Corps should therefore adhere to 404(b)(1) guidelines and the agency's independent judgment.

3. Practicable Alternatives - Terminal

a) The Burden is on Applicants to Show No Practicable Alternatives

The applicant has the duty under the CWA to rebut the presumption that a less environmentally damaging practicable alternative to a discharge to a special site exists.[48] Thus, if the applicant does not rebut this presumption, the Corps is directed not to issue the applicant a section 404/10 permit.[49]

b) Terminal Location Alternatives

The underlying purpose of this project could be met at other terminal locations, and these alternatives should be considered by the Corps. For example, the applicant's alternatives analysis (Resource Report 10) fails to consider practicable alternatives, such as the Puget Sound and Columbia River Ports. There are many locations in Puget Sound where a deepwater port could theoretically be located, yet none are considered in the application. The applicant has not met their burden to show less damaging alternatives are not practicable. Again, we strongly urge the Corps to undertake independent analysis, rather than rely on biased project proponent reports.

i) Suggested Alternatives

Alternatives remain practicable, even if they are not immediately available. Export terminals proposed or potentially built on the coast of British Columbia are also a reasonable, practicable alternative that achieves the same purpose. JCEP's Resource Report 10 refers to 35 applications in various stages of development in B.C.[50] The applicants reason that because none of these projects are yet authorized to export U.S.-sourced natural gas, they cannot meet the project purpose and need.[51] Especially in light of various free trade agreements and longstanding

[48] 40 C.F.R. § 230.10(a)(3).

[49] 5 U.S.C.S. § 706(2)(A); *Hillsdale Envtl. Loss Prevention, Inc. v. United States Army Corps of Eng'rs*, 702 F.3d 1156 (10th Cir.2012); *Bering Strait Citizens for Responsible Res. Dev. v. United States Army Corps of Eng'r*s, 524 F.3d 938, (9th Cir. Alaska 2008).

[50] Jordan Cove Energy Project, *Resource Report No. 10: Alternatives* 5 (2017), http://jordancovelng.com/wp-content/uploads/2017/07/JCEP-Revised-Draft-RR10.pdf hereinafter JCEP RR10.

[51] *Id.* at 5.

relations between the U.S. and Canada, it is reasonable to suppose such an authorization could and would be given.

The underlying purpose of this project could be met at other terminal locations, and these alternatives should be considered by the Corps. Existing terminals on the Gulf Coast provide access to export gas to Asia via the Panama Canal. Under Resource Report 10, the applicants assert that East Coast and Gulf Coast LNG export facilities are "far removed" from the pipeline intersection and that those ports cannot meet the need to get Rocky Mountain and western Canada gas to Asian markets.[52] We urge the Corps to conduct its own analysis of these alternatives. It is imperative that analysis be done of pipeline routing that avoids any unwilling landowners, so as to avoid eminent domain. The applicant has not met their burden to show less damaging alternatives are not practicable. Again, we strongly urge the Corps to undertake independent analysis, rather than rely on biased proponent reports.

In light of the applicant's failure to consider reasonable alternative locations for their port, it is incumbent on the Corps to conduct that analysis with re-doubled attention. The Corps should specifically consider the unique tsunami and other safety hazards associated with Coos Bay in its review of less damaging practicable alternatives.

ii) Offshore Alternatives

An offshore location for the LNG terminal should be considered. This would negate the need for dredging and wetland destruction, and remove the LNG safety hazard from the tsunami-prone and populated Coos Bay area.

The applicant's alternatives analysis asserts that an offshore platform would not meet safety criteria set by the United States Coast Guard ("USCG").[53] It is unknown what safety criteria USCG would have set, or under what authority they would do so, because no citation is given for that assertion. It is impossible to support this conclusion in the absence of any analysis by the applicants regarding offshore alternatives.

Despite what the applicants claim, an offshore terminal could be technically and economically feasible. The offshore LNG export facility in the Gulf of Mexico operates even while contending with much heavier ship traffic, and an annual hurricane season.

c) Terminal Design and Configuration Alternatives

i) Marine Slip Design

A narrower marine slip should be re-evaluated. The marine slip and access channel would be dredged to accommodate a draft that the port itself does not handle. Shallower alternatives could be practicable. One alternative that should be considered would be dredging the marine slip and

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[52] JCEP, RR10 at 4.
[53] *Id.* at 12.

access channel to match the Federal Navigation Channel ("FNC"), which would substantially decrease the massive volume of dredged material that is proposed.

ii) South Dunes Site – Southern Oregon Regional Safety Center ("SORSC") and Jordan Cove Fire Department Alternatives

We are concerned that the location of the SORSC on the North Spit may be located within the tsunami inundation zone. The Corps should fully review the potential direct, indirect, and cumulative impacts of this location.

iii) Workforce Housing Alternatives

The workforce housing proposal would likely result in multiple negative impacts that could be avoided with alternatives. The location for the facility itself seems problematic because it is located within the tsunami inundation zone and is isolated from towns and services. There are multiple upland locations where housing could be developed. For example, the applicant could make use of existing housing and amenities by hiring local residents.

iv) Primary Entrance Alternatives

The Corps should assess whether the proposed widening of the Trans Pacific Parkway ("TPP") at highway 101 is in compliance with local codes. The proposed widening of the TPP creates an unnecessary negative impact on wetlands. It is concerning that every expansion option involves harmful destruction of valuable wetlands and harm to the public interest.

v) APCO Dredged Material Disposal Sites

This vulnerable and visible location is a poor choice for long-term disposal, particularly of contaminated dredged waste. Better disposal sites, such as landfills and treatment facilities, should be evaluated for practicability. It is against the Corps' guidelines and regulations under 33 CFR 320.4(a) to destroy wetlands and dispose of dredged material in this way, when there are less damaging practicable alternatives. The temporary dredged material storage and testing, treatment, and sorting of contaminated materials that would occur on these sites is another major negative effect on this location.

vi) Marine Offloading Facility

The Corps should fully evaluate the applicants' determination that a permanent marine offloading facility is the least damaging option here. The barge offloading site, located within the access channel footprint, is one alternative location for this facility. The proposed facility does not need to be permanent if the need for it is related only to initial project construction. Other available options exist, including several other docks in Coos Bay. The applicant could rent out the chip facility dock or another latent facility for as long as the offloading facility is required. Those options would have the benefit of adding more to the local economy, as well as minimizing impacts to wetlands and waterways.

vii) Kentuck and Eelgrass Mitigation Sites

As discussed in more detail in subsequent sections, it is highly problematic and contrary to the Corps' own regulations to rely on the Kentuck and Eelgrass mitigation sites to mitigate project impacts, which occur over a swath of 229 miles through several different major watersheds. We believe there are a host of less environmentally damaging (and likely more environmentally beneficial) mitigation alternatives. We are concerned that contaminated soil will be disposed of on the Kentuck site, that would be in opposition to the long-term conservation vision and harm the estuary. We urge the Army Corps to carefully evaluate practicable alternative restoration alternatives of that location that do not involve as much fill, as well as alternatives that ensure fill is not contaminated.

viii) Impacts, Risks, and Contingencies for Horizontal Directional Drilling of Coos Bay

Concerns regarding the impacts, risks, and contingencies for crossing Coos Bay using HDD technology is discussed in further detail in the 401 Comments in Appendix 1. The applicants propose to install the 36-inch pipeline across Coos Bay using two horizontal directional drills (HDD) of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after rejecting the use of HDD for the Coos Bay crossing. The prior route was noted as reducing risk because "The route within the bay would keep the pipeline away from the navigation channel slope." As noted above, the current route proposal would cross the navigation channel in not one but two places.

In evaluating geotechnical feasibility of using HDD for the Coos Bay crossing in 2006, the applicant's engineer described challenges for the crossing: "The length, diameter, and geometry of the crossing approach the limits of successfully completed HDD crossings…In our opinion, the geometric and mechanical requirements for this crossing reduce the potential for successfully completing the crossing." The applicant's engineer concluded, "[a] crossing of this magnitude would not be considered routine and the potential for failure would be substantial."[54] The HDD crossing of Haynes Inlet was determined "non-feasible" due to cumulative effects of the geotechnical conditions, construction capabilities, and workspace constraints.[55] *See* Appendix 2.

As part of that geotechnical evaluation, the engineers completed six borings to depths of up to 110 feet below existing ground surface elevation to review subsurface soil and groundwater conditions. One of those test bores, HIB-2, was described as follows:

> The soils encountered in boring HIB-2 consisted of approximately 28 feet of very loose to medium dense sand overlying dense to very dense sand to the bottom of the boring at 90 feet. After leaving the boring overnight, the drillers discovered the borehole collapsed with approximately 80 feet of drill rod in the hole. The

[54] Geoengineers Memorandum to Lori Dalton, Williams Northwest Pipeline (Nov. 15, 2006).
[55] PCGP ltr (June 1, 2010).

> drill rod had to be abandoned in-place. ***This suggests a potential unstable sand condition in the area of the design profile***."[56]

According to the attached figure in Appendix 2, the location of HIB-2 is similar to the current proposed HDD alignment at the Jordan Cove/South Dunes location.

The currently proposed pipeline alignment would require not one but two HDD crossings of Coos Bay, for a total of over 14,000 feet. The consultants who performed the HDD Feasibility Analysis provided with the JPA (Part 2, Section 17, p. 87) did not perform any new borings, but instead relied existing subsurface and site survey information.[57] The 2017 GeoEngineers Memo describes the prior boring efforts, but entirely omits the discussion of the collapsed hole, abandoned drill rod, and potentially unstable condition. Omitting all this, and without any new data, the GeoEngineers now conclude HDD is feasible.[58] The analysis contains numerous assumptions that are unsupported by data. These include potential scour and other impacts in the vicinity of the rail bridge footings and crossings under the active navigation channel.

In its 2017 scoping comments, DOGAMI noted that "geologic hazard evaluations and proper mitigation of hazards are needed."[59] The State requested "a thorough geologic characterization of the project area and surrounding area and a comprehensive site-specific geologic hazard and geotechnical assessment . . . at the proposed facility and along the pipeline with supporting evidence to explain that the facility can be appropriately constructed and operated throughout its existence."[60] Without this information, the Corps cannot evaluate the impacts of the proposed project on water quality and special aquatic sites, and the applicant has not demonstrated that the project will comply with water quality standards. The Corps should require additional information from the applicants regarding practicable alternatives to the current route and to demonstrate how the current route is now feasible.

4. Practicable Alternatives - Pipeline

According to the public notice, "[t]he applicant states they have designed wetland and waterway crossings to minimize impacts [to] wetlands and waterways to the greatest extent practicable."[61] Without survey information for much of the proposed pipeline or access to potentially impacted wetlands, the Corps does not have the basis to find that this is an accurate statement. The Corps must ensure that public comments and interagency consultation are actually applied to each waterway crossing, using the best available information to select the least damaging of all alternatives and to perform minimization/mitigation measures.

a) Pipeline Route

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[56] Geoengineers Memo at 1 (2006) (emphasis added).
[57] GeoEngineers Memorandum, Coos Bay West HDD Crossing (Sept. 14, 2017) at 2.
[58] *Id.* at
[59] State of Oregon 2017 Scoping comments at 8.
[60] Id.
[61] Public Notice, *supra* note 6, at 7.

The pipeline's proposed route would create many environmental impacts that could be avoided with different routes. Changes, both large (e.g. connecting the Northwest line more directly at Puget Sound or the Columbia River ports) and small (e.g. avoiding wetlands, populations, and valuable habitat), can and should be made.

Practicable route adjustments to avoid adverse impacts are too numerous to attempt to list here. It is important to note that FERC previously rejected the Blue Ridge pipeline alignment, which followed the same route as the current proposed PCP, on the basis that it would negatively affect too much old growth habitat for the spotted owl and marbled murrelet.[62]

We urge the Corps to critically review the applicant's use of route selection criteria. The description in their Resource Report 10 is vague and includes numerous subjective criteria.[63] These criteria could result in artificially eliminating consideration of practicable alternatives. Alternative routes, including avoiding the Coos Bay estuary entirely, would have less of an adverse impact than the current proposal.

b) Pipeline Design

Construction methods for crossing waterbodies is another area where less environmentally damaging alternatives are practicable. Except for a few select waterbodies, rivers and streams will be crossed using dry open-cut methods, including both flume and dam-and-pump methods.[64] These methods have major negative impacts that are avoided with more sophisticated crossing methods, such as direction drilling and above-ground crossings.

Practicable alternative approaches to construction infrastructure also exist. The public notice indicates "approximately 35 sites" are proposed for contractor, pipe, or offload areas, one of which impacts 1.13 acres of wetland (Milo Yard 2 site). These locations appear to have been proposed by the applicant according to their own criteria, which do not capture the section 404 criteria.

B. The Project will Cause or Contribute to Violation of State Water Quality Standards

The Corps cannot approve a 404/10 permit if the discharge of dredged or fill material will result in violations of state water quality standards.[65] The applicants failure to provide reasonable assurances that the project will not violate state water quality standards is discussed in significant detail in the 401 Comments in Appendix 1. The proposed activities will result in a combination of point and nonpoint source pollution under state law. The applicant has failed to demonstrate that there is no alternative to lower water quality or that there are economic benefits of lowering water quality, meaning the Corps cannot certify that the project will not result in a violation of State water quality standards, specifically Oregon's anti-degradation policy. In addition, the

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[62] *See* FEDERAL ENERGY REGULATORY COMMISSION, FINAL ENVIRONMENTAL IMPACT STATEMENT (2015), https://elibrary.ferc.gov/idmws/file_list.asp.
[63] JCEP RR10, supra note 44, at 19-20.
[64] Public Notice, *supra* note 6, at 7 – 9.
[65] 40 C.F.R § 230.11(b)(1).

project would impair designated beneficial uses, as well as violating both numeric and narrative criteria. Therefore, the project does not comply with the 404(b)(1) Guidelines[66] under 40 CFR 230.10(b)(1) and the Corps must deny the 404/10 permit.[67]

1. There is No Reasonable Assurance That the Project will Comply with the Requirements of Oregon's Antidegradation Policy

The applicants have not demonstrated that the project will comply with Oregon's antidegradation policy. The purpose of Oregon's antidegradation policy is to "guide decisions that affect water quality to prevent unnecessary further degradation from new or increased point and nonpoint sources of pollution, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses."[68] Oregon DEQ has already denied 401 certification in part based on violations of the state's antidegradation policy for a similar pipeline and gas export terminal infrastructure proposed for Bradwood Landing.[69]

As a result of dredging, damming, and trenching waterways, and of the use of HDD, the removal of riparian vegetation, the creation of temporary and permanent roads, and other proposed activities, the project would likely result in a lowering of water quality for at least the following parameters: Narrative Criteria; Biocriteria; Dissolved Oxygen; Temperature; Toxic Substances; and Turbidity. This lowering of water quality, together with loss of habitat and food sources, will adversely impact the existing designated beneficial uses of: Anadromous Fish Passage; Salmonid Fish Rearing; Salmonid Fish Spawning; Resident and Aquatic Life; Wildlife and Hunting; Fishing; and Aesthetic Quality in the various waterbodies impacted by the project.

For example, the LNG terminal and pipeline fail to protect the designated use of those waterbodies by aquatic life, including threatened salmonids, eulachon, and green sturgeon. The expansive acreage of dredging and filling in critical salmon habitat fails to protect salmon. The construction and operation of the terminal and pipeline (which will include riparian vegetation removal, tanker traffic, wastewater discharge, ballast water intake, pipeline stream crossings, and the risk of catastrophic damage due to a gas fire) will lower water quality and result in unacceptable harm to aquatic species, some of which are on the brink of extinction. The applicants have failed to provide reasonable assurances that the project will not violate Oregon's Antidegradation policy.

a) High Quality Waters Policy OAR 340-041-0004(6)

High quality waters, namely, waterbodies that are currently meeting water quality standards, the lowering of water quality is allowed by Oregon's Antidegradation Policy only if:

(a) No other reasonable alternatives exist except to lower water quality; and

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[66] *Id.* § 230.10(b)(1).
[67] *Id.* § 230.10(b)(1).
[68] OAR 340-041-0004.
[69] Letter from Sally Puent to James Holm and Kimberly D. Bose (March 10, 2011).

(b) The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality [];
(c) All water quality standards will be met and beneficial uses protected; and
(d) Federal threatened and endangered aquatic species will not be adversely affected.[70]

First, the applicant has failed to demonstrate that there are no other reasonable alternatives. Second, Jordan Cove has not demonstrated that the project is necessary or that the benefits of the impacts to water quality outweigh the environmental costs. Third, the project will likely violate water quality standards. Finally, threatened and endangered species listed under the ESA, including but not limited to salmonids, eulachon, and green sturgeon, would be adversely affected by the lowering of water quality (e.g. increased temperature, decreased dissolved oxygen) as a result of this project. Because Jordan Cove has failed to show that it satisfies any of these requirements, it is therefore in violation of this requirement of the antidegradation policy.

b) Water Quality Limited Waters OAR 340-041-0004(7)

With respect to waterbodies that are water quality limited, the antidegradation policy states that the "waters may not be further degraded except" in limited circumstances. As well as degrading water quality in high quality waters that are meeting water quality standards, the Jordan Cove project will degrade water quality in many areas where water quality is *already* impaired. The applicant must demonstrate that there are no alternatives to lowering water quality in the water quality limited waters, and that the economic benefits of lowering water quality are greater than other uses of the assimilative capacity of that waterway.[71] This analysis requires the consideration of reasonable alternatives and a technical analysis of socioeconomic benefits versus environmental costs.

The application fails to meet these criteria. First, Jordan Cove has not demonstrated a need for this project in Southern Oregon. Second, and related, the project seriously conflicts with the ecologic and economic health of the Coos Bay estuary, areas impacted by the pipeline, alternative locations, and economic viability of the larger United States. Third, the detrimental effects on protected aquatic resources, threatened and endangered species, the economy, and public safety are significant and permanent.

Further, in many areas along the pipeline route, significant resources, both private and public, have been invested in the restoration and recovery of water quality and aquatic habitat:

- **Coos (HUC 17100304):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coos subbasin. The Oregon Watershed Enhancement Board (OWEB) has distributed restoration funds to a number of organizations. As of this writing, OWEB has invested $16.8 million dollars in activities including assessment work, watershed council support, education, technical

[70] OAR 340-041-0004(6)(a)-(d).
[71] *See* STATE OF OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, *Antidegradation Internal Management Directive* 28 (2001), https://www.oregon.gov/deq/Filtered%20Library/IMDantideg.pdf

assistance, monitoring and the hard costs of restoration work to restore the Coos subbasin.

- **Coquille (HUC 17100305):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coquille subbasin. As of this writing, OWEB has invested $18.2 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the Coquille subbasin would affect Coos Bay and the success of other restoration work downstream.
- **South Umpqua (HUC 17100302):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the South Umpqua subbasin. As of this writing, OWEB has invested $11 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the South Umpqua subbasin would affect the Umpqua River and the success of other restoration work downstream.
- **Upper Rogue (HUC 17100307):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Rogue subbasin. As of this writing, $11.2 million dollars has been granted by OWEB for activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Rogue subbasin would affect the Rogue River and the success of other restoration work throughout the whole Rogue Basin. The Rogue River Watershed Council is in the process of removing seven fish passage barriers in Salt Creek downstream from the proposed pipeline crossing of the Rogue. According to the Rogue River Watershed Council:

> Construction activities during pipeline placement and raw, exposed soil for several years after pipeline installation is likely to contribute sediment to Salt Creek. Such increased sediment load works directly against our proposed restoration work, which will allow summer and winter steelhead and threatened Coho Salmon to reach more spawning habitat in Salt Creek. Sedimentation will contribute injury to the redds (nests) of these fishes. Moreover, the right of way at the pipeline location will be exposed due to vegetation management, leading to increased water temperatures in Salt Creek. One of the reasons Salt Creek is a target for restoration for us is the cool stream temperatures all summer long.[72]

Further, the Upper Rogue Coho Salmon Strategic Action Planning group is focusing on West Fork Trail, Elk, parts of Big Butte, and parts of Little Butte Creeks. Careful review of the pipeline route show that impacts from erosion and sedimentation, streamside vegetation removal, and other associated impacts could work against restoration activities to be done in the future to enhance and protect Coho salmon habitat in these streams.

[72] Email communication from Barr, Brian. Rogue River Watershed Council (June 29,2018).

- **Upper Klamath (HUC 18010206):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Klamath subbasin. Funds have been distributed to a number of organizations through OWEB. As of this writing, OWEB has invested $5.4 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Klamath subbasin would affect the Klamath River and the success of other restoration work downstream. Impacts to the Klamath River may also impact waterways in the State of California and the beneficial uses and restoration activities found downstream. Oregon should consult with the California State Water Resources Control Board regarding potential impacts to California waters.

Overall, it is likely that the proposed impacts from the pipeline undermine the Oregon Plan for Salmon and Watersheds that the State uses to restore wild salmon.

The activities proposed here will result in a combination of point and nonpoint source pollution under state law. These discharges will likely result in a reduction in water quality as compared to water not affected by anthropogenic sources, affecting turbidity, temperature, and habitat conditions for salmonids, and causing various other environmental issues. Since the applicant has failed to demonstrate that there is no alternative to lowering water quality or that there are economic benefits of lowering water quality, the Corps cannot certify that the project will not result in a violation of State water quality standards, specifically Oregon's antidegradation policy.

2. The Applicant has Failed to Demonstrate That the Project Will Not Impair Designated Beneficial Uses

Pursuant to the EPA's implementing regulations for Water Quality Standards under the Clean Water Act,[73] Oregon has promulgated regulations that designate beneficial uses for its watersheds as a part of its state water quality standards. The Jordan Cove project is likely to impair these designated beneficial uses.

EPA's regulations describe the requirements and procedures for establishing, reviewing, and approving water quality standards by the states.[74] Specifically states are required to specify designated beneficial uses that are "appropriate water uses to be achieved and protected" and that "must take into consideration the use and value of water for public supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation."[75] Beneficial designated uses are defined under Oregon's regulations for the impacted watersheds and are summarized in the table below.

Table 2. Basin-Specific Criteria Designated Beneficial Uses

[73] 40 C.F.R § 131.10.
[74] 33 U.S.C § 1313(c).
[75] 40 C.F.R § 131.10.

Basin-Specific Criteria	Beneficial Uses
South Coast Watershed OAR 340-041-0300	*Estuaries and Adjacent Marine Waters:* Industrial water supply Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Commercial navigation and transportation *All streams and tributaries thereto:* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower
Umpqua Watershed OAR 340-041-0320	*Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers* *North Umpqua River Main Stem* *South Umpqua River Main Stem* *All Other Tributaries to Umpqua, North & South Umpqua Rivers* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (*does not apply for Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers)*
Rogue Watershed OAR 340-041-0271	*Rogue River main stem from estuary to Lost Creek dam* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower Commercial navigation and transportation
Klamath Watershed OAR 340-41-0180	*Klamath River from Klamath Lake to Keno Dam (RM 255 to 232.5)* Public domestic water supply

	Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (RM 255-232.5) Commercial navigation and transportation (RM 255-232.5)

a) Use and Value of Water for Public Supplies Will Not Be Protected

All of the impacted watersheds include public domestic water supply and private domestic water supply as a beneficial designated use. The Jordan Cove project will likely impair public and private domestic water supply as a result of direct, indirect, and cumulative impacts to drinking water sources from the construction, operation, and maintenance of the pipeline. These impacts could include frac-out resulting from HDD proposed for rivers such as the Rogue that are a source of public drinking water, increasing sedimentation through the construction of stream crossings, and increasing temperature by removing riparian vegetation. In addition, withdrawing large volumes of freshwater for activities such as the hydrostatic testing necessary during pipeline constructions will also impair water quality and quantity, thus impacting public and private domestic water supply. Potential direct, indirect, and cumulative impacts to drinking water supplies are discussed in more detail in Section II(B) *infra*, titled The Project will Cause or Contribute to Significant Degradation of waters of the United States.

According to Resource Report 2 for the Pacific Connector Pipeline, the applicants state that the pipeline will cross 12 Public Drinking Water Surface Water Source Areas (DWSAs).[76] At a minimum, this would impact approximately 116,000 people. Further, the report identifies multiple sites where a potable water intake is located less than three miles downstream from the proposed pipeline crossings. There are also a number of private potable water intakes less than three miles downstream from proposed pipeline crossings.[77]

Further, impacts to groundwater resources can impact surface waters, and therefore have the potential to impair designated beneficial uses for public and private drinking water. The U.S. Geological Survey ("USGS") estimates that nearly half of the state of Oregon's population depends on groundwater for daily use and 88 percent of Oregon's public drinking water systems depend, at least in part, on groundwater as a source of drinking water.[78] Due to the potential interactions between groundwater and surface water systems that provide public and private domestic drinking water supplies, the Corps should fully review the direct, indirect, and cumulative impacts of impacts to groundwater resources.

[76] *See* PCP RR2, *supra* note 10, at 12; PCP A-B Part 6. P. 223.
[77] *Id.*
[78] Oregon's Drinking Water Protection Program. Oregon Health Authority, https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/Pages/whppsum.aspx

Between the Resource Report 2 submitted in October and the Resource Report 2 submitted in February, the applicants estimate that 46 miles (20%) of the proposed pipeline would cross shallow groundwater areas or that 26 miles (13%) of the proposed pipeline would cross shallow groundwater areas, where the water table ranges from zero to six feet below the surface.[79] The existence of these types of discrepancies illustrates the lack of consistent information provided by the applicants and failure to provide reasonable assurances.

Because this information has not been made available to the Corps by the applicant, the Corps must find that the applicant has failed to comply with the 404(b)(1) restrictions on discharge.[80] Therefore, the Corps must deny the permit for failure to comply with the 404(b)(1) guidelines.[81]

b) Beneficial Use Designations for the Protection and Propagation of Fish, Shellfish, and Wildlife Will Be Impaired

All of the impacted watersheds include fish and aquatic life, wildlife and hunting, and fishing as designated beneficial uses. The proposed activities for the project will likely impair these designated uses by degrading aquatic habitat for fish and shellfish.

i) LNG Terminal

Construction of the LNG terminal, a 38-acre marine slip, a 22-acre access channel, and a 3-acre marine offloading facility would require dredging 5.7 million cubic yards of material and would result in the permanent loss of 14.5 acres of shallow subtidal and intertidal habitat, 0.06 acres of estuarine saltmarsh habitat, and 1.9 acres of submerged aquatic vegetation habitat (eelgrass). As previously described in Section I.A.2, the terminal's construction will require extensive annual dredging, which will significantly impair habitat for fish and shellfish, thus harming designated beneficial uses protected under the CWA.

The project will likely impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing because of the proposed activities at the terminal and in Coos Bay that will permanently destroy habitat and degrade water quality for fish and shellfish. Specific impacts to fish, shellfish, and wildlife will be discussed in more detail in Sections II D and E *infra*. The applicants have not provided reasonable assurance that the project will comply with water quality standards and therefore the Corps must deny the 404 permit.

ii) Pacific Connector Pipeline

In addition to the LNG terminal, the proposed pipeline will dam, divert, trench, or use HDD technology to cross approximately 485 waterways. Construction of the pipeline will affect at least 30,778 feet (5.83 miles) of wetlands and 3,028 feet of waterways. Approximately 48,675 cubic yards of material will be discharged into wetlands and 9,519 cubic yards of material will be discharged into waterways to construct the pipeline. Additionally, a 75-foot clearcut buffer

[79] *See* PCP RR2, *supra* note 10,78; Pacific Connector Pipeline, *Resource Report 2* 85 (February 2018).
[80] 40 C.F.R § 230.12 (a)(3).
[81] 33 C.F.R § 323.6(a); 33 C.F.R § 320.4(a).

around waterways crossings would be constructed. [82] As stated by the applicants, stream crossings could have many impacts:

> Clearing and grading of streambanks, removal of riparian vegetation, instream trenching, trench dewatering, and backfilling could all result in modification of aquatic habitat; increased sedimentation; turbidity; increase in temperature, decreased dissolved oxygen concentrations; releases of chemical and nutrient pollutants from sediments; and introduction of chemical contaminants, such as fuel and lubricants. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent stream flow or peak flows.[83]

Specific impacts from stream crossings will be described in further detail in Section II B infra. In summary, construction and operation of the proposed PCP will impact aquatic resources and therefore harm designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing, causing:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, and bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage, long-term soil compaction, and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

The Corps cannot authorize the 404 permit because the project will likely impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing. Further, the proposed activities related to construction and operation of the pipeline will permanently destroy habitat and degrade water quality for fish and wildlife.

c) Recreation In and On the Water Will Not Be Protected

All of the impacted watersheds include fishing, boating, water contact recreation, and aesthetic quality as designated beneficial uses. The proposed activities for the project will likely impair these designated uses by harming habitat and water quality for fish, impacting recreational access, and altering the aesthetic values of Coos Bay and the other waterways crossed by the pipeline. The project harms these beneficial designated uses by damming, trenching, blasting, and diverting waterways to build pipeline stream crossings; cutting down 75-foot buffers around

[82] Public Notice, *supra* note 6, at8.
[83] PCP RR2, *supra* note 10, at 35; PCP Part 6 P. 245.

stream crossings; dredging sections of Coos Bay; filling in wetlands; and permanently destroying habitat, such as eelgrass beds.

In addition, construction and operation of the LNG terminal and PCP will impact aquatic resources and therefore harm designated beneficial uses for fishing, boating, water contract recreation, and aesthetic quality by:

- Impacting or limiting public access for recreational boaters as a result of LNG tankers transiting in the waterways to the terminal;
- Potentially increasing risk to recreational boaters, fishermen, crabbers, and clammers in the event of an LNG spill;
- Increasing sediment pollution at stream crossings, which impairs habitat for fish; and
- Altering aesthetic values of Coos Bay and the 485 waterways crossed by the pipeline as a result of the 75-foot clearcut buffer around each stream crossing, dredging of Coos Bay, and construction of the terminal and related facilities.

3. There is No Reasonable Assurance That the Project Will Not Violate Numeric Water Quality Standards

The JCEP and PCP project would do immense damage to water quality in Oregon, which will likely result in violations of Oregon's numeric water quality standards. The proposed project will likely cause significant temperature increases in numerous stream segments, as well as significant decreases in dissolved oxygen levels in Coos Bay. It will also likely further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. The proposed project would also violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations. Construction of the pipeline and dredging of Coos Bay would likely violate Oregon's numeric criteria for dissolved oxygen. The proposed project would likely violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state. Because the applicants have not provided reasonable assurances that the state's numeric water quality standards will be met, the Corps must deny the permit for failure to comply with 404(b)(1) Guidelines.[84]

a) Temperature (OAR 340-041-0028)

The purpose of Oregon's statewide numeric criteria for temperature is to "protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State."[85] The proposed project would likely violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use.

[84] 40 C.F.R § 230.10(b)(1).
[85] OAR 340-041-0028(3).

Additionally, the LNG carriers have the potential to discharge cooling water that is as much as 19.4 degrees Fahrenheit warmer than ambient water temperatures.[86] LNG Carriers at berth at the LNG Terminal would have the potential both to warm the temperature of the marine slip while discharging engine cooling water, and to cool the temperature of the marine slip while loading LNG cargo. Moderate to large temperature increases would have the potential to reduce fish and invertebrate growth, harm reproductive success, and if high enough, cause direct mortality. Fish of the north Pacific, including those found in Coos Bay, are adapted to cool water conditions and could be adversely affected by sharp increases in water temperature. Coos Bay temperatures historically remain less than 20°C.[87]
The proposed action would impact:

1) Streams identified as having salmon and steelhead spawning use (South Coast, Umpqua, and Rogue);
2) Streams identified as having core cold water habitat use (South Coast, Umpqua, and Rogue);
3) Streams identified as having salmon and trout rearing and migration use (South Coast and Umpqua); and
4) Streams identified as having migration corridor use (South Coast).

Table 3. Fish Use Designations for Impacted Watersheds

Watershed	Salmon and steelhead spawning	Core coldwater habitat	Salmon and trout rearing and migration use	Migration corridor use	Redband or Lahontan cutthroat trout
South Coast[88,89]	X	X	X	X	
Umpqua[90,91]	X	X	X		
Rogue[92,93]	X	X			

86 FEDERAL ENERGY REGULATORY COMMISSION, BRADWOOD LNG PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT. 4-85 (2008), https://www.ferc.gov/industries/gas/enviro/eis/2008/06-06-08-eis.asp hereinafter Bradwood FEIS.
87 BRUCE W. MCALISTER &AND JACKSON O.BLANTON, TEMPERATURE, SALINITY, AND CURRENT MEASUREMENTS FOR COOS BAY, OREGON, DURING 1960-1963 (1963).
88 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300A: Fish Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300a.pdf
89 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300B Salmon and Steelhead Spawning Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300b.pdf.
90 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320A Fish Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320a.pdf.
91 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320B Salmon and Steelhead Spawning Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320b.pdf
92 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271A, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271a.pdf.
93 *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271B Salmon and Steelhead Spawning Use Designations, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271b.pdf.

Klamath[94]					X

Additionally, numerous stream segments that would be impacted by the proposed action already are impaired for high temperatures that violate State water quality standards. Many of these streams are on the State's list of water quality limited waters under Section 303(d) of the CWA. Therefore, any temperature increases in these streams attributable to the proposed action would result in exacerbations of existing violations of state water quality standards. The Ninth Circuit Court of Appeals made clear that new dischargers may not add a pollutant into a water body that is water quality limited.[95] The DEIS for the previous iteration of the project states, "removal of vegetation that once shaded the stream may cause local and temporary (daily) increases in temperature during the hot summer months. This may or may not exceed the TMDL on temperature-impaired streams…"[96] Even where waterways are not already impaired for temperature, stream temperature increases cause acute stress that has an immediate impact on salmon and other temperature-dependent fish. The applicants have not provided reasonable assurance that the proposed activities will not result in significant adverse effects to aquatic ecosystems as a result of increased stream temperature. and that the proposed activities will not violate Oregon's numeric criteria for temperature; therefore, the Corps cannot authorize the 404 permit.[97]

b) Turbidity (OAR 340-041-0036)

A violation of Oregon's water quality standard for turbidity occurs when an activity causes a more than 10% increase in natural turbidity levels, unless the activity is necessary to accommodate essential dredging, construction or other legitimate activities AND all practicable turbidity control techniques have been applied.[98] The activities proposed by the applicants are likely to result in a more than 10% increase in natural turbidity levels from pipeline stream crossings, potential HDD failure and frac-out, removal of riparian vegetation around stream crossings, increased landslide risk as a result of pipeline construction, dredging of Coos Bay, and construction and operation of roads. For example, if silt fences are 90-95 percent efficient in trapping sediment post-construction during intense rainfall, this means that up to 10% of the sediment generated during intense rainfall will reach streams.[99] Ten percent delivery of sediment from a large disturbance area is likely to be significant, particularly for threatened salmonids, in violations of the State's numeric turbidity standard.

<u>i) Stream Crossings</u>

The applicants propose dry open-cut methods, including both flume and dam and pump methods, for the stream crossings where HDD or Direct Pipe technology is not proposed. HDD is

[94] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 180A, Klamath Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure180a.pdf.
[95] *See Friends of Pinto Creek v. United States Environmental Protection Agency*, 504 F.3d 1007 (9th Cir. 2007).
[96] 2014 DEIS, *supra* note 71, at 4-372.
[97] 40 C.F.R § 230.10(b)(1); 33 C.F.R § 323.6(a).
[98] OAR 340-041-0036.
[99] 2014 DEIS, *supra* note 73, at 4-74, citing Robichaud et al (2000).

proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River and Direct Pipe technology is proposed for the South Umpqua. The applicants acknowledge in Pacific Connector Pipeline Resource Report 2: Water Use and Quality that "some turbidity will result during instream activities and when the water is diverted to the backfilled areas."[100] Further, the applicants state that under a 2017 report from GeoEngineers evaluating turbidity risk that:

> Turbidity generated during construction may exceed the Oregon water quality standard for short distances and short durations downstream from each crossing, either coinciding with construction across perennial waterbodies or in intermittent streams coincidental with autumn precipitation. Such exceedances are allowed as part of the narrative turbidity standard if recognized in a 401 Certification as long as every practicable means to control turbidity has been used.[101]

Not only do the applicants acknowledge the potential for violations of the turbidity standard, but the analyses included in the JPA materials are outdated and incomplete. Specifically, the Stream Crossing Risk Analysis 2017 report within Research Report 2 from GeoEngineers reviewed 173 crossings that will be trenched out of 330 total crossings.[102] However, as the latest materials from May 8, 2018 submitted to DEQ reveal and as identified in the public notice submitted by the Corps and DEQ, the applicants estimate that 485 waterways would be crossed. This indicates that additional stream crossings have been added and have not been evaluated for turbidity risk. Similarly, the Channel Migration and Scour Analysis 2017 report identified 10 Level 2 crossings that have a high potential for migration, avulsion, and/or scour and 44 Level 1 crossings with a moderate potential for migration, avulsion, and/or scour.[103] Channel migration and streambed scour not only increase sediment pollution and potential violations of the turbidity standard, but also increase the potential for complete or partial exposure of the pipeline within the channel or floodplain. The application has failed to provide information sufficient to demonstrate that their proposed discharges associated with stream crossings necessitated by pipeline construction will not violate State water quality standards for turbidity.

ii) Horizontal Directional Drilling

Specific to crossings where HDD technology is proposed, there is also an increased risk of frac-out where a large release of sediment, bentonite clay, and drilling chemicals may occur. HDD technology is proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River. Bentonite clay is highly detrimental to salmon spawning habitat. In addition, the prior DEIS states that drilling mud "can include additional additives specific to each drilling operation" and "Pacific Connector would approve any additive compounds" but does not disclose what these additives might include.[104] The State of Oregon has specifically requested a list of the additives used in drilling fluids and their potential effects on the aquatic environment.[105]

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[100] PCP RR2, *supra* note 10, at 22; PCP A-B part 6 p. 233.

[101] *Id.* at 22; PCP A-B part 6 p. 233.

[102] *Id.* at Appendix O.2, at 3. (Stream Crossing Risk Analysis); PCP A-B P. 505.

[103] *Id.* at Appendix T.2 (Channel Migration and Scour Analysis); PCP A-B P. 253.

[104] 2014 DEIS, *supra* note 73, at 4-387.

[105] 2017 State of Oregon Scoping comments at 18.

The Oregon Department of Fish & Wildlife ("ODFW") has described some of their concerns regarding frac-outs several times, first in 2008:

> Between August and October of 2003, MasTec North America Inc. was cited by DEQ for a series of water-quality violations which occurred between August and October of 2003. The violations were a result of frac-outs during the horizontal drilling work for the construction of a natural gas pipeline under the North Fork of the Coquille River in Coos County. If similar frac-out related turbidity discharge impacts were to occur at the proposed Rogue River crossing, they would likely impact last known significant spawning habitat for Spring-run Chinook salmon in the Rogue River Basin. This EIS should include analysis of the potential environmental impacts of a frac-out related turbidity discharge due to the proposed action and alternatives.[106]

And again in 2015:

> Pipeline crossings using HDD or other subsurface methodologies can be expected to cause frac-outs in Coos County geology and possibly throughout the project. The Applicant should be prepared for construction stoppages, cleanup, and remediation of damages caused by frac-outs.
>
> HDD and other subsurface boring or drilling crossing design locations should pro-actively address the risks associated with the potential for a "Frac out" or inadvertent loss of drilling fluid…[107]

In the region, many HDD attempts along the 12-inch Coos County pipeline failed, resulting in frac-outs and release of sediment and bentonite clay into the Coquille River. More recently, the Rover LNG Pipeline in Ohio released 50,000 gallons of drilling fluid from HDD operation into a wetland in Richland County, Ohio in April 2017. A second spill as a result of HDD operation for the Rover Pipeline released an estimated 2 million gallons of drilling fluid into the Tuscarawas River.[108]

Due to the potential risk of frac-out and likely increase in turbidity as a result of all stream crossing methods, the Corps cannot certify that the project will not violate the numeric criteria for turbidity.

<u>iii) Removing Riparian Vegetation</u>

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[106] STATE OF OREGON, *Jordan Cove Draft Environmental Impact Statement* 24 (2008) hereinafter Oregon 2008 DEIS.

[107] STATE OF OREGON, *Jordan Cove Draft Environmental Impact Statement* 102 (2015) hereinafter Oregon 2015 DEIS.

[108] Letter from Buffy Thomason to Aaron Wolfe and Kurt Kollar, Ohio EPA. (April 17, 2017), https://www.scribd.com/document/345647356/Notice-of-Violation-Rover-Pipeline-LLC.

Pipeline clearing and severe soil disturbance from excavation result in impacts similar to those from road construction. Roads undergo elevated erosion for years. In addition, the soil compaction from pipeline construction activities is likely to persist for decades, and even longer in soil with high clay content. Soil compaction contributes to elevated surface erosion potential by degrading surface and subsurface hydrology in several ways, including hindering the ability of soils to absorb, store, and slowly release water, and increasing erosion and sediment delivery through surface runoff. The removal of ecologically important vegetation for pipeline construction and operation will also accelerate bank erosion and reduce bank stability at stream crossings, because trees and deep-rooted vegetation are critically important to bank stability. Decreased bank stability contributes to both stream sedimentation and channel widening.

Sediment generated from forest clearing (i.e. logging) for the pipeline on steep topography is well documented, even with the sediment control measures. Even if silt fences are 90-95 percent efficient in trapping sediment post-construction during intense rainfall, this means that up to 10% of the sediment generated during intense rainfall will reach streams.[109] Ten percent delivery of sediment from a large disturbance area is likely to be significant, particularly for spawning coho salmon in very small streams, resulting in violations of the State's numeric turbidity standard.

iv) Landslides

There are many areas along the pipeline route that include steep terrain and unstable land. The risk of landslides in these areas is high, particularly when disturbed by construction and other activities related to the project. A single landslide event could result in significant deposits of sediment into stream reaches, impacting fish habitat and water quality. Response and control of continued sediment deposition could be difficult and time consuming in remote areas of the pipeline route. These risks are exacerbated by wildfires, which leave soils exposed and without the complex structure necessary to withstand landslide events.

v) Dredging of Coos Bay

The resubmitted JPA includes the 2017 turbidity analysis, updated from the prior 2006 assessment. The analysis reports that turbidity plumes from dredging operations within NRIs will extend between 2,000 and 4,600 feet upstream and downstream beyond the dredging footprint,[110] with the largest plumes expected at NRI Dredge Area #4. Dredging at the south end of the Access Channel is likewise expected to generate a large plume "due to changes in hydrodynamic conditions."[111]

The JPA does not provide an adequate analysis of dredging method alternatives and a clear indication of why the proposed methods will minimize impacts. The JPA indicates that both mechanical and hydraulic dredging may be used, potentially resulting in significant turbidity in Coos Bay. Although some specially designed hydraulic cutterhead dredges may reach 0.5 percent spillage, the JPA fails to disclose what kind of cutterhead dredge will be used for

[109] 2014 DEIS, *supra* note 73, at 4-74, citing Robichaud et al (2000).

[110] Jordan Cove, LNG, *404 Joint Permit Application: Turbidity Analysis* 18 (2017) (Table 5-1).

[111] *Id.*

dredging. This is vitally important information for the Corps to be able to assess the applicant's statements, because without knowing what type of cutterhead dredge will be used, the Corps cannot begin to evaluate what kind of sedimentation dredging activities will cause. Furthermore, any modeling conducted on behalf of the Project is suspect until a spillage rate can be determined. All cutterhead dredges are not the same. Studies indicate that conventional cutterhead dredging "can liberate considerable amounts of turbidity and associated contaminants to overlying water."[112]

Selection of the proper cutterhead for the type of sediment, in addition to using the correct rotational speed and hydraulic suction to obtain reduced suspension rates of sediments, is rarely achieved.[113] Therefore, knowing not just the type of dredge used but also the anticipated methods of using the dredging equipment are important factors that must be disclosed for the Corps so that it can properly analyze the effects of dredging at the proposed project.

The applicant has not provided the Corps with sufficient information to fully analyze the impacts dredging will have on turbidity and therefore to make a reasonable judgment as to whether the proposed discharge will comply with State water quality standards for turbidity. Therefore the Corps must deny the permit for failure to comply with the 404(b)(1) guidelines.[114]

vi) Roads

The increased use of unpaved roads associated with the construction and operation of the pipeline will also elevate sediment delivery to streams, resulting in potentially significant violations of the State turbidity standard. Studies have consistently documented that elevated use of unpaved roads vastly elevates sediment delivery from roads to streams, particularly near and at stream crossings, where it is impossible to eliminate the delivery of sediment from road runoff.

The JPA relies on outdated information regarding temporary and permanent roads to be created or improved during construction of the pipeline. Pacific Connector has not provided the public or the Corps with the most recent road information either in the JPA or by uploading it to the FERC website and giving notice to all parties. This new road information could significantly change the location and impacts of the project. The application is incomplete and in violation of the Guidelines without complete and accurate maps of roads that will be constructed or improved for the project. Road construction is likely to cause turbidity impacts to wetlands, streams, and rivers throughout the 229-mile path of the PCGP, significantly increasing the number of impacted waterbodies beyond the 485 listed in the May 22, 2018 USACE and DEQ public notice.

The JPA inadequately addresses the turbidity impacts from road use, road modifications (including but not limited to Key Watersheds), temporary extra work area ("TEWA") construction and temporary and permanent access roads. In order to use heavy equipment on these roads, significant road modifications will be necessary, including blading/grading,

[112] Cooke, 2005.
[113] Herbich, 2000.
[114] 40 C.F.R § 230.12(a)(3)(iv).

widening, drainage improvements, and the construction of turnouts and roadside TEWAs. The JPA does not include detailed descriptions of what activities will be occurring that could cause turbidity impacts to wetlands, streams, and other waters. Rather, the JPA relies on blanket statements about the application of best management practices to avoid such impacts to streams. By not specifying the location and nature of construction activities associated with all access roads, the JPA provides an inadequate description of the project. On steep slopes, particularly in rainy winter months, similar BMPs have failed in the past to prevent turbidity impacts to streams, creeks and ditches. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. As a result, the Corps lacks sufficient information to determine whether the proposed project will comply with State turbidity standards, in violation of the 404(b)(1) guidelines.

c) Toxics OAR 340-041-0033(2)

By disturbing and re-suspending contaminated material in and around waters of the state, the proposed project will likely result in violations of Oregon's water quality standards for toxics. Toxic substances may not be introduced above natural background levels in concentrations that may be harmful to aquatic life.[115]

There is known contamination at the terminal site, most notably at both the Ingram Yard property and the proposed South Dunes site. There is also significant potential for toxic contaminant disturbance and release at the Klamath River crossing site. These sites with existing or potential toxic contamination are discussed in detail in Section II.C.

d) Dissolved Oxygen (OAR 340-041-0016)

OAR 340-041-0016 sets out the State's water quality standard for Dissolved Oxygen ("DO"). DO is essential for maintaining aquatic life. Depletion of DO in waterways is a significant pollution problem, affecting fish and aquatic species in a variety of ways at different life stages and life processes. DO levels can be influenced by several factors including pH changes, temperature increases, groundwater inflow and hyporheic exchange, decaying material or algae blooms, and sedimentation. The Corps must consider in deciding whether to certify the proposed action as complying with Oregon's water quality standards, that construction dredging lowers DO levels in estuarine waters both by re-suspending sediment and by deepening an estuarine channel where hypoxic conditions can occur due to reduced circulation in deeper waters.

The proposed action involves dredging that will decrease DO in Coos Bay. Dredging increases the oxygen demand by disturbing sediments and releasing oxygen-demanding materials (decomposing organic materials contained within the sediments). In its 2008 DEIS comments, Oregon DEQ previously expressed strong concerns about lowered DO levels that resuspension of sediments during dredging activities would cause:

[115] OAR 340-041-0033(1)

> Total organic carbon, acid volatile sulfides, and nutrient sampling should be conducted to quantify the potential for adverse impact to oxygen levels caused by resuspension of sediments during dredging activities. Impacts should then be evaluated utilizing hydro dynamic modeling which can capture real time tidal conditions and simulate real time tidal exchanges during the period of the project.[116]

The current JPA fails to incorporate or analyze the sampling that was recommended by DEQ. The applicant's hydrodynamic modeling memo concludes that the project will cause changes in currents, but does not evaluate the impacts to oxygen levels caused by dredging or real time tidal exchanges during the project period.[117] As noted in its comments on the 2014 DEIS, "these data should be utilized to quantify the potential for adverse impact to oxygen levels caused by re-suspension of sediments during dredging activities."[118]

In addition, construction dredging lowers DO levels in estuarine waters by deepening an estuarine channel where hypoxic conditions can occur due to reduced circulation. Once the dredging is completed, there also is the potential for reduced circulation in the deeper portions of the approach channel. In combination with other factors, reduced circulation has the potential to result in lower DO levels in the deeper waters. The applicants must demonstrate that actual hydrodynamic conditions in Coos Bay would not result in a 0.1 mg/L decrease in DO levels caused by reduced circulation in the deeper channel.[119]

Further, as discussed in more detail in the Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project (*See* Appendix 3), the applicants rely on two-dimensional models that "are inherently incapable of representing the dynamics required to assess impacts on water quality in Coos Bay."[120] The applicants utilized a salinity study as a proxy for water quality variables including dissolved oxygen, pH, temperature, and turbidity. However, as described in Appendix 3, salinity is inherently different from these other variables. As stated by Jesse Lopez, doctoral student of Dr. Antonio Baptista with the Center for Coastal Margin Observation & Prediction in Appendix 3:

> Salinity varies primarily due to the mixing of dense ocean and fresh water in Coos Bay. In contrast, the other water quality variables vary not only due to mixing, but also due to other variable specific factors including biological processes, chemical reactions, solar conditions, and winds. As such, salinity is not an adequate proxy for water quality or constituent attributes. A model study investigating these properties should explicitly include them.[121]

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[116] Oregon 2008 DEIS, *supra* note 95, at 63.
[117] Hydrodynamic Modeling Memorandum at 29.
[118] Oregon 2015 DEIS, *supra* note 97, at 42.
[119] OAR 340-041-0016.
[120] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018. P. 1.
[121] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018. P. 9.

The Corps should require the applicants to utilize a more robust, three-dimensional model that adheres to best practices. The applicants have failed to provide reasonable assurances that State dissolved oxygen standards will not be violated by the project.

In summary, the project would likely violate Oregon's numeric water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations. Construction of the pipeline and dredging of Coos Bay would violate Oregon's numeric criteria for both temperature and dissolved oxygen. Finally, the proposed project would violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state. The applicants have not demonstrated that the project will comply with state water quality standards, and therefore the Corps cannot authorize the 404 permit because the project does not comply with the 404(b)(1) Guidelines.[122]

4. There is No Reasonable Assurance That the Project Will Comply with Oregon's Narrative Water Quality Standards

Through construction, operation, and maintenance of the terminal, pipeline, and related facilities, the project would increase water temperatures in Coos Bay and numerous stream segments; decrease dissolved oxygen levels in Coos Bay; disturb and re-suspend contaminated sediments; and further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. In addition to causing violations of the State's numeric water quality criteria, the available information demonstrates that the proposed projects would cause violations of Oregon's narrative water quality criteria.

OAR 340-041-0007 establishes Oregon's statewide narrative criteria. Specifically, the project is likely to result in violations of the following sections:

a) Highest and best practicable treatment and/or control of wastes, activities, and flows OAR 340-041-0007(1)

It is wholly unclear from the application materials that Jordan Cove is complying with this standard. OAR 340-041-0007(1) requires that "the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels."[123]

Instead of specifying which treatment and control technologies it would use, and how it determined that those were the highest and best practicable technologies, Jordan Cove states only that it "does not anticipate adverse impacts to water quality in general, or the water quality parameters . . ." and that "BMPs and conservation measures will be implemented throughout the Project to prevent impacts to water quality as a result of Project activities to the maximum extent

[122] 40 C.F.R § 230.10(b)(1).
[123] OAR 340-041-0007(1).

practicable, and the best practicable treatment will be employed when discharging to jurisdictional waters."[124]

Jordan Cove has fallen well short of the requirements of the state standard. First, Jordan Cove misses the mark by claiming this criterion will be satisfied because it "does not anticipate adverse impacts to water quality in general, or the water quality parameters . . ..."[125] Whether or not there will be impacts to water quality, adverse or otherwise, is not the bar set by this criterion. Rather, to satisfy this criterion, as long as the discharge will have any impact to the waters of the state, the proponent must demonstrate that it would use the appropriate level of treatment and control to reduce that impact; under this rule, the applicant must use the "highest and best practicable treatment and/or control of wastes, activities, and flows."

First, Jordan Cove misses the mark by claiming this criteria will be satisfied because it "does not anticipate adverse impacts to water quality in general, or the water quality parameters . . ..."[126] Whether or not there will be impacts to water quality, adverse or otherwise, is not the question posed by this criterion. Rather, to satisfy this criterion, as long as the discharge will have any impact to the waters of the state, the proponent must demonstrate that it would use the appropriate level of treatment and control to reduce that impact; and under this rule, it must use the "highest and best practicable treatment and/or control of wastes, activities, and flows." Jordan Cove impermissibly conflates compliance with other criteria, both narrative and numeric, with compliance with the requirements of OAR 340-041-0007(1). The requirement to use the highest and best practicable treatment and/or control technology is a separate standard. It must be given independent utility and the applicant must demonstrate compliance before the Corps can determine whether the project complies with 404(b)(1) Guidelines.

Second, Jordan Cove has failed to demonstrate that it is in fact complying with this requirement. Jordan Cove first claims that "BMPs and conservation measures will be implemented throughout the Project to prevent impacts to water quality as a result of Project activities to the maximum extent practicable." This is not the standard. While there may be some overlap in some instances, it is not axiomatic that BMPs and conservation measures are treatment and control technologies. Moreover, there is a difference between implementing the highest and best practicable treatment and control technology and preventing impacts "to the maximum extent practicable." These distinctions are not inconsequential. In addition, Jordan Cove admits that it will not implement an important component of the requirement by failing to address the use of control technology, stating only that "the best practicable *treatment* will be employed *when discharging to jurisdictional waters*."[127] The Corps must ensure the applicant will comply with the criterion contained in OAR 340-041-0007(1), not a different, more lenient standard proposed by Jordan Cove.

Finally, as discussed above, it is the applicant's duty to provide the information necessary to allow the Corps (and the public) to determine whether the proposal will comply with water

[124] JCEP 401 Water Quality Memo, at 14.
[125] *Id.*
[126] Id.
[127] Id. (emphasis added)

quality standards. Here, Jordan Cove must identify the potential discharges, catalogue the potential impacts waters of the state, identify the highest and best treatment and/or control of wastes, activities, and flows for each potential discharge, identify the factors it may use in determining whether the identified treatment or control technology is practicable, analyze the practicality of implementing those measures, under those factors for each discharge, and explain why any lesser measures are being implemented as a result of that analysis. Only with this information provided by the application can the Corps meet its legal obligation of reviewing and analyzing whether the applicant will comply with this criterion.

b) Conditions deleterious to aquatic life OAR 340-041-0007(10)

The proposed action would also create many conditions that are deleterious to fish and/or other aquatic life that may not be allowed under OAR 340-041-0007(10). The construction and operation of the terminal and pipeline will cause immediate, severe, deleterious impacts to salmon, critical habitat, and essential fish habitat. The impacts to aquatic life, particularly threatened and endangered species, are discussed in more detail in Section II.D. In general, the proposed project would likely create many conditions that are deleterious to fish and/or other aquatic life that are not allowed by this narrative water quality standard, including to Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*). Dredging millions of cubic yards of material from the Coos Bay estuary in salmon habitat and expansive wetland fill creates a condition deleterious to fish due to permanent loss of habitat.

In addition, National Marine Fisheries Service ("NMFS") and DEQ claim that LNG tankers will impinge and entrain juvenile salmon and other fish when the tankers take on cooling water. Additional deleterious conditions include modification of river flow and hydrology of Coos Bay; wake stranding of juvenile fish; discharge of warm engine cooling water and ballast water; long-term pile driving and dredging; and destruction of riparian and upland habitat along the entire pipeline.

Benthic organisms that are vital to the aquatic ecology of Coos Bay reside in high-quality, intertidal land that would be permanently altered by the proposed action. Dredging in Coos Bay would also degrade the habitat of the native mud shrimp. The shrimp are especially sensitive to the kind of disturbance caused by installing the pipeline through the bay. Mud shrimp are already impacted by an introduced parasitic isopod called *Orthione griffenis*.[128] Mud shrimp are filter feeders and filter as much as 80 percent of bay water every day.[129] As a result, degrading habitat for mud shrimp could further trigger reduced water quality in Coos Bay.

The LNG terminal and the tankers would likely harm marine mammals due to habitat destruction and vessel strikes. The Corps must assess the impact of these strikes to individuals and

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[128] Jolene Guzman, *Invader Kills Off Mud Shrimp*, THE WORLD (February 27, 2009), https://theworldlink.com/news/local/invader-kills-off-mud-shrimp/article_fa08c2d9-47e9-5cb6-83d3-6bad07ec3bdf.html hereinafter Guzman 2009.

[129] Eric Wagner, *Mud Shrimp Meets Invasive Parasite, High Drama for Northwest Estuaries* (2006), available at http://depts.washington.edu/nwst/issues/index.php?issueID=winter_2006&storyID=782 hereinafter Wagner, 2006..

populations. The Corps should require additional information from the applicants to fully review the tanker route to Jordan Cove and the tanker routes in the Exclusive Economic Zone.

In addition, Jordan Cove would introduce or allow the proliferation of invasive species to Coos Bay, the terminal site, and along the pipeline route. First, ships from foreign ports transport exotic species on multiple surfaces and in water releases from ballast or engine cooling water. These species may harm the aquatic ecosystem. Second, the removal of vegetation, along with other long-term disturbances at the site, would allow the introduction and proliferation of exotic species, which would harm native ecosystems and may require herbicides and pesticides to manage. Third, exotic species that harm native ecosystems, forestland, and farmland would thrive in the large swath of clearing and ground disturbance across Oregon due to the pipeline. These impacts would significantly affect fish, wildlife, and special aquatic sites. The Corps must determine whether the direct, indirect, and cumulative impacts of exotic and invasive species from the construction and operation of the LNG terminal and related facilities will result in conditions deleterious to aquatic life that violate this State narrative water quality standard.

c) Aesthetic conditions OAR 340-041-0007(13)

Proposed activities, including but not limited to the removal of riparian vegetation that shades streams and the construction of HDD crossings that may result in potential releases of drilling fluids through a frac-out will likely not comply with the state's narrative criteria for aesthetic conditions. Under OAR 340-041-0007(13), "aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed."

d) Biocriteria Standard (OAR 340-041-0011)

Oregon's Biocriteria standard is intended to assess the total impact to a biological community, including multiple stressors and cumulative effects. OAR 340-041-0011 provides that "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." DEQ's regulations define "without changes in the resident biological community" to mean "no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region."[130] "Ecological integrity" means "the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat for the region."[131] In this way, the Biocriteria standard complements the other parameter-specific water quality standards.

DEQ has noted that the 2014 DEIS does not address whether the pipeline construction and operation activities will achieve compliance with the biocriteria standard.[132] As noted by ODFW

[130] OAR 340-041-0002.
[131] OAR 340-041-0002.
[132] Oregon 2015 DEIS, *supra* note 96, at 60.

in its 2017 scoping comments, "despite modest changes to the project configuration… ODFW expects the impacts to fish and wildlife resources to remain largely the same."[133]

While the applicant suggests that all impacts would be temporary and localized, the significant re-shaping of Coos Bay and at least 485 waterway crossings from the pipeline, together with ongoing operations and related discharges, would result in permanent and/or chronic detrimental changes in the resident biological communities. The proposed activities would likely cause negative impacts that do not comply with the Biocriteria standard, including but not limited to:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage, long-term soil compaction, and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

e) OAR 340-041-0007(7) Road construction and maintenance

The Corps must require information from the applicants to determine whether the construction of a road over several waterbodies will comply with the criteria that "[r]oad building and maintenance activities must be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces."[134] Roads can disrupt hydrologic function and increase sediment delivery to streams. The applicants failed to provide complete and accurate maps of roads (existing, proposed, and expanded), specific characterizations of impacts to waterways that would be affected, details regarding types of roads and how they will be modified, or specific details on long-term maintenance proposed for roads in areas of steep terrain or wildfire risk. The JPA relies on generalized statements regarding the application of best management practices to avoid impacts to streams. The Corps should require the applicants provide site-specific details regarding construction and maintenance of roads to be able to determine whether the applicants are in compliance with this narrative standard. Without this information, the applicants have failed to provide reasonable assurances that this standard would not be violated, and therefore the Corps must not approve the 404/10 permit.

Thus, the Corps cannot determine that the proposed project will comply with Oregon's Biocriteria standard. In conclusion, under the Corps' implementing regulations, the agency

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[133] State of Oregon Scoping comments at 11.

[134] OAR 340-041-0007(7).

cannot approve a 404/10 permit if the discharge of dredged or fill material will result in violations of state water quality standards.[135] As discussed in further detail in the 401 Comments (*See* Appendix 1), the project would likely violate Oregon's antidegradation policy, impair designated beneficial uses, and result in violations of both numeric and narrative state water quality standards. The Corps cannot authorize a 404/10 permit for the project because the applicants have failed to provide reasonable assurances that the project will not violate state water quality standards.[136]

C. The Project will Violate Applicable Toxic Effluent Standards and Prohibitions under Section 307 of the Act

The Corps cannot authorize the 404 permit because the applicants have not demonstrated that the project complies with the 404(b)(1) Guidelines under 40 CFR 230.10(b)(2):

> (b) No discharge of dredged or fill material shall be permitted if it:
>
> …
>
> (2) Violates any applicable toxic effluent standard or prohibition under section 307 of the Act.

The CWA establishes technology-based effluent standards for toxic chemicals identified by the EPA. The Priority Pollutant List identifies 126 non-conventional pollutants including, but not limited to: benzene, arsenic, copper, lead, mercury, zinc, and other chemicals.[137] The terminal site has the confirmed presence of toxic chemicals identified as Priority Pollutants by the EPA under Clean Water Act Section 307 including, but not limited to, mercury, arsenic, dioxins, and petroleum products.[138] Additionally, Coos Bay is already impaired for multiple toxic chemicals identified as Priority Pollutants, such as lead.[139]

Regulations require states to establish numeric limits for Section 307(a) toxic pollutants in order to protect designated uses.[140] The Corps must fully evaluate the potential for the project to violate Oregon's standard for toxics. Toxic substances may not be introduced above natural background levels in concentrations that may be harmful to aquatic life.[141] Table 30 Aquatic Life Water Quality Criteria for Toxic Pollutants under OAR 340-041-0033(2) identifies the numeric criteria established by Oregon DEQ.

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[135] 40 C.F.R § 230.11(b)(1).
[136] *Id.* § 230.10(b)(1).
[137] 40 C.F.R Part 423, Appendix A. (U.S. EPA, Priority Pollutant List), https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf.
[138] SHN Consulting Engineers & Geologists, Inc., Site Safety Plan for Jordan Cove Energy Project 2 (2015), http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=0522588a-0b10-4e07-9705-599d39399d8dpdf&s=Black%20Soil%20Summary%20Report.pdf hereinafter Black Soil Summary Report.
[139] Oregon DEQ, Oregon's 2012 Integrated Report Assessment Database and 303(d), https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.
[140] CWA 303(c)(2)(B); 33 U.S.C. § 1313(c)(2)(B); 40 CFR § 131.11.
[141] OAR 340-041-0033(1).

By disturbing and re-suspending contaminated material in and around waters of the state, the proposed activities will likely result in violations of Oregon's water quality standards for toxics.

1. Terminal

There is known contamination at the terminal site that, if disturbed as a result of project activities, could impact waters of the state. Both the Ingram Yard property and the location of the proposed South Dunes site on the former Weyerhaeuser North Bend Containerboard Mill are listed in the DEQ's Environmental Cleanup Site Information ("ECSI"). The Ingram Yard property (ECSI 4704) was used for spreading contaminated materials from the late 1970s to 1994 and contains "low levels of potentially bioaccumulating chemicals and must not be placed in waters of the state."[142] More recently, during construction of the Industrial Wastewater Pipeline by Jordan Cove, the contractor discovered black soils in March 2015 on the site. The results of the sampling confirmed that the black soil contained contaminants, including, but not limited to, mercury, arsenic, dioxins, and petroleum products.[143]

Photo 1. Black soils discovered during construction of the JCEP IWP Phase 1 Project.

IWP Phase 1A & 1B Construction, Black Soil Summary Report, Jordan Cove Energy Project. 15 April 2015. P. 1.

Additionally, the South Dunes (ECSI 1083) site is also listed on the ECSI database. This site is also part of the former Weyerhaeuser North Bend Containerboard Mill. A 2007 Environmental Site Assessment commissioned by Jordan Cove found:

> "Contaminants were detected at several locations across the site. Samples collected within the black ashy mill waste typically had higher concentrations of contaminants than those taken in sand. VOCs and tributyltin were not detected. Detected levels of PAHs and TPH were below state and federal guidelines. Chromium was detected in one sample in test pit TP-7 above the SSL. Arsenic was detected in all samples analyzed. The level of arsenic is below the background levels with the exception of test pit TP-7. Dioxins and furans were detected throughout the site at levels below the PRG for individual congeners. The TEQ

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[142] Weyerhaeuser – Ingram Yard. Environmental Cleanup Site Information Database, OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY (Nov. 11, 2007) hereinafter Weyerhaeser. http://www.deq.state.or.us/Webdocs/Forms/Output/FPController.ashx?SourceId=4704&SourceIdType=11.

[143] Black Soil Summary Report, *supra* note 123, at 2.

> value for test pit TP-10 at a depth of 2 ft is above the equivalent PRG. PES also reported TEQ values above the equivalent PRG. Although the value is above federal guidelines for individual samples, the statistical level for the site is within state requirements."[144]

Chemicals were used at the Weyerhaeuser mill, including, but not limited to, biocides, resins, alum, mineral spirits, petroleum distillates, and other cleaning agents. Boiler blowdown containing chemicals may have been discharged into a septic drain field.[145] Compressor condensate may also have been released at the site.[146]

The map below is based on aerial imagery from September 2006 and indicates the area of the site that was not included in DEQ's "no further action" determination.

Weyerhaeuser North Bend Containerboard Mill. ECSI 1083. Oregon Department of Environmental Quality.

Both the Ingram Yard and South Dunes sites (ECSI 4704 and 1083) are listed as "Partial No Further Action" as of 2006. The DEQ reports acknowledge that the recommendation for no further action is contingent upon there being no "new or previously undisclosed information" becoming available. Further, as demonstrated by the map above, there are also locations within the site that are not included within the "Partial No Further Action" finding that could be

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[144] GRI, Geotechnical & Environmental Consultants, *Phase II Environmental Site Assessment Proposed Liquefied Natural Gas Terminal* 6(January 16, 2007), http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=001761ee-a0de-4084-a735-1098e00fc023.pdf&s=JCEPTaskOrder8GRIPhase2ESA(1-2007).pdf.

[145] Delta Environmental Consultants, *Level I Environmental Site Assessment* 8 (June 2004), http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=02f102a1-f089-494a-9ca9-dea5d52fdb7dpdf&s=DeltaLevel1ESA(6-2004).pdf

[146] *Id.*

impacted by the applicants' proposed activities. The discovery of contamination by the contractor on the site could constitute new available information.[147]

Significantly, on December 16, 2014, Barbara Gimlin, former Environmental Inspector at the Jordan Cove LNG terminal site and employee of SHN Consulting, submitted testimony to FERC regarding discovery of contaminants at the site during a March 2014 exploratory test program. Ms. Gimlin described her knowledge of the discovery of contaminated soils along the Jordan Cove shoreline during a September 2013 cultural resources survey by Southern Oregon University Laboratory of Anthropology. Ms. Gimlin then described her personal observations of excavations at the site exposing potential contaminants including "black soils (north to south in Ingram Yard, including near the shoreline), bright yellow granulated/powder found in clumps of varying sizes, gray gummy material found in clumps (likely related to hydraulic drilling conducted by GRI), and the exposure of an underground concrete storage tank punched through by heavy equipment with unknown liquid inside."[148]

The information provided by Gimlin, in combination with the documented discovery of "black soils" by Jordan Cove in 2015, should be considered new or previously undisclosed information. Given that the project calls for excavating and moving large amounts of soils from one area to another, to be used as fill for the South Dunes site and other construction areas, the extent and condition of the contamination at these sites must be fully investigated, disclosed, and addressed to ensure contaminants do not reach waterways. Given this new information regarding additional contamination at the Jordan Cove LNG Terminal site, the Corps must fully evaluate whether the proposed activities at the terminal site and in Coos Bay will result in violations of Oregon's toxic criteria.[149]

Based on the presence of these pollutants and the potential that they would be discharged into waters of the United States as a result of the proposed activities, the applicants have failed to demonstrate that the proposed activities will not violate applicable toxic effluent standards under Section 307 of the Clean Water Act. Therefore, the Corps must not approve the 404/10 permit.

2. Pipeline

In addition to known contamination at the terminal site, there is a significant potential for toxic contaminant disturbance and release at the proposed stream crossings. Many of the waterways that would be crossed by the pipeline are already impaired for toxic chemicals.

Proposed Stream Crossings Impaired for Priority Pollutants under Section 307[150]

Watershed	Waterbody	Impaired for Priority Pollutants

[147] Black Soil Summary Report, s*upra* note 123, at 2.
[148] *See* FERC Docket No. CP13-483-000. (Public Comments on Jordan Cove Energy Project Draft Environmental Impact Statement by Barbara Gimlin, http://www.co.coos.or.us/Portals/0/Planning/AP-15-02/exhibit%207.pdf).
[149] OAR 340-041-0033.
[150] Oregon DEQ, Oregon's 2012 Integrated Report Assessment Database and 303(d), https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

Coos	Coos Bay	Lead, nickel, zinc, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), copper
Coquille	Middle Creek	Cadmium, chromium, copper, barium, arsenic, antimony, nickel, selenium, silver, thallium, and zinc
Umpqua	Olalla Creek	Antimony, arsenic, cadmium, copper, iron, lead, nickel, selenium, and silver
Umpqua	South Umpqua River	Arsenic, cadmium, copper, lead, nickel, selenium, silver, thallium, and zinc
Rogue	Little Butte Creek	Lead, nickel, selenium, silver, zinc
Rogue	Upper Rogue River	Selenium, silver, zinc, nickel, mercury, lead, copper, chromium, cadmium
Klamath	Klamath River	Arsenic, cadmium, toxics, copper, lead, nickel, selenium, silver, and ziinc

For example, the proposed pipeline would cross the Klamath River, Hwy 97 and Southern Pacific Railroad, just after wrapping around a 660-acre industrial facility with known contamination. A frac-out during the HDD under the Klamath River would likely impact the riverbed immediately adjacent to the contaminated facility, exposing riverine sediment that could contain high levels of arsenic, chromium, copper, mercury, polycyclic aromatic hydrocarbons and/or petroleum from the Weyerhaeuser site or from other industrial facilities upstream. Additionally, the Klamath River is already listed as water quality impaired for toxics.[151] The 2014 DEIS and JPA do not include studies or test cores of potential contaminants at this HDD crossing. Further, the 2014 DEIS includes no discussion of what efforts, if any, would be made to analyze toxicity or properly dispose of fill removed through the HDD. The Corps must require additional information from the applicants to identify and analyze the potential for contamination at the Klamath River crossing site and other sites where appropriate, in violation of Oregon's standard for toxics.

Based on the presence of these pollutants, the numerous waterbodies listed as impaired for these pollutants, and the potential that the pollutants would be discharged into waters of the United States as a result of the proposed activities, the applicants have not provided reasonable assurances that the proposed project will not violate the Toxics Standard and, therefore, the Corps must not authorize the 404/10 permit.

D. The Project will jeopardize the continued existence of Endangered Species Act -listed species or adversely modify or destroy designated Critical Habitat.

The Corps cannot authorize the 404/10 permit because the applicants have not demonstrated that the project complies with the 404(b)(1) Guidelines under 40 CFR 230.10(b)(3):

> (b) No discharge of dredged or fill material shall be permitted if it:
>
> …
>
> (3) 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 a habitat which is

[151] *Id.*

> determined by the Secretary of Interior or Commerce, as appropriate, to be a critical habitat under the Endangered Species Act of 1973, as amended. If an exemption has been granted by the Endangered Species Committee, the terms of such exemption shall apply in lieu of this subparagraph.

The Endangered Species Act ("ESA") has the broad goal of protecting threatened and endangered species. The Supreme Court held that there is no doubt that "Congress intended endangered species to be afforded the *highest* of priorities."[152] The Act instructs the Secretary of the Interior and the Secretary of Commerce to maintain a list of threatened and endangered species and designate critical habitats for each listed species.[153] Endangered species are those in danger of extinction, while threatened species are likely to become endangered in the foreseeable future.[154] A critical habitat is the specific area occupied by the endangered species where "physical or biological features essential to the conservation of the species" are found and therefore may require special protection.[155]

In order to comply with the ESA's Section 7 requirement, each federal agency shall, in consultation with the Secretary, insure that any federal agency action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat.[156] Section 7 first requires the agency proposing an action to determine whether the action "may affect" an endangered or threatened species or its critical habitat.[157] If the agency determines the proposed agency action "may affect" an endangered species or its critical habitat, the action agency must initiate formal consultation with the consulting agency, either the Fish and Wildlife Service ("USFWS") or the NMFS, as appropriate.[158]

The second requirement within Section 7 is the biological opinion written by the consulting agency during consultation. This biological opinion informs the action agency as to whether the proposed action, taken either alone or together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.[159] Destruction or adverse modification of critical habitat means "a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species."[160]

If the consulting agency determines that the proposed agency action will likely result in jeopardy to endangered or threatened species or adverse habitat modification, the consulting agency must suggest "reasonable and prudent alternatives, if any" that avoid jeopardy or adverse

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[152] *TVA v. Hill*, 437 U.S. 153, 174 (1978) (emphasis added).
[153] 16 U.S.C. § 1533(a)(1)--(3).
[154] *Id.* § 1532(6), (20).
[155] *id.* § 1532(5)(A)(i),
[156] 16 U.S.C. § 1536(a)(2).
[157] 50 C.F.R. § 402.14(a).
[158] *Id.*
[159] *Id.* § 402.14(g)(4), (h)(3).
[160] *Id.* § 402.02.

modification.[161] However, if there are no alternatives and the federal agency continues with the action anyway, then a "take" of the listed species would result, in violation of Section 9 of the ESA, which prohibits the taking of any member of an endangered or threatened species.[162] The term "take" in Section 9 includes habitat modification.[163]

1. Impacts to Threatened and Endangered Species

The proposed action would likely jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act, or result in the destruction or adverse modification of critical habitat under the ESA. The applicants have failed to demonstrate that the proposed activities would not jeopardize listed species or adversely modify critical habitat.

The direct, indirect, and cumulative effects of the project would impact threatened and endangered species by degrading habitat and aquatic resources used by species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly productive intertidal habitat to low productive deep-water habitat, by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

Expansive wetland fill and the dredging of millions of cubic yards of material from the Coos Bay estuary will result in the permanent loss of salmon habitat. In addition, NMFS and DEQ raised as a major concern that LNG tankers will impinge and entrain juvenile salmon and other fish when the tankers take on cooling water. Modifying the river flow and hydrology of Coos Bay; wake stranding of juvenile fish; discharge of warm engine cooling water and ballast water; long-term pile driving and dredging; and destruction of riparian and upland habitat along the entire pipeline will further impact threatened and endangered species listed under the ESA. Local, state, and federal management plans all concede that dredging impedes salmon recovery and estuarine habitat restoration.

a) Coho salmon – Southern Oregon/Northern California Coast ESU

The project area includes two major river systems known to support SONCC Coho: the Rogue River and the Klamath River. The project is likely to adversely affect SONCC Coho due to numerous impacts to feeding, loss of hatching and rearing habitat from substrate removal and turbidity at stream crossings, barriers to migration during stream crossing construction, potential swim bladder rupture due to blasting activities, injury and mortality during fish salvage, and long term habitat deterioration due to reductions in large woody debris.[164] Stream crossing

[161] *Id.* § 402.14(h)(3).
[162] 16 U.S.C. § 1538.
[163] *Babbit v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 708 (1995); 50 CFR § 17.3.
[164] 2015 FEIS, *supra* note 49, at 4-629 - 31.

construction and removal of riparian vegetation are the two primary contributors to these impacts.

The pipeline construction will disrupt fish passage by damming the streams during the trenching and pipeline placement processes. It is unclear for how long fish passage would be interrupted. The mitigation of capturing and removing fish behind dams is historically ineffective, and in this case would likely result in the take of threatened salmonids. This is particularly troubling for large crossings proposed on the Coquille and Umpqua, and for potential crossings of the Rogue and Coos if proposed HDDs fail.[165]

Within the Rogue Basin, Trail Creek and Little Butte Creek have long been identified as major producers of SONCC coho.[166] The proposed pipeline route would cross the West Fork of Trail Creek, the North and South Forks of Little Butte Creek, as well as numerous smaller tributaries within this watershed. Prevost highlighted upper South Fork Little Butte Creek and West Fork Trail Creek as core areas in the Upper Rogue River watershed that are critical to the survival of SONCC coho in the region.[167]

The Upper Rogue section of the 2014 Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan notes that this watershed already has severely impaired water quality and degraded riparian forest conditions, concluding that future coho survival would be further threatened roads and timber harvest.[168] These stresses and threats would be increased by actions described in the JPA and DEIS. In fact, the 2014 Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan identifies impaired water quality as one of the key limiting stressors for the Upper Rogue River population.[169] The Recovery Plan identifies increasing Large Woody Debris as one of six high priority recovery actions. The proposed pipeline route would cross waterbodies that support threatened SONCC or have high intrinsic potential to support habitat.[170]

The below figure from the Final SONCC Recovery Plan issued by NMFS in 2014 identifies the Little Butte Creek watershed and Trail Creek as some of the most significant streams in the region for coho.

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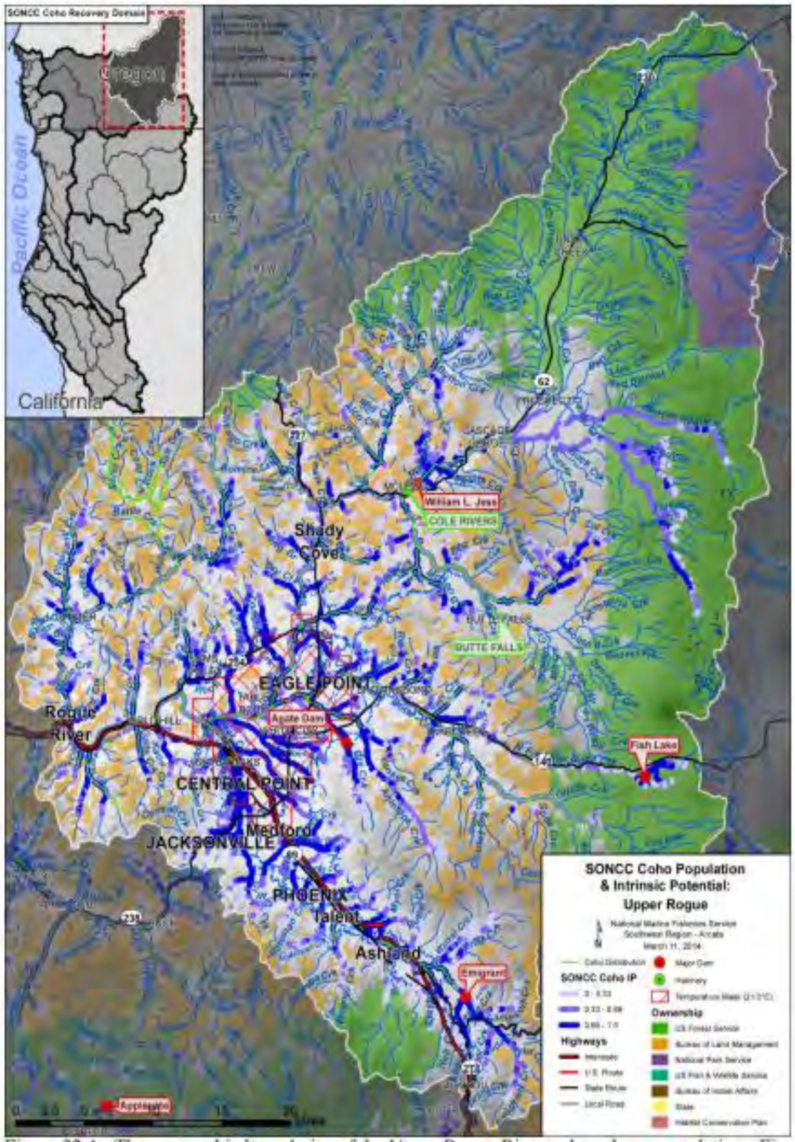
165 *See* discussion of HDD failure, *supra* at 22-24.
166 Jerry Vogt, *Upper Rogue Smolt Trapping Project, 2001* (2001), https://nrimp.dfw.state.or.us/nrimp/information/docs/fishreports/smolt01.pdf.
167 Marc Prevost, et al., *Southwest Oregon Salmon Restoration Initiative* 65 (1997), https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/5029/Vol.2Chapter17F.pdf
168 NATIONAL OCEANIC AND ATMOSPHEREIC ADMINISTRATION, SOUTHERN OREGON NORTHERN CALIFORNIA COAST COHO SALMON RECOVERY PLAN (2014), http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/southern_oregon_northern_california_coast/SONCC_recovery_plan.html.
169 NOAA FISHERIES, UPPER ROGUE RIVER POPULATION:SOUTHERN OREGON/NORTHERN CALIFORNIA COAST (SONCC) COHO RECOVERY PLAN 32-1 (2014) hereinafter Coho Recovery Plan.
170 *Id.* at 32-3.



“Upper Rogue River Population.” Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-3.

The pipeline crossings would also threaten SONCC recovery in the Klamath Basin. While the Upper Klamath Basin is currently unavailable to anadromous fish, resource agencies face a court mandate to restore fish passage to this area, whether or not PacifiCorp’s mainstem dams on the Klamath are removed. Manual reintroduction of imperiled spring Chinook, and natural re-colonization of imperiled steelhead and ESA threatened Southern Oregon/Northern California Coast ESU (SONCC) coho, will occur in the Klamath Basin at an unknown time in the next 10 years. The DEIS does not address the need to coordinate construction through the Upper Basin with habitat used by returning anadromous fish as described in ODFW’s *Plan for the Reintroduction of Anadromous Fish in the Upper Klamath Basin*[171] approved by the Oregon Fish

[171] OREGON DEPARTMENT OF FISH AND WILDLIFE, DRAFT PLAN FOR THE REINTRODUCTION OF ANADROMOUS FISH IN THE UPPER KLAMATH BASIN (2008),

and Wildlife Commission in July of 2008. The DEIS acknowledges that despite Pacific Connector's best management practices and mitigation measures, other effects to salmonid habitat elsewhere in the project area could include increased turbidity, frac-out from HDD, nutrient loading, decreased fish access, reduction of benthic organisms and large woody debris ("LWD"), and surface runoff.[172] These impacts apply to reintroduced fish populations as well.

Spencer Creek is recognized as a tributary used by coho and spring Chinook before implementation of the Klamath Hydro Project.[173] As such, it is a likely site for natural re-colonization of these fish. The Corps should recognize this resource value, as recolonizing endangered coho and imperiled spring Chinook will be part of the beneficial uses associated with Spencer Creek watershed and its TMDLs.

The mainstem Klamath will also be a migration corridor for returning anadromous fish. The Coalition's comments in the following section regarding endangered sucker Critical Habitat also apply to imperiled spring Chinook, ESA threatened coho, and imperiled steelhead who may be using the mainstem Klamath by the time the proposed pipeline crosses it.

b) Coho salmon – Oregon Coast ESU

The project area includes designated critical habitat for the federally threatened Oregon Coast Coho: the South Umpqua Subbasin, Coquille Subbasin, and the Coos Subbasin (which includes the Coos Bay estuary). The DEIS acknowledges that the project is likely to adversely affect Oregon Coast Coho and its critical habitat.[174]

Activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel, and construction of the pipeline across Hayes Inlet could all jeopardize the survival of this species. Moreover, cooling water intake is likely to entrain and impinge many food sources for Coho, such as juvenile stages of crab, shrimp, other zooplankton, and eggs and larval fish. Pipeline-related activities including stream crossing construction or failures of those operations, blasting, mortality during fish salvage operations, and loss of large woody debris for habitat also have the potential to cause jeopardy to the Oregon Coast Coho and adversely affect its designated critical habitat.[175] Therefore, if this project were to go through, an ESA Section 9 taking of the Coho salmon would occur and an ESA Section 7 consultation will be required.

As noted by the Coos Watershed Association in 2008:

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https://www.dfw.state.or.us/agency/commission/minutes/08/07_july/Exhibit%20B_Attachment%204.pdf [hereinafter ODFW 2008].

[172] DEIS 2014, *supra* note 73, at 4-577, 4-605 - 06, 4-644.

[173] (Hamilton et. al. 2004).

[174] DEIS 2014, *supra* note 73 at 4-644 - 45.

[175] *Id.* at 4-645.

> 1. This route crosses two significant streams (Kentuck Slough and Willanch Slough), both of which have high value for coho salmon. The area downstream from the proposal for the crossing at Willanch Slough is presently being considered for a Wetland Mitigation Bank, while the area upstream has had significant and successful riparian restoration projects. The route down Lilienthal Creek (T.25S.;R.12W., Sections 20 and 30) will cross the entirety of the Brunschmid Wetland Reserve Project (WRP) that has a perpetual easement held by the U.S.D.A. Farm Services Agency. This site has had significant restoration work during 2008 and will be completed in the winter of 2009.
>
> 2. Juvenile coho salmon were found during fish surveys in this wetland. Across East Bay Drive, and hydrologically connected to the Brunschmid WRP are high quality tidal fringe wetlands (low and high salt marsh) adjacent to the Cooston Channel that have also been identified as having potential for long term protection and enhancement. Additional details on watershed conditions in the proposed routes for this area can be found in the Coos Bay Lowlands Assessment and Action Plan on our website (www.cooswatershed.org/publications).
>
> 3. Once it crosses the Coos River the proposed pipeline route will traverse lowlands adjacent to Catching Slough and its tributaries (approximately MP 8.25 to MP 18). These areas provide some of the most significant current lowland habitat for coho and Chinook salmon rearing, potential wetland restoration opportunities, and needed riparian restoration to reduce summer stream water temperatures. Of particular importance are Stock Slough (MP 10.1), the crossing in lower Catching Slough (MP 11), and Boone Creek (MP 15.75). All these streams and sloughs are used by coho salmon, and the adjacent riparian areas provide resources for these fish and other aquatic life. Additional information on these resources is found in the recently completed Catching Slough Assessment and Action Plan in the Publications section of our website. . .[176]

The Corps should require additional information from the applicants regarding direct mortality impacts to listed fish from dredging in Coos Bay. As discussed, the proposed hydraulic cutterhead dredge method will entrain juvenile fish, including threatened salmonids, as well as benthic organisms critical to salmon diets.[177] Mechanical dredging would not have the same fish entrainment impacts, but Jordan Cove has not seriously considered this alternative dredge method.

The Corps must analyze the impacts of fish entrainment due to dredging, particularly for listed salmonids. The Corps must also look to the effect cooling water entrainment would have on food sources for the threatened Coho salmon. The Corps must consider cumulative impacts on aquatic life, including the impacts from dredging, terminal construction and operation, pipeline construction and operation, and dredging and maintenance dredging to deepen the channel.

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[176] Coos Watershed Association comments for Jordan Cove FERC/EIS, Docket #CP07-441-000, http://elibrary ferc.gov/idmws/file list.asp?accession num=20081204-5103
[177] DEIS 2014, *supra* note 73 at 4-644.

c) North American Green Sturgeon – Southern Distinct Population Segment

Both Northern and Southern population segments of the North American Green Sturgeon are known to exist within Coos Bay for feeding, growth, and thermal refuge. The DEIS admits that the project is likely to adversely affect Green Sturgeon as a result of bottom disturbance and reduction of benthic food supply from construction and maintenance dredging as well as dredge spoils disposal, and the potential for dredge spoils disposal to bury sub-adult Green Sturgeon.[178] Likewise, the project is likely to adversely affect critical habitat for the species, violating Section 9 of the Endangered Species Act.[179] The Corps must consider the effect dredging and dredge spoils disposal would have on food sources for the threatened green sturgeon.

d) Pacific Eulachon – Southern Distinct Population Segment

Pacific Eulachon (also known as candlefish) utilize Coos Bay for habitat, and may be present in the estuary during construction and operation of the project. Eulachon typically spend three to five years in saltwater before returning to freshwater to spawn in late winter through mid-spring. Eulachon are a small fish that are rich in calories and important to marine and freshwater food webs, as well as commercial and recreational fisheries and indigenous people from Northern California to Alaska. The JPA does not adequately assess potential impacts to this species as a result of the dredge and fill operations proposed in ocean waters, Coos Bay, and coastal tributaries.

e) Lost River Sucker

The Lost River sucker is a federally listed endangered species that spawns in freshwater streams. The Pacific Connector Pipeline will cross the Lost River upstream of known spawning areas. The pipeline will also cross the Klamath River, another basin where Lost River suckers live. The DEIS acknowledges that the project is likely to kill Lost River suckers and injure its designated critical habitat through fish salvage or through the release of drilling muds from frac-out during HDD of the Klamath River.[180]

f) Shortnose Sucker

The shortnose sucker is another endangered fish species whose populations have been severely impacted by dam construction, water diversions, overfishing, water quality problems, loss of riparian vegetation, and agricultural practices. Shortnose sucker critical habitat includes the Klamath River within the project area. The DEIS states that the project is likely to adversely affect shortnose suckers in the same manner that it will harm the Lost River sucker.[181]

g) Spencer Creek Redband Trout

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[178] DEIS 2014, *supra* note 73 at 4-647.
[179] 16 U.S.C. § 1538.
[180] DEIS 2014, *supra* note 73 at 4-650.
[181] *Id.* at 4-652.

The Upper Klamath Basin redband trout is considered by the state of Oregon to be a "vulnerable" species, and is currently classified as "at risk" by the Oregon Department of Fish and Wildlife. Due to extensive dam building and habitat modification, Spencer Creek is now the only known spawning area and source of juvenile recruitment in the upper Klamath River basin upstream of J.C. Boyle dam and is a highly productive spawning ground for the Lower Klamath population of redband trout that migrates to the Keno Reach of the Klamath River. Migratory and resident redband trout are known to use the mainstem of Spencer Creek and are also thought to use smaller tributaries including ephemeral streams.[182] Redband spawning in Spencer Creek is thought to occur from February through June and biologists have recorded counting in excess of 300 redds in Spencer Creek.[183] The applicants have not provided sufficient information regarding construction timing in relation to redband trout spawning in Spencer Creek. Given that Spencer Creek's dominant land uses to date (grazing and logging) have degraded the watershed so heavily that it is listed for sediment and temperature pollution, additional industrial degradation plus undetermined long term impacts to water quality and hydrology will likely only bring more harm to Spencer Creek's spawning and juvenile redband trout, which require cold, clear streams for successful recruitment and maturation.

h) Marine Mammals and Sea Turtles

The LNG terminal and the tankers will likely cause or contribute to the harm of marine mammals due to habitat destruction and vessel strikes. In addition, multiple ESA-listed mammals and turtles are present, including the green turtle, leatherback, olive ridley, and loggerhead. In 2012, NMFS designated critical habitat for the leatherback, including nearshore areas around Coos Bay and areas that are part of the proposed LNG tanker routes.[184] All of these ESA-listed species, as well as the non-ESA-listed species, will be adversely affected by the proposed project.

The large increase in deep draft vessels due to the LNG terminal will increase the risk of vessel strikes of marine mammals and turtles. The NMFS' unpublished compiled data indicates that nine whale vessel strikes were either reported in the region or detected during necropsy by the NW Marine Mammal Stranding Network between January 2002 and January 2007.[185] Fin whales were encountered most frequently (six strikes), with individual strikes reported for blue, sei and humpback whales.[186] Seven of the strikes were reported from Washington and two from Oregon, during the four-year period (start of 2002 through start of 2007). The closest strikes to the proposed action area involved a fin whale that came into the Port of Portland on the bow of a vessel in September 2002, and a blue whale that was reported struck and killed off Tillamook, Oregon, in January 2007. The Corps must assess the impact of these strikes to individuals and populations.

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[182] (USFS 1995)

[183] Steven J. Starcevich & Steven E. Jacobs, *Effects of Dams on Redband Trout Life History in the Upper Klamath River: A Summary and Synthesis of Past and Recent Studies*, 4 (2006).

[184] 77 Fed Reg 4170 (Jan. 2012).

[185] Bradwood FEIS, *supra* note 77, at 4-225.

[186] *Id.*

Marine mammals, especially pinnipeds, are also sensitive to noise disturbances. Jordan Cove would install steel piles for the LNG vessel berth and a loading platform on the east side of the marine slip. According to the applicant's modeling, sound levels greater than 65 dB will extend less than 0.25 miles from pile driving operations. Jordan Cove has not yet developed a plan to protect pinnipeds from noise impacts associated with the construction of the marine slip and berth. The Corps should consider whether these potential impacts can be adequately addressed.

Based on all of the potential impacts to listed aquatic species, marine mammals, and fish associated with the proposed action, the applicants have failed to provide reasonable assurances that the project would not violate OAR 340-048-007(11). The applicants have not demonstrated that the project will not jeopardize threatened and endangered species listed under the ESA and adversely impact critical habitat and, therefore, the Corps cannot authorize the 404 permit because the project does not comply with the 404(b)(1) Guidelines.[187]

E. The Project will Cause or Contribute to Significant Degradation of the Waters of the United States

The Corps' regulations clearly prohibit permitting discharges which will "cause or contribute to significant degradation of waters of the United States." Significant degradation includes impacts to human health and welfare; life stages of aquatic life and other wildlife dependent on aquatic ecosystem; aquatic ecosystem diversity, productivity, and stability; and recreational, aesthetic, and economic values.[188] Specifically, the Corps regulations state:

> (c) [E]ffects contributing to significant degradation considered individually or collectively, include:
>
> (1) Significantly adverse effects on the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites.
> (2) Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;
> (3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or
> (4) Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.

[187] 40 CFR 230.10(b)(3).
[188] *Id.* § 230.10(c).

The applicants have not demonstrated that the proposed activities would not cause or contribute to significant degradation to waters of the United States and therefore the Corps must deny the 404/10 permit for the project.

1. The project will have significant adverse effects on human health or welfare, including, but not limited to, effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites

The Corps cannot authorize the 404 permit because the proposed activities will likely adversely impact human health and welfare by causing or contributing to significant degradation of municipal water supplies; fish, shellfish, and wildlife; and special aquatic sites. The applicants have failed to demonstrate that the proposed activities will not result in these significant adverse effects.

a) The Project Will Have Significant Adverse Effects on Municipal Water Supplies

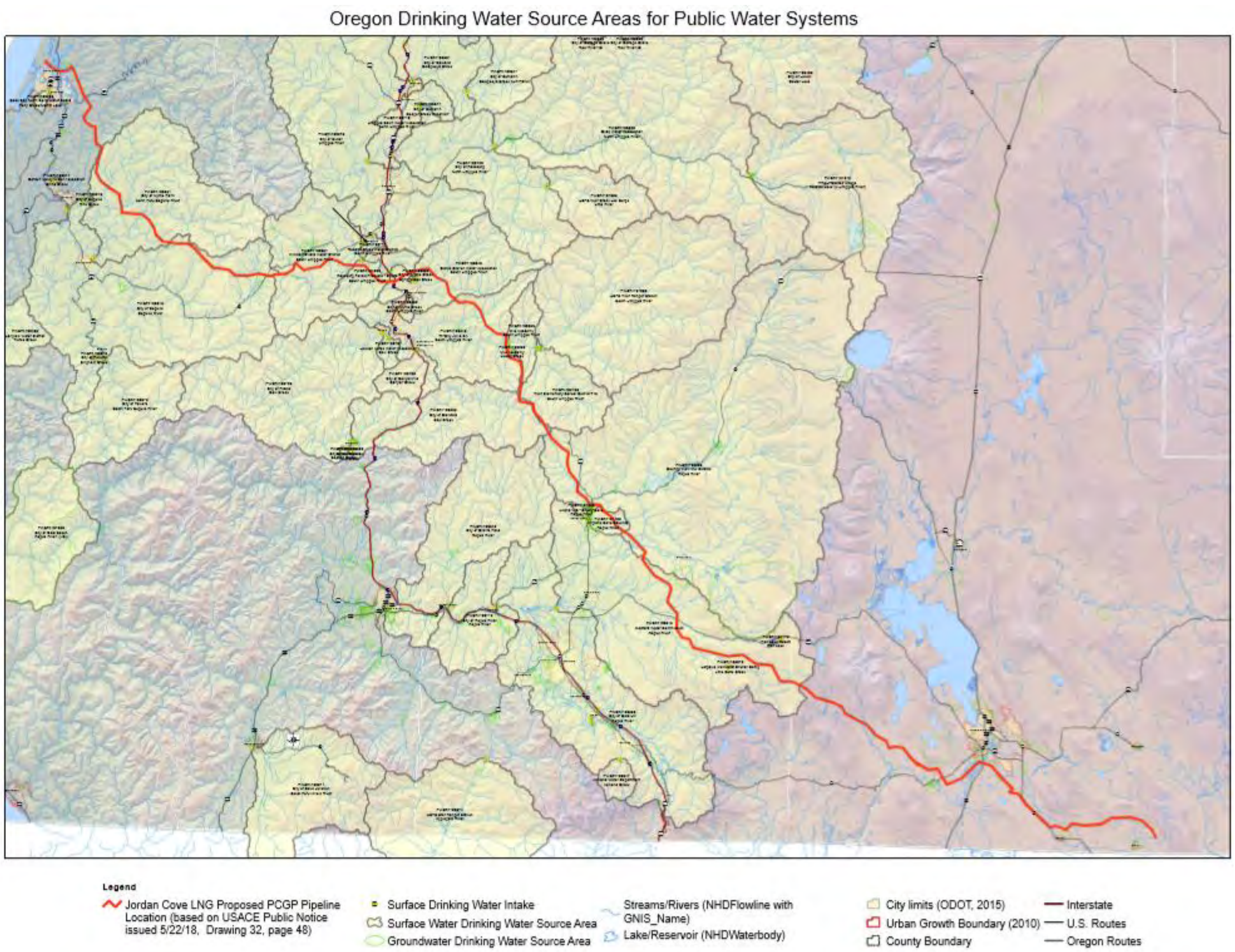
The applicants state that the proposed activities would impact 12 surface water source areas.[189] The applicants also identify multiple sites where public and private potable water intakes are located less than three miles downstream from the proposed pipeline crossings.[190] However, the project will likely impair more than 12 public and private domestic water supplies by contaminating sources through a potential frac-out as a result of HDD, increased sedimentation through the construction of at least 485 stream crossings, and increased temperature by removing riparian vegetation.

Withdrawing large volumes of freshwater for activities such as hydrostatic testing will also likely impair water quality and quantity, thus impacting public and private domestic water supply. Further, impacts to groundwater resources can impact surface waters, and therefore have the potential to significantly degrade public and private drinking water. Based on the surface water systems identified by the applicants, the proposed activities could impact drinking water sources that provide water to at least 116,000 people. [191] The Corps should require additional information to fully evaluate the direct, indirect, and cumulative impacts to municipal and private water supply systems from the proposed activities.

[189] PCP RR2, *supra* note 10, at 12; PCP A-B Part 6. P. 223.

[190] *Id*.

[191] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 12. PCP A-B Part 6. P. 223.



Oregon Department of Environmental Quality. Oregon Drinking Water Source Areas for Public Water Systems.

i. Medford Water Commission

As one example, the Medford Water Commission is identified by the applicants as one of the Drinking Water Source Areas that would be impacted by the project. The Medford Water Commission provides drinking water to approximately 91,100 people in the City of Medford, as well as the cities of Eagle Point, Central Point, Jacksonville, Phoenix, Talent, and Lake Creek Learning Center.[192] Big Butte Springs, part of the Rogue watershed, is the source of the Medford Water Commission's drinking water supply for these communities.[193]

The Medford Water Commission uses the Medford Aqueduct to transport drinking water from Big Butte Springs to the City of Medford and the other communities that rely upon this source. Not only do the applicants propose to cross at least 88 waterways within the Rogue watershed, including the Rogue River, but they propose to bore underneath the Medford Aqueduct. The 31-inch Medford Aqueduct pipeline was constructed in 1927 and carries approximately 40 cubic feet per second of drinking water from Big Butte Springs to the City of Medford and

[192] Medford Water Commission, Water Quality, http://www.medfordwater.org/SectionIndex.asp?SectionID=5.
[193] *Id.*

communities within the Bear Creek watershed.[194] The applicants provide very minimal information regarding construction of this crossing. The plan and profile for the Medford Aqueduct state that the depth of the aqueduct is unknown.[195] The Corps should require more information regarding the depth of the bore and site-specific details to evaluate the potential direct, indirect, and cumulative impacts of the proposed pipeline crossing the main source of the City of Medford's drinking water.

With the exception of the proposed Rogue River crossing upstream from Shady Cove, all of the proposed stream crossings within the Rogue Basin will use the dry open cut method. Specific concerns regarding stream crossings within the Rogue Basin, as well as the Coos, South Coast, Umpqua, and Klamath basins are discussed in the 401 Comments (*See* Appendix 1). In order for the Corps to effectively determine the direct, indirect, and cumulative impacts of these crossings on private and public drinking water sources, the applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. The applicants identify seven stream crossings in the Rogue Basin as having Level 1 (moderate) risk of channel migration, avulsion, and/or scour. The crossing of the North Fork Little Butte Creek, which is already impaired for dissolved oxygen, temperature, and sedimentation, is identified as having a high risk of channel migration, avulsion, and/or scour. In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings cut through waterbodies that are already impaired for sedimentation.[196]

The Corps should consider the assessment of the New York Department of Environmental Conservation ("NYSDEC"), which denied 401 certification due to a LNG pipeline applicant's failure to provide site-specific analysis of each stream crossing.[197] In NYSDEC's assessment, the agency denied 401 certification for the Constitution Pipeline in part because:

> Without a site-specific analysis of the potential for vertical movement of each steam crossing to justify a burial depth, NYSDEC is unable to determine whether the depth of pipe is protective of State water quality standards and applicable State statutes and standards. In addition to impacts to water quality described above and without proper site-specific evaluations, future high flow events could expose the pipeline, resulting in risks to the health, safety, and welfare of the people of New York State. Pipe exposure would require more extensive stabilization measures and in stream disturbances resulting in addition degradation to environmental quality. We note that flooding conditions from

[194] "Big Butte Creek." Eagle Point Irrigation District. https://www.eaglepointirrigation.com/big-butte-creek.html.

[195] Pacific Connector Gas Pipeline Project. Plan and Profile – Medford Aqueduct. PCP A-B Part 7. 6 February 2018. P. 1.

[196] OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, ROGUE RIVER BASIN TMDL 1-19 (2008), https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.

[197] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

> extreme precipitation events are projected to increase on the operational span of the pipeline due to climate change.[198]

The Corps should require comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, in order to evaluate potential impacts to public water supply.

Additionally, the applicants propose to use HDD technology to cross the Rogue River at MP 122.65. The applicants fail to comprehensively disclose and analyze the likelihood and frequency of frac-out events.[199] The applicants also failed to conduct a numerical hydraulic fracture analysis, instead relying upon a qualitative analysis.[200] Further, the applicants do not provide adequate information regarding impacts to groundwater as a result of HDD. The September 2017 GeoEngineers report states:

> We did not measure groundwater levels upon completion of the borings because of the presence of drilling fluid in the holes at the time of drilling. We anticipate that groundwater levels will mimic the elevation of the Rogue River around 1,410 feet mean sea level (MSL). We anticipate that groundwater levels will fluctuate with precipitation, site utilization and other factors. During heavy prolonged precipitation, and probably during most of the winter months, we expect that groundwater will be near or at the surface of the site on the east side of the Rogue River. [201]

The Corps must determine whether "anticipating" impacts to groundwater is a comprehensive and site-specific review of the potential consequences to drinking water of a frac-out related to HDD crossing of the Rogue River.

Finally, the applicants have inaccurately included Klamath River crossing data in the Rogue River crossing section. The HDD Design Summary provided is for the Klamath River and not for the Rogue River.[202] Therefore, the JPA is completely missing information regarding HDD design for the Rogue River crossing. Without this information, the Corps cannot certify that the proposed HDD crossing for the Rogue, in addition to the other proposed activities, will not cause or contribute to the significant degradation of public or private drinking water sources.

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[198] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

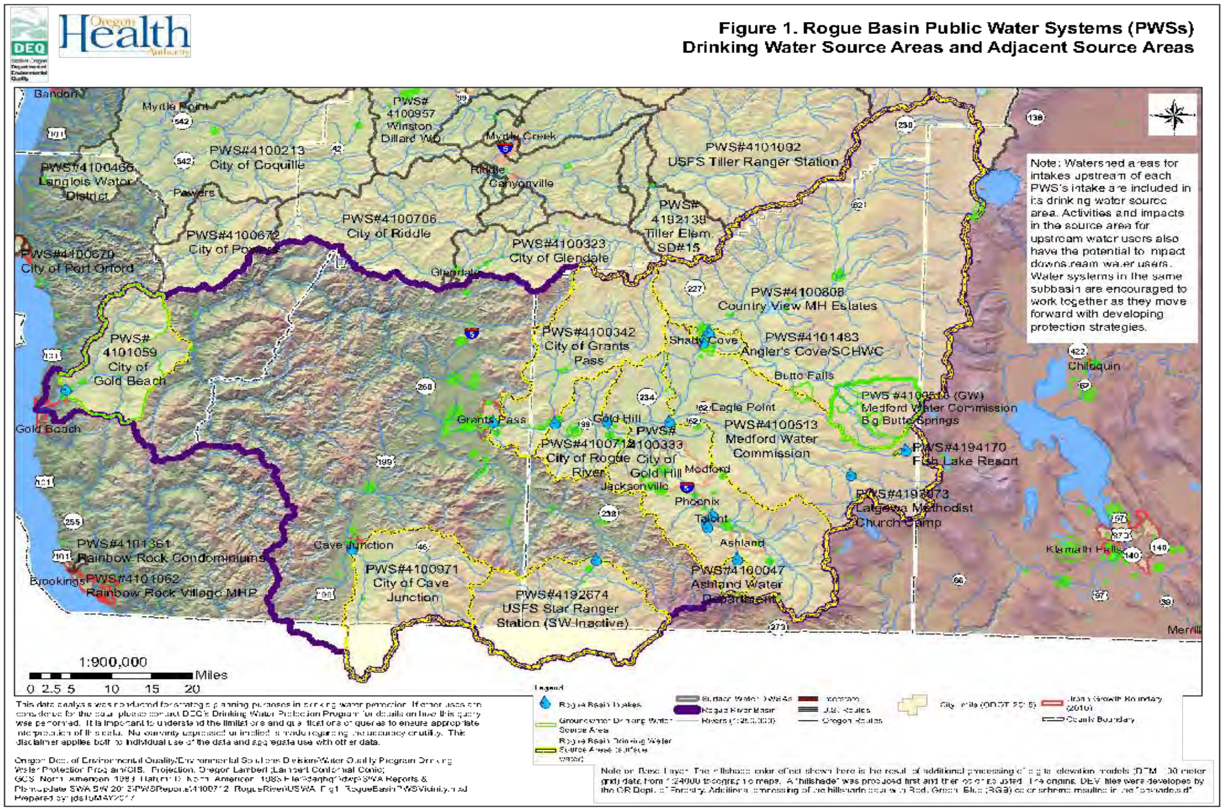
[199] State of Oregon 2017 Scoping comments at 15.

[200] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 7; Pacific Connector Pipeline Part 2 Appendix B. P. 1578.

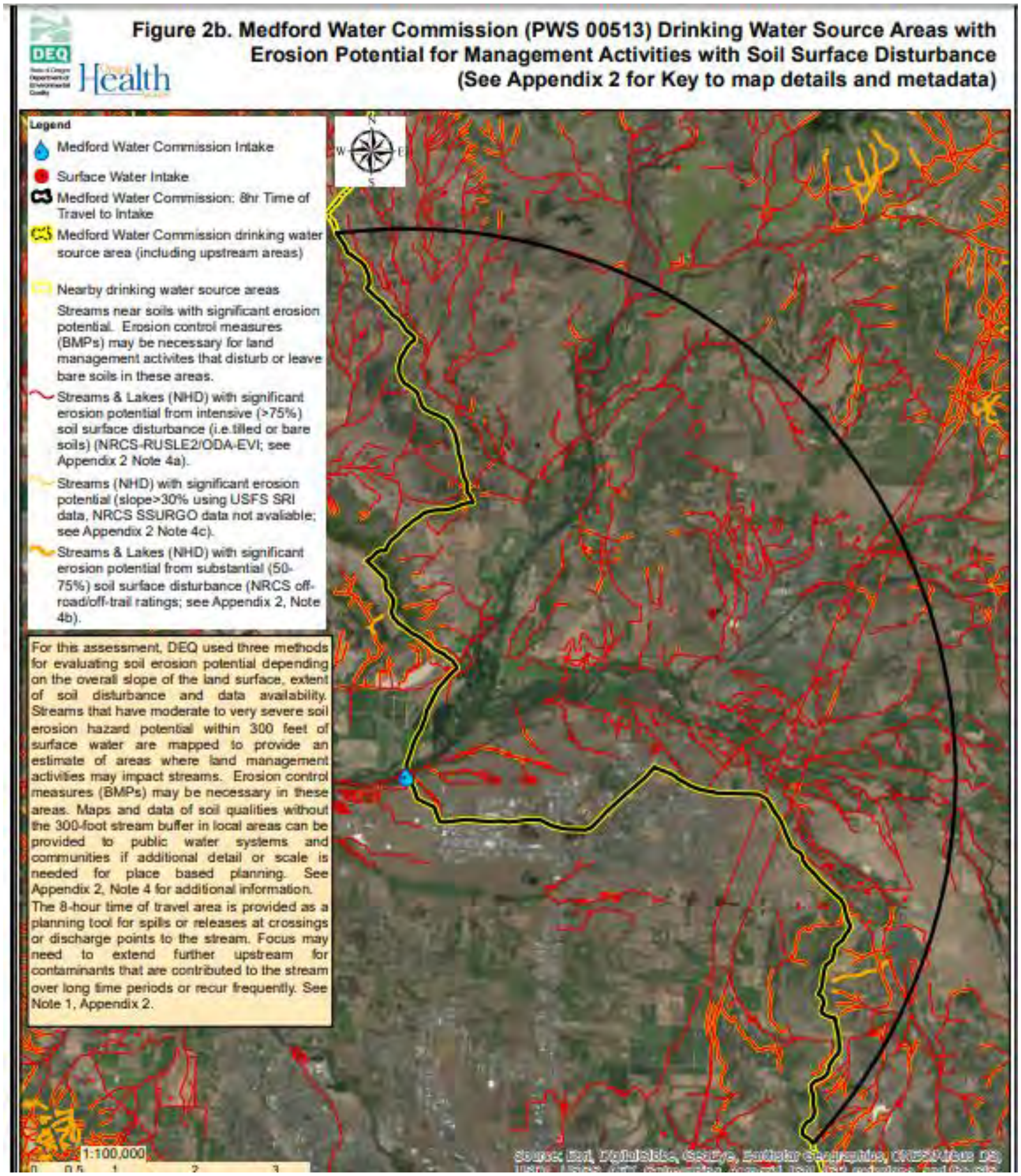
[201] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 6; Pacific Connector Pipeline Part 2 Appendix B. P. 1577.

[202] Pacific Connector Pipeline. Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017; Appendix B HDD Design Drawing and Calculations. PCP Part 2 Appendix B 8 May 2018. P. 1633.

The maps below developed by DEQ as part of the 2018 Source Water Assessment for the Rogue River and the Medford Water Commission demonstrate the potential for increased sediment pollution as a direct threat to drinking water supplies.



Updated Source Water Assessment. March 2018. Medford Water Commission. Oregon Health Authority. https://www.deq.state.or.us/wq/dwp/docs/uswareports/USWA_00513Medford.pdf.



Updated Source Water Assessment. March 2018. Medford Water Commission. Oregon Health Authority. https://www.deq.state.or.us/wq/dwp/docs/uswareports/USWA_00513Medford.pdf.

The Corps must fully evaluate the potential loss of values to municipal and private water supplies. Such factors include, but are not limited to:

- Impacts to water quality that affect the color, taste, odor, chemical content and suspended particulate concentration, in such a way as to reduce the fitness of the water for consumption;

- Additions of suspended particulates, viruses and pathogenic organisms, and dissolved materials;
- Potential expenses to municipalities and citizens to remove such substances before consumption;
- Changes to quantity of water available for municipal and private water supplies; and
- Potential for toxic effects on consumers when commonly used water treatment chemicals interact with suspended or dissolved substances as a result of dredged or fill material.[203]

b) The Project Will Have Significant Adverse Effects on Fish, Wildlife, and Shellfish

The applicants have failed to demonstrate that the proposed activities will not result in significant adverse effects on fish, wildlife, and shellfish. Therefore, the Corps cannot authorize the 404/10 permit for the project because the project does not comply with the 404(b)(1) Guidelines under 40 CFR 230.10(b)(c).

i. LNG Terminal

LNG Terminal construction activities and ongoing maintenance dredging will likely significantly impair habitat for fish and shellfish. The proposed activities at the LNG terminal will impact aquatic resources and have adverse impacts on fish, wildlife, and shellfish by:

- Permanently destroying at least 1.9 acres of eelgrass beds that provide habitat and food base for fish and invertebrate species including juvenile crab, juvenile lingcod, salmonids, starry flounder, and English sole;
- Impairing water quality by decreasing dissolved oxygen, changing salinity levels, increasing temperature, and increasing sedimentation as a result of dredging and other related activities;
- Jeopardize the survival of aquatic species through activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel, and construction of the pipeline across Coos Bay;
- Directly removing benthic organisms, such as worms, clams, starfish, and vegetation from the bottom of the bay by dredging; entraining crabs, shrimp, clams, oysters, and fish through the operation of the dredging equipment;[204] and
- Degrading habitat and aquatic resources used by threatened and endangered species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly productive intertidal habitat to low productive deep-water habitat; failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

[203] *See* 40 C.F.R § 230.50.
[204] DEIS 2014, *supra* note 73, at 4-569 - 4-570.

The applicants have not demonstrated that the project will not adversely impact fish, wildlife, and shellfish at the terminal and Coos Bay by destroying habitat and degrading water quality for fish and shellfish. Therefore, the Corps cannot authorize the 404 permit because the project does not comply with the 404(b)(1) Guidelines under 40 CFR 230.10(b)(c).

ii. Pacific Connector Pipeline

As described in detail in Section II.B.2, the project will adversely impact fish, shellfish, and wildlife. Therefore, the Corps cannot authorize the 404 permit because the project does not comply with the 404(b)(1) Guidelines.[205]

c) The Project Will Have Significant Adverse Effects on Special Aquatic Sites

Special aquatic sites are "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values."[206] These sites generally significantly influence or positively contribute to the "general overall environmental health or vitality of the entire ecosystem of a region."[207] From a national perspective, the CWA's guiding principle is to not irreversibly harm valuable aquatic resources.[208] Special aquatic sites include wetlands, mudflats, vegetated shallows, riffle and pool complexes, and municipal and private water supplies that would all be impacted by the proposed activities throughout each affected watershed.[209]

The Corps should fully evaluate the direct, indirect, and cumulative impacts to special aquatic sites that occur throughout the project area. The following summarizes the potential impacts that the Corps should consider in its evaluation.

i) Project will cause or contribute to significant degradation of wetlands

Impacts to wetlands are discussed in more detail in Section IV. In summary, at the terminal site, the applicants propose to temporarily impact a total of 0.4 acres of freshwater wetlands and 39.40 acres of estuarine resources. Permanent impacts will total 3.45 acres of freshwater wetlands and 33.33 acres of estuarine resources.[210] Along the pipeline route, the applicants propose to cross approximately 30,778 feet (5.83 miles) of wetlands as a result of the construction of the pipeline, all of which are jurisdictional under the CWA.[211] The proposed activities will negatively impact wetlands, which are specifically identified as special aquatic sites by the presence of degrading habitat, increasing sediment pollution and erosion, increasing water temperature, changing water levels and drainage patterns, fragmentation of wetland complexes, and loss of recharge area. Further, critical information regarding the location, type,

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205 33 CFR 320.10(c).
206 40 CFR 230.3(q-1).
207 *Id.*
208 *Id.* at 230.1(d).
209 *Id.* 230.40 - 230.50.
210 Jordan Cove Energy Project. Resource Report 2 Water Use and Quality. P. 34. 6 February 2018. P. 377.
211 Pacific Connector Pipeline. 404 Joint Permit Application. 8 May 2018. P. 8.

and status of potentially impacted wetlands is missing from the application. Resource Report 2 lists under Table 2.3-1 the parcels where access was denied by landowners. Approximately 4.77 miles of wetlands that could be impacted by the project have not been evaluated by the applicants.[212]

The Corps must fully evaluate the potential loss of values to wetlands by examining:

- Adverse effects to biological productivity of wetland ecosystems by smothering, dewatering, permanently flooding, or by altering substrate elevation or periodicity of water movement;
- Destruction of wetland vegetation that may result in advancement of succession to dry land species;
- Reduction or elimination of nutrient exchange by reducing a system's productivity;
- Alteration of current patterns or velocities;
- Obstruction of circulation patterns;
- Interference with filtration functions of wetlands;
- Changes to wetland habitat value for fish and wildlife; and
- Modification of flood storage and buffer capacity.[213]

Without additional information regarding these wetlands, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

<u>ii) Project will cause or contribute to significant degradation of mudflats</u>

Mudflats are broad flat areas along the sea coast and in coastal rivers,inland lakes, ponds, and riverine systems.[214] When mudflats become flooded, wind and waves may stir up bottom sediments.[215] Coastal mudflats are "exposed at extremely low tides and inundated at high tides with the water table at or near the surface of the substrate."[216] They are either "unvegetated or vegetated" by algal mats.[217] To evaluate the potential loss of values to mudflats, the Corps should examine:

- Changes in water circulation patterns which may permanently flood or dewater the mud flat or disrupt periodic inundation, resulting in an increase in the rate of erosion or accretion;

212 Table 2.3-1 Wetland Survey – Parcels Where Access Was Denied. Pacific Connector Pipeline. Resource Report 2. P. 56. 8 May 2018. Part 2 Appendix B. P. 1149.
213 40 C.F.R § 230.4.1
214 *Id.* at § 230.42
215 *Id*.
216 *Id.*
217 *Id.*

- Changes in inundation patterns that can affect the chemical and biological exchange and decomposition process occurring on the mud flat and change the deposition of suspended material affecting the productivity of the area; and
- Changes that may reduce the mud flat's capacity to dissipate storm surge runoff.[218]

Without additional information regarding impacts to mudflats, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

iii) Project will cause or contribute to significant degradation of vegetated shallows

Vegetated shallows are "permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as turtle grass and eelgrass in estuarine or marine systems as well as a number of freshwater species in rivers and lakes.[219] To evaluate the potential loss of values to vegetated shallows, the Corps must examine:

- Smothering vegetation and benthic organisms as a result of dredging and fill activities;
- Creating unsuitable conditions for vegetation and benthic organisms by changing water circulation patterns, releasing nutrients that increase algal populations, releasing chemicals that adversely affect plants and animals, increasing turbidity levels, changing the capacity of vegetated shallows to stabilize bottom materials and decrease channel shoaling;
- Reducing the value of vegetated shallows as nesting, spawning, nursery, cover, and forage areas, as well as their value in protecting shorelines from erosion and wave actions; and
- Encouraging the growth of nuisance vegetation.[220]

Without additional information regarding impacts to vegetated shallows, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

iv) Project will cause or contribute to significant degradation of riffle and pool complexes

Riffle and pool complexes are particularly valuable habitat for fish and wildlife. When water flows over a "coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water."[221] Pools are deeper areas associated with riffles, but have

[218] 40 CFR § 230.42.
[219] *Id.* § 230.43.
[220] *Id.*
[221] 40 CFR § 230.45.

a slower stream velocity and flow. Pools also have a smooth surface and finer substrate.[222] Impacts to riffle and pool complexes are discussed in more detail in Section VII.

The applicants propose to cross at least 485 waterways along the pipeline route and terminal site. Many of the proposed stream crossings are vulnerable to channel migration, avulsion, and/or scour. Altering stream hydrology in this way could increase scouring or sedimentation of pools and riffles. For example, a total of 113 sites were classified as moderate and high risk for pipeline exposure due to potential stream instability as a result of pipeline construction.[223]

This assessment is dated from August 2017 and the applicants have altered the route and proposed activities since the report was completed. But reviewing this information highlights the potential for channel migration, avulsion, and/or scour that would degrade pool and riffle systems for many waterways crossed by the pipeline.

To provide a specific example, the applicants identify seven stream crossings in the Rogue Basin as having Level 1 (moderate) risk of channel migration, avulsion, and/or scour. The crossing of North Fork Little Butte Creek, which is already impaired for dissolved oxygen, temperature, and sedimentation, is identified as having a high risk of channel migration, avulsion, and/or scour. No site-specific analyses of these moderate and high risk crossings is provided by the applicants. The Corps should require site-specific information including, but not limited to the specific location of access roads, details of proposed blasting, and the location of temporary coffer dams.

Table 4. Waterways in the Rogue Watershed Crossed by Pipeline with Moderate and High Risk of Channel Migration, Avulsion, and/or Scour

Waterbody crossed by pipeline	Level 1 (moderate) risk of channel migration, avulsion, and/or scour	Level 2 (high) risk of channel migration, avulsion, and/or scour	Bore	HDD
West Fork Trail Creek (MP 118.89)	X			
Canyon Creek (MP120.45)	X			
Rogue River (MP 122.65)				X
Deer Creek (MP 128.49)	X			
Neil Creek (MP132.12)	X			
Medford Aqueduct (MP 133.38)			X	
Lick Creek (MP 140.27)	X			
Salt Creek (MP 142.57)	X			
North Fork Little Butte Creek (MP 145.69)		X		
South Fork Little Butte Creek (MP 162.45)	X			

In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings in the Rogue watershed cut through waterbodies that are already impaired for sedimentation. Specifically, Little Butte Creek and the

[222] *Id.*

[223] Pacific Connector Pipeline Stream Crossing Risk Analysis Addendum Pacific Connector Gas Pipeline Coos, Douglas, Jackson, and Klamath Counties, Oregon File No. 22708-001-00 August 28, 2017. P. 5. 8 May 2018. Part 2 Appendix B. P. 1963.

South Fork of Little Butte Creek are both listed as impaired for sediment.[224] The South Fork Little Butte Creek crossing is identified as a moderate risk for channel migration, avulsion, and/or scour while the North Fork Little Butte Creek is identified as high risk. However, the applicants do not provide any further field assessments or site-specific analysis regarding these high risk crossings in waterbodies that are already impaired for sediment. According to Table 2.2-13 Site-Specific Waterbody Crossing Plans, the applicants have provided a site-specific crossing plan in Appendix E.2 for the South Fork Little Butte Crossing, but this plan is not included in the 8 May 2018 JPA documents.

The Corps must fully evaluate the potential loss of values to riffle and pool systems, as required under 40 CFR 230.45, including but not limited to:

- Eliminating pool and riffle areas by displacement, hydrologic modification, or sedimentation;
- Altering stream hydrology and causing scouring or sedimentation of riffles and pools; and
- Eliminating pools and meanders, reducing the water holding capacity of streams and causing rapid runoff from a watershed.

Without additional information regarding impacts to riffle and pool complexes, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

v) Project will cause or contribute to significant degradation of municipal and private water supplies

The impacts to municipal and private water supplies are discussed in Section II B *infra*. The Corps' regulations define municipal and private water supplies as "Municipal and private water supplies consist of surface water or ground water which is directed to the intake of a municipal or private water supply system."[225]

The project will likely impair public and private domestic water supply by contaminating sources through a frac-out as a result of HDD proposed for rivers such as the Rogue that are a source of public drinking water, increasing sedimentation through the construction of stream crossings, and increasing temperature by removing riparian vegetation. The applicants identify 12 surface water source areas that would be impacted by the proposed activities.[226] Further, the report identifies multiple sites where a potable water intake is located less than three miles downstream from the proposed pipeline crossings. Withdrawing large volumes of freshwater for activities such as hydrostatic testing will also impair water quality and quantity, thus impacting public and private domestic water supply.

[224] OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, ROGUE RIVER BASIN TMDL 1-20 (2008),https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.

[225] 40 C.F.R § 230.50.

[226] PCP RR2, *supra* note 10, at12 (*See* Table 2.26); PCP A-B Part 6. P. 223.

There are also a number of private potable water intakes less than three miles downstream from proposed pipeline crossings.[227] Impacts to groundwater resources can impact surface waters, and therefore have the potential to significantly degrade public and private drinking water. The applicants have not provided reasonable assurances that impacts to groundwater resources will not impact surface waters and degrade public water supplies.

For example, the Winston Dillard Water District is identified by the applicants as one Drinking Water Source Area that would be impacted by the proposed activities. The Winston Dillard Water District obtains drinking water from the South Umpqua River and its tributaries, including Lookingglass Creek and Olalla Creek, which would be crossed by the pipeline.[228] The 2003 Source Water Assessment identifies the following primary contaminants of concern for surface water intakes: sediments/turbidity, microbiological, and nutrients.[229] Additionally, the Source Water Assessment identifies sensitive areas with high to moderate risk that have high soil permeability, high soil erosion potential, high runoff potential, and areas that are within 1,000 feet from rivers and streams.[230]

In order to assess the direct, indirect, and cumulative impacts to municipal systems such as the Winston Dillard Water District, the Corps must require the following information from the applicants for all potentially impacted drinking water source areas:

- Stream miles in erodible soils;
- High soil erosion potential present (the percentage of stream miles with high erosion potential within 300 feet of streams);
- Shallow landslide potential;
- Landslide deposits;
- Previous Harmful Algal Bloom (HAB) advisories;
- DEQ water quality limited listing indicating the waterbody needs TMDL for Algae and aquatic weeds, Chlorophyll-A, pH, Dissolved Oxygen; and
- Oregon Health Authority (OHA) Drinking Water Source sampling locations for cyanobacteria toxins.

Similarly, at the terminal site, the residents of Coos Bay and North Bend rely primarily on the Upper Pony Creek and Merritt Reservoirs, as well as the Joe Ney Reservoir, to supply municipal drinking water. The Coos Bay-North Bend Water Board ("CBNBWB") also relies on groundwater from 19 wells in the Dunes National Recreation Area that can supplement industrial needs and municipal use.[231] Resource Report 2 for the LNG terminal does not provide substantive detail regarding impacts to municipal sources. In fact, the report states that "water

[227] *Id.*
[228] OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WINSTON DILLARD WATER DISTRICT PWS 4100957: SOURCE WATER ASSESSMENT 1 (2003), https://www.deq.state.or.us/wq/dwp/docs/swasummary/pws00957.pdf.
[229] *See Id.*
[230] *Id.* at 2.
[231] Coos Bay-North Bend Water Board, *Consumer Confidence Report* (2016), . http://cbnbh2o.com/assets/Reports/2016_ccr.pdf.

supply in the JCEP Project Area is provided through municipal sources," but provides no further detail.[232] The Corps should fully assess potential impacts to the drinking water protection area from construction, operations, and maintenance of the LNG terminal and related facilities.

The Corps must fully evaluate the potential loss of values to municipal and private water supplies, including but not limited to:

- Impacts to water quality that affect the color, taste, odor, chemical content and suspended particulate concentration, in such a way as to reduce the fitness of the water for consumption;
- Additions of suspended particulates, viruses and pathogenic organisms, and dissolved materials;
- Potential expenses to municipalities and citizens to remove such substances before consumption;
- Changes to quantity of water available for municipal and private water supplies; and
- Potential for toxic effects on consumers when commonly used water treatment chemicals interact with suspended or dissolved substances as a result of dredged or fill material.[233]

Without additional information regarding impacts to municipal and private water supplies, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

2. The Project Will Have Significant Adverse Effects on Aquatic Life and Aquatic Ecosystems

The applicants have failed to demonstrate that the proposed activities will not have significant adverse effects on aquatic life and aquatic ecosystems that would significantly degrade waters of the United States in violation of 40 CFR 230.10(c). Construction and operation of the terminal and related facilities will result in significant degradation of waters of the United States by adversely impacting aquatic life and aquatic ecosystems.

The proposed activities related to construction and operation of the terminal and pipeline will:

- Result in wake stranding, impingement, and entrainment of juvenile fish;
- Harm threatened and endangered species;
- Impair high quality benthic communities; and
- Harm marine mammals and sea turtles.

a) Fish Impingement and Entrainment

NMFS and DEQ raised as a major concern that LNG tankers will impinge and entrain juvenile salmon and other fish when the tankers take on cooling water. Cooling water withdrawals for the

[232] Jordan Cove Energy Project Resource Report 2 Water Use and Quality. P. 3. JCEP E-N Part 3 p. 334.
[233] 40 C.F.R § 230.50

project will require the intake of over 50 million gallons of Coos Bay water, presenting a significant risk of entrainment and impingement of salmonids that is not adequately addressed in the JPA. Hydraulic pipeline dredging also has the potential to impact aquatic species through entrainment and impingement.

b) Impacts to Threatened and Endangered Fish and Wildlife

The project would jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act, or result in the likelihood of the destruction or adverse modification of critical habitat under the ESA. These impacts to threatened and endangered species include impacts to Coho salmon, green sturgeon and eulachon. Specific impacts to threatened and endangered species have been discussed in more detail in Section II.

c) Impacts to High Quality Benthic Communities

Benthic organisms that are vital to the aquatic ecology of Coos Bay reside in high-quality, intertidal land that would be permanently altered by the proposed action. According to the DEIS:

> Prey species that are important for local EFH fish species rely on many of the same habitat conditions as the EFH fish species. The food web components including phytoplankton, zooplankton, detritus, epiphyton, and SAV (e.g., eelgrass, macrophytic algae) are all important in supplying the habitat and food base for EFH species within Coos Bay. For example, submerged grasses or SAV are important habitat for small prey species of adult lingcod (in Appendix B-2 of PFMC 2008). Forage items that are habitat components for the managed species do depend to some extent on estuarine systems. Many species of groundfish and salmonids occupy inshore areas of the lower bay during juvenile stages (e.g., Chinook salmon, coho salmon, English sole) where they feed on estuarine-dependent prey, including shrimp, small fishes, and crabs. As they mature and move offshore, their diets in many cases change to include fish, although estuarine dependent species (e.g., shrimp, crabs) can still constitute an important dietary component.…
>
> The proposed dredging would also directly remove benthic organisms (e.g., worms, clams, starfish, and vegetation) from the dredged area. Mobile organisms such as crabs, many shrimp, and fish could move away from the region during the process, although some could be entrained during dredging so that direct mortally or injury could occur. Based on 1978 maps of shellfish (Gaumer et al. 1978), shrimp, softshell calms, bentnose clams, and cockles are located within the intertidal areas near the slip and within proposed dredge areas (west of the Roseburg Forest Products Company site). ODFW captured Dungeness crab and red rock crab in this area during 2005 seining efforts. These species could be injured or killed during dredging operations.[234]

[234] 2014 DEIS, *supra* note 73, at 4.5-57 – 4.5-64.

Additionally, as discussed in Section II(B)(4)(d), dredging in Coos Bay will also degrade the habitat of the native mud shrimp, further reducing water quality in Coos Bay.

d) Marine Mammals and Sea Turtles[235]

As discussed in Section II, the LNG terminal and the tankers will harm marine mammals due to habitat destruction and vessel strikes, and noise from construction of the marine slip (including pile driving) may adversely impact pinnipeds. The Corps should consider whether these potential impacts can be adequately addressed.

In conclusion, the Corps cannot certify that the project will not adversely impact aquatic life and aquatic ecosystems because of the proposed activities related to construction and operation of the terminal and pipeline that will directly, indirectly, and cumulatively harm aquatic species. The applicants have failed to demonstrate that the proposed activities will not directly, indirectly, and cumulatively harm aquatic species.

3. The Project Will Have Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity, and Stability

In addition to direct, indirect, and cumulative impacts to aquatic species, the proposed activities will likely result in significant adverse effects to aquatic ecosystem diversity, productivity, and stability primarily through degradation of habitat.

The proposed activities related to construction and operation of the terminal and pipeline will likely:

- Increase water temperature as a result of discharged cooling water and riparian vegetation removal;
- Impact salinity levels;
- Decrease dissolved oxygen;
- Destroy important wetland habitat;
- Increase sedimentation; and
- Increase the presence of invasive species.

a) Increased Water Temperature – LNG Cooling Water Discharge and Riparian Vegetation Removal

As discussed in Section II, the LNG carriers might discharge cooling water that heats the ambient water temperatures, violating Oregon's numeric water quality standards and causing significant harm to ecosystems.

[235] *See* OAR 340-041-0002(72): "Waters of the state" means lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface or underground waters) that are located wholly or partially within or bordering the state or within its jurisdiction.

b) Impacts to Salinity

The JPA fails to adequately address salinity changes and resulting impacts to fish resources in Coos Bay. The JPA likewise does not address the impacts of fertilization in riparian areas and nutrient loading impacts on water quality. Increased salinity could degrade habitat for fish and wildlife, as well as alter the entire aquatic ecosystem.

c) Decreased Dissolved Oxygen

Decreased DO in waterways is a significant pollution problem, affecting fish and aquatic species in a variety of ways at different life stages and life processes. The impacts of decreased dissolved oxygen have been discussed in more detail in Section II.

d) Degraded Wetland Habitat

Impacts to wetlands have been discussed in Section II and will be discussed in more detail in Section IV.

e) Increased Sedimentation

The impacts of increased sedimentation as a result of the proposed activities have been discussed in more detail in Section II.

f) Invasive Species

As mentioned in Section II, Jordan Cove will introduce or allow the proliferation of invasive and exotic species to Coos Bay, the terminal site, and along the pipeline route. The Corps should fully analyze the direct, indirect, and cumulative impacts of these species from the construction and operation of the LNG terminal and related facilities and resulting conditions that are deleterious to aquatic life.

In conclusion, the applicants have not demonstrated that the project will not adversely impact aquatic ecosystems because of the proposed activities related to construction and operation of the terminal and pipeline that will directly, indirectly, and cumulatively harm aquatic ecosystem diversity, productivity, and stability. Therefore, the Corps cannot authorize the 404/10 permit under 40 CFR 230.10(c).

4. The Project Will Result in Significant Adverse Effects on Recreational, Aesthetic, and Economic Values

The terminal and accompanying carriers will likely cause economic harm by inhibiting the flow of boat traffic, diminishing the tourism appeal of the area, and negatively impacting the housing market. Coos County is home to many commercial and recreational fishermen. Coos Bay has a flourishing oyster industry. The LNG-related delays caused to commercial fishing vessels would thus be felt heavily in Coos County. Shipping and tourist vessels bound for Coos County would experience similar costly delays. Additionally, property values of areas near Jordan Cove or anywhere along the LNG tanker pathway would experience a considerable decrease, due to factors such as the diminished aesthetic appeal of the area as well as the ongoing subjection to the blast zone of the LNG carriers. Also associated with the risks inherent in LNG are increased insurance costs.

Construction of the Jordan Cove LNG terminal would diminish recreational and commercial fishing due to both the fishing vessels' compliance with the mandatory safety zone accompanying every LNG traveling to Jordan Cove LNG terminal.

F. Jordan Cove Has Failed to Adequately Avoid, Minimize, or Mitigate the Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

In 1990, EPA and the Department of Army entered into a Memorandum of Agreement (MOA) to clarify the type and level of mitigation required under Section 404 regulations. The agencies established a three-part process, known as mitigation sequencing, to help guide mitigation decisions.[236] Only after this sequence has been satisfactorily completed can the Corps review the proposed compensatory mitigation:

1. Avoid - Adverse impacts are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact.
2. Minimize - If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.
3. Compensate - Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain.[237]

Under these guidelines, the Corps must first evaluate the proposed activities to determine whether potential impacts have been avoided. The Corps cannot authorize a discharge of dredged or fill material unless it can be demonstrated that it will not have an unacceptable adverse impact.[238] In order for an applicant to receive a 404 permit from the Corps that allows the discharge of dredged or fill material, "practical steps [must be taken to] minimize potential adverse impacts of the discharge on the aquatic ecosystem."[239] As stated in the MOA:

> Section 230.10(a) allows permit issuance for only the least environmentally damaging practicable alternative. The thrust of this section on alternatives is avoidance of impacts. Section 230.10(a) requires that no discharge shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. In addition, Section 230.10(a)(3) sets forth rebuttable presumptions that 1) alternatives for non-

[236] 40 CFR § 230.91(c).
[237] Memorandum of Agreement Between the Department of the Army and the Environmental Protection Agency. The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines. 6 February 1990. https://www.epa.gov/cwa-404/memorandum-agreement.
[238] 40 CFR § 230.1(c).
[239] *Id.* § 230.10(d).

> water dependent activities that do not involve special aquatic sites are available and 2) alternatives that do not involve special aquatic sites have less adverse impact on the aquatic environment. Compensatory mitigation may not be used as a method to reduce environmental impacts in the evaluation of the least environmentally damaging practicable alternatives for the purposes of requirements under Section 230.10(a).

The applicants are not in compliance with the mitigation sequencing established by the EPA and the Corps because the proposed mitigation fails to avoid adverse impacts, practical steps were not taken to minimize the adverse impacts, and the appropriate compensatory mitigation was not selected. Therefore, the Corps must deny the 404/10 permit.

1. The Project Would Result in Unacceptable Adverse Impacts in Violation of 40 CFR § 230.91(c).

The Corps should not authorize the proposed discharges of dredged and fill material because the proposed project will result in unacceptable adverse impacts. As discussed in previous sections, the adverse impacts range from increased temperature as a result of removing riparian vegetation along the pipeline route to decreased dissolved oxygen as a result of proposed dredging activities in Coos Bay. Therefore, the Corps should not authorize the proposed discharges of dredged or fill materials.

Under its regulations and related MOA, the Corps must first make a determination that potential impacts have been avoided to the maximum extent practicable. Even a "partial reduction in function" is still contrary to the Corps' mandate. Therefore, the Corps must sufficiently document their reasoning for approval in the administrative record.[240]

The applicants have not thoroughly demonstrated that adverse impacts have been avoided and that practicable alternatives have been selected. The applicants have failed to demonstrate that there are no other, less damaging project alternatives, such as those that do not damage special aquatic sites, including but not limited to wetlands, mud flats, vegetated shallows, and riffle and pool systems. Further, the applicants have failed to demonstrate that the proposed project would have less adverse impacts than the alternatives. The Corps should require additional information, particularly regarding direct, indirect, and cumulative impacts to special aquatic sites as a result of the proposed activities from the applicants.

2. The Applicants Have Not Minimized Adverse Impacts in Violation of 40 CFR § 230.91(c).

The applicants have failed to demonstrate that they have minimized adverse impacts to the maximum extent practicable where adverse impacts are unavoidable. According to the 2017 Compensatory Wetland Mitigation Plan (Mitigation Plan) provided by the applicants in the February 6th JPA package, the applicants identify a total of 26.64 acres of impacts that will

[240] *O'Reilly v. U.S. Army Corps of Eng'rs*, 477 F.3d 225, 231-32 (5th Cir. 2007).

require mitigation for the entire project.[241] The majority of the impacts identified by the applicants that require mitigation will occur at the terminal site (25.81 acres) with the remainder related to the pipeline (0.83 acres). [242] As stated by the applicants:

> The proposed LNG Terminal will result in *unavoidable, permanent* impacts to freshwater wetlands and estuarine habitats . . . within the intertidal and shallow subtidal zone of Coos Bay[. . .]The proposed Pipeline will result in *permanent* impacts to wetlands in the form of permanently converting forested and scrub-shrub wetlands to emergent wetlands as a result of temporary disturbance activities involved with pipe installation. Conversion from a forested to an emergent wetland condition is viewed as a permanent wetland impact by the USACE and DSL due to an overall loss of wetland functions (Oregon Revised Statutes [ORS] 141-085-0680). [243]

To mitigate these impacts, the applicants propose to construct the Eelgrass Mitigation Site (9.34 acres) in the Coos Bay estuary and the Kentuck Project (100 acres) adjacent to Kentuck Slough and Kentuck Creek.[244] The applicants claim that because the impacts are spread out over a long distance, it is not practicable to provide mitigation for each impact.[245] Despite identifying impacts to the likely many additional waterways, wetlands, and floodplains, the Compensatory Wetland Mitigation Plan only proposes mitigation in Coos Bay at these two sites.[246]

The applicants must demonstrate that the proposed activities avoid impacts to special aquatic sites to the maximum extent practicable.[247] To determine adverse impacts, the Corps should examine:

> 1) physical substrate determinations;
> 2) water circulation, fluctuation, and salinity determinations;
> 3) suspended particulate/turbidity determinations;
> 4) contaminant determination;
> 5) aquatic ecosystem and organism determinations;
> 6) proposed disposal site determinations;
> 7) determination of cumulative effects on the aquatic ecosystem; and
> 8) determination of secondary effects on the aquatic ecosystem.[248]

The applicants downplay the potential adverse impacts to waterways along the pipeline route, asserting that the proposed activities related to the pipeline "consist of very small impacts that

[241] Jordan Cove Energy Project and Pacific Connector Pipeline, *Compensatory Wetland Mitigation Plan* 1 (2017) hereinafter Mitigation Plan; ; JPA Part 10 JCEP P. 395.
[242] Mitigation Plan, *supra* note 249, at 1; JPA Part 10 JCEP P. 395.
[243] Mitigation Plan, *supra* note 249, at 2; JPA Part 10 JCEP P. 396. Emphasis added.
[244] Mitigation Plan, *supra* note 249, at 3; JPA Part 10 JCEP P. 398.
[245] Mitigation Plan, *supra* note 249, at 17; 10 JCEP P. 411.
[246] Mitigation Plan, *supra* note 249, at 17; 10 JCEP P. 411.
[247] 40 C.F.R § 230.1(c).
[248] *Id.* § 230.11.

are spread out over a very long distance" and will "result only in a partial loss of wetland functions."[249] However, the Corps must fully assess the direct, indirect, and cumulative effects of the proposed activities to ensure that the applicants have not only avoided adverse impacts, but also minimized them.[250]

3. The Proposed Mitigation is Not Sufficient and is in Violation of 40 CFR § 230.93.

In addition to failing to avoid and minimize adverse impacts, the applicants have also failed to propose adequate compensatory mitigation. While the Corps' reasoning for their approval of a mitigation plan "need not be laid out in the finest detail," the selected mitigation success cannot be predicted on "mere perfunctory or conclusory language."[251]

The applicants state that they will mitigate the impacts to the species affected by destruction of habitat through its Mitigation Plan. However, the Mitigation Plan will be insufficient to mitigate the adverse impacts of filling the wetlands. The filling of the wetlands and their resulting destruction will be certain, permanent, and imminent. In contrast, the measures to be implemented in the Compensatory Wetland Mitigation Plan and the effectiveness of such measures are highly uncertain. Furthermore, even if the measures of the Mitigation Plan are successfully implemented, the benefits from the measures may accrue slowly while the endangered and threatened species are put in further jeopardy by a lack of essential habitat. For example, the previous DEIS categorizes as "temporary" impacts those that may recover within three years. Three years of degraded and lost habitat within the Coos Bay estuary could have significant effects on benthic habitat, water quality, and the aquatic organisms that depend on these areas for survival.

The Corps' "path" to approving the mitigation plan from the applicants should "reasonably be discerned" within the administrative record.[252] The Corps must therefore require the applicants to provide a more thorough analysis concerning the effectiveness of the Mitigation Plan.

In the Compensatory Wetland Mitigation Plan, the applicants state:

> Pipeline impacts to wetlands will consist of several relatively small, individual impacts spread over a large geographic area, and ***therefore it was deemed impracticable to conduct wetland mitigation at multiple sites in the various watersheds the Pipeline crosses.*** Instead, wetland mitigation for the Pipeline emphasized consolidating mitigation in a single location that would have a high likelihood of success. Therefore, Pipeline mitigation is being incorporated into the same location as much of the LNG Terminal wetland mitigation, which will occur at the Kentuck Project site in Coos Bay, Oregon.[253]

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249 Mitigation Plan, *supra* note 249, at 17; 10 JCEP P. 411.
250 40 C.F.R § 230.11(g).
251 *O'Reilly,* 477 F.3d at 231-32.
252 *Nat'l Ass'n of Home Builders v. Defs. of Wildlife*, 551 US 644, 658 (2007). (quoting *Bowman Transp., Inc. v. Arkansas–Best Freight System, Inc.*, 419 U.S. 281, 286 (1974)).
253 Mitigation Plan, *supra* note 249, at 1; 10 JCEP P. 396. Emphasis added.

The "fundamental objective" of compensatory mitigation is to offset "environmental losses" in light of what is "environmentally preferable."[254] The regulation further requires:

> …[T]he required compensatory mitigation ***should be located within the same watershed as the impact site***, and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses.[255]

As opposed to off-site and out-of-kind mitigation, on-site mitigation is when the mitigation area is either located on the same parcel of land, or contiguous to, the impact site.[256] In-kind mitigation is when mitigation occurs from a similar structural resource and functional type from the impacted resource.[257] In-kind mitigation is preferable to out-of-kind mitigation because it is required to be of similar type to the affected aquatic resource and therefore most likely to compensate for the functions and services lost at the impact site.[258]

The Corps' regulations make clear that off-site and out-of-kind mitigation is the *last* and *least* preferable option for compensatory mitigation. Out-of-kind mitigation can only be used when in-kind mitigation is proven to be impractical, by the district engineer, using a detailed watershed approach.[259] Selecting out-of-kind mitigation and the reasons for doing so must be documented in the administrative record.[260]

The applicants currently propose to mitigate all of the identified impacts to aquatic resources within Coos Bay at the Kentuck and Eelgrass Mitigation sites. Mitigating impacts to small streams, forested wetlands, and within watersheds that are hundreds of miles from Coos Bay by restoring eelgrass beds and an estuarine wetland is not "of a similar type to the affected aquatic resource" for many of the proposed pipeline impacts.[261] Therefore, while the applicants claim their selected mitigation is "in-kind," the mitigation actually proposed is both off-site and out-of-kind mitigation, running contrary to the Corps' guidelines under 33 CFR 332.3(e).

After the applicants discovered there were no mitigation bank credits available, they attempted to camouflage their selected in-kind mitigation by referring to it as "like-kind,"[262] but nowhere in

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[254] 33 CFR § 332.3(a)(1).
[255] *Id.* § 332.3(b)(1).
[256] *Id.* § 332.2.
[257] *Id.* § 332.2.
[258] *Id.* § 332.3(e)(1).
[259] *Id.* § 332.3(e)(2); *Ohio Valley Environmental Coalition v. Aracoma Coal Co.*, 556 F.3d 177, 204 (4th Cir. 2009).
[260] 33 CFR § 332.3(e)(2).
[261] *Id.* § 332.3(e)(1); 40 CFR § 230.93(e)(1).
[262] Mitigation Plan, *supra* note 249, at 2,17; 10 JCEP P. ("The Pipeline investigated whether credits could be obtained from a mitigation bank; however mitigation banks with available credits and service areas that overlap with the Pipeline are not available").

the regulations is "like-kind" identified as an option. The applicants' selected remedy differs both structurally and functionally from the impacted resource, making it out-of-kind.[263] Therefore, a detailed explanation is required in the administrative record, which the applicants have not done. Restoring eelgrass beds, which provide particular functions and specific values related to marine resources, cannot be considered to provide a similar function and value as a forested wetland impacted by the pipeline in the Rogue watershed.

The Corps must require additional information from the applicants to adequately assess the direct, indirect, and cumulative impacts of the proposed activities. After acquiring sufficient information to determine whether the applicants have avoided adverse impacts, the Corps should then consider whether the applicants have appropriately minimized those impacts.[264] Finally, if the Corps can move forward from that point, then the agency must assess the proposed compensatory mitigation with a preference for on-site and in-kind mitigation, rather than the off-site and out-of-kind mitigation that the applicants have proposed. Because the applicants have not provided sufficient information, have not demonstrated that adverse impacts have been avoided or minimized, and have proposed the least preferable type of mitigation, the Corps must deny the 404/10 permit.

III. The Corps Must Deny the Permit Because the Project is Not in the Public Interest

The Corps must deny the 404 permit because the project is not in the public interest. According to Corps general policies, the public interest review "will be based on an evaluation of the probable impacts, including cumulative impacts" of the proposal "on the public interest."[265] This evaluation requires a "careful weighing of all those factors which become relevant" to the particular case.[266] The regulation enumerates several factors which must be considered by the Corps, each of which is addressed below. The permit must be denied if it does not comply with the 404(b)(1) EPA guidelines, or if the district engineer determines it would be contrary to the public interest.[267]

The Corps must apply the following criteria when determining whether the LNG terminal and pipeline are in the public interest:

> i) The relative extent of the public and private need for the proposed structure or work;
> ii) Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative location and methods to accomplish the objective of the proposed structure or work; and
> iii) The extent and permanence of the beneficial and/or detrimental effects which the proposed structure or work is likely to have on the public and private uses to which the area is suited.[268]

[263] 33 CFR § 332.2.
[264] *O'Reilly*, 477 F.3d at 231-32.
[265] 33 CFR 320.4(a).
[266] *Id.*
[267] *Id.*
[268] *Id.* § 320.4(a)(2).

The "specific weight" of each factor is to be determined case-by-case.[269] Also, the Corps is required to give "full consideration and appropriate weight" to all comments.[270] The Corps should fully review the direct, indirect, and cumulative impacts to conservation, economics, aesthetics, general environmental concerns, 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 need, safety, food and fiber production, mineral needs, consideration of property ownership, and the needs and welfare of the people.

The public interest review for this permit is especially important. Many of the public interest factors are described in further detail throughout these comments, and should be considered by the Corps in that framework. Some of the relevant factors that are not discussed in other sections are described below.

A. Public Need

This project has an imbalance between the benefits, which accrue almost exclusively to a private company, and detrimental effects, which fall entirely on the public and other private landowners. There is no demonstration of *public* need for this project at all. In fact, FERC approval was recently denied for exactly that reason.[271]

B. Aesthetics

The proposed activities for the project will impair the aesthetic values of Coos Bay and the other waterways crossed by the pipeline. The project impacts aesthetic values by damming, trenching, blasting, and diverting waterways to build pipeline stream crossings; cutting down 75-foot buffers around stream crossings; dredging sections of Coos Bay; filling in wetlands; permanently destroying habitat, such as eelgrass beds; and constructing huge, ugly industrial structures in beautiful natural areas. Construction and operation of the terminal and pipeline will impose an aggressively industrial facility onto the landscape, degrading its aesthetic value for tourists and residents. Air pollution as a result of LNG tanker operations and operation of the LNG terminal would be another negative impact in Coos Bay, as well as along and off the coast. The pipeline too would be an aesthetic blight on the landscape. This impact would probably be most strongly felt by landowners who were forced through eminent domain to allow pipeline construction and operation through their land, diminishing overall property values and the aesthetic value of the land. Negative aesthetic impacts also would be found along the pipeline corridor as it crosses public and private forestlands, clearing a swath through the forest and necessitating the construction of roads and other infrastructure.

C. Land Use

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[269] *Id.* § 320.4(a)(3).
[270] *Id*
[271] FEDERAL ENERGY REGULATORY COMMISSION, ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION 18 (2016).

The LNG facility is out of character with the other industrial port operations here. Those other operations are focused on the timber industry, a long-standing and traditional part of the character and culture of the area. The LNG facility by contrast will be a massive fossil fuel infrastructure, completely out of character with the surroundings and local community. Analysis and decision-making is ongoing in towns and counties along the route. The Corps must carefully consider the status of the project's compliance with other land use plans.

D. Climate Impacts

We are very concerned that this project would significantly increase the amount of greenhouse gas pollution from fossil fuels, contributing to one of the greatest environmental challenges of our time: global climate change. The recent report, Oil Change Int'l (Jan. 2018) explains that this project would contribute 36.8 million metric tons of GHG emissions annually.[272] It further found "no evidence to support an assumption that gas supplied by the project would replace coal in global markets."[273] Further, the Corps should consider the upstream effects of this project in terms of spurring further development of fracked gas in the U.S. Rockies and Western Canada. This is a significant negative public impact. The importance of analyzing these impacts under NEPA cannot be overstated. For example, the Washington Shoreline Hearings Board found that the EIS for the Kalama methanol refinery was deficient by failing to consider climate effects.[274]

E. Historic Properties

The public interest review requires due consideration of impacts to historic, cultural, scenic and recreational values, such as those associated with wild and scenic rivers; seashores; national recreation areas; lakeshores; parks; monuments; estuarine and marine sanctuaries; archaeological resources; and other state, regional or local classifications. The Corps decision on the 404/10 permit should "insofar as possible, be consistent with, and avoid significant adverse effects on the values or purposes" of such classifications.[275]

There are many historic properties and values in the project area, some of which would be destroyed and others degraded by construction and operation. Historic properties and values include, but are not limited to the:

- Historic village site at Coos Bay;
- Coos Bay museum property;
- Oregon Dunes National Monument;
- Shipwreck near the mouth of Coos Bay; and
- Oregon seashore.

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[272] Oilchange International, *Jordan Cove LNG and Pacific Connector Pipeline Greenhouse Gas Emissions Briefing* (2018), http://priceofoil.org/content/uploads/2018/01/JCEP_GHG_Final-Screen.pdf.
[273] *Id.*
[274] Earthjustice, *Port Of Kalama Refinery Violated The Law By Failing To Evaluate Greenhouse Gas Impacts* (Sept. 18, 2017), https://earthjustice.org/news/press/2017/port-of-kalama-violated-washington-law-by-failing-to-evaluate-greenhouse-gas-impacts.
[275] 33 C.F.R § 320.4(e).

F. Tribal Sovereignty

It is important that the government heavily weigh tribal sovereignty and interests in its public interest analysis. Tribal leaders from four tribes testified to Oregon's Environmental Justice Task Force ("EJTF") Committee on June 8 in Klamath Falls about their concerns on the negative impacts of building and operating PCP and the JCEP. Each tribe is a sovereign nation with corresponding rights of their own. Those rights do not rely on this legal process, much less on non-tribal public commenters, for vindication. Rather, the U.S. government has an obligation in this process to honor those rights and interests. In working with the State of Oregon and various state agencies, representatives of several tribes have expressed their frustration in not being adequately consulted about the impacts this project would have on their people and lands. We stand in solidarity with these tribes as they assert their rights, and agree with the Environmental Justice Task Force that this project is not in the public interest because of its disproportionate negative impacts on tribes. A project cannot be in the "public interest" if it violates fundamental obligations to tribes.

By way of emphasis, a summary of the EJTF meeting, which contains some detail regarding the important tribal interests at stake, follows.

Chairman Don Gentry of the Klamath Tribes discussed the inadequate legal protection of ancestral lands and their cultural significance. Noting that the pipeline is routed through burial grounds with cultural and human remains, Chairman Gentry said that the Klamath Tribes' "interests have been marginalized," and that environmental justice is a legal, moral, and spiritual obligation.

Margaret Corvi, Director of the Department of Natural Resources of the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw, emphasized the importance of these tribes' identity and connection with the land. She noted that JCEP has grown dramatically since 2006, now threatening tribal lands more than ever. Other concerns she voiced included the disturbance of burial sites; the contamination of areas used for gathering roots, basketry materials, and shellfish; the reduced access to fishing due to vessel traffic and erosion; the intrusion of industrial noise into fishing and cultural activities; and the lack of consultation by FERC or state agencies about mitigating harm to tribal resources.

David Gensaw, Vice Chairman of the Yurok Tribal Council, contended that the PCP would devastate the Yurok's long standing traditions of hunting, gathering, fishing, praying, and practicing spiritual healing, lamenting that the Yurok have already "been through devastation." He noted that in 2014, 80 percent of the juvenile salmon run was lost, and that in 2015, 90% of the run was lost on the Klamath River, all due to global warming and warm water conditions that would be exacerbated by the operation of JCEP and the PCP. The pipeline, Vice Chairman Gensaw noted, would wind through 250 miles of land and five rivers, destroying extensive swaths of tribal land.

Jason Robinson, Director of Natural Resources of the Cow Creek Band of Umpqua Tribe of Indians, echoed the concerns of other tribal spokespeople, adding that the pipeline will transect 123 miles of ancestral land, creating a disproportionate burden on the Umpqua Tribe. He beseeched federal and state agencies to individually consult with each affected tribe to address their specific issues and concerns; no substantive consultation has occurred to date.

Following the testimony of the four tribes, the EJTF concluded that the PCP would "irrevocably change Oregon" to the detriment of both tribal and public interests. The Oregon Physicians for Social Responsibility issued a statement supporting EJTF's conclusion, writing that the negative impacts of JCEP and the PCP to sovereign tribal nations' waters "constitute an environmental injustice that cannot be mitigated."

G. Safety

"Safety" is an explicitly enumerated factor which the Corps much consider in its public interest review of the §404 permit application.[276] Here, this factor should be weighed heavily because it is so integral to the proposal.

1. Earthquake & Tsunami Hazard is Extreme

The proposed action poses an extreme public safety hazard in light of cumulative impacts associated with the Cascadia Subduction Zone and likely tsunami hazard. The tsunami-related hazard is so extreme it warrants permit denial due to extraordinary negative impacts to the public interest.

The Cascadia Subduction Zone (CSZ) is located off the Oregon coast and extends from Northern California to Vancouver, B.C, where the oceanic Juan de Fuca and Gorda Plates meet the North American Plate. The zone widens from 60 km off southern Oregon to 150 km off the northern Olympic Peninsula in Washington. According to US Geological Survey's 2009 Earthquake Probability Mapping there is a 10% chance of a greater than 5.0 magnitude earthquake in the CSZ in the next 30 years. This probability increases as the years go on with a 20-25% chance in the next 50 years and a 30-40% chance in 100 years. A very recent study based on 13 years of research finds that the Coos Bay area is more vulnerable than northern stretches of the CSZ, and concludes that there is a 40 percent chance of a major earthquake in the Coos Bay region during the next 50 years.[277] The study also found that "major earthquakes tend to strike more frequently along the southern end – every 240 years or so – and it has been longer than that since it last happened."[278]

Forecasts predict that the CSZ is due for an earthquake similar in strength to the 9.0 magnitude earthquake felt off the coast of Japan in March 2011.[279] A high magnitude earthquake in this

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[276] 33 C.F.R § 320.4(a)(1).

[277] *See* Chris Goldfinger, et al., *Turbidite Event History – Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone*, 1661 (Robert Kayen, ed. 2012); Chris Goldfinger, 1*3-Year Cascadia Study Complete – And Earthquake Risk Looms Large*, OREGON STATE UNIVERSITY NEWSROOM (Aug. 1, 2012), http://oregonstate.edu/ua/ncs/archives/2012/jul/13-year-cascadia-study-complete- %E2%80%93-and-earthquake-risk-looms-large

[278] *Id.*

[279] *Id.*

zone would create several different conditions that could severely impact the stability of the terminal and pipeline.[280]

The Jordan Cove LNG Terminal will be constructed on dredged soils, and will thus be susceptible to earthquake liquefaction hazards, which occur when water-saturated sediment is exposed to strong seismic shaking. The shaking causes the grains to lose grain-to-grain contact and the sediment acts as a fluid. Liquefaction is more likely in loose sandy soil with a shallow water table. Liquefied sediment layers may vibrate with displacements large enough to rupture pipelines, move bridge abutments, or rupture building foundations.

Future earthquake could result in further movement of existing rockslides as well as formation of new rockslides along the coast. Landslides along the pipeline route could result in breakage or movement of the pipeline.

The Oregon Department of Geologic and Mineral Industries (DOGAMI) has recently undertaken updated tsunami inundation zone mapping along the Oregon coast. Updated maps for the Coos Bay area show that the Jordan Cove site would be partially inundated in the event of a medium earthquake in the CSZ and would be fully inundated by a tsunami resulting from a larger earthquake. NOAA is also in the process of completing tsunami forecast model reports and will soon post the report for the area around Florence, OR. This model would be a useful guide in considering tsunami risk in Coos Bay.

The Jordan Cove site will include two large LNG storage tanks, the liquefaction terminal, pipeline connections, and marine facilities. Disruption of the site from earthquake or tsunami could compromise the integrity of any of these components and possibly lead to leaking of gas or LNG, disruption in power service to the local grid, gas explosion or other catastrophic event.

The Coos Bay area has a population of about 31,750 according to the 2010 Census. There are residential areas, businesses, and an airport all located within mile of the Jordan Cove site. A hazardous event at the site could seriously impact the safety and infrastructure of the surrounding area. Specific analysis to assess risks in Coos Bay to tankers in transit and in the slip is needed. Tsunami current modeling is constrained by direct observations, and different models produce different results, so a wide margin for uncertainty should be used. For example, strong tsunami currents could cause a tanker breach by pushing it into a hard structure like a jetty, or sweeping it sideways into shallow water where the vessel could roll.

2. Process Safety Hazards

Large, complex, high-stakes industrial facilities such as this pose a unique sort of safety hazard. In addition to the physical components of infrastructure, the management and oversight of facilities needs to be a focus of the analysis as well. At the recommendation of the US Chemical Safety and Hazard Investigation Board, the Baker panel did a "thorough review of the company's corporate safety culture, safety management systems, and corporate safety

[280] *Id.*

oversight."[281] Similarly, after the BP *Deepwater Horizon* oil well blowout, analysis and determinations regarding management and oversight processes were critically important to understanding what happened. Institutional structures and corporate culture matter a great deal, and our scientific ability to rationally address those risk factors has improved dramatically in recent years.

With regard to process safety, three factors warrant special attention: (1) complacency, (2) secrecy, and (3) cost-cutting. The Corps should fully evaluate the potential safety impacts of the project and the proposed activities by the applicants, specifically in the context of these risk factors.

3. Natural Hazards

Statewide Planning Goal 7 requires land use planning to reduce risk to people and property from natural hazards.[282] Regulated natural hazards include floods, landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfire. The proposed LNG terminal would be located in an area subject to extreme risk from earthquake and tsunami inundation.[283] In addition, the pipeline would cross several areas of steep terrain and heavily forested areas within the Coastal Zone, subject to landslide and wildfire risk. Scientists predict that there is a 40 percent chance of a major earthquake (magnitude 8.7 to 9.2) and tsunami on the Cascadia Subduction Zone off Coos Bay in the next 50 years.[284] This type of event would cause violent ground motion, soil liquefaction, lateral spreading and subsidence. In turn, these land changes could cause pipe breaks and damage the LNG storage tanks proposed for the facility. In order to protect the site from tsunami inundation, Jordan Cove proposes to use sand to fill and elevate the property site above the projected inundation level, 40 feet or more about current land elevations.

The project site on the North Spit is located at a bend in Coos Bay, where tidal energy is deflected. The elevation of the land at this location could significantly alter the direction and velocity of an incoming tsunami. For example, instead of running up onto the North Spit and inundating the land there, the proposed sand wall, if it survives the liquefaction and lateral spreading effect of the earthquake, would deflect and redirect the force of a tsunami. DOGAMI has prepared inundation zone maps to help the communities of Coos Bay and North Bend prepare for evacuation and planning in case of tsunami. The proposed significant alteration of the shoreline at this location could have important effects on the inundation of other areas within the Bay Area communities. In other words, the risks of these types of hazards extend beyond just the inundation, liquefaction, and ground shaking at the project site. The project's proposed alterations of the shoreline at the project location could have significant impacts to the communities of the Coos Bay area. These types of risks to people and property must be accounted for in order to protect the public interest and comply with Goal 7.

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[281] BP U.S. Refineries Independent Safety Review Panel, *Safety Report* i (2007).
[282] Oregon's Statewide Planning Goals and Guidelines. Goal 7: Areas Subject to Natural Hazards. 1 June 2002. https://www.oregon.gov/LCD/docs/goals/goal7.pdf.
[283] Cascadia Subduction Zone. Pacific Northwest Seismic Network. https://pnsn.org/outreach/earthquakesources/csz.
[284] Cascadia Subduction Zone. Pacific Northwest Seismic Network. https://pnsn.org/outreach/earthquakesources/csz.

The project's proposed alterations of the shoreline at the project location could have severe and significant impacts to the communities of the Coos Bay/North Bend area in the event of a disaster. These types of risks to people and property must be accounted for in order to comply with Goal 7. In the likely case that there is no adequate mitigation or alternative (short of not building the project at all) for Goal 7 issues, this must be clearly stated so that officials deciding whether the project meets Statewide Planning Goals CZMA standards can weigh the true risks involved.

4. Leak Detection & Situational Awareness

On a pipeline of this length, together with a busy export terminal accommodating international marine traffic, basic monitoring and awareness issues are challenging. The Corps should require the applicants to provide specific monitoring and detection techniques that will be used, review their effectiveness, and compare them with reasonable alternatives. Monitoring the pipeline, particularly in remote areas, will be a special challenge.

5. Incident Response Is Inadequate

A foundational safety deficiency is an almost complete lack of legal framework, planning infrastructure, response equipment, or trained responders to address the very serious risk of LNG leaks and spills. LNG releases are not regulated under the CWA (oil), Comprehensive Environmental Response, Compensation, and Liability Act (hazardous substances), or Clean Air Act (hazardous air pollutants). LNG spills are not addressed in the National Contingency Plan, nor are they addressed in any of the tiered area-, facility-, or region-specific geographic response plans. The Spill Prevention, Control, and Countermeasure plans for construction and operation of both the terminal and pipeline entirely fail to address risks of LNG spills.[285] Oregon State law also does not have any spill prevention or response regulations, or liability regimes, that are pertinent to LNG.[286]

Incident response is an important consideration in facing dramatic potential accidents such as a tanker explosion. Incident responses should be analyzed in relation to the applicable response planning laws and directives, in particular the National Contingency Plan, the Stafford Act, and the National Incident Management System. A complex but discoverable network of plans and directives addresses how to respond to any of the potential hazards posed by this project, hazards which should be disclosed and addressed explicitly.

Commenters have criticized this oversight and called for these incident response gaps to be filled.[287] This planning failure violates established best practices and international protocols, such as the World Bank EHS Guidelines for Liquefied Natural Gas Facilities, various Society of International Gas Tanker and Terminal Operators standards, and National Fire Protection

[285] *See* 40 C.F.R § 112.

[286] *See* ORS 468B.357 (limiting coverage to LNG import terminals); ORS 468B.300 - .500 (spill response rule, defines oil to include LNG); OAR 340-141-0005(29) (excluding LNG from "oil" definition), OAR 340-142-0005(15).

[287] *See* March 22, 2018 letter to ODEQ Commission regarding LNG spill prevention & response planning gap.

Association Codes, which all require that emergency prevention and response frameworks be in place. Siting a facility in a place with no such framework is against the public interest.

6. Chronic Human Health Impacts

The Corps should require the applicants to analyze potential health and safety impacts of the proposal in terms of lower-level chronic exposures to toxins. An undetected slow leak on the pipeline near an occupied residence, for example, could result in harmful health effects. Similarly, but on a grander scale, the LNG terminal is likely to involve *at least* low level releases of pollutants with known negative human health effects. Even presuming the company follows all applicable regulations, negative effects are expected, must be disclosed, and weighed against the public interest.

The applicants should disclose and analyze both (1) all of the hazardous compounds involved in this operation, as well as (2) the potential cumulative effects of exposure to multiple different chemicals over time.

7. Airport Hazard

The Federal Aviation Association ("FAA") recently issued notices of presumed hazard for LNG Carrier vessels at Point 6, Transit East Point, Transit West Point, Transit Point 6, Transit Point 4, Transit Point 3, 2, and 1, the LNG Carrier Vessel Stack (in terminal), the Amine Regenerator, the Oxidizer, and the LNG Tanks North and Sout.[288] According to FAA's aeronautical study conducted under 49 U.S.C., Section 44718, heights above certain thresholds "exceed[] obstruction standards and/or would have an adverse physical or electromagnetic interference effect upon navigable airspace or air navigation facilities." [289] Their study disclosed a variety of problems at different locations, including penetration of 14 CFR Part 77 protected airspace at the airport. *Id.*

8. Evacuation

The Jordan Cove facility creates new evacuation needs and hinders existing evacuation strategies. Unlike most other fires and oil spills, where the response strategy for emergency responders is to immediately combat the crisis, the basic response strategy for gas or LNG leaks is to evacuate the area. This is a cost to safety that should be weighed in the Corps public interest analysis.

9. U.S. Coast Guard Gaps for Facility Transfer

[288] FEDERAL AVIATION ASSOCIATION, NOTICES OF PRESUMED HAZARD 60 (2018),https://oeaaa.faa.gov/oeaaa/external/searchAction.jsp.

[289] *Id.*

US Coast Guard regulations require that LNG facilities submit an operations manual and an emergency manual that contain required operations and emergency procedures.[290] Operators of waterfront handling facilities are responsible for ensuring that no LNG is released to navigable waters, and that in the event of LNG release operations are suspended and the COTP is notified.[291] The Corps should fully review whether the applicants have complied with these requirements.

10. Liability for Damages

Liability for LNG release from a vessel would be governed by general maritime law and state law. Because the State here has no relevant liability rules, it is foreseeable that liability for vessel casualties would fall under general maritime law. The 1976 Limitation of Liability for Maritime Claims and the 1996 Protocol limit liability to the value of the vessel post-casualty. These liability limits sometimes are waived by contract with the port, but there is no indication that such a waiver is being considered in this case. Punitive damages also would be limited. As a result, in the foreseeable event of an LNG vessel casualty, there would be significant uncompensated damages borne by the public. These damages constitute a significant harm to the public interest and should be considered by the Corps.

11. Coos Bay Geographic Response Plan

This project should be considered in the context of the National Contingency Plan, including the Coos Bay Geographic Response Plan ("GRP").[292] That plan "prioritizes resources to be protected" in the event of a spill, and so it is a useful guide to resources at risk in Coos Bay, as well as response capabilities.[293] In terms of contingency planning, the GRP would need to be revised and updated to address new risks created by this project. Oil spill response booms aren't useful in the event of LNG spills, and the number and types of vessels calling on Coos Bay would change, making updated contingency planning a necessity. The Corps should also consider effects of this project to existing oil spill and other emergency response strategies.[294] Finally, the Coos Bay GRP is incomplete, illustrating obvious gaps in preparedness. The sections on sensitive fisheries and wildlife, for example, are blank, awaiting text from the Oregon Department of Fish & Wildlife. The Coast Guard LOR strongly recommends the applicant become consistent with the GRP. A decade later, this still has not been done.

H. Food and Fiber Production

The pipeline and terminal interfere with public values of food and fiber production in at least the following ways:

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[290] 33 C.F.R § 127.309; 33 C.F.R § 127.019.

[291] 33 C.F.R § 127.321.

[292] Northwest Area Committee, *Coos Bay, Oregon Geographic Response Plan* (2014), https://www.oregon.gov/deq/FilterDocs/CoosBayGeoResponsePlan.pdf

[293] *Id.* at 3.

[294] *See Id.* at 4-11.

- The Pipeline and associated facilities would cross farmlands and grazing lands, taking them out of production and interfering with operations. Many of these crossings would be against the will of the property owner, so would require eminent domain proceedings;
- The Pipeline and associated facilities, such as roads, would clear timberlands, including removing some timberlands permanently from production, and otherwise interfering with timber operations;
- Adverse impacts to marine and aquatic fisheries (including subsistence, commercial, and recreational fisheries) would occur via wetland and stream crossings, dredging in Coos Bay, and operation of LNG tankers; and
- Greenhouse Gas emissions, by worsening climate change, would cause widespread disruption of global food production.

I. Recreation

The project would impact fishing, boating, water contact recreation, and other recreational uses. It will also harm habitat and water quality for fish, impact recreational access, and alter the aesthetic values of Coos Bay and the other waterways crossed by the pipeline.

The FEIS from the previous iteration of the project states that impacts to recreational users could occur "when an LNG carrier is transiting in the waterway to the terminal."[295] This occurs because "other boats in or near the channel would be required to move away and those seeking to approach the channel would have to delay doing so until the LNG carrier had passed.[296]

Further, the FEIS also states "in the event of an LNG spill from an LNG carrier in transit to the Jordan Cove terminal, and a related pool fire if there was ignition, there could be impacts on commercial ships or fishing boats."[297] And again: "Recreational boaters, fishermen, crabbers and clammers could be affected in the unlikely event of an incident resulting in an LNG spill from a carrier in transit in the waterway, and an associated pool fire if there was ignition of released LNG vapors."[298]

This project will create a large number of negative recreation impacts. The applicant does admit that recreational activities take place in the Coos Bay estuary, including hunting, birding, clamming, crabbing, boating and fishing. The North Spit itself is a high-value recreational area. While it is true that it is designated for industrial use, the fact that it still remains a well-used recreational landscape speaks to its incredible value. Fishing, picnicking, clamming, crabbing, boating, hiking, birding, and off-highway vehicle riding are common and popular in the area. Henderson marsh offers a high-value wetland that attracts birds and wildlife. The Oregon Dunes to the north are a world-class public recreational landscape.

At Coos Bay, the facility will likely interfere with recreational use of the North Spit and the adjoining Oregon Dunes in several ways:

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[295] FEIS, *supra* note 49 at 4.8-7.
[296] *Id.*
[297] *Id.* at 4.8-8.
[298] *Id.* at 4.7-5.

- Throughout construction the existing recreational uses will be displaced and disrupted by workers, equipment, and road closures. Operations will have similar impacts, albeit to a lesser degree;
- The location of the worker camp on the North Spit also will cause potential problems of competition and recreational conflicts as hundreds of new users (who are coming largely from other places and unfamiliar with local customs) are brought onsite;
- Ecological harms caused by the project, such as loss of clamming and crabbing habitat and introduction of invasive species, will indirectly harm the area's recreational value; and
- The massive industrial facility and mammoth LNG tankers will degrade the quality of the recreational experience.

Further negative effects to recreation occur along the pipeline route, where prime recreational wildlands will be taken over by project construction and permanently degraded by the project.

J. Fish & Wildlife Impacts

The Corps should consider the full NEPA process, including public comment, in terms of weighing impacts to fish and wildlife. Impacts to fish and wildlife are identified in Sections I (D) and (E).

K. The Project Fails the Public Interest Balancing Test

The public harms of this project far outweigh its public and private benefits. It should be rejected under the public interest balancing test and the Corps should deny the 404/10 permit.

IV. The Corps Must Deny the Permit Because the Project Will Negatively Impact Wetlands

Special aquatic sites that will be disrupted due to the projects include wetlands, mud flats, vegetated shallows, riffle and pool complexes, and municipal and private water supplies that would all be impacted by the proposed activities throughout each impacted watershed.[299] Subpart E further clarifies the potential loss of values resulting from the discharge of dredged or fill material into wetlands, stating:

> The discharge of dredged or fill material in wetlands is likely to damage or destroy habitat and adversely affect the biological productivity of wetlands ecosystems by smothering, by dewatering, by permanently flooding, or by altering substrate elevation or periodicity of water movement. The addition of dredged or fill material may destroy wetland vegetation or result in advancement of succession to dry land species. It may reduce or eliminate nutrient exchange by a reduction of the system's productivity, or by altering current patterns and velocities. Disruption or elimination of the wetland system can degrade water quality by obstructing circulation patterns that flush large expanses of wetland systems, by interfering

[299] 40 CFR 230.40 - 230..50.

> with the filtration function of wetlands, or by changing the aquifer recharge capability of a wetland. . . . When disruptions in flow and circulation patterns occur, apparently minor loss of wetland acreage may result in major losses through secondary impacts. Discharging fill material in wetlands as part of municipal, industrial or recreational development may modify the capacity of wetlands to retain and store floodwaters and to serve as a buffer zone shielding upland areas from wave actions, storm damage and erosion.[300]

Additionally, the wetlands proposed for destruction are important because the wetlands serve significant biological functions, contain important environmental characteristics, and are scarce in quantity in this region.[301] As part of the Corps 404(b)(1) public interest review,[302] the agency must evaluate impacts to wetlands:

> (2) Wetlands considered to perform functions important to the public interest include:
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> (i) Wetlands which serve significant natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species;
> (ii) Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges;
> (iii) Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics;
> (iv) Wetlands which are significant in shielding other areas from wave action, erosion, or storm damage. Such wetlands are often associated with barrier beaches, islands, reefs and bars;
> (v) Wetlands which serve as valuable storage areas for storm and flood waters;
> (vi) Wetlands which are ground water discharge areas that maintain minimum baseflows important to aquatic resources and those which are prime natural recharge areas;
> (vii) Wetlands which serve significant water purification functions; and
> (viii) Wetlands which are unique in nature or scarce in quantity to the region or local area.
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> (3) Although a particular alteration of a wetland may constitute a minor change, ***the cumulative effect of numerous piecemeal changes can result in a major impairment of wetland resources***.[303]

A. Wetland Impacts – Terminal and Pipeline

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[300] 40 C.F.R § 230.41.
[301] 33 C.F.R § 320.4(b)(2).
[302] *Id.* § 320.4(b).
[303] 33 CFR 320.4(b).

Along the pipeline route, the applicants propose to cross approximately 30,778 feet (5.83 miles) of wetlands as a result of the construction of the pipeline, all of which are jurisdictional under the CWA.[304] According to the applicants, the primary impacts to wetlands from the pipeline are:

> The primary impact on wetlands from Pipeline construction and operation will be the temporary, long-term, or permanent alteration of wetland vegetation (see Table 2.3-3). In herbaceous wetlands (palustrine emergent systems) this impact will be temporary because herbaceous vegetation regenerates quickly, and ***the hydrology of the wetland will not be altered***. In forested or scrub-shrub wetlands, the impact may be long-term because the recovery period for these wetland types may require more than 3 years to reach preconstruction conditions, especially in forested systems. Clearing of wetland vegetation, especially in forested or scrub-shrub types can also result in the loss or alteration of wildlife habitat. Construction activities can temporarily displace wildlife from affected wetlands and can diminish the recreation and aesthetic values of the wetland.[305]

The wide-scale degradation proposed by the applicants is inconsistent with the Guidelines, the purpose of which is, like the purpose of the CWA itself, "to restore and maintain the chemical, physical, and biological integrity of the waters of the United States through the control of discharges of dredged or fill material."[306] The Corps' implementing regulations clearly state that "the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines."[307]

Additionally, the Corps should evaluate impacts to nearby wetlands, which may not be identified by the applicants, but could be affected due to increased sediment pollution, increased temperature, decreased habitat, and other impacts. State agencies including the Department of Fish and Wildlife, Department of Oregon Department of Geology and Mineral Industries, Oregon Department of Land Conservation and Development, Department of State Lands, and State Water Resources, have all weighed in voicing serious and myriad concerns about the considerable adverse effects of this project on the state's water, species, habitat, and forest resources, as well as emergency response resources.[308]

The proposed activities will negatively impact wetlands, which are specifically identified as special aquatic sites, by degrading habitat, increasing sediment pollution and erosion, increasing water temperature, changing water levels and drainage patterns, fragmenting wetland complexes, and depleting recharge area. In the Klamath Basin alone, the State of Oregon estimates that 75 percent of original wetlands have been destroyed.[309]

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[304] Pacific Connector Pipeline. 404 Joint Permit Application. 8 May 2018. P. 8.

[305] PCP RR2, *supra* note 10, at 74; 8 May 2018. P. 1166. Emphasis added.

[306] 33 C.F.R § 230.1(a).

[307] 40 C.F.R § 230.1(d).

[308] *See* State of Oregon FEIS comments, May 29, 2009.

[309] Morlan, Janet. 3.4 Summary of Current Status and Health of Oregon's Freshwater Wetlands. Oregon Division of State Lands. https://www.oregon.gov/dsl/WW/Documents/SOERChapter3.4.pdf. P. 45.

B. The Corps Must Evaluate Direct, Indirect, and Cumulative Impacts

The Corps must analyze the habitat loss due to dredge and fill cumulatively. The application fails to consider impacts to nearby wetlands from erosion, increased temperature, or other factors. Wetlands to the west of the slip are likely to be impacted, but ignored in the application. In addition, the estuarine wetlands provide a nursery for young salmon and other aquatic life. Losing shallow water habitat from dredging and filling wetlands is a devastating blow to the estuary ecosystem. The wetland fill will also degrade habitat utilized by birds, amphibians, mammals, and invertebrates.

C. Site-Specific Information is Inadequate or Missing

The applicants must also provide site-specific information regarding impacts to wetlands. Instead, the applicants rely upon generalizations which do not allow the public or the Corps to review the potential direct, indirect, and cumulative impacts of the proposed activities on wetlands. Most importantly, the applicants have not been able to access all of the identified potentially impacted wetland sites. Wetlands and portions of wetlands that were delineated by ICF J&S, but were denied access to by landowners are considered "Pending Verification."[310] Wetlands that are Pending Verification also include other waters that have not been previously documented, but were detected by DSL during their review in October 2016 and associated GIS data.[311]

Approximately 4.77 miles of wetlands that could be impacted by the project have not been evaluated by the applicants.[312] Without additional information regarding these wetlands, it is nearly impossible to demonstrate that the applicants have avoided adverse impacts to the maximum extent practicable, and subsequently, whether they have minimized those impacts or appropriately compensated for them. Therefore, the Corps cannot authorize the 404/10 permit.

V. The Corps Must Deny the Permit because the Project will Interfere with Access to or Use of Navigable Waters

Protection of navigation and anchorage are primary concerns under the Corps' general policies for evaluating permit applications.[313] It is the prerogative of the district engineers to protect navigable interests in connection with NPDES permits.[314] They do this by recommending to EPA or the state that a permit should be denied unless "appropriate conditions can be included to avoid any substantial impairment of navigation and anchorage."[315]

Both construction and operation of the terminal would interfere with access to and use of navigable waters. During construction, dredging in the NRIs would impact access to waters in

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[310] PCP RR2, supra note 10, at 56 (Part 2 Appendix B, 1147).
[311] PCP RR2, *supra* note 10 at56. (Part 2 Appendix B. P. 1147).
[312] *Id.* at 56. (Table 2.3-1; Part 2 Appendix B. P. 1149.)
[313] 33 C.F.R § 320.4(o)(3).
[314] *Id.* § 320.4(o)(4).
[315] *Id.*

the vicinity of dredging operations for recreational boaters and anglers. Most of the recreational salmon fishing in Coos Bay occurs in late summer and fall – the same time as the in-water work window for the dredging activities. Boat angling for Chinook and coho salmon in the fall is concentrated around the railroad bridge and downstream[316] – the same areas where dredging will occur.

The navigation and safety measures imposed by the Coast Guard include a moving safety/security zone extending 500 yards around any LNG vessels entering or leaving the port. "No vessel may enter the safety/security zone without first obtaining permission from the Coast Guard Captain of the Port (COTP)."[317] The proposed 500-yard security zone could effectively exclude all other marine traffic and activity within areas of Coos Bay that are narrower than the total security zone area. These areas include important fishing and navigation areas. Other vessels navigating in the bay would experience significant delays because the LNG vessels must travel through the channel at slow speeds to avoid other adverse impacts such as wake strandings and propeller wash sediment disturbances.

In some places, the navigable channel of Coos Bay is less than 1,000 yards across, meaning that the entire channel would be subsumed by the safety zone. The record also shows that several important areas of shellfish harvest are located in narrow portions of the Coos Bay that would be impacted by the 500-yard LNG tanker security zone. The 2015 FEIS notes "if crabbing and clamming activities were to occur within the established security zones, those activities would be required to cease and temporarily move out of the way."[318] "Recreational boaters using the bay at the same time as an LNG vessel is in transit within the waterway may encounter delays due to the moving security zone requirements around an LNG vessel…"[319]

Fisheries and navigation are recognized public trust rights in Oregon.[320] According to State data, nearly "90 percent of the boat use-days [in Coos Bay] involved fishing (including angling, crabbing, and clamming)…."[321] The project will interfere with these public trust rights and access to public trust resources including navigation.

The Coast Guard simply assumed that the applicant is fully capable of doing everything it hopes to do, that actual conditions at the port are perfectly described, and even that the applicant will fully meet all regulatory requirements, including the emergency and operations manual. The Coast Guard recommendation is "contingent" on the perfect application of everything in the WSA.[322] Those are assumptions, making it incumbent on the Corps to conduct its own analysis, and to do its own consultation with the Coast Guard.

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[316] *See* 2015 FEIS, *supra* note 49, at 4-738.
[317] USCG Waterway Suitability Report at 2 (July 1, 2008) (incorporated by reference in the 2018 USCG Letter of Recommendation).
[318] 2015 FEIS, *supra* note 49, at 4-737.
[319] *Id*. at 4-738.
[320] *Morse v. Division of State Lands*, 590 P.2d 709, 712 (Or. 1979).
[321] 2015 FEIS, *supra* note 49 at 4-737.
[322] USCG 2018 at 6, ¶11

Coos Bay is subject to a pilotage requirement, illustrating the tricky nature of the port, and raising a host of new complications. There are only two pilots in Coos Bay. They have never piloted LNG tankers before, and currently only handle a light load of fifty vessels per year. The applicant has established what it calls an “emergency response planning group,” which it says is tasked with education and preparedness for the facility.[323]

The LOR also reveals that the Coast Guard itself will be playing a very minimal role, reflecting its limited capacity here. The Captain of the Port is distant in Portland, and the LOR states the Coast Guard will not require any safety inspections for visiting vessels beyond the minimum required.[324]

The Limited access areas for this project have yet to be established. *Id.* p.2 ¶3. This has hindered meaningful public engagement regarding impacts to navigation. No tribes, resource agencies, or public-interest representatives were present at the Coast Guard’s “systematic” review under NVIC 01-2011.

Some potential adverse impacts to navigation are as follows:

- **Waterway Conditions** adjacent to the facility, and along the shipping route, make the introduction of LNG tankers there hazardous.[325] The bay is subject to currents, tides and winds under normal conditions. Water depth is low through most of the estuary, and the navigation channel is very narrow, particularly for large tankers.
- **Timing Restriction.** The bar channel is a significant hazard that can only be crossed at slack high tides during daylight, which is when the LOR applies. This limitation, combined with security measures (like the 500-yard exclusion zone[326]) particular to tankers along with ordinary navigation rules, raises a particular threat to navigation, because with 120 vessel calls per year, Jordan Cove is relying on using 240 out of the 365 available daylight high tides in the year. Having claimed the safest crossing times for themselves, all remaining vessels will have to use the remaining 115 available daylight slack high tides. If there are fifty other vessels, such as tank barges or export ships, using the port in a year, then for all practical purposes mariners will no longer be able to use the safest bar crossing time at all. Outgoing vessels would have to hold up just inside the bar while the LNG ship passes, or leave earlier under time pressure, both of which are situations that increase safety risks to vessels and directly impair navigation. This situation greatly increases the chances of LNG ships having to hold up offshore.
- **Fishing Vessels,** both commercial and recreational, use the estuary itself and offshore areas in abundance. Under ordinary rules of navigation, a fishing vessel having deployed gear has the right-of-way, but the overriding security and safety concerns related to tankers gives them an exception.
- **Shipwrecks**. The applicants should fully identify shipwrecks and possible human remains in and near the navigation channel.

[323] See USCG 2018 LOR p.2 ¶10.
[324] USCG 2018 LOR p.2.
[325] *See* JCEP 2007 WSA; USCG 2018 LORA.
[326] See USCG July 1, 2008 WSR.

- **Ship Size**. There are numerous navigation-related concerns related to the size of LNG tankers that are being avoided by the applicant. Tall vessels are an important limiting factor for the airport hazard. In light of this obvious limitation, there are future plans from the applicant and Port to dredge the channel deeper, enabling the passage of even larger ships. Vessel draft is a key limiting factor that impairs navigation in several ways. It greatly increases the likelihood of groundings, which further limit access to other port facilities. Draft restrictions are navigation limits on access to this gas by the global LNG fleet. New LNG ships being built are generally extremely large with deep draft requirements, which means Coos Bay will end up with the smaller, older LNG vessels.
- **Vessel Routing** from the open ocean over the bar, up the estuary to the marine slip is a hazardous route that impairs navigation for all other users under even the best circumstances. The entrance and first river bend, as well as the entrance to the marine slip, are both precise maneuvers.
- **The 2008 Waterway Suitability Report**, issued July 1, 2008 by the Coast Guard, contains numerous risk mitigation measures that are required, as well as numerous resource gaps. These restrictions, particularly those related to navigation, should be carefully weighed by the Corps in evaluating impacts to navigation. Especially impactful on navigation are the safety/security zones and the vessel traffic management measures. Ordinary operations of this facility require such intensive expert attention (e.g. meetings of port, FBI, coast guard and escort tugs in advance of every vessel arrival; VTIS installation; tractor tugs; navigational aids; training; USCG facilities; fire-fighting; notification; gas detection) that have yet to be developed. Regarding emergency response, the Coast Guard frankly states that “response planning is limited” in the region and will need to be developed and augmented.
- **Redacted security material**. The proposed facility, including tankers, the LNG facility, and the pipeline, are all security risks that adversely impact on public safety as well as on navigation. We are not privy to the confidential and redacted security-sensitive material related to navigation, but believe it is of concern to the public interest. In general, tight security at ports impairs navigation, not only for the LNG tankers but also for all other users of the port.

We request that the Corps protect navigational interests by denying the permit due to substantial impairment of navigation and anchorage.

VI. The Corps Must Deny the Permit because the Project will not Obtain the Required State and Local Authorizations or Certifications

A. Land Use Compatibility

The applicant has not provided a Land Use Compatibility Statement (LUCS) to demonstrate compliance with state and local land use planning goals and regulations. The LUCS has not been submitted likely because the applicant has failed to obtain land use approvals from Coos County. Jordan Cove applied to the County for land use approval of its prior project design in 2015. Coos County issued land use approval for that application in 2016. In 2017 the Land Use Board of Appeals (“LUBA”) found Coos County had erred in approving the land use application and remanded the decision. Subsequent appeals have upheld LUBA’s decision. No remand application has been initiated on that version of the project. Nor has any new land use application been filed that reflects the current project alignment. The JPA misleadingly states that the Coos County Conditional Use Permit was approved in 2016.[327] While that is technically correct, the applicant fails to note that subsequent to that approval, the permit was found invalid and remanded by LUBA. There is currently no valid land use approval from Coos County for the terminal, and the Corps cannot approve the permit until local land use approval is obtained. The Corps must not authorize the 404/10 permit without compliance with appropriate land use regulations.

B. Coastal Zone Management Act

The JPA does not demonstrate compliance with the Coastal Zone Management Act ("CZMA"). The application is both incomplete and inadequate. The application is premature, lacking complete applications to other key agencies and adequate analyses of impacts to sensitive resources. Additionally, the project has clearly failed to obtain local approvals for the terminal and pipeline necessary for the project to demonstrate compliance with the CZMA.

The application is also incomplete because it does not show that the project complies with local land use regulations. Oregon DEQ and DLCD cannot process applications under the CWA 401 Certification and Coastal Zone Management Act without completed and approved Land Use Compatibility Statements ("LUCS") from both Douglas and Coos Counties. Pacific Connector has failed to obtain necessary local permits.

As described in previous sections supra, the applicant only proposes to mitigate impacts to certain shallow-water impacts, defining shallow areas as less than 15 feet in depth. The JPA is required under the CZMA to propose comprehensive mitigation for estuarine resources, which it has failed to do.

Furthermore, impacts to shellfish resources in Coos Bay are largely unmitigated. The project does not minimize its impact to these sensitive resources in the Bay. Because the applicant has failed to apply for local approvals of the pipeline segments through Coos Bay, the project has not demonstrated that it is complying with requirements to protect estuarine resources as outlined in the Coos Bay Estuary Management Plan (CBEMP). Impacts to shellfish resources are also relevant to the public interest determination since shellfish are a major income source for the region.

Additionally, as described in detail *supra*, the JPA fails to demonstrate that the project and its associated impacts on the Coos Bay Estuary and other coastal zone resources are necessary for meeting Oregon's energy needs. Indeed, as Oregon agencies commented on several occasions, the project has not demonstrated that other less environmentally harmful alternatives including renewable energy, domestic gas resources, and alternative LNG sites are impracticable. The CZMA requires that the applicant demonstrate that the project is in the public interest. DLCD wrote in June 2009:

[327] Jordan Cove Energy Project, L.P., *Resource Report 1* 82 (2017), http://jordancovelng.com/wp-content/uploads/2017/07/JCEP-Revised-Draft-RR1.pdf.

> FERC staff's analysis of domestic natural gas supply and new pipeline infrastructure concludes, without substantive analysis that "It stands to reason that a longer pipeline would not have any clear environmental advantages." This conclusion assumes that the areas proposed for pipelines contain resources of equivalent environmental and natural resource value. The analysis also ignores the significant reduction of environmental and resource effects of these projects because they do not require a ship transit, terminal infrastructure and estuarine alterations for the access channel and ship berth. Issues such as entrainment and dredging are avoided with domestic supply and pipeline options. FERC staff's response to these issues raised during the DEIS review is that each project is reviewed on its own merit. Multiple approved projects may be approved on individual merit and the "market" will determine if any project is constructed. There is still no recognition that, once sited, a terminal and pipeline will fit within a larger regional/national system of natural gas infrastructure. There is nothing other than FERC staff s reliance on the market to determine which facility or facilities are ultimately constructed, despite the obvious observation that even minimal planning could result in a superior option that can meet a prospective need, with less long term environmental and natural resource effects. FERC staff makes no attempt to identify and evaluate the relative impacts of each project and determine whether any project is environmentally preferable.[328]

Therefore, we urge the Corps to deny the 404/10 permit because the project will not obtain required state and local certifications.

VII. The Corps Must Deny the Permit Because the Project will Impair Floodplain Function and Values

Floodplains provide multiple benefits to water quality and quantity, from storing floodwaters to allowing for the exchange of nutrients to increasing opportunities for hyporheic exchange. Floodplains support critical biological processes by allowing rivers to form diverse habitat types, facilitating the exchange of nutrients between land and water, providing off-channel areas and shallow habitat for juvenile fish, improving habitat for terrestrial and aquatic species, and expanding areas for sediment deposition to mitigate impacts of turbidity. [329] Healthy floodplains also support habitat for threatened and endangered species. For example, NOAA Fisheries identifies the benefit of floodplains to supporting habitat for threatened salmonids, stating:

> When rivers are connected to their floodplains, river channels are able to migrate naturally. This process creates side channels, back-water sloughs, and other off-channel habitats that are important refuge for salmon. High flow spreads across floodplain habitats—dissipating hydraulic energy and increasing the exchange of

[328] State of Oregon FEIS comments at 30.

[329] NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, OREGON FLOODPLAINS: WORKING TO CONSERVE PACIFIC SALMON & LOCAL COMMUNITIES (2016), http://www.westcoast.fisheries.noaa.gov/publications/habitat/fact_sheets/oregon_fema_biop_factsheet_2016.pdf.

> nutrients and organic material between aquatic and riparian habitats. Coho salmon, in particular, rely heavily on floodplain habitat for rearing. Juvenile coho show strong preference for pools and woody debris cover in the summer months and for side-channel and pond habitats in the winter months. Other salmon species also depend on healthy floodplain habitat. Chum salmon, for example, rely primarily on floodplains for spawning, while juvenile Chinook salmon rear in floodplains.[330]

The applicants have identified 6.34 miles of the pipeline that are located within the 100-year floodplain, as described below in Table 2.2-12.[331] Floodplain areas that would be crossed by the pipeline include Coos Bay; the North Fork Coquille River; the East Fork Coquille River; Olalla Creek, Lookingglass Creek, Clark Branch, and Days Creek in the South Umpqua watershed; and Little Butte Creek and the Rogue River within the Rogue watershed.

Table 2.2-12
Floodplain Areas Crossed by the Pipeline

Starting MP	Ending MP	Fifth-Field Watershed	Zone [1]	Miles of Pipeline
0.26	1.00	Coos Bay-Frontal Pacific Ocean	AE	0.74
1.15	1.17	Coos Bay-Frontal Pacific Ocean	AE	0.02
1.21	1.32	Coos Bay-Frontal Pacific Ocean	AE	0.11
1.37	1.44	Coos Bay-Frontal Pacific Ocean	AE	0.10
1.46	6.45R	Coos Bay-Frontal Pacific Ocean	AE	2.19
8.24R	8.45R	Coos Bay-Frontal Pacific Ocean	A	0.21
11.03R	11.92BR	Coos Bay-Frontal Pacific Ocean	A	0.87
15.02BR	15.31BR	Coos Bay-Frontal Pacific Ocean	A	0.29
24.31BR	24.33BR	North Fork Coquille River	A	0.02
22.76	23.07	North Fork Coquille River	A	0.31
27.00	27.06	North Fork Coquille River	A	0.06
29.76	29.90	East Fork Coquille River	A	0.14
58.03	58.86	Olalla Creek-Lookingglass Creek	A	0.83
65.74	65.78	Clark Branch-South Umpqua River	A	0.04
66.91	66.96	Clark Branch-South Umpqua River	A	0.06
71.22	71.33	Clark Branch-South Umpqua River	AE	0.11
71.33	71.38	Clark Branch-South Umpqua River	X500	0.05
94.69	94.80	Days Creek-South Umpqua River	A	0.11
122.63	122.68	Shady Cove-Rogue River	A	0.05
122.68	122.73	Shady Cove-Rogue River	X500	0.05
145.63	145.71	Little Butte Creek	A	0.08
			Total	6.44

[1] Zone A or AE: The area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood.
Zone X500: Areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood; An area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

The Corps must fully evaluate the direct, indirect, and cumulative impacts to floodplains as a result of the proposed activities under Executive Order (EO) 11988 as well as its own implementing regulations. Under EO 11988, federal agencies are required to "take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in

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[330] *Id.*

[331] PCP RR2, *supra* note 10, at19. 8 May 2018. P. 1112.

carrying out its responsibilities."[332] Further, the Corps first must determine whether the proposed action will occur in a floodplain and include this evaluation under Section 102(2)(c) of NEPA and then consider alternatives to avoid adverse effects.[333]

Additionally, the Corps' implementing regulations under Subpart E 40 CFR 230.45 describe potential impairments to special aquatic sites, including pool and riffle complexes, that could be caused by activities that impact floodplains. Crossing or otherwise impacting floodplains could alter stream hydrology by reducing flood storage, reducing the dissipation of hydraulic energy, increasing sediment pollution, and reducing hyporheic exchange. Specifically, the following potential loss of values to pool and riffle complexes as a result of dredge and fill activities:

> (b) Possible loss of values: Discharge of dredged or fill material can eliminate riffle and pool areas by displacement, hydrologic modification, or sedimentation. Activities which affect riffle and pool areas and especially riffle/ pool ratios, may reduce the aeration and filtration capabilities at the discharge site and downstream, may reduce stream habitat diversity, and may retard repopulation of the disposal site and downstream waters through sedimentation and the creation of unsuitable habitat. The discharge of dredged or fill material which alters stream hydrology may cause scouring or sedimentation of riffles and pools. Sedimentation induced through hydrological modification or as a direct result of the deposition of unconsolidated dredged or fill material may clog riffle and pool areas, destroy habitats, and create anaerobic conditions. Eliminating pools and meanders by the discharge of dredged or fill material can reduce water holding capacity of streams and cause rapid runoff from a watershed. Rapid runoff can deliver large quantities of flood water in a short time to downstream areas resulting in the destruction of natural habitat, high property loss, and the need for further hydraulic modification.[334]

The Corps should fully evaluate the direct, indirect, and cumulative impacts of proposed activities on or near floodplains. The Corps should assess the identified floodplain impacts and determine whether the applicants have provided sufficient information or whether there are additional potential floodplain impacts that have not been identified.

Many of the proposed stream crossings where floodplain impacts have also been identified may also be vulnerable to channel migration, avulsion, and/or scour. The Corps should require the applicants to identify these waterways and to fully evaluate the potential direct, indirect, and cumulative impacts.

Critically, this assessment is dated from August 2017 and the applicants have altered the route and proposed activities since the report was completed. Further, the applicants do not specifically address impacts to floodplains where there is an increased risk of channel migration, scour,

[332] Exec. Order No. 11988, 42 F.R. 26951 (1977).
[333] *Id.*

[334] 40 C.F.R § 230.5.

and/or avulsion. Additionally, the applicants should be required to provide site-specific analysis related to potential impacts to floodplains from HDD crossings of Coos Bay, the Coos River, the Rogue, and the Klamath rivers.

The proposed activities would harm floodplain function and values throughout the project area in all impacted waterways. In line with EO 11988 and the Corps' implementing regulations to avoid impacts to special aquatic sites, including pool and riffle complexes under 40 CFR 230.45, the Corps cannot authorize the 404/10 permit for the project.

VIII. The Corps Must Deny the Permit Because the Project will Harm Oregon's and the Nation's Economy

In determining whether proposed activities in the waters of the United States are in the public interest, the Corps must also consider economic impacts.[335] Here, the projects will have numerous adverse impacts, relating to the impairment of commercial and recreational use of Coos Bay and environmental degradation caused by increased sedimentation and other impacts to water quality throughout the project area.

On the other hand, the projects will not provide the economic benefits identified by the applicants. At the threshold, the applicants have not shown that there is need or support for the projects: to the contrary, their inability to secure customers indicates that it is unlikely that this project, if completed, will enter full operation. Even if the project does enter operation, exporting LNG will increase North American energy prices, resulting in a regressive redistribution of wealth as most consumers pay more for their energy whereas the benefits of exports are concentrated in the minority of individuals who own shares in gas production companies.

A. Impacts on Coos Bay and Other Affected Waterways Will Cause Economic Harm Contrary to the Public Interest.

The Corps must reject applicants' argument, in their filings with FERC, that impacts to tourism and recreation will be minimal. The applicants rely on the report of a consultancy that purports to have examined tourism issues by speaking with "local officials" in six communities in which LNG terminals exist.[336] However, these communities are all areas in which LNG and similar infrastructure have existed for a long time, and these community's experiences do not meaningfully illustrate the consequence of adding an LNG facility to Coos Bay. Moreover, the applicants do not appear to have addressed the tourism and recreational impact of the pipeline, including the tourism impact of placing the pipeline across 81 miles of public land.

1. The Project Is Unnecessary and There is No Evidence of Demand For It

The project proponents have failed to show that anyone wants to buy the LNG they propose to sell. In 2016, FERC denied the prior applications because, in large part, applicants had provided "little or no evidence" that any third party was interested in purchasing gas delivered by the

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[335] 33 C.F.R § 320.4(a)(1).

[336] Jordan Cove Energy Project, L.P., Resource Report 5 31 (Appendix C.5) hereinafter JCEP RR5.

pipeline or liquefied natural gas made available by the terminal.[337] Although this denial was without prejudice, and applicants have since re-filed, they have not corrected this fundamental flaw. They have provided *no* evidence of commitments for the liquefied natural gas sales that are the ultimate purpose of the related projects. Instead, applicants submit only two press releases stating that applicants *hope* to negotiate agreements for some sales, but even this hope only amounts to *less than half o*f the terminal's proposed capacity.[338] Those press releases were hastily issued after FERC denied the prior proposal, and there is no evidence indicating that now, over two years later, these negotiations have meaningfully progressed—despite the fact that the applicants and any potential customers clearly understand the need to demonstrate market support for these projects.

2. Even If the Project Finds Customers and Enters Operation, It Will Not Provide Meaningful Net Economic Benefit

a) The Applicants' Analyses Overstate Economic Benefit

Even if the project enters operation, it will not provide meaningful economic benefits. The applicants argue that the project will benefit the Oregon economy because of direct spending and employment associated with project construction and operation, and because of the indirect impact of these expenditures.[339] However, the applicants' arguments rely on a modeling approach that is fundamentally flawed in ways that overstate potential benefits and that ignore adverse impacts. Crucially, this analysis ignores displacement effects—e.g., the fact that some of the people working in these jobs would work other jobs if the project does go forward—or the counterfactual of how the economy might have grown without the project.[340] Indeed, in discussing nationwide macroeconomic impacts of LNG exports, DOE has acknowledged that such displacement is an important factor that cannot be ignored.

Separate from this modeling, the applicants' other assertions regarding socioeconomic impact are misleadingly one-sided. For example, in discussing how the projects could "influence," the applicants only consider ways in which the project might *increase* property values, entirely ignoring the possibility that properties encumbered by a pipeline easement will suffer a decline in value, or that harmful impacts of the project will decrease demand for property and property values in the affected regions.[341] More broadly, the applicants ignore the economic impacts of harm to the environment or to other users of Coos Bay.[342]

b) The U.S. DOE General Analysis of LNG Export Ignores Important Impacts

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[337] 154 FERC ¶ 61,190, PP39-40 (Mar. 11, 2016), https://www.ferc.gov/CalendarFiles/20160311154932-CP13-483-000.pdf.

[338] Jordan Cove Energy Project, Application to FERC at 15 n.16 & n.19.

[339] JCEP RR5, *supra* note 358, at Appendix B.5.

[340] *See, e.g.,* Amanda Weinstein & Mark Partridge, *The Economic Value of Shale Gas in Ohio* at 11 (2011), https://aede.osu.edu/sites/aede/files/publication_files/Economic%20Value%20of%20Shale%20FINAL%20Dec%202011.pdf.

[341] JCEP RR5, *supra* note 358, at 17.

[342] *Supra* part G.1.

Insofar as the Corps considers broader economic impacts, the Corps cannot simply rely on the Department of Energy's assertion that increasing LNG exports generally provides macroeconomic benefits. DOE has published studies of exports' macroeconomic impacts in 2012, 2015, and most recently in 2018.

Similar to the project applicants' analysis, DOE's economic analysis ignores the environmental impact of increasing LNG exports. Exports will increase gas production, in turn increasing emissions of both conventional and greenhouse gas pollutants. These emissions have public health, environmental, and ultimately economic consequences. For greenhouse gas emissions in particular, available tools such as the social cost of carbon and social cost of methane protocols can be used to provide monetary estimates of the impacts of emissions. Because these impacts have consistently been omitted from DOE's analyses, those analyses do not provide a basis for the Corps to conclude that the projects proposed here would be in the public interest.

Even as to more traditional economic impacts, the DOE studies do not show that increasing exports will benefit the general public. Instead, these studies indicate that exports will make most Americans economically worse off, because of higher energy prices, while regressively redistributing wealth to the minority of Americans who own shares of gas production companies.[343] Although DOE has generally predicted a small net increase in gross domestic product as a result of exports, in the face of the regressive distributional impacts, this net increase is not enough to demonstrate a public benefit. And while DOE has contended that gas companies' increased profits will accrue to the public at large because of shares in these companies are ultimately owned by individuals, DOE has uniformly failed to provide any analysis of how share ownership is distributed.[344] The fact is that most Americans don't own any stock at all, much less stock in gas companies. Accordingly, LNG exports, by increasing energy prices for everyone while principally increasing profits for shareholders in gas companies, will affect a large and regressive redistribution of wealth. Simply moving money from gas consumers—including households that rely on gas for heat and cooking, or who will face higher electric bills because of increased energy prices—to gas producers is not an effect that furthers the public interest.

B. Conclusion on Economic Impacts

The proposed crossing of Coos Bay and numerous other water bodies will impair recreation, fishing, and other water-dependent activities, causing economic harms that must be considered in the Corps' public interest determination. Meanwhile, there is no evidence of an actual need for the project, or that the project will actually enter operation—and an idle pipeline and terminal do not provide meaningful economic benefits. More broadly, the applicants' discussion of economic impacts is one-sided and ignores displacement, opportunity cost, and economic harm. Similarly, although the federal Department of Energy recently published a renewed report on the macroeconomic impacts of exports, this report ignored distributional issues and the fact that many Americans will be made worse off by increased North American gas exports. Accordingly,

[343] See, e.g., 2015 LNG Export Study at 15 Figure ES3, C-1

[344] *See, e.g.,* NERA Economic Consulting, *2018 Macroeconomic Study* 67 (2018), https://www.energy.gov/sites/prod/files/2018/06/f52/Macroeconomic%20LNG%20Export%20Study%202018.pdf.

economic impacts are one more reason why the Corps should not authorize the 404 permit for the project.

IX. The Corps Must Deny the Permit Because It Lacks Sufficient Information to Make A Reasonable Judgment

The application does not include sufficient information for the Corps to make a reasonable judgment regarding compliance with the 404(b)(1) Guidelines, the CWA, or the Rivers and Harbors Act. Therefore, the Corps must deny the 404 permit.

Numerous deficiencies are identified as to specific information and issues throughout this document, and those should be considered. In addition, several aspects of the application are so insufficient that they warrant emphasis here.

A. Sources and Impacts of Hydrostatic Testing

The JPA does not provide specific information regarding the sources and disposal of water used for hydrostatic testing. For purposes of determining whether the proposed action complies with State water quality standards, the applicants must provide essential details of proposed hydrostatic testing requested by DEQ, including a complete listing of all hydrostatic test discharge points with the name of the receiving stream and location on that stream and/or a complete listing of the infiltration areas, including the location where the water would drain if it were released. Since no pipe welding is without leaks, the applicant must describe where additional water would come from for further testing after fixing leaks found in the first test, and how much water would be required.

B. Extent and Impact of Channel Deepening Projects

Dredging has the potential to change the hydrodynamics of Coos Bay in the long-term. The application fails to evaluate the project in conjunction with other proposed dredging in Coos Bay. For instance, the Corps is considering a massive channel-deepening project for Coos Bay, and the State of Oregon commented that some level of channel deepening will be required to accommodate LNG tankers, particularly if the LNG terminal is allowed to use larger tankers in the future.

C. Extent of Completed Work

The JPA does not provide information regarding the extent of work that has already been completed on the project. Specifically, the JPA fails to note the prior excavation and testing programs that have already been completed on the project site, including pile testing and ground disturbance evaluations that involved significant excavation and movement of material.

D. Hydraulic Alteration at Stream Crossings

The pipeline will cross tributaries and mainstream rivers within the Coos, Coquille, South Umpqua, Rogue and Klamath basins, most of which are impaired for several water quality parameters. The applicants have not provided analysis of potential risk for hydraulic and geomorphic alteration upstream and downstream from the impact areas. Without a risk assessment for stream crossings based on fluvial geomorphic analyses as recommended by the USFWS for all proposed stream crossings, the application does not provide mandatory minimum information as required for DEQ to evaluate the project's ability to comply with water quality standards, such as biocriteria.[345]

E. Potential Interference with Subsurface Flow Regimes

The applicants have not provided adequate information demonstrating the potential effects of pipeline construction on the hyporheic regimes of affected waterbodies, including streambed and bank disturbance and placement of pipe and backfill. As noted by DEQ, rerouting of subsurface water or prevention by barriers (such as buried pipes) of subsurface flows interacting with stream flows can increase temperature. These interactions have a greater impact at low flow periods, when baseflow impacts are critical. Hyporheic exchange often allows for cool water pockets, providing thermal refuge for migrating cold water fish like threatened Coho salmon. In addition, other water quality parameters including pH and dissolved oxygen can be impacted by disturbances to hyporheic exchanges.

F. Proposed Horizontal Directional Drilling of Coos Bay

The use of HDD represents a significant change from the previously proposed wet open crossing.[346] The applicants have not provided comprehensive information regarding why the HDD technology currently proposed is now feasible where previously it was determined not to be feasible and a wet open cut crossing was the preferred method. More information regarding the feasibility of the Coos Bay East HDD is needed. The HDD Feasibility Evaluation submitted by the applicants only explored to a depth of 50 feet, despite the proposed drill depth closer to 230 feet.

G. Inaccurate Data for HDD Crossings

The Corps should fully review the application for missing, inaccurate, and incomplete information. In the appendices for the HDD Design for the Rogue River, the applicants included data and information for the Klamath crossing. HDD Design Drawing and Calculations, the HDD Design Summary, Minimum Radius Calculations, Operating Stress Summary, and Installation Load Calculations included are for the Klamath River rather than the Rogue River.[347] The JPA is therefore missing these documents and this analysis for the Rogue HDD crossing. Additionally, groundwater levels were not measured.[348]

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[345] OAR 340-041-0011.

[346] *See* 2015 FEIS, *supra* note 49.

[347] Pacific Connector Gas Pipeline Project, *Geotechnical Engineering Services and Horizontal Directional Drilling Design Rogue River* (2017). (Part 2 Attachment C. P. 1. PCP A-B Part 7 P. 219 – 239).

[348] *Id*.

H. Extent of Road Construction

The JPA inadequately addresses the aquatic impacts from road use, road modifications (including but not limited to Key Watersheds), temporary extra work area (TEWA) 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, and the activities that accompany access magnify their negative effects on aquatic habitats. Activities and impacts associated with roads include fire, target-practice, ORV use, fishing, recreation, timber harvest, livestock grazing, and agriculture. Roads also provide avenues for stocking non-native fishes. The JPA fails to provide complete and accurate maps of roads (existing, proposed, and expanded), specific characterizations of impacts to waterways that would be affected, details regarding types of roads and how they will be modified, or specific details on long-term maintenance proposed for roads in areas of steep terrain.

I. Projected Erosion and Effectiveness of Controls Along Pipeline Route

The JPA does not provide an analysis of how cleared areas are to be managed during the winter in order to prevent significant erosion and sedimentation events during that time or into the future. Without site-specific analysis relevant to this construction period, and the long-term management of a cleared ROW, the Corps, DEQ, and the public cannot meaningfully evaluate the effectiveness of measures to control erosion and sedimentation of waterways during this period. DEQ must evaluate both the short and long term discharges of turbidity and sediments from what is essentially a proposed new 229-mile dirt road for the lifetime of the project. The 2003 MasTec pipeline provides a much smaller example of similar the water quality risks. The turbidity and sediment discharges from the cleared ROW and pipeline installation should be evaluated for cumulative discharges over long term, and should include an analysis of how this may contribute to mercury pollution from elemental mercury found in soils.

J. Identification of Impacted Waterways

The application materials do not consistently specify the number of waterbodies that would be crossed. As noted by DEQ and the Corps, the pipeline will necessitate direct impacts to waters at 485 locations, including 326 perennial and/or intermittent waterways, seven lakes and/or ponds, two estuarine waters, and 150 wetlands.[349] However, The Pipeline will cross 326 waterbodies, 61 of these are not crossed by the center line, but are within the right-of-way or workspaces.[350] Of those waterbodies crossed, “66 are perennial, 148 are intermittent, 98 are ditches, 10 are lakes or stock ponds, and 4 are estuarine.[351]

As evidenced by these two descriptions of the impact of the project, the applicants state that a different number of lakes and ponds, estuarine waters, and wetlands would be crossed.

[349] Public Notice, *supra* note 6, at7

[350] PCP RR2, supra note 10, at 7; Part 2 attachment C. PCP A-B Part 6 p.217.

[351] *Id.*

X. Before the Permit May Issue, the Corps Must Consult with the State and Federal Wildlife Agencies

The Corps regulations give special emphasis on the need for consultation and "full consideration" of comments from FWS, NMFS, and state wildlife agencies.[352] Federal agencies are of course required to consult with the FWS or NMFS under section 7 of the ESA.[353] Impacts to Essential Fish Habitat moreover require consultation with NMFS.[354] Furthermore, the lack of consultation, and speculation as to its results, render the proposed mitigation measures highly suspect and likely to change. Therefore, the Corps must first consult with state and federal wildlife agencies before authorizing the 404/10 permit.

Consultation with NMFS will be critically important to the Corps permit decision. As the lead agency, FERC alone is responsible for submitting a BA. Even if the Corps intends to defer to FERC analysis and consultation with NMFS, such as under NEPA, the MMPA, the Magnuson-Stevens Act or ESA, it remains the Corps' duty to take due regard of consultation recommendations and ensure all legal obligations are met.

It is essential to meaningful public and expert engagement that NMFS consultation be a part of the public record on a timeframe that enables public review, so that this information can be incorporated into public comment. The Corps should fully consider analysis conducted through the NEPA process as it makes its decision.

Consultation with expert State agencies will also be essential to the Section 404 analysis. These agencies are essential under several of the provisions of the Corps' Section 404 analysis, including identification of practicable alternatives, compliance with other legal requirements, adequacy of mitigation, and the public interest analysis. Important agencies include ODFW regarding fish and wildlife, ODEQ regarding waterways, DSL regarding land use, DOGAMI regarding geological hazards, and DOE regarding safety and emergency response. Local fire departments, police and other first responders also have essential information that the Corps is obligated to consider. As with NMFS and FWS, we are concerned that the needed consultation does not appear to be happening in a timely manner.

XI. Request for a Public Hearing

Commenters reiterate the request for public hearings regarding the Section 404/10 permit application. Hearings are necessary here for meaningful public comment. Public delivery of public comment is a unique and valuable form of input that is not replicated in other settings.

XII. Conclusion

[352] 33 C.F.R § 320.4(c).
[353] 16 U.S.C. §1531.
[354] *Id*. §§ 1361, 305(b)(2)

In conclusion, the Corps cannot authorize the Clean Water Act 404/10 permit for the Jordan Cove Terminal and Pacific Connector Pipeline Projects because the applicants have not provided reasonable assurances that the project complies with multiple requirements of the Corps' 404(b)(1) Guidelines. The Section 404 permit should be rejected under the public interest test, for the same reasons. Therefore, the Coalition urges the Corps to deem the JPA legally and factually insufficient and deny the 404/10 permit for this project.

Dated this 8th day of August, 2018.

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Public Comments on the Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 401 State Water Quality Certification (U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697)

Submitted to the Oregon Department of Environmental Quality on behalf of:

Rogue Riverkeeper
Rogue Climate
Oregon Coast Alliance
Northwest Environmental Defense Center
Oregon Wild
Center for Sustainable Economy
Citizens for Renewables/Citizens Against LNG
Oregon Physicians for Social Responsibility
Pipeline Awareness Southern Oregon
University of Oregon Climate Justice League
350 Eugene
Food & Water Watch
Jordan Cove Resistance Douglas County
350 Seattle
350 Corvallis
Honor the Earth
Western Environmental Law Center
Bob Barker, Affected Landowner
Center for Biological Diversity
Stop Fracked Gas PDX
Cascadia Wildlands
Friends of Living Oregon Waters (FLOW)
Douglas County Global Warming Coalition
Rogue Fly Fishers
Onward Oregon
Oregon Shores Conservation Coalition
OPAL Environmental Justice Oregon
Oregon Just Transition Alliance
Evans Schaaf Family, LLC
350 Salem
Hair on Fire Oregon
Signal Fire
Scholars for Social Responsibility
Sierra Club
Columbia Riverkeeper
Climate Action Coalition
Our Revolution Southern Oregon
Craig and Stacey McLaughlin, Affected Landowners
350 PDX
Waterkeeper Alliance
Klamath-Siskiyou Wildlands Center
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August 8, 2018

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August 8, 2018

RE: U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697 Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 401 State Water Quality Certification

Please accept these comments on the Oregon Department of Environmental Quality Water Quality 401 Certification Application (USACE NWP-2017-41/DSL APP0060697) that has been made by Jordan Cove LNG, LLC ("the applicants") for the Jordan Cove Energy Project ("JCEP") and Pacific Connector Pipeline ("PCP"). We submit these comments on behalf of Rogue Riverkeeper, Rogue Climate, Oregon Coast Alliance, Northwest Environmental Defense Center, Oregon Wild, Center for Sustainable Economy, Citizens For Renewables/Citizens Against LNG, Oregon Physicians for Social Responsibility, Pipeline Awareness Southern Oregon, University of Oregon Climate Justice League, 350 Eugene, Food & Water Watch, Jordan Cove Resistance Douglas County , 350 Seattle, 350 Corvallis, Honor the Earth, Western Environmental Law Center, Bob Barker, Center for Biological Diversity, Stop Fracked Gas PDX, Cascadia Wildlands, Friends of Living Oregon Waters (FLOW), Douglas County Global Warming Coalition, Rogue Fly Fishers, Onward Oregon, Oregon Shores Conservation Coalition, OPAL Environmental Justice Oregon, Oregon Just Transition Alliance, Evans Schaaf Family, LLC, 350 Salem, Hair on Fire Oregon, Signal Fire, Scholars for Social Responsibility, Sierra Club, Columbia Riverkeeper, Climate Action Coalition, Our Revolution Southern Oregon, Craig and Stacey McLaughlin, Affected Landowners, 350 PDX, Waterkeeper Alliance, Klamath-Siskiyou Wildlands Center, and Engineers for a Sustainable Future.

Members of the Coalition have direct and personal interests in the proceeding, including rights to property, safety, and to a livable environment, and these interests would be directly and adversely impacted by project approval. Commenters here have been recognized as parties to the proceeding and have submitted lengthy, detailed comments on previous rounds of the proposed project including, but not limited to, the Draft Environmental Impact Statements ("DEIS") in 2008 and Final Environmental Impact Statements ("FEIS") in 2009 submitted for the import project round 1 and the DEIS and FEIS in 2015 for the export project round 2, local land use proceedings in Douglas and Coos Counties, and scoping comments on the current third round of the project to the Federal Energy Regulatory Commission ("FERC").

The Environmental Impact Statements and the procedures of the National Environmental Policy Act ("NEPA") are especially important here, on a project of such magnitude, complexity and significance. Commenters hereby adopt in full and incorporate by reference our scoping comments and interventions with FERC as they apply to the Oregon Department of Environmental Quality ("DEQ") permitting, and expect that further NEPA documents and comments will be fully and properly considered by DEQ. These include references to the Draft

Environmental Impact Statement (DEIS) and Final Environmental Impact Statement (FEIS) for the previous, related Liquid Natural Gas ("LNG") import facility in Coos Bay, Oregon in 2005, as well as the second iteration of this project designed for export in 2014. Additional supporting documents are included as appendices and should be adopted in full and incorporated by reference:

- **Appendix 1:** Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018;
- **Appendix 2:**
- **Appendix 3:** Public Comments on the Jordan Cove Energy Project and Pacific Connector Pipeline Application for Clean Water Act 404 Permit (U.S. Army Corps NWP-2017-41/Oregon Dept. of State Lands APP0060697).

Over the last decade, scores of individuals, organizations, and agencies have spent an enormous amount of time and resources analyzing and battling a project that is not in the public's interest and that significantly threatens Oregon's rivers, lakes, and streams. DEQ has the opportunity to use its authority as a state agency working on behalf of all Oregonians and our shared water resources to carefully and independently evaluate the effects of the proposed project on a whole host of public resources. The following comments identify issues we ask DEQ to thoroughly analyze in its evaluation of the applicants' application for certification under Clean Water Act Section 401. Our comments identify the lack of reasonable assurance provided by the applicants that the project will not violate state water quality standards. DEQ must deny the 401 certification for the project because the applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards. 40 C.F.R. § 121.2(a)(3).

I. Introduction

A. The Jordan Cove Energy Project and Pacific Connector Pipeline

1. Project History

a. Import Project, Round 1 (2004-2010)

In 2004, the Jordan Cove Energy Project (JCEP) and a 234-mile Pacific Connector Pipeline (PCP) project was first proposed as an import facility. In 2006, Jordan Cove filed an application for the project with FERC. In December 2009, the County Planning Commission granted a Conditional Use Permit ("CUP") for the construction of the Pacific Connector Gas Pipeline for import only of natural gas. That month, FERC granted the Pacific Connector Certificate for the construction of the Pacific Connector Gas Pipeline to import natural gas. Also in 2009, FERC initiated the Environmental Impact Statement ("EIS") process under NEPA for the project. Comments on the DEIS were submitted in June 2009. Many of the undersigned organizations submitted comments during the EIS process.

b. Export Project, Round 2 (2011-2016)

In July 2011, Jordan Cove applied to the Department of Energy for authorization to export LNG, in violation of its Douglas County CUP import only restriction. In September 2011, Jordan Cove filed an application with Federal agencies to export LNG in violation of the Douglas County CUP import only restriction. After Jordan Cove filed a request for extension, Douglas County granted the extension request in October 2011 in violation of CUP 09-045's import only condition.

In April 2012, FERC vacated its approval of the December 17, 2009 order to construct pipeline facilities. In December 2012, Douglas County granted a second extension on a CUP with conditions that the project was for natural gas import only and required a FERC Certificate. The applicant announced plans to export, FERC's order to import was vacated nine months earlier, and no new application for the project had been filed with FERC.

On 21 May 2013, Jordan Cove filed an application under section 3 of the Natural Gas Act ("NGA") and Parts 153 and 380 of the Commission's regulations for the Jordan Cove Energy Project (CP13-483-000) and Pacific Connector Pipeline. On June 6, 2013 Pacific Connector filed an application to FERC under NGA section 7(c) and Part 157 of the Commission's regulations for a certificate of public convenience and necessity to construct and operate a 232-mile Pacific Connector Pipeline (CP13-492-000) to export natural gas.

On 7 May 2014, FERC sent a data request to Pacific Connector requesting the current status of Jordan Cove's negotiations with liquefaction contracts for the LNG terminal and Pacific Connector's actions to enter an open season and enter into precedent agreements for pipeline capacity. FERC submitted multiple data requests to Pacific Connector over the next year. Concurrently, FERC initiated the EIS process under NEPA between 2014 and 2015. Many of the undersigned organizations submitted comments on the EIS process.

On 20 May 2015, FERC sent a third data request to Pacific Connector, stating that:

> The Commission's Certificate Policy Statement requires the Commission to balance the public benefits of a pipeline proposal against its potential adverse impacts, and that Pacific Connector must show that the public benefits of its proposal outweigh the project's adverse impacts.[1]

On 30 September 2015, FERC issued the FEIS for the Jordan Cove Energy Project and the Pacific Connector Pipeline (CP13-483-000 and CP13-492-000). On 14 October 2015, FERC staff submitted a fourth data request to Pacific Connector regarding the existence of firm commitments for service on the pipeline, potential liquefaction and transportation customers, whether the company entered into precedent agreements, and when the open season would be held. On 11 March 2016, FERC issued an order denying applications for certificate and Section 3 Natural Gas Act authorization. In its denial, FERC states:

> Here, Pacific Connector has presented little or no evidence of need for the Pacific Connector Pipeline. Pacific Connector has neither entered into any precedent agreements for its project, nor conducted an open season, which might (or might not) have resulted in

[1] Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 8.

> "expressions of interest" the company could have claimed as indicia of demand. As it stands, Pacific Connector states that the pipeline will benefit the public by delivering gas supply from the Rocky Mountains and Canada to the Jordan Cove LNG Terminal and by providing an additional source of gas supply to communities in southern Oregon (though, again, it has presented no evidence of demand for such service). Pacific Connector also contends that construction of the pipeline and LNG terminal will create temporary construction jobs and full-time operation jobs and millions of dollars in property, sales, and use taxes to state and local governments. Finally, Pacific Connector contends that the Commission has previously found that the benefits provided by pipelines that deliver feed gas to export terminals outweigh the minimal adverse impacts and such projects are required by the public convenience and necessity.[2]

Ultimately, in its 11 March 2016 order denying the certificate for the project, FERC stated:

> We find the generalized allegations of need proffered by Pacific Connector ***do not outweigh the potential for adverse impact*** on landowners and communities… Because the record does not support a finding that the public benefits of the Pacific Connector Pipeline outweigh the adverse effects on landowners, we deny Pacific Connector's request for certificate authority to construct and operate its project[3]

In April 2016, Jordan Cove appealed FERC's decision. On 9 December 2016, FERC upheld its decision to deny the certificate for the project.

c. Export Project Round 3 (2017 – Present)

In January 2017, Jordan Cove submitted a pre-filing request to FERC for the Jordan Cove Energy Project and Pacific Connector Pipeline project. In March 2017, Jordan Cove held Open Houses regarding the project. In June 2017, FERC initiated the scoping period for the Jordan Cove Energy Project and Pacific Connector Pipeline project and held scoping hearings in Coos Bay, Douglas County, and Klamath Falls. On 24 September 2017, Jordan Cove submitted the final application to FERC. On 23 October 2017, Jordan Cove submitted a Joint Permit Application ("JPA") to the U.S. Army Corps of Engineers ("the Corps") for the Clean Water Act and, to the best of our knowledge, emailed the Oregon Department of Environmental Quality ("DEQ") a copy of the application.

On 6 February 2018, Jordan Cove submitted "a combined electronic Section 401 Water Quality Package to DEQ for the Jordan Cove Energy Project ("JCEP") and Pacific Connector Gas Pipeline ("PCGP") projects" as a "supplement to the Section 404/10 permit application provided to the U.S. Army Corps of Engineers on October 23, 2017."[4] This package included materials

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[2] Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 17.

[3] Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 18. Emphasis added.

[4] David Evans and Associates letter to Oregon DEQ. SUBJECT: Jordan Cove Energy Project / Pacific Connector Gas Pipeline - 401 Water Quality Package (NWP-2017/41). 6 February 2018.

submitted in October 2017 and additional materials. On 3 November 2017, Jordan Cove submitted a removal-fill permit application to the Department of State Lands ("DSL"). On 1 December 2017, DSL found that the application was incomplete. On 8 May 2018, Jordan Cove submitted current and new materials to DEQ. To the best of our ability, when our comments refer to these Joint Permit Application ("JPA") documents, we identify them specifically by date. On 22 May 2018, the Corps and DEQ initiated a public comment period for Jordan Cove's application for a Clean Water Act Section 404 removal-fill permit and Clean Water Act Section 401 state water quality certification.

2. Jordan Cove Energy Project Today

Jordan Cove proposes to site, construct, and operate a Liquefied Natural Gas (LNG) terminal that would receive a maximum of 1.2 million dekatherms per day of natural gas and produce a maximum of 7.8 million tons of LNG for export each year. The LNG terminal will cool natural gas into its liquid form to in preparation for export from Coos Bay.[5]

Referred to as the Jordan Cove Energy Project ("JCEP"), the project is composed of:

- LNG terminal site
- Slip and access channel
- Materials Offloading Facility ("MOF")
- Navigation Reliability Improvements ("NRIs")
- Meteorological Station
- Industrial Wastewater Pipeline ("IWWP")
- Trans Pacific Parkway ("TPP") / US 101 Widening
- APCO Sites 1 and 2
- Kentuck Site
- Eelgrass Mitigation Site
- Temporary Construction Areas
- LNG Carrier Operation

The LNG terminal is composed of Ingram Yard, South Dunes site, the Access and Utility Corridor, and the Roseburg Forest Products property. The LNG terminal and associated facilities would cover 538-acres of land, including 5.2 acres of open water and 169-acres of wetlands.[6]At the LNG terminal site, the Ingram Yard will store LNG tanks and liquefaction equipment. The South Dunes site includes the Workforce Housing Facility, metering station, administrative building, and the Southwest Oregon Regional Safety Center ("SORSC"). The Roseburg Forest Products property will be used as a temporary construction staging area and for upland dredge disposal, contained with an on-site berm. The LNG terminal itself consists of a connection to the Pacific Connector Pipeline metering station, gas inlet facilities, a gas conditioning plant, liquefaction facilities, two full-containment LNG storage tanks, an LNG loading line, LNG

[5] Betz, Sarah and Derik Vowels. Technical Memorandum. Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting. 2 February 2018. 8 May 2018 Pacific Connector Pipeline. P. 1.
[6] U.S. Army Corps of Engineers. Public Notice Application for Permit to Alter Federally Authorized Projects. 22 May 2018. NWP-2017-41. P. 3

loading facilities, and a marine slip and access channel for LNG carriers. According to the applicants, construction and operation of the LNG terminal may impact water quality through upland site preparation and facilities construction, placement of permanent infrastructure, construction and operational stormwater runoff, potential construction and operational fuel and chemical spills, hydrostatic testing, wastewater discharge, dredge soil disposal and dewatering/decanting, and Operation of construction vehicles and equipment.[7]

Construction of the marine slip would require excavating 38-acres from uplands. The slip and access channel combined would equal 60-acres and result in the permanent loss of 14.5-acres of shallow subtidal and intertidal habitat, 0.6-acres of estuarine saltmarsh habitat, and 1.9 acres of submerged aquatic vegetation habitat. Additionally, the applicants propose to dredge 5.7 million cubic yards of material to create the slip basin and access channel. Dredged material would be disposed of at the LNG terminal, Roseburg Forest Products Site, South Dunes Site, or Kentuck Site. Dredging for the temporary berth would require dredging approximately 45,000 cubic yards of material. Dredging of the existing navigation channel would remove 700,000 cubic yards of material and would construct a temporary pipeline on the bottom of the channel over 8.3 miles to remove the dredged material. Widening of the Transpacific Parkway/Highway 101 intersection would require permanently filling in 0.51 acres of intertidal habitat. Future maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years.[8]

By constructing the Kentuck mitigation site, applicants propose to reconstruct and enhance 100-acres of tide channels, mudflats, saltmarsh, and freshwater wetlands. At the eelgrass mitigation site, the applicants propose establishing approximately 9-acres of eelgrass beds at different densities.

Maintenance dredging of the access channel, marine slip, and NRI area will involve dredging between 34,600 cubic yards and 37,700 cubic yards of material from the access channel and slip every year and dredging between 27,900 cubic yards and 49,800 cubic yards of material from the NRI area every three years.

3. Pacific Connector Pipeline Today

Jordan Cove also proposes to construct a 36-inch underground 229-mile natural gas pipeline from Malin, Oregon to the coast at Coos Bay, Oregon. As noted by DEQ and the Corps in the Public Notice, the pipeline will necessitate direct impacts to waters at 485 locations, including 326 perennial and/or intermittent waterways, seven lakes and/or ponds, two estuarine waters, and 150 wetlands.[9] However, in the JPA under Resource Report 2, the applicants state the following:

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[7] Betz, Sarah and Derik Vowels. Technical Memorandum. Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting. 2 February 2018. 8 May 2018 Pacific Connector Pipeline. P. 3.

[8] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 3-6.

[9] Public Notice Application for Permit and to Alter Federally Authorized Projects. U.S. Army Corps of Engineers. P. 7

> The Pipeline will cross 326 waterbodies within these Fifth Field Watersheds; 61 of these are not crossed by the centerline (29 streams, 10 ponds, 21 ditches, and 1 estuarine feature) but are within the right-of-way or workspaces. Of the 326 waterbodies crossed, 66 are perennial, 148 are intermittent, 98 are ditches, 10 are lakes or stock ponds, and 4 are estuarine (Coos Bay/2 HDD crossings, the HDD pullback at MP 0.0, and the Coos River).[10]

It is unclear whether all impacted waterways have been identified by the applicants.

Additionally, over the 229-mile pipeline route, the applicants propose to cross Coos Bay, the South Coast watershed (Coos and Coquille Subbasins), the Umpqua watershed, the Rogue watershed, and the Klamath watershed (Upper Klamath and Lost Subbasins). Overall pipeline construction would impact 30,778-feet (5.83 miles) of wetlands and 3,028-feet of waterways. Approximately 48,675 cubic yards of material would be excavated and discharged into wetlands and 9,519 cubic yards of material would be excavated and discharged into waterways.[11]

Horizontal Directional Drilling is proposed for Coos Bay, the Coos River, the Rogue, and the Klamath Rivers. Within Coos Bay, Jordan Cove proposes to install the 36-inch pipeline across the bay using two horizontal directional drills ("HDD") of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after rejecting the use of HDD for the Coos Bay crossing. It is unclear how the applicants have altered the proposal in a way that two proposed HDD crossings are now determined to be feasible. The currently proposed pipeline alignment would require not one but two HDD crossings of Coos Bay, for a total of over 14,000 feet.[12] All other waterways will be crossed using a dry open-cut method. Construction right-of-ways at each crossing would require clearing a 75-foot buffer.

Table 1. Summary of Waterways Impacted by Pipeline

County	Impacted Waters Identified by Applicants
Coos	44 perennial and/or intermittent waterways, 2 estuarine waters, and 29 wetlands
Douglas	86 perennial and/or intermittent waterways, 1 pond, and 38 wetlands
Jackson	89 perennial and/or intermittent waterways, 2 lakes and/or ponds, and 22 wetlands
Klamath	107 perennial and/or intermittent waterways, 4 ponds, and 61 wetlands

B. The Clean Water Act

[10] Pacific Connector Gas Pipeline Project Resource Report 2 Water Use and Quality. P. 7. Part 2 Attachment C. PCP A-B Part 6 p. 217.

[11] Public Notice Application for Permit and to Alter Federally Authorized Projects. U.S. Army Corps of Engineers. P. 7 – 8.

[12] GeoEngineers Memorandum, Coos Bay West HDD Crossing (Sept. 14, 2017) at 2.

The purpose of the Clean Water Act ("CWA"), 33 U.S.C. § 1251 *et seq.*, is to restore and maintain the chemical, physical, and biological integrity of waters of the United States.

Under Section 401(a) of the CWA, any applicant for a Federal license or permit to conduct any activity that may result in a discharge to navigable waters in Oregon must obtain a certification from DEQ stating that the discharge from the proposed action will comply with the requirements of the CWA. *See* 33 U.S.C. § 1341.

Before DEQ may certify the Project, it must affirm "that there is a reasonable assurance that the activity will be conducted in a manner which will not violate water quality standards." 40 C.F.R. § 121.2(a)(3). DEQ has made clear in its regulations and guidance documents that the applicant bears the burden of persuasion and the burden of proof in this review. As a result, the applicant must not only demonstrate that the activity will comply with water quality standards, but it must also provide DEQ with adequate information supporting that position. Stated another way, DEQ must work from the presumption that the activity will violate water quality standards and must require the applicant to prove otherwise and support its conclusion.

An application for certification must contain "environmental information submitted to the federal licensing or permitting agency . . . and evaluations as necessary to demonstrate that the activity will comply with applicable provisions of" the CWA. OAR 340-048-0020(2)(g). DEQ may consider the potential water quality impacts of the proposed project as a whole in its 401 certification analysis, not just the significant effects of the discharge itself. *PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700, 712 (1994); 40 C.F.R. § 121.2(a)(3) (requiring the state to find "a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards") (emphasis added).

Water quality standards include three elements: (1) one or more designated "uses" of a waterway; (2) numeric and narrative "criteria" specifying the water quality conditions, such as maximum amounts of toxic pollutants, maximum temperature levels, and the like, that are necessary to protect the designated uses; and (3) an antidegradation policy that ensures that uses dating to 1975 are protected and high quality waters will be maintained and protected. 33 U.S.C. §§ 1313(c)(2), 1313(d)(4)(B); 40 C.F.R. Part 131, Subpart B. Compliance with water quality standards requires protection of all three of these components.

DEQ must deny the 401 certification for the project because the applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards.

C. Environmental Justice and Tribal Sovereignty

Tribal interests are held and asserted most importantly and fundamentally by tribes themselves. Commenters insist, however, that our government respect tribal sovereignty and give those interests their due regard, and give them heavy weight in DEQ's analysis. In this regard, we call attention to the recent findings of the Oregon Environmental Justice Task Force. Tribal leaders from four tribes testified to Oregon's Environmental Justice Task Force Committee on June 8, 2018 in Klamath Falls about their concerns regarding the negative impacts of building and operating the Pacific Connector Gas Pipeline and the Jordan Cove LNG Export Terminal. Each tribe is a sovereign nation with corresponding rights of their own. Those rights do not rely on this legal process, much less on non-tribal public commenters. Rather, state and federal governments have obligations to honor those rights and interests.

We are concerned that, in working with the State of Oregon and various state agencies, representatives of several tribes have expressed their frustration in not being adequately consulted about the impacts this project would have on their tribal people and tribal lands. We stand in solidarity with these tribes as they assert their rights, and agree with the Environmental Justice Task Force that this project is not in the public interest because of its disproportionate negative impacts on tribes. A project cannot be in the "public interest" if it violates fundamental obligations to tribes.

By way of emphasis, a summary of that recent Environmental Justice Task Force meeting, which contains some detail regarding the important tribal interests at stake, follows:

> Oregon Physicians for Social Responsibility (PSR) Partial Summary of June 8, 2018 Public Meeting of Oregon Environmental Justice Task Force ("EJTF") and Confederated Tribes of Coos, Lower Umpqua and Siuslaw, The Klamath Tribes, The Yurok Tribe, and The Cow Creek Band of Umpqua Tribe of Indians:
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> > Ben Duncan, Environmental Justice Task Force member, began with two quotes from a Klamath Tribal Council member in a closed meeting the previous day, "We are not as important as everyone else" and "we are beat down over and over." These quotes emphasize the issue of disparity that tribes experience overall and in working with the state and the federal government. He also noted that the state "statute that created the EJTF requires natural resource agencies, that is fourteen agencies, "shall consider the environmental justice impact when making determinations on how and when to act."
> >
> > <u>The Klamath Tribes</u>
> > Chairman Don Gentry of the Klamath Tribes stated that "History has shown that what we think should be important has not been that important to other people. The fact that our interests have been marginalized, we're still marginalized, our fish aren't as important as the ag community or money; our people aren't. This is the here and now. Environmental justice is something that is real. I think it is a legal, I think it is a moral, I think it is a spiritual obligation." Chairman Gentry noted that the pipeline would go through burial grounds, where there are cultural and human remains, and emphasized the negative impacts this will have on the psyche and world view of First Peoples. He noted that, although cultural resource laws require consulting with the tribes to figure out beforehand what to do with remains, not all burial grounds are known and may only be discovered as the pipeline is laid. There is inadequate legal protection of ancestral lands and their cultural significance, i.e. how the impact of destruction of these lands affects tribal people.

Confederated Tribes of Coos, Lower Umpqua, and Siuslaw

Margaret Corvi, Director of the Department of Natural Resources of the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw, spoke for the Tribes, emphasizing the importance of tribal identity and connection to the land. Calling out the "traumatic and heartbreaking" history of tribes in Oregon that have already experienced "a lot of loss," she expressed strong concerns about the Jordan Cove project's harmful impacts to her tribe. She noted that the project has changed dramatically since it was initially envisioned in 2006, growing much, much larger and, therefore, having the potential for much more significant and dramatic impacts to tribal people and to the land. The following are some of the concerns she expressed at the meeting about negative impacts of the proposed project to the water and water resources on tribal land:

● The removal of massive amounts of dirt in the area will cause a significant amount of ground disturbance. The bay is a constellation of village sites which moved around over the years with the changing of the estuary and channel. Some of the burial sites are known but some are unknown. Disturbing these sites would be devastating to the cultural and spiritual lives of the tribes, re-traumatizing the tribes by digging up their ancestors.

● There has already of been an issue of soil and water contamination and a huge concern about the ability of the tribes to continue to use the area for gathering of roots and basketry materials and for harvesting shellfish. Coos Bay has had one of the most robust areas for harvesting shellfish and is home to one of the largest intact fish weirs.

● The project of channel modification with widening and deepening of the channel to increase large vessel traffic will cause erosion, less access to fishing, and fewer fish overall. This will result in environmental degradation and cause the negative health impact of less access to a source of healthy foods.

● The dredged materials may be contaminated; how to prevent these materials from affecting the area has not been addressed. A tsunami would spread the contaminated materials over a much larger area and increased wave action would further degrade both natural and cultural resources.

● The construction and operation of the export terminal will generate high levels of noise, disturbing fish and wildlife, such that tribal members may not want to fish or participate in other traditional cultural practices.

● There has not been meaningful consultation with tribes by either the federal government, including FERC, or state agencies to address the avoidance or mitigation of harm to tribal resources. This includes a lack of adequate surveys and survey design for identifying cultural resources, including burial grounds, and a failure to address the issue of the length of the project and its cumulative and, in some cases, permanent impacts to resources. For example, the DEQ has issued cleanup permits for contaminated soil but nothing has happened because 85% of the DEQ's permits are back logged; even though permits are issued, no action is taken.

- Ms. Corvi raised questions about a DOE permit, a DOGAMI permit, and a plan for coordination of the permits as well as a plan for coordination with FERC.
- She also expressed serious concerns about both water and air quality and the impact of global warming and increased greenhouse gases.
- Ms. Corvi expressed the "lack of support for the disproportional impacts to tribes. So, these are not renewable resources in a lot of cases to tribes and highly valued for cultural reasons."

<u>The Yurok Tribe</u>

David Gensaw, Vice Chairman of the Yurok Tribal Council, spoke about their tradition of being hunters, gatherers, fisherman, prayer people and spiritual healers, and the past history of massacres and loss of their land, as well as attempts to destroy their language and religion. Nevertheless, the Yurok continue to live as they have for thousands of years.

He stated that "We oppose this LNG, this Pacific Connector Pipeline. We know what it's going to do. We know the devastation. We've been through devastation." He expressed concern that the oil and gas developers are not concerned about what would be destroyed by the terminal and pipeline, specifically from the negative effects of climate change, global warming, already a reality that will worsen, affecting ecosystems that the tribe and everyone depends upon. For example, in 2014, 80% of the juvenile salmon run was lost and, in 2015, 90% was lost on the Klamath River, due to warm water conditions. He emphasized that the pipeline will go through and devastate 250 miles of land and five rivers, destroying farmlands, private, public, forest and tribal lands. Because of this, the Yurok fight not only for themselves but for everybody and call on others to stand in solidarity with them to protect current and future generations of all people.

<u>The Cow Creek Band of Umpqua Tribe of Indians</u>

Jason Robison, Director of Natural Resources of the Cow Creek Band of Umpqua Tribe of Indians, spoke on behalf of the Tribes, first calling out their deep connection to the land, noting that the tribes have been here "from time immemorial" and will continue to be here.

He noted the following:

- There are 6.2 million acres of ancestral tribal land, including the Umpqua and Rogue River basins, providing services for 1800 tribal members.
- The tribe tracks, monitors and provides feedback for the pipeline portion of this project and notes that it has the potential to impact their ancestral territory in many ways, including environmental degradation, impacts to fish and wildlife populations, a direct impact to cultural resource sites, to

cultural resources and artifacts, and to the tribal community and its social wellbeing.
● The pipeline will transect 123 miles of ancestral land, creating a disproportionate burden on the tribe. He emphasizes that this requires a proper consultation, coordination and collaboration. Each tribe is a sovereign government - not just a stakeholder. As such, federal and state agencies have an obligation to consult with tribes at a level much different than anyone else on this project. At this time, the surface has only been scratched with regard to consultation. There is a need for individual consultation with tribes to address their specific issues and concerns about their ancestral territory and this is not happening.
● Jordan Cove and the pipeline will have a disproportionate effect on tribes' interests within their ancestral territory. "Tribes have been here forever and they will be here forever. They have to live with the impacts of their actions as well as the impacts of actions of others. Once again, they can't simply pick up and move the culture." As sovereign governments, tribes should be respected and treated as such.

Finally, following the testimony of the four tribes, the Oregon EJTF concluded that the Pacific Connector Pipeline project is not in the best interests of the state of Oregon. The Chair noted that it "could irrevocably change Oregon." The group committed to communicating with the Governor, the Governor's office, and state agencies and share the perspective of the Tribes and the EJTF.

In conclusion, we urge the State of Oregon to respect tribal sovereignty and to give tribal interests their due regard in this process. DEQ should carefully consider the environmental justice impacts of the project as identified by the Oregon Environmental Justice Task Force.

D. Conclusion

DEQ must deny the 401 certification for the project because the applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards. More specifically:

- The application fails to contain the mandatory minimum information (*See* Section II infra);
- There is no reasonable assurance that the project will comply with Oregon's antidegradation implementation policy (*See* Section III infra);
- There is no reasonable assurance that designated beneficial uses will be protected (*See* Section IV infra);
- There is no reasonable assurance that numeric criteria will not be violated (*See* Section V infra); and
- There is no reasonable assurance that narrative criteria will not be violated (*See* Section VI infra).

Each of these points will be discussed in further detail in the following sections. In addition to general comments regarding the lack of reasonable assurance from the applicants that the project will not violate water quality standards, we have provided specific examples and detailed information regarding each of the impacted watersheds in Section VII infra.

II. DEQ Must Deny the Certification Because the Application Fails to Contain the Mandatory Minimum Information

DEQ must deny the 401 certification for the project because the applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards. Specifically, the applicants have failed to provide the mandatory minimum information required by DEQ's regulations. Pursuant to DEQ's regulations, at a minimum, applications for a 401 certification filed with the state must contain "information and evaluations as necessary to demonstrate that the activity will comply with" the Clean Water Act and Oregon's water quality standards. OAR 340-048-0020(2)(g). Specifically, Oregon's Administrative Rules under OAR 340-048-0020(2) require:

> An application filed with the department must contain, at a minimum, the following information…
> (c) A description of the activity's location sufficient to locate and distinguish existing and proposed facilities and other features relevant to the water quality effects of the activity; …
> (e) A complete written description of the activity, including maps, diagrams, and other necessary information;
> (f) The names of affected waterways, lakes, or other water bodies.

When necessary, DEQ must "request any additional information to complete an application or to assist the department in evaluating an activity's impacts on water quality." OAR 340-048-0020(3). "An applicant's failure to complete an application or provide requested additional information within the time specified by the department is grounds for denial of certification." OAR 340-048-0020(3).

The applicant has failed to provide critical information necessary for the certification. Without this information, which is required by Oregon's regulations, DEQ must deny the certification request under OAR 340-048-0020.

A. The applicant does not provide "a description of the activity's location sufficient to locate and distinguish existing and proposed facilities and other features relevant to the water quality effects of the activity."[13]

1. Sources and Impacts of Hydrostatic Testing

The JPA does not provide specific information regarding the sources and disposal of water used for hydrostatic testing. For purposes of determining whether the proposed action complies with

[13] OAR 340-048-0020(2)(c)

State water quality standards, the applicants must provide essential details of proposed hydrostatic testing requested by DEQ, including a complete listing of all hydrostatic test discharge points with the name of the receiving stream and location on that stream and/or a complete listing of the infiltration areas, including the location where the water would drain if it were released. Therefore, the application fails to contain the mandatory minimum information required under OAR 340-048-0020(2)(c), (e) and (f) and must therefore be rejected as incomplete.

Since no pipe welding is without leaks, the applicant must describe where additional water would come from for further testing after fixing leaks found in the first test, and how much water would be required. The potential impacts of hydrostatic testing in each watershed are discussed in more detail in Section VII. Waterbody-Specific Comments.

2. Extent and Impact of Channel Deepening Projects

Dredging has the potential to change the hydrodynamics of Coos Bay in the long-term. The application fails to evaluate the project in conjunction with other proposed dredging in Coos Bay. For instance, the Corps is considering a massive channel-deepening project for Coos Bay, and the State of Oregon commented that some level of channel deepening will be required to accommodate LNG tankers, particularly if the LNG terminal is allowed to use larger tankers in the future.

3. Extent of Completed Work

The JPA does not provide information regarding the extent of work that has already been completed on the project. Specifically, the JPA fails to note the prior excavation and testing programs that have already been completed on the project site, including pile testing and ground disturbance evaluations that involved significant excavation and movement of material.

B. The applicant does not provide "a complete written description of the activity, including maps, diagrams, and other necessary information."[14]

1. Extent and Condition of Potential Contamination at Sites

Both the Ingram Yard property and the location of the proposed South Dunes site on the former Weyerhaeuser North Bend Containerboard Mill are listed in the DEQ's Environmental Cleanup Site Information (ECSI). The Ingram Yard property (ECSI 4704) was used for spreading of contaminated materials from the late 1970s to 1994 and contains "low levels of potentially bioaccumulating chemicals and must not be placed in waters of the state."[15] More recently, during construction of the Industrial Wastewater Pipeline by Jordan Cove, the contractor discovered black soils in March 2015 on the site. The results of the sampling confirmed that the

[14] OAR 340-048-0020(2)(e)

[15] Oregon Department of Environmental Quality. Weyerhaeuser – Ingram Yard. Environmental Cleanup Site Information Database. Available online < http://www.deq.state.or.us/Webdocs/Forms/Output/FPController.ashx?SourceId=4704&SourceIdType=11 >.

black soil contained contaminants, including but not limited to, mercury, arsenic, dioxins, and petroleum products.[16]

Photo 1. Black soils discovered during construction of the JCEP IWP Phase 1 Project.

IWP Phase 1A & 1B Construction, Black Soil Summary Report, Jordan Cove Energy Project. 15 April 2015. P. 1.

Additionally, the South Dunes site is also listed on the ECSI database (ECSI 1083). This site is also part of the former Weyerhaeuser North Bend Containerboard Mill. A 2007 Environmental Site Assessment commissioned by Jordan Cove found:

> "Contaminants were detected at several locations across the site. Samples collected within the black ashy mill waste typically had higher concentrations of contaminants than those taken in sand. VOCs and tributyltin were not detected. Detected levels of PAHs and TPH were below state and federal guidelines. Chromium was detected in one sample in test pit TP-7 above the SSL. Arsenic was detected in all samples analyzed. The level of arsenic is below the background levels with the exception of test pit TP-7. Dioxins and furans were detected throughout the site at levels below the PRG for individual congeners. The TEQ value for test pit TP-10 at a depth of 2 ft is above the equivalent PRG. PES also reported TEQ values above the equivalent PRG. Although the value is above federal guidelines for individual samples, the statistical level for the site is within state requirements."[17]

According to a 2004 Phase I Environmental Assessment of the site prepared for Weyerhaeuser, the report states that chemicals were used at the mill, including but not limited to biocides, resins, alum, mineral spirits, petroleum distillates, and other cleaning agents. Boiler blowdown containing chemicals may have been discharged into a septic drain field. Compressor condensate may also have been released at the site.[18]

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[16] IWP Phase 1A & 1B Construction, Black Soil Summary Report, Jordan Cove Energy Project. 15 April 2015. Available online < http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=0522588a-0b10-4e07-9705-599d39399d8dpdf&s=Black%20Soil%20Summary%20Report.pdf >. P. 2.

[17] Jordan Cove Task Order No. 8 Phase II Environmental Site Assessment Proposed Liquefied Natural Gas Terminal North Bend, Oregon. 16 January 2007. Available online < http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=001761ee-a0de-4084-a735-1098e00fc023.pdf&s=JCEPTaskOrder8GRIPhase2ESA(1-2007).pdf >. P. 6.

[18] LEVEL I ENVIRONMENTAL SITE ASSESSMENT WEYERHAEUSER COMPANY HORSEFALL BEACH ROAD NORTH BEND, OREGON DELTA PROJECT NO. E003-627-2. June 2004. Available online at <

The map below is based on aerial imagery from September 2006 and indicates the area of the site that was not included in DEQ's "no further action" determination.

Weyerhaeuser North Bend Containerboard Mill. ECSI 1083. Oregon Department of Environmental Quality.

Both the Ingram Yard and South Dunes sites (ECSI 4704 and 1083) are listed as "Partial No Further Action" as of 2006. The DEQ reports acknowledge that the recommendation for no further action is contingent upon there being no "new or previously undisclosed information" becoming available. Further, as demonstrated by the map above, there are also locations within the site that are not included within the "Partial No Further Action" finding that could be impacted by the applicant's proposed activities.

Additionally, on December 16, 2014, Barbara Gimlin, former Environmental Inspector at the Jordan Cove LNG terminal site and employee of SHN Consulting, submitted testimony to FERC regarding discovery of contaminants at the site during a March 2014 exploratory test program. Ms. Gimlin describes her knowledge of discovery of contaminated soils along the Jordan Cove shoreline during a September 2013 cultural resources survey by Southern Oregon University Laboratory of Anthropology. Ms. Gimlin then describes her personal observations of excavations at the site exposing potential contaminants including "black soils (north to south in Ingram Yard, including near the shoreline), bright yellow granulated/powder found in clumps of varying sizes, gray gummy material found in clumps (likely related to hydraulic drilling conducted by GRI), and the exposure of an underground concrete storage tank punched through by heavy equipment

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http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=02f102a1-f089-494a-9ca9-dea5d52fdb7dpdf&s=DeltaLevel1ESA(6-2004).pdf >. P. 8.

with unknown liquid inside." These exposures occurred during the March 2014 Kiewit test program.[19]

The information provided by Gimlin, in combination with the documented discovery of "black soils" by Jordan Cove in 2015, should be considered "new or previously undisclosed information" "which warrants further investigation." Given that the project calls for excavating and moving large amounts of soils from one area to another, to be used as fill for the South Dunes site and other construction areas, the extent and condition of the contamination at these sites must be fully investigated, disclosed, and addressed to ensure contaminants do not reach waterways.

2. Hydraulic Alteration at Stream Crossings

The pipeline will cross tributaries and mainstream rivers within the Coos, Coquille, South Umpqua, Rogue and Klamath basins, most of which are impaired for several water quality parameters. The applicants have not provided analysis of potential risk for hydraulic and geomorphic alteration upstream and downstream from the impact areas. Without a risk assessment for stream crossings based on fluvial geomorphic analyses as recommended by the U.S. Fish and Wildlife Service for all proposed stream crossings, the application does not provide mandatory minimum information as required for DEQ to evaluate the project's ability to comply with water quality standards, such as biocriteria (OAR 340-041-0011).

3. Potential Interference with Subsurface Flow Regimes

The applicants have not provided adequate information demonstrating the potential effects of pipeline construction, including streambed and bank disturbance and placement of pipe and backfill, on the hyporheic regimes of affected waterbodies. As noted by DEQ, rerouting of subsurface water or prevention by barriers (such as buried pipes) of subsurface flows interacting with stream flows can increase temperature. These interactions have a greater impact at low flow periods, when baseflow impacts are critical. Hyporheic exchange often allows for cool water pockets, providing thermal refuge for migrating cold water fish like threatened Coho salmon. In addition, other water quality parameters including pH and dissolved oxygen can be impacted by disturbances to hyporheic exchanges.

4. Proposed Horizontal Directional Drilling of Coos Bay

The applicants propose to use Horizontal Directional Drilling (HDD) technology to cross the Coos Bay estuary twice between MPs 0.28 and 1.0 and between MPs 1.45 and 3.02. As stated by the applicants in Resource Report 2:

> PCGP is not proposing to cross any waterbodies using a wet open cut crossing method. While the Coos Bay Estuary was previously proposed as a wet open cut crossing in the

[19] Gimlin, Barbara. Public Comment on Jordan Cove Energy Project Draft EIS by Barbara Gimlin. 12 February 2015. FERC Docket No. CP13-483-000.

> FERC 2015 FEIS, the proposed crossing method now incorporates two trenchless HDDs to avoid in-water work and the associated impacts.[20]

The use of HDD represents a significant change from the previously proposed wet open crossing, as described in the 2015 FEIS. The applicants have not provided comprehensive information regarding why the HDD technology currently proposed is now feasible where previously it was determined not to be feasible and a wet open cut crossing was the preferred method. More information regarding the feasibility of the Coos Bay East HDD is needed. The HDD Feasibility Evaluation submitted by the applicants only explored to a depth of 50 feet, despite the proposed drill depth closer to 230 feet. The report states the following:

> Our feasibility evaluation of the proposed Coos Bay East HDD is based on limited subsurface data.[21]

Further, the applicants have not provided information regarding the impacts of a potential frac-out or increased suspended sediments as a result of the HDD crossing in the bay. Without this information, DEQ cannot provide the requested certification of compliance with water quality standards.

5. Expected Temperature Increases in Discharged LNG Vessel Cooling Water

Jordan Cove states that water will be discharged from engine cooling at 3 degrees C (5.4 degrees F) above ambient water temperatures. Modeling of mixing zones and dissipation of water temperature increases were likewise based on this assumed 3 degrees of increase. However, Jordan Cove did not provide any information regarding the source of this assumed temperature of cooling water. Nothing in the JPA or FERC filings appears to support the assertion that engine cooling water will be only 3 degrees Celsius higher than the average ambient Coos Bay water temperatures of 10 degrees Celsius. In fact, FERC's FEIS for the Bradwood LNG Project states that:

> Cooling water discharged from a 150,000 m3 steam powered LNG carrier could initially be 19.4°F higher than ambient water temperatures" as compared to seasonally ranging ambient temperatures in the Columbia River of 42 to 68°F.[22]

Oregon LNG, also proposed for the Columbia River, estimated that "according to industry sources, the water taken for cooling the vessel's machinery is warmed by 6 to 9 degrees Celsius at the point of discharge" and that the average for diesel-powered LNG vessels would be 8.9°C

[20] Pacific Connector Gas Pipeline Project. Resource Report 2: Water Use and Quality P. 21. Part 2 Attachment C in PCPG A-B Part 6. March 2018. P. 231.

[21] GeoEngineers, Inc. HDD Feasibility Evaluation Coos Bay East Crossing. Pacific Connector Gas Pipeline Project. Coos County, Oregon File No. 22708-001-01. 6 September 2017. Part 2 Attachment C. Resource Report 2 Appendix G.2. P. 1. PCP A-B part 6 March 2018. P. 30.

[22] Bradwood LNG Project FEIS at 4-85 (2008).

above ambient water temperatures.[23]And according to EPA, cooling water can reach high temperatures with the "thermal difference between seawater intake and discharge typically ranging from 5ºC to 25ºC, with maximum temperatures reaching 140ºC."[24] Given these widely varying ranges of cooling water discharge temperatures, DEQ should at the very least require Jordan Cove to provide a worst case analysis of temperature increases from diesel and steam powered vessels. DEQ should also require that the applicants provide an accurate number of shipments that would occur using 148,000 cubic meter ships (the maximum size that would be allowed to transit Coos Bay) to export the full proposed natural gas export amounts (0.9 Bcf/d according to FERC, 1.2 Bcf/d according to DOE, 1.55 Bcf/d according to NEB and DOE).

6. Inaccurate Data Included for HDD Crossings

DEQ should fully review the application for missing, inaccurate, and incomplete information. In the appendices for the Horizontal Directional Drilling Design for the Rogue River, the applicants included data and information for the Klamath crossing. Specifically, in Appendix B. HDD Design Drawing and Calculations, the HDD Design Summary, Minimum Radius Calculations, Operating Stress Summary, and Installation Load Calculations included are for the Klamath River rather than the Rogue River.[25] The JPA is therefore missing these documents and this analysis for the Rogue HDD crossing. Additionally, the Horizontal Directional Drilling Design report states that groundwater levels were not measured. Instead, the report states:

> We anticipate that groundwater levels will mimic the elevation of the Rogue River around 1,410 feet mean sea level (MSL). We anticipate that groundwater levels will fluctuate with precipitation, site utilization and other factors. During heavy prolonged precipitation, and probably during most of the winter months, we expect that groundwater will be near or at the surface of the site on the east side of the Rogue River.[26]

Without this information, it is difficult to determine potential impacts to groundwater, and therefore interactions with surface waters, in the event of a frac-out or other drill failure. Without this information, DEQ cannot provide the requested certification of compliance with water quality standards.

7. Post-construction Restoration at Streambed Crossings

Several stream crossing methods are proposed for different types of streams. One proposed method for the majority of identified waterbody crossings is an "open dry cut." In most cases the

[23] Oregon LNG, CH2MHill Technical Memorandum, Appendix F Cooling Water Discharge Analysis, at 2 (Sept. 10, 2008).
[24] EPA, Final 2013 Vessel General Permit Fact Sheet at 133.
[25] Geotechnical Engineering Services and Horizontal Directional Drilling Design Rogue River HDD. Pacific Connector Gas Pipeline Project. Jackson County, Oregon. 1 September 2017. Part 2 Attachment C. P. 1. PCP A-B Part 7 P. 219 – 239.
[26] Geotechnical Engineering Services and Horizontal Directional Drilling Design Rogue River HDD. Pacific Connector Gas Pipeline Project. Jackson County, Oregon. 1 September 2017. Part 2 Attachment C. P. 6. PCP A-B Part 7 P. 163.

stream itself would not actually be dry and the process involves creating a temporary dam or flume, and pumping the water from that impoundment downstream of the work area. This process is anything but "dry" in reality if the stream contains any water at all. This type of crossing will have substantial turbidity impacts during the installation and removal of any temporary structures, also frequently discharging constant turbidity from muddy sump holes and from unavoidable seepage of surface or subsurface flow into the active work area and then downstream. Additionally, the methods do not explain how streambeds will be restored to avoid impacts to water quality following re-watering of the streams. Lastly, how the impacts from removal of all riparian vegetation on both banks for 75' (the ROW is stated to neck down from 95' at stream crossings) at crossing sites will be addressed is not described.

8. Stormwater Management Plan

The applicants submitted a NPDES 1200-C application in 2010. DEQ notified the applicants that critical details of long-term stormwater management are required. Specifically, DEQ requested information related to runoff from all impervious areas at terminal and pipeline facilities, docks, structures, pavements, roadways, and access and storage areas. DEQ asked that information related to the final pipeline and associated roadways be included in the detailed stormwater management plan. The applicants have not provided an adequately detailed stormwater management plan including specifications for proposed treatment facilities sized to handle runoff from all contributing impervious surfaces.

In addition, given the known and potential soil contamination at various locations that would be disturbed for site construction, a stormwater management plan must be individually developed for each construction location, accounting for contaminants at each site, and adopting measures to ensure that contaminants are not transported to the shoreline or released into the waters of Coos Bay and nearby wetlands. Finally, given the remarkable scope of this project and the imperfect nature of BMPs (including even straw bales) the applicants' negative response on the JPA application form to "Will any construction debris, runoff, etc., enter a wetland or waterway?" defies credibility and must be evaluated in more detail. The DEIS specifically states "Silt fences are 90 to 95 percent efficient at trapping sediment," which would appear to indicate there would be some discharges to waterways.

9. Extent of Road Construction

The JPA inadequately addresses the aquatic impacts from road use, road modifications (including but not limited to Key Watersheds), temporary extra work area (TEWA) 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, and the activities that accompany access magnify their negative effects on aquatic habitats. Activities and impacts associated with roads include fire, target-practice, ORV use, fishing, recreation, timber harvest, livestock grazing, and agriculture. Roads also provide avenues for stocking non-native fishes. The JPA fails to provide complete and accurate maps of roads (existing, proposed, and expanded), specific characterizations of impacts to waterways that would be affected, details regarding types of roads and how they will be modified, or specific details on long-term maintenance proposed for roads in areas of steep terrain.

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

- 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, marbled murrelet nest predation, human fire ignition, etc.

Roads have a particularly negative influence on aquatic and riparian ecosystems and organisms. Roads interfere with movement of materials and organisms in three dimensions: upstream/downstream, channel/upland, and surface/subsurface.[27] Roads also act as conveyor belts for delivering chronic sediment to streams.[28]

Over the last few 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. Road building in National Forests and other public lands threatens the existence of de facto wilderness and the species that depend on wilderness.[29]

From a review of the literature, we conclude that increases in sedimentation are unavoidable even using the most cautious methods. Roads combined with wildfires accentuate the risk from sedimentation. The amount of sediment or hydrologic alteration from roads that streams can tolerate before there is a negative response is not well known. It is not fully known which causes greater risk to aquatic systems: building roads to reduce fire risk or realizing the potential risk of fire. More research is needed in this area.

U.S. 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. …

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[27] Jim Doyle, Where the Water Meets the Road. Available at http://web.archive.org/web/20070325061623/http://wwwfsl.orst.edu/geowater/RRR/jim/aquahab/index.html.

[28] Michael Derrig. Road Improvements for Watershed Restoration. Available at http://wwwfsl.orst.edu/geowater/PEP/calfed/derrig/indexhtml.

[29] Noss, Reed; The Ecological Effects of Roads. Available at http://www.wildlandscpr.org/ecological-effects-roads.

> [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 channe 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).[30]

The JPA fails to disclose the full extent of the road network for pipeline construction or explain how these impacts could be adequately mitigated.

Additionally, in order to use heavy equipment on these roads, significant road modifications will be necessary, including blading/grading, widening, drainage improvements, and the construction of turnouts and roadside TEWAs. The JPA does not include detailed descriptions of what activities will be occurring that could impact wetlands, streams, and other waters. Rather, the JPA relies on blanket statements about the application of best management practices to avoid impacts to streams. By not specifying the location and nature of construction activities associated with all access roads, the JPA provides an inadequate description of the project.

The current application lacks site-specific information on impacts to resources for both existing and new roads to be constructed, instead relying on broad statements regarding use of BMPs. It is impossible for the public to know which special aquatic sites will be impacted without a detailed and up-to-date description of road construction activities.

On steep slopes, particularly in rainy winter months, similar BMPs have failed in the past to prevent impacts to streams, creeks and ditches. Not only is road construction inadequately described, but also the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable.

For example, during construction of the 12-inch MasTec Coos County pipeline in 2003, covering terrain similar to the proposed PCGP, erosion and sedimentation control measures repeatedly failed, leading to both massive erosion and landslides. The JPA gives little specific information to justify the assumption that, particularly in steep areas, BMPs will be adequate to prevent impacts to streams, and result in zero discharge as stated in the JPA.

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[30] EPA 2012. Notice of Intent To Revise Stormwater Regulations Federal Register. May 23, 2012.

Silt fence overtopped by eroding soil during construction of the Coos County pipeline in 2003 and discharged sediment into a tributary of the Coquille River.

Failure of a hay bale, used as an erosion control device, that became lodged in a culvert and resulted in the stream cutting through the road.

Pictured above, a silt fence during construction of the Coos County pipeline in 2003 is overtopped by eroding soil, which is then deposited directly into a small tributary stream of the Coquille River. The second photo shows a bale of hay – an erosion control device – that has become lodged in a culvert, resulting in the stream cutting through the road itself.

10. Impacts, Risks, and Contingencies for Horizontal Directional Drilling

HDD crossings, when successful, have impacts in areas adjacent to rivers where staging and construction areas occur. HDDs also require the disposal of materials extracted from the drill hole. HDD attempts frequently fail, causing drastic impacts to water quality and fish habitat. According to Williams' own experience, large-diameter HDDs frequently fail. In recent history, 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. Bentonite clay and sediment released through frac-outs can disrupt fish spawning habitat, increase turbidity, and potentially introduce other contaminants to impacted waterways. The 2009 FEIS states at 2-97:

> "…there are two problems that may occur during the use of an HDD. First, there may be an unintentional release of drilling mud, forcing its way to the surface through underground fissures. This situation is termed a 'frac-out.' Second, the drill may be blocked by unexpected substrata soils or geological conditions (such as gravel or boulders)."

Frac-out that released bentonite clay into the Coquille River in 2003.

Frac-out that released bentonite clay into the Coquille River in 2003.

The photographs above document a frac-out that led to sedimentation and a huge release of bentonite clay into the Coquille River during construction of the 12-inch Coos County pipeline. A similar HDD failure on the Rogue and Coos Rivers would severely impact water quality and salmon habitat. Bentonite clay is highly detrimental to salmon spawning habitat.

ODFW described some of their concerns regarding frac-outs:

> Between August and October of 2003, MasTec North America Inc. was cited by DEQ for a series of water-quality violations which occurred between August and October of 2003. The violations were a result of frac-outs during the horizontal drilling work for the construction of a natural gas pipeline under the North Fork of the Coquille River in Coos County. If similar frac-out related turbidity discharge impacts were to occur at the proposed Rogue River crossing, they would likely impact last known significant spawning habitat for Spring-run Chinook salmon in the Rogue River Basin. This EIS should include analysis of the potential environmental impacts of a frac-out related turbidity discharge due to the proposed action and alternatives… [31]
>
> Pipeline crossings using HDD or other subsurface methodologies can be expected to cause frac-outs in Coos County geology and possibly throughout the project. The Applicant should be prepared for construction stoppages, cleanup, and remediation of damages caused by frac-outs. HDD and other subsurface boring or drilling crossing design locations should proactively address the risks associated with the potential for a "Frac out" or inadvertent loss of drilling fluid… [32]

The JPA fails to disclose and comprehensively analyze the likelihood and frequency of frac-out events. Without this information, DEQ cannot evaluate whether the project is likely to degrade water quality below state standards.

11. Projected Erosion and Effectiveness of Controls Along Pipeline Route

The JPA does not provide an analysis of how cleared areas are to be managed during the winter in order to prevent significant erosion and sedimentation events during that time, or into the future. Without site-specific analysis relevant to this construction period, and the long-term management of a cleared ROW, the Corps, DEQ, and the public cannot meaningfully evaluate the effectiveness of measures to control erosion and sedimentation of waterways during this period. DEQ must evaluate both the short and long term discharges of turbidity and sediments from what is essentially a proposed new 229-mile dirt road for the lifetime of the project. The 2003 MasTec pipeline provides a much smaller example of similar the water quality risks. The turbidity and sediment discharges from the cleared ROW and pipeline installation should be evaluated for cumulative discharges over long term, and should include an analysis of how this may contribute to mercury pollution from elemental mercury found in soils.

C. Applicant doesn't provide the names of affected waterways, lakes, or other water bodies.

1. Identification of Impacted Waterways

[31] State of Oregon 2008 DEIS comments at 24.

[32] State of Oregon 2015 DEIS comments at 102.

The application materials do not consistently specify the number of waterbodies that would be crossed. As noted by DEQ and the USACE, the pipeline will necessitate direct impacts to waters at 485 locations, including 326 perennial and/or intermittent waterways, seven lakes and/or ponds, two are estuarine waters, and 150 are wetlands.[33] However, in the JPA under Resource Report 2, the applicants state the following:

> The Pipeline will cross 326 waterbodies within these Fifth Field Watersheds; 61 of these are not crossed by the centerline (29 streams, 10 ponds, 21 ditches, and 1 estuarine feature) but are within the right-of-way or workspaces. Of the 326 waterbodies crossed, 66 are perennial, 148 are intermittent, 98 are ditches, 10 are lakes or stock ponds, and 4 are estuarine (Coos Bay/2 HDD crossings, the HDD pullback at MP 0.0, and the Coos River).[34]

As evidenced by these two descriptions of the impact of the project, the applicants state that a different number of lakes and ponds, estuarine waters, and wetlands would be crossed.

In addition, the application does not identify the location of all wells, springs, and seeps within 150 feet of the construction right-of-way for the pipeline. Springs and seeps supplied by shallow groundwater could be affected by the pipeline project. In particular, if the pipeline is located up-gradient of a spring or seep location, it should be evaluated.[35] This is a significant and serious concern for impacted landowners along the pipeline route who rely on springs on their property for drinking water and domestic uses. The pipeline and its bedding material will substantially alter surface and subsurface flow patterns and will likely impact waters regulated by DEQ.

For example, landowner John Schofield submitted comments to FERC on February 13, 2015, stating that his home, located at pipeline milepost 60.11 to 60.26, is located within 500 feet of the proposed pipeline route on his property. Mr. Schofield's family relies on its spring for drinking water, and is concerned that the installation of the pipeline will alter the course of the spring water and negatively impact the source of the family's drinking water. These types of impacts must be disclosed by the applicant and evaluated by DEQ.

Unless and until the applicants provide a consistent and complete list of waterbodies that would be affected by the proposed action, and name each affected waterbody, the application fails to contain the mandatory minimum information required under OAR 340-048-0020(2)(c), (e) and (f) and must therefore be rejected as incomplete.

D. Lack of Endangered Species Act Consultation

As a related concern regarding the overall lack of mandatory minimum information provided by the applicants, DEQ must not approve the application without consulting with NOAA Fisheries.

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[33] Public Notice Application for Permit and to Alter Federally Authorized Projects. U.S. Army Corps of Engineers. P. 7

[34] Pacific Connector Gas Pipeline Project Resource Report 2 Water Use and Quality. P. 7. Part 2 Attachment C. PCP A-B Part 6 p. 217.

[35] DEIS at 4-355.

Additional analysis is necessary to provide the agency and the public with adequate information about the fish exclusion technology to be used, complete with an analysis of the effectiveness of the plan, and the stormwater testing to be employed. Without addressing these issues, and without the many other missing studies, plans, and analyses, the JPA is wholly inadequate and legally insufficient. DEQ cannot approve the application without consulting with NOAA Fisheries. Because a Draft EIS has not yet been released and there has been no formal consultation under the ESA and given the significant concerns the National Marine Fisheries Service ("NMFS"), now known as NOAA Fisheries, previously raised about inadequate information on the impacts of the current project configuration, the application should be denied as incomplete.

In their review of the Biological Assessment for the previous iteration of this project, multiple agencies expressed concern regarding the lack of information provided. For instance, NMFS requested further information and consultation for green sturgeon based on potential dredging impacts. NMFS informed FERC:

> Disturbance of substrate from project construction and biennial maintenance dredging, along with disposal at the Coos Bay ocean dredged material disposal site (Site F), will modify habitat and reduce safe passage by causing direct adverse physical effects due to physical entrainment in the discharge plume."[36]

Additionally, according to the 2015 DEIS from the last iteration, the project is likely to adversely affect the following species listed under the ESA:[37]

- Threatened Marbled murrelet;
- Threatened Northern spotted owl;
- Threatened Coho salmon ("SONCC");
- Threatened Coho salmon (Oregon Coast Evolutionarily Significant Unit "ESU");
- Threatened North American green sturgeon (Southern Distinct Population Segment "DPS");
- Endangered Lost River sucker;
- Endangered Shortnose sucker;
- Threatened Vernal pool fairy shrimp;
- Endangered Applegate's milk-vetch;
- Endangered Gentner's fritillary;
- Threatened Kincaid's lupine; and
- Endangered Rough Popcornflower.

Again, this list is not the result of a final Biological Assessment or any formal consultation and review by the wildlife agencies NMFS and USFWS.

The lack of consultation for the project is also problematic because key mitigation measures for ESA-listed species have not been determined or vetted by key agencies, such as NOAA

[36] NMFS Biological Assessment comments at 2.
[37] DEIS at 4-628.

Fisheries. Information included in the JPA fails to provide an adequate assessment of how the impacts of the project to key listed species will be avoided or minimized. Due to the complexity and scale of the project, as well as the number of listed species that could be impacted, consultation for the project is clearly warranted. Until official consultation is initiated, it is impossible for the public to know what mitigation measures will be proposed and whether they will be effective. The lack of information regarding impacts to listed species further emphasizes the lack of mandatory minimum information provided by the applicants throughout the application and, therefore, DEQ cannot certify.

E. Conclusion

In conclusion, the applicant has not provided critical information necessary for the certification under OAR 340-048-0020(2). Specifically, the applicant has failed to:

- Provide descriptions of the activity's location as required under OAR 340-048-0020(2)(c), specifically regarding the sources and impacts of hydrostatic testing, the extent and impact of channel deepening projects, and the extent of completed work;
- Provide a complete written description of the activity as required under OAR 340-048-0020(2)(e), specifically regarding the extent and condition of potential contamination at sites, hydraulic alteration at stream crossings, potential interference with subsurface flow regimes, proposed Horizontal Directional Drilling ("HDD")of Coos Bay, expected temperature increases in discharged LNG vessel cooling water, inaccurate data included for HDD crossings, post-construction restoration at streambed crossings, stormwater management plan, lack of Endangered Species Act consultation, extent of road construction, impacts and contingencies for HDD, and projected erosion and effectiveness controls along pipeline route; and
- Provide the names of affected waterways, lakes, or other waterbodies under OAR 340-048-0020(2)(f), specifically regarding identification of impacted waterways.

Without this information, as required by Oregon's regulations under OAR 340-048-0020, DEQ must deny the certification request.

III. DEQ Must Deny the Certification Because the Application Fails to Provide a Reasonable Assurance that the Project will Comply with Oregon's Antidegradation Implementation Policy

Any 401 Certification issued by DEQ must confirm that the project will comply with Oregon's antidegradation policy,[38] which ensures the full protection of all existing and beneficial uses by

[38] In 2013, the U.S. Environmental Protection Agency found that Oregon's implementation of its antidegradation policy was inconsistent with federal law (*See* The EPA's Review of Portions of Oregon's March 2001 Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications (August 8, 2013) ("EPA Review"). In May 2018, DEQ released three new memorandums addressing several of the flaws in the IMD identified by EPA (*See* http://www.oregon.gov/deq/Pages/WQ-Standards-Antidegradation.aspx). However, the documents do not appear to apply to 401 Certifications. DEQ should clarify to the public and the applicants how it will implement its antidegradation policy in a manner consistent with federal law.

preventing unnecessary degradation of water quality from new sources of pollution and protecting, maintaining and enhancing existing surface water quality. For all waters, the "[e]xisting in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[39] This level of protection is the absolute floor of water quality.[40] Oregon's antidegradation policy mirrors the federal language, requiring the protection of "all existing beneficial uses" from "point and nonpoint sources of pollution."[41]

As a threshold matter, it is clear that the Jordan Cove project must comply with Oregon's antidegradation policy because none of the exemptions to the policy apply. Specifically, under OAR 340-041-0004(3), a discharge can be considered a "Nondegradation Discharge" and may not require antidegradation review if it is:

1) a discharge into an existing mixing zone;
2) a water conservation activity;
3) a discharge that would result in "insignificant temperature increases;[42] or
4) a discharge that results in up to a 0.1 mg/l decrease in dissolved oxygen is not considered a reduction in water quality if there are no adverse effects on threatened and endangered species.

Further, under OAR 340-041-0004(5), activities that cause a short-term water quality degradation may be exempt from the antidegradation policy, specifically riparian restoration activities and emergency situations. The project is not a water conservation activity, riparian restoration activity, discharging into an existing mixing zone, or related to emergency situations. Further, the project would likely increase water temperature above 0.3 degrees Celsius (0.5 degrees Fahrenheit). The FEIS for the Bradwood LNG project found that cooling water discharged from LNG tankers could be as much as 19.4 degrees Fahrenheit higher than ambient water temperatures of the Columbia River.[43] The proposed action involves dredging that will decrease dissolved oxygen in Coos Bay because dredging increases the oxygen demand by disturbing sediments and releasing oxygen-demanding materials (decomposing organic materials contained within the sediments). Construction dredging lowers dissolved oxygen levels in estuarine waters not only by re-suspending sediment, but by deepening an estuarine channel where hypoxic conditions can occur due to reduced circulation in deeper waters. Once the

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[39] 40 C.F.R. § 131.12(a)(1); 40 C.F.R. § 131.3(e) ("Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.").

[40] Questions and Answers on: Antidegradation, EPA Office of Water Regulations and Standards, August 1985, at 4.

[41] OAR 340-041-0004(1).

[42] OAR 340-041-004(3)(c) "Temperature. Insignificant temperature increases authorized under OAR 340-041-0028(11) and (12) are not considered a reduction in water quality." Effectively, waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the colder water ambient temperature.

[43] FERC's FEIS for the Bradwood LNG Project states that "cooling water discharged from a 150,000 m3 steam powered LNG carrier could initially be 19.4 oF higher than ambient water temperatures" as compared to seasonally ranging ambient temperatures in the Columbia River of 42 to 68 oF. Bradwood LNG Project FEIS at 4-85 (2008). Oregon LNG, also proposed for the Columbia River, estimates that "according to industry sources, the water taken for cooling the vessel's machinery is warmed by 6 to 9 degrees Celsius at the point of discharge" and that the average for diesel-powered LNG vessels would be 8.9 oC above ambient water temperatures. Oregon LNG, CH2MHill Technical Memorandum, Appendix F Cooling Water Discharge Analysis, at 2 (Sept. 10, 2008).

dredging is completed, there also is the potential for reduced circulation in the deeper portions of the approach channel. In combination with other factors, reduced circulation has the potential to result in lower dissolved oxygen levels in the deeper waters. Thus, it is clear that the project does not qualify for an exemption and must comply with the State's Antidegradation Policy.

Critically, DEQ has already expressed strong concerns that the proposed action would violate Oregon's antidegradation policy. In its 2008 DEIS comments on a previous iteration of the project, DEQ stated:

> The project proponent cannot be allowed to further degrade a water quality limited waterbody. According to Oregon Administrative Rule (OAR) 340-0410004(7) 'Water quality limited waters may not be further degraded except in accordance with section (9)(a)(B), (C) and (D) of this rule.' Section (9)(a)(B), (C) and (D) specify very limited circumstances where further degradation can be allowed. It is unknown whether this project could qualify for any exception…
>
> The project cannot cause or contribute to water quality standard violations nor discharge pollutants to a stream that already is in violation. If a TMDL has been issued, the project needs to comply with all requirements of the TMDL. If they cannot comply with a TMDL, no discharge is possible and the project probably cannot go forward.[44]

As discussed in detail below, the applicants have not provided information that will address DEQ's initial concerns. Consequently, DEQ must conclude that this project will undoubtedly have significant water impacts, and there is no justification for allowing this degradation to occur.

A. The Applicant Has Failed to Provide DEQ with the Information Necessary to Permit the Required Analysis

Jordan Cove fails to provide the necessary information to allow DEQ, and the public, to determine if the proposal will comply with the antidegradation requirements. First, the applicant has failed to provide DEQ with the information necessary to ensure the protection of all existing uses. As EPA noted in its 2013 analysis, "the federal antidegradation policy at 40 CFR 131.12(a)(1) requires protection of existing uses in all cases, even if a permit does not authorize a lowering of water quality.[45] DEQ, in fact, produced a memorandum in 2014 addressing this topic and updating the IMD.[46] DEQ must require that the applicant provide the information necessary to allow for this analysis.

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[44] State of Oregon 2008 DEIS comments at 48

[45] IEPA Review at 32.

[46] In May 2018, DEQ released three new memorandums addressing several of the flaws in the IMD identified by EPA. *See* https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Antidegradation.aspx. However, by their terms none of those documents appear to apply to 401 Certifications. As a result, DEQ is still operating under a flawed IMD that fails to ensure compliance with the law. DEQ, Memo Re: Procedures for existing use review during anti degradation analysis (Nov. 3, 2014)

Second, Jordan Cove has failed to provide the information necessary for DEQ to determine if the proposed activities will impact water quality. DEQ's antidegradation analysis must ensure all of Oregon's waters will be protected. At the heart of any antidegradation analysis will be a determination of whether the receiving water is an Outstanding Resource Water, a High Quality Water or a Water Quality Limited Water. To set the stage properly for an antidegradation analysis, DEQ must identify each parameter that may be impacted by the action, for each receiving water, and assign the correct category. Based on this information, DEQ can then determine how to apply Oregon's antidegradation rule.

For example, when a waterbody is considered to be a High Quality Water, because it is not in violation of water quality criteria, "that water quality must be maintained and protected."[47] Therefore, absent grounds for allowing an exception to the rule, DEQ must ensure that the action will not lower the existing water quality. As DEQ has stated, "[a] reviewer from DEQ may conclude that if a pollutant is in the pollutant stream, then the discharger/applicant/source has the burden of proof to show that there is no consequent lowering of water quality."[48] For Water Quality Limited Waters, in turn, no additional pollutant loading can be allowed, except in very limited circumstances.[49] Thus, the antidegradation policy in this context should more appropriately be called a "non-degradation" policy, as it prohibits degradation.

To begin with, Jordan Cove fails to clearly explain what activities will take place on or near what waterbodies in manner that will allow for the meaningful review of the impacts to each waterbody. Specifically, Jordan Cove has failed to identify which waterbodies that will be affected by the project are Outstanding Resource Waters ("ORW"), High Quality Waters and Water Quality Limited Waters, thus allowing DEQ to apply the proper test for the potential impacts.

Moreover, the "adverse impact" standard Jordan Cove appears to apply here is inconsistent with the law. As the EPA explained in 2013, while federal antidegradation policy may allow for "insignificant or 'de minimis' lowering of water quality" in some instances, "any such application of de minimis needs to account for cumulative degradation from individual and multiple sources in the same water body and employ an appropriate cap on the cumulative amount of degradation that may be allowed."[50]

B. DEQ may Not Permit the Lowering of Water Quality as a Result of the Proposed Project

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[47] OAR 340-041-0004(6).

[48] Antidegradation IMD, at 16.

[49] OAR 340-041-0004(7) ("Water quality limited waters may not be further degraded except" in limited circumstances).

[50] EPA Review at 31. As discussed above, EPA found that DEQ does not "include such a cumulative cap on the extent to which degradation may be allowed without a Tier 2 review," and indeed, "Oregon's approach to determining if water quality would be lowered is itself a de facto de minimis provision without a cumulative cap." Because DEQ has not addressed this failure in a subsequent applicable policy statement or regulatory change, DEQ must first provide the applicant and the public clarity on what constitutes a lowering of water quality that will trigger the additional reviews called for in OAR 340-041-0004(6) and (7).

Under OAR 340-041-0004, the purpose of Oregon's antidegradation policy is to:

> Guide decisions that affect water quality to prevent unnecessary further degradation from new or increased point and nonpoint sources of pollution, and to protect, maintain, and enhance existing surface water quality to ensure the full protection of all existing beneficial uses.[51]

The project would likely result in a lowering of water quality for at least the following parameters: Narrative Criteria, Biocriteria; Dissolved Oxygen; Temperature; Toxic Substances; and Turbidity. This lowering of water quality, together with loss of habitat and food sources, will adversely impact the existing designated beneficial uses of: Anadromous Fish Passage; Salmonid Fish Rearing; Salmonid Fish Spawning; Resident and Aquatic Life; Wildlife and Hunting; Fishing; and Aesthetic Quality in the various waterbodies impacted by the project. For example, the LNG terminal and pipeline fail to protect the designated use of aquatic life, including threatened salmonids, eulachon, and green sturgeon. The expansive acreage of dredging and filling in critical salmon habitat fails to protect salmon. The construction and operation of the terminal and pipeline, including removing riparian vegetation, tanker traffic, wastewater discharge, ballast water intake, pipeline stream crossings, and the risk of catastrophic damage due to a gas fire combine to create unacceptable harm to aquatic life. The fact that some of the aquatic wildlife species are on the brink of extinction makes the project even less acceptable.

DEQ has found very similar proposals for pipeline and gas export terminal infrastructure construction and operation would violate Oregon's antidegradation policies and denied 401 certification for Bradwood Landing.[52]

1. High Quality Waters Policy OAR 340-041-0004(6)

For these high quality waters, namely, waterbodies that are currently attaining water quality standards, the lowering of water quality is allowed only if:

> (a) No other reasonable alternatives exist except to lower water quality; and
> (b) The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality [];
> (c) All water quality standards will be met and beneficial uses protected; and
> (d) Federal threatened and endangered aquatic species will not be adversely affected.[53]

The applicant has failed to demonstrate that it satisfies any of these requirements.

First, the applicants have not demonstrated that no other reasonable alternatives exist except to lower water quality. Adequate information has not been provided to enable the most meaningful comment on project design criteria, and comment on other aspects of the project (e.g.

[51] OAR 340-041-0004.
[52] DEQ letter dated March 10, 2011 to James Holm and Kimberly D. Bose from Sally Puent.
[53] OAR 340-041-0004(6)(a)-(d).

alternatives) is hindered by the fact that project design criteria are not discussed here. We are concerned that the project design criteria will be dictated by the applicant so as to artificially eliminate consideration of practicable alternatives. The underlying purpose of this project could be met at other terminal locations, and these alternatives should be considered by DEQ. Existing terminals on the Gulf Coast provide access to export gas to Asia via the Panama Canal. Under Resource Report 10, the applicants assert that East Coast and Gulf Coast LNG export facilities are "far removed" from the pipeline intersection and that those ports cannot meet the need to get Rocky Mountain and western Canada gas to Asian markets.[54] The applicant has not met their burden to show less damaging alternatives are not practicable. We urge DEQ to conduct its own analysis of these alternatives. It is imperative that analysis be done of pipeline routing that avoids any unwilling landowners, so as to avoid eminent domain. The applicant has not met their burden to show less damaging alternatives are not practicable. Again, we strongly urge DEQ to undertake independent analysis, rather than rely on biased proponent reports.

Second, Jordan Cove has not demonstrated that the project is necessary or that the benefits of the impacts to water quality outweigh the environmental costs.

Third, the project will likely violate water quality standards for at least the following parameters: Narrative Criteria, Biocriteria, Dissolved Oxygen, Temperature, Toxic Substances, and Turbidity as described in detail in Sections V and VI.

Finally, threatened and endangered species listed under the ESA, including but not limited to salmonids, eulachon, and green sturgeon would be adversely affected by the lowering of water quality (e.g. increased temperature, decreased dissolved oxygen) as a result of this project. Therefore, DEQ should deny the 401 certification for the project.

2. Water Quality Limited Waters OAR 340-041-0004(7)

With respect to waterbodies that are water quality limited, the antidegradation policy states that the "waters may not be further degraded except" in limited circumstances. In other words, DEQ may not certify a project that would result in a lowering of water quality in a waterbody that is already impaired for one or more parameters. Where the project would result in a lowering of water quality on water quality limited waters, DEQ must determine that 1) "[t]he action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality", 2) [t]he new or increased discharged load will not unacceptably threaten or impair any recognized beneficial uses or adversely affect threatened or endangered species, and 3) that the discharge will not exacerbate the existing problems or that there is there is a TMDL in place that demonstrates sufficient reserve capacity to assimilate the parameter impacted by the project.

The project will degrade water quality in many areas where water quality is already impaired, as well as in high quality waters that are meeting water quality standards. The 2009 FEIS for a previous iteration of the project stated:

[54] JCEP, RR10 at 4.

> Clearing and grading of streambanks, removal of riparian vegetation, instream trenching, trench dewatering, and backfilling could result in streambank modification; increased sedimentation; turbidity; increase in temperature, decreased dissolved oxygen concentrations; releases of chemical and nutrient pollutants from sediments; and introduction of chemical contaminants, such as fuel and lubricants. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent streamflow or peak flows. Surface waters could be impacted due to alteration of groundwater flow where the pipeline intersects waterbodies.[55]

Before DEQ could certify this project as complying with the state's antidegradation policy, it must evaluate the environmental and economic effects of the project for water quality limited waters under OAR 340-041-0004(9)(c). Under the environmental and economic effects criteria, the applicant must demonstrate that there are no alternatives to lowering water quality in the water quality limited waters, and that the economic benefits of lowering water quality are greater than other uses of the assimilative capacity of that waterway.[56] This analysis requires the consideration of reasonable alternatives and a technical analysis of socioeconomic benefits versus environmental costs.

The application fails to meet these criteria. First, Jordan Cove has not demonstrated a need for this project in Southern Oregon. Second, and related, the project seriously conflicts with the ecologic and economic health of the Coos Bay estuary, areas impacted by the pipeline, alternative locations, and economic viability of the larger United States. Third, as detailed below, the detrimental effects on protected aquatic resources, including threatened and endangered species, the economy, and public safety are significant and permanent.

C. The Project Fails to Meet the Environmental and Economic Effects Criteria for Water Quality Limited Waters

The project will degrade water quality in many areas where water quality is already impaired. The applicants have failed to demonstrate that the project meets the environmental and economic effects criteria for water quality limited waters under OAR 340-041-0004(9)(c). Therefore, DEQ must not certify the project.

1. Reasonable Alternatives that Better Protect Water Quality Exist

The purpose of the terminal is primarily to provide natural gas to Asian markets. A myriad of alternatives exist that would accomplish this purpose. The primary flaw with the applicant's alternatives arguments is the contention that the projects must be located in Southern Oregon to meet the project's needs. Not only is the project not a demonstrated necessity for Oregon, but the JPA's approach to the siting of the project unduly ruled out other gas supply alternatives by defining the purpose so narrowly as to prevent alternatives from meeting that purpose. As a result, other possible alternative locations have not been adequately analyzed to demonstrate that the proposed project location will have the least adverse impact on the aquatic ecosystem.

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[55] 2009 FEIS at 4.3-31.

[56] See DEQ Antidegradation Internal Management Directive at 28.

An applicant may not define a project in order to preclude the existence of any alternative sites.[57] Here, the applicants have unreasonably narrowed the purpose and need analysis of the project in order to foreclose other alternatives. The project's failure to both identify a permissible purpose for the project and to adequately weigh alternatives does not comply with Section 401 requirements that the applicants demonstrate that no alternatives exist to the proposed project and its impacts.

The applicant's alternatives analysis fails to address many alternatives, and some alternatives are given such cursory consideration that it is impossible for DEQ, based on the information that the applicant has provided, to realistically conclude they are not practicable. This includes changes to terminal design, turning basin size and design, alternative LNG sites, and both major and minor route variations on the pipeline route.

2. The Project's Economic Benefits Do Not Outweigh the Environmental Costs

The applicant has not demonstrated that the benefits of lowered water quality outweigh the costs of water quality impairment. Specifically, the proposal will increase domestic natural gas and electricity prices, which is not in the public interest.

The potential risk of increased domestic natural gas prices weighs strongly against the need for the project as higher gas prices will hurt public and private need for the project. First, larger export levels lead to larger domestic price increases, while rapid increases in export levels lead to large initial price increases that moderate somewhat in time. Even slower increases in export levels lead to price increases, just at a slower scale of price hikes. Second, natural gas markets in the U.S. will increase production to satisfy an estimated 60-70% of the increase in natural gas exports, with three-quarters of this increased production expected from shale resources. Third, the remaining deficit in energy supply correlated to price increases will likely be met by the electric sector, which the EIA anticipates coal-fired generation to primarily produce. Fourth and last, consumers will consume less but still see an increase in their natural gas and electricity costs if export is allowed under any scenario.[58]

Increases in domestic natural gas prices, in shale gas production, and in coal-fired electricity production possess serious economic and environmental consequences for the greater public and as well as the West Coast's environmental economies that cast significant doubt on the benefits or need for Jordan Cove's export proposal. In addition to price and production impacts, a public interest analysis should examine the nexus between increased natural gas export, decrease in consumption in electric power sector, and an increase in other power generation for electricity

[57] *Sylvester v. U.S. Army Corps of Engineers*, 882 F.2d 407, 409 (9th Cir. 1989).

[58] EIA, Effect of Increased Natural Gas Exports on Domestic Energy Markets 6, 10 (2012), available at http://www.eia.gov/analysis/requests/fe/pdf/fe_lng.pdf ("EIA Export Study"); see also, e.g., Deloitte MarketPoint, Analysis of Economic Impact of LNG Exports from the United States 16, available at http://wwwfossil.energy.gov/programs/gasregulation/authorizations/2013_applications/sc_exhibts_13_116_118/Ex._08_-_Deloitte_Analysis_for_Excelerat.pdf ("Deloitte Study").

needs. The applicants have failed to demonstrate a need for this project in Southern Oregon and the project seriously conflicts with the ecologic and economic health of the Coos Bay estuary, areas impacted by the pipeline, alternative locations, and economic viability of the larger United States.

Further, in many areas along the pipeline route, significant resources, both private and public, have been invested in the restoration and recovery of water quality and aquatic habitat. DEQ should require the applicants to provide current ambient water quality data for all impacted watersheds. This information is important to fully analyze current conditions of the waterways in each basin as part of the antidegradation analysis. The following examples from each of the impacted waterways demonstrate the significant investments in restoration activities that has occurred:

- **Coos (HUC 17100304):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coos subbasin. The Oregon Watershed Enhancement Board (OWEB) has distributed restoration funds to a number of organizations. As of this writing OWEB has invested $16.8 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore the Coos subbasin.

- **Coquille (HUC 17100305):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coquille subbasin. As of this writing, OWEB has invested $18.2 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the Coquille subbasin would affect Coos Bay and the success of other restoration work downstream.

- **South Umpqua (HUC 17100302):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the South Umpqua subbasin. As of this writing OWEB has invested $11 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the South Umpqua subbasin would affect the Umpqua River and the success of other restoration work downstream.

- **Upper Rogue (HUC 17100307):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Rogue subbasin. As of this writing, $11.2 million dollars has been granted by OWEB for activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Rogue subbasin would affect the Rogue River and the success of other restoration work throughout the whole Rogue Basin. The Rogue River Watershed Council is in the process of removing seven fish passage barriers in Salt Creek downstream from the proposed pipeline crossing of the Rogue. According to the Rogue River Watershed Council:

> Construction activities during pipeline placement and raw, exposed soil for several years after pipeline installation is likely to contribute sediment to Salt Creek. Such increased sediment load works directly against our proposed restoration work, which will allow summer and winter steelhead and threatened Coho Salmon to reach more spawning habitat in Salt Creek. Sedimentation will contribute injury to the redds (nests) of these fishes. Moreover, the right of way at the pipeline location will be exposed due to vegetation management, leading to increased water temperatures in Salt Creek. One of the reasons Salt Creek is a target for restoration for us is the cool stream temperatures all summer long.[59]

Further, the Upper Rogue Coho Salmon Strategic Action Planning group is focusing on West Fork Trail, Elk, parts of Big Butte, and parts of Little Butte Creeks. Careful review of the pipeline route show that impacts from erosion and sedimentation, streamside vegetation removal, and other associated impacts could work against restoration activities to be done in the future to enhance and protect Coho salmon habitat in these streams.

- **Upper Klamath (HUC 18010206):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Klamath subbasin. Funds have been distributed to a number of organizations through OWEB. As of this writing, OWEB has invested $5.4 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Klamath subbasin would affect the Klamath River and the success of other restoration work downstream. Impacts to the Klamath River may also impact waterways in the State of California and the beneficial uses and restoration activities found downstream. Oregon should consult with the California State Water Resources Control Board regarding potential impacts to California waters.

Overall, it is likely that the proposed impacts from the pipeline undermine the Oregon Plan for Salmon and Watersheds that the State uses to restore wild salmon.

E. Conclusion

In conclusion, any 401 Certification issued by DEQ must confirm that the project will comply with Oregon's antidegradation policy. Under 40 CFR 131.12(a)(1), for all waters, the "[e]xisting in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[60] None of the exemptions under OAR 340-041-0004(3) apply to this project and, therefore, Oregon's antidegradation policy must be applied to this project.

[59] Barr, Brian. Rogue River Watershed Council. Email communication. 29 June 2018.

[60] 40 C.F.R. § 131.12(a)(1); 40 C.F.R. § 131.3(e) ("Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.").

First, the applicant has failed to provide DEQ with the information necessary to ensure the protection of all existing uses.[61] DEQ must require that the applicant provide the information necessary to allow for this analysis. Second, the applicant has failed to demonstrate that the project is consistent with Oregon's High Quality Waters policy under OAR 340-041-0004(6) and Water Quality Limited Waters policy under OAR 340-041-0004(7). The project will degrade water quality in many areas where water quality is already impaired, as well as in high quality waters that are meeting water quality standards.

There can be no question that the activities proposed here will result in a combination of point and nonpoint source pollution under state law. These discharges will likely result in a reduction in water quality as compared to water not affected by anthropogenic sources, affecting turbidity, temperature, and habitat conditions for salmonids among other issues. As a result, DEQ should deny certification because the applicant has failed to provide reasonable assurance that its project will comply with Oregon's Antidegradation Policy.

IV. DEQ Must Deny the Certification Because there is No Reasonable Assurance that Designated Uses Will be Protected

Because the applicants have not provided reasonable assurances that designated beneficial uses will not be impaired, DEQ should deny certification of their project.

Section 303 of the Clean Water Act requires states to establish water quality standards that consist of designated beneficial uses of waterbodies, criteria to protect designated uses, and antidegradation requirements to protect existing uses and high quality waters. As defined in the U.S. EPA's Water Quality Standards Handbook, a water quality standard:

> "…defines the water quality goals of a water body or portion thereof, in part, by designating the use or uses to be made of the water. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act. "Serve the purposes of the Act" (as defined in sections 101(a)(2), and 303(c) of the Act) means that water quality standards should:
>
> - provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water ("fishable/swimmable"), and

[61] In addition, Before DEQ can process this request, it must first describe how it will implement its antidegradation policy consistent with federal law, in light of the 2013 finding by the U.S. EPA that Oregon's implementation of its antidegradation policy is <u>not</u> consistent with federal law.[#] *See* The EPA's Review of Portions of Oregon's March 2001 Antidegradation Policy Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications (August 8, 2013) ("EPA Review"). at 32.

- consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation."[62]

The U.S. EPA's implementing regulations for Water Quality Standards under the Clean Water Act under 40 CFR 131 describe the requirements and procedures for establishing, reviewing, and approving water quality standards by the states, as authorized under Clean Water Act Section 303(c). Specifically, under 40 CFR 131.10, states are required to specify designated beneficial uses that are "appropriate water uses to be achieved and protected" that "must take into consideration the use and value of water for public supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation."[63] Beneficial designated uses are defined under Oregon's regulations for the impacted watersheds and are summarized in the table below.

Under 40 CFR 131.12, for all waters, the "[e]xisting in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[64] As discussed previously, Oregon's antidegradation policy requires the protection of "all existing beneficial uses" from "point and nonpoint sources of pollution."[65] DEQ should deny certification because the project would likely lower water quality and result in impairment of beneficial designated uses in violation of the Clean Water Act, and the applicants have not provided reasonable assurances that designated beneficial uses will not be impaired.

Table 1. Basin-Specific Criteria Designated Beneficial Uses

Basin-Specific Criteria	Beneficial Uses
South Coast Watershed **OAR 340-041-0300**	*Estuaries and Adjacent Marine Waters:* Industrial water supply Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Commercial navigation and transportation *All streams and tributaries thereto:* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting

[62] Water Quality Standards Handbook CHAPTER 2: DESIGNATION OF USES. U.S. Environmental Protection Agency. 2012. Available online < https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter2.pdf >.
[63] 40 CFR 131.10.
[64] 40 C.F.R. § 131.12(a)(1); 40 C.F.R. § 131.3(e) ("Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.").
[65] OAR 340-041-0004(1).

	Fishing Boating Water contact recreation Aesthetic quality Hydropower
Umpqua Watershed **OAR 340-041-0320**	*Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers* *North Umpqua River Main Stem* *South Umpqua River Main Stem* *All Other Tributaries to Umpqua, North & South Umpqua Rivers* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (*does not apply for Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers)*
Rogue Watershed **OAR 340-041-0271**	*Rogue River main stem from estuary to Lost Creek dam* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower Commercial navigation and transportation
Klamath Watershed **OAR 340-41-0180**	*Klamath River from Klamath Lake to Keno Dam (RM 255 to 232.5)* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (RM 255-232.5) Commercial navigation and transportation (RM 255-232.5)

Beneficial designated uses by watershed are discussed in Section VII below.

A. Use and Value of Water for Public Supplies Will Not Be Protected

Under 40 CFR 131.10, states are required to specify designated beneficial uses that consider use and value of water for public supplies. All of the impacted watersheds include public domestic water supply and private domestic water supply as a beneficial designated use. DEQ should require the applicants to identify and analyze all direct, indirect, and cumulative impacts to drinking water sources from the construction, operation, and maintenance of the pipeline. The project will likely impair public and private domestic water supply by contaminating sources through a frac-out as a result of Horizontal Directional Drilling proposed for rivers such as the Rogue that are a source of public drinking water, increasing sedimentation through the construction of stream crossings, and increasing temperature by removing riparian vegetation. Withdrawing large volumes of freshwater for activities such as hydrostatic testing will also impair water quality and quantity, thus impacting public and private domestic water supply. The applicants do not provide specificity regarding when, where, how much, or how often water would be withdrawn for hydrostatic testing.

According to Resource Report 2 for the Pacific Connector Pipeline, the applicants state that the pipeline will cross 12 Public Drinking Water Surface Water Source Areas (DWSAs).[66] At a minimum, this would impact approximately 116,000 people. Further, the report identifies multiple sites where a potable water intake is located less than three miles downstream from the proposed pipeline crossings. There are also a number of private potable water intakes less than three miles downstream from proposed pipeline crossings.[67]

DEQ should require additional information from the applicants to fully analyze the potential impacts to drinking water sources, and therefore the likely violation of protecting this designated beneficial use, from the proposed LNG terminal and related facilities. According to the Coos Bay North Bend Water Board (CBNBWB), the residents of Coos Bay and North Bend rely primarily on the Upper Pony Creek and Merritt Reservoirs, as well as the Joe Ney Reservoir, to supply municipal drinking water. CBNBWB also relies on groundwater from 19 wells in the Dunes National Recreation Area that can supplement industrial needs and municipal use.[68] Resource Report 2 for the LNG terminal does not provide substantive detail regarding impacts to municipal sources. In fact, the report states that "water supply in the JCEP Project Area is provided through municipal sources," but provides no further detail.[69] As demonstrated by this example, DEQ should require additional information from the applicants to fully assess potential impacts to the drinking water protection area from construction, operations, and maintenance of the LNG terminal and related facilities.

1. Medford Water Commission

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[66] See Table 2.2-6. Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 12. PCP A-B Part 6. P. 223.

[67] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 12. PCP A-B Part 6. P. 223.

[68] 2016 Consumer Confidence Report. Coos Bay-North Bend Water Board. http://cbnbh2o.com/assets/Reports/2016_ccr.pdf.

[69] Jordan Cove Energy Project Resource Report 2 Water Use and Quality. P. 3. JCEP E-N Part 3 p. 334.

As one example of the importance of assessing impacts to public supplies, the Medford Water Commission is identified by the applicants as one of the Drinking Water Source Areas that would be impacted by the project. The Medford Water Commission provides drinking water to approximately 91,100 people in the City of Medford, as well as the cities of Eagle Point, Central Point, Jacksonville, Phoenix, Talent, and Lake Creek Learning Center. Big Butte Springs, which is part of the Rogue watershed, is the source of the Medford Water Commission's drinking water supply.[70]

Not only do the applicants propose to cross at least 88 waterways within the Rogue watershed, including the Rogue River, but they propose to bore underneath the Medford Aqueduct. The 31-inch Medford Aqueduct pipeline was constructed in 1927 and carries approximately 40 cubic feet per second of drinking water from Big Butte Springs to the City of Medford and communities within the Bear Creek watershed.[71] The applicants provide very minimal information regarding construction of this crossing. The plan and profile for the Medford Aqueduct state that the depth of the aqueduct is unknown.[72] DEQ should require more information regarding the depth of the bore and site-specific details to evaluate the potential direct, indirect, and cumulative impacts of the proposed pipeline crossing the main source of the City of Medford's drinking water.

2. Impacts to Groundwater

Additionally, impacts to groundwater resources can impact surface waters, and therefore have the potential to impair designated beneficial uses for public and private drinking water. The U.S. Geological Survey ("USGS") estimates that nearly half of the state of Oregon's population depends on groundwater for daily use and 88 percent of Oregon's public drinking water systems depend, at least in part, on groundwater as a source of drinking water.[73] Even the applicants note the importance of impacts to groundwater resources:

> Groundwater is a substantial source of drinking water in the areas traversed by the Pipeline. More than 70 percent of Oregon residents get their drinking water from groundwater, and over 90 percent of the state's public water systems get their drinking water from groundwater (DEQ 2017b).[74]

Dennis Nelson with the Oregon Department of Human Services Drinking Water Program writes:

> Few resources are more valuable to a community than its drinking water supply. And yet

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[70] Medford Water Commission. http://www.medfordwater.org/SectionIndex.asp?SectionID=5.

[71] "Big Butte Creek." Eagle Point Irrigation District. https://www.eaglepointirrigation.com/big-butte-creek.html.

[72] Pacific Connector Gas Pipeline Project. Plan and Profile – Medford Aqueduct. PCP A-B Part 7. 6 February 2018. P. 1.

[73] Oregon's Drinking Water Protection Program. Oregon Health Authority. Available online < http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/Pages/whppsum.aspx >.

[74] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 82. PCP A-B Part 6. P. 293.

> for those communities that depend on groundwater, i.e., wells and/or springs, local officials often find themselves having to make important decisions about land use that may potentially conflict with safe drinking water without having sufficient information or established procedures to adequately do so. Many land use decisions would be better served if local planning authorities had more information regarding the nature of the groundwater system that serves as the community's and/or rural resident's drinking water source.[75]

Due to the potential interactions between groundwater and surface water systems that provide public and private domestic drinking water supplies, DEQ should require identification of public groundwater supply wells that are within 400 feet of the construction right-of-way and associated construction facilities and assess impacts to additional groundwater wells that may be directly or indirectly impacted. Additionally, DEQ should identify wellhead protection areas (WHPAs) as defined under the Safe Drinking Water Act (SDWA). The applicants note that the proposed pipeline would cross six WHPAs.[76] DEQ should evaluate the potential for contamination of groundwater resources from pipeline construction, operation, and maintenance. Between the Resource Report 2 submitted in October and the Resource Report 2 submitted in February, the applicants estimate that 46 miles (20%) of the proposed pipeline would cross shallow groundwater areas or that 26 miles (13%) of the proposed pipeline would cross shallow groundwater areas, where the water table ranges from zero to six feet below the surface.[77]

DEQ should not only identify these discrepancies, which make it difficult to analyze potential impacts, but also comprehensively review how the proposed activities will impact shallow groundwater areas and thus potentially degrade designated beneficial uses for private and public drinking water supply. DEQ should also require the applicants to identify the presence of drain tiles or other factors that may increase the potential for contamination of groundwater resources.

In conclusion, DEQ cannot certify the project because the applicants have failed to demonstrate that designated beneficial uses for public supplies will not be impaired. DEQ should require the applicants to identify and analyze all direct, indirect, and cumulative impacts to drinking water sources from the construction, operation, and maintenance of the pipeline.

B. Protection and Propagation of Fish, Shellfish, and Wildlife Uses Will Not Be Protected

Under 40 CFR 131.10, states are required to specify designated beneficial uses that consider protection and propagation of fish, shellfish, and wildlife uses. Beneficial designated uses by watershed are discussed below in Section VII. All of the impacted watersheds include fish and aquatic life, wildlife and hunting, and fishing as designated beneficial uses. The proposed

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[75] Nelson, Dennis. 2002. Source Water Assessments and Land Use Planning. http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/Documents/swp/swaplup.pdf at 2.

[76] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 83. PCP A-B Part 6. P. 294.

[77] See 23 October 2017 Pacific Connector Pipeline Resource Report 2 at P. 78 versus 6 February 2018 Pacific Connector Pipeline Resource Report 2 at P. 85.

activities for the project will likely impair these designated uses by degrading aquatic habitat for fish and shellfish.

1. LNG Terminal

Construction of the LNG terminal and related construction and maintenance activities will significantly impair habitat for fish and shellfish, thus harming designated beneficial uses protected under the Clean Water Act. Construction of the terminal itself would cover 538 acres of land, including 5.2 acres of open water and 169 acres of wetlands.[78] Additionally, the applicants propose construction of a 38-acre marine slip from uplands and a 22-acre access channel (2,200 feet wide at its intersection with the Coos Bay Channel). A 3-acre marine offloading facility would also be constructed. Construction of the slip and access channel would require dredging 5.7 million cubic yards of material and would result in the permanent loss of 14.5 acres of shallow subtidal and intertidal habitat, 0.06- acre of estuarine saltmarsh habitat, and 1.9-acres of submerged aquatic vegetation habitat (eelgrass). Dredged material would be transported to the LNG terminal, South Dunes site, Roseburg Forest Products site, or the Kentuck mitigation site. Construction of the temporary berth would require dredging 45,000 cubic yards of material. Dredging of the existing navigation channel would remove 700,000 cubic yards of material and would construct a temporary pipeline on the bottom of the channel over 8.3 miles to remove the dredged material. Widening of the Transpacific Parkway/Highway 101 intersection would require permanently filling in 0.51 acres of intertidal habitat. Future maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years.[79]

Specific impacts to fish, shellfish, and wildlife will be discussed in more detail in Sections V and VI. In summary, the proposed activities at the LNG terminal will impact aquatic resources and therefore harm designated beneficial uses by:

- Permanently destroying at least 1.9-acres of eelgrass beds that provide habitat and food base for fish and invertebrate species including juvenile crab, juvenile lingcod, salmonids, starry flounder, and English sole;
- Impairing water quality by decreasing dissolved oxygen, changing salinity levels, increasing temperature, and increasing sedimentation as a result of dredging and other related activities;
- Activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel and construction of the pipeline across Coos Bay could all jeopardize the survival of aquatic species;

[78] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 2.
[79] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 3-6.

- Dredging would directly remove benthic organisms, such as worms, clams, starfish, and vegetation from the bottom of the bay. Crabs, shrimp, clams, oysters, and fish could become entrained in the operation of the dredging equipment;[80] and
- Degrade habitat and aquatic resources used by threatened and endangered species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly productive intertidal habitat to low productive deep-water habitat; by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

In summary, DEQ cannot certify that the project will not impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing because the proposed activities at the terminal and in Coos Bay will permanently destroy habitat and degrade water quality for fish and shellfish.

2. Pacific Connector Pipeline

In addition to the proposed activities for the LNG terminal, the project would also involve construction of the 229-mile Pacific Connector Pipeline. The pipeline will dam, divert, trench, or use Horizontal Directional Drilling technology to cross approximately 485 waterways. Construction of the pipeline will affect at least 30,778-feet (5.83 miles) of wetlands and 3,028-feet of waterways. Approximately 48,675 cubic yards of material will be discharged into wetlands and 9,519 cubic yards of material will be discharged into waterways to construct the pipeline. Additionally, a 75-foot clearcut buffer around waterways crossings would be constructed. [81] As stated by the applicants, impacts from stream crossings include:

> Clearing and grading of streambanks, removal of riparian vegetation, instream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat; increased sedimentation; turbidity; increase in temperature, decreased dissolved oxygen concentrations; releases of chemical and nutrient pollutants from sediments; and introduction of chemical contaminants, such as fuel and lubricants. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent stream flow or peak flows.[82]

Specific impacts from stream crossings will be described in further detail in additional sections. In summary, construction and operation of the proposed Pacific Connector Pipeline will impact aquatic resources and therefore harm designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing by:

[80] DEIS 2014 at 4-569 to 4-570.

[81] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 8.

[82] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 35. PCP Part 6 P. 245.

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage and long-term soil compaction and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

DEQ cannot certify that the project because the applicants have failed to demonstrate that the proposed activities related to construction and operation of the pipeline will not impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing.

C. Recreation In and On the Water Will Not Be Protected

Under 40 CFR 131.10, states are required to specify designated beneficial uses that consider recreation in and on the water. All of the impacted watersheds include fishing, boating, water contact recreation, and aesthetic quality as designated beneficial uses. The proposed activities for the project will likely impair these designated uses by harming habitat and water quality for fish, impacting recreational access, and altering the aesthetic values of Coos Bay and the other waterways crossed by the pipeline. The project harms these beneficial designated uses by damming, trenching, blasting, and diverting waterways to build pipeline stream crossings; cutting down 75-foot buffers around stream crossings; dredging sections of Coos Bay; filling in wetlands; and permanently destroying habitat, such as eelgrass beds.

In 2005, recreational boaters took 30,996 boat trips in Coos Bay and engaged in 36,547 use-days of boating activity. Approximately 88% of these use days were related to fishing. The FEIS from the previous iteration of the project states that impacts to recreational users could occur when:

> “During operation of the Jordan Cove LNG terminal, when an LNG carrier is transiting in the waterway to the terminal, other boats in or near the channel would be required to move away and those seeking to approach the channel would have to delay doing so until the LNG carrier had passed.[83]

Further, the FEIS also states “In the event of an LNG spill from an LNG carrier in transit to the Jordan Cove terminal, and a related pool fire if there was ignition, there could be impacts on commercial ships or fishing boats.”[84] And again: “Recreational boaters, fishermen, crabbers and clammers could be affected in the unlikely event of an incident resulting in an LNG spill from a

[83] FEIS at 4.8-7.
[84] FEIS at 4.8-8.

carrier in transit in the waterway, and an associated pool fire if there was ignition of released LNG vapors."[85]

Construction and operation of the LNG terminal and Pacific Connector Pipeline will impact aquatic resources and therefore harm designated beneficial uses for fishing, boating, water contract recreation, and aesthetic quality by:

- Impacting or limiting public access for recreational boaters as a result of LNG tankers transiting in the waterways to the terminal;
- Increasing risk to recreational boaters, fishermen, crabbers, and clammers in the event of an LNG spill;
- Increasing sediment pollution at stream crossings, which impairs habitat for fish; and
- Altering aesthetic values of Coos Bay and the 485 waterways crossed by the pipeline as a result of the 75-foot clearcut buffer around each stream crossing, dredging of Coos Bay, and construction of the terminal and related facilities.

Because of the potential impacts to beneficial designated uses for fishing, boating, water contact recreation, and aesthetic quality from the project, DEQ cannot approve 401 certification.

D. Navigation Will Not Be Protected

Under 40 CFR 131.10, states are required to specify designated beneficial uses that consider navigation. In Oregon, navigation is identified as a designated beneficial use for all of the impacted watersheds except the Umpqua Basin. Both construction and operation of the terminal would interfere with access to and use of navigable waters. During construction, dredging in the NRIs would impact access to waters in the vicinity of dredging operations for recreational boaters and anglers. Most of the recreational salmon fishing in Coos Bay occurs in late summer and fall, which is the same time as the in water work window for the dredging activities. Boat angling for Chinook and coho salmon in the fall is concentrated around the railroad bridge and downstream, which is also the same areas where dredging will occur.[86] Not only is navigation a designated beneficial use, but it is also a recognized public trust right in Oregon.[87] According to State data, nearly "90 percent of the boat use-days [in Coos Bay] involved fishing (including angling, crabbing, and clamming)…."[88] The project will interfere with these public trust rights and access to public trust resources including navigation.

Potential adverse impacts to navigation include:

- **Waterway Conditions** adjacent to the facility, and along the shipping route, makes the introduction of LNG tankers there hazardous. *See* JCEP 2007 WSA; USCG 2018 LORA. The bay is subject to currents, tides and winds under normal conditions. Water depth is

[85] FEIS at 4.7-5.
[86] *See* 2015 FEIS at 4-738.
[87] *Morse v. Division of State Lands*, 34 Or App 853, 859 (1978), *aff'd*, 285 Or 197 (1979).
[88] *Id*. at 4-737.

low through most of the estuary, and for large tankers the navigation channel is very narrow.

- **Timing Restriction.** The bar channel is such a significant hazard that the applicants propose only to cross it, and the LOR only applies when it is crossed, only at slack high tides during daylight. This limitation, combined with security measures (like the 500-yard exclusion zone, *see* USCG July 1, 2008 WSR) particular to tankers along with ordinary navigation rules, raises a particular harm to navigation. With 120 vessel calls per year, that means Jordan Cove is relying on using 240 out of the 365 available daylight high tides in the year. Having claimed the safest crossing times for themselves, all remaining vessels will have to use the remaining 115 available daylight slack high tides. If there are fifty other vessels, such as tank barges or export ships, using the port in a year, then for all practical purposes mariners will no longer be able to use the safest bar crossing time at all. Outgoing vessels would have to hold up just inside the bar while the LNG ship passes, or leave earlier under time pressure, both of which are situations that increase safety risks to vessels and directly impair navigation. This situation greatly increases the chances of LNG ships having to hold up offshore.
- **Fishing Vessels,** both commercial and recreational, use the estuary itself and offshore areas in abundance. Under ordinary rules of navigation, a fishing vessel having deployed gear has the right-of-way, but the overriding security and safety concerns related to tankers gives them an exception.
- **Shipwrecks**. The applicants should fully identify shipwrecks and possible human remains in and near the navigation channel.
- **Ship Size**. There are numerous navigation-related concerns related to the size of LNG tankers that would call on this port. Tall vessels are an important limiting factor for the airport hazard. In light of this obvious limitation, there are future plans from the applicant and Port to dredge the channel deeper, enabling even larger ships. Vessel draft is a key limiting factor, which impairs navigation in several ways. It greatly increases the likelihood of groundings. Groundings further limit access to other port facilities. Draft restrictions are navigation limit on access to this gas by the global LNG fleet. New LNG ships being built have deep draft requirements, which means Coos Bay will likely end up with the smaller, older LNG vessels.
- **Vessel Routing** from the open ocean over the bar, up the estuary to the marine slip is a hazardous route that impairs navigation for all other users under the best circumstances. The entrance and first river bend, as well as the entrance to the marine slip, are both precise maneuvers.
- **The 2008 Waterway Suitability Report**, issued July 1, 2008 by the Coast Guard, contains numerous risk mitigation measures that are required, as well as numerous resource gaps. These restrictions, particularly those related to navigation, should be carefully weighed by the Corps in evaluating impacts to navigation. Especially impactful on navigation are the safety/security zones, and the vessel traffic management measures. It is very notable that ordinary operations of this facility require such intensive expert attention (e.g. meetings of port, FBI, coast guard and escort tugs in advance of every vessel arrival; VTIS installation; tractor tugs; navigational aids; and training; USCG facilities; fire-fighting; notification; gas detection) that have yet to be developed. Regarding emergency response, the Coast Guard frankly states that “response planning is limited” in the region, and will need to be developed and augmented.

- **Redacted security material**. The proposed facility, including tankers, the LNG facility, and the pipeline, are all security risks that adversely impact on public safety as well as on navigation. Without being privy to the confidential and redacted security-sensitive material related to navigation, it can safely be said to be voluminous, and therefore of concern to the public interest. In general, tight security at ports impairs navigation, not only for the LNG tankers but also for all other users of the port.

The applicants have not provided reasonable assurances that designated beneficial uses, including but not limited to navigation will be protected. The applicants must also address potential impacts to designated beneficial uses including industrial uses and agricultural uses. Without these reasonable assurances, DEQ must deny the 401 certification.

E. Conclusion

In conclusion, under 40 CFR 131.10, states are required to specify designated beneficial uses that are "appropriate water uses to be achieved and protected" that "must take into consideration the use and value of water for public supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation."[89] The applicants have not provided reasonable assurances that designated beneficial uses will not be impaired.

<u>Specifically, the applicant has failed to demonstrate that:</u>

- **Use and value of water for public supplies will be protected:** The project will likely impair public and private domestic water supply by contaminating sources through a frac-out as a result of Horizontal Directional Drilling proposed for rivers such as the Rogue that are a source of public drinking water, increasing sedimentation through the construction of stream crossings, and increasing temperature by removing riparian vegetation. Withdrawing large volumes of freshwater for activities such as hydrostatic testing will also impair water quality and quantity, thus impacting public and private domestic water supply.
- **Fish, shellfish, and wildlife will be protected:** The proposed activities for the terminal will likely impair these designated uses by degrading aquatic habitat for fish and shellfish through permanently destroying at least 1.9-acres of eelgrass beds; impairing water quality by decreasing dissolved oxygen, changing salinity levels, increasing temperature, and increasing sedimentation; causing turbidity plumes, wake strandings, engine cooling water intake entrainment; permanently removing coastal riparian vegetation; and removing benthic organisms through dredging. The proposed activities for the pipeline will likely impair these designated uses by permanently removing riparian vegetation at stream crossings; permanent loss of base flows; impaired water quality by increasing temperature and sedimentation; and permanent loss of Large Woody Debris.
- **Recreation in and on the water will be protected:** All of the impacted watersheds include fishing, boating, water contact recreation, and aesthetic quality as designated beneficial uses. The proposed activities for the project will likely impair these designated

[89] 40 CFR 131.10.

uses by harming habitat and water quality for fish, impacting recreational access, and altering the aesthetic values of Coos Bay and the other waterways crossed by the pipeline.

- **Agricultural, industrial, and other purposes including navigation will be protected:** Both construction and operation of the terminal would interfere with access to and use of navigable waters. Dredging operation would impact recreational boaters and anglers in Coos Bay. The applicants have also failed to adequately address impacts to agricultural, industrial, or other designated beneficial uses.

The applicants have not provided reasonable assurances that designated beneficial uses will not be impaired and, therefore, DEQ must deny certification.

V. DEQ Must Deny the Certification Because the Application Fails to Provide Reasonable Assurances that Numeric Criteria Will Not be Violated

As discussed more fully below, the State of Oregon cannot certify that the project will comply with Section 303 of the Clean Water Act, which encompasses water quality standards adopted by the State. The proposed project would likely violate Oregon's antidegradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels in Coos Bay, and further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. The proposed project would likely violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations. Construction of the pipeline and dredging of Coos Bay would violate Oregon's numeric criteria for dissolved oxygen. The proposed project would likely violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state. Specific waterbody impacts related to violations of numeric criteria will be discussed in more detail in Section VII below. In sum, the proposed project would do immense damage to water quality in Oregon, and the applicants have failed to demonstrate that the proposed activities would not result in violations of water quality standards.

A. Temperature - OAR 340-041-0028(4)

The applicants have failed to demonstrate that the proposed project would not violate Oregon's water quality standard for temperature. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use. Additionally, the discharge of cooling water from LNG carriers has the potential to discharge water that is as much as 19.4 degrees Fahrenheit warmer than ambient water temperatures.[90] Under OAR 340-041-0028(3), the purpose of Oregon's statewide numeric criteria for temperature is to "protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State."

[90] Bradwood LNG Project. 2008 FEIS at 4-85.

OAR 340-041-0028(4) establishes the state's numeric criteria for temperature:

> (4) Biologically Based Numeric Criteria. Unless superseded by the natural conditions criteria described in section (8) of this rule, or by subsequently adopted site-specific criteria approved by EPA, the temperature criteria for State waters supporting salmonid fishes are as follows:
>
> > (a) The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use on subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Tables 101B, and 121B, and Figures 130B, 151B, 160B, 170B, 220B, 230B, 271B, 286B, 300B, 310B, 320B, and 340B, may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times indicated on these maps and tables;
> >
> > (b) The seven-day-average maximum temperature of a stream identified as having core cold water habitat use on subbasin maps set out in OAR 340-041-101 to 340-041-340: Figures 130A, 151A, 160A, 170A, 180A, 201A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit);
> >
> > (c) The seven-day-average maximum temperature of a stream identified as having salmon and trout rearing and migration use on subbasin maps set out at OAR 340-041-0101 to 340-041-0340: Figures 130A, 151A, 160A, 170A, 220A, 230A, 271A, 286A, 300A, 310A, 320A, and 340A, may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit);
> >
> > (d) The seven-day-average maximum temperature of a stream identified as having a migration corridor use on subbasin maps and tables OAR 340-041-0101 to 340-0410340: Tables 101B, and 121B, and Figures 151A, 170A, 300A, and 340A, may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit). In addition, these water bodies must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. Finally, the seasonal thermal pattern in Columbia and Snake Rivers must reflect the natural seasonal thermal pattern;

Further, under OAR 340-041-0028(7) Oceans and Bays:

> (7) Oceans and Bays. Except for the Columbia River above river mile 7, ocean and bay waters may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the natural condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life. Absent a discharge or human modification that would reasonably be expected to increase temperature, DEQ will presume that the ambient temperature of the ocean or bay is the same as its natural thermal condition.

Additionally, under OAR 340-041-0028(11) Protecting Cold Water:

> (a) Except as described in subsection (c) of this rule, waters of the State that have summer seven-day-average maximum ambient temperatures that are colder than the biologically based criteria in section (4) of this rule, may not be warmed by more than 0.3 degrees Celsius (0.5 degrees Fahrenheit) above the colder water ambient temperature. This provision applies to all sources taken together at the point of maximum impact where salmon, steelhead or bull trout are present.
>
> (b) A point source that discharges into or above salmon & steelhead spawning waters that are colder than the spawning criterion, may not cause the water temperature in the spawning reach where the physical habitat for spawning exists during the time spawning through emergence use occurs, to increase more than the following amounts after complete mixing of the effluent with the river:
>
> > (A) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is 10 to 12.8 degrees Celsius, the allowable increase is 0.5 Celsius above the 60 day average; or
> > (B) If the rolling 60 day average maximum ambient water temperature, between the dates of spawning use as designated under subsection (4)(a) of this rule, is less than 10 degrees Celsius, the allowable increase is 1.0 Celsius above the 60 day average, unless the source provides analysis showing that a greater increase will not significantly impact the survival of salmon or steelhead eggs or the timing of salmon or steelhead fry emergence from the gravels in downstream spawning reach.
>
> (c) The cold water protection narrative criteria in subsection (a) do not apply if:
>
> > (A) There are no threatened or endangered salmonids currently inhabiting the water body;
> > (B) The water body has not been designated as critical habitat; and
> > (C) The colder water is not necessary to ensure that downstream temperatures achieve and maintain compliance with the applicable temperature criteria.

The proposed action would impact:

> 1) Streams identified as having salmon and steelhead spawning use (South Coast, Umpqua, and Rogue):
> 2) Streams identified as having core cold water habitat use (South Coast, Umpqua, and Rogue);
> 3) Streams identified as having salmon and trout rearing and migration use (South Coast and Umpqua); and
> 4) Streams identified as having migration corridor use (South Coast).

Specific waterbody impacts related to violations of numeric criteria for temperature will be discussed in more detail in subsequent sections.

Table 2. Fish Use Designations for Impacted Watersheds

Watershed	Salmon and steelhead spawning	Core coldwater habitat	Salmon and trout rearing and migration use	Migration corridor use	Redband or Lahontan cutthroat trout
South Coast[91,92]	X	X	X	X	
Umpqua[93,94]	X	X	X		
Rogue[95,96]	X	X			
Klamath[97]					X

Additionally, numerous stream segments that would be impacted by the proposed action already suffer high temperatures that violate State water quality standards. Many of these streams are on the State's list of water quality limited waters under Section 303(d) of the Clean Water Act. Therefore, any temperature increases in these streams attributable to the proposed action would result in exacerbations of existing violations of state water quality standards. The Ninth Circuit Court of Appeals made clear that new dischargers may not add a pollutant into a water body that is water quality limited.[98] The DEIS for the previous iteration of the project states, "removal of vegetation that once shaded the stream may cause local and temporary (daily) increases in temperature during the hot summer months. This may or may not exceed the TMDL on temperature-impaired streams…"[99] Even where waterways are not already impaired for

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[91] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300A: Fish Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300a.pdf

[92] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300B Salmon and Steelhead Spawning Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300b.pdf.

[93] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320A Fish Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320a.pdf.

[94] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320B Salmon and Steelhead Spawning Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320b.pdf

[95] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271A, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271a.pdf.

[96] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271B Salmon and Steelhead Spawning Use Designations, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271b.pdf.

[97] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 180A, Klamath Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure180a.pdf.

[98] See Friends of Pinto Creek v. United States Environmental Protection Agency, No. 05-70785 (9th Cir. Oct. 4, 2007).

[99] DEIS at 4-372.

temperature, stream temperature increases cause acute stress that has an immediate impact on salmon and other temperature-dependent fish. The applicants have failed to provide reasonable assurances that the proposed activities will not violate Oregon's numeric criteria for temperature, and therefore DEQ should deny certification.

B. Turbidity: OAR 340-041-0036

The applicants have failed to demonstrate that the proposed project would not violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments as a result of proposed stream crossings, increased soil erosion and landslide risk, dredging proposed for Coos Bay, and construction and use of roads.

Under OAR 340-041-0036 (Turbidity):

> No more than a ten percent cumulative increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied and one of the following has been granted:
>
> > (1) Emergency activities: Approval coordinated by the Department with the Oregon Department of Fish and Wildlife under conditions they may prescribe to accommodate response to emergencies or to protect public health and welfare;
> >
> > (2) Dredging, Construction or other Legitimate Activities: Permit or certification authorized under terms of section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 14l-085-0100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

Put more simply, a violation of Oregon's water quality standard for turbidity occurs when an activity causes a more than 10% increase in natural turbidity levels, unless the activity is necessary to accommodate essential dredging, construction or other legitimate activities AND all practicable turbidity control techniques have been applied. The activities proposed by the applicants are likely to result in a more than 10% increase in natural turbidity levels from pipeline stream crossings, potential HDD failure and frac-out, removal of riparian vegetation around stream crossings, increased landslide risk as a result of pipeline construction, dredging of Coos Bay, and construction and operation of roads, as discussed in subsections 1 - 6 below.

Further, the applicants have not demonstrated that "all practicable turbidity control techniques have been applied."[100]

1. Stream Crossing Impacts

[100] OAR 340-041-0036(2)

The applicants acknowledge the potential for violations of the turbidity standard associated with stream crossings. In addition, the analyses included in the Joint Permit Application materials are outdated and incomplete. As a result, it will be nearly impossible for DEQ to accurately determine the potential for turbidity violations, and therefore the applicant has provided no reasonable assurances that the standard will be met.

The applicants acknowledge in Pacific Connector Pipeline Resource Report 2: Water Use and Quality that "some turbidity will result during instream activities and when the water is diverted to the backfilled areas."[101] Further, the applicants state that under a 2017 report from GeoEngineers evaluating turbidity risk that:

> Turbidity generated during construction may exceed the Oregon water quality standard for short distances and short durations downstream from each crossing, either coinciding with construction across perennial waterbodies or in intermittent streams coincidental with autumn precipitation. Such exceedances are allowed as part of the narrative turbidity standard if recognized in a 401 Certification as long as every practicable means to control turbidity has been used.[102]

The applicants propose dry open-cut methods, including both flume and dam and pump methods, for the stream crossings where HDD or Direct Pipe technology is not proposed. HDD is proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River and Direct Pipe technology is proposed for the South Umpqua. In the Stream Crossing Risk Analysis 2017 report, GeoEngineers reviewed 173 crossings that will be trenched out of 330 total crossings.[103] However, as the latest materials from May 8, 2018 submitted to DEQ reveal and as identified in the public notice submitted by the Corps and DEQ, the applicants estimate that 485 waterways would be crossed. This indicates that additional stream crossings have been added and have not been evaluated for turbidity risk. Similarly, the Channel Migration and Scour Analysis 2017 report identified 10 Level 2 crossings that have a high potential for migration, avulsion, and/or scour and 44 Level 1 crossings with a moderate potential for migration, avulsion, and/or scour.[104] Channel migration and streambed scour not only increases sediment pollution and potential violations of the turbidity standard, but increases the potential for complete or partial exposure of the pipeline within the channel or floodplain.

Because the applicant has provided no reasonable assurances that the turbidity standard will be met, DEQ cannot certify that its stream crossing activities will comply with the state numerical standard for turbidity.

2. Horizontal Directional Drilling ("HDD") Crossing Impacts

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[101] Pacific Connector Pipeline Resource Report 2: Water Use and Quality. P. 22. PCP A-B part 6 p. 233.

[102] Pacific Connector Pipeline Resource Report 2: Water Use and Quality. P. 22. PCP A-B part 6 p. 233.

[103] Stream Crossing Risk Analysis. 29 August 2017. Resource Report 2 Appendix O.2. P. 3. PCP A-B P. 505.

[104] Channel Migration and Scour Analysis. 29 August 2017. Resource Report 2. Appendix T.2. PCP A-B P. 253.

Specific to crossings where HDD technology is proposed, there is also an increased risk of frac-out where a large release of sediment, bentonite clay, and drilling chemicals may occur. Due to the potential risk of frac-out, DEQ cannot certify that the project will not violate the numeric criteria for turbidity.

HDD technology is proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River. Bentonite clay is highly detrimental to salmon spawning habitat. In addition, the prior DEIS states that drilling mud "can include additional additives specific to each drilling operation" and "Pacific Connector would approve any additive compounds" but does not disclose what these additives might include.[105] The State of Oregon has specifically requested a list of the additives used in drilling fluids and their potential effects on the aquatic environment.[106]

ODFW has described some of their concerns regarding frac-outs several times, first in 2008:

> Between August and October of 2003, MasTec North America Inc. was cited by DEQ for a series of water-quality violations which occurred between August and October of 2003. The violations were a result of frac-outs during the horizontal drilling work for the construction of a natural gas pipeline under the North Fork of the Coquille River in Coos County. If similar frac-out related turbidity discharge impacts were to occur at the proposed Rogue River crossing, they would likely impact last known significant spawning habitat for Spring-run Chinook salmon in the Rogue River Basin. This EIS should include analysis of the potential environmental impacts of a frac-out related turbidity discharge due to the proposed action and alternatives.[107]

And again in 2015:

> Pipeline crossings using HDD or other subsurface methodologies can be expected to cause frac-outs in Coos County geology and possibly throughout the project. The Applicant should be prepared for construction stoppages, cleanup, and remediation of damages caused by frac-outs.
>
> HDD and other subsurface boring or drilling crossing design locations should proactively address the risks associated with the potential for a "Frac out" or inadvertent loss of drilling fluid…[108]

The state re-iterated these comments yet again in its 2017 scoping comments to FERC.[109]

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[105] 2014 DEIS at 4-387.
[106] 2017 State of Oregon Scoping comments at 18.
[107] State of Oregon 2008 DEIS comments at 24.

[108] State of Oregon 2015 DEIS comments at 102.
[109] State of Oregon 2017 Scoping comments at 18.

In 2015, DEQ noted that the DEIS failed to disclose and analyze the likelihood and frequency of frac-out events.[110] The State re-iterated these concerns in its 2017 scoping comments.[111] Without this information in the current application, DEQ cannot evaluate whether the project is likely to degrade water quality below state standards.

In the JPA, the applicants explicitly state in the Drilling Fluid Contingency Plan for Horizontal Directional Drilling Operations September 2017 that:

> If corrective measures can be feasibly implemented, an assessment will be made to determine the most appropriate containment structure to be erected to minimize the volume of drilling fluid released into the waterbody. However, it will likely be impractical to erect effective containment structures to extract drilling fluid from rivers.[112]

In the region, many HDD attempts along the 12-inch Coos County pipeline failed, resulting in frac-outs and release of sediment and bentonite clay into the Coquille River.

Frac-out from HDD operation into the Coquille River.

More recently, the Rover LNG Pipeline in Ohio released 50,000 gallons of drilling fluid from HDD operation into a wetland in Richland County, Ohio in April 2017. A second spill as a result of HDD operation for the Rover Pipeline released an estimated 2 million gallons of drilling fluid into the Tuscarawas River. [113]

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[110] State of Oregon 2015 DEIS comments at 43 & 102.
[111] Stat of Oregon 2017 Scoping comments at 15.
[112] Drilling Fluid Contingency Plan for Horizontal Directional Drilling Operations. Pacific Connector Pipeline. September 2017. P. 5. PCP A-B Part 7 P. 365.
[113] Notice of Violation Rover Pipeline, LLC. Ohio EPA. 17 April 2017. https://www.scribd.com/document/345647356/Notice-of-Violation-Rover-Pipeline-LLC.

Clean up efforts on the Rover Pipeline. Ohio EPA.

Specific concerns regarding HDD technology and contingency plans are discussed further in waterbody-specific comments in Section VII below. Due to the likely increase in turbidity as a result of all stream crossing methods, as well as the potential risk of frac-out, DEQ cannot certify that the project will not violate the numeric criteria for turbidity. The applicants have failed to provide reasonable assurances that the proposed activities will not violate the numeric turbidity standard.

3. Removing Streamside Vegetation

Pipeline clearing and severe soil disturbance from excavation result in impacts akin to road construction. Roads undergo elevated erosion for decades, even after obliteration. The soil compaction from pipeline construction activities is likely to persist for decades, and even longer in soil with high clay content. Soil compaction contributes to elevated surface erosion potential by degrading surface and subsurface hydrology in several ways: the ability of soils to absorb, store, and slowly release water and increases in surface runoff increases erosion and sediment delivery. The removal of ecologically important vegetation for pipeline construction and operation will also accelerate bank erosion and reduce bank stability at stream crossings, because trees and deep-rooted vegetation are critically important to bank stability. Decreased bank stability contributes to both stream sedimentation and channel widening.

Sediment generated from forest clearing (i.e. logging) for the pipeline on steep topography is well documented even with the sediment control measures. The 2014 DEIS 4-74 cites Robichaud et al. (2000) to assert that silt fences are 90-95 percent efficient in trapping sediment. Even if this trapping efficiency is true for post-construction during intense rainfall, this means that up to 10% of the sediment generated during intense rainfall will reach streams. Ten percent delivery of sediment from a large disturbance area is likely to be significant for spawning coho salmon in very small streams.

4. Landslides

There are many areas along the pipeline route that include steep terrain and unstable land. The risk of landslides in these areas is high, particularly when disturbed by construction and other activities related to the project. A single landslide event could result in significant deposits of sediment into stream reaches, impacting fish habitat and water quality. Response and control of continued sediment deposition could be difficult and time consuming in remote areas of the pipeline route. These risks are exacerbated by wildfires, which leave soils exposed and without the complex structure necessary to withstand landslide events. DEQ must consider the risk of landslides, based on current conditions and including wildfire events, as part of the activities of the project and their impacts on water quality. In order to assess potential landslide impacts as a result of the proposed activities, DEQ should require additional information from the applicants regarding current conditions and future conditions, particularly in light of wildfire events.

5. Dredging of Coos Bay

The resubmitted JPA includes the 2017 turbidity analysis, updated from the prior 2006 assessment. The analysis reports that turbidity plumes from dredging operations within NRIs will extend between 2,000 and 4,600 feet upstream and downstream beyond the dredging footprint,[114] with the largest plumes expected at NRI Dredge Area #4. Dredging at the south end of the Access Channel is likewise expected to generate a large plume "due to changes in hydrodynamic conditions."[115]

The JPA does not provide an adequate analysis of dredging method alternatives and a clear indication of why the proposed methods will minimize impacts. The JPA indicates that both mechanical and hydraulic dredging may be used. Hydraulic pipeline dredging has the potential to impact aquatic species through entrainment and impingement. Other dredge methods will result in significant turbidity in Coos Bay. Although some specially designed hydraulic cutterhead dredges may reach 0.5 percent spillage, the JPA fails to disclose what kind of cutterhead dredge will be used for dredging. This is vitally important information for the public and the agencies to assess the veracity of the applicant's statements, because without knowing what type of cutterhead dredge will be used, the public cannot begin to evaluate what kind of sedimentation dredging activities will cause. Furthermore, any modeling conducted on behalf of the Project is suspect until a spillage rate can be determined. All cutterhead dredges are not the same. Studies indicate that conventional cutterhead dredging "can liberate considerable amounts of turbidity and associated contaminants to overlying water."[116]

Selection of the proper cutterhead for the type of sediment, in addition to correct rotational speed and hydraulic suction, to obtain reduced suspension rates of sediments is rarely achieved.[117] Therefore, knowing not just the type of dredge used but also the anticipated methods of using the dredging equipment are important factors that must be disclosed for the public and agencies to properly analyze the effects of dredging at the proposed project. ODEQ must make specific findings on the types of dredging equipment. The JPA should present an analysis of alternative

[114] 2017 Turbidity Analysis at 18 (Table 5-1).
[115] Id.
[116] Cooke, 2005.
[117] Herbich, 2000.

methods in order for ODEQ to fully analyze the impacts dredging will have on turbidity and overall pollution.

6. Roads

The pipeline will also elevate sediment delivery to streams via the increased use of unpaved roads associated with the construction and operation of the pipeline. Studies have consistently documented that elevated use of unpaved roads vastly elevates sediment delivery from roads to streams, particularly near and at stream crossings, where it is impossible to eliminate the delivery of sediment from road runoff. Therefore, this pipeline impact will also elevate sediment delivery to streams.

The JPA relies on outdated information regarding temporary and permanent roads to be created or improved during construction of the pipeline. Pacific Connector has not provided the public with the most recent road information either in the JPA or by uploading it to the FERC website and noticing all parties, information that significantly changes the location and impacts of the project. The application is incomplete and in violation of the Guidelines without complete and accurate maps of roads that will be constructed or improved for the project. Road construction is likely to impact wetlands, streams, and rivers throughout the 229-mile path of the PCGP, significantly increasing the number of impacted waterbodies beyond the 485 listed in the May 22, 2018 USACE and DEQ public notice.

The JPA inadequately addresses the aquatic impacts from road use, road modifications (including but not limited to Key Watersheds), temporary extra work area (TEWA) construction and temporary and permanent access roads. In order to use heavy equipment on these roads, significant road modifications will be necessary, including blading/grading, widening, drainage improvements, and the construction of turnouts and roadside TEWAs. The JPA does not include detailed descriptions of what activities will be occurring that could impact wetlands, streams, and other waters. Rather, the JPA relies on blanket statements about the application of best management practices to avoid impacts to streams. By not specifying the location and nature of construction activities associated with all access roads, the JPA provides an inadequate description of the project. On steep slopes, particularly in rainy winter months, similar BMPs have failed in the past to prevent impacts to streams, creeks and ditches. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable.

The activities proposed by the applicants are likely to result in a more than 10% increase in natural turbidity levels from pipeline stream crossings, potential HDD failure and frac-out, removal of riparian vegetation around stream crossings, increased landslide risk as a result of pipeline construction, dredging of Coos Bay, and construction and operation of roads, in violation of Oregon's water quality standard for turbidity.

7. Inadequate Modeling of Sediment Impacts

An analysis of modeling used by the applicants, specifically regarding the proposed activities within Coos Bay, is provided in Appendix 1. In summary, a review of the hydrodynamic and sediment modeling studies reveals that:

> All but one of the studies conducted by Moffat & Nichol rely on the results of two-dimensional model simulations that are inherently incapable of representing the dynamics required to assess impacts on water quality in Coos Bay… All studies were critically limited in temporal scope representing a small subset of the conditions exhibited in the system.[118]

Specifically regarding the potential for increased turbidity and sediment impacts from proposed activities related to construction and operation of the terminal (JCEP), the Turbidity Analysis Memo (M&N 2017c) uses a two-dimensional model with significant limitations. For example, the study conditions were not described, the applicants did not provide the number of sediment size classes, and initial or boundary conditions for the system were not reported. Additionally, model calibration and validation were also not included. DEQ should require the applicants to use best practices for the models upon which the assessment of impacts to water quality, including but not limited to turbidity, are based. DEQ should not rely upon inaccurate and narrow two-dimensional modeling provided by the applicant. Further details regarding the limitations and flaws of modeling provided by the applicant, specifically regarding the JCEP and impacts to Coos Bay, are provided in Appendix 1.

In conclusion, the applicants have failed to provide reasonable assurances that the project will not violate the numeric water quality standard for turbidity under OAR 340-041-0036. DEQ should fully evaluate the potential for violations of the turbidity standard, particularly regarding proposed stream crossings, increased soil erosion and landslide risk, dredging proposed for Coos Bay, and construction and use of roads.

C. Toxics: OAR 340-041-0033(2)

By disturbing and re-suspending contaminated material in and around waters of the state, the proposed activities will likely result in violations of Oregon's water quality standards for toxics. Toxic substances may not be introduced above natural background levels in concentrations that may be harmful to aquatic life.[119] Additionally, numeric criteria for toxics are established under OAR 340-041-0033(2):

> 2) Aquatic Life Numeric Criteria. Levels of toxic substances in waters of the state may not exceed the applicable aquatic life criteria as defined in Table 30 under OAR 340-041-8033.

As described in previous sections, there is known contamination at the terminal site. Both the Ingram Yard property and the location of the proposed South Dunes site on the former

[118] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018.
[119] OAR 340-041-0033(1)

Weyerhaeuser North Bend Containerboard Mill are listed in the DEQ's Environmental Cleanup Site Information (ECSI). During construction of the Industrial Wastewater Pipeline by Jordan Cove, the contractor discovered black soils in March 2015 on the site. The results of the sampling confirmed that the black soil contained contaminants, including but not limited to, mercury, arsenic, dioxins, and petroleum products.[120]

Additionally, there is a significant potential for toxic contaminant disturbance and release at the Klamath River crossing site. The proposed pipeline would cross the Klamath River, Hwy 97 and Southern Pacific Railroad, just after wrapping around a 660-acre industrial facility with known contamination. A frac-out during the HDD under the Klamath River would impact the riverbed immediately adjacent to the contaminated facility, exposing riverine sediment that could contain high levels of arsenic, chromium, copper, mercury, polycyclic aromatic hydrocarbons and/or petroleum from the Weyerhaeuser site or from other industrial facilities upstream. The 2014 DEIS and JPA do not include studies or test cores of potential contaminants at this HDD crossing. Further, the 2014 DEIS includes no discussion of what efforts, if any, would be made to analyze toxicity or properly dispose of fill removed through the HDD. The applicants have not provided reasonable assurances that the toxics standard will be met, particularly in areas of known contamination such as the terminal site and the Klamath River crossing.

D. Dissolved Oxygen: OAR 340-041-0016

OAR 340-041-0016 sets out the State's water quality standard for Dissolved Oxygen (DO). Dissolved oxygen is essential for maintaining aquatic life. Depletion of DO in waterways is a significant pollution problem, affecting fish and aquatic species in a variety of ways at different life stages and life processes. DO levels can be influenced by several factors including pH changes, temperature increases, groundwater inflow and hyporheic exchange, decaying material or algae blooms, and sedimentation.

The proposed action involves dredging that will decrease dissolved oxygen in Coos Bay because dredging increases the oxygen demand by disturbing sediments and releasing oxygen-demanding materials (decomposing organic materials contained within the sediments). As explained in the DEIS, "[r]esuspension of sediments during dredging operations can be a significant source of turbidity."[121]Although the 2014 DEIS apparently concludes that turbidity increases will not be significant, it admits that "the hydraulic cutterhead dredge to be used by Jordan Cove would generate TSS levels up to a maximum of 500 mg/l in the vicinity of the dredge" and "maintenance dredging may result in a turbidity plume for up to 1.9 miles from the dredging location at highest ebb or flood currents."[122]

Oregon DEQ previously expressed strong concerns about lowered dissolved oxygen levels that the proposed action would cause. In its 2008 DEIS comments, DEQ stated:

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[120] IWP Phase 1A & 1B Construction, Black Soil Summary Report, Jordan Cove Energy Project. 15 April 2015. Available online < http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=0522588a-0b10-4e07-9705-599d39399d8dpdf&s=Black%20Soil%20Summary%20Report.pdf >. P. 2.

[121] DEIS at 4-360.

[122] DEIS at 4-361.

> Total organic carbon, acid volatile sulfides, and nutrient sampling should be conducted to quantify the potential for adverse impact to oxygen levels caused by resuspension of sediments during dredging activities. Impacts should then be evaluated utilizing hydro dynamic modeling which can capture real time tidal conditions and simulate real time tidal exchanges during the period of the project.[123]

The current JPA fails to incorporate or analyze the sampling that was recommended by DEQ. The applicant's hydrodynamic modeling memo concludes that the project will cause changes in currents, but does not evaluate the impacts to oxygen levels caused by dredging or real time tidal exchanges during the project period.[124] As noted in its comments on the 2014 DEIS, "these data should be utilized to quantify the potential for adverse impact to oxygen levels caused by re-suspension of sediments during dredging activities."[125]

The Coalition urges DEQ to perform an independent sediment transport analysis consistent with actual conditions in the Coos Bay estuary. In particular, DEQ should consider that construction dredging lowers dissolved oxygen levels in estuarine waters not only by re-suspending sediment, but by deepening an estuarine channel where hypoxic conditions can occur due to reduced circulation in deeper waters. Once the dredging is completed, there also is the potential for reduced circulation in the deeper portions of the approach channel. In combination with other factors, reduced circulation has the potential to result in lower dissolved oxygen levels in the deeper waters. The applicants must prove that actual hydrodynamic conditions in Coos Bay would not result in a 0.1 mg/L decrease in dissolved oxygen levels caused by reduced circulation in the deeper channel.

Further, as discussed in more detail in the Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project (*See* Appendix 1), the applicants rely on two-dimensional models that "are inherently incapable of representing the dynamics required to assess impacts on water quality in Coos Bay."[126] The applicants utilized a salinity study as a proxy for water quality variables including dissolved oxygen, pH, temperature, and turbidity. However, as described in Appendix 1, salinity is inherently different from these other variables. As stated by Jesse Lopez, doctoral student of Dr. Antonio Baptista with the Center for Coastal Margin Observation & Prediction in Appendix 1:

> Salinity varies primarily due to the mixing of dense ocean and fresh water in Coos Bay. In contrast, the other water quality variables vary not only due to mixing, but also due to other variable specific factors including biological processes, chemical reactions, solar conditions, and winds. As such, salinity is not an adequate proxy for water quality or

[123] State of Oregon 2008 DEIS comments at 63.
[124] Hydrodynamic Modeling Memorandum at 29.
[125] State of Oregon 2015 DEIS comments at 42.
[126] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018. P. 1.

> constituent attributes. A model study investigating these properties should explicitly include them.[127]

DEQ should require the applicants to utilize a more robust, three-dimensional model that adheres to best practices. In deciding whether to certify the proposed action as complying with Oregon's water quality standards, DEQ must consider that the applicant has failed to incorporate or analyze the sampling that was recommended by DEQ and that its modeling has been questioned by an outside expert. Because DEQ's 2008 strong concerns have not been addressed, the applicant has not provided DEQ with reasonable assurances that State dissolved oxygen standards will not be violated by the project.

E. Conclusion

In summary, the applicants have not provided reasonable assurances that the proposed activities would not violate Oregon's numeric water quality standards. Specifically, it is likely that the project will violate the water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations. Construction of the pipeline and dredging of Coos Bay would likely violate Oregon's numeric criteria for dissolved oxygen. The proposed project would likely violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state. As discussed in more detail in Appendix 1, the applicants also rely on narrow and inaccurate two-dimensional models to assess potential impacts, use salinity as a proxy for other water quality parameters (such as temperature) that are inherently different, and do not adhere to scientific best practices. Jordan Cove has failed to demonstrate that numeric water quality standards would not be violated and, therefore, the state of Oregon cannot authorize 401 certification for the project.

VI. DEQ Must Deny the Certification Because there is No Reasonable Assurance that Narrative Criteria Will Not be Violated

The proposed project would do significant damage to water quality in Oregon. Through construction, operation, and maintenance of the terminal, pipeline, and related facilities, the project would likely increase water temperatures in Coos Bay and numerous stream segments; decrease dissolved oxygen levels in Coos Bay; disturb and re-suspend contaminated sediments; and further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. Because of these potential impacts and the failure of the applicants to demonstrate that the project will not result in violations of statewide narrative criteria, DEQ cannot certify that the project will comply with state water quality standards.

OAR 340-041-0007 establishes Oregon's statewide narrative criteria. The applicants have failed to demonstrate that the proposed activities will not result in violations of Oregon's narrative water quality criteria. As a result, DEQ cannot certify that these projects will comply with Oregon's narrative criteria. Specifically, the project is likely to result in violations of OAR 340-

[127] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project. 1 July 2018. P. 9.

041-0007(1), 340-041-0007(7), 340-041-0007(10), 340-041-0007(13), and 340-041-0011 as described in the following paragraphs.

A. OAR 340-041-0007(1) Highest and best practicable treatment and/or control of wastes, activities, and flows.

OAR 340-041-0007(1) requires that "the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels."

Before DEQ can certify that the proposal complies with the state's narrative criteria, it must first ensure that the applicant is using the "the highest and best practicable treatment and/or control" to meet this standard. It is wholly unclear from the application materials that Jordan Cove is complying with this standard.

Indeed, Jordan Cove's application leaves DEQ to guess what treatment and control technologies it proposes to employ to meet this standard. Instead of specifying which treatment and control technologies it would use, and how it determined that those were the highest and best, while being practicable, Jordan Cove only states that it "does not anticipate adverse impacts to water quality in general, or the water quality parameters . . ." and that "BMPs and conservation measures will be implemented throughout the Project to prevent impacts to water quality as a result of Project activities to the maximum extent practicable, and the best practicable treatment will be employed when discharging to jurisdictional waters."[128] Here, Jordan Cove has fallen well short of making the required showing.

First, Jordan Cove misses the mark by claiming this criteria will be satisfied because it "does not anticipate adverse impacts to water quality in general, or the water quality parameters . . .."[129] Whether or not there will be impacts to water quality, adverse or otherwise, is not the question posed by this criterion. Rather, to satisfy this criterion, as long as the discharge will have any impact to the waters of the state, the proponent must demonstrate that it would use the appropriate level of treatment and control to reduce that impact; and under this rule, it must use the "highest and best practicable treatment and/or control of wastes, activities, and flows." Jordan Cove impermissibly conflates compliance with other criteria, both narrative and numeric, with compliance with the requirements of OAR 340-041-0007(1). The requirement to use the highest and best practicable treatment and/or control technology is a separate standard. It must be given independent utility and the applicant must demonstrate compliance before the state may issue a 401 Certification.

Second, Jordan Cove has failed to demonstrate that it is in fact complying with this requirement. Jordan Cove first claims that "BMPs and conservation measures will be implemented throughout the Project to prevent impacts to water quality as a result of Project activities to the maximum

[128] JCEP 401 Water Quality Memo, at 14.
[129] Id.

extent practicable." This is not the standard. While there may be some overlap in some instances, it is not axiomatic that BMPs and conservation measures are treatment and control technologies. Moreover, there is a difference between implementing the highest and best practicable treatment and control technology and preventing impacts "to the maximum extent practicable." These distinctions are not inconsequential. In addition, Jordan Cove admits that it will not implement an important component of the requirement by failing to address the use of control technology, stating only that "the best practicable *treatment* will be employed *when discharging to jurisdictional waters*."[130] DEQ must ensure the applicant will comply with the criterion contained in OAR 340-041-0007(1), not a different, more lenient standard proposed by Jordan Cove.

Finally, as discussed above, it is the applicant's duty to provide the information necessary to allow DEQ (and the public) to determine whether the proposal will comply with water quality standards. Here, Jordan Cove must identify the potential discharges, catalogue the potential impacts waters of the state, identify the highest and best treatment and/or control of wastes, activities, and flows for each potential discharge, identify the factors it may use in determining whether the identified treatment or control technology is practicable, analyze the practicality of implementing those measures, under those factors for each discharge, and explain why any lesser measures are being implemented as a result of that analysis. Only with this information provided by the application can DEQ meet its legal obligation of reviewing and analyzing whether the applicant will comply with this criterion.

B. OAR 340-041-0007(7) Road construction and maintenance

DEQ must determine whether the construction of a road over several waterbodies will comply with the criteria that "[r]oad building and maintenance activities must be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces."[131] As discussed previously in Section II, roads can disrupt hydrologic function and increase sediment delivery to streams. The applicants failed to provide complete and accurate maps of roads (existing, proposed, and expanded), specific characterizations of impacts to waterways that would be affected, details regarding types of roads and how they will be modified, or specific details on long-term maintenance proposed for roads in areas of steep terrain or wildfire risk. The JPA relies on generalized statements regarding the application of best management practices to avoid impacts to streams. DEQ should require the applicants provide site-specific details regarding construction and maintenance of roads to be able to determine whether the applicants are in compliance with this narrative standard. Without this information, the applicants have failed to provide reasonable assurances that this standard would not be violated, and therefore DEQ must not certify the application.

C. OAR 340-041-0007(10) Conditions deleterious to aquatic life

[130] Id. (emphasis added)
[131] OAR 340-041-0007(7).

In addition to the statewide narrative criteria under OAR 340-041-0007 discussed above, the proposed action would likely create many conditions that are deleterious to fish and/or other aquatic life, which is prohibited under OAR 340-041-0007(10). The construction and operation of the terminal and pipeline will cause immediate, severe, deleterious impacts to salmon, critical habitat, and essential fish habitat. The applicants have failed to provide reasonable assurances that the project will not result in conditions deleterious to aquatic life.

The aquatic life threatened by these deleterious conditions include, but are not limited to, Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*). Dredging millions of cubic yards of material from the Coos Bay estuary in salmon habitat and expansive wetland fill creates a condition deleterious to fish due to permanent loss of habitat. In addition, NMFS and DEQ raised as a major concern that LNG tankers will impinge and entrain juvenile salmon and other fish when the tankers take on cooling water. Additional deleterious conditions include modification of river flow and hydrology of Coos Bay; wake stranding of juvenile fish, discharge of warm engine cooling water and ballast water; and long-term piling driving and dredging, and destruction of riparian and upland habitat along entire pipeline.

1. Threatened and Endangered Fish and Aquatic Species

The proposed action would likely jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act(“ESA”), or result in the likelihood of the destruction or adverse modification of critical habitat under the ESA. These impacts to threatened and endangered species include impacts to Coho salmon, green sturgeon and eulachon. Impacts to threatened and endangered species are described in further detail in the Coalition’s Section 404 comments to the U.S. Army Corps of Engineers (*See* Appendix 3).

The proposed dredging is antithetical to salmon recovery and restoring estuarine habitats, as described in every local, state, and federal management plan. Quite simply, we cannot recover threatened salmon while simultaneously permitting this massive dredging project. A project of this size and scope are unacceptable in a location containing so much critical salmon habitat.

In summary, the proposed activities are likely to create conditions deleterious to the following threatened and endangered species:

a. Coho salmon – Southern Oregon/Northern California Coast ESU

The project area includes two major river systems known to support Southern Oregon/Northern California Coast ESU (SONCC) Coho: the Rogue River and the Klamath River. The 2014 DEIS acknowledged that the project is likely to adversely affect SONCC Coho due to numerous impacts to feeding, juvenile exposure to elevated turbidity levels, potential swim bladder rupture due to blasting activities, injury and mortality during fish salvage, and long term habitat deterioration due to reductions in large woody debris. Stream crossing construction and removal of riparian vegetation are the two primary contributors to these impacts. The 2014 DEIS also found that the project is likely to adversely impact critical habitat for SONCC Coho. The acknowledged impacts include loss of hatching and rearing habitat from substrate removal and turbidity at stream crossings, degraded water quality as a result of turbidity caused by stream crossing construction, reduction in food sources, barriers to migration during stream crossing construction, and long term loss of native riparian vegetation.

The pipeline construction would disrupt fish passage by damming the streams during the trenching and pipeline placement. It is unclear how long fish passage would be interrupted. The mitigation of capturing and removing fish behind the dams is historically ineffective, and will likely result in the take of threatened salmonids. Additionally, for rivers where HDD is proposed, the potential sediment pollution and release of drilling fluid from a frac-out poses additional threats to threatened SONCC.

The pipeline crossings would also threaten SONCC recovery in the Klamath Basin. While the Upper Klamath Basin is currently unavailable to anadromous fish, resource agencies face a court mandate to restore fish passage to this area, whether or not PacifiCorps' mainstem dams on the Klamath are removed. Manual reintroduction of imperiled spring Chinook, and natural recolonization of imperiled steelhead and ESA threatened SONCC coho will occur in the Klamath Basin at an unknown time within the next ten years. DEQ should address the need to coordinate construction through the Upper Basin with habitat used by returning anadromous fish as described in Oregon Department of Fish and Wildlife's ("ODFW") Plan for the Reintroduction of Anadromous Fish in the Upper Klamath Basin (ODFW 2008) approved by the Oregon Fish and Wildlife Commission in July of 2008.

b. Coho salmon – Oregon Coast ESU

The project area includes designated critical habitat for the Federally Threatened Oregon Coast Coho: the South Umpqua Subbasin, Coquille Subbasin, and the Coos Subbasin (which includes the Coos Bay estuary). The 2014 DEIS acknowledged that the project is likely to adversely affect Oregon Coast Coho and its critical habitat.[132] Oregon Coast coho will be most impacted by the LNG terminal and associated facilities. Activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel and construction of the pipeline across Coos Bay could all jeopardize the survival of this species. Moreover, cooling water intake is likely to entrain and impinge many food sources for Coho, such as juvenile stages of crab and shrimp, other zooplankton and eggs and fish larvae. Pipeline-related activities including stream crossing construction or failures of those operations, blasting, mortality during fish salvage operations, increased stream temperature as a result of riparian vegetation removal, and loss of large woody debris for habitat also have the potential to cause jeopardy to the Oregon Coast Coho and adversely affect its designated critical habitat.[133]

As noted by the Coos Watershed Association in 2008:

> This route crosses two significant streams (Kentuck Slough and Willanch Slough), both of which have high value for coho salmon. The area downstream from the proposed for

[132] DEIS at 4-644, 4645.
[133] DEIS at 4645.

> the crossing at Willanch Slough is presently being considered for a Wetland Mitigation Bank, while the area upstream has had significant and successful riparian restoration projects. The route down Lilienthal Creek (T.25S.;R.12W., Sections 20 and 30) will cross the entirety of the Brunschmid Wetland Reserve Project (WRP) that has a perpetual easement held by the U.S.D.A. Farm Services Agency. This site has had significant restoration work during 2008 and will be completed in the winter of 2009.[134]

Direct mortality from dredging in Coos Bay, fish entrainment from dredging, harm or take of listed salmonids, impact of cooling water on food sources, and cumulative impacts on aquatic life from dredging, terminal construction and operation, pipeline construction and operation, as well as the impact of the channel deepening dredging and maintenance dredging are all potential impacts to Oregon Coast Coho.

c. Green sturgeon

Both Northern and Southern population segments of the North American green sturgeon are known to occur within Coos Bay for feeding, growth, and thermal refuge. The DEIS admits that the project is likely to adversely affect green sturgeon as a result of bottom disturbance and reduction of benthic food supply from construction and maintenance dredging as well as dredged spoils disposal, and the potential for dredged spoils disposal to bury sub-adult green sturgeon.[135] Likewise, the project is likely to adversely affect critical habitat for the species. DEQ must look at the effect dredging and dredged spoils disposal would have on food sources for the threatened green sturgeon.

d. Eulachon

Pacific Eulachon (also known as candlefish) utilize Coos Bay for habitat, and may be present in the estuary during construction and operation of the project. Eulachon typically spend three to five years in saltwater before returning to freshwater to spawn in late winter through mid-spring. Eulachon are a small fish, rich in calories and important to marine and freshwater food webs, as well as commercial and recreational fisheries and indigenous people from Northern California to Alaska. DEQ should assess potential impacts to this species as a result of the dredge and fill operations proposed in ocean waters, Coos Bay, and coastal tributaries.

e. Lost River Sucker

The Lost River sucker is a federally listed endangered species that spawns in freshwater streams. The Pacific Connector Pipeline would cross the Lost River upstream of known spawning areas. The pipeline would also cross the Klamath River, another basin where Lost River suckers occur. The 2014 DEIS acknowledged that the project is likely to adversely affect Lost River sucker and

[134] Coos Watershed Association comments for Jordan Cove FERC/EIS under Docket #CP07-441-000, available at, http://elibraryferc.gov/idmws/file list.asp?accession num=20081204-5103.
[135] DEIS at 4-647.

its designated critical habitat due to injury or death during fish salvage or release of drilling muds from frac-out during HDD of the Klamath River.[136]

f. Shortnose Sucker

The Shortnose sucker is another endangered fish species whose populations have been severely impacted by dam construction, water diversions, overfishing, water quality problems, loss of riparian vegetation, and agricultural practices. Shortnose sucker critical habitat includes the Klamath River within the project area. The 2014 DEIS stated that the project is likely to adversely affect shortnose suckers for the same reasons that the Lost River sucker is likely to be adversely affected.[137]

g. Spencer Creek Redband Trout

Upper Klamath Basin redband trout are considered by the state of Oregon to be a "vulnerable" species, and are currently classified as "at risk" by the Oregon Department of Fish and Wildlife. Due to extensive dam building and habitat modification Spencer Creek is now the only known spawning area and source of juvenile recruitment in the upper Klamath River basin upstream of J.C. Boyle dam and is a highly productive spawning ground for the Lower Klamath population of redband trout who migrate to the Keno Reach of the Klamath River. Migratory and resident redband trout are known to use the mainstem of Spencer Creek and are also thought to use smaller tributaries including ephemeral streams (USFS 1995). Redband spawning in Spencer Creek is thought to occur from February through June and biologists have recorded counting in excess of 300 redds in Spencer Creek (Jacobs and Stacevich 2007). Given that Spencer Creek's dominant land uses to date (grazing and logging) have degraded the watershed so heavily that it is listed for sediment and temperature pollution, additional industrial degradation plus undetermined long-term impacts to water quality and hydrology will only bring more harm to Spencer Creek's spawning and juvenile redband trout who require cold, clear streams for successful recruitment and maturation.

2. High Quality Benthic Communities

Benthic organisms that are vital to the aquatic ecology of Coos Bay reside in high-quality, intertidal land that would be permanently altered by the proposed action. According to the DEIS:

> Prey species that are important for local EFH fish species rely on many of the same habitat conditions as the EFH fish species. The food web components including phytoplankton, zooplankton, detritus, epiphyton, and SAV (e.g., eelgrass, macrophytic algae) are all important in supplying the habitat and food base for EFH species within Coos Bay. For example, submerged grasses or SAV are important habitat for small prey species of adult lingcod (in Appendix B-2 of PFMC 2008). Forage items that are habitat

[136] DEIS at 4-650.

[137] DEIS at 4-652.

> components for the managed species do depend to some extent on estuarine systems. Many species of groundfish and salmonids occupy inshore areas of the lower bay during juvenile stages (e.g., Chinook salmon, coho salmon, English sole) where they feed on estuarine-dependent prey, including shrimp, small fishes, and crabs. As they mature and move offshore, their diets in many cases change to include fish, although estuarine dependent species (e.g., shrimp, crabs) can still constitute an important dietary component.…
>
> The proposed dredging would also directly remove benthic organisms (e.g., worms, clams, starfish, and vegetation) from the dredged area. Mobile organisms such as crabs, many shrimp, and fish could move away from the region during the process, although some could be entrained during dredging so that direct mortally or injury could occur. Based on 1978 maps of shellfish (Gaumer et al. 1978), shrimp, softshell clams, bentnose clams, and cockles are located within the intertidal areas near the slip and within proposed dredge areas (west of the Roseburg Forest Products Company site). ODFW captured Dungeness crab and red rock crab in this area during 2005 seining efforts. These species could be injured or killed during dredging operations.[138]

Dredging in Coos Bay would also degrade the habitat of the native mud shrimp. The shrimp are especially sensitive to the kind of disturbance caused by installing the pipeline through the bay. Mud shrimp are already impacted by an introduced parasitic isopod called *Orthione griffenis*.[139] Mud shrimp are filter feeders and filter as much as 80 percent of bay water every day.[140] As a result, degrading habitat for mud shrimp could further trigger reduced water quality in Coos Bay.

3. Marine Mammals and Sea Turtles

The LNG terminal and the tankers would harm marine mammals due to habitat destruction and vessel strikes. Far more actual strikes occur than are reported. DEQ must assess the impact of these strikes to individuals and populations. DEQ must fully understand the tanker route to Jordan Cove and the tanker routes in the Exclusive Economic Zone.

4. Invasive Species

Jordan Cove would introduce or allow the proliferation of invasive species to Coos Bay, the terminal site, and along the pipeline route. First, ships from foreign ports transport exotic species on multiple surfaces and in water releases from ballast or engine cooling water. These species may harm the aquatic ecosystem. Second, the removal of vegetation, and long-term disturbances at the site would allow the introduction and proliferation of exotic species, which would harm native ecosystems and may require herbicides and pesticides to manage. Third, a large swath of

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138 DEIS at 4.5-57 – 4.5-64.

139 Jolene Guzman, Invader kills off mud shrimp (February, 2009), available at http://theworldlink.com/news/local/invader-kills-off-mud-shrimp/article_fa08c2d9-47e95cb6-83d36bad07ec3bdf.html. (Guzman, 2009).

140 Eric Wagner, Mud Shrimp Meets Invasive Parasite, High Drama for Northwest Estuaries (2006), available at http://depts.washington.edu/nwst/issues/index.php?issueID=winter_2006&storyID=782. (Wagner, 2006).

clearing and ground disturbance across Oregon for the pipeline would create an ideal site for exotic species to thrive and harm native ecosystems, forestland, and farmland. These impacts would significantly affect fish, wildlife, and special aquatic sites. DEQ should fully analyze the direct, indirect, and cumulative impacts of exotic and invasive species from the construction and operation of the LNG terminal and related facilities and resulting conditions that are deleterious to aquatic life.

The proposed action would likely create many conditions that are deleterious to fish and/or other aquatic life, which is prohibited by OAR 340-041-0007(10). The applicants have failed to demonstrate that the proposed activities, the construction and operation of the terminal and pipeline, will not violate this narrative standard.

D. OAR 340-041-0007(13) Aesthetic conditions

Proposed activities, including but not limited to the removal of riparian vegetation that shades streams and construction of HDD crossings that may result in potential releases of drilling fluids through a frac-out will likely not comply with narrative criteria for aesthetic conditions. Under OAR 340-041-0007(13), "aesthetic conditions offensive to the human senses of sight, taste, smell, or touch may not be allowed." The applicants have failed to demonstrate that the proposed activities will not result in a violation of the aesthetic conditions narrative standard.

E. OAR 340-041-0011 Biocriteria Standard

OAR 340-041-0011 provides that "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." DEQ's regulations define "without changes in the resident biological community" to mean "no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region."[141] "Ecological integrity" means "the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat for the region."[142]

The Biocriteria standard is intended to assess total impact to a biological community, including multiple stressors and cumulative effects. In this way, the Biocriteria standards complement the other parameter-specific water quality standards. DEQ noted that the 2014 DEIS does not address whether the pipeline construction and operation activities will achieve compliance with the biocriteria standard.[143] As noted by ODFW, "despite modest changes to the project configuration . . . ODFW expects the impacts to fish and wildlife resources to remain largely the same."[144]

[141] OAR 340-041-0002.
[142] OAR 340-041-0002.
[143] State of Oregon 2015 DEIS comments at 60.
[144] State of Oregon Scoping comments at 11.

While the applicant suggests that all impacts would be temporary and localized, the significant re-shaping of Coos Bay and at least 485 waterway crossings from the pipeline, together with ongoing operations and related discharges, would result in permanent and/or chronic detrimental changes in the resident biological communities. The proposed activities would likely cause the following impacts that do not comply with the Biocriteria standard, including but not limited to:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage and long term soil compaction and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

The applicants have not demonstrated that the proposed activities will not violate the Biocriteria standard, and therefore DEQ must deny the 401 certification.

F. Conclusion

In conclusion, the applicants have not demonstrated that the proposed activities will not result in violations of Oregon's narrative water quality criteria. As a result, DEQ cannot certify that these projects will comply with Oregon's narrative criteria. Specifically, the applicants have failed to demonstrate that the project will not violate:

- OAR 340-041-0007(1) Highest and best practicable treatment and/or control of wastes, activities, and flows;
- OAR 340-041-0007(7) Road construction and maintenance;
- OAR 340-041-0007(10) Conditions deleterious to aquatic life;
- OAR 340-041-0007(13) Aesthetic conditions; and
- OAR 340-041-0011 Biocriteria Standard.

Without reasonable assurances that these narrative standards will not be violated, DEQ must deny the 401 certification.

VII. Waterbody-Specific Comments

A. Coos Bay

Coos Bay is the extensive estuary of the Coos River. Occupying approximately 20 square miles, the bay is the second largest drowned river valley on the Oregon Coast. Tidelands cover approximately 4,569 acres including 2,738 acres of tidal marsh and 1,400 acres of eelgrass beds. Its primary features include the main, expansive bay, an extensive arch of water around a peninsula, and major arms—South Slough, near the entrance of the bay, Jordan Cove, at the heart of the bay, and Haynes Inlet, which extends northeasterly from the main body of the bay.

The natural environment of the Coos estuary supports a diversity of plants and animals. The extensive shallow tidal flats provide habitat for shellfish as well as feeding and spawning habitat for many native fish. The Coos Bay supports a variety of beneficial uses as designated in the South Coast Basin as a whole.[145] These include fish and aquatic life, wildlife & hunting, fishing, boating, water contact recreation, aesthetic quality, and commercial navigation & transportation. Coos Bay is central to Oregon's commercial fishing industry, whose economic contribution is equivalent to about 10,000 jobs. Economic contributions from commercial fishing go beyond harvesting and seafood-processing, and include visitors and tourism, boat building and gear manufacturing, safety, research and education.[146] Recreational fisheries, including shellfish harvest and crabbing, are also important resources in Coos Bay. Several of the most important shellfish beds are located in close proximity to the LNG transit route along the edge of the North Spit (western side of lower Coos Bay).

Both Coos Bay and the Coos River are water quality impaired for different pollutants, including but not limited to temperature, sedimentation, and toxics such as lead.

Table 3. 303(d) Listings for Streams Crossed by Pacific Connector Pipeline in the South Coast Basin – Coos Subbasin[147]

Waterbody Crossed by Pipeline	Dissolved Oxygen	Habitat Modification	Temperature	Biological Criteria	Sedimentation	Toxics (e.g. lead, nickel, tributylin)
Coos Bay					X	X
Coos River			X		X	

Coos Bay and the Coos River support salmonid species, including Oregon Coast coho (*Oncorhynchus kisutch*), winter steelhead (*Oncorhynchus mykiss irideus*), fall Chinook salmon (*Oncorhynchus tshawytscha*), and coastal cutthroat trout (*Oncorhynchus clarki clarki*).[148] Coos Bay and the Coos River support ESA-listed species, including but not limited to Oregon Coast coho and green sturgeon.

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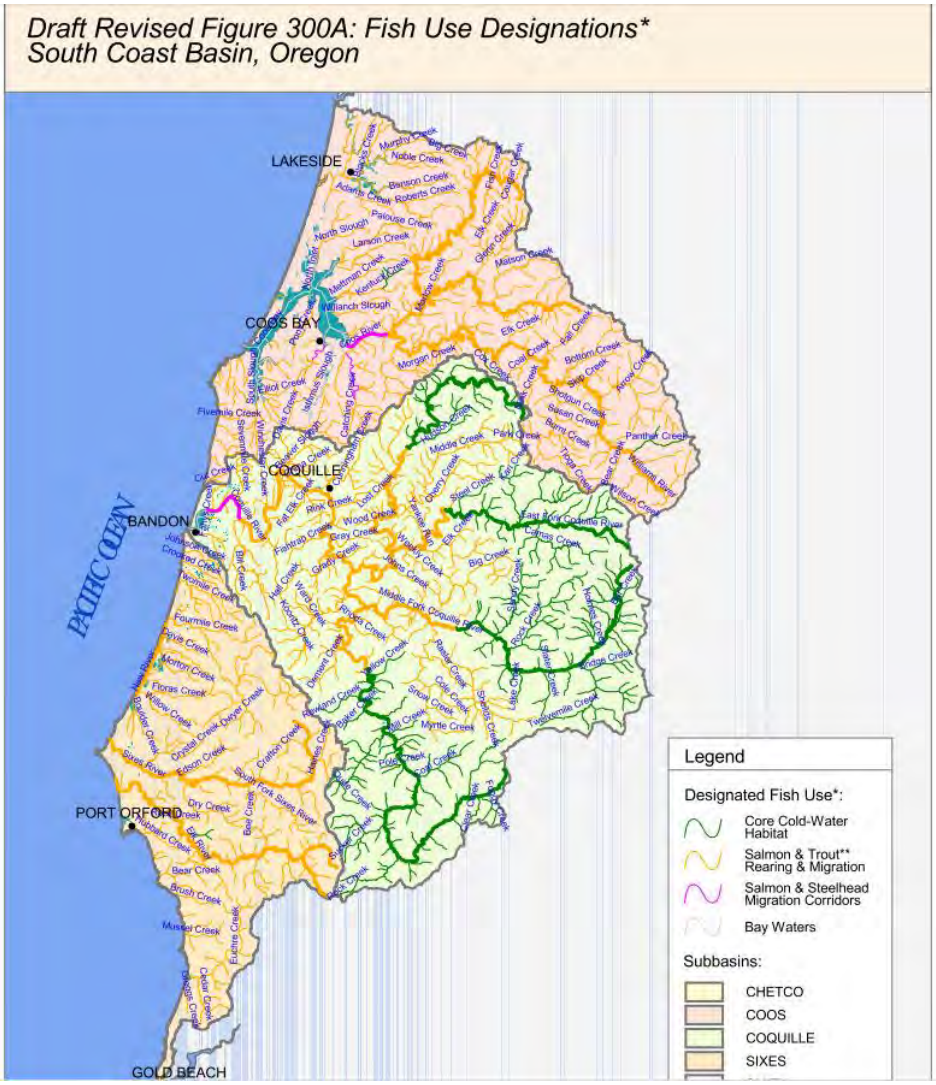
[145] *See* Table 300A (OAR 340-041-0300).

[146] *See* Oregon Commercial Fishing Industry Year 2016 Economic Activity Summary at 5 (April 2017).

[147] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

[148] Salmonids in the Lower Coos Watershed. Partnership for Coastal Watersheds. http://www.partnershipforcoastalwatersheds.org/salmonids-in-the-lower-coos-watershed/.



OAR 340-041-0101 to 340-041-0340: Figure 300A Fish Use Designations, South Coast Basin.

The applicant suggests that any reduction in water quality would be outweighed by the necessity of the proposed action pursuant to OAR 340-041-0004(9)(a)(B). To the contrary, the Department should conclude that the project would violate Oregon's Antidegradation Policy because the project would further degrade water quality in Coos Bay and the exceptions to the policy have not been met.

The purpose of the terminal is to provide natural gas to Asian markets.[149] A myriad of alternatives are available to accomplish this purpose. The primary flaw with the applicant's alternatives arguments is Jordan Cove/Pacific Connector's contention that the projects must be located in Southern Oregon to meet the project's needs. According to Oregon's Department of State Lands ("DSL"), the project has failed to demonstrate that the proposed terminal and pipeline are necessary in Oregon:

[149] Note that the applicant no longer suggests that any U.S. markets are intended to receive its products. *See* RR1 at 2.

> Per OAR 141-085-0029(3), "the Department must determine that the proposed removal fill activity will not be inconsistent with the protection, conservation and best use of the water resources of this state, and would not reasonably interfere with the paramount public policy of this state to preserve the use of its waters for navigation, fish and public recreation." If Oregon were not a target market, why would it need to come through this state and impact its waters, forests and agricultural lands?[150]

This comment is even more telling now that the project has been converted to an export facility, with no demonstrated intention of serving Oregon markets. Not only is the project not a demonstrated necessity for Oregon, but the JPA's approach to the siting of the Jordan Cove/Pacific Connector project unduly ruled out other gas supply alternatives by defining the purpose so narrowly as to prevent alternatives from meeting that purpose. *See* section 1.1 *supra*. As a result, other possible alternative locations have not been adequately analyzed to demonstrate that the proposed project location will have the least adverse impact on the aquatic ecosystem. The applicant has not met their burden to show less damaging alternatives are not practicable.

The purpose of the project does not serve Oregon's interest, and the environmental costs far outweigh the speculative benefits of the project. For example, the project will negatively impact Coos Bay's commercial and recreational fisheries. Important shellfish beds and crabbing areas will be impacted not only by proposed dredging, but also by operation of the LNG vessels and their "safety zones" that will require other vessels including those engaged in crabbing activities to vacate the waterway during transit times.

As discussed in Sections II-VI, the applicants have failed to demonstrate that the project will not violate state water quality standards. The proposed activities related to identified stream crossings in the Coos watershed will likely:

- Violate Oregon's anti-degradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels, and by further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;
- Violate Oregon's statewide narrative criteria by creating conditions deleterious to aquatic species, including but not limited to threatened and endangered species (e.g. Oregon Coast coho, green sturgeon);
- Violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;

[150] State of Oregon 2009 FEIS comments at 15, DSL section, May 29, 2009.

- Violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the South Coast Basin.

The applicants have failed to provide reasonable assurances that water quality standards will not be violated, and therefore DEQ must deny certification.

1. Pipeline Construction

a. Stream Crossings

All of the stream crossings proposed for the Coos Subbasin would use a dry open-cut method, except for the two HDD crossings proposed for Coos Bay and the HDD crossing proposed for the Coos River. In order for DEQ to effectively determine the direct, indirect, and cumulative impacts of these crossings, the applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. However, the JPA does not include such site-specific analysis. DEQ should consider the assessment of the New York Department of Environmental Conservation ("NYSDEC"), which denied 401 certification due to a LNG pipeline applicant's failure to provide site-specific analysis of each stream crossing.[151] In NYSDEC's assessment, the agency denied 401 certification for the Constitution Pipeline in part because:

> Without a site-specific analysis of the potential for vertical movement of each steam crossing to justify a burial depth, NYSDEC is unable to determine whether the depth of pipe is protective of State water quality standards and applicable State statutes and standards. In addition to impacts to water quality described above and without proper site-specific evaluations, future high flow events could expose the pipeline, resulting in risks to the health, safety, and welfare of the people of New York State. Pipe exposure would require more extensive stabilization measures and in stream disturbances resulting in addition degradation to environmental quality. We note that flooding conditions from extreme precipitation events are projected to increase on the operational span of the pipeline due to climate change.[152]

Without comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, DEQ cannot certify that the project will comply with state water quality standards.

In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings cut through waterbodies that are

[151] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

[152] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

already impaired for sedimentation. Channel modifications that increase sedimentation can decrease the depth and frequency of pools, which decreases the assimilative capacity for thermal loading of a stream.[153] Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat. As a result, DEQ cannot certify that the proposed activities will not result in violations of water quality standards.

b. Coos Bay HDD Crossings

The applicants propose to install the 36-inch pipeline across Coos Bay using two horizontal directional drills (HDD) of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after rejecting the use of HDD for the Coos Bay crossing.

In evaluating geotechnical feasibility of using HDD for the Coos Bay crossing in 2006, the applicant's engineer described challenges for the crossing: "The length, diameter, and geometry of the crossing approach the limits of successfully completed HDD crossings…In our opinion, the geometric and mechanical requirements for this crossing reduce the potential for successfully completing the crossing." The applicant's engineer concluded, "[a] crossing of this magnitude would not be considered routine and the potential for failure would be substantial."[154] The HDD crossing of Haynes Inlet was determined "non-feasible" due to cumulative effects of the geotechnical conditions, construction capabilities, and workspace constraints.[155] *See* Appendix 2.

As part of that geotechnical evaluation, the engineers completed six borings to depths of up to 110 feet below existing ground surface elevation to review subsurface soil and groundwater conditions. One of those test bores, HIB-2, was described as follows:

> The soils encountered in boring HIB-2 consisted of approximately 28 feet of very loose to medium dense sand overlying dense to very dense sand to the bottom of the boring at 90 feet. After leaving the boring overnight, the drillers discovered the borehole collapsed with approximately 80 feet of drill rod in the hole. The drill rod had to be abandoned in-place. ***This suggests a potential unstable sand condition in the area of the design profile***."[156]

According to the attached figure in Appendix 2, the location of HIB-2 is similar to the current proposed HDD alignment at the Jordan Cove/South Dunes location.

[153] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-20.
[154] Geoengineers Memorandum to Lori Dalton, Williams Northwest Pipeline (Nov. 15, 2006).
[155] PCGP ltr (June 1, 2010).
[156] Geoengineers Memo at 1 (2006) (emphasis added).

The currently proposed pipeline alignment would require not one but two HDD crossings of Coos Bay, for a total of over 14,000 feet. The consultants who performed the HDD Feasibility Analysis provided with the JPA (Part 2, Section 17, p. 87) did not perform any new borings, but instead relied existing subsurface and site survey information.[157] The 2017 GeoEngineers Memo describes the prior boring efforts, but entirely omits the discussion of the collapsed hole, abandoned drill rod, and potentially unstable condition. Omitting all this, and without any new data, the GeoEngineers now conclude HDD is feasible.[158] The analysis contains numerous assumptions that are unsupported by data. These include potential scour and other impacts in the vicinity of the rail bridge footings and crossings under the active navigation channel.

HDD crossings, even when successful, have impacts in areas adjacent to waters where staging and construction areas occur. HDDs also require the disposal of materials extracted from the drill hole. HDD attempts frequently fail, causing drastic impacts to water quality and fish habitat. In recent history, 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. Bentonite clay and sediment released through frac-outs can disrupt fish spawning habitat, increase turbidity, and potentially introduce other contaminants to impacted waterways. In addition, the prior DEIS states that drilling mud "can include additional additives specific to each drilling operation" and "Pacific Connector would approve any additive compounds" but does not disclose what these additives might include.[159] The State of Oregon has specifically requested a list of the additives used in drilling fluids and their potential effects on the aquatic environment.[160] The state re-iterated these comments yet again in its 2017 scoping comments to FERC.[161]

In 2015, DEQ noted that the DEIS fails to disclose and analyze the likelihood and frequency of frac-out events.[162] The State re-iterated these concerns in its 2017 scoping comments.[163] Without this information, DEQ cannot evaluate whether the project is likely to degrade water quality below state standards.

In the 2014 DEIS, FERC noted the high liquefaction and/or lateral spreading potential at Coos Bay:

> Pacific Connector would conduct numerical modeling for these sites prior to construction to estimate the magnitude of liquefaction-induced settlement and lateral spreading that would be expected during the design earthquake event. If the numerical modeling indicates that liquefaction settlement and/or lateral spreading would result in excessive pipe stress conditions, as analyzed by Pacific Connector, further mitigation design would be needed. Mitigation options may

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157 GeoEngineers Memorandum, Coos Bay West HDD Crossing (Sept. 14, 2017) at 2.
158 *Id.* at
159 2014 DEIS at 4-387.
160 2017 State of Oregon Scoping comments at 18.
161 State of Oregon 2017 Scoping comments at 18.
162 State of Oregon 2015 DEIS comments at 43 & 102.
163 State of Oregon 2017 Scoping comments at 15.

> include deeper burial below the liquefiable soils, thicker pipe and/or weighting the pipe with a concrete coating, if necessary. The primary mitigation measure being considered to address liquefaction risks is ground improvement. Potential ground improvement measures include vibroflotation, stone columns, compaction grouting, and deep dynamic compaction. Primary geotechnical factors involved in selecting the type of mitigation include: the depth of liquefiable soils, fines content, the potential for obstructions (i.e., buried logs), and the density of overburden soils over the liquefiable soils.
>
> Because the crossing of Coos Bay (Hayes Inlet) would have the greatest potential along the proposed route for liquefaction and lateral spreading in the event of an earthquake, Pacific Connector had a geotechnical consultant perform a site-specific analysis (GeoEngineers 2007a).
>
> Pacific Connector also identified other measures that would reduce potential impacts on its pipeline in Haynes Inlet from liquefaction and lateral spreading. The route within the bay would keep the pipeline away from the navigation channel slope. In addition, Pacific Connector would bury the pipeline 5 feet below the estuary bottom within Haynes Inlet and use thicker wall pipe and concrete coating.[164]

The prior route is noted as reducing risk because "The route within the bay would keep the pipeline away from the navigation channel slope." As noted above, the current route proposal would cross the navigation channel in not one but two places.

In its 2017 scoping comments, DOGAMI noted that "geologic hazard evaluations and proper mitigation of hazards are needed."[165] The State requested "a thorough geologic characterization of the project area and surrounding area and a comprehensive site-specific geologic hazard and geotechnical assessment . . . at the proposed facility and along the pipeline with supporting evidence to explain that the facility can be appropriately constructed and operated throughout its existence."[166] Without this information, DEQ cannot evaluate the impacts of the proposed project on water quality and special aquatic sites, and the applicant has not demonstrated that the project will comply with water quality standards.

i. Erosion and Scour

The applicant continues to rely on the geomorphic and scour report produced in 2007 (see data request response filed in the FERC docket on June 5, 2018 "Response to Staff Environmental Information Request Dated May 16, 2018." That report was based on an entirely different pipeline alignment proposed at that time. According to the report, the areas where the pipeline is now proposed are subject to risk of scour:

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[164] 2014 *DEIS at 4-264 to 4-265.*

[165] State of Oregon 2017 Scoping comments at 8.

[166] Id.

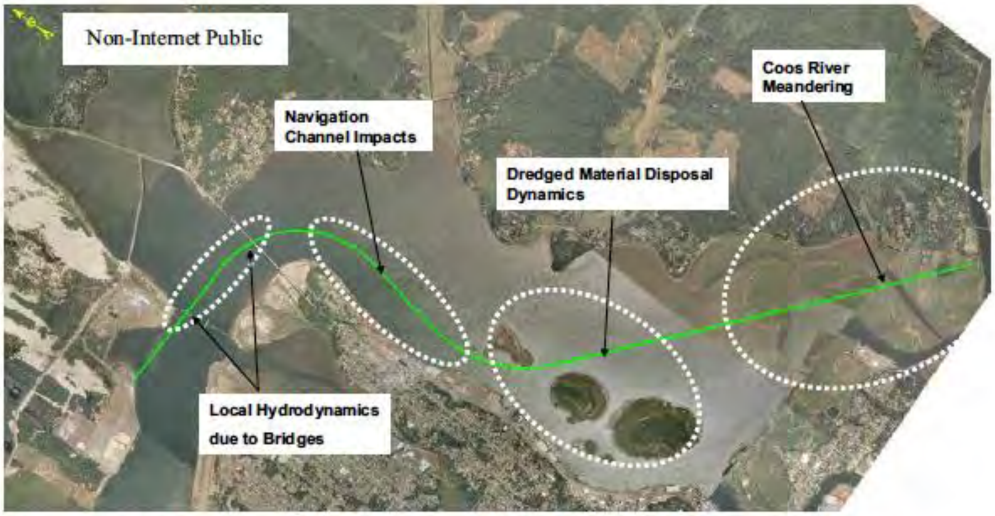

Figure 3-1. Areas in Upper Coos Bay Area with Potential for Morphological Changes and that Could Result in Bottom Scour

Excerpted from *Technical Report: Pacific Connector Gas Pipeline Project – Coos Bay Crossing Scour Evaluation*, 30 (Aug. 24, 2007).

The current proposed pipeline route would cross under the railroad bridge, navigation channel, and Coos River meandering areas of potential scour. The applicant fails to address these challenges or explain how the project will avoid adverse impacts from erosion and scour and the associated degradation of water quality.

c. Coos River HDD Crossing

In addition to the two HDD crossings proposed for Coos Bay, the applicants propose to use HDD technology to cross the Coos River at MP 11.13R. Due to the soft silts and clays located at the exit and entry points proposed for the Coos River crossing, the 2017 GeoEngineers report states:

> The hydraulic fracture and drilling fluid surface release model indicates the risk of drilling fluid surface release is high along the first approximately 250 feet of the drill path. The risk becomes low from the northern edge of the Coos River Highway and across Coos River to approximate station 17+00. The risk becomes high within approximately 150 feet of the exit point.[167]

Further, the 2017 GeoEngineers report in Table 4 establishes relative risk in terms of factor of safety from less than 1 (Very High Risk) to greater than 2 (Low Risk). The report cautions that the factors of safety “drop significantly,” in other words demonstrate an increased risk, when the HDD passes through certain soil types:

[167] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. ES-1. PCP Part 2 Appendix B. P. 1471.

> The factors of safety, however, drop significantly when the HDD passes through the fat clay, organic silt and clay, and shallow sandy silt units as shown in Figure 6 between Stations 4+00 (Entry) and 7+00 and 17+00 and 20+00 (Exit). Figure 6 also shows the factors of safety against hydraulic fracture generally decrease as the HDD progresses towards the exit point as the required drilling fluid pressure increases with length.[168]

The 2017 GeoEngineers report describes how HDD alignment through fat clay soils is "typically more challenging than in other non-cohesive soils" and the potential for hydraulic fracture and drilling fluid surface release increases dramatically.[169] The report further concludes that:

> It is our opinion that there is a relatively high risk of hydraulic fracture and drilling fluid surface releases along the first 500 feet and last 300 feet of the HDD, respectively.[170]

Additionally, the applicants do not provide adequate information regarding impacts to groundwater as a result of HDD. The September 2017 GeoEngineers report states:

> During our borings, we were not able to measure groundwater levels due to the presence of drilling fluid. However, based on the observed relative moisture content of the samples, and the locations and elevations of the borings relative to the Coos River, we estimate that groundwater was at or near the ground surface at the time of drilling. We anticipate that groundwater levels will fluctuate with precipitation, site utilization and other factors. During heavy prolonged precipitation, and probably during most of the winter months, we expect that groundwater will be near or at the surface of the site.[171]

The applicants provide very limited details regarding how potential sediment pollution as a result of developing the temporary work areas and other construction activities associated with the HDD crossing will be minimized:

> To reduce the potential for migration of sediment off site and into adjacent receiving waters during HDD operations, we recommend that state and local regulations be followed during and after construction operations. Proper BMP should be implemented in accordance with the PCGP Project's Erosion Control and Revegetation Plan (ECRP).[172]

[168] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 9. PCP Part 2 Appendix B. P. 1480.
[169] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 13. PCP Part 2 Appendix B. P. 1484.
[170] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 13. PCP Part 2 Appendix B. P. 1484.
[171] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 5. PCP Part 2 Appendix B. P. 1476.
[172] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 18. PCP Part 2 Appendix B. P. 1489.

DEQ should require additional information regarding the potential for a frac-out and BMPs to address sediment pollution from the applicants. Without this information, DEQ cannot certify that the proposed activities will not violate state water quality standards.

d. Removal of Riparian Vegetation

Construction of the pipeline would require removal of riparian vegetation across a wide construction easement, which would increase stream temperatures. Removal of riparian vegetation increases stream temperature by decreasing shade, which is particularly problematic for numerous streams within the Coos Subbasin that have salmon and steelhead spawning use, core cold water habitat use, salmon and trout rearing and migration use, or migration corridor use. Without specific information about baseline temperatures in streams where riparian vegetation would be removed, it is impossible to review potential violations of numerical temperature limits specified in OAR 340-041-0028(4).

Removing riparian vegetation, as proposed by the applicants, will likely impair water quality in violation of the Clean Water Act. Specifically, removal of riparian vegetation will both reduce shade and increase sedimentation. Increased sedimentation can impact interactions between surface water and groundwater by decreasing porosity in the hyporheic zone, resulting in reduced cool water inputs to streams. [173] Further, as stream temperature increases, dissolved oxygen levels decrease. Removing riparian vegetation also decreases Large Woody Debris that is an important component of stream morphology and habitat for aquatic species. Both the Coos River and Coos Bay are already impaired for temperature, sedimentation, and dissolved oxygen.

The Coos Subbasin supports habitat for threatened and endangered species listed under the ESA that are sensitive to temperature, sedimentation, and dissolved oxygen levels.

Based on the existing water quality impairments for temperature, sedimentation, and dissolved oxygen in the Coos Subbasin and the presence of ESA-listed species specifically threatened by increased temperature, decreased dissolved oxygen, and increased sedimentation as a result of removing riparian vegetation, DEQ cannot certify that the proposed activities will not violate water quality standards.

e. Roads

The applicants propose construction of temporary access roads (TARs) at 10 locations impacting 3.8 acres and construction of 15 permanent access roads (PARs) impacting 2.16 acres.[174] As the project continues to change throughout the public process, impacts to streams may be significantly altered as well. The applicants do not provide site-specific details to minimize impacts of temporary or permanent road construction to waterways beyond general descriptions of BMPs. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. DEQ

[173] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-20.

[174] Pacific Connector Pipeline Resource Report 1 General Project Description. p. 31, PCP Part 2 Appendix B 8 May 2018. p. 329.

cannot rely upon future analysis to determine now how construction of permanent or temporary roads will impact wetlands, streams, and rivers.

f. Hydrostatic Testing

The applicants propose to use the Coos Bay-North Bend Water Board as the source of hydrostatic testing water within the Coos Subbasin.[175] Water withdrawals from the Coos Subbasin for hydrostatic testing and other related uses should be carefully reviewed by DEQ to evaluate the direct, indirect, and cumulative impacts on water quality. The applicants provide minimal information regarding the source and discharge of hydrostatic testing water. Not only would these water withdrawal impact existing water rights, but reducing flows can also impair water quality, in violation of water quality standards.[176]

2. Terminal Construction

The construction of the terminal would degrade water quality in Coos Bay. The proposed project would violate Oregon's antidegradation policy by causing significant decreases in dissolved oxygen levels in Coos Bay. The proposed project would violate Oregon’s statewide narrative criteria by creating conditions deleterious to aquatic species, including Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*); by permanently converting 6.8 acres of highly productive intertidal habitat to low productivity deep-water habitat; by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation along Henderson Marsh and Coos Bay that is an essential component of the food chain for fish and aquatic life, among other impacts.

The proposed project would also violate Oregon’s water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 95-foot wide construction easement. The proposed project would violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations.

a. Extent and Impact of Channel Deepening Projects

Dredging has the potential to change the hydrodynamics of Coos Bay in the long-term. The application fails to evaluate the project in conjunction with other proposed dredging in Coos Bay. For instance, the Corps is considering a massive channel-deepening project for Coos Bay, and the State of Oregon commented that some level of channel deepening will be required to accommodate LNG tankers, particularly if the LNG terminal is allowed to use larger tankers in the future. The State of Oregon commented on the DEIS to FERC in 2008:

[175] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 58. PCP Part 2 Appendix B from DEQ 8 May 2018. P. 352.
[176] PUD No. 1 of Jefferson Cty v. Washington Dept. of Ecology. 511 U.S. 700 (1994). https://www.law.cornell.edu/supct/html/92-1911.ZO.html.

> Deepening of the existing federal navigation channel will be required to accommodate the vessels with capacities proposed to be received at the terminal. The significant volumes of material to be removed, the geomorphic adjustments to the bay and its tributaries precipitated by deepening the channel, and all the potential impacts to water quality and beneficial uses must be included in the analysis of dredging for this proposal, particularly with regard to projected ongoing maintenance dredging.[177]

Similarly, Oregon Department of Fish and Wildlife ("ODFW") noted that these issues were not adequately resolved in the 2009 FEIS:

> In the FEIS, [Jordan Cove is] only considering the dredging at the slip and access channel into the slip as part of this project. ODFW continues to have concern over the potential ecological effects of future dredging (down to -51 feet mean lower low water and channel widening from 300 to 600 feet, plus widening the jetty opening) that is proposed to occur to further use the Port's facility ("Oregon Gateway Terminal"), even though the JCEP tenancy is not portrayed as associated with that level of dredging. Changes to salinity, ocean water exchange, water temperatures, flood/ebb rates, etc. may be expected to occur with additional deepening of the channel. Predictive modeling should be conducted to ascertain the potential impacts to the estuarine ecology from the anticipated >10 feet of additional depth from the current situation.[178]

In its 2017 scoping comments, the State again raised concerns about the impacts of the channel modification, stating "ODFW believes the Pilots' Channel Modification Project is a connected action to the JCEP/PCGP project."[179]

The current JPA again fails to address issues related to channel deepening in Coos Bay. Without remedying addressing these deficiencies in the JPA, the 401 certification cannot be issued. DEQ must evaluate related and reasonably foreseeable channel deepening projects that might contribute to the impacts of the Jordan Cove project.

<u>i. Dredging Impacts in Coos Bay – Turbidity (OAR 340-041-0036)</u>

The resubmitted JPA includes the 2017 turbidity analysis, updated from the prior 2006 assessment. The analysis reports that turbidity plumes from dredging operations within NRIs will extend between 2,000 and 4,600 feet upstream and downstream beyond the dredging footprint,[180] with the largest plumes expected at NRI Dredge Area #4. Dredging at the south end of the Access Channel is likewise expected to generate a large plume "due to changes in hydrodynamic conditions."[181]

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[177] State of Oregon DEIS comments at 50, Dec. 4, 2008.
[178] State of Oregon FEIS comments at 37, ODFW section, May 29, 2009.
[179] State of Oregon 2017 scoping comments at 15.
[180] 2017 Turbidity Analysis at 18 (Table 5-1).
[181] Id.

The JPA does not provide an adequate analysis of dredging method alternatives and a clear indication of why the proposed methods will minimize impacts. The JPA indicates that both mechanical and hydraulic dredging may be used. Hydraulic pipeline dredging has the potential to impact aquatic species through entrainment and impingement. Other dredge methods will result in significant turbidity in Coos Bay. Although some specially designed hydraulic cutterhead dredges may reach 0.5 percent spillage, the JPA fails to disclose what kind of cutterhead dredge will be used for dredging. This is vitally important information for the public and the agencies to assess the veracity of the applicant's statements, because without knowing what type of cutterhead dredge will be used, the public cannot begin to evaluate what kind of sedimentation dredging activities will cause. Furthermore, any modeling conducted on behalf of the Project is suspect until a spillage rate can be determined. All cutterhead dredges are not the same. Studies indicate that conventional cutterhead dredging "can liberate considerable amounts of turbidity and associated contaminants to overlying water."[182]

ii. Dredging Impacts in Coos Bay – Dissolved Oxygen (OAR 340-041-0016)

OAR 340-041-0016 sets out the State's water quality standard for Dissolved Oxygen (DO). Dissolved oxygen is essential for maintaining aquatic life. Depletion of DO in waterways is a significant pollution problem, affecting fish and aquatic species in a variety of ways at different life stages and life processes. DO levels can be influenced by several factors including pH changes, temperature increases, groundwater inflow and hyporheic exchange, decaying material or algae blooms, and sedimentation.

The proposed action involves dredging that will decrease dissolved oxygen in Coos Bay because dredging increases the oxygen demand by disturbing sediments and releasing oxygen-demanding materials (decomposing organic materials contained within the sediments). As explained in the 2014 DEIS, "[r]esuspension of sediments during dredging operations can be a significant source of turbidity."[183] The applicant previously admitted that "the hydraulic cutterhead dredge to be used by Jordan Cove would generate TSS levels up to a maximum of 500 mg/l in the vicinity of the dredge" and "maintenance dredging may result in a turbidity plume for up to 1.9 miles from the dredging location at highest ebb or flood currents."[184] The applicants must prove that actual hydrodynamic conditions in Coos Bay would not result in a 0.1 mg/L decrease in dissolved oxygen levels caused by reduced circulation in the deeper channel.

b. Rock Dredging and Blasting Impacts in Coos Bay

The applicant proposes to modify the navigation channel through a series of "navigation reliability improvements" (NRIs) that include widening and deepening the channel at four points. According to the JPA, the total volume of material to be hydraulically dredged from these areas

[182] Cooke, 2005.
[183] 2014 DEIS at 4-360.
[184] 2014 DEIS at 4-361.

will be approximately 590,000 cy, and will be disposed of in upland confined sites at APCO Site 1 and APCO Site 2. The applicant proposes no mitigation at all for this dredging activity.[185]
The JPA documents indicate the presence of rock at Dredge Areas #1 and #2. Table 3-2 of the Dredged Material Management Plan ("DMMP") filed with the JPA states that in these two areas an estimated total volume of more than 505,000 cy of rock will be removed:

Table 3-2: Summary of Navigation Reliability Improvements Material Characterization (GRI 2011, 2016)

Dredging Location	Sand Volume (CY)	Rock Volume (CY)	Total Volume (CY)	Notes	Properties
1	4,300	345,900	350,200	Sand overlying soft sandstone within one to three feet of the upper sand layer at the mudline. Dredging of up to twenty feet of sandstone will be required.	Rock 633 to 1,200 psi UCS
2	24,600	159,400	18,400	Sand overlying Soft Siltstone / Sandstone. Dredging of up to twelve feet of siltstone/sandstone will be required.	Rock 633 to 1,120 psi UCS

The DMMP does not explain how this quantity of rock will be removed, other than to state that, "mechanical dredge might need to chisel the harder rock if the clamshell bucket is not heavy enough to break out the rock."[186] The applicant notes that hydraulic dredging is not appropriate for rock removal: "Hydraulic dredging is most efficient when working with fine materials and sands since they are easily held in suspension," yet suggests that at Dredging Areas #1 and #2 a "27-30 inch size hydraulic dredge (depending on available equipment on the West coast) is assumed to allow for sufficient cutter-head power for cutting into the rock."[187]

More importantly, the application fails to explain how the dredging will remove harder rock in the vicinity of Guano Rock. Specifically, the DMMP states:

> "The rock near Guano Rock is relatively hard, but the extent of this harder rock is limited and *largely* outside of the footprint of the navigation reliability improvements."[188]

[185] JPA Attachment 1.A at 12-13.
[186] DMMP at 30.
[187] *Id*. at 31.
[188] *Id*. at 40 (emphasis added).

This indicates that the harder rock is at least partially within the footprint of the NRIs. Yet nothing in the application explains how this harder rock will be removed, whether through blasting or other methods. Blasting can have significant impacts on marine organisms from plants to fish to marine mammals, and would need to be thoroughly evaluated, including evaluation of alternatives and mitigation, before the Corps or the State could approve this proposal.

Similarly, the JPA fails to explain how rock discovered in Borehole #B15 within Dredge Area #3 would be removed. The DMMP acknowledges that the borehole indicates rock within the dredge depth at Dredge Area #3, but states that the material is primarily sand.[189] Even if the material is primarily sand, the applicant must explain how the rock would be removed and evaluate those impacts and alternatives.

c. Impacts to Biological Criteria

OAR 340-041-0011 provides that "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." DEQ's regulations define "without changes in the resident biological community" to mean "no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region."[190] "Ecological integrity" means "the summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat for the region."[191]

The Biocriteria standard is intended to assess total impact to a biological community, including multiple stressors and cumulative effects. In this way, the Biocriteria standards complement the other parameter-specific water quality standards. In 2015, DEQ noted that the DEIS does not address whether the terminal construction and operation activities will achieve compliance with the biocriteria standard.[192] As noted by ODFW, "despite modest changes to the project configuration . . . ODFW expects the impacts to fish and wildlife resources to remain largely the same."[193]

While the applicant suggests that all impacts will be temporary and localized, the significant re-shaping of the bay, together with ongoing operations and related discharges, will likely result in permanent and/or chronic detrimental changes in the resident biological communities.

d. Impacts from Construction Noise

Increased noise from LNG ship traffic creates conditions that are deleterious to fish or other aquatic life.[194] The noise emitted from LNG ships is above the NMFS's noise threshold for

[189] DMMP at 40.
[190] OAR 340-041-0002.
[191] *Id.*
[192] State of Oregon 2015 DEIS comments at 60.
[193] State of Oregon 2017 Scoping comments at 11.
[194] OAR 340-041-0007(10).

physical harm to fish. LNG ships are considered cargo vessels and cargo vessels are known to emit high levels of low frequency sound (6.8 to 7.7 hertz (Hz) at 181 to 190 dB, re: 1 μPa) capable of traveling long distances (Richardson et al., 1995).[195] The NMFS' current noise thresholds for fish are a peak pressure of 180 dB re: 1 μPa for physical harm and an impulse pressure, or root mean square (rms), of 150 dBrms re: 1 μPa for behavioral disruption. Noise from LNG vessels can adversely affect whale behavior.

In addition, noise from construction of the marine slip (including pile driving) may adversely impact pinnipeds. Jordan Cove would install 112 steel piles for the LNG vessel berth on the east side of the marine slip. This pile driving could exceed NMFS noise criteria and cause adverse impacts to pinnipeds.

3. Operation of Terminal

The applicants have failed to provide reasonable assurances that operation of the terminal will not result in violations of water quality standards in Coos Bay. Operation of the terminal will likely violate Oregon water quality standards by entraining and killing fish as LNG vessels uptake millions of gallons of engine cooling water; by discharging heated cooling water above ambient temperatures into Coos Bay; by killing and injuring aquatic life through ship-animal collisions (vessel strikes) and beaching (stranding) of animals in the vessels' wakes.

a. Temperature Impacts from Operation of Terminal (OAR 340-041-0028)

Jordan Cove states that water will be discharged from engine cooling at 3 degrees C (5.4 degrees F) above ambient water temperatures.[196] Modeling of mixing zones and dissipation of water temperature increases were likewise based on this assumed 3 degrees increase. However, Jordan Cove did not provide any information regarding the source of this assumed temperature of cooling water. Nothing in the JPA or FERC filings appears to support the assertion that engine cooling water will be only 3 degrees C higher than the average ambient Coos Bay water temperatures of 50 degrees F. In fact, FERC's FEIS for the Bradwood LNG Project states that "cooling water discharged from a 150,000 m^3 steam powered LNG carrier could initially be 19.4 ^{o}F higher than ambient water temperatures" as compared to seasonally ranging ambient temperatures in the Columbia River of 42 to 68 ^{o}F.[197] Oregon LNG, also proposed for the Columbia River, estimated that "according to industry sources, the water taken for cooling the vessel's machinery is warmed by 6 to 9 degrees Celsius at the point of discharge" and that the average for diesel-powered LNG vessels would be 8.9 ^{o}C above ambient water temperatures.[198] And according to EPA, cooling water can reach high temperatures with the "thermal difference between seawater intake and discharge typically ranging from 5 ^{o}C to 25 ^{o}C, with maximum temperatures reaching 140 ^{o}C."[199] Given these widely varying ranges of cooling water discharge

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195 *See* Bradwood Landing LNG Terminal DEIS at 4-224.

196 JPA, Resource Report 2 at 27. See also Cooling Water Discharge memo.

197 Bradwood LNG Project FEIS at 4-85 (2008).

198 Oregon LNG, CH2MHill Technical Memorandum, Appendix F Cooling Water Discharge Analysis, at 2 (Sept. 10, 2008).

199 EPA, *Final 2013 Vessel General Permit Fact Sheet* at 133.

temperatures, DEQ should at the very least require Jordan Cove to provide a worst case analysis of temperature increases from diesel and steam powered vessels. DEQ should also require that the applicants provide an accurate number of shipments that would occur using 148,000 cubic meter ships (the maximum size that would be allowed to transit Coos Bay) to export the full proposed natural gas export amounts (0.9 Bcf/d according to FERC, 1.2 Bcf/d according to DOE, 1.55 Bcf/d according to NEB and DOE).

b. Entrainment of Fish by LNG Vessels (OAR 340-041-0007)

The LNG vessels that would dock in the new marine slip under the proposed action would take in large amounts of bay water from the slip to cool vessel engines. Jordan Cove estimates that a 148,000 m^3 LNG vessel would take in approximately 6.1 million gallons of water for engine cooling while at the dock.[200] Jordan Cove is not proposing any additional screening system other than that already employed on LNG vessels. The screens would not meet NMFS (1997a) screening criteria for juvenile salmonids.[201] As a result, fish at least up to fry and possibly larger juvenile salmonids, smaller marine and estuarine fish, juvenile stages of crab and shrimp, and other zooplankton and eggs and larvae fish could be entrained. The 2014 DEIS acknowledged that a high portion of juvenile larval stages of fish and invertebrates entrained or impinged would suffer mortality.[202] Nevertheless, the DEIS concludes that entrainment impacts are minimal because "natural mortality of these early life stages is extremely high."[203] The JPA similarly asserts that "percentages of entrainment and entrapment [ ] will not be much greater than natural levels of mortality for invertebrate larval stages in Coos Bay."[204] In other words, because many juvenile and larval aquatic organisms die, the additional mortality caused by entrainment is not significant. This logic flies in the face of standards for protection of water quality set forth in OAR 340-041-0007(10). Simply because juvenile fish already suffer high mortality, that is not sufficient to discount the additional mortality caused by entrainment in LNG vessels via cooling water uptake. Furthermore, the JPA fails to explain how the data regarding overall juvenile fish mortality is relevant to the specific conditions of Coos Bay and its ESA and EFH species and benthic communities.

In addition, the applicant states that the overall abundance of organisms in the slip will be relatively low compared to the main channel. NMFS previously rejected this assumption:

> The NMFS knows of no literature to support this assumption. In fact, it is more likely that the abundance of organisms, including OC Coho salmon juveniles and southern DPS green sturgeon, especially smaller life stages, may be greater in the slip area as they use it for refuge from the higher velocities of the main channel. Secondly, the FERC analysis minimizes the potential for effects to resources based on the percentage of Coos Bay water that will be taken aboard ships. The analysis incorrectly assumes that resources are evenly distributed throughout the

200 2014 DEIS at 4-572.
201 *Id*.
202 2014 DEIS at 4-573.
203 *Id*.
204 JPA, Attachment A.2: Cumulative Impacts Analysis at 28-29.

bay. Provide an effects analysis that incorporates the likely heterogeneity of resources in the estuarine environment.[205]

The unnecessarily high levels entrainment of fish and other aquatic life in engine cooling water for LNG vessels is, within the meaning of OAR 340-041-0007(10), a condition deleterious to fish or other aquatic life that may not be allowed.

The JPA fails to present a comprehensive description of alternative fish screen designs and their impacts. The current proposal appears to dismiss fish screening, totally ignoring ODFW's prior comments stating, the "Coast Guard's concerns should not be interpreted to mean that ballast and cooling water screening cannot occur. Screening can and should occur to reduce negative impacts to fish as a result of this project. Additional marine industry review and permitting may be necessary, but this has not eliminated the opportunity to develop and use fish screens."[206] The JPA should evaluate clearly fish screen alternatives and the impacts of the proposed screening alternative, which would negatively impact ESA protected Coho salmon.

c. Strikes and Strandings by LNG Vessels

Approximately 110 to 120 LNG tankers will dock at Jordan Cove each year. Movement of these massive vessels will injure fish and aquatic life by ship-animal collisions (vessel strikes) and beaching (stranding) of animals in the vessels' wakes. Wake stranding will likely increase greatly due to the additional deep draft ships. Further, turning of the LNG tankers with high thrust tugs will increase wake stranding and disorientation of salmon.

The Vessel Wake Impacts Analysis demonstrates that tugs will generate wakes of about 0.6 to 0.8 feet at the shoreline, with greater impacts on the right back than the left.[207] The right bank is more prone to wake impacts, as it is includes important shellfish and crabbing areas.
The killing and injuring of whales, leatherback sea turtles, harbor seals and fish caused by strikes with vessels or wake stranding, is, within the meaning of OAR 340-041-0007(10), a condition deleterious to fish or other aquatic life that may not be allowed.

d. Exotic and Invasive Species

Jordan Cove will likely introduce or allow the proliferation of invasive species to Coos Bay, the terminal site, and along the pipeline route. First, ships from foreign ports will transport exotic species on multiple surfaces and in water releases from ballast or engine cooling water. These species may harm the aquatic ecosystem. Second, the removal of vegetation, and long-term disturbances at the site will allow the introduction and proliferation of exotic species, which will harm native ecosystems and may require herbicides and pesticides to manage. Third, a large swath of clearing and ground disturbance across Oregon for the pipeline will create an ideal site for exotic species to thrive and harm native ecosystems, forestland, and farmland. These impacts will significantly affect fish, wildlife, and special aquatic sites.

[205] NMFS 2008 DEIS comments at 2.
[206] State of Oregon 2009 FEIS comments at 37.
[207] Vessel Wake Impacts memorandum at 16.

B. South Coast Basin – Coquille Subbasin

The South Coast Basin stretches across 1.9 million acres and consists of the Coos, Coquille, Sixes, Chetco, and part of the Smith subbasins.[208] The proposed pipeline route would cross through the Coos and Coquille subbasins. Impacts to the Coos subbasin are discussed above. The Coquille subbasin drains 1,058 square miles and the Coquille is the longest river in the South Coast Basin.[209] Waterways in the Coquille subbasin are impaired for dissolved oxygen, sedimentation, temperature, habitat modification, and biological criteria. In 1994, DEQ established a TMDL for the Coquille River for dissolved oxygen.[210]

The applicants propose to cross multiple streams within the Coquille subbasin that are already impaired for multiple water quality parameters, including but not limited to dissolved oxygen, temperature, biological criteria, and sedimentation.

Table 4. 303(d) Listings for Streams Crossed by Pacific Connector Pipeline in the South Coast Basin – Coquille River Subbasin[211]

Waterbody Crossed by Pipeline	Dissolved Oxygen	Habitat Modification	Temperature	Biological Criteria	Sedimentation	Turbidity
Belieu Creek			X			
Big Creek		X	X		X	
Coquille River			X		X	X
East Fork Coquille River	X	X	X	X	X	
Elk Creek	X		X	X	X	
Middle Creek	X		X	X		
Middle Fork Coquille River	X	X	X		X	
North Fork Coquille River	X	X	X	X	X	X
Rock Creek	X	X	X	X	X	

The Coquille subbasin supports multiple native fish species, including coho salmon, winter steelhead, fall chinook, spring chinook, coastal cutthroat trout, rainbow trout, and green and white sturgeon.[212] The Oregon Coast coho ESU was listed as a threatened species under the ESA

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208 South Coast Basin Report. 2016. Oregon DEQ.

209 Coquille River & Estuary Water Quality Report. Total Maximum Daily Load Program. Oregon DEQ. March 1994. https://www.oregon.gov/deq/FilterDocs/scCoquilleRiverTMDL.pdf. P. 1.

210 Coquille River & Estuary Water Quality Report. Total Maximum Daily Load Program. Oregon DEQ. March 1994. https://www.oregon.gov/deq/FilterDocs/scCoquilleRiverTMDL.pdf. P. 3.

211 Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

212 "Chapter 2: The Coquille Fishery." Coquille Watershed Action Plan. 16 May 2003. https://www.coquillewatershed.org/wp-content/uploads/2016/02/CHAP2.pdf.

in 1998.[213] According to the Oregon Coast coho 2012 Recovery Plan, the primary threats to the species include reduced amount and complexity of habitat as well as degraded water quality.[214] The 2007 Coquille River Subbasin Plan specifically points to water quality impairments from sedimentation and temperature as threats to Oregon Coast coho:

> Excessive sedimentation from erosion in the watershed was identified as a potential cause for concern by the Soil and Water Conservation District (1983) and in the Preliminary Statewide Nonpoint Source Assessment (ODEQ 1988 in CWA 1997). Elevated turbidity and sediment loads in all zones can be attributed to the effects of soil disturbing activities such as management practices associated with road building, timber harvest, agriculture and active bank erosion above the head of tide.[215]

Further, the 2007 Coquille River Subbasin Plan also identifies temperature as an existing water quality impairment that threatens salmonids:

> Warm season water temperatures appear to be one of the most critical, potential limiting factors in the Coquille drainage: 21 out of the 25 303(d) listed stream segments are listed for temperature. In addition, elevated water temperatures work in concert with other limiting factors to exacerbate their impacts. Salmonids and some amphibians appear to be of the most temperature-sensitive species. Stream temperatures during the salmonid spawning, incubation and emergence life stages are desirable, but are elevated during the summer rearing life stage.[216]

Additionally, the North and South Forks of the Coquille River were identified as Tier 1 Key Watersheds under the Northwest Forest Plan that "serve as refuge areas critical for maintaining and recovering habitat for at-risk stocks of anadromous salmonids on federally administered land (CWA 1997)."[217]

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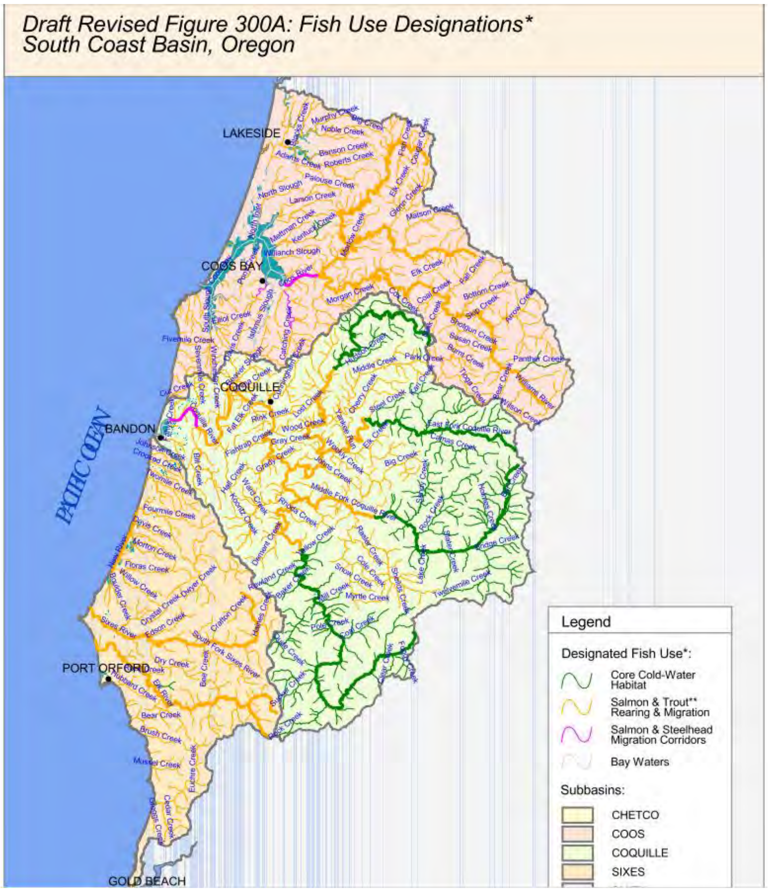
[213] Oregon Coast Coho Salmon Recovery Plan Summary. NOAA Fisheries. December 2016. http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/oregon_coast/oc_coho_plan_exec_summary_12_16.pdf.

[214] Oregon Coast Coho Salmon Recovery Plan Summary. NOAA Fisheries. December 2016. http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/oregon_coast/oc_coho_plan_exec_summary_12_16.pdf. P. 6.

[215] Coquille River Subbasin Plan. NOAA Fisheries. June 2007. https://www.coquillewatershed.org/wp-content/uploads/2017/01/CoquilleRiversub-basinplan.pdf. P. 29.

[216] Coquille River Subbasin Plan. NOAA Fisheries. June 2007. https://www.coquillewatershed.org/wp-content/uploads/2017/01/CoquilleRiversub-basinplan.pdf. P. 29.

[217] Coquille River Subbasin Plan. NOAA Fisheries. June 2007. https://www.coquillewatershed.org/wp-content/uploads/2017/01/CoquilleRiversub-basinplan.pdf. P. 18.



OAR 340-041-0101 to 340-041-0340: Figure 300A Fish Use Designations, South Coast Basin.

As discussed in Sections II-VI, the applicants have failed to provide reasonable assurances that state water quality standards will be met in the Coquille Subbasin. The proposed activities related to identified stream crossings in the Coquille Subbasin will likely:

- Violate Oregon's anti-degradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels, and by further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;
- Violate Oregon's statewide narrative criteria by creating conditions deleterious to aquatic species, including but not limited to threatened and endangered species (e.g. Oregon Coast coho, green sturgeon);
- Violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;
- Violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the South Coast Basin.

The applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards and, therefore, DEQ cannot certify that the project will be in compliance with the Clean Water Act.

1. Construction

Construction of the project within the Coquille Subbasin primarily consists of pipeline construction and related stream crossings, vegetation removal, and temporary or permanent road construction. All of the proposed activities within the Rogue Basin are likely to impair water quality and the applicants do not provide reasonable assurance that the proposed activities will not violate state water quality standards. Therefore, DEQ cannot certify that the project will comply with state water quality standards.

a. Stream Crossings

All of the proposed stream crossings within the Coquille Subbasin would use the dry open cut method. In order for DEQ to effectively determine the direct, indirect, and cumulative impacts of these crossings, the applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. However, the JPA does not include such site-specific analysis. DEQ should review the assessment of the New York Department of Environmental Conservation (DEC), which denied 401 certification due to the applicant's failure to provide site-specific analysis of each stream crossing.[218] Without comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, DEQ cannot certify that the project will comply with state water quality standards.

As demonstrated in the table below, the applicants identify seven stream crossings in the Coquille Subbasin as Level 1 (moderate) risk of channel migration, avulsion, and/or scour. Two stream crossings within the subbasin are identified as a Level 2 (high risk) of channel migration, avulsion, and/or scour (Middle Creek and South Fork Elk Creek).

Table 5. Moderate and High Risk Stream Crossings in the Coquille Subbasin

Waterbody crossed by pipeline	Level 1 (moderate) risk of channel migration, avulsion, and/or scour	Level 2 (high) risk of channel migration, avulsion, and/or scour
North Fork Coquille River (MP23.06)	X	
Middle Creek (MP 27.04)		X
Trib. To E Fork Coquille River (MP 28.86)	X	
East Fork Coquille River	X	
Elk Creek	X	
South Fork Elk Creek		X
Upper Rock Creek (MP 44.21)	X	

[218] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

Deep Creek (MP 48.27)	X	
Middle Fork Coquille River (MP 50.28)	X	

Although the applicants include some analysis of the open-cut method proposed for the North Fork Coquille River crossing, there is no site-specific analysis for Middle Creek or the South Fork of Elk Creek, which are both identified as high risk sites for channel migration, avulsion, and/or scour. DEQ cannot certify that the proposed activities will not violate water quality standards without this information.

In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings cut through waterbodies that are already impaired for sedimentation. Specifically, the North Fork of the Coquille, East Fork of the Coquille, Elk Creek, Middle Fork of the Coquille, and Rock Creek are all water quality limited for sedimentation and also have at least a moderate risk of channel migration, avulsion, and/or scour.

Channel modifications that increase sedimentation can decrease the depth and frequency of pools, which decreases the assimilative capacity for thermal loading of a stream. Elk Creek, East Fork of the Coquille, Middle Creek, Middle Fork Coquille River, North Fork Coquille River, and Rock Creek are all impaired for temperature.[219]

Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat. As a result, DEQ cannot certify that the proposed activities will not result in violations of water quality standards.

b. North Fork and East Fork Coquille River Crossings

The applicants provide limited additional detail regarding the North Fork and East Fork Coquille River crossings. As stated in the both plans for the North Fork and East Fork crossings, the applicants propose using either a flume or dam and pump crossing method.[220] Limited detail is provided regarding the methods proposed as well as methods to mitigate sediment pollution. No analysis is provided regarding potential impacts to water quality, including but limited to increased stream temperature as a result of removing riparian vegetation, increased sedimentation, decreased dissolved oxygen, or degraded habitat. As discussed previously, the applicants do not provide site-specific analysis for Middle Creek and South Fork Elk Creek, the two crossings within the Coquille Subbasin that were identified as a high risk for channel migration, avulsion, and/or scour. Both of these waterways are already water quality impaired for temperature and sedimentation.

c. Removal of Riparian Vegetation

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[219] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

[220] Site Specific Plan for Open Cutting The North Fork Coquille River. 9 June 2008. P. 1. Pacific Connector Pipeline. Appendix 2 Part B. 8 May 2018. P. 1325.

The proposed action would likely cause stream temperature increases by removing riparian vegetation across a wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use. Without specific information about baseline temperatures in streams where riparian vegetation would be removed, it is impossible to review potential violations of numerical temperature limits specified in OAR 340-041-0028(4).

Further, temperature and dissolved oxygen levels are closely related. The Coquille River already has a TMDL for dissolved oxygen. The proposed pipeline would cross the East Fork, Middle Fork, and North Fork of the Coquille which are impaired for dissolved oxygen, as well as Elk Creek, Middle Creek, and Rock Creek.

Riparian vegetation is critical to overall stream health and water quality. Removing riparian vegetation, as proposed by the applicants, will likely impair water quality in violation of the Clean Water Act. Not only will removing riparian vegetation likely increase water temperature, but it is also likely to result in increased sedimentation. Further, removal of riparian vegetation that results in increased sedimentation can impact interactions between surface water and groundwater, further impairing streams for temperature. Removing riparian vegetation also decreases Large Woody Debris that is an important component of stream morphology and habitat for aquatic species.

Not only is riparian vegetation critical for water quality, but removing riparian vegetation has direct, indirect, and cumulative impacts on threatened salmonids. Specifically, NOAA Fisheries identifies protection of stream buffers and riparian forests as a priority action to protect Oregon Coast coho in the Coquille subbasin:

> Improve timber management activities, including road management, by protecting riparian forests and providing stream buffers sufficient for OC coho salmon recovery through protection and enhancement of shade to reduce stream temperatures and improve water quality.[221]

DEQ cannot certify that the proposed activities will not violate water quality standards including but not limited to dissolved oxygen, temperature, sedimentation, and biological criteria.

d. Roads

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[221] 6.3.5 Strategies and Actions for the Mid-South Coast Stratum. ESA Recovery Plan for Oregon Coast Coho Salmon. NOAA Fisheries. http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/oregon_coast/final_mid-south_coast_stratum.pdf. P. 7.

The applicants propose construction of temporary access roads (TARs) at 10 locations impacting 3.8 acres and construction of 15 permanent access roads (PARs) impacting 2.16 acres.[222] Because the project continues to change throughout the public process, impacts to streams may be significantly altered as well. The applicants do not provide site-specific details to minimize impacts of temporary or permanent road construction to waterways beyond general descriptions of BMPs. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. DEQ should not rely upon later analysis to determine how construction of permanent or temporary roads will impact wetlands, streams, and rivers.

e. Hydrostatic Testing

Potential sources for hydrostatic testing water identified by the applicants within the Coquille Subbasin include the Coos Bay-North Bend Water Board, Kinnan Lake, and Looking Glass Olalla Water District. The applicants provide minimal information regarding the source and discharge of hydrostatic testing water. Not only would these water withdrawal impact existing water rights, but reducing flows can also impair water quality, in violation of water quality standards.[223] Water withdrawals from the Coquille Subbasin for hydrostatic testing and other related uses should be carefully reviewed by DEQ to evaluate the direct, indirect, and cumulative impacts on water quality.

C. Umpqua Basin

The South Umpqua fifth-field watershed is 141,575 acres and begins at the confluence of the South Umpqua River and Elk Creek and flows 28 miles to the confluence with Cow Creek.[224] The proposed pipeline would enter the South Umpqua watershed with a crossing at Olalla Creek-Lookingglass Creek at pipeline milepost 55.9 and cross approximately 85 streams until leaving the watershed with a crossing of Upper Cow Creek.

The South Umpqua is impaired for temperature, dissolved oxygen, sediment/turbidity, and habitat modification.[225] These water quality parameters would be both directly and indirectly impacted by the proposed activities.

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[222] Pacific Connector Pipeline Resource Report 1 General Project Description. p. 31, PCP Part 2 Appendix B 8 May 2018. p. 329.

[223] PUD No. 1 of Jefferson Cty v. Washington Dept. of Ecology. 511 U.S. 700 (1994). https://www.law.cornell.edu/supct/html/92-1911.ZO.html.

[224] South Umpqua River Watershed. Institute for Natural Resources. Oregon State University. http://oregonexplorer.info/content/south-umpqua-river-watershed.

[225] Umpqua Basin Status Report and Action Plan. Oregon DEQ. 30 July 2014. https://www.oregon.gov/deq/FilterDocs/BasinlUmpquaAssess.pdf.

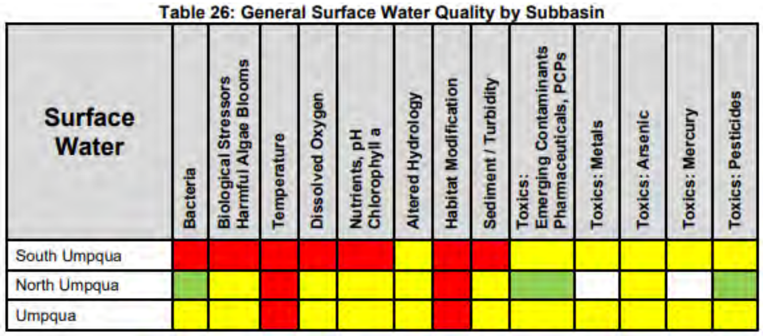


Table 26: General Surface Water Quality by Subbasin

Surface Water	Bacteria	Biological Stressors Harmful Algae Blooms	Temperature	Dissolved Oxygen	Nutrients, pH Chlorophyll a	Altered Hydrology	Habitat Modification	Sediment / Turbidity	Toxics: Emerging Contaminants Pharmaceuticals, PCPs	Toxics: Metals	Toxics: Arsenic	Toxics: Mercury	Toxics: Pesticides
South Umpqua													
North Umpqua													
Umpqua													

Umpqua Basin Status Report and Action Plan at 79.

The incomplete information provided by the applicants regarding waterways that may be impacted by the pipeline reveals at least 13 different waterways that are 303(d) listed for temperature, sedimentation, biological criteria, habitat modification, and dissolved oxygen within the South Umpqua watershed.[226] In addition to statewide numeric and narrative criteria, the Umpqua watershed has basin-specific water quality standards for turbidity, pH, and total dissolved solids.[227] DEQ should fully evaluate the potential for the proposed activities to violate these water quality standards.[228]

Table 6. 303(d) Listings for Streams Crossed by Pacific Connector Pipeline in the South Umpqua Watershed

Waterbody Crossed by Pipeline	Dissolved Oxygen	Habitat Modification	Temperature	Biological Criteria	Sedimentation
Bilger Creek	X				
Days Creek	X	X	X		
East Fork Cow Creek	X		X		
Fate Creek			X		
Kent Creek		X	X		
North Myrtle Creek	X	X	X	X	X
Olalla Creek			X	X	X
Rice Creek		X	X		
Saint John Creek			X		
Shields Creek				X	
South Myrtle Creek	X		X	X	X
South Umpqua River	X	X	X	X	X
Wood Creek	X		X		

[226] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.
[227] OAR 340-041-0326.
[228] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

Additionally, the project area within the South Umpqua watershed includes designated critical habitat for threatened Oregon Coast Coho listed under the ESA. The 2014 DEIS acknowledged that the project is likely to adversely affect Oregon Coast Coho and its critical habitat.[229] Fish use designations for the Umpqua, as identified by DEQ, include salmon and steelhead spawning, core coldwater habitat, and salmon and trout rearing and migration use. [230,231] The South Umpqua River is also designated as a Tier 1 Key Watershed under the Northwest Forest Plan. Key Watersheds serve as strongholds or potential strongholds for Oregon Coast coho. The Northwest Forest Plan states of Key Watersheds:

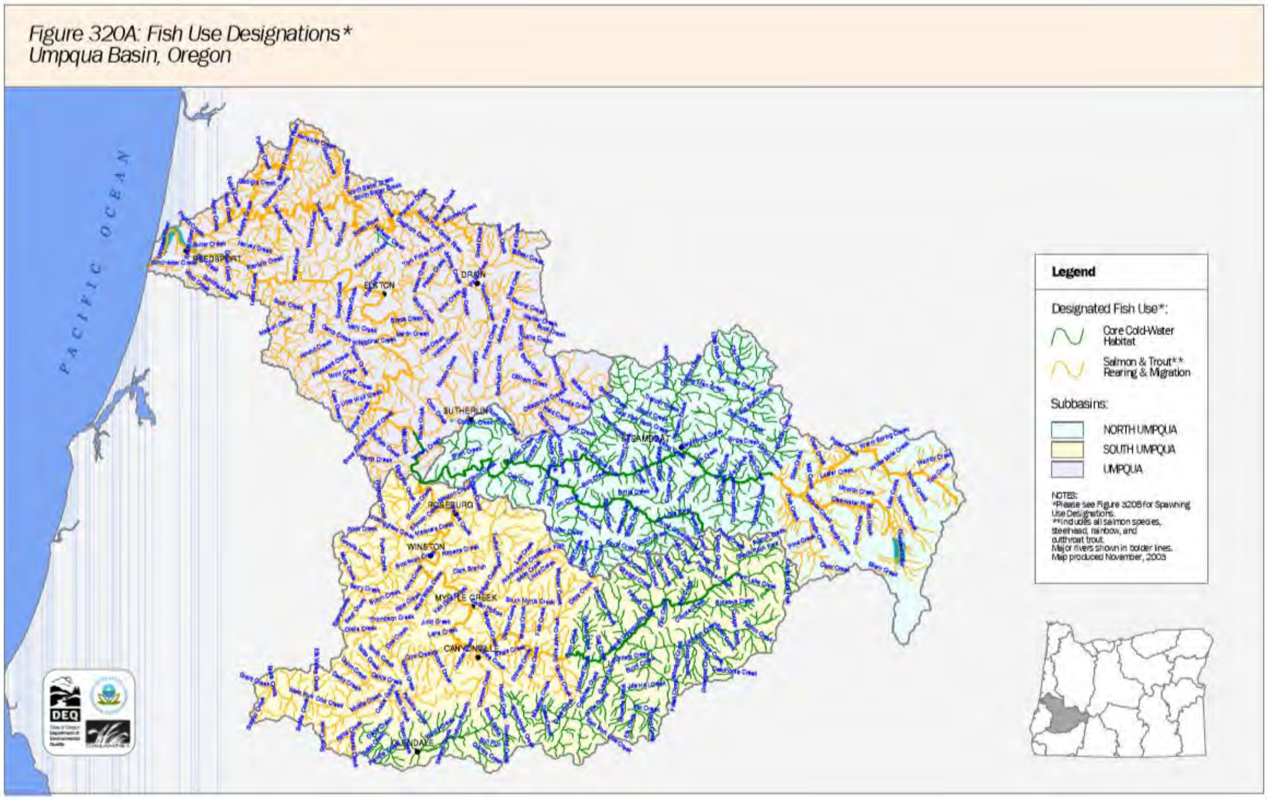
> Refugia are a cornerstone of most species conservation strategies. They are designated areas that either provide, or are expected to provide, high quality habitat. A system of Key Watersheds that serve as refugia is crucial for maintaining and recovering habitat for at-risk stock of anadromous salmonids and resident fish species. These refugia include areas of high quality habitat as well as areas of degraded habitat. Key Watersheds with high quality conditions will serve as anchors for the potential recovery of depressed stocks. Those of lower quality habitat will have a high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program.[232]

[229] DEIS at 4-644, 4645.

[230] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320A Fish Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320a.pdf.

[231] See Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320B Salmon and Steelhead Spawning Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320b.pdf

[232] Northwest Forest Plan at B-18.



OAR 340-041-0101 to 340-041-0340: Figure 320A Fish Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320a.pdf.

As discussed in Sections II-VI, the applicants have failed to provide reasonable assurances that the project will not violate state water quality standards in the Umpqua Basin. Proposed activities related to identified stream crossings in the Umpqua watershed will likely:

- Violate Oregon's anti-degradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels, and by further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;
- Violate Oregon's statewide narrative criteria by creating conditions deleterious to aquatic species, including Coho salmon (*Oncorhynchus kisutch*);
- Violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;
- Violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the Umpqua Basin.

The applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards and, therefore, DEQ cannot certify that the project will be in compliance with the Clean Water Act.

1. Construction

Construction of the project within the Umpqua watershed primarily consists of pipeline construction and related stream crossings, vegetation removal, and temporary or permanent road construction. All of the proposed activities within the Umpqua watershed are likely to impair water quality and the applicants do not provide reasonable assurance that the proposed activities will not violate state water quality standards. Therefore, DEQ cannot certify that the project will comply with state water quality standards.

a. Stream Crossings

The JPA provides multiple versions of tables and different total number of waterways crossings. Therefore, it is nearly impossible to comprehensively review the direct, indirect, and cumulative impacts of stream crossings without the mandatory minimum information required under OAR 340-048-0020(2). As of the 6 February 2018 JPA, the applicants identified 85 stream crossings within the South Umpqua watershed.[233] Of these identified stream crossings, nine were identified as Level 1 moderate risk of channel migration, avulsion, and/or scour and four were identified as Level 2 high risk. The applicants propose to use dry open cut technology for all of the identified stream crossings, except for the crossing of the South Umpqua River at milepost 71.27 using Direct Pipe technology.

The applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. However, the JPA does not include such site-specific analysis. DEQ should review the assessment of the New York Department of Environmental Conservation (DEC), which denied 401 certification for the Constitution Pipeline in part because the applicants failed to provide this site-specific analysis.[234] Without comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, DEQ cannot certify that the project will comply with state water quality standards.

Additionally, the applicants propose to cross streams that are already impaired for dissolved oxygen, habitat modification, temperature, biological criteria, and sedimentation. Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat.

b. South Umpqua River Crossings

[233] See Table A.2-2.

[234] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

Specific to the South Umpqua, the applicants propose to use Direct Pipe technology for the first crossing of the South Umpqua River near Milepost 71 concurrently with the crossing of I-5. The applicants then propose to cross the South Umpqua a second time at MP 94.73 near Milo using a diverted open-cut method. Direct Pipe technology is a new technology and, according to the applicants, "is still in its infancy with respect to construction and wide-spread adoption."[235] DEQ must closely evaluate the feasibility of this new technology and potential problems that may not be identified by the applicants.

Regarding the potential release of drilling fluid directly into the South Umpqua River, the applicants state:

> Fractures and voids in the rock, if encountered, could result in a loss of fluid (formational fluid loss) into the subsurface. The lost slurry or lubrication fluid could then potentially emerge at the ground surface or within the South Umpqua River and/or sensitive area as a slurry surface release. We believe the risk of formational fluid loss to be low to moderate. We judge the risk of slurry surface release resulting from formational fluid risk to be low, provided that the contractor responds rapidly and appropriately to unexpected changes in fluid pressures during mining.[236]

DEQ must fully evaluate whether the applicants' analysis of the potential pollution from Direct Pipe Technology discharged into the South Umpqua River provides reasonable assurance that state water quality standards for biological criteria, toxics, turbidity, and others will be met. This is even more important because the South Umpqua River is already water quality limited for dissolved oxygen, habitat modification, temperature, biological criteria, and sedimentation.[237]

According to the 2013 Umpqua Basin Report from DEQ:

> The South Umpqua River at HWY 42 (Winston) shows a decreasing trend in water quality. Temperature, bacteria, nutrients and fine sediment have been identified as pollutant stressors that affect fish and other aquatic life throughout the basin. TMDLs were approved by EPA for bacteria, temperature, algae/aquatic weeds, dissolved oxygen and pH for the Umpqua Basin in 2007.[238]

The use of a diverted open-cut method to cross the South Umpqua River combined with removal of riparian vegetation to create the 75-foot clear-cut buffer will likely result in increased temperature, increased sedimentation, and degraded habitat and biological conditions in violation of state water quality standards.

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[235] Appendix J.2 Direct Pipe Technology Overview Memo I-5/South Umpqua Direct Pipe Feasibility Evaluation. P. 3. 8 May 2018 JPA. PCP Part 2 Appendix B 8 May 2018 P. 1800.

[236] Appendix J.2 Direct Pipe Technology Overview Memo I-5/South Umpqua Direct Pipe Feasibility Evaluation. P. 8. 8 May 2018 JPA. PCP Part 2 Appendix B 8 May 2018 P. 1815.

[237] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

[238] Umpqua Basin Report. Oregon DEQ. 2 June 2013. P. 145.

c. Removal of Riparian Vegetation

The proposed action would cause stream temperature increases by removing riparian vegetation across a wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use. According to the FEIS:

> In response to requests from the USFS, Pacific Connector submitted the results of a water temperature impacts assessment for this project (North State Resources 2009). The assessment looked at 6 waterbody crossings that would occur on USFS managed lands. Five of the locations modeled occur in the Upper Umpqua River sub-basin; two on East Fork Cow Creek and three small tributaries to East Fork Cow Creek. The sixth modeled location was on the South Fork Little Butte Creek in the Upper Rogue River sub-basin. The analysis used two models to estimate instream temperature effects that would occur as a result of vegetation clearing for pipeline construction immediately after construction and after 5, 10, and 20 years based on conditions that could be expected on the hottest summer days. The conceptual model for the analysis assumed that for a given stream temperature at base flow, the main source of heat load is direct and indirect solar radiation and that effective shade from topographic features and vegetation is a dominant influence of stream temperatures regimes. The analysis is conservative in that it assumed a maximum amount of anticipated disturbance at each crossing based on 95-foot construction right-of-way, while Pacific Connector would actually reduce the construction right-of-way to 75 feet at stream crossings.
>
> Most of the streams that were modeled were small streams; three were tributaries to East Fork Cow Creek that are 3 feet wide or less with baseflows estimated at 0.9 cfs to practically zero. Two streams were between 5 and 6 feet wide with baseflows estimated between 0.18 and 0.48 cfs. The sixth stream, South Fork Little Butte Creek, is about 22 feet wide and has an estimated baseflow of 4.2 cfs. The results of the analysis indicated that the greatest effect would occur in the smallest and slowest waterbodies immediately following disturbance. *For the three smallest streams, the model predicted initial average temperature changes of 1.0° to 8.6° C (1.8° to 15.4° F).* The highest predicted increase (8.6° C) was in a very small drainage that is frequently dry in the summer, but occasionally has water present from phreatic groundwater and any water present infiltrates back into the ground shortly downstream of the proposed crossing location. Just as these very small waterbodies are modeled to warm quickly in response to clearing, they would likely also have rapid temperature reductions downstream of the affected reach; thus there would be no measurable effect on stream temperatures in East Fork Cow Creek. At the two modeled crossing locations on East Fork Cow Creek, the creek would be about 5 to 6 feet wide. Average Temperature changes in East Fork Cow Creek as a result of pipeline construction and maintenance were predicted to be up to 0.5° C (0.8°F) immediately following disturbance. The predicted temperature increase in the largest stream, 22 feet wide, was 0.1° C (0.1° F). All temperature impacts were predicted to decrease with time as vegetation returns to provide shade; with significant recovery occurring between 5 and 10 years following disturbance. Most of the values presented

> here are well below the uncertainty of the model (1 to 2°C). For comparison to the modeled crossings, about 62 percent of the perennial and intermittent dry open-cut stream crossings would occur on streams 10 feet wide or less.[239]

Commenting on the above results of the FEIS water temperature impacts assessment for this project, DEQ observed:

> Stream temperature increases were discussed in the FEIS on pages 4.3-42 through 4.345. The last paragraph on page 4.3-43 notes that for the smallest streams modeled 'predicted initial average temperature changes of 1.0 to 8.6 degrees C.' This is obvious stream heating and may be on streams with relatively steeper gradients than valley floor streams. The valley floor streams crossed might have slower times of travel and thus subjected to increase times of solar radiation.[240]

The applicants do not provide information about baseline temperatures in streams that would suffer removal of riparian vegetation and stream shading. Therefore, it is impossible to undertake a systematic analysis of the extent to which modeled increases in stream temperatures would cause violations of numerical temperature limits specified in OAR 340-041-0028(4). However, numerous stream segments that would be impacted by the proposed action already suffer high temperatures that violate state water quality standards. Of the identified waterways proposed to be crossed within the Umpqua watershed, all but two are impaired for temperature.[241] Therefore, any temperature increases in these streams attributable to the proposed action would result in exacerbations of existing violations of state water quality standards. The Ninth Circuit Court of Appeals recently made clear that new dischargers may not add a pollutant into a water body that is water quality limited.[242]

Additionally, removing riparian vegetation also decreases Large Woody Debris that is an important component of stream morphology and habitat for aquatic species.[243] As demonstrated in the map below from the South Umpqua River Watershed Assessment and Action Plan from 2003, streams that will be crossed by the pipeline are also in poor condition for Large Woody Debris. Specifically, Fate, Days, and Wood Creeks are in poor condition for Large Woody Debris.[244]

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239 FEIS at 4.3-43 (emphasis added)

240 State of Oregon FEIS comments at 24, DEQ Section (emphasis added).

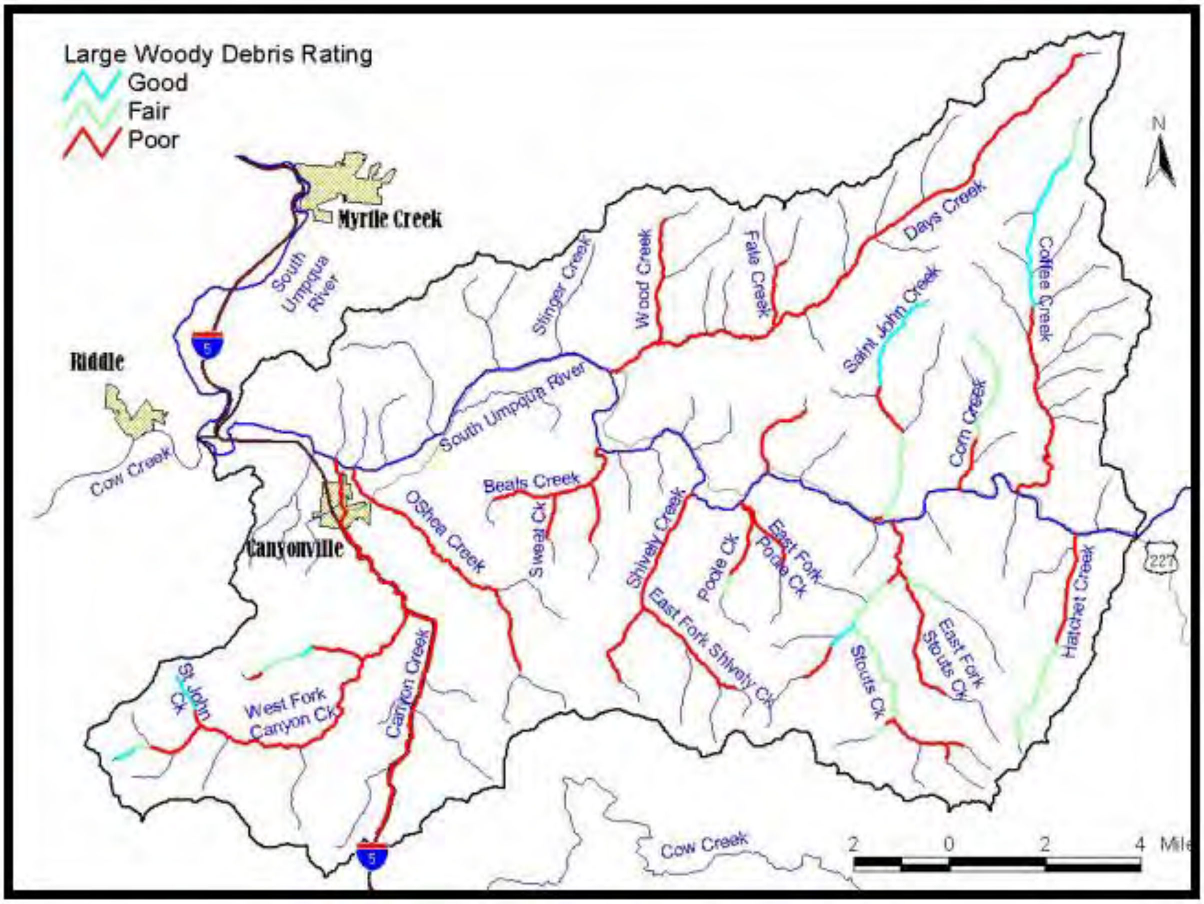
241 Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

242 See Friends of Pinto Creek v. United States Environmental Protection Agency, No. 05-70785, (9th Cir. Oct. 4, 2007).

243 Bisson, Peter A. et al. Large Woody Debris in Forested Streams in the Pacific Northwest: Past, Present, and Future. https://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub1316.pdf.

244 South Umpqua River Watershed Assessment and Action Plan. Umpqua Basin Watershed Council. 2003. Available https://nrimp.dfw.state.or.us/web%20stores/data%20libraries/files/Watershed%20Councils/Watershed%20Councils_280_DOC_South_Umpqua_RiverUBWC2003WSAssess.pdf.

South Umpqua River Watershed Assessment and Action Plan. Umpqua Basin Watershed Council. 2003.



d. Road Construction

According to the 8 May 2018 JPA materials, the applicants propose construction of temporary access roads ("TARs") at 10 locations impacting 3.8 acres and construction of 15 permanent access roads ("PARs") impacting 2.16 acres.[245] The applicants continue to amend this information as plans are changed and access roads relocated. As a result, impacts to fish-bearing and non-fish-bearing streams may be significantly altered as well. However, no site-specific details are provided to avoid and minimize impacts beyond general descriptions of Best Management Practices ("BMPs"), such as silt fences or straw bale sediment barriers. On steep slopes, particularly in rainy winter months, similar BMPs have failed in the past to prevent impacts to streams, creeks and ditches. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. State and federal agencies cannot defer until later analysis of how the project will impact wetlands, streams, and rivers.

[245] Pacific Connector Pipeline Resource Report 1 General Project Description. p. 31, PCP Part 2 Appendix B 8 May 2018. p. 329.

Particularly because the South Umpqua is a Key Watershed under the Northwest Forest Plan, it is even more important to have accurate information involving direct, indirect, and cumulative impacts regarding temporary and permanent roads. The Forest Plan directs that, "[t]he amount of existing system and nonsystem roads within Key Watersheds should be reduced through decommissioning of roads. Road closures with gates or barriers do not qualify as decommissioning or a reduction in road mileage."[246] By constructing roads in key watershed areas, the Pacific Connector will harm salmon habitat and water quality. The Forest Plan concludes: "The most important components of a watershed restoration program are control and prevention of road-related runoff and sediment production, restoration or the condition of riparian vegetation, and restoration of in-stream habitat complexity." Without adequate description of road construction activities and related impacts, the JPA fails to disclose impacts of road construction and modification, and fails to demonstrate how it meets the goals described in the Northwest Forest Plan.

Additionally, use of existing access roads does not mean that these roads are anywhere close to being ready for the proposed industrial use. Many of these are old, decrepit logging spurs or Off-Road Vehicle tracks, which would require significant construction to handle heavy equipment.

e. Hydrostatic Testing

The applicants provide minimal information regarding the source and discharge of hydrostatic testing water. As stated in Resource Report 1:

> Water for hydrostatic testing will be obtained from commercial or municipal sources or from surface water right owners (see Table 1.3-2). If water for hydrostatic testing is acquired from surface water sources, PCGP will obtain all necessary appropriations and withdrawal permits (see Appendix C.1). As required by ODFW, pumps used to withdraw surface water will be screened according to National Marine Fisheries Service screening criteria to prevent entrainment of aquatic species.[247]

In Table 1.3-2, the applicants identify four potential sources of hydrostatic testing water within the Umpqua Basin including the Ben Irving reservoir, Looking Glass Olalla Water District, and both crossings of the South Umpqua River. DEQ should fully evaluate the potential impact of water withdrawals from these sources within the context of existing water rights and the resulting consequences for water quality. Reducing flow by withdrawing water for hydrostatic testing has the potential to exacerbate water quality impairments. The South Umpqua River is already impaired for temperature, sedimentation, dissolved oxygen, biological criteria, and habitat modification. Olalla Creek is impaired for temperature, sedimentation, and biological criteria.[248]

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[246] Northwest Forest Plan at B-19.

[247] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 53. PCP Part 2 appendix B from DEQ 8 May 2018 p. 351.

[248] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

Table 1.3-2
Potential Hydrostatic Source Locations

County	MP	Source		Owner	Estimated Withdrawal Requirement *(Longest Test Segment Volume)*[1]
South Coast Basin - Coos Bay Frontal Pacific Ocean (1710030403) - Fifth Field Watershed					
Coos	0.00	Coos Bay - North Bend Water Board		Coos Bay - North Bend Water Board	4,999,228
South Coast Basin - M. F. Coquille River (1710030501) - Fifth Field Watershed					
Douglas	50.20	Water Impoundment	Kinnan Lake	5-J Limited Partnership, Donald R. Johnson 29080801300	3,315,584
Umpqua Basin - Olalla Creek-Lookingglass Creek (1710030212) - Fifth Field Watershed					
Douglas	55.90	Water Impoundment	Ben Irving Reservoir	Douglas County Public Works/ Looking Glass Olalla Water District/ Winston-Dillard Water District	3,316,584
Douglas	58.75	Looking Glass Olalla Water District (Olalla Creek Crossing)		Looking Glass Olalla Water District	3,316,584
Umpqua Basin - Clark Branch-South Umpqua River (1710030211) - Fifth Field Watershed					
Douglas	71.30	S. Umpqua River Crossing #1		Oregon Department of Water Resources	2,037,230
Umpqua Basin - Days Creek-South Umpqua River (1710030205) - Fifth Field Watershed					
Jackson	94.73	S. Umpqua River Crossing #2		Oregon Department of Water Resources	2,525,177
Rogue Basin - Shady Cove-Rogue River (1710030707) - Fifth Field Watershed					
Jackson	122.5	Rogue River Crossing		Oregon Department of Water Resources	1,951,591
Rogue Basin - Little Butte Creek (1710030708) - Fifth Field Watershed					
Jackson	133.38	Medford Aqueduct		Eagle Point Irrigation	2,256,357
Jackson	146.70	N. Fork Little Butte Creek Crossing		Medford Irrigation District/ Rogue River Valley Irrigation District	2,847,495
Jackson	161.40	Water Impoundment	Fish Lake		2,847,495
Klamath Basin - Fourmile Creek (1801020302) - Fifth Field Watershed					
Klamath	168.90	Water Impoundment	Lake Of The Woods National Forest Lake	United States (Rogue River-Siskiyou NF)	5,585,825

Table 1.3-2 Potential Hydrostatic Source Locations. Pacific Connector Pipeline Resource Report 1. 8 May 2018. P. 53. PCP Part 2 Appendix B P. 351.

D. Rogue Basin

The Rogue Basin stretches 3.3 million acres in southwestern Oregon and northern California. According to the 2012 303(d) list, waterbodies in the Rogue watershed do not meet state water quality standards for temperature, dissolved oxygen, sedimentation, bacteria, pH, and nuisance weeds and algae.[249] The table below lists the waterbodies in the Upper Rogue sub-watershed (HUC 17100307) that the applicants propose to cross that do not meet water quality standards for dissolved oxygen, temperature, and sedimentation. These proposed crossings include: Big Butte Creek, Indian Creek, Lick Creek, Little Butte Creek, Trail Creek, and the Rogue River. Additionally, Little Butte Creek and the Rogue River are also impaired for multiple toxics, including but not limited to cadmium, selenium, mercury, nickel, silver, and zinc.[250]

[249] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

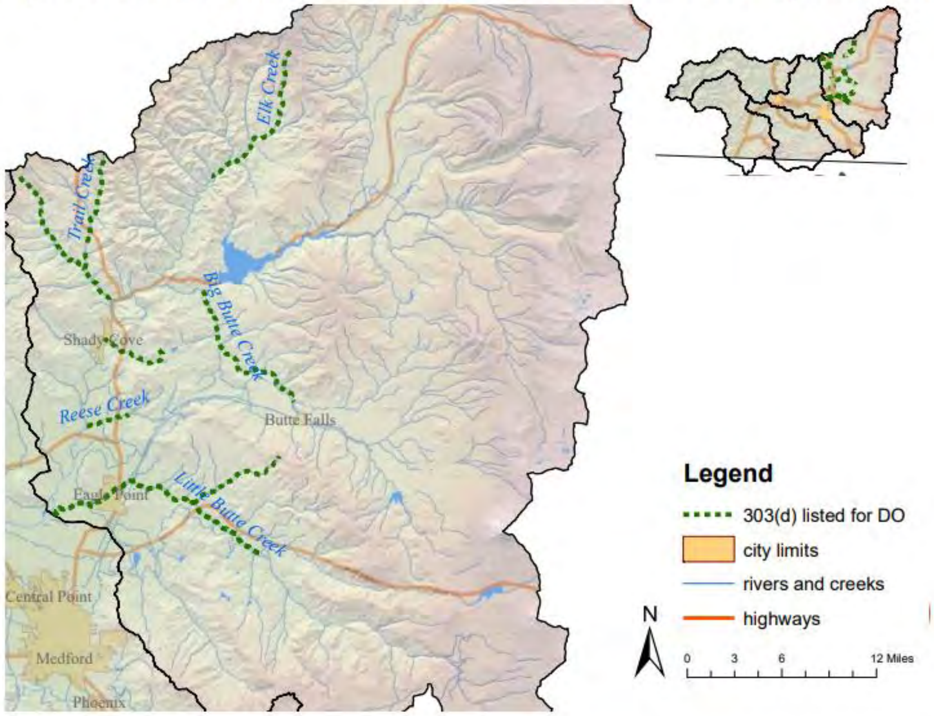
[250] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

Table 7. 303(d) Listings for Streams Crossed by Pacific Connector Pipeline in the Rogue Basin[251]

Waterbody Crossed by Pipeline	Dissolved Oxygen	Habitat Modification	Temperature	Biological Criteria	Sedimentation
Big Butte Creek	X		X		X
Indian Creek	X		X		
Deer Creek			X		X
Lick Creek	X			X	
Little Butte Creek	X		X		X
Trail Creek	X		X		X
West Fork Trail Creek	X		X		X
Rogue River	X		X		X

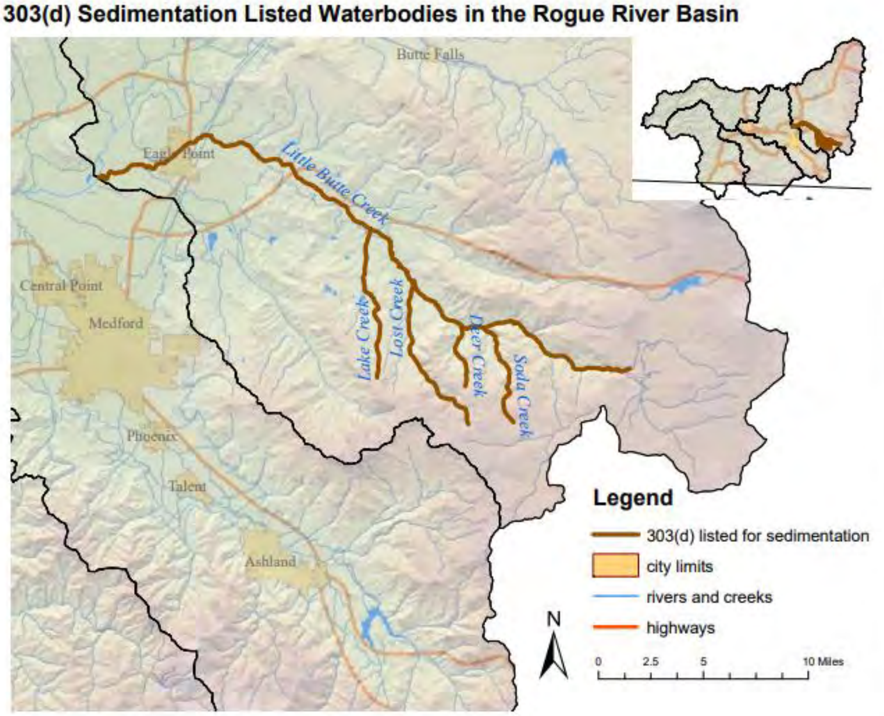
[251] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

Figure 1.9. 2004/2006 303(d) Dissolved Oxygen Listed Waterbodies in the Rogue River Basin



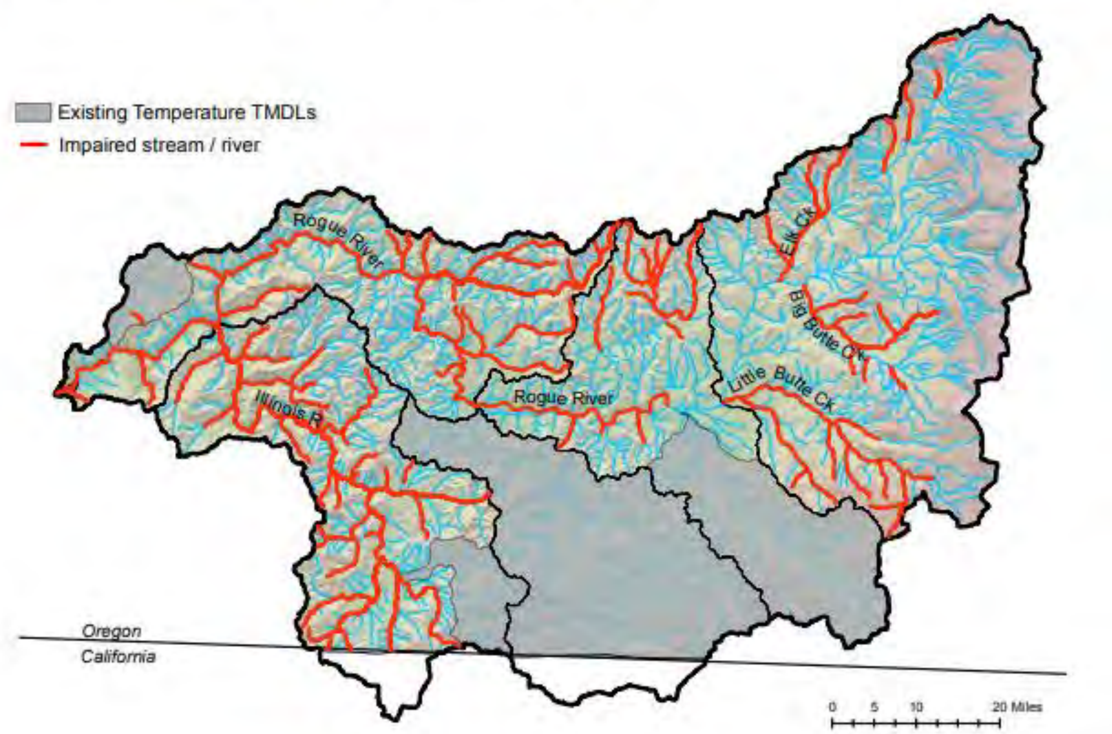
Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-19.

Figure 1.10. 303(d) Sedimentation Listed Waterbodies in the Rogue River Basin



Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-20.

Figure 2.3. 2004/2006 303(d) list for temperature (Red)



"Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-9.

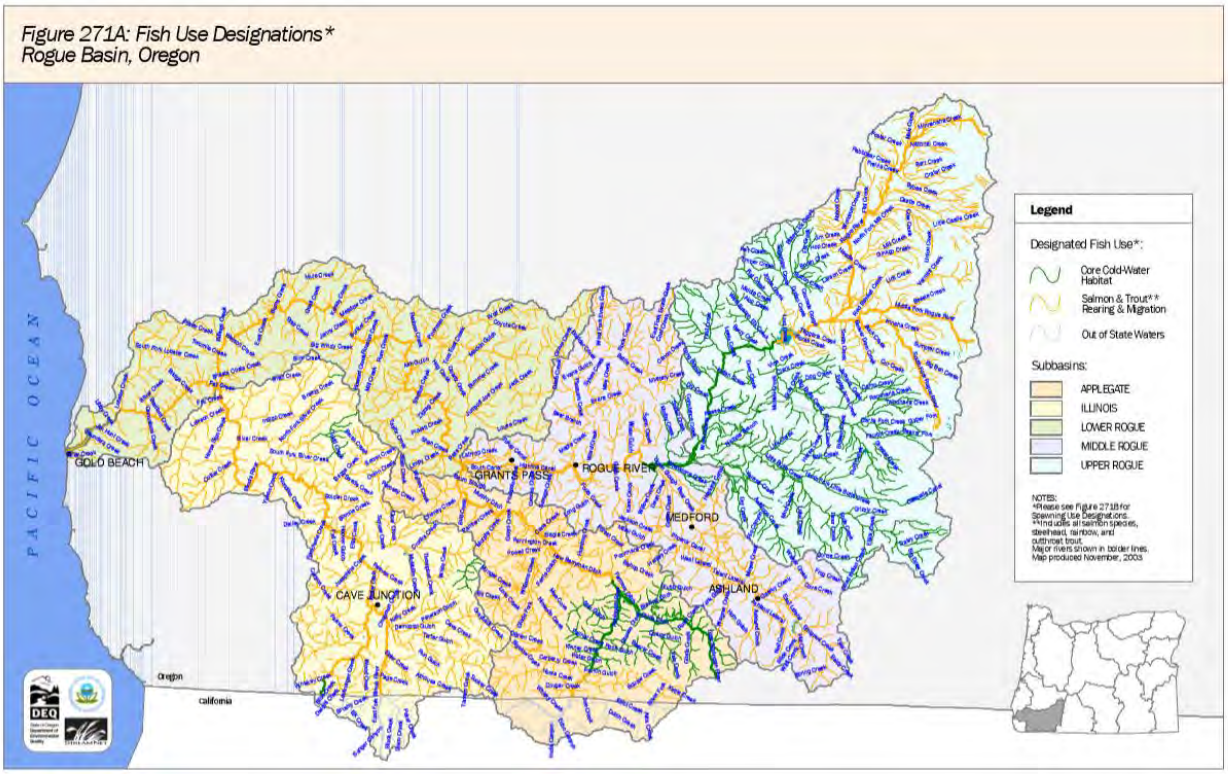
The Rogue Basin supports coho salmon, spring chinook salmon, fall chinook salmon, summer steelhead, winter steelhead, cutthroat trout, Pacific lamprey, green sturgeon, and other native freshwater species. In 1997, the Southern Oregon/Northern California Coast (SONCC) coho salmon were federally listed as threatened.[252] As discussed in more detail in Section VI, the proposed activities will likely create conditions deleterious to these threatened and endangered species, in violation of OAR 340-041-0007(10). The Rogue Basin TMDL states:

> Urbanization, agriculture, water withdrawals, warm water temperatures, and loss of stream/floodplain connectivity in the greater Rogue River Basin inhibit the recovery of coho salmon (USFS 1995).[253]

Further, the 2014 Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan identifies impaired water quality as one of the key limiting stressors for the Upper Rogue River

[252] Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-6. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.
[253] Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-8. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf

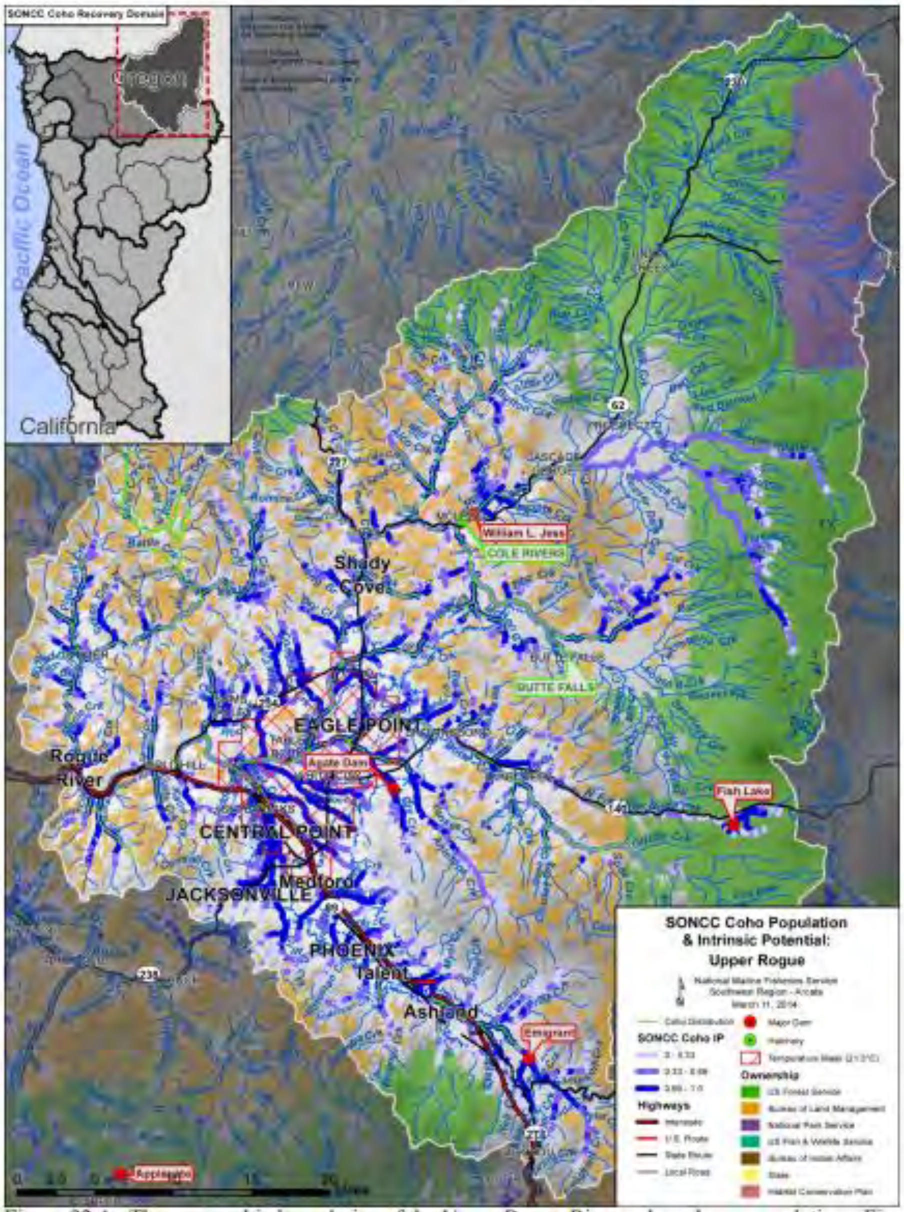
population.[254] Among six high priority recovery actions, the Recovery Plan identifies increasing Large Woody Debris as a priority recovery action. The proposed pipeline route would cross waterbodies that support threatened SONCC or have high Intrinsic Potential to support habitat.[255]



OAR 340-041-0101 to 340-041-0340: Figure 271A Fish Use Designations, Rogue Basin.

[254] "Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-1.

[255] "Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-3.



"Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-3.

As discussed in Sections II-VI, the applicants have failed to demonstrate that water quality standards will not be violated in the Rogue Basin. Proposed activities related to identified stream crossings in the Rogue Basin will likely:

- Violate Oregon's anti-degradation policy by causing significant temperature increases in numerous stream segments, therefore causing a decrease in dissolved oxygen levels, and further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;

- Violate Oregon's statewide narrative criteria by creating conditions deleterious to aquatic species, including but not limited to threatened and endangered species (e.g. SONCC coho, green sturgeon);
- Violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;
- Violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the Rogue Basin.

The applicants have failed to provide reasonable assurances that water quality standards will not be violated and, therefore, DEQ must not certify the project.

1. Construction

Construction of the project within the Rogue Basin primarily consists of pipeline construction and related stream crossings, vegetation removal, and temporary or permanent road construction. All of the proposed activities within the Rogue Basin are likely to impair water quality and the applicants do not provide reasonable assurance that the proposed activities will not violate state water quality standards. Therefore, DEQ cannot certify that the project will comply with state water quality standards.

a. Stream Crossings

With the exception of the proposed Rogue River crossing upstream from Shady Cove, all of the proposed stream crossings within the Rogue Basin will use the dry open cut method. In order for DEQ to effectively determine the direct, indirect, and cumulative impacts of these crossings, the applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. However, the JPA does not include such site-specific analysis. DEQ should review the assessment of the New York Department of Environmental Conservation (DEC), which denied 401 certification due to the applicant's failure to provide site-specific analysis of each stream crossing.[256] Without comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, DEQ cannot certify that the project will comply with state water quality standards.

As demonstrated in the table below, the applicants identify seven stream crossings in the Rogue Basin as Level 1 (moderate) risk of channel migration, avulsion, and/or scour. The crossing of North Fork Little Butte Creek, which is already impaired for dissolved oxygen, temperature, and sedimentation, is identified as having a high risk of channel migration, avulsion, and/or scour.

[256] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

The proposed bore crossing of the Medford Aqueduct and the HDD crossing of the Rogue River will be discussed separately in subsequent sections.

No site-specific analyses of these moderate and high risk crossings is provided by the applicants. DEQ should require site-specific information including, but not limited to the specific location of access roads, details of proposed blasting, and the location of temporary coffer dams.

Table 8. Stream Crossings Identified with Moderate and High Risk of Channel Migration, Avulsion and/or Scour

Waterbody crossed by pipeline	Level 1 (moderate) risk of channel migration, avulsion, and/or scour	Level 2 (high) risk of channel migration, avulsion, and/or scour	Bore	HDD
West Fork Trail Creek (MP 118.89)	X			
Canyon Creek (MP120.45)	X			
Rogue River (MP 122.65)				X
Deer Creek (MP 128.49)	X			
Neil Creek (MP132.12)	X			
Medford Aqueduct (MP 133.38)			X	
Lick Creek (MP 140.27)	X			
Salt Creek (MP 142.57)	X			
North Fork Little Butte Creek (MP 145.69)		X		
South Fork Little Butte Creek (MP 162.45)	X			

The FEIS from the previous iteration of the proposed pipeline specifically addressed the potential water quality impairments as a result of channel migration, avulsion, and/or scour. The FEIS states:

> Fluvial erosion represents potential hazard to the proposed pipeline where streams are capable of exposing the pipe as a result of channel migration, avulsion, widening, and/or streambed scour. The principal hazard resulting from channel migration and streambed scour is complete or partial exposure of the pipeline within the channel from streambed and bank erosion or within the floodplain from channel migration and/or avulsion….two crossings were identified that require additional field reconnaissance; West Fork Trail Creek and North Fork Little Butte Creek.[257]

The JPA for the current version of the proposed project does not provide further information regarding these crossings.

In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings cut through water bodies that are already impaired for sedimentation. According to the 2008 Rogue Basin TMDL:

> There are six segments in the Rogue River Basin that were listed in the 2004/2006 WQ Assessment as sedimentation impaired (Table 1.12 and Figure 1.10). The impairments

[257] FEIS at 4.3-36.

> were determined based on Oregon Department of Fish and Wildlife (ODFW) reporting that a high percentage of fine sediment was measured in most reaches during a 1994 survey. At the time of the writing of this TMDL, DEQ is in the process of developing a sedimentation assessment methodology that could be used for implementing the narrative sedimentation standard. When the methodology and associated guidance is completed, the agency will establish sedimentation TMDLs for those waterways on the 303(d) list. DEQ also intends to re-visit the Rogue River Basin sedimentation impairments when the temperature and bacteria TMDLs are reviewed, on a 5 year basis.[258]
>
> Disturbances that change riparian vegetation, increase the rate or amount of overland flow, or destabilize a stream bank may increase the rates of stream bank erosion and result in sedimentation increases. Disturbances in the uplands that remove vegetation, reduce soil stability on slopes, or channel runoff can increase sediment inputs (DEQ 2003, DEQ 2007). Sediment created from upland erosion is delivered to a stream channel through various erosional processes. Wide mature riparian vegetation buffers filter sediment from upslope sources as well as stabilize stream banks from erosion. System potential riparian vegetation measured by percent effective shade is a surrogate measure that has been used in other TMDLs to address sedimentation (DEQ 2003).

Modifications to the stream channel, as a result of the proposed activities that can result in channel migration, avulsion, and/or scour, will also impact temperature. As described in the Rogue Basin TMDL, channel modifications that increase sedimentation can decrease the depth and frequency of pools, which decreases the assimilative capacity for thermal loading of a stream.[259]

Specifically, Little Butte Creek and the South Fork of Little Butte Creek are both listed as impaired for sediment.[260] The South Fork Little Butte Creek crossing is identified as a moderate risk for channel migration, avulsion, and/or scour while the North Fork Little Butte Creek is identified as high risk. However, the applicants do not provide any further field assessments or site-specific analysis regarding these high risk crossings in water bodies that are already impaired for sediment. According to Table 2.2-13 Site-Specific Waterbody Crossing Plans, the applicants have provided a site-specific crossing plan in Appendix E.2 for the South Fork Little Butte Crossing, but this plan is not included in the 8 May 2018 JPA documents.

Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat. As a result, DEQ cannot certify that the proposed activities will not result in violations of water quality standards.

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[258] Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-19. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.

[259] “Chapter 2: Temperature.” Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-20.

[260] Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-20. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.

b. Rogue River Crossing

The applicants propose to use Horizontal Directional Drilling (HDD) technology to cross the Rogue River at MP 122.65. As discussed in more detail in Sections II-VI, the use of HDD also poses the risk of an unintended release of drilling fluid known as a frac-out. The applicants fail to comprehensively disclose and analyze the likelihood and frequency of frac-out events. The State re-iterated these concerns in its 2017 scoping comments.[261] Without this information, DEQ cannot evaluate whether the project is likely to degrade water quality below state standards.

The applicants failed to conduct a numerical hydraulic fracture analysis, instead relying upon a qualitative analysis.[262] As part of the qualitative analysis, GeoEngineers identifies the presence of gravels and cobbles near the HDD entry point and cautions that:

> If cuttings are not effectively removed from the hole during HDD operations, pullback forces could be excessively high during pullback of the 36-inch-diameter product pipe, or the product pipe could become lodged in the hole. The failure to effectively remove cuttings from the hole could potentially result in failure of the HDD installation. Therefore, we recommend that the drilling contractor maintain drilling fluid returns at all times, and use appropriate means and methods (appropriate penetration rates, drilling fluid management, mechanical methods) to ensure that cuttings are adequately removed from the hole during the HDD process.[263]

Further, the qualitative assessment of the potential for a frac-out results in the following conclusion from GeoEngineers:

> It is our opinion that there is a low risk of drilling fluid surface release along the proposed HDD profile, except within about 50 to 100 feet of the entry and exit points where the HDD profile passes through alluvial and colluvial soils, and the cover between the HDD profile and the ground surface is relatively thin. As is typical with most HDD installations, the risk of drilling fluid surface release within about 100 feet of the entry and exit points is relatively high.[264]

Additionally, the applicants do not provide adequate information regarding impacts to groundwater as a result of HDD. The September 2017 GeoEngineers report states:

> We did not measure groundwater levels upon completion of the borings because of the presence of drilling fluid in the holes at the time of drilling. We anticipate that groundwater levels will mimic the elevation of the Rogue River around 1,410 feet mean

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[261] Stat of Oregon 2017 Scoping comments at 15.

[262] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 7. Pacific Connector Pipeline Part 2 Appendix B. P. 1578.

[263] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 11. Pacific Connector Pipeline Part 2 Appendix B. P. 1582.

[264] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 12. Pacific Connector Pipeline Part 2 Appendix B. P. 1583.

> sea level (MSL). We anticipate that groundwater levels will fluctuate with precipitation, site utilization and other factors. During heavy prolonged precipitation, and probably during most of the winter months, we expect that groundwater will be near or at the surface of the site on the east side of the Rogue River. [265]

DEQ should conclude that merely "anticipating" impacts to groundwater is not a comprehensive and site-specific review of the potential consequences of a frac-out related to HDD crossing of the Rogue River.

Finally, the applicants have inaccurately included Klamath River crossing data in the Rogue River crossing section. The HDD Design Summary provided is for the Klamath River and not for the Rogue River.[266] Therefore, the JPA is completely missing information regarding HDD design for the Rogue River crossing. Without this information, DEQ cannot certify that the proposed HDD crossing for the Rogue, in addition to the other proposed activities, will not violate state water quality standards.

c. Medford Aqueduct Crossing

In addition to the dry open-cut methods and the HDD proposed for the Rogue River, the applicants also propose to bore below the Medford Aqueduct. The 31-inch Medford Aqueduct pipeline was constructed in 1927 and carries approximately 40 cubic feet per second of drinking water from Big Butte Springs to the City of Medford and communities within the Bear Creek watershed.[267] The applicants provide very minimal information regarding construction of this crossing. The plan and profile for the Medford Aqueduct state that the depth of the aqueduct is unknown.[268] DEQ should require more information regarding the depth of the bore and site-specific details to evaluate the potential direct, indirect, and cumulative impacts of the proposed pipeline crossing the main source of the City of Medford's drinking water.

d. Removal of Riparian Vegetation

The proposed action would cause stream temperature increases by removing riparian vegetation across a wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use. Without specific information about baseline temperatures in streams where riparian vegetation would be removed, it is impossible to review potential violations of numerical temperature limits specified in OAR 340-041-0028(4).

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[265] Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. P. 6. Pacific Connector Pipeline Part 2 Appendix B. P. 1577.

[266] Pacific Connector Pipeline. Rogue River HDD Pacific Connector Pipeline Project Jackson County, Oregon. 1 September 2017. Appendix B HDD Design Drawing and Calculations. PCP Part 2 Appendix B 8 May 2018. P. 1633.

[267] "Big Butte Creek." Eagle Point Irrigation District. https://www.eaglepointirrigation.com/big-butte-creek.html.

[268] Pacific Connector Gas Pipeline Project. Plan and Profile – Medford Aqueduct. PCP A-B Part 7. 6 February 2018. P. 1.

Riparian vegetation is critical to overall stream health and water quality. Removing riparian vegetation, as proposed by the applicants, will likely impair water quality in violation of the Clean Water Act. As described in the Rogue Basin TMDL:

> Near-stream vegetation disturbance/removal reduces stream surface shading via decreased riparian vegetation height, width and/or density, thus increasing the amount of solar radiation reaching the stream surface (shade is commonly measured as percent-effective shade or open sky percentage). Furthermore, forests even beyond the distance necessary to shade a stream can influence the microclimate, providing cooler daytime temperatures (Chen et al. 1999). Riparian vegetation also plays an important role in shaping channel morphology, resisting erosive high flows, and maintaining floodplain roughness.[269]

Not only will removing riparian vegetation likely increase water temperature, but it is also likely to result in increased sedimentation. As stated in the Rogue Basin TMDL:

> Increased sediment loading can result from agricultural, logging and mining activities which can result in increased runoff, landslides, debris torrents and other mass wasting events. Lastly, removal of riparian vegetation can lead to bank instability and increased erosion.[270]

Further, removal of riparian vegetation that results in increased sedimentation can impact interactions between surface water and groundwater, further impairing streams for temperature. As stated in the Rogue Basin TMDL:

> Excess fine sediment can also decrease permeability and porosity in the hyporheic zone, greatly reducing hyporheic flow, and resulting in less cool water inputs (Rehg et al. 2005).[271]

Stream temperature is also closely related to dissolved oxygen levels. Removing riparian vegetation will not only increase stream temperature, but also likely result in decreased dissolved oxygen. As stated in the Rogue Basin TMDL:

> Stream temperature has a significant impact on the dissolved oxygen level in a stream in two ways. As stream temperatures decrease, the amount of oxygen that can remain dissolved in water increases, and as temperatures decrease the amount of oxygen consumed by biological processes decreases.[272]

Multiple streams that would be crossed by the pipeline are also impaired for dissolved oxygen (e.g. Big Butte Creek, Little Butte Creek, and the Rogue River). The Ninth Circuit Court of

[269] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-19.
[270] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-19.
[271] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-20.
[272] Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 1-18.

Appeals made clear that new dischargers may not add a pollutant into a water body that is water quality limited.[273]

Removing riparian vegetation also decreases Large Woody Debris that is an important component of stream morphology and habitat for aquatic species.

The Rogue Basin supports habitat for threatened and endangered species listed under the ESA that are sensitive to temperature, sedimentation, and dissolved oxygen levels. Specifically, the Upper Rogue provides habitat for threatened SONCC coho. Regarding the Upper Rogue River population of SONCC coho, NOAA Fisheries stated:

> The most pervasive problem affecting coho salmon is water temperature. Very few reaches in the Upper Rogue River Sub-basin meet ODEQ (2008) water standards compatible with coho salmon recovery…Flow depletion reduces water volume and slows water velocity, thus promoting warming, stagnation, and depressed dissolved oxygen (D.O.) (Thompson and Fortune 1970). Nawa (1999) documented loss of coho salmon juveniles in Trail Creek due to flow depletion and low D.O. Little Butte Creek is similar to Trail Creek and has both low flow and D.O. problems.[274]

Further, regarding the Upper Rogue River population, the 2014 SONCC Recovery Plan states:

> Poor pool frequency and depth throughout the Upper Rogue River basin (URWA 2006) are likely due to elevated levels of fine sediment partially filling pools, a lack of scour-forcing obstructions such as large wood, and in some reaches diminished scour due to channel widening.[275]

Based on the existing water quality impairments for temperature, sedimentation, and dissolved oxygen in the Rogue Basin and the presence of ESA-listed species specifically threatened by increased temperature, decreased dissolved oxygen, and increased sedimentation as a result of removing riparian vegetation, DEQ cannot certify that the proposed activities will not violate water quality standards.

e. Road Construction

Runoff and sedimentation from roads is a major source of pollution to the streams of southwest Oregon. The Rogue Basin TMDL states:

> Excessive summer water temperatures have been recorded in a number of tributaries. These high summer temperatures are reducing the quality of rearing and spawning habitat

[273] See Friends of Pinto Creek v. United States Environmental Protection Agency, No. 05-70785, (9th Cir. Oct. 4, 2007).
[274] "Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-15.
[275] "Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-17.

> for chinook and coho salmon, steelhead and resident rainbow trout. The potential causes of high water temperatures in the Rogue River subbasins include urban and rural residential development near streams and rivers, reservoir management, irrigation water return flows, past forest management within riparian areas, NPDES regulated point sources, agricultural land use within the riparian area, water withdrawals, and road construction and maintenance.[276]

Increased sediment as a result of road construction, operation, and maintenance is also identified as a risk to threatened SONCC coho under the 2014 Recovery Plan:

> Sediment contribution from landslides and erosion occurs naturally in the Upper Rogue River basin; however, roads, timber harvest, and bank erosion following removal of riparian vegetation have elevated fine sediment input. Excess fine sediment directly impacts coho salmon egg viability and can reduce food for fry, juveniles and smolts.[277]

The applicants propose construction of temporary access roads (TARs) at 10 locations impacting 3.8 acres and construction of 15 permanent access roads (PARs) impacting 2.16 acres.[278] Because the project continues to change throughout the public process, impacts to streams may be significantly altered as well. The applicants do not provide site-specific details to minimize impacts of temporary or permanent road construction to waterways beyond general descriptions of BMPs. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. DEQ should not rely upon later analysis to determine how construction of permanent or temporary roads will impact wetlands, streams, and rivers.

f. Hydrostatic Testing

Potential sources of hydrostatic test water from the Rogue Basin include the Rogue River, the Medford Aqueduct, Eagle Point Irrigation, or the North Fork of Little Butte Creek.[279] Water withdrawals from the Rogue Basin for hydrostatic testing and other related uses should be carefully reviewed by DEQ to evaluate the direct, indirect, and cumulative impacts on water quality. The applicants provide minimal information regarding the source and discharge of hydrostatic testing water. Not only would these water withdrawals impact existing water rights, but reducing flows can also impair water quality, in violation of water quality standards.[280]

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[276] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-2.

[277] "Upper Rogue River Population." Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan. NOAA Fisheries. 2014. P. 32-17.

[278] Pacific Connector Pipeline Resource Report 1 General Project Description. p. 31, PCP Part 2 Appendix B 8 May 2018. p. 329.

[279] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 58. PCP Part 2 Appendix B from DEQ 8 May 2018. P. 352.

[280] PUD No. 1 of Jefferson Cty v. Washington Dept. of Ecology. 511 U.S. 700 (1994). https://www.law.cornell.edu/supct/html/92-1911.ZO.html.

E. Upper Klamath and Lost River Subbasins

The Upper Klamath Basin covers approximately 5.6 million acres and includes six hydrologic sub-basins above Iron Gate dam. As stated in the Upper Klamath and Lost Subbasins TMDL:

> The Klamath River basin is of vital economic and cultural importance to the states of Oregon and California, as well as the Klamath Tribes in Oregon; the Hoopa, Karuk, and Yurok tribes in California; the Quartz Valley Indian Reservation in California, and the Resighini Rancheria in California…. Historically, the Basin once supported vast spawning and rearing fishery habitat with cultural significance to the local Indian tribes. The watershed supports an active recreational industry, including activities that are specific to the Wild and Scenic portions of the river designated by both the states and federal governments in both Oregon and California.[281]

The proposed pipeline would enter the Upper Klamath watershed with a crossing of Spencer Creek at MP 171.07 and cross approximately 10 streams within the watershed. The Upper Klamath has TMDLs for Dissolved Oxygen, Chlorophyll a, pH, and Ammonia Toxicity.[282] These water quality parameters would be both directly and indirectly impacted by the proposed activities. Multiple streams crossed by the pipeline within the Upper Klamath subbasin are impaired for dissolved oxygen, temperature, habitat modification, biological criteria, sedimentation, and toxics.[283]

The headwaters of the Lost River are located in California and the sub-basin stretches across both Oregon and California.[284] Approximately 109 waterways would be crossed by the pipeline in the Lost River watershed. The Lost River subbasin also has TMDLs for Dissolved Oxygen, Chlorophyll a, pH, and Ammonia Toxicity.[285] Regarding water quality in the Lost River subbasin, DEQ states:

> High nutrient loading in the Lost River subbasin contributes directly to exceedances of the ammonia toxicity and nuisance phytoplankton water quality criteria. In addition, nutrient loading promotes the production of aquatic plants and algae (macrophytes, epiphyton, periphyton, and phytoplankton), resulting in exceedances of water quality criteria for dissolved oxygen (DO) and pH. Biochemical oxygen demand (BOD), in the water column and sediment, also contributes to the dissolved oxygen limitation.[286]

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[281] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf. P. 15.
[282] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf.
[283] Oregon's 2012 Integrated Report Assessment Database and 303(d) list. Oregon DEQ. https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.
[284] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf.
[285] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf.
[286] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf. P. 92

Table 9. 303(d) Listings for Streams Crossed by Pacific Connector Pipeline in the Upper Klamath and Lost River Subbasins

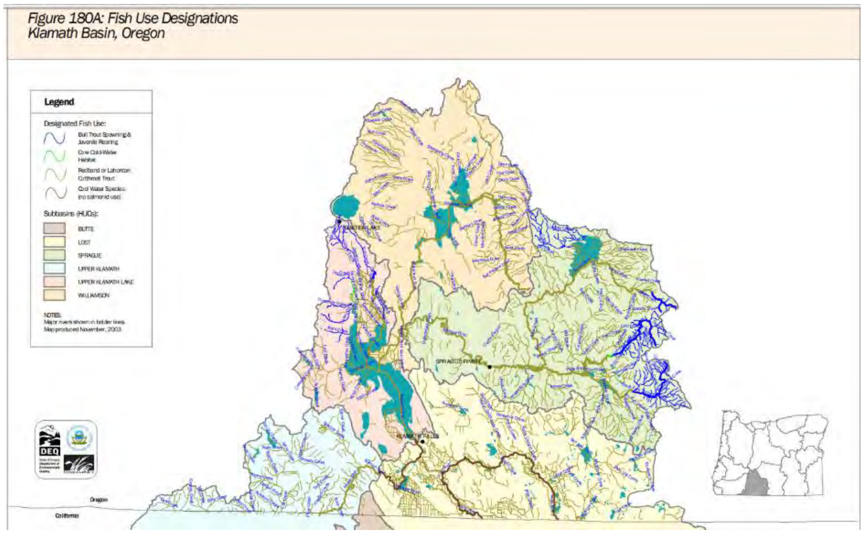
Waterbody Crossed by Pipeline	Dissolved Oxygen	Habitat Modification	Temperature	Biological Criteria	Sedimentation	Toxics
Klamath River	X	X	X		X	X
Clover Creek		X	X	X	X	
Spencer Creek		X	X	X	X	
Lake Ewauna	X					

Additionally, the Upper Klamath subbasin supports threatened and endangered species listed under the ESA, including the shortnose sucker, Lost River sucker, Bull trout, and Redband/Rainbow trout.[287] As discussed in more detail in Section VI, the proposed activities will likely create conditions deleterious to these threatened and endangered species, in violation of OAR 340-041-0007(10). According to the USFWS, factors that impact the persistence and abundance of Lost River and shortnose suckers include habitat fragmentation and "decreases in water quality associated with timber harvest, removal of riparian vegetation, livestock grazing, and agriculture practices."[288]

Regarding impacts of decreased water quality on threatened and endangered fish within the Upper Klamath and Lost River subbasins, DEQ states:

> Water quality problems are of great concern because of their potential impact on native fish populations in the Klamath basin including the Shortnose sucker (*Chasmistes brevirostris*), Lost River sucker (*Deltistes luxatus*), and interior redband trout (*Oncorhynchus mykiss ssp.).* Both sucker species were listed as endangered under the Endangered Species Act in 1988, and water quality degradation has been identified as a probable major factor in their declines. Populations of listed sucker species in the main stem of the Lost River, and Tule Lake are small and consist primarily of adults. Suckers have been eliminated entirely from the middle portion of the main stem of the Lost River and Lower Klamath Lake (NRC 2004).[289]

[287] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf. P. 30.
[288] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf. P. 32.
[289] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf. P. 96.



OAR 340-041-0101 to 340-041-0340: Figure 180A Fish Use Designations, Klamath Basin.

As discussed in Sections II-VI, the applicants have failed to provide reasonable assurances that the proposed activities will not violate state water quality standards. Proposed activities related to identified stream crossings in the Upper Klamath and Lost River watersheds will likely:

- Violate Oregon’s anti-degradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels, and by further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;
- Violate Oregon’s statewide narrative criteria by creating conditions deleterious to aquatic species, including but not limited to threatened and endangered species (shortnose sucker, Lost River sucker, Bull trout, and Redband/Rainbow trout);
- Violate Oregon’s water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;
- Violate Oregon’s toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the Klamath Basin.

The applicants have failed to provide reasonable assurances that the project will not violate state water quality standards and, therefore, DEQ must not certify the project.

1. Construction

Construction of the project within the Upper Klamath and Lost River subbasins primarily consists of pipeline construction and related stream crossings, vegetation removal, and temporary or permanent road construction. All of the proposed activities within the Upper Klamath and Lost River subbasins are likely to impair water quality and the applicants do not provide reasonable assurance that the proposed activities will not violate state water quality standards. Therefore, DEQ cannot certify that the project will comply with state water quality standards.

a. Stream Crossings

The applicants should provide a comprehensive environmental review for each stream crossing, particularly for those crossings identified as moderate or high risk. However, the JPA does not include such site-specific analysis. DEQ should review the assessment of the New York Department of Environmental Conservation (DEC), which denied 401 certification due to the applicant's failure to provide site-specific analysis of each stream crossing.[290] Without comprehensive environmental reviews of and detailed plans for stream crossings, particularly those identified as at a high or moderate risk of scour, channel migration, and/or avulsion, DEQ cannot certify that the project will comply with state water quality standards.

With the exception of the Klamath River crossing, all of the proposed crossings will use either a dry open cut method or a bore. The crossing of Clover Creek at MP 177.76 is identified as a Level 1 moderate risk of scour, channel migration, and/or avulsion. However, no site-specific analysis of this higher risk crossing is provided. DEQ should require site-specific information including, but not limited to the specific location of access roads, details of proposed blasting, and the location of temporary coffer dams.

Additionally, the applicants propose to cross streams that are already impaired for dissolved oxygen, habitat modification, temperature, biological criteria, and sedimentation. Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat. Specifically, the crossing of the Klamath River, Clover Creek, and Spencer Creek should be carefully evaluated because these waterways are already listed as impaired for multiple water quality parameters.

b. Klamath River Crossing

The applicants propose to use Horizontal Directional Drilling (HDD) technology to cross the Klamath River at MP 199.38. The HDD crossing is given a Level 1 moderate risk of channel migration, scour, and/or avulsion. As discussed in more detail in Sections II-VI, the use of HDD also poses the risk of an unintended release of drilling fluid known as a frac-out. The applicants fail to comprehensively disclose and analyze the likelihood and frequency of frac-out events. The State re-iterated these concerns in its 2017 scoping comments.[291] Without this information, DEQ cannot evaluate whether the project is likely to degrade water quality below state standards.

The September 2017 GeoEngineers report states:

[290] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.
[291] Stat of Oregon 2017 Scoping comments at 15.

> As is typical of HDD installations, we anticipate that there is a relatively high risk of hydraulic fracture and drilling fluid surface release within about 100 feet of the entry and exit points.[292]

This assessment emphasizes both the uncertainty and likelihood of a frac-out event using HDD technology to drill under the Klamath River. The Klamath is already water quality impaired for dissolved oxygen, toxics, sedimentation, habitat modification, and temperature. Further, the Klamath River provides habitat for threatened and endangered fish. Under OAR 340-041-0180, designated uses for the Klamath include:

- Public domestic water supply
- Private domestic water supply
- Industrial water supply
- Irrigation
- Livestock watering
- Fish and aquatic life
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality
- Hydropower (RM 255-232.5)
- Commercial navigation and transportation (RM 255-232.5)

A frac-out as a result of HDD would impair water quality and designated beneficial uses, in violation of state water quality standards and the Clean Water Act.

Additionally, the applicants do not provide adequate information regarding impacts to groundwater as a result of HDD. The September 2017 GeoEngineers report states:

> We did not measure groundwater levels upon completion of the borings because of the presence of drilling fluid in the holes at the time of drilling. We anticipate that groundwater levels will mimic the elevation of the Klamath River around 4,092 feet MSL. We anticipate that groundwater levels will fluctuate with precipitation, site utilization and other factors.[293]

DEQ must conclude that “anticipating” impacts to groundwater is not a comprehensive and site-specific review of the potential consequences of a frac-out related to HDD crossing of the Klamath River.

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[292] Klamath River HDD Pacific Connector Gas Pipeline Project Klamath County, Oregon. 1 September 2017. P. ES-1. PCP Part 2 Appendix B 8 May 2018. P. 1662.
[293] Klamath River HDD Pacific Connector Gas Pipeline Project Klamath County, Oregon. 1 September 2017. P. ES-6. PCP Part 2 Appendix B 8 May 2018. P. 1671.

c. Removal of Riparian Vegetation

The proposed action would cause stream temperature increases by removing riparian vegetation across a wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use. Without specific information about baseline temperatures in streams where riparian vegetation would be removed, it is impossible to review potential violations of numerical temperature limits specified in OAR 340-041-0028(4).

The Upper Klamath watershed supports habitat for the following threatened and endangered species listed under the ESA that are sensitive to temperature: shortnose sucker, Lost River sucker, Bull trout, and Redband/Rainbow trout. The Klamath River, Spencer Creek, and Clover Creek are all listed as water quality impaired for temperature. Any temperature increases in these streams as a result of the proposed activities would exacerbate existing violations of state water quality standards. The Ninth Circuit Court of Appeals recently made clear that new dischargers may not add a pollutant into a water body that is water quality limited.[294]

Additionally, removing riparian vegetation also decreases Large Woody Debris that is an important component of stream morphology and habitat for aquatic species.

d. Road Construction

According to the 8 May 2018 JPA materials, the applicants propose construction of temporary access roads (TARs) at 10 locations impacting 3.8 acres and construction of 15 permanent access roads (PARs) impacting 2.16 acres.[295] However, this information continues to change throughout the public process. As a result, impacts to fish-bearing and non-fish-bearing streams may be significantly altered as well. The applicants do not provide site-specific details to minimize impacts of temporary or permanent road construction to waterways beyond general descriptions of BMPs. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. DEQ should not rely upon later analysis to determine how construction of permanent or temporary roads will impact wetlands, streams, and rivers.

e. Hydrostatic Testing

The applicants provide minimal information regarding the source and discharge of hydrostatic testing water. As stated in Resource Report 1:

> Water for hydrostatic testing will be obtained from commercial or municipal sources or from surface water right owners (see Table 1.3-2). If water for hydrostatic testing is

[294] See Friends of Pinto Creek v. United States Environmental Protection Agency, No. 05-70785, (9th Cir. Oct. 4, 2007).

[295] Pacific Connector Pipeline Resource Report 1 General Project Description. p. 31, PCP Part 2 Appendix B 8 May 2018. p. 329.

> acquired from surface water sources, PCGP will obtain all necessary appropriations and withdrawal permits (see Appendix C.1). As required by ODFW, pumps used to withdraw surface water will be screened according to National Marine Fisheries Service screening criteria to prevent entrainment of aquatic species.[296]

For the Klamath watershed, the applicants propose hydrostatic testing water withdrawals from "Klamath River, or Lake of the Woods, or Keno Reservoir, or John C. Boyle Reservoir."[297] According to Table 1.3-2 Potential Hydrostatic Source Locations, the applicants could withdraw 5.6 million gallons from Lake of the Woods, 5.6 million gallons from John C. Boyle Reservoir, 5.6 million gallons from the Klamath River, and 4.6 million gallons from the High Line Canal. In coordination with OWRD, DEQ should fully evaluate the availability of this surface water for the proposed hydrostatic testing, even with cascading water from one test site to the next. As the applicants admit:

> If determined to be feasible for hydrostatic testing requirements, water would be returned to its withdrawal source location after use; however, cascading water from one test section to another to minimize water withdrawal requirements may make it impractical to release water within the same watershed where the water was withdrawn. If it is impracticable to return hydrostatic test source water to the same water basin from which it was withdrawn, PCGP would employ an effective and practical water treatment method (chlorination, filtration, or other appropriate method) to disinfect the water that would be transferred across water basin boundaries. The hydrostatic test water would be treated after it is withdrawn and prior to hydrostatic testing.[298]

The applicants have failed to analyze the feasibility of withdrawing and discharging water for hydrostatic testing within the same watershed. Further the applicants must disclose the quantity and impacts of discharging chlorinated water on fish and other aquatic life.

Not only would these water withdrawal impact existing water rights, but reducing flows can also impair water quality, in violation of water quality standards. In the U.S. Supreme Court decision in *Jefferson City Public Utility District v. Ecology Dept. of Washington* in 1994, Justice O'Connor wrote:

> In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, navigation or, as here, as a fishery. In any event, there is recognition in the Clean Water Act itself that reduced stream flow, *i.e.*, diminishment of water quantity, can constitute water pollution. First, the Act's definition of pollution as "the man made or man induced alteration of the chemical, physical, biological, and

[296] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 53. PCP Part 2 appendix B from DEQ 8 May 2018 p. 351.
[297] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 58. PCP Part 2 Appendix B from DEQ 8 May 2018. P. 352.
[298] Pacific Connector Pipeline Resource Report 1 General Project Description. 8 May 2018. P. 52. PCP Part 2 Appendix B from DEQ 8 May 2018. P. 350.

> radiological integrity of water" encompasses the effects of reduced water quantity. 33 U.S.C. § 1362(19). This broad conception of pollution--one which expressly evinces Congress' concern with the physical and biological integrity of water--refutes petitioners' assertion that the Act draws a sharp distinction between the regulation of water "quantity" and water "quality." Moreover, §304 of the Act expressly recognizes that water "pollution" may result from "changes in the movement, flow, or circulation of any navigable waters . . . including changes caused by the construction of dams." 33 U.S.C. § 1314(f).[299]

Water withdrawals from the Klamath Basin for hydrostatic testing and other related uses should be carefully reviewed by DEQ to evaluate the direct, indirect, and cumulative impacts on water quality.

F. Conclusion

In conclusion, these comments provide specific examples from each of the impacted watersheds to illustrate the points raised in Sections II-VI. DEQ must deny the 401 certification because the application fails to include mandatory minimum information under OAR 340-048-0020. Further, the applicants have failed to provide reasonable assurances that the project will comply with Oregon's antidegradation policy, that beneficial uses will be protected, and that numeric and narrative water quality standards will not be violated.

As discussed in Sections II-VI, the applicants have failed to demonstrate that the project will not violate state water quality standards. The proposed activities related to identified stream crossings in the Coos, South Coast (Coquille Subbasin), Umpqua, Rogue, and Klamath (Upper Klamath and Lost Subbasins) Basins will likely:

- Violate Oregon's anti-degradation policy by causing significant temperature increases in numerous stream segments, by causing significant decreases in dissolved oxygen levels, and by further degrading stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation;
- Violate Oregon's statewide narrative criteria by creating conditions deleterious to aquatic species, including but not limited to threatened and endangered species (e.g. Oregon Coast coho, green sturgeon);
- Violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement;
- Violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations;
- Violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state; and
- Impair beneficial uses to be protected in the each of the impacted watersheds.

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[299] PUD No. 1 of Jefferson Cty v. Washington Dept. of Ecology. 511 U.S. 700 (1994). https://www.law.cornell.edu/supct/html/92-1911.ZO.html.

VIII. Request for Public Hearing

Commenters reiterate the request for public hearings regarding the Clean Water Act 401 permit application. Hearings are necessary here for meaningful public comment. Public delivery of public comment is a unique and valuable form of input, that is not replicated in other settings. As required under OAR 340-048-0027, DEQ "may also provide a public hearing on a proposed certification decision or provide informational meetings regarding a certification application as it deems appropriate." In determining whether to schedule public hearings, we request that DEQ consider the unique and unprecedented nature of project in Oregon, the extensive scope of its impacts, the significant harm to Oregon's rivers and clean water, and the challenges that local landowners and community members who live in rural southern Oregon and who are directly impacted by the pipeline and terminal face in accessing and participating in the public process.

IX. Conclusion

In conclusion, DEQ must deny the 401 certification for the Jordan Cove Terminal and Pacific Connector Pipeline Projects because the applicants have not provided reasonable assurances that the project will not violate state water quality standards.

Under Section 401(a) of the Clean Water Act (CWA), any applicant for a Federal license or permit to conduct any activity that may result in a discharge to navigable waters in Oregon must obtain a certification from DEQ stating that the discharge from the proposed action will comply with the requirements of the CWA. *See* 33 U.S.C. § 1341. Before DEQ may certify the project, it must affirm "that there is a reasonable assurance that the activity will be conducted in a manner which will not violate water quality standards." 40 C.F.R. § 121.2(a)(3).

Water quality standards include three elements: (1) one or more designated "uses" of a waterway; (2) numeric and narrative "criteria" specifying the water quality conditions, such as maximum amounts of toxic pollutants, maximum temperature levels, and the like, that are necessary to protect the designated uses; and (3) an antidegradation policy that ensures that uses dating to 1975 are protected and high quality waters will be maintained and protected. 33 U.S.C. §§ 1313(c)(2), 1313(d)(4)(B); 40 C.F.R. Part 131, Subpart B. Compliance with water quality standards requires protection of all three of these components.

DEQ must deny the 401 certification for the project because:

- The application fails to contain the mandatory minimum information (*See* Section II);
- There is no reasonable assurance that the project will comply with Oregon's antidegradation implementation policy (*See* Section III);
- There is no reasonable assurance that designated beneficial uses will be protected (*See* Section IV);
- There is no reasonable assurance that numeric criteria will not be violated (*See* Section V); and
- There is no reasonable assurance that narrative criteria will not be violated (*See* Section VI).

In addition to general comments regarding the lack of reasonable assurance from the applicants that the project will not violate water quality standards, we have provided specific examples and detailed information regarding each of the impacted watersheds in Section VII.

For the foregoing reasons, the Coalition urges DEQ to deem the JPA legally and factually insufficient and deny the 401 certification for this project.

Dated this 8th day of August, 2018.

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January 30, 2019

RE: Public Comment on DSL APP0060697 (Jordan Cove Energy Project and Pacific Connector Gas Pipeline) Application for Removal-Fill Permit

Dear Mr. Lobdell:

Please accept these comments regarding the Department of State Lands (DSL) removal-fill permit application (APP0060697) submitted by the applicants, Jordan Cove Energy Project, L.P., for the Jordan Cove Energy Project ("JCEP") and the Pacific Connector Gas Pipeline ("PCGP"). We respectfully request that the Department deny the removal-fill permit for the JCEP and PCGP, hereafter referred to as the "project," because the project does not comply with the State's removal-fill law (*See* ORS 196.795-990).

We submit these comments on behalf of Rogue Riverkeeper, Rogue Climate, Beyond Toxics, Bold Alliance, Cascadia Wildlands, Center for Biological Diversity, Columbia Riverkeeper, Citizens for Renewables, Food & Water Watch, Friends of Living Oregon Waters (FLOW), Greater Good Oregon, Hair on Fire Oregon, Honor the Earth, Klamath-Siskiyou Wildlands Center, Oregon Coast Alliance, Oregon Physicians for Social Responsibility, Oregon Shores Conservation Coalition, Oregon Wild, Pipeline Awareness Southern Oregon, Rogue Fly Fishers, Sierra Club, UO Climate Justice League, Waterkeeper Alliance, Western Environmental Law Center, 350 Corvallis, 350 Eugene, and 350 Seattle hereafter referred to as the "Commenters."

Commenters have direct and personal interests in the proceeding, including rights to property, clean water, safety, and to a livable environment, and these interests would be directly and adversely impacted by project approval. Commenters here have been recognized as parties to the proceeding and have submitted lengthy, detailed comments on previous rounds of the proposed project including, but not limited to, the Draft Environmental Impact Statement ("DEIS") in 2008 and Final Environmental Impact Statements ("FEIS") in 2009 submitted for the import project round 1 and the DEIS and FEIS in 2015 for the export project round 2, local land use proceedings in Douglas and Coos Counties, scoping comments on the current third round of the project to the Federal Energy Regulatory Commission ("FERC"), and comments on the Joint Permit Application ("JPA") to the Oregon Department of Environmental Quality ("DEQ") for the Clean Water Act Section 401 state water quality certification and the U.S. Army Corps of Engineers ("the Corps") for the Clean Water Act Section 404 removal-fill permit. Comments submitted for both the Clean Water Act 404 and 401 permits are incorporated by reference and attached as appendices.

Summary of Commenters' Position: It is the commenters' position that the applicants have failed to provide reasonable assurances that the project will comply with Oregon's removal-fill law and related regulations and policies for the following reasons:

Chapter 1. Introduction

Chapter 2. Application Completeness: The Department must deny the permit because the application is not complete. ORS 196.825(12)(b)). Specifically, the applicants fail to provide essential information and analysis of wetland and/or water impacts in areas where the applicants have been denied access by landowners; the application does not appear to contain cross-section drawings for fill and/or removal where the pipeline crosses jurisdictional waters; the presumed obstruction hazards identified by the Federal Aviation Administration will require termination or re-design of the project; the application fails to address deficiencies identified by DEQ in the 401 Water Quality Certification Joint Permit Application; the application fails to include referenced mitigation plans; and the application fails to include the necessary contaminant studies regarding the marine slip dock and access channel area.

Chapter 3. Public Need: The Department must affirmatively determine that the project would address a public need consistent with *Citizens for Resp. Devel. In the Dalles v. Walmart* 295 Or App 310 (2018). For a privately-sponsored project of this scale and complexity, the Department must consider public need in a transparent and comprehensive analysis that weighs all of the relevant impacts and alleged benefits of the project. The Department cannot find there is a predominate public need for the project because the project is unnecessary and there is no evidence of demand for it, and the public need identified by the applicants is outweighed by the loss to Oregon's waters.

Chapter 4. Consistency with Protection, Conservation, and Best Use of Water Resources of the State: The project would likely do immense damage to water quality in Oregon, and it is not consistent with the protection, conservation and best use of the water resources of this state. The proposed project will likely impair designated beneficial uses, threatening drinking water supplies and fish habitat. It will also likely further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. Because the applicants have not demonstrated that the state's waters' will be protected, the Department must deny the permit because the project is not consistent with the protection and conservation of Oregon's waters under ORS 196.825(1)(a).

Chapter 5. Interference with Navigation, Fishing, and Public Recreation: The Director must conduct a weighing of the public benefits of the project against interference with factors including navigation, fishing, and public recreation (See *Citizens for Resp. Devel. In the Dalles v. Walmart,* 295 Or App 310 (2018)).[1] As part of this weighing of benefits, the legislature has clearly demonstrated that it is the State's "paramount policy" to preserve Oregon waters for navigation, fishing, and public recreation. ORS 196.825(1). The applicants have failed to demonstrate that the project will not unreasonably interfere with navigation, fishing, and public recreation and, therefore, the Department must deny the permit. ORS 196.825(1)(b).

[1] ORS 196.825(1)(b).

Chapter 6. Independent Utility: The Department must comprehensively review clearly connected actions to the application, including but not limited to the Coos Bay Channel Modification project. The applicants would be the primary benefactors from the proposed widening and deepening of the federal navigation channel as part of the CBCM project or similar efforts to expand the navigation channel. Further, there are serious questions about the feasibility of LNG vessels transiting the federal navigation channel under the dredging currently proposed as part of this application. The Department should question the full scope of the applicants' plan to develop an LNG export terminal in Coos Bay. The applicants have failed to demonstrate in the application that the project has independent utility as required under OAR 141-085-0565(3)(a) and, therefore, the Department must deny the permit.

Chapter 7. Availability of Alternatives: The applicants have failed to demonstrate a comprehensive analysis of alternatives to the project, and therefore, the Department does not have the information to consider the availability of alternatives both for the project and for proposed fill sites, and to determine that the project is the practicable alternative with the least adverse impacts on the water resource, as required under Oregon law. Consequently, without the information necessary to determine whether the applicant has considered a reasonable range of alternatives, the Department must deny the removal-fill permit.

Chapter 8. Sound Policies of Conservation and Interfering with Public Health and Safety: In summary, the Department is required to consider whether the project conforms to the sound policies of conservation and whether the project would not interfere with public health and safety. ORS 196.825(3)(e). The applicants have failed to demonstrate compliance with the Clean Water Act, as discussed in detail in Appendix A. Clean Water Act 401 Comments and Chapter 4 *infra*. The Department must not approve the permit without consultation with NOAA Fisheries and U.S. Fish and Wildlife as required under the Endangered Species Act. Further, the applicants have failed to demonstrate compliance with state conservation policies, including but not limited to the Oregon Conservation Strategy and the Oregon Plan for Salmon and Watersheds. Additionally, the applicants have failed to demonstrate that the project will not interfere with public health and safety. Potential risks to public health and safety include natural hazards, such as floods, tsunamis, wildfires, landslides, and earthquakes identified under Statewide Planning Goal 7. The potential for high flow events that expose the pipeline or frac-outs at proposed stream crossings may result in increased risks to public health and safety. The Department should consider the airport hazard identified by the FAA, navigation safety hazards discussed in Chapter 5 *infra*, and rock dredging and blasting impacts in Coos Bay.

Chapter 9. Conformance with Land Uses: The applicants have failed to demonstrate that the project conforms with existing land uses designated in applicable comprehensive plan and land use regulations. Moreover, the applicants have failed to provide the Department with the information necessary to make the determinations required by ORS 196.825(3)(g) that the applicants' proposed fill or removal is compatible with the requirements of the comprehensive plan and land use regulations for the area in which it will take place. Finally, because the applicant has failed to obtain land use permits for the project in Coos Bay, the Department cannot conclude that the project is compatible with land use regulations and acknowledged comprehensive plans. Further, because the reasons adopted by LUBA in remanding the prior land use application are directly related to the inconsistency of the proposed dredge and fill in wetlands and in the Coos Bay estuary with the Coos Bay Estuary Management Plan, the project cannot be conditioned on a future land use approval to meet this criterion. In January 2019, the Douglas County Circuit Court Judge reversed the Douglas County extensions from December 2016 and 2017 that approved the Pacific Connector Gas Pipeline as a conditional use. Because the pipeline will require a new application for conditional use permit and utility facility necessary for public service, the applicant has not met its burden to demonstrate to the Department that the project conforms to Douglas County's acknowledged comprehensive plan and land use regulations. The applicant has failed to meet its burden of providing the Department with the information necessary to make the evaluations under ORS 196.825(3)(g); therefore, the Department must deny the permit.

Chapter 10. Mitigation: The Department should carefully evaluate practicable alternative restoration alternatives of that location that do not involve as much fill, as well as alternatives that ensure fill is not contaminated (*See* Chapter 8 *infra*). The applicants have not provided sufficient information, have not demonstrated that adverse impacts have been avoided or minimized, and have proposed the least preferable type of mitigation; therefore, the Department must deny the permit.

Chapter 11. Conclusions

In summary, the applicants have failed to provide reasonable assurances that the project will comply with Oregon's removal-fill law and related regulations and policies and the Department must deny the permit.

Chapter 1. INTRODUCTION

1.1 Project History

A. The Jordan Cove Energy Project and Pacific Connector Pipeline (2004-2017)

A detailed project history is included in Section I of Appendix A. Clean Water Act 401 Comments).

In summary, in 2004 the project was first proposed to import natural gas and Jordan Cove filed an application for the project with FERC in 2006. In 2009, FERC initiated the Environmental Impact Statement ("EIS") process under NEPA for the project. The second round of the project began in July 2011 when Jordan Cove applied to the Department of Energy for authorization to export LNG, in violation of its Douglas County CUP import only restriction. In April 2012, FERC vacated its approval of the December 17, 2009 order to construct pipeline facilities. In May 2013, Jordan Cove filed an application under Section 3 of the Natural Gas Act ("NGA") for the JCEP and the PCGP to export natural gas. FERC initiated the EIS process under NEPA between 2014 and 2015. On 30 September 2015, FERC issued the FEIS for the Jordan Cove Energy Project and the Pacific Connector Pipeline (CP13-483-000 and CP13-492-000). After multiple information requests, FERC issued an order denying applications for certificate and Section 3 NGA authorization on 11 March 2016. [2]

In its denial, FERC stated:

> We find the generalized allegations of need proffered by Pacific Connector ***do not outweigh the potential for adverse impact*** on landowners and communities… Because the record does not support a finding that the public benefits of the Pacific Connector Pipeline outweigh the adverse effects on landowners, we deny Pacific Connector's request for certificate authority to construct and operate its project[3]

In April 2016, Jordan Cove appealed FERC's decision. On 9 December 2016, FERC upheld its decision to deny the certificate for the project.

The third and current round of the project began in January 2017 when Jordan Cove submitted a pre-filing request to FERC for the Jordan Cove Energy Project and Pacific Connector Pipeline project. In June 2017, FERC initiated the scoping period for the project. On 24 September 2017, Jordan Cove submitted the final application to FERC. On 23 October 2017, Jordan Cove submitted a Joint Permit Application ("JPA") to the U.S. Army Corps of Engineers ("the Corps") for the Clean Water Act and, to the best of our knowledge, emailed the Oregon Department of Environmental Quality ("DEQ") a copy of the application. On 6 February 2018, Jordan Cove submitted "a combined electronic Section 401 Water Quality Package to DEQ for JCEP and PCGP as a "supplement to the Section 404/10 permit application provided to the U.S. Army Corps of Engineers on October 23, 2017."[4] This package included materials submitted in October 2017 and additional materials.

On 3 November 2017, Jordan Cove submitted a removal-fill permit application to the Department of State Lands ("DSL"). On 1 December 2017, DSL found that the application was incomplete. On 8 May 2018, Jordan Cove submitted current and new materials to DEQ. On 22 May 2018, the Corps and DEQ initiated a public comment period for Jordan Cove's application for a Clean Water Act Section 404 removal-fill permit and Clean Water Act Section 401 state water quality certification. On 7 November 2018, Jordan Cove submitted a removal-fill permit application to DSL. The Department determined that the application was "complete" on 6 December 2018 and initiated a 60-day public comment period for the removal-fill application until 3 February 2019.

B. The Jordan Cove Energy Project ("JCEP") in 2018

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[2] On 20 May 2015, FERC sent a third data request to Pacific Connector, stating that: *The Commission's Certificate Policy Statement requires the Commission to balance the public benefits of a pipeline proposal against its potential adverse impacts, and that Pacific Connector must show that the public benefits of its proposal outweigh the project's adverse impacts.* Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 8.

[3] Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 18. Emphasis added.

[4] David Evans and Associates letter to Oregon DEQ. SUBJECT: Jordan Cove Energy Project / Pacific Connector Gas Pipeline - 401 Water Quality Package (NWP-2017/41). 6 February 2018.

Jordan Cove proposes to site, construct, and operate a Liquefied Natural Gas (LNG) terminal that would receive a maximum of 1.2 million dekatherms per day of natural gas and produce a maximum of 7.8 million tons of LNG for export each year. The LNG terminal will cool natural gas into its liquid form in preparation for export from Coos Bay.[5]

The LNG terminal is composed of Ingram Yard, South Dunes site, the Access and Utility Corridor, and the Roseburg Forest Products property. The LNG terminal and associated facilities would cover 538-acres of land, including 5.2 acres of open water and 169-acres of wetlands.[6]At the LNG terminal site, the Ingram Yard will store LNG tanks and liquefaction equipment. The South Dunes site includes the Workforce Housing Facility, metering station, administrative building, and the Southwest Oregon Regional Safety Center ("SORSC"). The Roseburg Forest Products property will be used as a temporary construction staging area and for upland dredge disposal, contained with an on-site berm. The LNG terminal itself consists of a connection to the Pacific Connector Pipeline metering station, gas inlet facilities, a gas conditioning plant, liquefaction facilities, two full-containment LNG storage tanks, an LNG loading line, LNG loading facilities, and a marine slip and access channel for LNG carriers. According to the applicants, construction and operation of the LNG terminal may impact water quality through upland site preparation and facilities construction, placement of permanent infrastructure, construction and operational stormwater runoff, potential construction and operational fuel and chemical spills, hydrostatic testing, wastewater discharge, dredge soil disposal and dewatering/decanting, and operation of construction vehicles and equipment.[7]

Construction of the marine slip would require excavating 38-acres from uplands. The slip and access channel combined would equal 60-acres and result in the permanent loss of 14.5-acres of shallow subtidal and intertidal habitat, 0.6-acres of estuarine saltmarsh habitat, and 1.9 acres of submerged aquatic vegetation habitat. Additionally, the applicants propose to dredge 5.7 million cubic yards of material to create the slip basin and access channel. Dredged material would be disposed of at the LNG terminal, Roseburg Forest Products Site, South Dunes Site, or Kentuck Site. Dredging for the temporary berth would require dredging approximately 45,000 cubic yards of material. Dredging of the existing navigation channel would remove 700,000 cubic yards of material and would construct a temporary pipeline on the bottom of the channel over 8.3 miles to remove the dredged material. Widening of the Transpacific Parkway/Highway 101 intersection would require permanently filling in 0.51 acres of intertidal habitat. Future maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years.[8]

By constructing the Kentuck mitigation site, applicants propose to reconstruct 100-acres of tide channels, mudflats, saltmarsh, and freshwater wetlands. At the eelgrass mitigation site, the applicants propose establishing approximately 9-acres of eelgrass beds at different densities.

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[5] Betz, Sarah and Derik Vowels. Technical Memorandum. Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting. 2 February 2018. 8 May 2018 Pacific Connector Pipeline. P. 1.

[6] U.S. Army Corps of Engineers. Public Notice Application for Permit to Alter Federally Authorized Projects. 22 May 2018. NWP-2017-41. P. 3

[7] Betz, Sarah and Derik Vowels. Technical Memorandum. Water Quality Considerations – Implications for Clean Water Act Sections 401 and 404 Permitting. 2 February 2018. 8 May 2018 Pacific Connector Pipeline. P. 3.

[8] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 3-6.

Maintenance dredging of the access channel, marine slip, and NRI area will involve dredging between 34,600 cubic yards and 37,700 cubic yards of material from the access channel and slip every year and dredging between 27,900 cubic yards and 49,800 cubic yards of material from the NRI area every three years.

Back of the envelope calculations indicate that construction alone of the slip and access channel, NRIs, MOF, temporary material barge berth, eelgrass mitigation site, and the Kentuck mitigation site will require dredging approximately 6.4 million cubic yards of material from Coos Bay.

C. The Pacific Connector Gas Pipeline ("PCGP") in 2018

Jordan Cove also proposes to construct a 36-inch underground 229-mile natural gas pipeline from Malin, Oregon to the coast at Coos Bay, Oregon. As noted by DEQ and the Corps in the Public Notice, the pipeline will necessitate direct impacts to waters at 485 locations, including 326 perennial and/or intermittent waterways, seven lakes and/or ponds, two estuarine waters, and 150 wetlands.[9] It is unclear whether all impacted waterways have been identified by the applicants.

Over the 229-mile pipeline route, the applicants propose to cross Coos Bay, the South Coast watershed (Coos and Coquille Subbasins), the Umpqua watershed, the Rogue watershed, and the Klamath watershed (Upper Klamath and Lost Subbasins). Overall pipeline construction would impact 30,778-feet (5.83 miles) of wetlands and 3,028-feet of waterways. Approximately 48,675 cubic yards of material would be excavated and discharged into wetlands and 9,519 cubic yards of material would be excavated and discharged into waterways.[10]

Horizontal Directional Drilling is proposed for Coos Bay, the Coos River, the Rogue, and the Klamath Rivers. Within Coos Bay, Jordan Cove proposes to install the 36-inch pipeline across the bay using two horizontal directional drills ("HDD") of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after the applicants rejected the use of HDD for the Coos Bay crossing. It is unclear how the applicants have altered the proposal in a way that two proposed HDD crossings are now determined to be feasible. The currently proposed pipeline alignment would require not one but two HDD crossings of Coos Bay, for a total of over 14,000 feet.[11] All other waterways will be crossed using a dry open-cut method. Construction right-of-ways at each crossing would require clearing a 75-foot buffer.

1.2 Oregon's Removal-Fill Statute

Under Oregon's Removal-Fill Law, any person who plans to "remove or fill" material within "waters of the state" must obtain a certification from the Department of State Lands stating that

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[9] Public Notice Application for Permit and to Alter Federally Authorized Projects. U.S. Army Corps of Engineers. P. 7

[10] Public Notice Application for Permit and to Alter Federally Authorized Projects. U.S. Army Corps of Engineers. P. 7 – 8.

[11] GeoEngineers Memorandum, Coos Bay West HDD Crossing (Sept. 14, 2017) at 2.

the removal and/or fill will comply with the requirements of the removal-fill law. *See* ORS 196.795-990.

The purpose of the removal-fill law is to ensure the protection and best use of Oregon's water resources for home, commercial, wildlife habitat, public navigation, fishing and recreational uses. An applicant must minimize or avoid adverse impacts to state waters. ORS 196.805.

Under ORS 196.825, the Director of the Department of State Lands shall issue a permit applied for under ORS 196.815 (Application for permit) if the director determines that the project described in the application:

> (a) Is consistent with the protection, conservation and best use of the water resources of this state as specified in ORS 196.600 (Definitions for ORS 196.600 to 196.655) to 196.905 (Applicability); **and**
>
> (b) Would not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing and public recreation.[12]

Further, in determining whether to issue a permit, the Director must consider:

> (a) The public need for the proposed fill or removal and the social, economic or other public benefits likely to result from the proposed fill or removal. When the applicant for a permit is a public body, the director may accept and rely upon the public body's findings as to local public need and local public benefit.
> (b) The economic cost to the public if the proposed fill or removal is not accomplished.
> (c) The availability of alternatives to the project for which the fill or removal is proposed.
> (d) The availability of alternative sites for the proposed fill or removal.
> (e) Whether the proposed fill or removal conforms to sound policies of conservation and would not interfere with public health and safety.
> (f) Whether the proposed fill or removal is in conformance with existing public uses of the waters and with uses designated for adjacent land in an acknowledged comprehensive plan and land use regulations.
> (g) Whether the proposed fill or removal is compatible with the acknowledged comprehensive plan and land use regulations for the area where the proposed fill or removal is to take place or can be conditioned on a future local approval to meet this criterion.
> (h) Whether the proposed fill or removal is for streambank protection.
> (i) Whether the applicant has provided all practicable mitigation to reduce the adverse effects of the proposed fill or removal in the manner set forth in ORS 196.800 (Definitions for ORS 196.600 to 196.905). In determining whether the applicant has provided all practicable mitigation, the director shall consider the findings regarding wetlands set forth in ORS 196.668 (Legislative findings) and whether the proposed mitigation advances the policy objectives for the protection of wetlands set forth in ORS 196.672 (Policy).[13]

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[12] ORS 196.825(1)
[13] ORS 196.825(3)

The burden is on the applicant to demonstrate compliance with these requirements. OAR 141-085-0565(5) states:

> The Department will issue a permit only upon the Department's determination that a fill or removal project is consistent with the protection, conservation and best use of the water resources of this state and would not unreasonably interfere with the preservation of the use of the waters of this state for navigation, fishing and public recreation. The Department will analyze a proposed project using the criteria set forth in the determinations and considerations in Sections (3) and (4) above (OAR 141-085-0565). ***The applicant bears the burden of providing the Department with all information necessary to make this determination.***[14]

A. Definition of the "Project"

For purposes of OAR Chapter 141, Division 85, OAR 141-085-0010(169) defines "project" to mean "the primary development or use intended to be accomplished (e.g. retail shopping complex, residential development)." In addition, OAR 141-085-0010(170) defines "project area" to mean "the physical space in which the removal-fill takes place including any on site or off-site mitigation site," which encompasses "the entire area of ground disturbance, even though not within waters of the state, including all staging areas and access ways, both temporary and permanent."

Commenters are cognizant of the limited view of the scope of "the project" under the DSL removal-fill statute, as explained in *Coos Waterkeeper v. Port of Coos Bay*, 363 Or. 354, 423 P.3d 60 (2018). In *Coos Waterkeeper v. Port of Coos Bay*, the Oregon Supreme Court held that the Department was correct in authorizing a permit to the Port of Coos Bay to construct a deep water marine terminal and properly considered the criteria under ORS 196.825. Further, the Court concluded that the Department's interpretation of the "project" to include fill, removal, and construction, but not operation of the completed terminal, was correct.[15] We attempt to focus on those impacts and effects directly pertaining to the removal-fill over which the Department has jurisdiction.

1.3 Environmental Justice and Tribal Sovereignty

Tribal interests are held and asserted most importantly and fundamentally by tribes themselves. Commenters insist, however, that our government respect tribal sovereignty and give those interests their due regard, and give them heavy weight in the Department's analysis. In this regard, we call attention to the recent findings of the Oregon Environmental Justice Task Force (*See* Appendix A. Clean Water Act 401 Comments). Tribal leaders from four tribes testified to Oregon's Environmental Justice Task Force Committee on June 8, 2018 in Klamath Falls about their concerns regarding the negative impacts of building and operating the Pacific Connector Gas Pipeline and the Jordan Cove LNG Export Terminal. Each tribe is a sovereign nation with corresponding rights of their own. Those rights do not rely on this legal process, much less on non-tribal public commenters. Rather, state and federal governments have obligations to honor those rights and interests. We stand in solidarity with these tribes as they assert their rights, and agree with the Environmental Justice Task Force that this project is not in the public interest

[14] OAR 196-085-0565(5). Emphasis added.
[15] *Coos Waterkeeper v. Port of Coos Bay*. 363 Or 354 (2018). P. 363.

because of its disproportionate negative impacts on tribes. A project cannot be in the "public interest" if it violates fundamental obligations to tribes.

The project appears to be inconsistent with SB 420, codified as ORS 182.538 *et. seq.*, which established Oregon's EJTF, as well as Executive Order 12,898 signed by President Clinton in 1994 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*). Executive Order 12,898 specifically directs federal agencies to ensure that their actions address human health or environmental effects that adversely impact low-income and minority populations.[16] Under ORS 182.545, it is the responsibility of Oregon's natural resource agencies "In making a determination whether and how to act, consider the effects of the action on environmental justice."[17]

This project has the potential to disproportionately impact minority and low income populations. For example, the proposed pipeline route and terminal site will likely impact traditional homelands and cultural resources of federally recognized tribes, including but not limited to the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians of Oregon, the Coquille Indian Tribe, the Cow Creek Band of Umpqua Tribe Indians, and the Klamath Tribes. As will be discussed throughout these comments, the considerable risks to public health and safety as well as impacts to cultural resources will likely disproportionately impact communities identified by the EJTF, specifically low-income and minority communities.

Chapter 2. APPLICATION COMPLETENESS

2.1 The Department Must Deny the Permit because the Application is Not "Complete" *(ORS 196.825(12)(b)).*

DSL must deny the permit because the application is not "complete" consistent with Oregon's removal-fill statute. ORS 196.825(12)(b) defines a "completed application" to:

> ... contain[] all necessary information for the director to determine whether to issue a permit, including:
> (A) A map showing the project site with sufficient accuracy to easily locate the removal or fill site;
> (B) A project plan showing the project site and proposed alterations;
> (C) The fee required under ORS 196.815;
> (D) Any changes that may be made to the hydraulic characteristics of waters of this state and a plan to minimize or avoid any adverse effects of those changes;
> (E) If the project may cause substantial adverse effects on aquatic life or aquatic habitat within this state, documentation of existing conditions and resources and identification of the potential impact if the project is completed;
> (F) An analysis of alternatives that evaluates practicable methods to minimize and avoid impacts to waters of this state;
> (G) If the project is to fill or remove material from wetlands, a wetlands mitigation plan; and

[16] William J. Clinton: "Memorandum on Environmental Justice," February 11, 1994, http://www.epa.gov/compliance/ej/resources/policy/clinton_memo_12898.pdf.
[17] ORS 182.545.

> (H) Any other information that the director deems pertinent and necessary to make an informed decision on whether the application complies with the policy and standards set forth in this section.[18]

Relevant substantive criteria of ORS 196.825 include the following:

> 3) In determining whether to issue a permit, the director shall consider all of the following:
>
> (a) The public need for the proposed fill or removal and the social, economic or other public benefits likely to result from the proposed fill or removal …
>
> ***
>
> (e) Whether the proposed fill or removal conforms to sound policies of conservation and would not interfere with public health and safety.
>
> (f) Whether the proposed fill or removal is in conformance with existing public uses of the waters and with uses designated for adjacent land in an acknowledged comprehensive plan and land use regulations.

In order to be able to apply these standards, the application must include, among other things: 1) a complete design of the project with enough detail to satisfy application requirements; 2) a detailed analysis of the wetland and water impacts along the entire pipeline route; 3) a demonstration of how the applicant will mitigate the permanent impacts; and 4) a demonstration of how the applicant will rectify temporary impacts.

In summary, the Department must consider the application incomplete and deny the permit because:

- The application fails to provide essential information and analysis of wetland and/or water impacts in areas where access has been denied by landowners;
- The application does not contain cross-section drawings for fill and/or removal where the pipeline crosses jurisdictional waters that are specifically required by the project drawings criteria;
- Presumed obstruction hazards identified by the Federal Aviation Administration (FAA) will require termination or re-design of the project;
- The application fails to address deficiencies identified by DEQ in the 401 state water quality certification application (JPA);
- The application fails to include referenced mitigation plans; and
- The application fails to include the necessary contaminant studies regarding the marine slip dock and access channel area.

Each of these points is discussed in further detail below. The Department must consider the application incomplete under ORS 196.825(12)(b) and deny the permit.

[18] ORS 196.825(12)(b)

A. The Application Fails to Provide Essential Information and Analysis of Wetland and/or Water Impacts in Areas Where the Applicants Have Been Denied Access by Landowners

DSL must deny the permit because the application is incomplete due to the lack of information provided by the applicants regarding the documentation of existing conditions and resources and identification of the potential impacts to aquatic life or aquatic habitat if the project is completed as required under sub-part (E) of ORS 196.825(12)(b)). Critically, the application includes survey data from only some of the proposed water and wetland crossings. Without surveys on every parcel, DSL cannot find the application complete because it does not provide the information required by sub-part (E) of ORS 196.825(12)(b).

1. The Wetland Survey is Insufficient

First, the wetland survey is insufficient because there are at least 83 un-surveyed parcels along the proposed pipeline route for a total of 20.88 miles impacted by the pipeline. [19] Coos County has 29 un-surveyed parcels, for a combined estimated 6.86 miles impacted. There are 37 un-surveyed parcels in Douglas County for a combined 10.89 miles. In Jackson County, there are 9 un-surveyed parcels, or 0.65 miles impacted, and in Klamath County there are 8 un-surveyed parcels with a combined impact of 2.48 miles.[20] DSL should not consider the wetland survey to be complete because of these parcels where access has been denied (*See* Appendix C. Table 2.3-1 "Wetland Survey – Parcels Where Access Was Denied up to June 13, 2017"). As one example, at MP 56.69 there is a large wetland excavation proposed by the applicants to remove an estimated 693 cubic yards of material to construct a 415-foot wide crossing where the landowner has denied access.[21] Without complete surveys of the potentially impacted wetlands neither the Department nor the public can properly assess the true impact of the proposed project.

2. The Flowing Water Survey is Insufficient

Second, the flowing water survey is insufficient. There are un-surveyed proposed pipeline crossings of creeks and streams in the proposed pipeline route, which are identified in Table A of Application Attachment F.1 They are numbered 01-16, although 02-04, 10, and 15 are missing (*See* Appendix D. Excerpts from Attachment F.1 Table A.). They amount to a combined crossing width of 29.87 feet and 52.24 cubic yards excavated. We have identified more landowners that are classified in the company's maps in Application Attachment F.5 as having denied survey access, although they are not marked as such in Table A.[22]

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[19] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: ATTACHMENT C.2, Table 2.3-1, p. 2564-2566 of 3638.

[20] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: ATTACHMENT C.2, Table 2.3-1, p. 2564-2566 of 3638.

[21] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: Appendix A.2, Table A.2-3, p. 1477 of 3638

[22] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 1 JCEP: ATTACHMENT F.5, Map Series 3, p. 1795-2119 of 3638

For example, although the Lost River crossing has not been marked as "Denied Access" like others, the note in the Crossing Method Rationale indicates that it too has not been permitted to be surveyed. Specifically, the applicants state:

> An HDD and conventional bore are likely probable at the approximate crossing location based on the topography, geometry and expected geotechnical conditions. ***Landowner restricted access for geotechnical investigations***. Significant costs, time requirements were the determinants for the proposed dry open-cut method.[23]

Similarly, there is a crossing on a tributary to Shields Creek which is referenced in Table B3.4 that has been denied survey access and lists no ESA, anadromous, or EFH species present, even though the same crossing appears in Table A and states that the site has assumed ESA and EFH species present. The rest of the un-surveyed crossing are listed as having no ESA, anadromous, or EFS species present although this information is not verified by survey. There are un-surveyed crossings on tributaries to Steele Creek that are classified as having no ESA, anadromous, or EFH species present, though Steele Creek was surveyed, and has a confirmed presence of all three.

3. Un-surveyed Water Crossings

Third, the applicants' assessment of un-surveyed water crossings is also incomplete because of sites where it is unknown whether or not water is present because the landowners have denied survey access. The applicant has only provided detailed maps of some segments of the pipeline route. Map Series 2 shows the overview of which parcels have denied survey access, and also which segments the company has provided an alignment map for. We have provided two examples in Appendix E. Excerpts from Map Series 1. DSL should deem the application incomplete and deny the permit because the applicants have provided insufficient wetland and flowing water surveys along the pipeline route.

B. The Application Does Not Contain the Cross-Section Drawings for Fill and/or Removal Where Pipeline Crosses Jurisdictional Waters Which Are Specifically Required by the Project Drawings Criteria.

According to DSL's Removal-Fill Guide, the project drawing required to process the application must include:

> Cross section drawings are required to illustrate the vertical extent of removal and fill activities relative to existing elevations. To be meaningful, the location of cross sections on the plan view should be in the area of greatest extent of removal-fill activity. Cross sections must be of a scale sufficient to evaluate proposed removal-fill activities and must include:
>
> o A vertical and horizontal scale
> o The existing and proposed ground elevations
> o Jurisdictional boundaries (e.g., OHW or wetland boundary)
> o The proposed water elevation, if applicable

[23] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697PART 1 JCEP: ATTACHMENT F.1, Table A., p. 1054 of 3638 (emphasis added).

o Any structures or construction limits[24]

The application includes only generic Best Management Practice (BMP) drawings to describe construction practices at crossings categorized as "Yellow Management." These are not sufficient to meet this requirement as they do not include the requisite detail described above.[25]

1. Oregon's Department of Environmental Quality Rejects BMPs as Inadequate

Further, DEQ consistently makes the case that the use of BMPs by the applicants throughout the Joint Permit Application ("JPA") is not sufficient detail to allow for a comprehensive environmental review, as required under DEQ's authority under both Oregon law and the Clean Water Act. For example, regarding the construction of the pipeline route, DEQ notes in its 20 December 2018 letter to Jordan Cove that:

> ***Citing potential BMPs by themselves is insufficient.*** DEQ recognizes BMPs as one part of a broader strategy that must also consider existing water quality, local environmental conditions, the anticipated magnitude of project-related effects, and appropriate engineering controls to mitigate negative effects on water quality. Proposed BMPs must be well-supported using quantitative analyses such as modeling, manufacturer's technical specifications, results of pilot tests, or other quantitative data to support their site-specific use to effectively achieve water quality objectives. Please provide a plan that demonstrates how proposed BMPs or other engineering controls will protect water quality at each location where project actions may directly or indirectly affect waters of the state. The plan should provide a site-specific analysis of each proposed activity and technical justification for each proposed remedy as discussed more fully in the following section.[26]

DSL should review the concerns expressed by DEQ regarding the lack of site-specific information for the project. DSL should deem the application incomplete and deny the permit because the application fails to provide site-specific cross-section drawings.

C. Presumed Obstruction Hazards Identified by the Federal Aviation Administration (FAA) will Require Termination or Re-design of the Project to Avoid Negatively Interfering with Public Health and Safety

The FAA issued thirteen (13) separate Notice(s) of Presumed Airport Hazard(s) to Jordan Cove LNG on May 7, 2018.[27] Nine (9) of these FAA Presumed Airport Hazards involve transiting LNG tanker ships at various points within the Coos Bay Estuary.

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[24] https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf Chapter 5, p. 20

[25] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: ATTACHMENT C.16 ADDENDUM, Appendix B, p. 3228-3244 of 3638

[26] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 1. (emphasis added).

[27] http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20180510-5165 Part 8 pp 281-326 of 326

Presumed Airport Hazards are included in this document in Appendix F. Notice of Presumed Hazards as follows:

- LNG Carrier Vessel - Stack, Transit Point 6 - 2018-ANM-720-OE
- LNG Carrier Vessel - Stack, Transit East Point - 2018-ANM-719-OE
- LNG Carrier Vessel - Stack, Transit West Point - 2018-ANM-718-OE
- LNG Carrier Vessel - Stack, Transit Point 5 - 2018-ANM-8-OE
- LNG Carrier Vessel - Stack, Transit Point 4 - 2018-ANM-7-OE
- LNG Carrier Vessel - Stack, Transit Point 3 - 2018-ANM-6-OE
- LNG Carrier Vessel - Stack, Transit Point 2 - 2018-ANM-5-OE
- LNG Carrier Vessel - Stack, Transit Point 1 - 2018-ANM-4-OE
- LNG Carrier Vessel - Stack - 2017-ANM-5418-OE
- Amine Regenerator - 2017-ANM-5389-OE
- Oxidizer - 2017-ANM-5388-OE
- LNG Tank North - 2017-ANM-5387-OE
- LNG Tank South - 2017-ANM-5386-OE

In each incidence, the FAA has instructed Jordan Cove LNG to resolve the Traffic Pattern Airspace penetration by lowering the structure height, terminating the project, or requesting further study by the FAA.

Pertaining to LNG Tank North and LNG Tank South, the applicants have explicitly stated their refusal to lower the structure heights, citing “economic viability” as its rationale:

> 10.4.2 LNG Storage Tank Design Alternatives
>
> JCEP considered whether the LNG storage tanks could be reduced in height or placed underground for greater safety and to reduce their visual impacts. Tanks with lower heights would be less of an obstruction to aircraft landing or taking off from the Southwest Oregon Regional Airport, whose runways are located about 1.1 miles from the proposed LNG storage tank locations.
>
> <...>The required 320,000 m^3 in total LNG storage capacity necessary for the economic viability of the Project established the tank aspect ratio (height to diameter). <...>The two 160,000 m^3 LNG storage tanks have been designed to fit within the long and narrow Ingram Yard site.[28]

In response, the Federal Energy Regulatory Commission (FERC) has recently requested that Jordan Cove provide information concerning the height and elevation of the LNG storage tanks as pertains to FAA Determination per 14 C.F.R. § 77.[29]

On 20 December 2018, Jordan Cove responded to FERC’s request for information with the following:

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[28] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 1 JCEP: ATTACHMENT B.1 Resource Report 10, p. 240 of 3638.

[29] https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20181130-3028 p. 3 of 16.

> a) The FAA has been notified of the LNG storage tanks and elevation. Form 7460s were filed with the FAA in December 2017 and Notices of Presumed Hazards were received on May 7, 2018, and filed with FERC on May 10, 2018. JCEP is currently working on further analysis to conclude the process in 2019 as required by 14 C.F.R. Part 77.
> b) <...>
> c) The FAA has been notified of LNG carrier operations and heights. Form 7460s were filed with the FAA in December 2017 and Notices of Presumed Hazards were received on May 7, 2018, and filed with FERC on May 10, 2018. JCEP is currently working on further analysis to conclude the process in 2019 as required by 14 C.F.R. Part 77.[30]

Given that major revisions to the LNG Terminal site plan and the Carrier Vessel stack points will be necessary, the project design is incomplete until all presumed hazards identified by the FAA are resolved. Moreover, given the FAA's determination, the current application cannot be deemed complete until a further study is conducted and submitted because DSL will not be able to properly assess the public health and safety impacts of the dredge and fill proposal without such a study.

D. Applicants Have Failed to Address Deficiencies in Information Submitted in Support of this Application that Were Identified as Inadequate by DEQ in Jordan Cove's 401 Water Quality Certification Application

In the related review, DEQ noted the following deficiencies in the information the applicant submitted in support of its 401 Certification application.[31] The information DEQ notes is missing from those materials is also relevant to DSL's fill and removal permit because both applications rely on largely the same materials.

1. Temporary Access Roads ("TARs") and Permanent Access Roads ("PARs")

Regarding the proposed use of new and existing roads, DEQ identifies multiple areas where the information provided by the applicants is not sufficient:

> Please provide the location of the propose<sic> 25 miles of new Temporary and Permanent Access Roads <...> Additionally, please provide detailed best management practices and design standards for DEQ review and approval for decommissioning the Temporary Access Roads.[32]

And further:

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[30] http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20181220-5255 p. 5 of 57

[31] Department of Environmental Quality. RE: Additional Information Request Jordan Cove Energy Project (FERC Project No. CP17-494) Pacific Connector Gas Pipeline (FERC Project No. CP17-495) U.S. Army Corps of Engineers (Project No. NWP-2017-41). 7 September 2018. https://www.oregon.gov/deq/FilterDocs/jcairrequest.pdf

[32] Department of Environmental Quality. RE: Additional Information Request Jordan Cove Energy Project (FERC Project No. CP17-494) Pacific Connector Gas Pipeline (FERC Project No. CP17-495) U.S. Army Corps of Engineers (Project No. NWP-2017-41). 7 September 2018. https://www.oregon.gov/deq/FilterDocs/jcairrequest.pdf. P. 8-9 of 15.

> <...> Please provide a post-construction stormwater management plan <...> for all the road stream crossings that Cove Energy Project and Pacific Connector Gas Pipeline will:
>
> ● Replace or improve to construct and/or operate the gas pipeline and
>
> ● Result in an increase in impervious surface area during the replacement/improvement process.[33]

DEQ specifically raises concerns regarding the lack of quantitative analysis of water quality impacts from new or existing roads, stating:

> Jordan Cove must include quantitative and/or engineering support for the proposed controls or best management practices. For example, DEQ suggests using models such as Geomorphic Road Analysis and Inventory Package (GRAIP) and XDRAIN to provide DEQ with the requested evaluation of potential water quality impacts from PCGP's proposal to use existing roads and to build new roads. Adequate quantitative analysis is necessary to demonstrate that current and future erosion control planning will not "cause or contribute to a violation of in-stream water quality standards" as required in Schedule A.10.a of the NPDES 1200-C General Permit and OAR 340-048-0042(2)(a).
>
> Jordan Cove's response does not include estimates of sediment discharge from the construction and post-construction rightof-way.[34]

2. Proposed Dredging Activities

In its 20 December 2018 letter to Jordan Cove (*See* Appendix G), DEQ specifically identifies the lack of detailed plans and reliance upon conceptual designs as problematic, stating:

> To ensure compliance with Oregon's turbidity standard (OAR 340-041-0036), JCEP must demonstrate in the pollution control plan requested in Comment 39 that "all practicable turbidity controls have been applied" during JCEP's dredging activities. JCEP's information in the references noted in its response provide a conceptual approach to minimize turbidity and other pollutant discharges. JCEP has not fully developed the details of all its proposed controls and this creates uncertainty regarding their efficacy. For example, PCGP's proposed pollution control plan for dredging must clearly identify:
>
> • The type of pollution controls JCEP will use including its design and specifications.
>
> • The specific applications for these controls.
>
> • The specific location where JCEP will employ these controls relative to sensitive sites as well as other landscape features (e.g., drainage pattern, vegetation, etc.).
>
> • The maintenance schedule for each control.

[33] Department of Environmental Quality. RE: Additional Information Request Jordan Cove Energy Project (FERC Project No. CP17-494) Pacific Connector Gas Pipeline (FERC Project No. CP17-495) U.S. Army Corps of Engineers (Project No. NWP-2017-41). 7 September 2018. https://www.oregon.gov/deq/FilterDocs/jcairrequest.pdf. P. 10-11 of 15.

[34] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 1-2 of 92.

> • A monitoring plan for evaluating the efficacy of all proposed controls and compliance with the turbidity standard.[35]

3. Slope Stability and Landslide Risk

DEQ also identifies multiple deficiencies in Jordan Cove's analysis of slope stability, landslides, and fill slope design on steep and unstable slopes. For example, DEQ states:

> In Resource Report 6 (Geologic Resources), PCGP provides few specifics regarding controls to stabilize slopes to prevent landslides. Moreover, as noted in DEQ's review of PCGP's response to Comment 35 below, PCGP provides no engineering designs and the technical support for these designs for stabilizing fill slopes on steep, unstable slopes greater than 30% including slopes with highly erosive soils. PCGP identifies this deficiency on page 35 of Section 4.6.2 of Resource Report 6 by stating the following:
>
> > *Steep side slope Pipeline construction segments will be identified during the final design phase of the Pipeline project. Fill slope construction details and specifications will be designed for the identified steep side slope Pipeline segments.*
>
> In Section 11.0 (Steep and Rugged Terrain), PCGP provides only a qualitative description of how it may approach fill slopes on steep, unstable slopes starting at the bottom of page 47. However, this mostly qualitative discussion does not consider terracing on erosive soils nor does it thoroughly address the management of stormwater on a terraced fill slope. The management of drainage on these steep slopes, the use of geotextiles or other engineering techniques to support terracing, and the need to reinforce the toe of slope are also not addressed in PCGP's submittal. These are issues typically addressed in technical references developed to construct linear infrastructure such as roads on steep slopes. However, PCGP does not discuss or addressed these issues in PCGP's submittal.[36]

4. Waterbodies Crossed by or Within 100 Feet of Pipeline

Further, DEQ emphasizes the potential impacts to water quality and designated beneficial uses beyond the waterbodies crossed by or within 100 feet of the pipeline. Specifically, DEQ states:

> Moreover, DEQ questions PCGP's proposal to focus BMPs on water bodies crossed by or within 100 feet of the pipeline. BMPs are required to protect water quality from

[35] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 82 of 92.

[36] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 18 of 92.

> impervious surfaces throughout all portions of the construction and permanent right-of-way that are hydrologically connected to water bodies.[37]

To the knowledge of the Commenters, the applicants have not met this request for information from DEQ. In addition, DEQ has repeatedly identified Jordan Cove's reliance upon BMPs and qualitative analysis with no site-specific information as insufficient. All of the information discussed in sub-sections (1) through (4) above that has been found to be deficient by DEQ is also necessary for the Department to adequately evaluate the impacts of fill and removal activities at those locations

E. The Application Fails to Include the Required Mitigation Plans

The application fails to include compensatory mitigation plans from the Forest Service and the Bureau of Land Management ("BLM"). These plans include mitigation for activities in riparian reserves and other wetlands on federal lands. The applicants claim that "[t]he BLM and Forest Service have proposed a suite of off-site mitigation projects which are intended to be responsive to BLM RMP and Forest Service LRMP objectives."[38]

The Department should deem the application incomplete and deny the permit because the application fails to provide mitigation plans for wetland disturbances on Federally-owned lands, as required under ORS 196.825(12)(b)(G).

F. The Application Fails to Include the Necessary Contaminant Studies Regarding the Marine Slip Dock and Access Channel Area

According to the former Environmental Inspector for the JCEP Kiewit $15 million exploratory test program conducted at the LNG terminal site on the North Spit of Coos Bay,[39] the applicant has not conducted adequate contaminate studies in the Marine Slip dock and access channel area.

> The contamination at the JCEP terminal site occurs well outside of the range of where the previous testing was conducted. Much more testing is needed at the overall site to fully understand the extent. Contaminated soil was exposed virtually everywhere excavation occurred in Ingram Yard and along the shoreline during the Kiewit exploratory test program conducted for the project in the spring of 2014. While the types of contaminants are somewhat understood, their extent is not.[40]

Dredging could release into the Coos Estuary harmful compounds from past industrial activities that are likely to be found buried in the tidal sediments. Without this information, DSL is not able to effectively determine if the dredge activity will further degrade water quality and harm marine life in the Estuary. DSL should deem the application incomplete and deny the permit because the application fails to provide contaminant studies for the Marine Slip dock and access channel area.

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[37] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 32 of 92.

[38] https://www.oregon.gov/deq/FilterDocs/jcairrequest.pdf pages 2586 and 2666 of 3638.

[39] http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20141218-5020 p. 1 of 8

[40] http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20150212-5193 p. 1 of 3

G. Conclusions

For the above stated reasons, the application that JCEP filed for the DLS removal-fill permit does not contain the information necessary for DLS to “make an informed decision on whether the application complies with the policy and standards set forth in [the relevant substantive criteria]. ORS 196.825(12)(b) and (b)(H).

Chapter 3. PUBLIC NEED

3.1 The Department Must Deny the Permit because the Applicants Have Failed to Demonstrate Public Need for the Project (*ORS 196.825(3)(a)*).

Under ORS 196.825(3)(a), DSL is required to consider the “public need” for the proposed removal fill:

> (3) In determining whether to issue a permit, the director shall consider all of the following:
>
> (a)The public need for the proposed fill or removal and the social, economic or other public benefits likely to result from the proposed fill or removal. When the applicant for a permit is a public body, the director may accept and rely upon the public body’s findings as to local public need and local public benefit.[41]

According to DSL’s removal-fill guide:

> The Department will consider whether a public need has been demonstrated in the application and what benefits the public may derive from the proposed removal-fill activity. When the applicant is a public body (including federal, state or local government agency, port, or other entity defined in ORS 174.109) the Department will generally accept the public body's rationale as to local public need and benefit without further consideration.[42]

This project has an imbalance between the benefits, which accrue almost exclusively to a private company, and detrimental effects, which fall entirely on the public and other private landowners. There is no demonstration of *public* need for this project at all. In fact, FERC approval was recently denied for exactly that reason.[43] The Department cannot find there is a predominate public need for the project because the project is unnecessary, there is no evidence of demand for it, and the public need identified by the applicants is outweighed by the loss to Oregon’s waters.

Critically, as discussed by the Oregon Court of Appeals in *Citizens for Resp. Devel. In the Dalles v. Walmart,* 295 Or App 310 (2018), the Department must do more than merely consider the public need for the proposed project. Specifically, the Court states:

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[41] ORS 196.825(3)(a).

[42] A Guide to the Removal-Fill Permit Process. Oregon Department of State Lands. December 2016. P. 6-13.

[43] FEDERAL ENERGY REGULATORY COMMISSION, ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION 18 (2016).

> Thus, the legislative history demonstrates that the legislature intended to codify *Morse's* construction of the statute, which ***required DSL to find that the public need predominates over the loss to the waters of the state*** caused by the proposed project.[44]

Further, the Court holds that:

> The court's conclusion in *Coos Waterkeeper* that *Morse* does not bear on the construction of the term "project" in ORS 196.825 does not affect the core principle recognized in Morse and codified by the legislature in 1979, which requires DSL to find that the public need for a proposed project predominates before DSL has the authority to issue a wetland fill and removal permit for the project. ***Because DSL found that it was inconclusive whether the project would address a public need, DSL lacked authority to issue the permit. Hence, DSL erred by granting the permit.*** [45]

Consistent with *Citizens for Resp. Devel. In the Dalles v. Walmart* 295 Or App 310 (2018), the Department must affirmatively determine that the project would address a public need. For a privately-sponsored project of this scale and controversy, the public need determination will require a thorough and transparent analysis that weighs all of the relevant impacts and alleged benefits of this project.

Any evidence that this project serves a public need must be weighed against the overwhelming evidence that developing the Jordan Cove LNG Export Project, and all of its associated developments (construction and operation of the Pacific Gas Connector Pipeline, significant physical modifications of Coos Bay, upstream impacts from gas fracking, direct and downstream GHG emissions, disruption of navigation, etc.) will cause significant public harm as explained in this letter and throughout the public record for this matter. This is reflected in FERC's rejection of the application for the applicant's LNG export terminal in March 2016, where FERC stated:

> We find the generalized allegations of need proffered by Pacific Connector ***do not outweigh the potential for adverse impact*** on landowners and communities… Because the record does not support a finding that the public benefits of the Pacific Connector Pipeline outweigh the adverse effects on landowners, we deny Pacific Connector's request for certificate authority to construct and operate its project.[46]

The Department has a responsibility to protect the public interest and should not frame the public need question in a way that avoids that responsibility to find a predominate public need for the project as a whole in light of all the relevant impacts.

A. The Project is Unnecessary and There is No Evidence of Demand for it.

The proposed crossing of Coos Bay and numerous other water bodies will impair recreation, navigation, fishing, and other water-dependent activities, causing economic harms that must be considered in the Department's review of public need under ORS 196.825(3)(a). The project will

[44] *Citizens for Responsible Development in the Dalles v. Walmart*. 295 Or App 310 (2018). P. 317
[45] *Id*. at 321 (emphasis added).
[46] Federal Energy Regulatory Commission. ORDER DENYING APPLICATIONS FOR CERTIFICATE AND SECTION 3 AUTHORIZATION. 11 March 2016. P. 18. Emphasis added.

likely have numerous adverse impacts relating to the impairment of commercial and recreational use of Coos Bay and environmental degradation caused by increased sedimentation and other impacts to water quality throughout the project area. Meanwhile, there is no evidence of an actual need for the project, or that the project will actually enter operation—and an idle pipeline and terminal do not provide meaningful economic benefits. If the Department follows the holding in *Coos Waterkeeper v. Port of Coos Bay*, 363 Or 354 (2018), and chooses to exclude consideration of the operational impacts of this project, they should also exclude the operational economic benefits touted by applicants.

More broadly, the applicants' discussion of economic benefits is one-sided and ignores adverse impacts such as job displacement, opportunity cost, economic harm, and boom-bust cycles (described below). Similarly, although the federal Department of Energy recently published a renewed report on the macroeconomic impacts of exports, this report ignored distributional issues and the fact that many Americans will be made worse off by increased North American gas exports.

The Department must not adopt a simplistic view that evidence of demand for gas as an indication of public benefit. First, DSL has made prior findings that "While there may be a market demand for the products and services offered by [the applicant], the desire of [the applicant]to enter the market does not necessarily constitute a public need."[47] Second, demand for gas is really demand for energy and there are many competitive alternative sources of energy. Third, fossil fuels have many serious adverse externalities that shift costs from the applicant to the general public, including but not limited to global climate change and ocean acidification.

Finally, the project proponents have failed to show that anyone wants to buy the LNG they propose to sell. In 2016, FERC denied the prior applications because, in large part, applicants had provided "little or no evidence" that any third party was interested in purchasing gas delivered by the pipeline or liquefied natural gas made available by the terminal.[48] Although this denial was without prejudice, and applicants have since re-filed, they have not corrected this fundamental flaw. They have provided *no* evidence of commitments for the liquefied natural gas sales that are the ultimate purpose of the related projects. Instead, applicants submit only two press releases stating that applicants *hope* to negotiate agreements for some sales, but even this hope only amounts to *less than half o*f the terminal's proposed capacity.[49] Those press releases were hastily issued after FERC denied the prior proposal, and there is no evidence indicating that now, over two years later, these negotiations have meaningfully progressed—despite the fact that the applicants and any potential customers clearly understand the need to demonstrate market support for these projects.

B. The Applicants' Analyses Ignores Economic Costs and Overstate Economic Benefit.

Even if the project moves forward, it will not provide meaningful economic benefits that outweigh public harm. The applicants argue that the project will benefit the Oregon economy

[47] DSL Findings in the permit underlying the *Citizens v Wal-Mart* (2018) case.
[48] 154 FERC ¶ 61,190, PP39-40 (Mar. 11, 2016), https://www.ferc.gov/CalendarFiles/20160311154932-CP13-483-000.pdf.
[49] Jordan Cove Energy Project, Application to FERC at 15 n.16 & n.19.

because of direct spending and employment associated with project construction and operation, and because of the indirect impact of these expenditures.[50] However, the applicants' arguments rely on a modeling approach that is fundamentally flawed in ways that overstate potential benefits and that ignore adverse impacts. Crucially, this analysis ignores displacement effects—e.g., the fact that some of the people working in these jobs would work other jobs if the project does not go forward—or the counterfactual of how the economy might have grown without the project.[51] Indeed, in discussing nationwide macroeconomic impacts of LNG exports, DOE has acknowledged that such displacement is an important factor that cannot be ignored.

Separate from this modeling, the applicants' other assertions regarding socioeconomic impact are misleadingly one-sided. For example, the applicants only consider ways in which the project might *increase* property values, entirely ignoring the likelihood that properties encumbered by a pipeline easement will suffer a decline in value, or that harmful impacts of the project will decrease demand for property and property values in the affected regions.[52]

Applicants also fail to account for the adverse social and economic effects related to "boom-bust" economics. Project construction will lead to a temporary economic boom that has known adverse effects related to housing shortages, housing inflation, drugs and prostitution associated with so-called "man camps," shortages of accommodations available for industries other than construction. The boom is followed by a rapid and dramatic bust that includes high unemployment, related social problems, housing deflation and disrepair, etc.[53]

More broadly, the applicants ignore the adverse economic impacts of fill-removal and harm to the environment and other uses of Coos Bay, such as adverse impacts to navigation, recreation, commerce, quality of life as a magnet for economic activity, and habitat for economically important species like Dungeness crab, salmon, oysters, clams, and others.[54]

1. The U.S. DOE General Analysis of LNG Export Ignores Important Impacts

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[50] JCEP RR5, *supra* note 358, at Appendix B.5.

[51] *See, e.g.,* Amanda Weinstein & Mark Partridge, *The Economic Value of Shale Gas in Ohio* at 11 (2011), https://aede.osu.edu/sites/aede/files/publication_files/Economic%20Value%20of%20Shale%20FINAL%20Dec%202011.pdf. The Jordan Cove Project threatens to degrade Oregon's quality of life which serves as a foundation for economic development. Lehner, J. 2015. "Migration (In Defense of Californians)." Oregon Office of Economic Analysis. 9-8-2015. https://oregoneconomicanalysis.com/2015/09/08/migration-in-defense-of-californians/. Schmidt, L. and P. N. Courant (2006). "Sometimes Close is Good Enough: The Value of Nearby Environmental Amenities." Journal of Regional Science 46(5): 931-951. https://ideas.repec.org/p/wil/wileco/2003-07.html. Sonoran Institute, Prosperity in the 21st Century West - The Role of Protected Public Lands. http://web.archive.org/web/20070105005615/http://sonoran.org/pdfs/Prosperity%20Report.pdf.

[52] JCEP RR5, *supra* note 358, at 17.

[53] Seydlitz, R. and S. Laska. 1993. Social and Economic Impacts of Petroleum "Boom and Bust" Cycles . Prepared by the Environmental Social Science Research Institute, University of New Orleans . OCS Study MMS 94-0016 . U.S . Dept . of the Interior, Minerals Mgmt . Service, Gulf of Mexico OCS Regional Office . New Orleans, La . 131 pp. https://www.boem.gov/ESPIS/3/3441.pdf. Grant D. Jacobsen and Dominic P. Parker 2016. The Economic Aftermath of Resource Booms: Evidence from Boomtowns in the American West. Economic Journal, 126.593 (2016) 1092-1128. https://pages.uoregon.edu/gdjaco/Booms.pdf.

[54] *Supra* part G.1.

The Department must not simply rely on the Department of Energy's assertion that increasing LNG exports generally provides macroeconomic benefits. DOE has published studies of exports' macroeconomic impacts in 2012, 2015, and most recently in 2018.

Similar to the project applicants' analysis, DOE's economic analysis ignores the environmental impact of increasing LNG exports. The DOE analysis fails to account for the significant negative externalities associated with fossil fuel use. These externalities effectively shift costs from the few that own stock in the corporations that are advancing this project to the public at large who will suffer real costs associated with climate change, ocean acidification, and other ecosystem services that are destroyed or degraded by this project. Expanding export infrastructure will increase gas production, in turn increasing emissions of both conventional and greenhouse gas pollutants. These emissions have public health, environmental, and ultimately economic consequences. For greenhouse gas emissions in particular, available tools such as the social cost of carbon protocols can be used to provide monetary estimates of the impacts of emissions. Because these impacts have consistently been omitted from DOE's analyses, those analyses do not provide a basis for the Department to conclude that there is a predominate public need for the project that outweighs public harms.

Even as to more traditional economic impacts, the DOE studies do not show that increasing exports will benefit the general public. Instead, these studies indicate that exports will make most Americans economically worse off, because of higher energy prices, while regressively redistributing wealth to the minority of Americans who own shares of gas production companies.[55] Although DOE has generally predicted a small net increase in gross domestic product as a result of exports, in the face of the regressive distributional impacts, this net increase is not enough to demonstrate a public benefit. And while DOE has contended that gas companies' increased profits will accrue to the public at large because of shares in these companies are ultimately owned by individuals, DOE has uniformly failed to provide any analysis of how share ownership is distributed.[56] LNG exports, by increasing energy prices for everyone while principally increasing profits for shareholders in gas companies, will affect a large and regressive redistribution of wealth. Simply moving money from gas consumers—including households that rely on gas for heat and cooking, or who will face higher electric bills because of increased energy prices—to gas producers is not an effect that furthers the public interest.

2. The Project's Social, Environmental, and Economic Costs Outweigh the Purported Economic Benefits.

This project will likely increase public hazards in many ways, as discussed in further detail in Chapter 8 *infra*. Much of the project will be built in an area subject to tsunami hazards and will modify the way tsunami waves bounce around the bay. This will increase public exposure, and infrastructure exposure, to tsunami hazards. Much of the project is located in an area with limited access for emergency vehicles and emergency personnel via the TransPacific Parkway which is built on a narrow berm near sea level. This project is located near an airport which increases hazards from accidental or intentional acts. The LNG tankers must have large safety buffers that

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[55] See, e.g., 2015 LNG Export Study at 15 Figure ES3, C-1

[56] *See, e.g.,* NERA Economic Consulting, *2018 Macroeconomic Study* 67 (2018), https://www.energy.gov/sites/prod/files/2018/06/f52/Macroeconomic%20LNG%20Export%20Study%202018.pdf.

will hamper navigation within Coos Bay, at the bar, and near offshore. This will expose people and watercraft to increased risks throughout the area and especially crossing the bar during restricted windows of opportunity. Construction of the PCGP will increase risks associated with landslides, forest fires, degraded water quality, trespassing, and loss of biodiversity. Climate change, caused in part by emissions related to this project, is also associated with many natural hazards, such as sea level rise, floods, droughts, intense precipitation events, fires, human disease, and crop failure.

C. Significant Changes in Project Design Have Occurred since DSL Approval of Removal-Fill Permit for Coos Bay Multi-Use Marine Slip

Significant changes in the project design have occurred since the time that the Department approved the removal fill permit for the excavation of the marine slip in Coos Bay. Specifically, the original proposal reviewed and approved by the Department included the LNG import facility as a component of a multi-use marine slip proposed by the Port of Coos Bay. *See SOPIP, Inc. v. Coos County*, 57 Or LUBA 301, 302 (2008) (explaining that, "[t]he proposed slip would be excavated and designed to be large enough to accommodate two berths, one of which would be dedicated to large ocean-going LNG tankers."). The Port's use of the terminal (as additional to and separate from the LNG project) was found to provide "considerable benefits" to the public that outweighed negative impacts to public trust resources. *Id*. at 314 n.6. The current project no longer anticipates a multi-use function, but instead will be totally dedicated to the LNG terminal facility. Rec. 10393.

Several of the previously asserted public benefits no longer apply given the narrowing of the project to a single, LNG-only marine terminal. There are no broad public benefits from attracting general new port activity and shipping activities because the proposed use no longer includes the Port's multi-use marine slip. The county's prior determinations of the benefits that would accrue to the county from the two-ship terminal, including number of jobs and increased marketability of the port, are no longer relevant to this proposal. These outdated analyses should be excluded from the record. Finally, this much more limited project purpose is a major consideration which provides additional support for a finding of no public need for this project.

C. Conclusions

In summary, the Department must affirmatively determine that the project would address a public need consistent with *Citizens for Resp. Devel. In the Dalles v. Walmart* 295 Or App 310 (2018). For a privately-sponsored project of this scale and complexity, the Department must consider public need in a transparent and comprehensive analysis that weighs all of the relevant impacts and alleged benefits of the project. The Department cannot find there is a predominate public need for the project because the project is unnecessary and there is no evidence of demand for it, the public need identified by the applicants is outweighed by the loss to Oregon's waters, discussed below, and significant changes in project design have occurred which further limit any public benefit.

Chapter 4. CONSISTENCY WITH PROTECTION, CONSERVATION, AND BEST USE OF WATER RESOURCES OF THE STATE

4.1 The Department Must Deny the Permit because the Application Fails to Provide Reasonable Assurances that the Project is Consistent with the Protection, Conservation, and Best Use of the Water Resources of the State (*ORS 196.825(1)(a)*).

The Oregon legislature has declared that the protection of the state's water resources is a state policy of the highest order. These policy goals are embodied in statute:

> The protection, conservation and best use of the water resources of this state are matters of the utmost public concern. Streams, lakes, bays, estuaries and other bodies of water in this state, including not only water and materials for domestic, agricultural and industrial use but also habitats and spawning areas for fish, avenues for transportation and sites for commerce and public recreation, are vital to the economy and well-being of this state and its people.
>
> ORS 196.805.

Under this statute, no person may remove any material from the "bed or banks" of state waterbodies, or fill any such waters, without a permit issued by DSL. ORS 196.810, ORS 196.815. In order to lawfully grant such a permit, DSL must determine that:

> the project described in the application: (a) is consistent with the protection, conservation and best use of the water resources of this state [...]; and (b) would not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing and public recreation.[57]

The Department's failure to carefully consider the relevant statutory criteria is grounds for reversal. *See, e.g., Morse v. Oregon Div. of State Lands*, 285 Or. 197, 207 (1979) (agency lacked authority to issue removal-fill permit in Coos Bay because it failed to make necessary statutory findings); *1000 Friends of Oregon v. Division of State Lands*, 46 Or. App. 425, 430 (1980) (setting aside permit for failing to make findings on a statutory factor).

Before the Department may issue a permit it must affirmatively determine that the project is consistent with the protection, conservation and best use of the water resources of this state. ORS 196.825(1)(a)). The permit applicant has the burden of proof to demonstrate compliance with this standard.[58] Given the significant impacts across more than 485 waterways of the proposed removal-fill activities and construction, combined with the inadequate information provided by the applicants regarding those impacts, DSL cannot reasonably make such as finding.[59]

Although the statute does not define what it means by "protection, conservation and best use of the water resources," the policy behind the fill and removal statutes states:

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[57] ORS 196.825(1).

[58] *In re Coyote Island Terminal LLC and Port of Morrow*. OAH Case Nos. 1403883 and 1403884. Rulings on Motions for Summary Determination. 11 August 2016.

[59] Commenters also incorporate by reference the comments they submitted to USACE and DEQ on the Clean Water Act § 404 permit and § 401 certification which discuss these issues in additional detail. These comments are included as Appendices A and B.

> Unregulated removal of material from the beds and banks of the waters of this state may create hazards to the health, safety and welfare of the people of this state. Unregulated filling in the waters of this state for any purpose, may result in interfering with or injuring public navigation, fishery and recreational uses of the waters. In order to provide for the best possible use of the water resources of this state, it is desirable to centralize authority in the Director of the Department of State Lands, and implement control of the removal of material from the beds and banks or filling of the waters of this state.
>
> (2) The director shall take into consideration *all beneficial uses of water* including streambank protection when administering fill and removal statutes.[60]

Section 303 of the Clean Water Act requires states to establish water quality standards that consist of designated beneficial uses of waterbodies, criteria to protect designated uses, and antidegradation requirements to protect existing uses and high quality waters. Under the Environmental Protection Agency's implementing regulations, states are required to specify designated beneficial uses that are "appropriate water uses to be achieved and protected" that "must take into consideration the use and value of water for public supplies, protection and propagation of fish, shellfish, and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation."[61] For all waters, the "[e]xisting in stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."[62]

Beneficial designated uses are defined under Oregon's regulations for the impacted watersheds and are summarized in the table below.

Table 1. Basin-Specific Criteria Designated Beneficial Uses

Basin-Specific Criteria	Beneficial Uses
South Coast Watershed OAR 340-041-0300	*Estuaries and Adjacent Marine Waters:* Industrial water supply Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Commercial navigation and transportation *All streams and tributaries thereto:* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting

60 ORS 196.805 (emphasis added).

61 40 C.F.R. § 131.10.

62 40 C.F.R. § 131.12(a)(1); 40 C.F.R. § 131.3(e) ("Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.").

	Fishing Boating Water contact recreation Aesthetic quality Hydropower
Umpqua Watershed OAR 340-041-0320	*Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers* *North Umpqua River Main Stem* *South Umpqua River Main Stem* *All Other Tributaries to Umpqua, North & South Umpqua Rivers* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (*does not apply for Umpqua R. Main from Head of Tidewater to Confluence of N. & S. Umpqua Rivers)*
Rogue Watershed OAR 340-041-0271	*Rogue River main stem from estuary to Lost Creek dam* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower Commercial navigation and transportation
Klamath Watershed OAR 340-41-0180	*Klamath River from Klamath Lake to Keno Dam (RM 255 to 232.5)* Public domestic water supply Private domestic water supply Industrial water supply Irrigation Livestock watering Fish and aquatic life Wildlife and hunting Fishing Boating Water contact recreation Aesthetic quality Hydropower (RM 255-232.5) Commercial navigation and transportation (RM 255-232.5)

As a result of dredging, damming, and trenching waterways, and of the use of HDD, the removal of riparian vegetation, the creation of temporary and permanent roads, and other proposed activities, the project would likely result in a lowering of water quality for at least the following parameters: Narrative Criteria; Biocriteria; Dissolved Oxygen; Temperature; Toxic Substances; and Turbidity. This lowering of water quality, together with loss of habitat and food sources, will adversely impact the existing designated beneficial uses of: Anadromous Fish Passage; Salmonid

Fish Rearing; Salmonid Fish Spawning; Resident and Aquatic Life; Wildlife and Hunting; Fishing; and Aesthetic Quality in the various waterbodies impacted by the project. The Department should deny the permit because the project would likely lower water quality and result in impairment of beneficial designated uses that is inconsistent with the "protection, conservation and best use of the water resources" under Oregon's removal-fill law and the applicants have not provided reasonable assurances that designated beneficial uses will not be impaired.

A. Use and Value of Water for Public Supplies Will Not Be Protected

All of the impacted watersheds include public domestic water supply and private domestic water supply as a beneficial designated use. The Department should require the applicants to identify and analyze all direct, indirect, and cumulative impacts to drinking water sources from the removal-fill activities and construction of the pipeline before it can evaluate whether this designated use will be impaired.

The project will likely impair public and private domestic water supply by:

- Contaminating sources through a frac-out as a result of Horizontal Directional Drilling proposed for rivers such as the Rogue that are a source of public drinking water;
- Increasing sedimentation through the construction of stream crossings, increased use of roads, and increased risk of landslides;
- Increasing temperature by removing riparian vegetation;
- Withdrawing large volumes of freshwater for activities such as hydrostatic testing, as part of the construction of the project, that will also impair water quality and quantity; and
- Interfering with groundwater sources.

For example, according to the Coos Bay North Bend Water Board (CBNBWB), the residents of Coos Bay and North Bend rely primarily on the Upper Pony Creek and Merritt Reservoirs, as well as the Joe Ney Reservoir, to supply municipal drinking water. CBNBWB also relies on groundwater from 19 wells in the Dunes National Recreation Area that can supplement industrial needs and municipal use.[63] Resource Report 2 for the LNG terminal does not provide substantive detail regarding impacts to municipal sources. DSL should require additional information from the applicants to fully assess potential impacts to the drinking water protection area from construction, operations, and maintenance of the LNG terminal and related facilities.

Similarly, the Medford Water Commission is identified by the applicants as one of the Drinking Water Source Areas that would be impacted by the project. The Medford Water Commission provides drinking water to approximately 91,100 people in the City of Medford, as well as the cities of Eagle Point, Central Point, Jacksonville, Phoenix, Talent, and Lake Creek Learning Center. Big Butte Springs, which is part of the Rogue watershed, is the source of the Medford Water Commission's drinking water supply.[64] Not only do the applicants propose to cross at least 88 waterways within the Rogue watershed, including the Rogue River, but they propose to bore underneath the Medford Aqueduct. The 31-inch Medford Aqueduct pipeline was constructed in 1927 and carries approximately 40 cubic feet per second of drinking water from

[63] 2016 Consumer Confidence Report. Coos Bay-North Bend Water Board. http://cbnbh2o.com/assets/Reports/2016_ccr.pdf.
[64] Medford Water Commission. http://www.medfordwater.org/SectionIndex.asp?SectionID=5.

Big Butte Springs to the City of Medford and communities within the Bear Creek watershed.[65] The applicants provide very minimal information regarding construction of this crossing. DSL should require more information regarding the depth of the bore and site-specific details to evaluate the potential direct, indirect, and cumulative impacts of the proposed pipeline crossing the main source of the City of Medford's drinking water.

According to Resource Report 2 for the Pacific Connector Pipeline, the applicants state that the pipeline will cross 12 Public Drinking Water Surface Water Source Areas (DWSAs).[66] At a minimum, this would impact approximately 156,000 people. Further, the report identifies multiple sites where a potable water intake is located less than three miles downstream from the proposed pipeline crossings. There are also a number of private potable water intakes less than three miles downstream from proposed pipeline crossings.[67] The applicants also identify eight proposed Temporary Access Roads ("TARs") and ten Permanent Access Roads ("PARs") within the identified Public Drinking Water Surface Water Source Areas that would be impacted by construction of the project.[68]

Critically, as DEQ points out in its 20 December 2018 letter to Jordan Cove, "PCGP's pipeline right-of-way is functioning as a primitive road."[69] Therefore, not only are there at least 18 temporary and permanent access roads that lie within the identified Public Drinking Water Surface Water Source Areas, but the pipeline in its entirely will function effectively as a road itself, with the potential to impact at least the 12 DWSAs identified by Jordan Cove. In its letter, DEQ raises significant concerns regarding potential sediment pollution from identified roads within the project area and from the pipeline itself:

> PCGP has not demonstrated in the Erosion Control and Revegetation Plan or Transportation Management Plan that PCGP will avoid discharging road drainage water into headwalls, slide areas, high landslide hazard locations, or steep erodible fill slopes. Moreover, PCGP has not addressed any of the ODF requirements noted below regarding forest road maintenance. ODF established FPA rule OAR 629-625-0600 to comply with water quality standards by timely maintenance of all active and inactive roads.[70]

Additionally, the proposed activities have the potential to impact groundwater supplies. Due to the potential interactions between groundwater and surface water systems that provide public and private domestic drinking water supplies, DSL should require identification of public groundwater supply wells that are within 400 feet of the construction right-of-way and associated construction facilities and assess impacts to additional groundwater wells that may be directly or indirectly impacted. DSL should also require the applicants to identify the presence of drain tiles or other factors that may increase the potential for contamination of groundwater resources.

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[65] "Big Butte Creek." Eagle Point Irrigation District. https://www.eaglepointirrigation.com/big-butte-creek.html.

[66] See Pacific Connector Gas Pipeline Project Resource Report 2: Water Use and Quality, Table 2.2-6, DSL p. 2519; Table 2.2-6. Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 12. PCP A-B Part 6. P. 223.

[67] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 12. PCP A-B Part 6. P. 223.

[68] See Pacific Connector Gas Pipeline Project Resource Report 2: Water Use and Quality, DSL p. 2521.

[69] Department of Environmental Quality. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. 20 December 2018. P. 14.

[70] Department of Environmental Quality. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. 20 December 2018. P. 15.

The Department may only issue a permit if it is able to affirmatively determine that the project is consistent with the protection, conservation and best use of the water resources of this state. ORS 196.825(1)(a)). Because the applicants have not provided the Department with critical information regarding the potential for project activities to negatively impact drinking water supplies, they have failed to meet their burden of proof to demonstrate compliance with this standard, and thus DSL cannot reasonably make such as finding.[71]

B. Protection and Propagation of Fish, Shellfish, and Wildlife Uses Will Not Be Protected

All of the impacted watersheds include fish and aquatic life, wildlife and hunting, and fishing as designated beneficial uses. The proposed activities for the project will likely impair these designated uses by degrading aquatic habitat for fish and shellfish.

1. LNG Terminal

Construction of the LNG terminal and related construction and maintenance activities will significantly impair habitat for fish and shellfish, thus harming designated beneficial uses protected under the Clean Water Act. Construction of the terminal itself would cover 538 acres of land, including 5.2 acres of open water and 169 acres of wetlands.[72] Additionally, the applicants propose construction of a 38-acre marine slip from uplands and a 22-acre access channel (2,200 feet wide at its intersection with the Coos Bay Channel). A 3-acre marine offloading facility would also be constructed. Construction of the slip and access channel would require dredging 5.7 million cubic yards of material and would result in the permanent loss of 14.5 acres of shallow subtidal and intertidal habitat, 0.06- acre of estuarine saltmarsh habitat, and 1.9-acres of submerged aquatic vegetation habitat (eelgrass). Dredged material would be transported to the LNG terminal, South Dunes site, Roseburg Forest Products site, or the Kentuck mitigation site.

Construction of the temporary berth would require dredging another 45,000 cubic yards of material. Dredging of the existing navigation channel would remove 700,000 cubic yards of material and would construct a temporary pipeline on the bottom of the channel over 8.3 miles to remove the dredged material. Widening of the Transpacific Parkway/Highway 101 intersection would require permanently filling in 0.51 acres of intertidal habitat. Future maintenance dredging at the slip, access channel, and navigation channel (NRI areas) would require dredging of between 34,600 – 37,700 cubic yards of material annually and additional dredging of the navigation channel of between 27,900 – 49,800 cubic yards of material every three years.[73]

In summary, the proposed activities at the LNG terminal will impact aquatic resources and therefore harm designated beneficial uses by:

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[71] Commenters also incorporate by reference the comments they submitted to USACE and DEQ on the Clean Water Act § 404 permit and § 401 certification which discuss these issues in additional detail. These comments are included as Appendix A and B.

[72] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 2.

[73] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 3-6.

- Permanently destroying at least 1.9-acres of eelgrass beds that provide habitat and food base for fish and invertebrate species including juvenile crab, juvenile lingcod, salmonids, starry flounder, and English sole;
- Impairing water quality by decreasing dissolved oxygen, changing salinity levels, increasing temperature, and increasing sedimentation as a result of dredging and other related activities;
- Activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel and construction of the pipeline across Coos Bay could all jeopardize the survival of aquatic species;
- Dredging would directly remove benthic organisms, such as worms, clams, starfish, and vegetation from the bottom of the bay. Crabs, shrimp, clams, oysters, and fish could become entrained in the operation of the dredging equipment;[74] and
- Degrade habitat and aquatic resources used by threatened and endangered species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly productive intertidal habitat to low productive deep-water habitat; by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

Consequently, the applicants have failed to provide reasonable assurances that the project will not impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing because the proposed activities at the terminal and in Coos Bay will permanently destroy habitat and degrade water quality for fish and shellfish. More detailed discussion of impacts to fish and shellfish is provided in Chapter 5 *infra*. Therefore, the Department must deny the permit.

2. Pacific Connector Pipeline

In addition to the proposed activities for the LNG terminal, the project would also involve construction of the 229-mile Pacific Connector Pipeline. The pipeline will dam, divert, trench, or use Horizontal Directional Drilling technology to cross approximately 485 waterways. Construction of the pipeline will affect at least 30,778-feet (5.83 miles) of wetlands and 3,028-feet of waterways. Approximately 48,675 cubic yards of material will be discharged into wetlands and 9,519 cubic yards of material will be discharged into waterways to construct the pipeline. Additionally, a 75-foot clear-cut buffer around waterways crossings would be constructed. [75] As stated by the applicants, impacts from stream crossings include:

> Clearing and grading of streambanks, removal of riparian vegetation, instream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat; increased sedimentation; turbidity; increase in temperature, decreased dissolved oxygen concentrations; releases of chemical and nutrient pollutants from sediments; and introduction of chemical contaminants, such as fuel and lubricants. An increase in soil

[74] DEIS 2014 at 4-569 to 4-570.

[75] U.S. Army Corps of Engineers. Public Notice Application for Permit and to Alter Federally Authorized Projects. 60-day notice. NWP-2017-41. 22 May 2018. P. 8.

compaction and vegetation clearing could potentially increase runoff and subsequent stream flow or peak flows.[76]

In summary, construction and operation of the proposed Pacific Connector Pipeline will impact aquatic resources and therefore harm designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing by:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage and long-term soil compaction and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

The Department cannot approve the permit because the applicants have failed to demonstrate that the proposed activities related to construction and operation of the pipeline will not impair designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing.

3. Impacts to listed aquatic species.

The project would likely jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act ("ESA"), or result in the destruction or adverse modification of critical habitat under the ESA. [77]

The project would impact threatened and endangered species by degrading habitat and aquatic resources used by species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly productive intertidal habitat to low productive deep-water habitat, by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

Expansive wetland fill and the dredging of millions of cubic yards of material from the Coos Bay estuary will result in the permanent loss of salmon habitat. Modifying the river flow and hydrology of Coos Bay; wake stranding of juvenile fish; discharge of warm engine cooling water and ballast water; long-term pile driving and dredging; and destruction of riparian and upland habitat along the entire pipeline will further impact threatened and endangered species listed

[76] Pacific Connector Pipeline Resource Report 2 Water Use and Quality. P. 35. PCP Part 6 P. 245.
[77] Impacts to fish and wildlife are discussed extensively in Appendix B. Clean Water Act 404 Comments

under the ESA. Local, state, and federal management plans all concede that dredging impedes salmon recovery and estuarine habitat restoration.

a. Coho salmon – Southern Oregon/Northern California Coast ESU

The project area includes two major river systems known to support SONCC Coho: the Rogue River and the Klamath River. The project is likely to adversely affect SONCC Coho due to numerous impacts to feeding, loss of hatching and rearing habitat from substrate removal and turbidity at stream crossings, barriers to migration during stream crossing construction, potential swim bladder rupture due to blasting activities, injury and mortality during fish salvage, and long term habitat deterioration due to reductions in large woody debris.[78] Stream crossing construction and removal of riparian vegetation are the two primary contributors to these impacts.

The pipeline construction will disrupt fish passage by damming the streams during the trenching and pipeline placement processes. It is unclear for how long fish passage would be interrupted. The mitigation of capturing and removing fish behind dams is historically ineffective, and in this case would likely result in the take of threatened salmonids. This is particularly troubling for large crossings proposed on the Coquille and Umpqua, and for potential crossings of the Rogue and Coos if proposed HDDs fail.[79]

Within the Rogue Basin, Trail Creek and Little Butte Creek have long been identified as major producers of SONCC coho.[80] The proposed pipeline route would cross the West Fork of Trail Creek, the North and South Forks of Little Butte Creek, as well as numerous smaller tributaries within this watershed. Prevost highlighted upper South Fork Little Butte Creek and West Fork Trail Creek as core areas in the Upper Rogue River watershed that are critical to the survival of SONCC coho in the region.[81]

The Upper Rogue section of the 2014 Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan notes that this watershed already has severely impaired water quality and degraded riparian forest conditions, concluding that future coho survival would be further threatened roads and timber harvest.[82] These stresses and threats would be increased by actions described in the application. In fact, the 2014 Southern Oregon/Northern California Coast (SONCC) Coho Recovery Plan identifies impaired water quality as one of the key limiting stressors for the Upper Rogue River population.[83] The Recovery Plan identifies increasing Large Woody Debris as one of six high priority recovery actions. The proposed pipeline route would

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[78] 2015 FEIS, *supra* note 49, at 4-629 - 31.

[79] *See* discussion of HDD failure, *supra* at 22-24.

[80] Jerry Vogt, *Upper Rogue Smolt Trapping Project, 2001* (2001), https://nrimp.dfw.state.or.us/nrimp/information/docs/fishreports/smolt01.pdf.

[81] Marc Prevost, et al., *Southwest Oregon Salmon Restoration Initiative* 65 (1997), https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/5029/Vol.2Chapter17F.pdf

[82] NATIONAL OCEANIC AND ATMOSPHEREIC ADMINISTRATION, SOUTHERN OREGON NORTHERN CALIFORNIA COAST COHO SALMON RECOVERY PLAN (2014), http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/southern_oregon_northern_california_coast/SONCC_recovery_plan.html.

[83] NOAA FISHERIES, UPPER ROGUE RIVER POPULATION:SOUTHERN OREGON/NORTHERN CALIFORNIA COAST (SONCC) COHO RECOVERY PLAN 32-1 (2014) hereinafter Coho Recovery Plan.

cross waterbodies that support threatened SONCC or have high intrinsic potential to support habitat.[84]

The pipeline crossings would also threaten SONCC recovery in the Klamath Basin. While the Upper Klamath Basin is currently unavailable to anadromous fish, resource agencies face a court mandate to restore fish passage to this area, whether or not PacifiCorp's main-stem dams on the Klamath are removed. Manual reintroduction of imperiled spring Chinook, and natural re-colonization of imperiled steelhead and ESA threatened Southern Oregon/Northern California Coast ESU (SONCC) coho, will occur in the Klamath Basin at an unknown time in the next 10 years. The DEIS does not address the need to coordinate construction through the Upper Basin with habitat used by returning anadromous fish as described in ODFW's *Plan for the Reintroduction of Anadromous Fish in the Upper Klamath Basin*[85] approved by the Oregon Fish and Wildlife Commission in July of 2008. The DEIS acknowledges that despite Pacific Connector's best management practices and mitigation measures, other effects to salmonid habitat elsewhere in the project area could include increased turbidity, frac-out from HDD, nutrient loading, decreased fish access, reduction of benthic organisms and large woody debris ("LWD"), and surface runoff.[86] These impacts apply to reintroduced fish populations as well.

Spencer Creek is recognized as a tributary used by coho and spring Chinook before implementation of the Klamath Hydro Project.[87] As such, it is a likely site for natural re-colonization of these fish. The Department should recognize this resource value, as recolonizing endangered coho and imperiled spring Chinook will be part of the beneficial uses associated with Spencer Creek watershed and its TMDLs.

The main-stem Klamath will also be a migration corridor for returning anadromous fish. The Coalition's comments in the following section regarding endangered sucker Critical Habitat also apply to imperiled spring Chinook, ESA threatened coho, and imperiled steelhead which may be using the main-stem Klamath by the time the proposed pipeline crosses it.

b. Coho salmon – Oregon Coast ESU

The project area includes designated critical habitat for the federally threatened Oregon Coast Coho: the South Umpqua Subbasin, Coquille Subbasin, and the Coos Subbasin (which includes the Coos Bay estuary). The DEIS acknowledges that the project is likely to adversely affect Oregon Coast Coho and its critical habitat.[88]

Activities related to the marine terminal and north spit facilities, including discharge of maintenance dredging spoils causing turbidity plumes, dredging of the access channel, and construction of the pipeline across Coos Bay could all jeopardize the survival of this species. Moreover, cooling water intake is likely to entrain and impinge many food sources for Coho,

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[84] *Id.* at 32-3.
[85] OREGON DEPARTMENT OF FISH AND WILDLIFE, DRAFT PLAN FOR THE REINTRODUCTION OF ANADROMOUS FISH IN THE UPPER KLAMATH BASIN (2008), https://www.dfw.state.or.us/agency/commission/minutes/08/07_july/Exhibit%20B_Attachment%204.pdf [hereinafter ODFW 2008].
[86] DEIS 2014, *supra* note 73, at 4-577, 4-605 - 06, 4-644.
[87] (Hamilton et. al. 2004).
[88] DEIS 2014, *supra* note 73 at 4-644 - 45.

such as juvenile stages of crab, shrimp, other zooplankton, and eggs and larval fish. Pipeline-related activities including stream crossing construction or failures of those operations, blasting, mortality during fish salvage operations, and loss of large woody debris for habitat also have the potential to cause jeopardy to the Oregon Coast Coho and adversely affect its designated critical habitat.[89] Therefore, if this project were to go through, an ESA Section 9 taking of the Coho salmon would likely occur and an ESA Section 7 consultation will be required.

The Department should require additional information from the applicants regarding direct mortality impacts to listed fish from dredging in Coos Bay. As discussed, the proposed hydraulic cutterhead dredge method will entrain juvenile fish, including threatened salmonids, as well as benthic organisms critical to salmon diets.[90] Mechanical dredging would not have the same fish entrainment impacts, but Jordan Cove has not seriously considered this alternative dredge method.

The Department must analyze the impacts of fish entrainment due to dredging, particularly for listed salmonids. The Department should also consider cumulative impacts on aquatic life, including the impacts from dredging, terminal construction, pipeline construction, and dredging and maintenance dredging to deepen the channel.

c. North American Green Sturgeon – Southern Distinct Population Segment

Both Northern and Southern population segments of the North American Green Sturgeon are known to exist within Coos Bay for feeding, growth, and thermal refuge. The DEIS from the previous iteration of the project admits that the project is likely to adversely affect Green Sturgeon as a result of bottom disturbance and reduction of benthic food supply from construction and maintenance dredging as well as dredge spoils disposal, and the potential for dredge spoils disposal to bury sub-adult Green Sturgeon.[91] Likewise, the project is likely to adversely affect critical habitat for the species, violating Section 9 of the Endangered Species Act.[92] The Department must consider the effect dredging and dredge spoils disposal would have on food sources for the threatened green sturgeon.

d. Pacific Eulachon – Southern Distinct Population Segment

Pacific Eulachon (also known as candlefish) utilize Coos Bay for habitat, and may be present in the estuary during construction and operation of the project. Eulachon typically spend three to five years in saltwater before returning to freshwater to spawn in late winter through mid-spring. Eulachon are a small fish that are rich in calories and important to marine and freshwater food webs, as well as commercial and recreational fisheries and indigenous people from Northern California to Alaska. The application does not adequately assess potential impacts to this species as a result of the dredge and fill operations proposed in ocean waters, Coos Bay, and coastal tributaries.

e. Lost River Sucker

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[89] *Id.* at 4-645.
[90] DEIS 2014, *supra* note 73 at 4-644.
[91] DEIS 2014, *supra* note 73 at 4-647.
[92] 16 U.S.C. § 1538.

The Lost River sucker is a federally listed endangered species that spawns in freshwater streams. The Pacific Connector Pipeline will cross the Lost River upstream of known spawning areas. The pipeline will also cross the Klamath River, another basin where Lost River suckers live. The DEIS acknowledges that the project is likely to kill Lost River suckers and injure its designated critical habitat through fish salvage or through the release of drilling muds from frac-out during HDD of the Klamath River.[93]

f. Shortnose Sucker

The shortnose sucker is another endangered fish species whose populations have been severely impacted by dam construction, water diversions, overfishing, water quality problems, loss of riparian vegetation, and agricultural practices. Shortnose sucker critical habitat includes the Klamath River within the project area. The DEIS states that the project is likely to adversely affect shortnose suckers in the same manner that it will harm the Lost River sucker.[94]

g. Spencer Creek Redband Trout

The Upper Klamath Basin redband trout is considered by the state of Oregon to be a "vulnerable" species, and is currently classified as "at risk" by the Oregon Department of Fish and Wildlife. Due to extensive dam building and habitat modification, Spencer Creek is now the only known spawning area and source of juvenile recruitment in the upper Klamath River basin upstream of J.C. Boyle dam and is a highly productive spawning ground for the Lower Klamath population of redband trout that migrates to the Keno Reach of the Klamath River. Migratory and resident redband trout are known to use the mainstem of Spencer Creek and are also thought to use smaller tributaries including ephemeral streams.[95] Redband spawning in Spencer Creek is thought to occur from February through June and biologists have recorded counting in excess of 300 redds in Spencer Creek.[96] The applicants have not provided sufficient information regarding construction timing in relation to redband trout spawning in Spencer Creek. Given that Spencer Creek's dominant land uses to date (grazing and logging) have degraded the watershed so heavily that it is listed for sediment and temperature pollution, additional industrial degradation plus undetermined long term impacts to water quality and hydrology will likely only bring more harm to Spencer Creek's spawning and juvenile redband trout, which require cold, clear streams for successful recruitment and maturation.

h. Marine Mammals and Sea Turtles

The LNG terminal and the tankers will likely cause or contribute to the harm of marine mammals due to habitat destruction and vessel strikes. In addition, multiple ESA-listed mammals and turtles are present, including the green turtle, leatherback, olive ridley, and loggerhead. In 2012, NMFS designated critical habitat for the leatherback, including nearshore areas around Coos Bay

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[93] DEIS 2014, *supra* note 73 at 4-650.
[94] *Id.* at 4-652.
[95] (USFS 1995)
[96] Steven J. Starcevich & Steven E. Jacobs, *Effects of Dams on Redband Trout Life History in the Upper Klamath River: A Summary and Synthesis of Past and Recent Studies*, 4 (2006).

and areas that are part of the proposed LNG tanker routes.[97] All of these ESA-listed species, as well as the non-ESA-listed species, will be adversely affected by the proposed project.

Marine mammals, especially pinnipeds, are also sensitive to noise disturbances. Jordan Cove would install steel piles for the LNG vessel berth and a loading platform on the east side of the marine slip. According to the applicant's modeling, sound levels greater than 65 dB will extend less than 0.25 miles from pile driving operations. Jordan Cove has not yet developed a plan to protect pinnipeds from noise impacts associated with the construction of the marine slip and berth. The Department should consider whether these potential impacts can be adequately addressed.

Based on all of the potential impacts to listed aquatic species, marine mammals, and fish associated with the proposed action, the applicants have failed to demonstrate that the project is consistent with the protection and conservation of Oregon's waters under ORS 196.825(1)(a)) and the Department must deny the permit.

C. The Project Will Not Protect Other Beneficial Uses

In addition to the specific beneficial used discussed above, the project will like harm other water uses by lowering water quality below the established water quality standards.

1. Temperature (OAR 340-041-0028)

The purpose of Oregon's statewide numeric criteria for temperature is to "protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State."[98] The proposed project would likely violate Oregon's water quality standard for temperature by removing riparian vegetation that shades streams, causing stream heating along a minimum 75-foot wide construction easement. Removing riparian vegetation will increase water temperature by decreasing shade in numerous streams identified as having salmon and steelhead spawning use, having core cold water habitat use, having salmon and trout rearing and migration use, or having migration corridor use.

The proposed action would impact:

1) Streams identified as having salmon and steelhead spawning use (South Coast, Umpqua, and Rogue);
2) Streams identified as having core cold water habitat use (South Coast, Umpqua, and Rogue);
3) Streams identified as having salmon and trout rearing and migration use (South Coast and Umpqua); and
4) Streams identified as having migration corridor use (South Coast).

Table 3. Fish Use Designations for Impacted Watersheds

[97] 77 Fed Reg 4170 (Jan. 2012).
[98] OAR 340-041-0028(3).

Watershed	Salmon and steelhead spawning	Core coldwater habitat	Salmon and trout rearing and migration use	Migration corridor use	Redband or Lahontan cutthroat trout
South Coast[99,100]	X	X	X	X	
Umpqua[101,102]	X	X	X		
Rogue[103,104]	X	X			
Klamath[105]					X

Additionally, numerous stream segments that would be impacted by the proposed action already are impaired for high temperatures that violate State water quality standards. Many of these streams are on the State's list of water quality limited waters under Section 303(d) of the CWA. Therefore, any temperature increases in these streams attributable to the proposed action would result in exacerbations of existing violations of state water quality standards. Even where waterways are not already impaired for temperature, stream temperature increases cause acute stress that has an immediate impact on salmon and other temperature-dependent fish. The applicants have not provided reasonable assurance that the proposed activities will not result in significant adverse effects to aquatic ecosystems as a result of increased stream temperature, and that the proposed activities will not violate Oregon's numeric criteria for temperature. Therefore, the Department must not issue the permit.

2. Turbidity (OAR 340-041-0036)

A violation of Oregon's water quality standard for turbidity occurs when an activity causes a more than 10% increase in natural turbidity levels, unless the activity is necessary to accommodate essential dredging, construction or other legitimate activities and all practicable turbidity control techniques have been applied.[106] The activities proposed by the applicants are likely to result in a more than 10% increase in natural turbidity levels from pipeline stream crossings, potential HDD failure and frac-out, removal of riparian vegetation around stream crossings, increased landslide risk as a result of pipeline construction, dredging of Coos Bay, and construction and operation of roads. For example, if silt fences are 90-95 percent efficient in trapping sediment post-construction during intense rainfall, this means that up to 10% of the

[99] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300A: Fish Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300a.pdf
[100] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 300B Salmon and Steelhead Spawning Use Designations, South Coast Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure300b.pdf.
[101] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320A Fish Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320a.pdf.
[102] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 320B Salmon and Steelhead Spawning Use Designations, Umpqua Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure320b.pdf
[103] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271A, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271a.pdf.
[104] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 271B Salmon and Steelhead Spawning Use Designations, Rogue Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure271b.pdf.
[105] *See* Subbasin maps and tables set out in OAR 340-041-0101 to 340-041-0340: Figure 180A, Klamath Basin. https://www.oregon.gov/deq/Rulemaking%20Docs/figure180a.pdf.
[106] OAR 340-041-0036.

sediment generated during intense rainfall will reach streams.[107] Ten percent delivery of sediment from a large disturbance area is likely to be significant, particularly for threatened salmonids, in violations of the State's numeric turbidity standard.

a. Stream Crossings

The applicants propose dry open-cut methods, including both flume and dam and pump methods, for the stream crossings where HDD or Direct Pipe technology is not proposed. HDD is proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River and Direct Pipe technology is proposed for the South Umpqua.

In addition to the potential for increased erosion, channel migration, avulsion, and/or scour as a result of pipeline crossings, many of the proposed crossings cut through waterbodies that are already impaired for sedimentation. Channel modifications that increase sedimentation can decrease the depth and frequency of pools, which decreases the assimilative capacity for thermal loading of a stream.[108] Proposed activities to conduct dry open cut technology have the potential to increase sedimentation, modify habitat, decrease dissolved oxygen, and impair the aquatic habitat.

The application includes a Stream Crossing Risk Analysis Addendum from 6 April 2018 that builds on the 2017 Pacific Connector Gas Pipeline Stream Crossing Risk Analysis (GeoEngineers, 2017a). In the analysis, the report identifies 98 stream crossings identified as Yellow (moderate risk) or Orange (high risk) of pipeline exposure due to stream instability.[109] However, the report specifically states that pre-construction surveys occurred on only "a portion of the sites."[110] Specifically, only 48 stream crossings were physically observed because "access to the remaining sites has not been granted by the property owners as of the date of this report."[111] This indicates that, yet again, the applicants have failed to include site-specific information that is required by the Department to review the application. The application has failed to provide information sufficient to demonstrate that their proposed discharges associated with stream crossings necessitated by pipeline construction will not violate State water quality standards for turbidity.

Further, DEQ raised significant concerns regarding the inadequacy of information for stream crossing BMPs provided by the applicants in the agency's 20 December 2018 letter. Specifically, DEQ states:

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[107] 2014 DEIS, *supra* note 73, at 4-74, citing Robichaud et al (2000).

[108] "Chapter 2: Temperature." Rogue River Basin TMDL. Oregon DEQ. December 2008. P. 2-20.

[109] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. Stream Crossing Risk Analysis Addendum. 6 April 2018. P. 5. P. 3168.

[110] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. Stream Crossing Risk Analysis Addendum. 6 April 2018. P. 5. P. 3168.

[111] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. Stream Crossing Risk Analysis Addendum. 6 April 2018. P. 5. P. 3168.

> Given the potential for pollutant discharge at stream crossings, DEQ is requesting the engineering designs and technical support for each water quality BMP proposed for each stream crossing that PCGP proposes to identify in a future update to Table A.2-6 in Q4 2018. DEQ will not accept a qualitative description of a treatment practice in lieu of these engineering designs and their technical support. Even for a simple stormwater treatment control such as a grass swale, several design variables influence the performance of a grass swale. For example, a simple statement that PCGP will use a grass swale to treat the roadside ditch runoff prior to discharge to a stream provides DEQ no information regarding the pollutant removal performance for this swale.[112]

Further, DEQ adds:

> PCGP provides none of the detailed information provided in the example above for how PCGP will manage and treat the stormwater discharge from slope breakers at stream crossings. Without additional information, PCGP is essentially asking DEQ to accept – without any engineering analysis or technical support – that the soils and vegetation in between the slope breaker's discharge point and the stream will treat this stormwater discharge.
>
> ***
>
> In the absence of this detailed information, DEQ can only assume that PCGP does not sufficiently treat the runoff from the permanent right-of-way at stream crossings once discharged from the slope breaker to the stream.[113]

Due to the inadequate information supplied by the applicants, particularly regarding stream crossing risk assessments and stream crossing BMPs, the applicants have failed to demonstrate that the turbidity standard will be met. Therefore, the Department must not approve the permit.

b. Horizontal Directional Drilling

Specific to crossings where HDD technology is proposed, there is also an increased risk of frac-out where a large release of sediment, bentonite clay, and drilling chemicals may occur. HDD technology is proposed for Coos Bay, the Coos River, the Rogue River, and the Klamath River. Bentonite clay is highly detrimental to salmon spawning habitat. In addition, the prior DEIS states that drilling mud "can include additional additives specific to each drilling operation" and "Pacific Connector would approve any additive compounds" but does not disclose what these additives might include.[114] The State of Oregon has specifically requested a list of the additives used in drilling fluids and their potential effects on the aquatic environment.[115]

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[112] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 63.

[113] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 67-68.

[114] 2014 DEIS, *supra* note 73, at 4-387.

[115] 2017 State of Oregon Scoping comments at 18.

The Oregon Department of Fish & Wildlife ("ODFW") has described some of their concerns regarding frac-outs several times, first in 2008:

> Between August and October of 2003, MasTec North America Inc. was cited by DEQ for a series of water-quality violations which occurred between August and October of 2003. The violations were a result of frac-outs during the horizontal drilling work for the construction of a natural gas pipeline under the North Fork of the Coquille River in Coos County. If similar frac-out related turbidity discharge impacts were to occur at the proposed Rogue River crossing, they would likely impact last known significant spawning habitat for Spring-run Chinook salmon in the Rogue River Basin. This EIS should include analysis of the potential environmental impacts of a frac-out related turbidity discharge due to the proposed action and alternatives.[116]

And again in 2015:

> Pipeline crossings using HDD or other subsurface methodologies can be expected to cause frac-outs in Coos County geology and possibly throughout the project. The Applicant should be prepared for construction stoppages, cleanup, and remediation of damages caused by frac-outs.
>
> HDD and other subsurface boring or drilling crossing design locations should pro-actively address the risks associated with the potential for a "Frac out" or inadvertent loss of drilling fluid…[117]

In the region, many HDD attempts along the 12-inch Coos County pipeline failed, resulting in frac-outs and release of sediment and bentonite clay into the Coquille River. More recently, the Rover LNG Pipeline in Ohio released 50,000 gallons of drilling fluid from HDD operation into a wetland in Richland County, Ohio in April 2017. A second spill as a result of HDD operation for the Rover Pipeline released an estimated 2 million gallons of drilling fluid into the Tuscarawas River.[118]

Due to the potential risk of frac-out and likely increase in turbidity as a result of all stream crossing methods, the applicants have failed to provide reasonable assurances that the project will not violate the numeric criteria for turbidity. Specific concerns regarding HDD crossings in each impacted waterway are discussed in Appendix A. Clean Water Act 401 Comments.

c. Removing Riparian Vegetation

Pipeline clearing and severe soil disturbance from excavation result in impacts similar to those from road construction. Roads undergo elevated erosion for years. In addition, the soil compaction from pipeline construction activities is likely to persist for decades, and even longer in soil with high clay content. Soil compaction contributes to elevated surface erosion potential

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[116] STATE OF OREGON, *Jordan Cove Draft Environmental Impact Statement* 24 (2008) hereinafter Oregon 2008 DEIS.
[117] STATE OF OREGON, *Jordan Cove Draft Environmental Impact Statement* 102 (2015) hereinafter Oregon 2015 DEIS.
[118] Letter from Buffy Thomason to Aaron Wolfe and Kurt Kollar, Ohio EPA. (April 17, 2017), https://www.scribd.com/document/345647356/Notice-of-Violation-Rover-Pipeline-LLC.

by degrading surface and subsurface hydrology in several ways, including hindering the ability of soils to absorb, store, and slowly release water, and increasing erosion and sediment delivery through surface runoff. The removal of ecologically important vegetation for pipeline construction and operation will also accelerate bank erosion and reduce bank stability at stream crossings, because trees and deep-rooted vegetation are critically important to bank stability. Decreased bank stability contributes to both stream sedimentation and channel widening.

DEQ raises concerns about removing riparian vegetation and potential violations of temperature standards in its 20 December 2018 letter, stating:

> PCGP should identify all the impacts to riparian vegetation that PCGP did not consider in its August 31, 2017 draft Thermal Impact Assessment. PCGP should also account for the effects of all cleared areas (e.g., TEWA, parallel stream-pipeline alignment, etc.) that were not previously included in the thermal load analysis.[119]

d. Landslides

There are many areas along the pipeline route that include steep terrain and unstable land. The risk of landslides in these areas is high, particularly when disturbed by construction and other activities related to the project. A single landslide event could result in significant deposits of sediment into stream reaches, impacting fish habitat and water quality. Response and control of continued sediment deposition could be difficult and time consuming in remote areas of the pipeline route. These risks are exacerbated by wildfires, which leave soils exposed and without the complex structure necessary to withstand landslide events.

DEQ in its 20 December 2018 letter expressed significant concerns regarding potential increased landslide risk and resulting sediment pollution from the project, stating:

> PCGP is proposing to clear ridgetops of trees and other vegetation in Tyee Core Area, other locations with mapped landslide features, steep slopes, and slopes with soil that has a high erosion potential. PCGP is also proposing to level these ridgetops to install a gas pipeline. These activities dramatically alter the interception of rainfall from trees and the movement of stormwater on these ridgetops. These alterations will result in a substantial increase in stormwater generated on these ridgetops relative to their undisturbed condition. However, PCGP has not provided DEQ with specific information for how PCGP will manage the stormwater generated on these ridgetops supporting the permanent right-of-way.
>
> As highlighted in references DEQ presented above, stormwater discharge has the potential to cause landslides. Landslides caused by stormwater discharge from pipeline construction activities and the operation of the permanent pipeline right-of-way have the potential to migrate into stream channels affecting water quality.[120]

[119] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 60.
[120] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 69.

The Department should fully evaluate the landslide risk associated with the project, particularly in relation to water quality and public health and safety. Specific concerns regarding landslide risk related to public health and safety are discussed in Chapter 8 *infra*.

e. Roads

The increased use of unpaved roads associated with the construction and operation of the pipeline will also elevate sediment delivery to streams, resulting in potentially significant violations of the State turbidity standard. Studies have consistently documented that elevated use of unpaved roads vastly elevates sediment delivery from roads to streams, particularly near and at stream crossings, where it is impossible to eliminate the delivery of sediment from road runoff.

U.S. 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. … [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 channe 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).[121]

The application is incomplete without complete and accurate maps of roads that will be constructed or improved for the project. Road construction is likely to cause turbidity impacts to wetlands, streams, and rivers throughout the 229-mile path of the PCGP, significantly increasing the number of impacted waterbodies beyond the 485 listed in the May 22, 2018 USACE and DEQ public notice.

The application inadequately addresses the turbidity impacts from road use, road modifications (including but not limited to Key Watersheds), temporary extra work area ("TEWA") construction and temporary and permanent access roads. In order to use heavy equipment on these roads, significant road modifications will be necessary, including blading/grading,

[121] EPA 2012. Notice of Intent To Revise Stormwater Regulations Federal Register. May 23, 2012.

widening, drainage improvements, and the construction of turnouts and roadside TEWAs. The application does not include detailed descriptions of what activities will be occurring that could cause turbidity impacts to wetlands, streams, and other waters. Rather, the application relies on blanket statements about the application of best management practices to avoid such impacts to streams.

By not specifying the location and nature of construction activities associated with all access roads, the application provides an inadequate description of the project. On steep slopes, particularly in rainy winter months, similar BMPs have failed in the past to prevent turbidity impacts to streams, creeks and ditches. Not only is road construction inadequately described, but the measures to prevent significant sedimentation and turbidity in streams are neither site-specific nor reliable. As a result, the Department lacks sufficient information to determine whether the proposed project will comply with State turbidity standards.

DEQ also expressed significant concerns regarding the increased new and existing road use proposed for the project. In its 20 December 2018 letter, DEQ states:

> PCGP's qualitative analysis of compliance with water quality standards does not even list the more than 660 miles of access roads as a source of sediment. The scientific literatures clearly shows roads as a major source of sediment and soil erosion in forested watersheds. The scientific literature identifies road maintenance practices, road construction decisions, road construction and maintenance standards, road improvements, and decommissioning standards as key elements in protecting soil and water quality.[122]

The increased use of unpaved roads associated with the construction and operation of the pipeline will also elevate sediment delivery to streams, impairing designated beneficial uses. Studies have consistently documented that elevated use of unpaved roads vastly elevates sediment delivery from roads to streams, particularly near and at stream crossings, where it is impossible to eliminate the delivery of sediment from road runoff.[123]

3. Toxics OAR 340-041-0033(2)

By disturbing and re-suspending contaminated material in and around waters of the state, the proposed project will likely result in violations of Oregon's water quality standards for toxics. Toxic substances may not be introduced above natural background levels in concentrations that may be harmful to aquatic life.[124] Potential violations of the toxics standard and Clean Water Act Section 307 violations are discussed in detail in Appendix B. Clean Water Act 404 Comments.

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[122] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 12.

[123] See e.g. Jim Doyle, Where the Water Meets the Road. Available at http://web.archive.org/web/20070325061623/http://wwwfsl.orst.edu/geowater/RRR/jim/aquahab/index.html.; Noss, Reed; The Ecological Effects of Roads. Available at http://www.wildlandscpr.org/ecological-effects-roads.; Michael Derrig. Road Improvements for Watershed Restoration. Available at http://wwwfsl.orst.edu/geowater/PEP/calfed/derrig/indexhtml.

[124] OAR 340-041-0033(1)

There is known contamination at the terminal site that, if disturbed as a result of project activities, could impact waters of the state. Both the Ingram Yard property and the location of the proposed South Dunes site on the former Weyerhaeuser North Bend Containerboard Mill are listed in the DEQ's Environmental Cleanup Site Information ("ECSI"). The Ingram Yard property (ECSI 4704) was used for spreading contaminated materials from the late 1970s to 1994 and contains "low levels of potentially bioaccumulating chemicals and must not be placed in waters of the state."[125] More recently, during construction of the Industrial Wastewater Pipeline by Jordan Cove, the contractor discovered black soils in March 2015 on the site. The results of the sampling confirmed that the black soil contained contaminants, including, but not limited to, mercury, arsenic, dioxins, and petroleum products.[126]

In addition to known contamination at the terminal site, there is a significant potential for toxic contaminant disturbance and release at the proposed stream crossings. Many of the waterways that would be crossed by the pipeline are already impaired for toxic chemicals.

Proposed Stream Crossings Impaired for Priority Pollutants under Section 307[127]

Watershed	**Waterbody**	**Impaired for Priority Pollutants**
Coos	Coos Bay	Lead, nickel, zinc, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), copper
Coquille	Middle Creek	Cadmium, chromium, copper, barium, arsenic, antimony, nickel, selenium, silver, thallium, and zinc
Umpqua	Olalla Creek	Antimony, arsenic, cadmium, copper, iron, lead, nickel, selenium, and silver
Umpqua	South Umpqua River	Arsenic, cadmium, copper, lead, nickel, selenium, silver, thallium, and zinc
Rogue	Little Butte Creek	Lead, nickel, selenium, silver, zinc
Rogue	Upper Rogue River	Selenium, silver, zinc, nickel, mercury, lead, copper, chromium, cadmium
Klamath	Klamath River	Arsenic, cadmium, toxics, copper, lead, nickel, selenium, silver, and ziinc

For example, the proposed pipeline would cross the Klamath River, Hwy 97 and Southern Pacific Railroad, just after wrapping around a 660-acre industrial facility with known contamination. A frac-out during the HDD under the Klamath River would likely impact the riverbed immediately adjacent to the contaminated facility, exposing riverine sediment that could contain high levels of arsenic, chromium, copper, mercury, polycyclic aromatic hydrocarbons and/or petroleum from the Weyerhaeuser site or from other industrial facilities upstream. Additionally, the Klamath River is already listed as water quality impaired for toxics.[128] The 2014 DEIS and application do not include studies or test cores of potential contaminants at this HDD crossing. Further, the 2014 DEIS includes no discussion of what efforts, if any, would be made to analyze toxicity or properly dispose of fill removed through the HDD. The Department must require additional information from the applicants to identify and analyze the potential for

[125] Weyerhaeuser – Ingram Yard. Environmental Cleanup Site Information Database, OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY (Nov. 11, 2007) hereinafter Weyerhaeser. http://www.deq.state.or.us/Webdocs/Forms/Output/FPController.ashx?SourceId=4704&SourceIdType=11.

[126] Black Soil Summary Report, *supra* note 123, at 2.

[127] Oregon DEQ, Oregon's 2012 Integrated Report Assessment Database and 303(d), https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp.

[128] *Id.*

contamination at the Klamath River crossing site and other sites where appropriate, in violation of Oregon's standard for toxics.

Based on the presence of these pollutants, the numerous waterbodies listed as impaired for these pollutants, and the potential that the pollutants would be discharged into waters of the United States as a result of the proposed activities, the applicants have not provided reasonable assurances that the proposed project will not violate the toxics standard and therefore, the Department must deny the permit.

4. Dissolved Oxygen (OAR 340-041-0016)

OAR 340-041-0016 sets out the State's water quality standard for Dissolved Oxygen ("DO"). DO is essential for maintaining aquatic life. Depletion of DO in waterways is a significant pollution problem, affecting fish and aquatic species in a variety of ways at different life stages and life processes. DO levels can be influenced by several factors including pH changes, temperature increases, groundwater inflow and hyporheic exchange, decaying material or algae blooms, and sedimentation. Construction dredging lowers DO levels in estuarine waters both by re-suspending sediment and by deepening an estuarine channel where hypoxic conditions can occur due to reduced circulation in deeper waters.

The proposed action involves dredging that will decrease DO in Coos Bay. Dredging increases the oxygen demand by disturbing sediments and releasing oxygen-demanding materials (decomposing organic materials contained within the sediments). In its 2008 DEIS comments, Oregon DEQ previously expressed strong concerns about lowered DO levels that resuspension of sediments during dredging activities would cause:

> Total organic carbon, acid volatile sulfides, and nutrient sampling should be conducted to quantify the potential for adverse impact to oxygen levels caused by resuspension of sediments during dredging activities. Impacts should then be evaluated utilizing hydro dynamic modeling which can capture real time tidal conditions and simulate real time tidal exchanges during the period of the project.[129]

Once the dredging is completed, there also is the potential for reduced circulation in the deeper portions of the approach channel. In combination with other factors, reduced circulation has the potential to result in lower DO levels in the deeper waters. The applicants must demonstrate that actual hydrodynamic conditions in Coos Bay would not result in a 0.1 mg/L decrease in DO levels caused by reduced circulation in the deeper channel.[130]

5. Conditions deleterious to aquatic life OAR 340-041-0007(10)

The project would also create many conditions that are deleterious to fish and/or other aquatic life that may not be allowed under OAR 340-041-0007(10). The construction and operation of the terminal and pipeline will cause immediate, severe, deleterious impacts to salmon, critical habitat, and essential fish habitat. The impacts to aquatic life, particularly threatened and endangered species, are discussed in more detail in Chapter 4(3) *infra*. In general, the proposed

[129] Oregon 2008 DEIS, *supra* note 95, at 63.
[130] OAR 340-041-0016.

project would likely create many conditions that are deleterious to fish and/or other aquatic life that are not allowed by this narrative water quality standard, including to Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*). Dredging millions of cubic yards of material from the Coos Bay estuary in salmon habitat and expansive wetland fill creates a condition deleterious to fish due to permanent loss of habitat.

Benthic organisms that are vital to the aquatic ecology of Coos Bay reside in high-quality, intertidal land that would be permanently altered by the proposed action. Dredging in Coos Bay would also degrade the habitat of the native mud shrimp. The shrimp are especially sensitive to the kind of disturbance caused by installing the pipeline through the bay. Mud shrimp are already impacted by an introduced parasitic isopod called *Orthione griffenis*.[131] Mud shrimp are filter feeders and filter as much as 80 percent of bay water every day.[132] As a result, degrading habitat for mud shrimp could further trigger reduced water quality in Coos Bay.

The LNG terminal and the tankers would likely harm marine mammals due to habitat destruction and vessel strikes. The Department must assess the impact of these strikes to individuals and populations. The Department should require additional information from the applicants to fully review the tanker route to Jordan Cove and the tanker routes in the Exclusive Economic Zone.

In addition, Jordan Cove would likely introduce or allow the proliferation of invasive species to Coos Bay, the terminal site, and along the pipeline route. First, ships from foreign ports transport exotic species on multiple surfaces and in water releases from ballast or engine cooling water. These species may harm the aquatic ecosystem. Second, the removal of vegetation, along with other long-term disturbances at the site, would allow the introduction and proliferation of exotic species, which would harm native ecosystems and may require herbicides and pesticides to manage. Third, exotic species that harm native ecosystems, forestland, and farmland would thrive in the large swath of clearing and ground disturbance across Oregon due to the pipeline. These impacts would significantly affect fish, wildlife, and special aquatic sites. The Department must determine whether the direct, indirect, and cumulative impacts of exotic and invasive species from the construction of the LNG terminal and related facilities will result in conditions deleterious to aquatic life that violate this State narrative water quality standard.

6. Biocriteria Standard (OAR 340-041-0011)

Oregon's Biocriteria standard is intended to assess the total impact to a biological community, including multiple stressors and cumulative effects. OAR 340-041-0011 provides that "Waters of the State shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." DEQ's regulations define "without changes in the resident biological community" to mean "no loss of ecological integrity when compared to natural conditions at an appropriate reference site or region."[133] "Ecological integrity" means "the summation of chemical, physical and biological integrity capable of supporting and maintaining

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[131] Jolene Guzman, *Invader Kills Off Mud Shrimp*, THE WORLD (February 27, 2009), https://theworldlink.com/news/local/invader-kills-off-mud-shrimp/article_fa08c2d9-47e9-5cb6-83d3-6bad07ec3bdf.html hereinafter Guzman 2009.

[132] Eric Wagner, *Mud Shrimp Meets Invasive Parasite, High Drama for Northwest Estuaries* (2006), available at http://depts.washington.edu/nwst/issues/index.php?issueID=winter_2006&storyID=782 hereinafter Wagner, 2006..

[133] OAR 340-041-0002.

a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat for the region."[134] In this way, the Biocriteria standard complements the other parameter-specific water quality standards.

While the applicant suggests that all impacts would be temporary and localized, the significant re-shaping of Coos Bay and at least 485 waterway crossings from the pipeline, together with ongoing operations and related discharges, would result in permanent and/or chronic detrimental changes in the resident biological communities. The proposed activities would likely cause negative impacts that do not comply with the Biocriteria standard, including but not limited to:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage, long-term soil compaction, and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

D. Conclusions

The project would do immense damage to water quality in Oregon, and it is not consistent with the protection, conservation and best use of the water resources of this state. The proposed project will threaten drinking water supplies and fish habitat. It will also likely cause significant temperature increases in numerous stream segments, as well as significant decreases in dissolved oxygen levels in Coos Bay. Moreover, it will likely further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. The proposed project would also likely violate Oregon's water quality standard for turbidity by causing a more than 10% increase in natural turbidity levels in Coos Bay and stream segments impacted by pipeline installations. Construction of the pipeline and dredging of Coos Bay would be likely to violate Oregon's numeric criteria for dissolved oxygen. The proposed project would also likely violate Oregon's toxics standard by disturbing and re-suspending contaminated material in and around waters of the state. Because the applicants have not demonstrated that the state's waters' will be protected, the Department must deny the permit because the project is not consistent with the protection and conservation of Oregon's waters under ORS 196.825(1)(a).

Chapter 5. INTERFERENCE WITH NAVIGATION, FISHING, AND PUBLIC RECREATION

[134] OAR 340-041-0002.

5.1 DSL must deny the permit because the application fails to provide reasonable assurance that the project will not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation… (ORS 196.825(1)(b)).

A. Introduction

According to the statute, and as explained clearly in the recent *Wal-Mart* decision, the Director must conduct a weighing of costs and benefits of, on the one hand, the project public benefits; and on the other, interference with the factors including navigation, fishing, and public recreation. The legislature has put a thumb on the scales in favor of the "paramount policy" to preserve Oregon waters for navigation, fishing, and public recreation. ORS 196.825(1)(b)). The impacted waterways are public resources. Commenters here, which represent thousands of citizens, consider this project's interference with navigation, fishing and recreation to be unreasonable and the balance tilts strongly in favor of denying the permit.

B. The Project Unreasonably Interferes with Navigation

1. Coos Estuary is important for Navigation

Coos Bay, with its international port, several large and small docks, and unique location on the Pacific Ocean, is important for maritime navigation. According to the application:

> Coos Bay is the second largest estuary in Oregon and is used by deep-draft commercial ships and barges, a commercial fishing fleet, and recreational boats. The FNC adjacent to the LNG Terminal site, which is maintained by the U.S. Army Corps of Engineers (USACE), is generally 300 feet wide and currently has a navigational depth of -37 Mean Lower Low Water (MLLW). Annual commercial ship traffic into and out of the Oregon International Port of Coos Bay (the "Port") has declined in recent years from a high of 310 deep-draft vessel calls at the Port in 1988 to 52 in 2016. The Port is also visited, by conservative estimates, by 50 tug/barge units per year, with 14 tug/barge units requesting pilotage during 2016 as per data from the Coos Bay Pilots Association.[135]

Additionally, the applicants state:

> Loaded LNG carriers departing the LNG facility could have a sailing draft approaching or exceeding the current channel navigation depth of -37 MLLW, thus requiring the use of tidal advantage and associated scheduled departure (i.e., loaded vessels would need to transit at slack high tide). As a LNG carrier is in transit through the bay, USCG will impose a moving safety/security zone of 500 yards around the carrier or up to the shoreline, whichever is less. Current USCG law restricts all recreation activities from within the Coos Bay FNC during all marine vessel transits. Recreational crabbing within the bay, which also typically occurs at slack high tide throughout the year, may be further limit access to crabbing areas within the safety/security zone, in two areas of the lower bay. The two areas are located immediately north of Charleston Marina and along the northwest side of the bay from approximately RM 2.5 to RM 5. Crab pots or traps placed

[135] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. [§(4)1.]

> outside of the FNC could feasibly be deployed prior to and remain during LNG carrier transit and subsequently retrieved following vessel safety zone passing. JCEP estimates that it will take an LNG carrier approximately 90 minutes to make the full transit of the waterway from the Coos Bay jetty entrance to the LNG Terminal at speeds between 4 and 6 knots. The maximum period for an LNG carrier to pass through the safety and security zone would be 30 minutes, meaning recreational crabbers would not have access to their pots or traps for up to 30 minutes, but the pots or traps would be "soaking" during this time. The sum of the periods in which LNG carriers would have a potential impact on recreational and other boating activity is about 7 hours per week or about 8 percent of all daylight hours (see Appendix C.5 to Resource Report 5).
>
> Once navigation safety stakeholders gain experience and familiarization with the transit (after the first few months), the USCG will allow LNG carrier transits to occur on a 24-hour basis. This will allow night transit, which will lessen potential impacts on recreational and commercial fishermen to about 4 percent of all hours when LNG carriers can potentially transit LNG carrier transits will be prioritized during nighttime hours to reduce the impact of the moving safety/security zone on recreational and commercial fishing activities in the bay. The USCG and Oregon State Marine Board will continue to remind boaters of their obligation not to impede the safe transit of deep-draft ships, regardless of the cargo.[136]

a. Applicable Maritime Law

We are concerned that the applicants assert the presumption that the Coast Guard "will allow night transit" after "navigation safety stakeholders gain experience," but do not appear to provide any law or policy to support this assertion. In fact, the Coast Guard has specifically restricted LNG operations to daylight hours, in their 2018 Letter of Recommendation.[137] If night-time transits become the priority, then that presents a whole new set of risks and issues that would need to be considered, and have not been adequately addressed by the applicants. The Department should consider impacts particularly to smaller vessels.

b. The USCG Letter of Recommendation ("LOR")

Critically, the Coast Guard's LOR serves as comments of the Coast Guard in a NEPA process. The State's perspective here is likely different from the Coast Guard, and while the views in the LOR are certainly persuasive and important, they are only the beginning of the analysis for the State.

It would be premature for the Department to rely upon the LOR because the draft EIS under NEPA has not yet been prepared for the project. Even for those items where there is authority and the requirements are foreseeable, the LOR generally asserts the *applicant* is "expected to

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[136] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. [Part 1, (4)3. , Insert page number of document]. [Insert page number in actual PDF].

[137] USCG June 1, 2018, Letter of Recommendation for the Jordan Cove LNG Project (including attached May 10, 2018 LOR; 2018 LOR Analysis; April 24, 2009 LOR; and 2008 Waterway Suitability Report).

examine the feasibility of implementing such mitigation measures" in consultation with others.[138] The Department should not rely on such speculative mitigation measures in its analysis to ensure that the removal-fill mandates regarding protection of navigation, protection of health and safety, and implementation of full mitigation are fulfilled.

As indicated in paragraph 2 of the LOR itself, it appears that the Coast Guard assumed that the applicant is capable of doing everything it hopes to do, that actual conditions at the port are perfectly described, and that the applicant will fully meet all regulatory requirements. The Coast Guard recommendation is "contingent" on the perfect application of everything in the WSA.[139] The Department should do its own analysis of impacts to navigation, in consultation with the Coast Guard.

Additionally, Coos Bay is subject to a pilotage requirement, illustrating the challenging nature of navigation at the port. There are only two pilots in Coos Bay. They have never piloted LNG tankers before, and currently only handle a load of fifty vessels per year. Further, the LOR also reveals that the Coast Guard itself will be playing a very minimal role, reflecting its limited capacity here. The Captain of the Port is far distant in Portland. The LOR states the Coast Guard will not require any safety inspections for visiting vessels beyond the minimum required.[140]

To address emergency response, the applicants claim to have established an "emergency response planning group" that is tasked with education and preparedness for the facility. *See* USCG 2018 LOR p.2 ¶10. Despite efforts to do so, Commenters have been unable to take part in this group. This process does not appear to be part of any official prevention, preparedness and response under the National Response Framework or National Contingency Plan. Further, the Limited access areas for this project have yet to be established.[141] This has hindered meaningful public engagement regarding impacts to navigation.

c. Recent Changes to Vessel Size

According to the application following recent simulations, the Coast Guard has deemed that the channel is suitable for LNG carriers up to 299.9 length, 49 meters breadth, and 11.9 draft. This is a reduction in all three parameters.[142] This change has important implications for DSL's review here.

First, it suggests that the application is premature and incomplete. When these types of fundamental parameters are still being changed, neither the Department nor the public can fully review the impacts of the project. The application should be considered incomplete without the expected Coast Guard clarification, and full disclosure of the cited internal report: JCEP, KSEAS, and Amergent Techs, 2017 Waterway Suitability Assessment Review JCLNG Doc

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[138] USCG June 1, 2018, Letter of Recommendation for the Jordan Cove LNG Project (including attached May 10, 2018 LOR; 2018 LOR Analysis; April 24, 2009 LOR; and 2008 Waterway Suitability Report).p.2.

[139] USCG June 1, 2018, Letter of Recommendation for the Jordan Cove LNG Project (including attached May 10, 2018 LOR; 2018 LOR Analysis; April 24, 2009 LOR; and 2008 Waterway Suitability Report).at 6, ¶11.

[140] USCG June 1, 2018, Letter of Recommendation for the Jordan Cove LNG Project (including attached May 10, 2018 LOR; 2018 LOR Analysis; April 24, 2009 LOR; and 2008 Waterway Suitability Report).p.2.

[141] *Id.* p.2 ¶3.

[142] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. [Part 1(5)], [pdf p.19].

Control #J1-000-MAR-RPT-KSE-00008-00. This analysis should be released for public review and must be considered by the Department.

Second, the applicants provide a 2017 reference (JCEP, KSEAS, and Amergent Techs, 2017 Waterway Suitability Assessment Review JCLNG Doc Control #J1-000-MAR-RPT-KSE-00008-00) that cannot adequately explain the 2018 changes, which appear to include additional studies and different conclusions. This analysis and these changes are critical information to the removal-fill application.

Third, the new information raises questions about the project purpose and effects. The application says that its design parameters included an "average 36 ft draft for an average" 135,000 m^3 LNG carrier. Part 1§(5). While the mean draft of a subset of LNG vessel isn't a relevant consideration,[143] assuming these are typical vessel drafts, the application presents mathematical challenges. Translating the given 36 feet back into its metric measure (10.9728 meters) then applying the 10% underkeel clearance required by the Coast Guard (1.09728 m.), we arrive at 12.07 meters, which is over the just-stated maximum of 11.9 meters, and at 39 ½ ft., which is more than the actual 37 ft. channel depth.

The Department should require additional information to clarify the changes to vessel size and inform its analysis of whether the currently proposed vessel sizes would safely navigate the channel.

d. Shipping Descriptions in Application

According to the application, the NRI dredging would not change allowable vessel dimensions, but would allow navigation of the FNC at higher windspeeds. The application says that, according to JCEP modeling, the navigation reliability improvements would increase the volume of LNG that is shipped by about 38,000 tonnes/ year.[144]

The Coast Guard has said that LNG shipping can only be done safely at high slack tide during daylight.[145] The application, however, asserts that the Coast Guard will allow transit at night, and furthermore asserts that "LNG carrier transits will be *prioritized* during nighttime hours to reduce the impact of the moving safety/security zone on recreational and commercial fishing activities in the bay."[146] We are concerned that the applicants appear to propose shipping practices that are not aligned with Coast Guard recommendations.

e. Navigational Servitude Assessment

The applicant has provided a new technical memorandum as Attachment A.5, dated September 18, 2018, evaluating the dredge and fill construction and maintenance activity impacts on navigation in the estuary. The following are specific comments regarding this memorandum.

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[143] What we are concerned with here are typical and maximum drafts.

[144] citing Schisler, V. 2015. LNG Carrier Transit and Maneuvering Simulation Report. Vallejo, CA, JCLNG Doc Control # J1-000-MAR-RPT-KSE-00003-00.)

[145] *See* USCG June 1, 2018 Letter of Recommendation packet, including May 10, 2018 LOR; June 1, 2018 Analysis in Support; April 2009 LOR, and 2008 Waterway Suitability Report.

[146] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. [], [pdf p.10].

Case law such as *Coos Waterkeeper* notwithstanding, the analysis is flawed in that it fails to address actual operation of the project, either as part of "the project" or by being aware of the reasonably foreseeable indirect impacts. The significant difference the dredging here makes for navigation in Coos Bay is primarily that it introduces a whole new sort of user (LNG tankers) that are more complex and hazardous that other forms of commercial navigation.

The effects of operation should be considered by the Department because the application raises those effects on operation as the core purpose of the channel dredging.

The standards used by the applicants in their memo are:

> • Construction and/or maintenance dredging activities may not create navigational constraints to the existing commercial operations in the FNC of Coos Bay, some accommodations may be required during construction but the safe passage of vessels may not be impeded.
> • Construction and/or maintenance dredging activities may not impact the US Coast Guard's (USCG) functionality or operation within Coos Bay,
> • Construction and/or maintenance dredging activities may not impact the USACE's ability to maintain the existing FNC.[147]

First, the applicants do not specifically address applicable law regarding navigation. The applicants should clearly state the relevant legal standards.

Additionally, the applicants assert the dredging won't interfere with the FNC use by large vessels. The Department should question this assertion because dredging will be located immediately adjacent to the channel and dredge plans involving cables crossing the whole channel are proposed. While large vessels may be able to routinely navigate around active dredging, this adds an additional hazard and strain on resources that should be comprehensively assessed. Accommodations for smaller vessels are burdensome for mariners, especially recreational users and commercial fishers.

The proposed dredging will require additional maintenance dredging outside of annual timing windows, with adverse impacts to water quality and fish species (*see* Chapter 4 *infra*). While the Corps may conduct maintenance dredging year-round, the applicants are limited to annual work windows. This may push Corps dredging outside of work windows and increase impact to fish and state waters.

Of most concern, the applicants' analysis found no potential concerns for navigation:

> Construction and maintenance of the JCEP Project does not present navigational servitude concerns that cannot be effectively eliminated or managed through coordinated design, implementation of typical industry construction practices, and communication during construction.

[147] Department of State Lands APP0060697. 7 November 2018, Part 1 Appendix A.5 @pg.4.

> Dredging within and adjacent to waterways is common practice. The proposed dredging activities do not include means and methods, or operations, which would create conflicts with navigational servitude that are unique or problematic to the industry or this area. Navigational servitude and safety on the project will be insured through typical practices including:
>
> • Implementation and oversight of regulations and requirements related to navigational servitude and safety
> • Implementation of an approved communications and coordination plan including the Pilots, USCG, USACE, OIPCB, and waterway users to help insure navigational servitude and safety
> • Appropriate marking and lighting of all dredge plants and equipment
> • Movement and/or location of dredge equipment to provide for safe vessel passage
> • Appropriate location and management of temporary dredge lines and unloading facilities.[148]

Here, the applicants assert that safety is ensured through "Implementation and oversight of regulations and requirements related to navigational servitude and safety."[149] However, the application fails to identify any specific regulations or requirements. Additionally, it is not clear what "communications and coordination plan" exists between the Pilots, USCG, USACE, OIPCB, and waterway users. Although rules and regulations exist regarding "appropriate marking and lighting" of dredge plants and equipment, the Department should carefully evaluate potential risks. Further, the applicants have failed to provide a site-specific analysis of "Movement and/or location of dredge equipment to provide for safe vessel passage" or "Appropriate location and management of temporary dredge lines and unloading facilities."[150] It is likely that under normal dredging operations, (1) small vessels would have to make way and adjust their operations to avoid interference with the dredge (in effect, the dredge would occupy part of the channel, making it unavailable for navigation by others) and (2) when larger ships pass through the FNC, the dredge would be required to make specific maneuvers to move anchoring lines and dredge lines out of the way to allow safe passage. These situations rely upon placing the burden on other mariners to curtail and adjust their navigation of the estuary and assuming that the dredge will be able to safely maneuver out of the way to allow uninterrupted use of the FNC.

i. Vessel Casualties

As with any major marine endeavor, this proposal in the Coos Bay estuary poses a risk of vessel casualties. Casualties occur for a large variety of reasons.[151] For example, the interplay with recreational users is especially important.[152] On August 30, 2016, three kayakers were injured when a ferry collided with their group in the Hudson River, highlighting the dangers of

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[148] Department of State Lands APP0060697. 7 November 2018. Appendix A.5, (Gerken 2018) @ pg.14.
[149] *Id.*
[150] *Id.*
[151] *See e.g.* NTSB Safer Seas Digest 2017, Lessons Learned from Marine Accident Investigations. Available online at: https://www.ntsb.gov/investigations/AccidentReports/Reports/SPC1802.pdf
[152] *See e.g.* NTSB Safety Recommendation Board, Safety Recommendation Report *Shared Waterways: Safety of Recreational and Commercial Vessels in the Marine Transportation System.* MSR-17/01. Available online at: https://www.ntsb.gov/investigations/AccidentReports/Reports/MSR1701.pdf.

recreational and commercial vessels operating on the same waterways. This led to a major effort by NTSB, which found that the most critical safety factor was cooperation between recreational and commercial users at established ports.[153] The Department should comprehensively evaluate whether this type of cooperation has occurred for the project.

3. NRI Dredging Impacts to Shipping

a. Applicants Fail to Demonstrate Public Benefits to Navigation from NRI Dredging

The applicants have not demonstrated that the NRI dredging will meaningfully improve navigation conditions for any vessels other than the LNG tankers proposed by the applicants. The application includes two letters of support from the Coos Bay Pilots Association and Roseburg Forest Products that provide no independent analysis and rely heavily upon information from the applicants. The Department should consider the direct, personal, and financial interests at stake in reviewing these letters. The improvements here are a response to a private need for channel dredging, not a public one. When security zones for additional use by LNG tankers is taken into account, it is likely that the public will routinely be prohibited from the area by operation of law.

Further, the applicants fail to demonstrate the independent utility of the project (*see* Chapter 6 *infra*).

b. Safety Margins from NRI Dredging

It is not clear that dredging the deeper channel wider at the turns will increase safety margins for pilots transiting the channel in LNG tankers. Pilots will make crossings using the same margins of safety as before; the difference is that those margins could be achieved in higher wind conditions than before. So while the turns are wider, they will be taken at higher wind speeds, resulting in the same margin of safety from the pilot's perspective. The Department should evaluate whether allowing bar crossings by LNG vessels under windier conditions would result in safer navigation.

Inherent in the purpose of the project, however, is that the proposed dredging will result in new and extensive LNG tanker traffic. The precise locations and extent of NRI and channel dredging in the Coos Bay estuary has immediate and direct implications for shipping safety. Vessel routing from the open ocean over the bar, up the estuary to the marine slip is a hazardous maneuver that impairs navigation for all other users under the best circumstances. The route itself contains numerous important turns and components, and there is very little room for error. The entrance and first river bend, as well as the entrance to the marine slip, are both precise maneuvers.

For example, at the first proposed NRI, after a ship makes a 95-degree turn, it must center itself in the channel to make a 21-degree starboard turn into the Coos Bay Range, and do that within a distance of about two ship lengths, "which is much less than the minimum of 5.0 ship lengths recommended by normal industry guidance (USACE EM 1110-2-1613, chapter 8-2). The

[153] NTSB 2017 @ p.81. ("Cooperation is needed because shared waterway safety issues are a function of geography, vessel types, predominant weather, and other local factors. Local stakeholders working cooperatively are in the best position to address local issues through mutual respect and a shared commitment to safety.")

dredging proposed here would widen the inside range channel from 300 to 450 feet, lengthening the corner cutoff from 850 feet to 1,400 feet from the turn's apex. This expansion will still require vessels to make their turns in a shorter distance than normal industry guidance.

Additional safety concerns include:

i. Waterway Conditions

Waterway conditions adjacent to the facility, and along the shipping route, make the introduction of LNG tankers hazardous. *See* JCEP 2007 WSA; USCG 2018 LORA. The bay is subject to currents, tides and winds under normal conditions.

ii. Timing Restrictions

The bar channel is another hazard that is particularly significant. In fact, tankers only propose to cross it and the LOR only applies when it is crossed at slack high tides during daylight. This limitation, combined with security measures (like the 500-yard exclusion zone, *see* USCG July 1, 2008 WSR) specific to tankers combined with ordinary navigation rules creates specific harm to navigation. With only 120 vessel calls per year, that means LNG tankers will rely on using 240 out of the 365 available daylight high tides in the year. Having claimed the safest crossing times for themselves, all remaining vessels will have to use the remaining 115 available daylight slack high tides. If there are fifty other vessels, such as tank barges or export ships, using the port in a year, then it is likely that other mariners will no longer be able to use the safest bar crossing time at all. Outgoing vessels would have to hold up just inside the bar while the LNG ship passes, or leave earlier under time pressure. Both of these situations are likely to increase safety risks to vessels and directly impair navigation.

Relying on the high slack tides raises another concern for navigation by creating potential bottlenecks. Ships will have to time their entrance precisely on a chance that only comes once a day. This situation greatly increases the chances of LNG ships having to hold up offshore. According to current guidance, which recognizes the hazard posed by waiting tank vessels along this navigation route and unprotected coastline, vessels holding up are directed to stay fifty nm from shore. There is no suitable anchorage for large vessels near shore, and certainly none well off the continental shelf. That means that if a bar crossing is missed for any reason, it adds a roughly 100 nm to the journey at a hazardous location where vessels will burn additional fuel and increase the chances for accidents to happen.

The 2008 Waterway Suitability Report, issued July 1, 2008 by the Coast Guard, contains numerous risk mitigation measures that are required, as well as numerous resource gaps. These restrictions, particularly those related to navigation, should be carefully weighed in evaluating impacts to navigation. Critically, decisions on almost all of those mitigation measures remain to be made, and cannot be known in time for the decision. Draft requirements, safety/security zones and the vessel traffic management measures peculiar to LNG traffic are especially important. In addition to the numerous *operational* measures (e.g. meetings of port, FBI, coast guard and escort tugs in advance of every vessel arrival; VTIS installation; tractor tugs; navigational aids; and training; USCG facilities; fire-fighting; notification; gas detection) that have yet to be developed, there are *fundamental* decisions regarding facility siting, purpose, alternatives and mitigation that impact directly on the purpose, need, and consequences of "the project" under the DSL dredge and fill rules.

iii. Shipwrecks

The applicants should fully identify shipwrecks and possible human remains in and near the navigation channel. We are concerned that historic wrecks are not adequately surveyed for and identified by the applicants.

c. Interference with Public Access

The availability of public boat ramps is an essential to use of waterways for navigation and for recreation. Smaller vessels like fishing vessels, kayaks, and river rafts rely on access to these areas.

While the issue is not addressed by the applicants, the location of the project will likely interfere with a number of different boat ramps. For example, the BLM boat ramp on the Coos Bay estuary is only 0.75 miles from the proposed JCEP. This is the only public marine access on that side of the estuary and would be closed during project construction. It is uncertain whether long-term access would be restored. The proposed South Umpqua River crossing also is located right at a public boat ramp.

The application does not appear to address effects to boat ramps at all. The Department should require the applicants to address effects to boat ramps before analyzing this application.

3. Navigation on Inland Rivers

The navigation uses on the inland rivers here also are significant. The Department should comprehensively evaluate impacts to river users along all waterways impacted by the project, such as the Rogue. At each of the major river crossings, operations would likely disturb recreational rafters, kayakers, and sport fishers. At times, navigation will be impaired completely. The application does not appear to include any kind of mitigation to facilitate portage around construction. At minimum, the Department should require the applicants to provide assurance that recreational boaters would be able to freely navigate all of the rivers and streams. Further, as discussed in Chapter 4 *infra*, pollution and similar disturbance from work on smaller streams also would impair use of the rivers and streams for recreational fishing.

5.2 DSL must deny the permit because the application fails to provide reasonable assurance that the project will not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for fishing (ORS 196.825(1)(b)).

A. Introduction

1. Coos Bay

The natural environment of the Coos estuary is habitat for a diversity of plants and animals. The extensive shallow tidal flats provide habitat for shellfish as well as feeding and spawning habitat for many native fish. The Coos Bay supports a variety of beneficial uses as designated in the

South Coast Basin as a whole.[154] These include fish and aquatic life, wildlife & hunting, fishing, boating, water contact recreation, aesthetic quality, and commercial navigation & transportation. According to Resource Report 3 for the Jordan Cove LNG terminal, there are nine representative anadromous fish species in the terminal project area: Chinook salmon, chum salmon, coho salmon, Pacific lamprey, green sturgeon, steelhead trout, striped bass, threespine stickleback, and white sturgeon.[155] Federally listed Oregon Coast coho and Southern Oregon/Northern California Coast under the Endangered Species Act (ESA) are both present in the project area. The 2014 DEIS noted that submerged aquatic vegetation (including eelgrass, macrophytic algae) as well as other food web components such as phytoplankton, zooplankton, detritus, and epiphyton, are all important in supplying habitat and food base for EFH species within Coos Bay.[156]

Historically, Native Olympic oysters were abundant in the Coos estuary, but became locally extinct as a result of basin-wide changes in sedimentation. The Coos Bay aquatic habitat has been degraded by cumulative effects of sedimentation, bark decay, dredging, diking, filling, domestic and industrial pollution and by colonization of non-indigenous aquatic species. Despite this habitat degradation, over the past two decades, water column and sediment have improved to a level that is conducive to recovery and re establishment of *O. conchaphila* in the low intertidal and shallow subtidal zones of the Coos estuary.

A 2008 SEACOR (Shellfish and Estuarine Assessment of Coastal Oregon) study conducted by Marine Resources Program of ODFW sampled three areas in the Coos Bay estuary for clam species and distribution. Areas sampled include Clam Island, Pigeon Point, and South Slough. Butter clams were found in high densities in Coos Bay, particularly in areas with high sand bars and little algae. Cockle clam populations were considerably lower than butter clams and were found near the surface in areas with oxygenated sediment and abundant algae. Gaper clams were abundant in low tidal areas with eelgrass (zostera marina). Native littleneck clams were found infrequently and were present in low tide areas with eelgrass and oxygenated sediments.
A significant portion of the Coos estuary bottom is covered in beds of eelgrass (both native Zostera marina, and the introduced Zostera japonica). Eelgrass beds, along with deeper tidal channels in the estuary, provide habitat to a number of fish and invertebrate species including juvenile crab, juvenile ling cod, salmonids, starry flounder, and English sole. Eelgrass also provides attachment area for algae, planktonic larvae, and snails.

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For example, submerged grasses or SAV are important habitat for small prey species of adult lingcod (in Appendix B-2 of PFMC 2008). Forage items that are habitat components for the managed species do depend to some extent on estuarine systems. Many species of groundfish

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[154] *See* Table 300A (OAR 340-041-0300).

[155] According to Resource Report 3 for the Jordan Cove LNG terminal, there are nine representative anadromous fish species in the terminal project area: Chinook salmon, chum salmon, coho salmon, Pacific lamprey, green sturgeon, steelhead trout, striped bass, threespine stickleback, and white sturgeon (RR3 at 2). Federally listed Oregon Coast coho and Southern Oregon/Northern California Coast under the Endangered Species Act (ESA) are both present in the project area.

[156] 2014 Draft EIS at 4-562.

and salmonids occupy inshore areas of the lower bay during juvenile stages (e.g., Chinook salmon, Coho salmon, English sole) where they feed on estuarine-dependent prey, including shrimp, small fishes, and crabs. As they mature and move offshore, their diets in many cases change to include fish, although estuarine- dependent species (e.g. shrimp, crabs) can still constitute an important dietary component. DEIS at 4-562.

Coos Bay is central to Oregon's commercial fishing industry, whose economic contribution is equivalent to about 10,000 jobs. Economic contributions from commercial fishing go beyond harvesting and seafood-processing, and include visitors and tourism, boat building and gear manufacturing, safety, research and education.[157] Recreational fisheries, including shellfish harvest and crabbing, are also important resources in Coos Bay. Several of the most important shellfish beds are located in close proximity to the LNG transit route along the edge of the North Spit.

2. Oregon Rivers

Oregon rivers that would be impacted by the project, notably the Klamath, Rogue, Coos, and Umpqua, as well as numerous of the smaller creeks and streams (e.g. Days Creek) also provide important habitat supporting fisheries. Coho and King salmon, and Steelhead are particularly significant resources on the inland rivers. Specific impacts to each watershed are provided in detail in Appendix A. Clean Water Act 401 Comments. Impacts to fisheries related to impacts from PCGP are discussed in Chapter 4 *infra*.

3. Summary of Impacts to Fisheries

In summary, the proposed activities associated with the terminal will likely impact aquatic resources by:

- Permanently destroying at least 1.9-acres of eelgrass beds that provide habitat and food base for fish and invertebrate species including juvenile crab, juvenile lingcod, salmonids, starry flounder, and English sole;
- Impairing water quality by decreasing dissolved oxygen, changing salinity levels, increasing temperature, and increasing sedimentation as a result of dredging and other related activities;
- Activities related to the marine terminal and north spit facilities, including discharge of dredging spoils causing turbidity plumes, LNG vessel wake strandings, engine cooling water intake entrainment, dredging of the access channel and construction of the pipeline across Coos Bay could all jeopardize the survival of aquatic species;
- Dredging would directly remove benthic organisms, such as worms, clams, starfish, and vegetation from the bottom of the bay.
- Crabs, shrimp, clams, oysters, and fish could become entrained in the operation of the dredging equipment;[158] and
- Degraded habitat and aquatic resources used by threatened and endangered species such as Coho salmon (*Oncorhynchus kisutch*), green sturgeon (*Acipenser medirostris*) and eulachon (*Thaleichthys pacificus*) by permanently converting 6.8 acres of highly

[157] *See* Oregon Commercial Fishing Industry Year 2016 Economic Activity Summary at 5 (April 2017).
[158] DEIS 2014 at 4-569 to 4-570.

productive intertidal habitat to low productive deep-water habitat; by failing to adequately mitigate for the permanent loss of freshwater and estuarine wetlands including eelgrass beds, and by permanently removing coastal riparian vegetation that is an essential component of the food chain for fish and aquatic life, among other impacts.

Construction and operation of the proposed Pacific Connector Pipeline will impact aquatic resources and therefore harm designated beneficial uses for fish and aquatic life, wildlife and hunting, and fishing by:

- Permanent loss of vegetative shading at corridors for pipeline stream crossings construction and operation;
- Permanent loss of base flows from pipeline;
- Stream width increases from sedimentation related to pipeline construction and operation;
- Soil, vegetation, bank destabilization and increased sedimentation from pipeline construction and implementation;
- Permanent degradation of riparian areas in pipeline corridors at stream crossings;
- Permanent loss of Large Wooded Debris areas from degradation of riparian areas and increased sediment transport in stream and river channels;
- Deforestation in pipeline corridors combined with wetlands damage and long-term soil compaction and new road creation and use, plus decreases in hydrologic connectivity due to all of the above; and
- Increased, prolonged sedimentation of waterways.

Impacts to fisheries in each impacted watershed are discussed in detail in Appendix A. Clean Water Act 401 Comments. Additionally, overall impacts to fisheries are discussed in Chapter 4 *infra*. Commenters are particularly concerned about impacts to Dungeness crab fisheries and provide more detail below.

B. Project Impacts to Dungeness Crab Fisheries

1. Fishery, Landings, Catch Value, and Fleet

In 2009, the Oregon House of Representatives designated the Dungeness crab as Oregon's official state crustacean.[159] The Dungeness crab fishery is consistently the most valuable single species commercial fishery in Oregon, making the crustacean's well-being of special significance to the economy of Coos Bay and the State of Oregon itself.[160]

Overall, Dungeness crabs make for a lucrative fishery. In a good year, landings can yield $100 million to the Oregon economy.[161] The ex-vessel value of Oregon's Dungeness crab fishery fluctuates yearly, based on the size of the harvest and prevailing market conditions.[162] In the

[159] *See* H.R.J. Res. 37, 75th Leg., Reg. Sess. (Or. 2009) *available at* https://web.archive.org/web/20110611123205/http://www.leg.state.or.us/09reg/measures/hjr1.dir/hjr0037.en.html.

[160] *See* Erik Knoder, Or. Emp't Dep't, "Oregon's Commercial Fishing in 2017," https://www.qualityinfo.org/-/oregon-s-commercial-fishing-in-2017 ("Dungeness crab is usually Oregon's most valuable fishery, and it was again in 2017").

[161] *Yamada Statement* at 2:17:36, *available at* https://www.youtube.com/watch?v=aRQATTbaE6k.

[162] Or. Dungeness Crab Comm'n, "Catch Value," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

most recent 10-year period, the to-the-boat catch value ranged from $5 million to $74 million dollars[163]

Since the establishment of the fishery over a century ago, Oregon has consistently been one of the largest producers of Dungeness crab on the west coast.[164] Dungeness crabs harvested in the Charleston/Coos Bay vicinity accounted for almost one quarter of total pounds landed in Oregon during the 2017-2018 season (5.2 million pounds), with the Coos Bay region coming second only to the Newport area.[165] In the 2017-2018 season, Dungeness crabs were valued at an average price of $3.22/lb, with prices of approximately $5 to $7/lb between the months of April 2018 to August 2018.[166] In other words, the Dungeness crab fishery is a substantial economic driver for Coos Bay.

In 1995, Oregon imposed a limited entry permit system on the Dungeness crab fishery, which capped the number of vessels allowed to participate.[167] Initially, 465 permits were issued based on prior participation, with the number subsequently dropping to 424 permits in June 2014 due to non-renewal.[168] Today, an average of 315 permits fish for Dungeness crab each year, with 2018 recording 318 active permit holders.[169]

There are in excess of 350 vessels presently engaged in the crab fishery.[170] The types of vessels range from the small wooden troller with its two-man crew to large steel combination vessels with a four-man crew capable of fishing around the clock for extended periods of time.[171]

2. Ocean Commercial, Bay Commercial, and Recreational Fisheries[172]

Oregon has three targeted fisheries for Dungeness crab: the ocean commercial crab fishery, the bay commercial crab fishery, and the recreational crab fishery (which occurs in both the ocean and estuaries).[173] The ocean commercial fishery is the largest, and is discussed in the next

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163 Or. Dungeness Crab Comm'n, "Catch Value," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

164 Or. Dep't of Fish and Wildlife, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019).

165 Or. Dep't of Fish and Wildlife (ODFW), Marine Resources Program, "Dungeness Crab Fishery Newsletter," 1, 2 (Nov. 2018) *available at* https://www.dfw.state.or.us/MRP/shellfish/commercial/crab/docs/Crab%20Newsletter_2018_final.pdf [hereinafter ODFW Dungeness Newsletter 2018].

166 ODFW Dungeness Newsletter 2018 at 2.

167 Or. Dep't of Fish and Wildlife, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019).

168 Or. Dungeness Crab Comm'n, "Vessels," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019); ODFW, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019); ODFW, Oregon Dungeness Crab Research and Monitoring Plan 4 (2014) *available at* https://www.dfw.state.or.us/MRP/shellfish/commercial/crab/docs/ODFW_DungenessCrabResearchMonitoringPlan_updated2014_Final_081414.pdf.

169 Or. Dep't of Fish and Wildlife, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019); ODFW Dungeness Newsletter 2018 at 1.

170 Or. Dungeness Crab Comm'n, "Vessels," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

171 Or. Dungeness Crab Comm'n, "Vessels," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

172 Or. Dungeness Crab Comm'n, "Seasons," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

173 Or. Dep't of Fish and Wildlife, Marine Resources Program, Oregon Dungeness Crab Research and Monitoring Plan 4 (2014) *available at*

paragraph. Relative to the ocean commercial crab fishery, the bay commercial crab fishery is smaller, in terms of both the number of participants and total harvest.[174] The fishery is typically restricted to a three to four-month season (September through December, annually), harvesting is not permitted on holidays or on weekends, and no more than 15 rings per vessel may be used.[175] Oregon's recreational crab fishermen target Dungeness crab in the ocean and within the state's many bays.[176] Per the Oregon Department of Fish and Wildlife's Dungeness Crab Research and Monitoring Plan:

> Participation and harvest in the recreational crab fishery peaks in the summer months and is estimated to harvest an average of five and half percent of the total targeted harvest of Dungeness crab statewide (average from 2010 and 2011 estimates to compare seasons of the same length (Dec-Oct.15)).[177]

The ocean crab season along the Oregon coast begins on December 1 (when crab shells have hardened, indicating that they have filled out with firm meat) and continues through August 14, annually.[178] Crabbing in the ocean is closed for Dungeness crab from Oct. 16 to Nov. 30, annually.[179] Although Oregon estuaries (including Coos Bay) provide year-round opportunities for crabbing, fall is typically recognized as the best time for harvesting.[180] Coos Bay Dungeness crab shells usually harden in the beginning of September after their summer molt, and are in peak condition for consumption between October and November.[181]

The peak ocean and bay harvest typically occurs during the first eight weeks of each respective season (i.e. between December and through the end of January for ocean fishery, and between September and October for bay fishery), with up to 75 percent of the annual production landed during this period.[182] In 2017-2018 season, 91 percent of the annual harvest was harvested within the first two months of fishery.[183] Ocean harvesting effort traditionally decreases in the spring as fishermen gear up for other coastal fisheries, but fresh crab continues to be available throughout the summer months, thanks to a small number of boats that fish up to the closure in August.[184]

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https://www.dfw.state.or.us/MRP/shellfish/commercial/crab/docs/ODFW_DungenessCrabResearchMonitoringPlan_updated2014_Final_081414.pdf [hereinafter ODFW Oregon Dungeness Crab Research and Monitoring Plan].

[174] *See* ODFW Oregon Dungeness Crab Research and Monitoring Plan at 4-5.

[175] ODFW Oregon Dungeness Crab Research and Monitoring Plan at 4-5.

[176] ODFW Oregon Dungeness Crab Research and Monitoring Plan at 5.

[177] ODFW Oregon Dungeness Crab Research and Monitoring Plan at 5 citing Ainsworth et. al. 2012.

[178] Or. Dungeness Crab Comm'n, "Seasons," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019); ODFW, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019).

[179] Or. Dep't. of Fish and Wildlife, "How to Crab," https://myodfw.com/articles/how-crab (last visited Jan. 18, 2019).

[180] Or. Dep't. of Fish and Wildlife, "How to Crab," https://myodfw.com/articles/how-crab (last visited Jan. 18, 2019).

[181] Or. Dep't. of Fish and Wildlife, "How to Crab," https://myodfw.com/articles/how-crab (last visited Jan. 18, 2019); Comments of Professor Janet Hodder for DSL Application APP0060697 (Jan. 12, 2019), App. H, 18-19. [hereinafter Hodder Comment]

[182] Or. Dungeness Crab Comm'n, "Seasons," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

[183] ODFW Dungeness Newsletter 2018 at 1, 2.

[184] Or. Dungeness Crab Comm'n, "Seasons," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

The Coos Bay region is renowned for its recreational Dungeness crab fishery. Estimates from the 2007-2011 period found a minimum of 10,661 to a maximum of 15,023 crabbing trips were made in Coos Bay from April to October per year.[185] Crabbing in Coos Bay is one of the most valuable recreational opportunities in the region and draws considerable number of people to the area. The commercial and recreational Dungeness crab fishery is of considerable economic significance (as detailed above), especially for the community of Charleston.

The applicant generally acknowledges the economic importance of the commercial Dungeness crab fishery to Coos Bay, Charleston, and surrounding areas, stating

> Oregon Department of Fish and Wildlife (ODFW) data on pounds and values of commercially caught fish and shellfish landed in Charleston, Oregon in 2016 indicate that shellfish fisheries (predominantly crab, shrimp, and clams) are of substantial economic importance to the Coos Bay area, exceeding $18.8 million in value in 2016[186]

The applicant similarly acknowledges the general economic importance of recreational fishery to the area, as well as highlighting some popular recreational fishing locations, stating

> Recreational crabbing and clamming bring year-round tourist income to the region. Crabbing occurs in the main channel areas, largely from the BLM boat ramp on the North Spit (west of the JCEP Project Area) to the mouth of the bay, and typically is done around slack tides. The main areas for recreational clamming and crabbing in the bay are located along the west side of the South Slough near Charleston, along the North Spit; at Fossil and Pigeon points; near Haynes Inlet, North Slough, and Glasgow; and along the east side of the upper bay. The west shore of the bay at Jordan Cove contains sand/mudflats, eelgrass beds, and a fringe of salt marsh that provide habitat for recreationally important ghost shrimp and mud shrimp. These shrimp are recreationally harvested at a number of locations throughout the bay, and are popular among fishermen for use as bait.[187]

Despite this initial recognition of crucial commercial and recreational fisheries in the vicinity of proposed project activities, the applicant largely fails to provide the the necessary data to assess the impacts of said activities on protected shellfish harvesting uses and in one instance provided incorrect information. A discussion of both of these matters follows below. Without adequate and accurate information about the extent to which proposed project activities will interfere with ocean and bay Dungeness crab fisheries in Coos Bay, DSL must deny the fill and removal permit.

3. Harvest Methods – Ocean, Bay, and Recreational Fishery[188]

Ocean Dungeness crabs are caught in circular steel traps commonly called pots. Weighing anywhere from 60 to 125 lbs. and measuring 36" to 48" in diameter, each pot has a length of line

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[185] Hodder Comment at 18, citing "The Oregon Recreational Dungeness Crab Fishery, 2007-2011 54, (July 2012) *available at* https://www.dfw.state.or.us/MRP/shellfish/docs/2012-04.pdf.

[186] JPA Part 1, Sec. 4 (Description of Resources in Project Area)(emphasis added).

[187] *Id*.

[188] Or. Dungeness Crab Comm'n, "Harvest Method," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).

and a buoy attached to mark its position for retrieval.[189] The pots are baited with squid or razor clams to attract the bottom-dwelling crabs, and set on the ocean floor following the contour of the adjacent coastline.[190] The pots are then allowed to "soak" for a one to four-day period, depending on the fishing conditions, weather and time of year.[191] The average boat fishes 300-500 pots in depths of 5-100 fathoms (30 to 600 feet) of water.[192] After being brought to the surface by a hydraulic power-block, the crabs are sorted and kept alive on-board the vessel in circulated seawater until they are delivered to shore-side processing plants.[193]

Most recreational and all commercial crab fishing in Coos Estuary is undertaken using rings.[194] In contrast to recreational fishery in the bay using traps or the use of commercial ocean crab pots (which may be allowed to soak for up to two hours or up to four days, respectively), the success of capture using crab rings depends upon the frequency with which the rings, once deployed, are brought rapidly to the surface.[195] Because crab rings do not retain crabs while the ring is at rest on the [bay] bottom, the only way to capture crabs using rings is to bring them rapidly to the surface while actively feeding crabs are present on the baited ring.[196] For bay crabbing, it is important to check rings on a more frequent basis as the tide approaches slack high water, since this coincides with the greatest crab movement and feeding activity.[197]

Commercial crabbers in the ocean and bay only harvest mature male crabs measuring 6 ¼" across the shell (carapace width).[198] This assures that the crab will have at least one year of reproduction, but often ensures at least two years.[199] The legal standard for recreational harvest for mature male crabs is legal at 5 ¾" carapace width.[200] Juvenile males and all females are immediately returned to the water to ensure healthy stocks for future harvests.[201] Females crabs are left to reproduce throughout their lifespan.[202]

4. Dungeness crabs and the lucrative fishery associated with the crustacean in Coos Bay will accrue numerous harms as a result of the proposed fill and removal activities associated with Jordan Cove.

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[189] Or. Dungeness Crab Comm'n, "Harvest Method," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).
[190] *Id*.
[191] *Id*.
[192] Or. Dungeness Crab Comm'n, "Harvest Method," http://oregondungeness.org/fishery/ (last visited Jan. 18, 2019).
[193] *Id*.
[194] Comments of Michael Graybill on DSL permit 60697, (submitted Jan. 15, 2019), App. I, 64. [hereinafter Graybill Comment]
[195] Graybill Comment at 64.
[196] *Id*.
[197] *Id*.
[198] *Id*.
[199] Or. Dep't of Fish and Wildlife, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019).
[200] *Id*.
[201] *Id*.
[202] Or. Dep't of Fish and Wildlife, "About the Dungeness crab fishery," https://www.dfw.state.or.us/mrp/Shellfish/commercial/crab/index.asp (Last updated Jan. 4, 2019).

In order to grant a fill and removal permit, DSL must determine that the project described is consistent with the protection, conservation, and best uses of the water resources of this state.[203] "Water resources" as used in Oregon's fill and removal statutes includes "not only water itself but also *aquatic life and habitats therein* and all other natural resources in and under the waters[204] of this state."[205] Coos Bay is a crucial "nursery" habitat for the Dungeness crab. In her statement given to DSL at the Public Hearing for Jordan Cove in Salem, Oregon, Professor Sylvia B. Yamada[206] expressed her concern that the construction of the Jordan Cove Energy Project could negatively impact this important nursery habitat for the native species of Coos Bay and its estuary, including the Dungeness crab.[207] According to Professor Yamada, the highest number of juvenile crabs are found in soft sediments and eel grass beds of estuaries, where the young crabs find food and shelter from predators.[208] Indeed, Professor Yamada stated that she herself has consistently trapped an average of 15 young Dungeness crabs per trap in her Coos Estuary study site, located along the Trans Pacific Parkway (adjacent to Jordan Cove).[209]

DSL must consider the Coos estuary's importance as a nursery habitat when determining whether to allow removal-fill in Coos Bay and in upland areas to create a berth for ocean going vessels. The applicant's construction timeline for the components associated with the LNG terminal estimates a project start date for the "1st half of 2020" with an estimated project completion date for the "1st half of 2024."[210] In other words, Dungeness crabs and other estuarine organisms (whose use of Coos Bay is protected under Oregon statute[211] and administrative rules[212]) would face multiple exposures to the proposed activities over a four-year period.

Not only would the turbidity during the construction phase of the LNG terminal's components negatively impact the ecological community, the ongoing dredging to maintain the berth and shipping channels will continue to be a disturbance to the ecosystem. In [an ongoing] study conducted by Professor Yamada and designed to simulate a dredging operation, she found that between 45 to 85 percent of the Dungeness crabs [exposed to the operation] died.[213] Over the four year estimated construction period, Dungeness crabs would face repeated exposure to

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203 *See* ORS 196.825(1)(a).

204 "Waters of this state" refers to "all natural waterways, tidal and nontidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, that portion of the Pacific Ocean that is in the boundaries of this state, all other navigable and nonnavigable bodies of water in this state and those portions of the ocean shore, […], where removal or fill activities are regulated under a state-assumed permit program as provided in 33 U.S.C. 1344(g) of the Federal Water Pollution Control Act, as amended." ORS 196.800(15).

205 ORS 196.800(14), emphasis added.

206 Professor Sylvia B. Yamada is an Assistant Professor of Senior Research in the Department of Zoology at Oregon State University. *See* University Web Page. She has been studying crabs in Oregon estuaries, including Coos Bay, for over 20 years. *See* Representative Publications; *See also* Older Publications.

207 *Public Hearing for Jordan Cove Removal-Fill Permit Application – Salem, OR: Before the Or. Dept. of State Lands* (1.15.2019) at 2:17:07, 2:17:19 (statement of Sylvia B. Yamada, Assistant Professor, Senior Research; Dep't of Zoology, Oregon State Univ.), *available at* https://www.youtube.com/watch?v=aRQATTbaE6k [hereinafter *Yamada Statement*].

208 *Yamada Statement* at 2:17:46, *available at* https://www.youtube.com/watch?v=aRQATTbaE6k.

209 *Id*. at 2:17:58, *available at* https://www.youtube.com/watch?v=aRQATTbaE6k.

210 JPA Part 1, Sec. 6 (Project Description).

211 *See* ORS 196.805(2).

212 *See* OAR 340-041-0300.

213 *See Yamada Statement* at 2:18:47, *available at* https://www.youtube.com/watch?v=aRQATTbaE6k.

dredging activities that could substantially increase their rates of mortality. The NEPA documents of earlier iterations of this project have recognized direct impacts to crabs from dredging.[214]

Apart from acknowledging the existence of a commercial ocean-going Dungeness crab fishery in Coos Bay[215], the applicant fails to make any mention of the crabs, let alone address any impacts to their habitat as a result of proposed activities. At the very least, DSL must deny this fill and removal permit until the applicant provides adequate information to make a determination on impacts to Dungeness crab nursery habitat in Coos Bay.

Professor Yamada concluded that the "construction and maintenance of the Jordan Cove LNG terminal will result in habitat loss for native species, including valuable nursery habitat for the Dungeness crab."[216] The applicant's proposed activities will cause harmful habitat loss for the valuable Dungeness crab, a species of critical importance to the region's lucrative recreational and commercial crab fisheries. This warrants denial of the fill and removal permit.

5. DSL must deny the permit because the work proposed will result in unreasonable interference with the use of state waters for commercial and recreational Dungeness crab fishery.

In order to lawfully grant a fill and removal permit, DSL must determine that the project described in the application "would not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing and public recreation."[217] ORS 196.805 sets out the policy behind the Oregon's fill and removal statutes.[218] The statute states that the "protection, conservation and best use of the water resources of [Oregon] are matters of the *utmost public concern*."[219] In implementing the policy, the director shall take into consideration "all beneficial uses of water…when administering fill and removal statutes."[220] Again, designated beneficial uses for all streams and tributaries to Coos Bay include, amongst a number of other criteria, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, [and] aesthetic quality.[221] Potential impacts to beneficial uses are discussed in substantive detail in Chapter 4 *infra*. Water contact recreation and shellfish harvesting are designated uses for Coos Bay.[222] This means:

> Coastal water contact recreation use is to be protected in all South Coast Basin marine waters and in coastal waters designated in Figures 300C and 300D…

[214] *See* Draft EIS 4-569 to 4-570.
[215] *See* JPA Part 1, Sec. 4 (Description of Resources in Project Area).
[216] *See Yamada Statement* at 2:18:56, *available at* https://www.youtube.com/watch?v=aRQATTbaE6k.
[217] ORS 196.825(1)(b); *See also* OAR 141-085-0565(3)(b)(detailing department determinations in evaluating a permit application).
[218] *In re Coyote Island Terminal LLC*, OAH Case No. 1403883, 21 (2016) (OR Dep't of State Lands) (Rulings on Mot. for Summ. Determination).
[219] ORS 196.805(1), emphasis added.
[220] ORS 196.805(2).
[221] *Id.*
[222] *See* OAR 340-041-0300(3)-(4, Figure 300C & 300D (Water Contact Recreation and Shellfish Harvesting Designated Uses – Coos Bay, South Coast Basin, Oregon) *available at* https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=68924

> Shellfish harvesting use is to be protected in all South Coast Basin marine waters and in coastal waters as designated in Figures 300C and 300D…[223]

As mentioned above, "[w]ater quality in the South Coast Basin…must be managed to protect [designated] beneficial uses…"[224]

6. The Data Required to Evaluate the Extent of Restriction of Access to Lower Coos Bay Crabbing Sites is Omitted[225]

The permit indicates that LNG carrier transits will increase time periods of restricted access to lower bay crabbing sites.[226] The proposed fill and removal activities are to be undertaken for the purpose of allowing LNG Carrier transit between the LNG Terminal the open sea. As an LNG carrier transits through the bay, the Coast Guard will "impose a moving safety/security zone of 500 yards around the carrier or up the shoreline, whichever is less."[227] Current USCG law restricts all recreation activities within the Coos Bay Federal Navigational Channel (FNC) during all marine vessel transits.[228] Recreational Dungeness crabbing within the bay:

> which typically occurs during slack high tide year-round, may be further limited in access to crabbing areas inside the "safety/security zone" in two areas of the lower bay. The two areas are located immediately north of Charleston Marina and along the northwest side of the bay from approximately RM 2.5 to RM 5.[229]

The permit states that "[t]he sum of the periods in which LNG carriers would have a potential impact on recreational and other boating activity is about 7 hours per week or about 8 percent of all daylight hours (see Appendix C.5 to Resource Report 5)."[230] However, this claim cannot be effectively evaluated with the information provided in the revised permit application. First, a search of the PDF using "Resource Report 5" and "Resource Report" as inputs fails to yield any relevant results. In addition, Appendix C.5 is a Wetland Delineation Concurrence Letter dated Nov. 8, 2013,[231] and does not appear to contain any information regarding the potential impact of LNG carrier transit safety/security zones on recreational Dungeness crab fishery. Finally, the input of the specific time impacts stated by the applicant ("7 hours," "8 percent," "daylight hours") also fail yield data to corroborate said assumptions. Without adequate and accurate information about the extent to which the safety/security zone associated with LNG carrier transit may impact access for recreational Dungeness crab fishery in Coos Bay, DSL must deny the fill and removal permit.

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223 *Id*.
224 OAR 340-041-0300(1).
225 Hodder Comment at 18.
226 JPA Part 1, Sec. 4 (Description of Resources in Project Area)(emphasis added).
227 *Id*.
228 *Id*.
229 *Id*.
230 *Id*.
231 *See* JPA Part 1, Attach. C.5 (Wetland Delineation WD #2014-0116 Concurrence Letter Nov. 8 2013).

7. The applicant incorrectly identifies the preferred Dungeness harvest method for Coos Bay, resulting in an inaccurate assessment of impacts on bay Dungeness fishery.[232]

As though seeking to minimize the aforementioned impact of restricted access to two Dungeness crabbing locations in the lower bay, the applicant suggests that "crab pots or traps placed outside the FNC could feasibly be deployed prior to and remain during LNG carrier transit and subsequently retrieved following vessel safety zone passing."[233] This is because:

> JCEP estimates that it will take an LNG carrier approximately 0- minutes to make the full transit of the waterway from the Coos Bay jetty entrance to the LNG Terminal at speeds between 4 and 6 knots. The maximum period for an LNG carrier to pass through the safety and security zone would be 30 minutes, meaning recreational crabbers would not have access to their pots or traps for up to 30 minutes, but the pots or traps would be "soaking" during this time.[234]

Professor Janet Hodder[235] stated in her comment that it was "obvious from this statement that the permit writer [had] never crabbed in Coos Bay."[236] Contrary to the assertion of the applicant regarding the deployment of "pots or traps," most recreational and all commercial Dungeness crab fishing in Coos Estuary is undertaken using crab "rings."[237] Unlike commercial crab pots (frequently used in Ocean commercial Dungeness fishery) and traps (used in bay recreational commercial fishery), using rings to harvest crabs does not require "soaking."[238] Recall that because crab rings do not retain crabs while at rest on the bay floor, the only way to capture crustaceans using rings is to bring them rapidly and frequently to the surface while actively feeding crabs are present on the baited ring.[239]

Deploying a string of baited crab rings and then requiring crabbers to vacate the deployment area (leaving the rings unattended for 30 minutes around slack high tide) while an LNG tanker and its associated safety zone pass will diminish the effectiveness of one of the most important methods used to capture crabs in the Coos Estuary.[240] Requiring rings to "soak" for a period of 30 minutes or more, as the applicant implies would be feasible, will not improve their capture success rate.[241] If transiting LNG carriers require recreational fishers to leave deployed rings unattended for 30 minutes, it will likely render the ring harvest method infeasible and impractical

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232 Hodder Comment at 19.
233 JPA Part 1, Sec. 4 (Description of Resources in Project Area).
234 *Id*.
235 Professor Janet Hodder is a Senior Lecturer and the Academic Coordinator at the Oregon Institute of Marine Biology at the University of Oregon. She teaches courses on Marine Birds and Mammals and Marine Environmental Issues. *See* Faculty Page.
236 Hodder Comment at 19.
237 Graybill Comment at 64.
238 *Id*.
239 *Id*.
240 Graybill Comment at 64.
241 *Id*.

in Coos Bay.[242] Hence, the proposed activities would unreasonably interfere with an existing and important method of recreational Dungeness crabbing in Coos Bay.

All boat-based recreational crab fishing takes place within a two-hour time period centered over slack high water.[243] Depending on the number of fishers aboard, it is common for boat-based recreational fishers in Coos Bay to deploy a string of rings or traps consisting of 6, 9, or 12 rings or traps per vessel.[244] It typically takes several minutes to recover, clear, and redeploy each crab ring or trap in a string.[245] Recreational fishers often deploy a string of rings or traps one hour before the slack tide, and monitor individual rings and traps continuously during the ensuing lead up to slack high water and during the hour following the slack high water.[246] This type of fishing has a 2 hour feasible timeframe centered over high tide.[247] A 30-minute interruption caused by a transiting LNG carrier in this peak period of activity would constitute a *major* disruption of one of the most important (and valuable) recreational uses of the Coos Estuary.[248]

8. Impacts to Dungeness crab fishery in the lower bay are not considered.

This recreational and commercial crab fishery will also be impacted by the passage of LNG carriers transiting the bay. Specifically:[249]

> A commercial crab fishery exists in the lower portion of the bay including the area between the north and south Jetties. Again, recall that this fishery uses commercial crab "rings."[250] Unlike commercial crab traps, deployed crab rings lie flat on the bottom permitting both legal and sub-legal sized crabs unimpaired freedom to enter and depart the ring while deployed.[251] For rings to capture crabs, they must be regularly pulled swiftly to the surface requiring regular tending to fish effectively.[252]

The in-bay commercial crab fishery is currently limited to weekdays.[253] Recall that the recreational crab fishery is permitted year-round, all days of the week.[254]

9. LNG vessel traffic in Coos Bay will interfere with ocean-based fisheries.[255]

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242 Graybill Comment at 64.
243 *Id.* citing http://www.scod.com/cities/crabs/crabbing.html ("[t]he best time of the day for crabbing is one hour before and after high tide").
244 Graybill Comment at 64.
245 *Id*.
246 Graybill Comment at 64-65.
247 *Id*. at 65.
248 *Id.*
249 Graybill Comment at 65.
250 Graybill Comment at 66.
251 *Id*.
252 *Id*.
253 Graybill Comment at 66.
254 Graybill Comment at 66.
255 Graybill Comment at 66.

According to Michael Graybill,[256] individual boats involved in commercial fisheries including but not limited to the Dungeness crab, salmon and pink shrimp work as a fleet.[257] When Dungeness crab season opens and weather conditions are agreeable, most of the boats in the fishery head toward the sea in unison.[258] Particularly in winter, during commercial crab season, boats at sea tend their crab pots while monitoring decline in weather conditions and the limitations these may impose on the bar.[259] Members of the fleet are communicating, and paying attention to bar conditions and the tides.[260] Mr. Graybill states:

> Particularly in declining and marginal weather conditions, the previous outbound parade of boats reverses direction and the whole fleet heads for the bar. It can take the entire window of suitable incoming high tide conditions on the bar for the fleet to get back into the harbor. When the tide reverses and begins to ebb, conditions on the bar degenerate rapidly and in a matter of minutes the bar conditions can change from marginal to impassable. Boats that miss this window are forced to ride out the storm at sea until the next high flood tide.[261]

Adding the proposed LNG ship transit to this scenario negatively impact the existing use of the navigation channel by crab fishery.[262] The bar being closed for a half an hour over the high flood tide to accommodate passage of an LNG carrier risks stranding one of the fishery "fleet" boats at sea in bad weather conditions.[263] The applicant states the total time required for an LNG carrier to transit between the harbor entrance and the proposed berth is 90 minutes and that no individual location in the estuary will be impacted for more than 30 minutes.[264] Mr. Graybill discusses the issues with this with this proposed activity in more detail:

> Roughly one third to one half of the LNG carrier's total transit time will occur when LNG vessels transit the lower portion of the bay that is also used by commercial and recreational vessels based in the Charleston harbor. Taking a half hour chunk out of the extremely limited time that the commercial fleet uses to cross the bar to enable an LNG tanker to transit the bar will only have negative impacts on fisheries.[265] Those impacts are serious and potentially life threatening.[266]
>
> The Dungeness crab fishery in Oregon has been characterized as a "derby fishery". During the first days and weeks of the season, a substantial portion of the total annual commercial crab landings are caught in the first days and weeks of the season. Having gear in the water for "the first pull" is critically important. In the days just prior to the start of the commercial crabbing season, fisheries management agencies provide a very

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[256] Mr. Graybill is the former manager of the South Slough National Estuarine Research Reserve and a current resident of Coos Bay.
[257] *Id*.
[258] Graybill Comment at 66.
[259] *Id*.
[260] Graybill Comment at 66.
[261] *Id*.
[262] *Id*.
[263] Graybill Comment at 66.
[264] Graybill Comment at 66-67.
[265] *Id*.
[266] *Id*.

> narrow window of time for commercial fishers to set out their gear before the first pull of the season. Smaller vessels in the fleet must make multiple trips to sea in order to get all their gear in the water. Thus, in the days leading up to the opening of the commercial crab season and in the days and weeks immediately following the season opening, there are hundreds of commercial vessel crossings over the Coos Bay Bar by boats loaded to capacity with crab pots and live crab. The restrictions imposed by LNG carriers transiting the lower portion of the Coos Bay federal navigation channel will result in significant, quantifiable, negative impacts on use of the channel by commercial fishing vessels.[267]

Despite places where the applicant fails to furnish adequate information, there is strong evidence to suggest the proposed fill and removal permit could result in a substantial reduction in commercial and recreational Dungeness crabbing opportunities in Coos Bay. This constitutes an unreasonable interference the paramount policy of this state to preserve the use of its waters for navigation, fishing and public recreation,[268] and is a basis for under the Oregon fill and removal statute.

5.3 DSL must deny the permit because the application fails to provide reasonable assurance that the project will not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for public recreation (ORS 196.825(1)(b)).

A. The Applicants Have Failed to Provide Reasonable Assurances that the Use of Oregon's Waters for Public Recreation Will Be Protected

All of the impacted watersheds include fishing, boating, water contact recreation, and aesthetic quality as designated beneficial uses.[269] The potential for the project to impair designated beneficial uses is discussed in Chapter 4 *infra*.

The construction of the LNG terminal and the Pipeline in the South Coast Basin will likely impact aquatic resources and therefore harm designated beneficial uses for fishing, boating, water contact recreation, and aesthetic quality by:

- Impacting or limiting public access for recreational boaters, fishermen, crabbers, and clammers as a result of dredging activity in the waterways to the terminal;
- Increasing sediment pollution at stream and rivers crossings, which impairs habitat for fish;
- Dredging associated with the NRI portion of the project will occur concurrently with recreational salmon fishery for approximately one month [October] annually during construction, which is expect to take over three years [check time] [Revised JPA Part 1, Description of Resources in Project Area]; and
- Altering aesthetic value of Coos Bay as a result of the 75-foot clearcut buffer around each stream crossing, dredging of Coos Bay, and construction of the terminal and related facilities.[270]

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[267] Graybill Comment at 67.
[268] Hodder Comment at 18.
[269] 404 Coalition Comment at 30.
[270] *Id*.

Furthermore, the applicant fails include sufficient information to assess the impacts of proposed project activities to a number of protected uses in Coos Bay. These include commercial and recreational crabbing and clamming, as discussed in Chapter 5 Section 5.2 *infra*.

According to the FEIS from a previous iteration of the project, the Coast Guard would likely impose a moving safety/security zone extending 500 yards around any LNG vessels entering or leaving the port.[271] In some places, the navigable channel of Coos Bay is less than 1,000 yards across, meaning that the entire channel would be subsumed by the safety zone. This could effectively exclude all other marine traffic and activity within areas of Coos Bay that are narrower than the total security zone. The record also shows that several important areas of shellfish harvest are located in narrow portions of the Coos Bay that would be impacted by the 500-yard LNG tanker security zone. The 2015 FEIS notes "if crabbing and clamming activities were to occur within the established security zones, those activities would be required to cease and temporarily move out of the way."[272] "Recreational boaters using the bay at the same time as an LNG vessel is in transit within the waterway may encounter delays due to the moving security zone requirements around an LNG vessel…"[273]

In summary, the proposed activities for the project will likely unreasonably interfere with the use of Oregon's waters for public recreation by harming habitat and water quality for fish, impacting recreational access, and altering the aesthetic values of Coos Bay and the other waterways crossed by the pipeline. The applicants have failed to provide reasonable assurance that the project will not unreasonably interfere with public recreation because the project will require damming, trenching, blasting, and diverting waterways to build pipeline stream crossings; cutting down 75-foot buffers around stream crossings; dredging sections of Coos Bay; filling in wetlands; and permanently destroying habitat, such as eelgrass beds.

1. Recreational Vessel Use

[271] USCG Waterway Suitability Report at 2 (July 1, 2008) (incorporated by reference in the 2018 USCG Letter of Recommendation).
[272] 2015 FEIS, *supra* note 49, at 4-737.
[273] *Id*. at 4-738.

The Coos Bay estuary generally, and areas at and in the immediate vicinity of the NRI dredging and dredge lines, is used extensively by "recreational" boaters, including for fishing.[274] In 2005, recreational boaters took 30,996 boat trips in Coos Bay and engaged in 36,547 use-days of boating activity. Approximately 88% of these use days were related to fishing. According to State data, nearly 90 percent of the boat use-days [in Coos Bay] involved fishing (including angling, crabbing, and clamming). Coos County local recreation expenditures, including hunting, fishing, wildlife, viewing, and shellfishing totaled $6.2 million dollars in 2008. Travel-generated expenditures for these activities in Coos County generated $33.5 million dollars in 2008.[275]

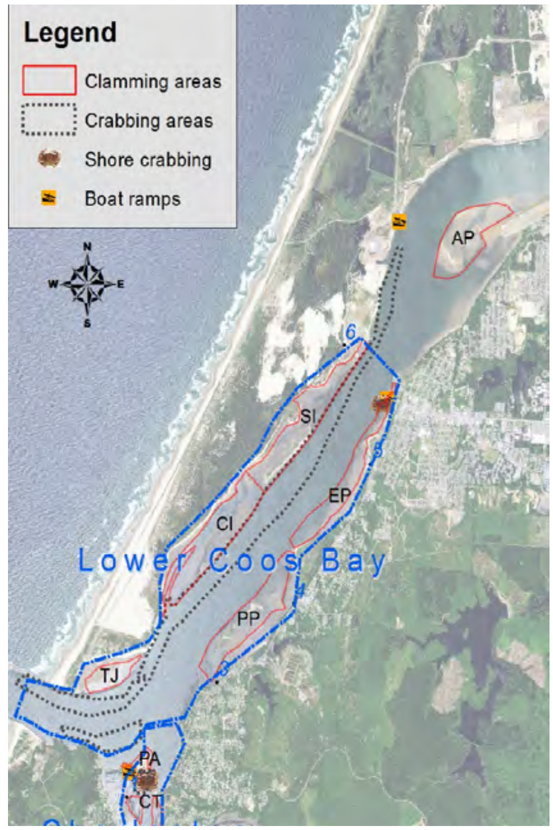

Figure 1 Oregon Department of Fish and Wildlife

According to analysis in RR5, App.C5, LNG carriers in Coos Bay would potentially impact on other recreational vessels about 7 hours per week, or about 8% of all daylight hours.[276] Assuming all daylight hours are available fails to account for inclement weather, which is a common limiting factor for recreation and navigation in the estuary. Further, this estimate fails to account for the potentially significant impacts of actual dredging and construction work.

Also falling under the "recreational" vessel umbrella are subsistence fishers, for whom the activity is an established cultural tradition, and a matter of direct economic livelihood. Subsistence use is almost universally recognized as a highest and best use of waterways, and it warrants more careful attention here. Tribal consultation is an important part of that consideration, but that does not capture all subsistence users or interests so the broader public issue should be considered as well.

The estuary is popular for clamming and crabbing, two fisheries that are particularly disturbed by dredging, and that are particularly vulnerable to chemical changes in the water.

[274] Image Source: http://www.dfw.state.or.us/mrp/shellfish/maps/images/coos_shellfish_areas2.jpg. *See also e.g.* http://oregonfishinginfo.com/Coos%20Bay.html ("Good fishing for salmon extends over a wide area outside of Coos Bay" "Fishing for rockfish is excellent…" "Feeder salmon enter lower Coos Bay during the summer usually in July feeding from Charleston to Fossil Point north to Jordan Cove"); http://www.dfw.state.or.us/mrp/shellfish/maps/images/coos_shellfish_areas2.jpg;

[275] "Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon - 2008 State and County Expenditure Estimates"; Prepared for the Oregon Department of Fish and Wildlife - Travel Oregon; Dean Runyan Associates; May 2009, available at http://www.dfw.state.or.us/agency/docs/Report 5 6 09--Final%20%282%29.pdf

[276] Department of State Lands APP0060697. 7 November 2018 [Part 1] [pdf p.10]

All four of the dredge areas are located at or adjacent to areas specifically used for fishing and/or crabbing, ensuring navigation conflicts. These and other areas also are used for fishing other species, notably salmon.[277]

2. Surfing

The description of impacted resources fails to identify the lower bay on the inside of the North Jetty as a popular recreational surfing spot, particularly during high and near slack outgoing tides, commonly in the winter months or periods of high ocean surf conditions. Surfers access this location by off highway vehicles via the North Spit or by paddling across the estuary from shore points in Charleston. Surfing in the lower bay is typically associated with winter periods of large ocean swells and strong fresh water runoff. Transiting LNG tank vessels will likely negatively impact surfing in this location.

5.4 Conclusions

In summary, the Director must conduct a weighing of the public benefits of the project against interference with factors including navigation, fishing, and public recreation (See *Citizens for Resp. Devel. In the Dalles v. Walmart,* 295 Or App 310 (2018)).[278] As part of this weighing of benefits, the legislature has clearly demonstrated that it is the State's "paramount policy" to preserve Oregon waters for navigation, fishing, and public recreation. ORS 196.825(1). The applicants have failed to demonstrate that the project will not unreasonably interfere with navigation, fishing, and public recreation and, therefore, the Department must deny the permit. ORS 196.825(1)(b).

Specifically, the application fails to accurately describe impacts to navigation in Coos Bay, including a transparent analysis of applicable maritime law, the Coast Guard Letter of Recommendation, recent changes to vessel size, shipping descriptions, and vessel casualties. The proposed NRIs would impact shipping, the applicants fail to demonstrate public benefits from the proposed NRI dredging, there are serious concerns with safety margins identified by the applicants, and the project would likely interfere with boat ramps and access.

Additionally, the applicants fail to provide reasonable assurances that the project will not interfere with fishing. Removal-fill activities and construction of the pipeline would likely result in permanent loss of vegetative shading, loss of base flows, increased sedimentation, permanent degradation of riparian areas, and permanent loss of Large Woody Debris that would harm fish habitat. Removal-fill activities and construction of the terminal would likely result in permanent destruction of at least 1.9 acres of eelgrass beds that provide habitat, decreased dissolved oxygen, altered salinity, increased temperature, increased sedimentation, entrainment of fish and shellfish by dredging activities that would directly or indirectly harm fish and shellfish. In particular, the Department should comprehensively evaluate potential impacts to the Dungeness crab fishery, which are discussed in detail in this chapter.

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[277] Image Source: http://www.dfw.state.or.us/mrp/shellfish/maps/images/coos_shellfish_areas2.jpg. *See also e.g.* http://oregonfishinginfo.com/Coos%20Bay.html ("Good fishing for salmon extends over a wide area outside of Coos Bay" "Fishing for rockfish is excellent…" "Feeder salmon enter lower Coos Bay during the summer usually in July feeding from Charleston to Fossil Point north to Jordan Cove");

[278] ORS 196.825(1)(b).

Finally, the applicants have failed to provide reasonable assurances that the use of Oregon's waters for public recreation will be protected. Specifically, the Department should evaluate impacts to recreational vessel use, surfing, and other recreational uses.

Chapter 6. INDEPENDENT UTILITY

6.1 The application does not demonstrate that the project has "independent utility."

The Department may issue a permit if it determines that the project has "independent utility" (OAR 141-085-0565). "Independent utility" as defined under OAR 141-085-0510(43) means "that the project accomplishes its intended purpose without the need for additional phases or other projects requiring further removal-fill activities." In the application, applicants must demonstrate independent utility by including "all phases, projects or elements of the proposed project which will require removal-fill activities."[279]

The applicants have failed to demonstrate that the project has independent utility, primarily because the project before the Department relies upon the widening and deepening of the navigation channel beyond what is described in the application.

A. Coos Bay Channel Modification Project

On 18 August 2017, the Corps initiated the scoping process under the National Environmental Policy Act ("NEPA") for the Coos Bay Channel Modification ("CBCM") project.
The current federal navigation channel ("FNC") where it meets the ocean is 300 feet wide and 47- feet deep, then transitions to 37- feet deep for 15 miles. From river mile 9.2 to 15, the channel widens to 400 feet. The proposed channel modification, a part of the CBCM project, would widen and deepen the ocean entrance to 1,280 feet wide and 57- feet deep. From the ocean entrance to river mile 8.2, the channel would be deepened to 45- feet and widened to 450 feet. From river mile 7.3 to 7.8, a vessel turning basin would be constructed with a width of 1,100 feet, length of 1,400 feet, and depth of 37- feet. In total, the Corps estimates that 18 million cubic yards of dredged material would be removed and disposed of 2 miles offshore over 1,850 acres under the proposed modification.

The proposed channel modification would likely have significant direct, indirect, and cumulative impacts to Coos Bay, from increased tsunami risk to degradation of habitat for threatened and endangered species to impaired water quality. Many commenters submitted comments in the scoping period regarding the CBCM project and, in particular, its connection to the project currently before the Department (*See* Appendix J). Under 40 CFR 1508.25(a), a programmatic EIS may be necessary where actions may be connected, cumulative or similar. Under 40 CFR 1502.4(a), related proposals that are part of a single course of conduct must be evaluated together in a single EIS. NEPA requires a programmatic EIS for broad Federal actions, where the failure to do so would be arbitrary & capricious. See 40 CFR § 1502.4(b).

B. The Applicants Have Not Demonstrated That the Project Has Independent Utility

[279] OAR 141-085-0550.

The proposed deepening and widening of the federal navigation channel as part of the CBCM project is clearly connected to the application before the Department. Coos Bay will only accommodate vessels up to 148,000 cubic meters, while Jordan Cove wants to accommodate LNG carries up to 217,000 cubic meters.[280] As currently proposed in the application before the Department, it is not feasible for LNG vessels to transit the navigation channel at any time other than during tides greater than 6' 3" above MLLW. Therefore, the existing navigation channel is *unsuitable* for LNG vessel traffic most of the time because the tide height is *lower* than 6' 3" most of the time. Jordan Cove will be a major benefactor of modifying the navigation channel to allow access to LNG vessels. Further, the scoping notice for the CBCM project includes maps for channel dredging that point to the Jordan Cove LNG as a "terminal to benefit with project condition." This is in itself misleading because in actuality there is no Jordan Cove LNG terminal, only a proposal for one.

In scoping comments to FERC for the JCEP and PCGP in August 2017, ODFW acknowledged the connected nature of the two projects:

> The 2015 DEIS briefly described but did not analyze the cumulative impacts from the "Coos Bay Channel Deepening/Widening Project" ("Pilots' Channel Modification Project", proposed by the Port of Coos Bay). ODFW understands that the current proposal moving forward is to deepen the channel to a navigation depth of 45 feet and widen the channel over 100 feet, which will result in removal of 12.0+ million cubic yards of additional material from Coos Bay. This material will require an open ocean disposal site over 2,000 acres in size that will be buried to a depth of ~15.0 feet.
>
> Since JCEP will create the terminal, own the terminal, and be a primary benefactor of the channel modification that is proposed to River Mile ~ 8.0, ODFW believes the Pilots' Channel Modification Project is a connected action to the JCEP/PCGP project. ODFW recommends the DEIS include a full analysis of the Port's proposed "Pilots Channel Modification Project."[281]

Further details regarding concerns about the CBCM project are included in Appendix J. Scoping Comments on Coos Bay Channel Modification Project.

Additionally, Jordan Cove has contributed financially to the Port of Coos Bay to support development of a plan to widen and deepen the navigation channel. Specifically, Jordan Cove contributed part of $4.1 million to the Coos Bay Channel Modification Study as part of a project reimbursement agreement.[282] Finally, the Oregon International Port of Coos Bay (OICB) budget

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[280] Resource Report 1. Sept 2017. Jordan Cove. Page 22.

[281] Oregon State Agency Scoping Comments on FERC's Notice of Intent to Prepare an Environmental Impact Statement for Docket No. PF 17-4-000 (Jordan Cove Energy Project LP and Pacific Connector Gas Pipeline LP) DOJ File No.: 0ES456-ES456. 15 August 2017 at 15.

[282] Oregon International Port of Coos Bay. Port of Coos Bay FY 2017/2018 Budget Message. 19 May 2017. https://static1.squarespace.com/static/569e6f1176d99c4f392858c4/t/594affd4ff7c50974dc3044d/1498087382779/Adopted+Budget+2017-18.pdf. P. 9.

report from FY 2017/2018 specifically states that the Port Operations Department primary focus will be to "support operational objectives for the Jordan Cove LNG project."[283]

C. Conclusions

The Department must comprehensively review clearly connected actions to the application, including but not limited to the CBCM project. The applicants would be the primary benefactors from the proposed widening and deepening of the federal navigation channel as part of the CBCM project or similar efforts to expand the navigation channel. Further, there are serious questions about the feasibility of LNG vessels transiting the federal navigation channel under the dredging currently proposed as part of the project application before the Department. The applicants have failed to demonstrate in their application that the Jordan Cove terminal project has independent utility. In other words, the applicants have not demonstrated that their project can accomplish its intended purpose without the need for other projects requiring further removal-fill activities, as required under OAR 141-085-0565(3)(a). Therefore, the Department must deny the permit.

Chapter 7. AVAILABILITY OF ALTERNATIVES

7.1 The Department Must Deny the Permit because the Applicants Have Inadequately Addressed the Availability of Alternatives for the Project and Alternative Sites for the Proposed Fill or Removal (*ORS 196.825(3)(c) and (d)*).

The applicants have failed to present a comprehensive analysis of alternatives to the project, as required under Oregon state law. OAR 141-085-0550(5), ORS 196.825(3)(c) and (d). Oregon law calls on the Director to consider "the availability of alternatives to the project," as well as "the availability of alternative sites for the proposed fill or removal" when deciding whether to issue a removal-fill permit. To ensure a full review of available alternatives, administrative rules require a removal-fill permit applicant to describe alternative sites that could avoid or minimize adverse impacts to state waters, and to explain why such alternatives are not "practicable" in light of the project's purpose and need.

Specifically, OAR 141-085-0550(5) requires that a removal-fill application include the following information regarding alternatives:

> (f) A description of the project purpose and need for the removal or fill. All projects must have a defined purpose or purposes and the need for removal or fill activity to accomplish the project purpose must be documented. The project purpose statements and need for the removal or fill documentation must be specific enough to allow the Department to determine whether the applicant has considered a reasonable range of alternatives.
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> ***

[283] Oregon International Port of Coos Bay. Port of Coos Bay FY 2017/2018 Budget Message. 19 May 2017. https://static1.squarespace.com/static/569e6f1176d99c4f392858c4/t/594affd4ff7c50974dc3044d/1498087382779/Adopted+Budget+2017-18.pdf. P. 9.

> (o) An analysis of alternatives to derive the practicable alternative that has the least reasonably expected adverse impacts on waters of this state. The alternatives analysis must provide the Department all the underlying information to support its considerations enumerated in OAR 141-085-0565, such as:
>
> > (A) A description of alternative project sites and designs that would avoid impacts to waters of this state altogether, with an explanation of why each alternative is, or is not practicable, in light of the project purpose and need for the fill or removal;
> > (B) A description of alternative project sites and designs that would minimize adverse impacts to waters of this state with an explanation of why each alternative is, or is not practicable, in light of the project purpose and need;[284]

The Department, in determining whether to issue a Removal and Fill permit, is required to consider the availability of alternatives both for the project and for proposed fill sites, and to determine that the project is the practicable alternative with the least adverse impacts on the water resource. ORS 196.825(3).

A. Availability of Alternatives for the Project

ORS 196.825(12)(b)(F) requires that a "completed application" include "An analysis of alternatives that evaluates practicable methods to minimize and avoid impacts to waters of this state."

In summary, the need for the removal-fill activities are inextricably linked to whether there is a need for the project as a whole. In this case, there is clearly *no need* for the proposed fill & removal, *but for* the entire Jordan Cove Energy Project and Pacific Gas Connector Pipeline.

In the application before the Department, the applicants submitted an alternatives analysis document, entitled "Resource Report No. 10, Alternatives," (Resource Report 10) which it had previously submitted to the Federal Energy Regulatory Commission (FERC) for a separate regulatory proceeding. As described below, this document fails to comply with the state's regulatory requirements for an acceptable alternatives analysis.

Specifically, the applicants have adopted an unreasonably narrow definition of the project's purpose and need—a definition which, to all appearances, was specifically designed to restrict the consideration of viable alternatives to a single site selected over a decade ago for an entirely different project purpose. Additionally, the applicants have failed to assess a range of viable alternatives that meet the project's fundamental purposes, and have ignored serious deficiencies associated with the proposed location and design of the project. Because the applicants' alternatives analysis fails to provide complete and accurate information and to properly consider project alternatives that avoid and minimize impacts to Oregon state waters, as required by state law, the Department must deny the permit.

1. The Applicants' Purpose and Need Statement Fails to Provide the Department with the Information Necessary to Determine Whether the Applicants Have Considered a Reasonable Range of Alternatives

[284] OAR 141-085-0550(5)

JCEP's Resource Report 10 sets out the following definition of the project's "purpose and need":

> The overall Project purpose and need is to construct a natural gas liquefaction and deep-water export terminal capable of receiving and loading ocean-going Liquefied Natural Gas (LNG) carriers, in order to export natural gas ***derived from a point near the intersections of the GTN Pipeline system and Ruby Pipeline system***. [Emphasis added.][285]

The Department's removal-fill guide specifies that project purpose statements should not be "overly narrow" lest they preclude "any other alternative but the selected one."[286] In direct contravention of this Department guidance, the geographic limit in JCEP's purpose and need statement—namely, that the LNG facility must source gas "from a point near" a specific pipeline intersection—inappropriately narrows the alternatives analysis to locations in Oregon and Washington, and clearly favors a single site in Coos Bay. This unnecessary and arbitrary geographic restriction eliminates consideration of many economically viable alternative sites that meet the fundamental project purpose of exporting LNG sourced from Canada and the Rocky Mountains.

Furthermore, the applicants have not demonstrated the need for Rocky Mountain and Canadian gas export to be accommodated from the same location in the first place. The Department must closely examine this underlying premise of the purpose and need statement, because LNG export terminal projects that are already proposed or in development are viable alternatives able to fulfill the portion of the project purpose that seeks to connect fracked gas producers to end-use customers.

Specifically, there are a number of feasible alternative locations for both Canadian gas supplies to access overseas LNG markets. Two different LNG export terminal projects have begun to move forward on the coast of British Columbia. One of these, the Woodfibre LNG project, has received an initial final investment decision and preconstruction activities have already begun at the site. The other, the massive LNG Canada project in Kitimat, has received a final investment decision from a consortium of international backers led by Royal Dutch Shell. TransCanada has already begun preconstruction activities for the pipeline that would supply the Canada LNG project.

Similarly, gas sourced from the Rocky Mountain region can gain access to LNG export terminals on the US Gulf Coast. Cheniere Energy's Sabine Pass LNG terminal is already operational, and the company is now expanding the facility. Construction has begun on three additional LNG plants along the Gulf, including one in Corpus Christi, TX and a second in Freeport, TX. Five additional Gulf Coast LNG terminals have been approved but are not yet under construction. These terminals are roughly the same distance from Rocky Mountain gas sources as Coos Bay. In addition, they have the additional economic advantage of not requiring significant new gas pipeline construction.

Finally, the Department should comprehensively evaluate the applicants' assertion that:

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[285] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.0 INTRODUCTION, p. 227 of 3638

[286] Department of State Lands. A Guide to the Removal-Fill Permit Process. Oregon Department of State Lands. December 2016. Appendix. Preparing the Alternatives Analysis. P. 16.

> [I]f developed, [those projects] could serve the same Asian markets as the proposed Project, [but] none are currently authorized, as required by U.S. Department of Energy ("DOE") Order 3639 (2015), to export U.S.-sourced natural gas.[287]

In fact, a policy decision issued by the DOE on December 19, 2018 discontinues the practice of including an "end use" reporting provision in orders authorizing the export of domestically produced natural gas. Thus, all LNG Terminals in Canada are now authorized to export gas sourced in the United States.[288]

The applicants' alternatives analysis improperly avoided a serious assessment of those alternatives by adopting an unnecessary and arbitrary geographic restriction, specifically a deep-water LNG facility near a particular gas pipeline intersection, in its purpose and needs statement. Because the applicants have failed to provide the Department a more robust alternatives analysis based on a purpose and needs statement that better reflects the realities of North American gas and LNG infrastructure, the Department should deny the permit. OAR 141-085-0550(2); ORS 196.825(3)(d).

2. The Applicants' Purpose and Need Statement Arbitrarily Limits Evaluation of the No Action Alternative

According to JCEP's Resource Report 10:

> Under the No Action Alternative, the Project would not be constructed, and ***the Project's purpose and need would not be met.*** [Emphasis added.][289]

We are concerned that this assertion does not accurately reflect the No Action Alternative. As discussed above, it is likely that the core purposes of the project could be met by directing Canadian gas to Canadian export terminals that are currently under development and by shipping Rocky Mountain gas to existing and under construction Gulf Coast export terminals.

Of most relevance to the Department, the applicants also contend that the No Action Alternative would not eliminate adverse impacts to state waters, but could instead lead to even greater impacts than the proposed project, stating:

> Whether the LNG Terminal is built or not, the site will likely be used for industrial purposes resulting in environmental impacts that could be similar to or greater than those that would be associated with the Project. Adoption of the No Action alternative would not eliminate the potential for environmental impacts as development of the proposed site for the LNG

[287] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.2.2.2 Canadian West Coast, p. 230 of 3638

[288] US Department of Energy, 10CFR Part 590, *Eliminating the End Use Reporting Provision for the Export of Liquefied Natural Gas*, Federal Register Vol. 83, No. 243

[289]6 Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.1.1 No Action Alternative, p. 228 of 3638.

> Terminal or an alternate development concept would likely occur—although possibly later in time, thereby delaying any environmental impacts.[290]

The project before the Department has a potentially high impact to waters of the state and speculating that other uses of the same site would require similar modifications to state waters should be considered outside of the scope of a reasonable alternatives analysis.[291] There is no reason to anticipate that additional environmental impacts from other infrastructure construction and/or expansion will occur if the No Action alternative is chosen for the project. Regardless, any expansions of alternative sites in Canada or the Gulf would have no direct impacts on the waters of the state of Oregon—the preservation of which constitutes Oregon's "paramount policy."[292] The Department should carefully consider this type of "Perfect Substitution" argument that is often used by the fossil fuel industry to claim that additional environmental impacts from other infrastructure construction or expansion will occur if the project is not built.[293]

B. Availability of Alternative Sites for Removal-Fill

In addition to evaluating the available of alternatives for the project, the Department must consider the availability of alternative sites. OAR 141-085-0550(5), ORS 196.825(3)(c) and (d). The applicants state that in their alternatives analysis, the reasonable site alternatives they selected to evaluate were Coos Bay, Astoria, Wauna, and Port Westward (in Oregon) and Grays Harbor (in Washington), using the following project criteria:

(1) Land Availability
(2) Channel Depth
(3) Navigational Accessibility
(4) LNG Vessel Travel Distance
(5) Pipeline Length and Costs.

The Department should comprehensively evaluate the rationale provided by the applicants regarding the selection of the Coos Bay project site location. Specifically, the Department should consider whether the applicants have developed quantitative project criteria, such as physical site suitability characteristics and local land use consistency.[294]

1. Land Availability

Regarding the selection of the Coos Bay site, the Department should review the thirteen (13) separate Notice(s) of Presumed Airport Hazard(s) to Jordan Cove LNG on May 7, 2018.[295] Nine

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[290] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.1.1 No Action Alternative, p. 228 of 3638.
[291] Department of State Lands. A Guide to the Removal-Fill Permit Process. Oregon Department of State Lands. December 2016. Appendix. Preparing the Alternatives Analysis. P. 16.
[292] ORS 196.825(1).
[293] *See WildEarth Guardians; Sierra Club v. Bureau of Land Management.* D.C. No. 2:13-CV-00042-ABJ. (2017).
[294] Department of State Lands. A Guide to the Removal-Fill Permit Process. Oregon Department of State Lands. December 2016. Appendix. Preparing the Alternatives Analysis. P. 17.
[295] http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20180510-5165 Part 8 pp 281-326 of 326

(9) of these FAA Presumed Airport Hazards involve transiting LNG tanker ships at various points within the Coos Bay Estuary. The FAA issued these Notices due to the height of storage tanks and other facilities proposed for the Coos Bay location and called for either adjustment to the design that will resolve that problem or abandonment of the project. Although these notifications are not directly addressed by the applicants, they do acknowledge consideration of lowering tank heights to minimize obstruction to the airport. However, this approach has not been adopted because the size and configuration of the property where the storage tanks are to be located precludes widening the circumference of the tanks to allow their height to be lowered.[296] The Department should consider whether the applicants have met their own criterion regarding land availability.

2. Channel Depth

The applicants acknowledge that their own channel depth criteria is not satisfied by the Coos Bay site.[297] To address this issue, the applicants propose Navigation Reliability Improvements (NRIs) which involve dredging to a depth of 45- feet to ensure the economic feasibility of the project. Further, the applicants state that:

> Modeling showed that without the NRIs in place, the greater delays imposed by the Pilots on LNG ship transits of the channel due to environmental conditions would result in a potential annual loss of production at the facility equal to about 38,000 tonnes of LNG. This would equate to a direct loss of revenue of about $8.0 million per year for the facility.[298]

The Department should comprehensively review this criterion identified by the applicants that the project does not meet. Additionally, the Department should consider this criterion in light of the failure of the applicants to demonstrate independent utility for the project (*See* Chapter 6 *infra*). Specifically, even with the proposed NRIs, the project clearly relies upon the proposed deepening and widening of the federal navigation channel as part of the CBCM project.[299]

3. Pipeline Length and Costs

We are additionally concerned that the applicants do not provide quantitative analysis for defining the pipeline criterion to reflect distance to the Malin hub, rather than distance to any other hub(s) that could also access the Montney Basin and/or the Rocky Mountain region. This results in precluding the consideration of any of other sites or alternatives, and thus does not accurately reflect their viability as alternate sites that meet the project's purposes.

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[296] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.4.2 LNG Storage Tank Design Alternatives, p. 240 of 3638.

[297] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: ATTACHMENT B1, Section 10.3.3.1 Proposed Site, p. 236 of 3638.

[298] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 1 JCEP: REMOVAL FILL APPLICATION, (3) PROJECT PURPOSE AND NEED, p. 2 of 3638.

[299] Resource Report 1. Sept 2017. Jordan Cove. Page 22.

C. Availability of Alternative Pipeline Routes

The Department must not issue a removal-fill permit for the project without a complete evaluation of all wetlands and/or water crossings as well as potential impacts to listed species.

1. Avoiding Wetlands and Waterway Crossings

As discussed in Chapter 2 *infra*, the applicants have been denied access by landowners to some parcels and have not provided adequate wetland or flowing water surveys. The applicants state that:

> Wetland surveys have been conducted for approximately 89% of the Proposed Route where survey permission has been granted.[300]
>
> ***
> The remaining cultural and wetland surveys will be completed as landowner permission is granted.[301]

Further, the applicants state:

> A revised HGM assessment for tidal wetlands of the Oregon Coast has not been completed due to reroutes to accommodate agency and landowner request. Surveys of the reroutes will be completed as landowners grant survey permission. The 2009 HGM assessment for the project only included two estuarine wetlands, also due to landowner restrictions on the entire route in the Coos Bay area.[302]

There are at least 83 un-surveyed parcels along the proposed pipeline route for a total of 20.88 miles impacted. [303] Coos County has 29 un-surveyed parcels, for a combined estimated 6.86 miles impacted. There are 37 un-surveyed parcels in Douglas County for a combined 10.89 miles. In Jackson County, there are 9 un-surveyed parcels, or 0.65 miles impacted, and in Klamath County there are 8 un-surveyed parcels with a combined impact of 2.48 miles.[304]

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[300] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 2 PCGP, ATTACHMENT A.2, Section 1.3.1.1.7 Wetland Delineation Report, p. 2141 of 3638.

[301] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 2 PCGP, ATTACHMENT A.2, Section 1.3.1.2.3 Surveying and Staking, p. 2149 of 3638.

[302] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 2 PCGP, ATTACHMENT C.3, Chapter 6 Summary, p. 2610 of 3638

[303] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: ATTACHMENT C.2, Table 2.3-1, p. 2564-2566 of 3638.

[304] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697 PART 2 PCGP: ATTACHMENT C.2, Table 2.3-1, p. 2564-2566 of 3638.

At a minimum, the applicants should develop and evaluate an alternate route or routes where full delineation of all wetlands and survey of all stream crossings are possible. The Department should exercise its authority to deny the permit Remove and Fill permit for the PCGP based on the applicant's failure to provide complete and accurate information regarding alternative routes for the PCGP that minimize or avoid impacts to the waters of the State. OAR 141-085-0550(2)

2. Avoiding Listed Species

Additionally, the applicants should fully evaluate pipeline route alternatives that would better protect endangered species habitat need also be considered, specifically, Marbled Murrelet or Northern Spotted Owl occupied habitat.

The applicants acknowledge that:

> A presumed occupied Marbled Murrelet stand occurs on the forested slopes immediately south of the river crossing and where TEWA 23.09-N is located. This stand has not been surveyed or assessed for suitable nesting habitat, because of denied property access.[305]

The applicant needs to develop an alternative route around the landowner, where potential impacts to Marbled Murrelet habitat can be thoroughly evaluated.
Even where access to habitat has been granted, it is not possible to determine whether impacts to Marbeled Murrelets could be reduced when no alternates are proposed. Table B3-4 lists 10 stream crossings where Jordan Cove's work will conflict with Murrelet nesting season restrictions. In each case the applicant proposes that:

> Year Two daily timing restrictions during construction to minimize impacts to MAMU should be waived during the stream crossing installation to minimize the duration of instream work and the installation of flumes or dams/pumps.[306]

Each of the 10 stream crossings that endanger nesting Marbeled Murrelets are located on Coos Bay Bureau of Land Management (BLM) land. On December 6 2018, BLM issued a memo requesting no mitigation for these impacts.[307] Thus, any negative impacts to the stream crossings and/or Marbeled Murrelet habitat will go unmitigated. Without an alternate route to consider, it is impossible to determine that impacts have been minimized.

D. Conclusions

In summary, because the applicants have failed to demonstrate a comprehensive analysis of alternatives to the project, the Department does not have the information to consider the

[305] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 2 PCGP, ATTACHMENT C.11_4., Site Specific Plan For Open Cutting The North Fork Coquille River, Pre-Construction Schedule, p. 2715 of 3638

[306] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. PART 2 PCGP, Table B.3-4, Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Proposed Route, pp. 1533-1541 of 3638.

[307] *https://www.blm.gov/policy/im-2019-018*

availability of alternatives both for the project and for proposed fill sites, and to determine that the project is the practicable alternative with the least adverse impacts on the water resource, as required under Oregon law. Consequently, without the information necessary to determine whether the applicant has considered a reasonable range of alternatives, the Department must deny the removal-fill permit.

Chapter 8. SOUND POLICIES OF CONSERVATION AND INTERFERING WITH PUBLIC HEALTH AND SAFETY

8.1 The Department Must Deny the Permit because the Applicants Have Failed to Provide Reasonable Assurances that the Project Conforms to Sound Policies of Conservation and Would Not Interfere with Public Health and Safety (*ORS 196.825(3)(e)*).

Under ORS 196.825(3)(e), the Department is required to consider whether the project conforms to the sound policies of conservation and whether the project would not interfere with public health and safety in determining whether to issue a permit. The burden is on the permit applicant to provide the Department with sufficient information to demonstrate compliance with this standard. OAR 141-085-0565(5). The application does not contain the information necessary for the Department to make an informed decision on whether the application complies with the policy and standards set forth in ORS 196.825(3)(e). Therefore, the Department must deny the permit.

A. Conformance to Sound Policies of Conservation

According to the DSL removal-fill guide:

> The Department will consider how the proposed action incorporates appropriate protection of and conservation measures for water resources. Sound policies of conservation are considered at the project scale and within the landscape. For example, a mitigation site should be located in an area that connects wildlife corridors, because that is a known conservation policy. [308]

Under its discretionary authority, the Department should consider "sound policies of conservation" provided for by existing state and federal laws and regulations that protect and conserve the waters of the state.

1. Compliance with the Clean Water Act

The purpose of the Clean Water Act ("CWA"), 33 U.S.C. § 1251 *et seq.*, is to restore and maintain the chemical, physical, and biological integrity of waters of the United States. We have included in Appendix A. Clean Water Act 401 Comments submitted to DEQ regarding the lack of reasonable assurances that the project will comply with state water quality standards and therefore must result in a denial of the Clean Water Act Section 401 state water quality certification. We have also included in Appendix B. Clean Water Act 404 Comments submitted to the Corps regarding the lack of reasonable assurances that the project is in compliance with

[308] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 6. P. 6-14.

the Clean Water and the Corps' regulations regarding removal-fill activities. These comments provide substantial details and the key points are summarized below.

The applicants have not provided reasonable assurances that the proposed activities will not violate state water quality standards. More specifically:

- The application fails to contain the mandatory minimum information (*See* Section II in Appendix A);
- There is no reasonable assurance that the project will comply with Oregon's antidegradation implementation policy (*See* Section III in Appendix A);
- There is no reasonable assurance that designated beneficial uses will be protected (*See* Section IV in Appendix A);
- There is no reasonable assurance that numeric criteria will not be violated (*See* Section V in Appendix A); and
- There is no reasonable assurance that narrative criteria will not be violated (*See* Section VI in Appendix A).

Further, the applicants have failed to demonstrate that the project activities would comply with EPA's 404(b)(1) guidelines by:

- Failing to include practicable alternatives (*See* Section II A in Appendix B);
- Causing or contributing to violations of state water quality standards (*See* Section II B in Appendix B);
- Violating applicable toxic effluent standard or prohibition under Clean Water Act Section 307 (*See* Section II C in Appendix B);
- Jeopardizing the continued existence of species listed under the Endangered Species Act ("ESA") or adversely modifying or destroying designated Critical Habitat (*See* Section II D in Appendix B);
- Causing or contributing to significant degradation of the waters of the United States (*See* Section II E in Appendix B);
- Failing to minimize the potential adverse impacts of the discharge on the aquatic ecosystem (*See* Section II F in Appendix B);
- Negatively impacting wetlands (*See* Section IV in Appendix B);
- Interfering with access to or use of navigable waters (*See* Section V in Appendix B);
- Failing to obtain the required state or local authorizations or certifications (*See* Section VI in Appendix B);
- Impairing floodplain values (*See* Section VII in Appendix B);
- Harming Oregon's and the nation's economies (*See* Section VIII in Appendix B);
- Missing sufficient information to make a reasonable judgment (*See* Section IX in Appendix B); and
- Failing to be in the public interest (*See* Section III in Appendix B).

a. Compliance with Total Maximum Daily Loads

The Department should carefully review the impacts of the project that occur on state and federal lands that are subject to existing Total Maximum Daily Loads ("TMDLs"). For certain waterbodies that are listed as impaired for different pollutants under the Clean Water Act because they fail to meet State water quality standards, DEQ has developed TMDLs to achieve compliance with those standards. In its 20 December 2018 letter regarding the Joint Permit Application for 401 state water quality certification for the project, DEQ specifically states:

> PCGP has not demonstrated to DEQ that proposed activities such as right-of-way construction, road maintenance, and road construction will comply with USDA Forest Service, U.S. Department of Interior BLM, Bureau of Reclamation, Oregon Department of Forestry, and County Total Maximum Daily Load compliance plans and programs. DEQ developed these TMDL to achieve compliance with water quality standard in water bodies impaired by specific pollutants.[309]

Not only are numerous impacted waterways already 303(d) listed as impaired for pollutants, but many are also subject to TMDLs. For example:

- In 1994, DEQ established a TMDL for the Coquille River for dissolved oxygen.[310]
- EPA approved TMDLs for bacteria, temperature, algae/aquatic weeds, dissolved oxygen, and pH for the Umpqua Basin in 2007. [311]
- The Rogue River has a TMDL for bacteria and temperature.[312]
- The Upper Klamath has TMDLs for Dissolved Oxygen, Chlorophyll a, pH, and Ammonia Toxicity.[313]
- The Lost River subbasin also has TMDLs for Dissolved Oxygen, Chlorophyll a, pH, and Ammonia Toxicity.[314]

Throughout the 20 December 2018 letter, DEQ raises substantial concerns regarding compliance with TMDLs as a result of the project. As one example, the Oregon Department of Forestry ("ODF") is a Designated Management Agency ("DMA") and regulates pollution to waterways as a result of the establishment, management, or harvesting of trees on private and state forestlands under the Oregon Forest Practices Act ("OFPA"). ODF uses the OFPA to comply with Clean Water Act requirements and TMDLs. DEQ raises multiple concerns regarding the project's compliance with the OFPA related to road use, stating:

> Moreover, PCGP has not addressed any of the ODF requirements noted below regarding forest road maintenance. ODF established FPA rule OAR 629-625-0600 to comply with water quality standards by timely maintenance of all active and inactive roads.[315]

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[309] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 10.

[310] Coquille River & Estuary Water Quality Report. Total Maximum Daily Load Program. Oregon DEQ. March 1994. https://www.oregon.gov/deq/FilterDocs/scCoquilleRiverTMDL.pdf. P. 3.

[311] Umpqua Basin Report. Oregon DEQ. 2 June 2013. P. 145.

[312] Rogue River Basin TMDL. Oregon DEQ. December 2008. https://www.oregon.gov/deq/FilterDocs/rogueChapter1andExecutiveSummary.pdf.

[313] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf.

[314] Upper Klamath and Lost River Subbasins TMDL. Oregon DEQ. December 2017. https://www.oregon.gov/deq/FilterDocs/UpperKlamathandLostRiverTMDL.pdf.

[315] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 14.

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> ODF uses road maintenance and building requirements associated with the Forest Practices Act to comply with Clean Water Act requirements such as those associated with Total Maximum Daily Loads and water quality standards. However, PCGP does not provide DEQ with information on how specifically PCGP will address OAR 629-625-0700 (Wet Weather Road Use).[316]

The Department should comprehensively review the application under ORS 196.825(3)(e) in light of these concerns from DEQ regarding the project's compliance with TMDLs in order to determine whether the project fails to conform to sound policies of conservation.

2. Lack of Endangered Species Act Consultation

The Department must not approve the application without consulting with NOAA Fisheries. A Draft EIS ("DEIS") has not yet been released and there has been no formal consultation under the Endangered Species Act ("ESA"). Additional analysis is necessary to provide the Department and the public with adequate information about the fish exclusion technology to be used, complete with an analysis of the effectiveness of the plan, and the stormwater testing to be employed. Without addressing these issues, and without the many other missing studies, plans, and analyses, the application is wholly inadequate and legally insufficient.

In the previous iteration of the project, the National Marine Fisheries Service ("NMFS," now NOAA Fisheries) together with multiple agencies expressed concern regarding the lack of information provided by the applicants in the Biological Assessment. For instance, NMFS requested further information and consultation for green sturgeon based on potential dredging impacts. NMFS informed FERC:

> Disturbance of substrate from project construction and biennial maintenance dredging, along with disposal at the Coos Bay ocean dredged material disposal site (Site F), will modify habitat and reduce safe passage by causing direct adverse physical effects due to physical entrainment in the discharge plume."[317]

Additionally, according to the 2015 DEIS from the last iteration, the project is likely to adversely affect the following species listed under the ESA:[318]

- Threatened Marbled murrelet;
- Threatened Northern spotted owl;
- Threatened Coho salmon ("SONCC");
- Threatened Coho salmon (Oregon Coast Evolutionarily Significant Unit "ESU");
- Threatened North American green sturgeon (Southern Distinct Population Segment "DPS");
- Endangered Lost River sucker;

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[316] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 19-20.

[317] NMFS Biological Assessment comments at 2.

[318] DEIS at 4-628.

- Endangered Shortnose sucker;
- Threatened Vernal pool fairy shrimp;
- Endangered Applegate's milk-vetch;
- Endangered Gentner's fritillary;
- Threatened Kincaid's lupine; and
- Endangered Rough Popcornflower.

Again, this list is not the result of a final Biological Assessment or any formal consultation and review by the wildlife agencies NMFS and USFWS.

The lack of consultation for the project is also problematic because key mitigation measures for ESA-listed species have not been determined or vetted by key agencies, such as NOAA Fisheries. Information included in the application fails to provide an adequate assessment of how the impacts of the project to key listed species will be avoided or minimized. Due to the complexity and scale of the project, as well as the number of listed species that could be impacted, consultation for the project is clearly warranted. Until official consultation is initiated, it is impossible for the public to know what mitigation measures will be proposed and whether they will be effective. The lack of information regarding impacts to listed species further emphasizes the lack of conformance to sound policies of conservation as required under ORS 196.825(3)(e), and therefore the Department must deny the permit.

3. The Applicants Have Failed to Provide Reasonable Assurances that the Project Conforms to State Policies of Conservation

In addition to the Clean Water Act and the Endangered Species Act, the state of Oregon has multiple laws, regulations, and policies that pertain to protection of and conservation measures for water resources. The Department should fully evaluate whether the project is in compliance with all applicable laws, policies, and regulations. The following examples are not a comprehensive list, but rather highlight some of the state conservation policies that the Department should consider. The applicants have failed to demonstrate that this project would conform to the sound policies of conservation in both the Oregon Conservation Strategy and the Oregon Plan for Salmon and Watersheds, and therefore the Department should deny the permit.

a. Oregon Conservation Strategy

For example, the Department should consider the Oregon Department of Fish and Wildlife's (ODFW) Oregon Conservation Strategy. The Oregon Conservation Strategy identifies the Klamath Mountains Ecoregion, which includes most of southwestern Oregon, as a key habitat where the loss of habitat connectivity and altered fire regimes as limiting factors. Oregon's Nearshore Ecoregion is also identified as a priority where habitat alteration and water quality degradation as limiting factors. Wetlands, coastal dunes, flowing water and riparian habitats, and estuaries are all identified as strategy habitats.[319] The primary goals of the Oregon Conservation Strategy are identified as 1) maintain healthy fish and wildlife populations by maintaining and restoring functioning habitats; 2) prevent decline of at-risk species; and 3) reverse downturns in

[319] Oregon Conservation Strategy. 2016. Oregon Department of Fish and Wildlife, Salem, Oregon

fish and wildlife populations where possible.[320] The Department should fully evaluate how the project would be consistent with these goals and the Oregon Conservation Strategy in light of the significant and harmful impacts to water quality and quantity, fish, wildlife, and habitats that would result.

b. Oregon Plan for Salmon and Watersheds ("The Oregon Plan")

In 1997, the Oregon Legislature and Governor Kitzhaber established the Oregon Plan for Salmon and Watersheds with the goal to:

> …restore the watersheds of Oregon and to recover the fish and wildlife populations of those watersheds to productive and sustainable levels in a manner that provides substantial ecological, cultural and economic benefits [ORS 541.405(1)(a)].[321]

The Oregon Plan relies upon voluntary restoration actions; coordinated action by state and federal agencies and tribes; monitoring watershed health; and scientific oversight by the Independent Multidisciplinary Science Team (IMST).

As discussed in significant detail in Chapter 4 *infra*, this project will likely harm water quality and habitat for fish and wildlife in total opposition to the goals of the Oregon Plan. In many areas along the pipeline route, significant resources, both private and public, have been invested in the restoration and recovery of water quality and aquatic habitat as part of the Oregon Plan. As a result of the likely adverse impacts of this project, these restoration efforts will put at risk, in conflict with sound policies of conservation. The following examples from each of the impacted waterways demonstrate the significant investments in restoration activities that has occurred:

- **Coos (HUC 17100304):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coos subbasin. The Oregon Watershed Enhancement Board ("OWEB") has distributed restoration funds to a number of organizations. As of this writing OWEB has invested $16.8 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore the Coos subbasin.

- **Coquille (HUC 17100305):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Coquille subbasin. As of this writing, OWEB has invested $18.2 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the Coquille subbasin would affect Coos Bay and the success of other restoration work downstream.

- **South Umpqua (HUC 17100302):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the

[320] Oregon Conservation Strategy. 2016. Oregon Department of Fish and Wildlife, Salem, Oregon. https://www.dfw.state.or.us/conservationstrategy/read_the_strategy.asp.
[321] Callens, Judith. Background Brief on Oregon Plan for Salmon and Watersheds. November 2006. https://www.oregonlegislature.gov/lpro/Publications/2006OregonSalmonPlanF.pdf. P. 1.

South Umpqua subbasin. As of this writing OWEB has invested $11 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ must consider that any impacts in the South Umpqua subbasin would affect the Umpqua River and the success of other restoration work downstream.

- **Upper Rogue (HUC 17100307):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Rogue subbasin. As of this writing, $11.2 million dollars has been granted by OWEB for activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Rogue subbasin would affect the Rogue River and the success of other restoration work throughout the whole Rogue Basin. The Rogue River Watershed Council is in the process of removing seven fish passage barriers in Salt Creek downstream from the proposed pipeline crossing of the Rogue. According to the Rogue River Watershed Council:

    > Construction activities during pipeline placement and raw, exposed soil for several years after pipeline installation is likely to contribute sediment to Salt Creek. Such increased sediment load works directly against our proposed restoration work, which will allow summer and winter steelhead and threatened Coho Salmon to reach more spawning habitat in Salt Creek. Sedimentation will contribute injury to the redds (nests) of these fishes. Moreover, the right of way at the pipeline location will be exposed due to vegetation management, leading to increased water temperatures in Salt Creek. One of the reasons Salt Creek is a target for restoration for us is the cool stream temperatures all summer long.[322]

    Further, the Upper Rogue Coho Salmon Strategic Action Planning group is focusing on West Fork Trail, Elk, parts of Big Butte, and parts of Little Butte Creeks. Careful review of the pipeline route show that impacts from erosion and sedimentation, streamside vegetation removal, and other associated impacts could work against restoration activities to be done in the future to enhance and protect Coho salmon habitat in these streams.

- **Upper Klamath (HUC 18010206):** The State of Oregon has invested significant funds in restoration activities designed to benefit water quality and salmon species within the Upper Klamath subbasin. Funds have been distributed to a number of organizations through OWEB. As of this writing, OWEB has invested $5.4 million dollars in activities including assessment work, watershed council support, education, technical assistance, monitoring and the hard costs of restoration work to restore this subbasin. Additionally, DEQ should consider that any impacts in the Upper Klamath subbasin would affect the Klamath River and the success of other restoration work downstream. Impacts to the Klamath River may also impact waterways in the State of California and the beneficial uses and restoration activities found downstream. Oregon should consult with the California State Water Resources Control Board regarding potential impacts to California waters.

[322] Barr, Brian. Rogue River Watershed Council. Email communication. 29 June 2018.

Overall, it is likely that the proposed impacts from the pipeline undermine the Oregon Plan for Salmon and Watersheds that the State uses to restore wild salmon.

B. Interference with Public Health and Safety

The removal-fill statute specifically requires that the Director consider potential interference with public health and safety, as a result of the proposed removal and fill. ORS §196.825(3)(e). Specifically, the DSL removal-fill guide states:

> The Department will also consider the potential positive and negative effects of the removal-fill on public health and safety. For example, positive effects might include removal-fill to protect a sewer line. Negative effects might include increased flood risk to nearby properties.[323]

The recent decision in *Citizens for Responsible Development In Dalles v. Wal-Mart Stores, Inc., 295 Or.App. 310 (2018),* emphasizes that the Director must weigh effects on public health and safety against the project's public need. The court there also found that §825(e) factors require a balancing.[324] Applying the analysis in that case to the public health and safety criterion, the same reasoning requires that the Department find that interference with public health and safety must not predominate over any arguable public need for the removal-fill.[325]

Some of the potential threats to public health and safety are inherently uncertain. It is impossible to know precisely when and where small fuel spills might occur during project construction, for example, though it is easy enough to foresee that they will occur and so need to be planned for. There is similar uncertainty regarding HDD drilling frac-outs, contamination of drinking water, and the effects of earthquakes and tsunamis. This implies that the applicants should have provided the Department with a risk analysis of threats and mitigation measures in order to enable it to weigh the probabilities of potential sources of interference. This sort of hazard risk analysis is routinely done in the pipeline industry in order to prioritize spending of maintenance dollars.

In addition, other effects on public health and safety resulting from this project are uncertain not because the effects are not knowable, but because the application is incomplete and premature (*See* Chapter 2 *infra*). The application does not contain information or analysis showing effects to a reasonable degree of certainty. This is in marked contrast with analysis that will be conducted for this project under NEPA, the CWA, the ESA, MMPA and MSA, among other authorities. The analysis the applicants include from contractors does not even purport to be an objective, scientific exploration of effects.[326] Aside from quantity and quality of information, the application does not enable the Department to reasonably predict probable effects with any specificity because foundational decisions remain to be made regarding construction, timing, alternatives and mitigation.

[323] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 6. P. 6-14.
[324] ORS §196.825(3)(e).
[325] *See* Citizens for Responsible Development In Dalles v. Wal-Mart Stores, Inc., 295 Or.App. 310, (2018).
[326] *See e.g.*. App. D of Att. C.16 Addendum, at pdf page 3287, (disclosing that report limitations on use restrict it only to the pipeline company.) It would be inappropriate therefore for the DSL or another agency to incorporate or rely on that analysis. Because other entities are not able to check their incorporation with the authors for accuracy or changes, third-party use of the study results would not be reliable.

The removal-fill statute mandates that the Department consider effects of the removal-fill on public health and safety. The Department cannot possibly comply with this mandate where those effects are being evaluated and determined *after* the permit has been granted (in the context of the FERC process primarily). The applicant has needlessly created this problem with its timing of its application to DSL. The applicant has no actual need for a DSL removal-fill permit to build a gas pipeline and LNG terminal, until it also has permits from FERC and many others. We urge the Department to deny this permit application because the applicants have not met their burden to provide it with the information necessary to make the determination regarding public health and safety required by ORS 196.825(f).

Commenters are cognizant of the limited view of the scope of "the project" under the DSL removal-fill statute, as explained in *Coos Waterkeeper v. Port of Coos Bay*, 363 Or. 354, 423 P.3d 60 (2018). Commenters request the Department's decision to be legally compliant beyond any reasonable question, and for that reason, focus here on only those impacts and effects directly pertaining to the removal-fill over which DSL has jurisdiction. A more comprehensive discussion of risks to public health and safety beyond the removal-fill activities and construction is included in Appendix B. Clean Water Act 404 Comments.

1. Natural Hazards

Statewide Planning Goal 7 requires land use planning to reduce risk to people and property from natural hazards.[327] Regulated natural hazards include floods, landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfire that all could be connected to the proposed removal-fill activities and construction of the project. The proposed LNG terminal would be located in an area subject to extreme risk from earthquake and tsunami inundation.[328] In addition, the pipeline would cross several areas of steep terrain and heavily forested areas within the Coastal Zone, subject to landslide and wildfire risk. Scientists predict that there is a 40 percent chance of a major earthquake (magnitude 8.7 to 9.2) and tsunami on the Cascadia Subduction Zone off Coos Bay in the next 50 years.[329] This type of event would cause violent ground motion, soil liquefaction, lateral spreading and subsidence. In turn, these land changes could cause pipe breaks and damage the LNG storage tanks proposed for the facility. In order to protect the site from tsunami inundation, Jordan Cove proposes to use sand to fill and elevate the property site above the projected inundation level, 40 feet or more about current land elevations.

The project's proposed alterations of the shoreline at the project location could have severe and significant impacts to the communities of the Coos Bay/North Bend area in the event of a disaster. These types of risks to people and property must be accounted for in order to comply with Goal 7. In the likely case that there is no adequate mitigation or alternative (short of not building the project at all) for Goal 7 issues, this must be clearly stated so that officials deciding whether the project meets Statewide Planning Goals CZMA standards can weigh the true risks involved.

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[327] Oregon's Statewide Planning Goals and Guidelines. Goal 7: Areas Subject to Natural Hazards. 1 June 2002. https://www.oregon.gov/LCD/docs/goals/goal7.pdf.
[328] Cascadia Subduction Zone. Pacific Northwest Seismic Network. https://pnsn.org/outreach/earthquakesources/csz.
[329] Cascadia Subduction Zone. Pacific Northwest Seismic Network. https://pnsn.org/outreach/earthquakesources/csz.

Effects related to earthquake, tsunami, wildfire, landslide risk as well as emergency response preparedness very clearly fall under the mandate to consider health and safety effects. ORS 196.825(3)(e). Also, comprehensive statewide land use planning Goal 7 requires local planning to address Oregon's natural hazards, including earthquake and tsunami. Therefore, the project also is not in conformance with ORS 196.825(3)(f), and is not compatible with the comprehensive plan and land use regulations for the area, ORS 196.825(g).

a. Landslides

In addition to the potential sediment pollution in violation of state water quality standards, removal-fill activities and construction of the project will likely increase risks to public health and safety as a result of increased landslide risks. In the case of the 12-inch MasTec Coos County pipeline constructed in 2003 that crossed similar terrain to the proposed PCGP, erosion and sedimentation measures repeatedly failed. This resulted in massive erosion, landslides, and impacts to roads.

As discussed in Chapter 4 *infra*, the applicants provide little specific information to justify the assumption that, particularly in steep areas, BMPs will be adequate to prevent impacts to streams and further, to minimize risks to public health and safety. The Department should consider the risks of landslides in steep terrain prone to wildfires and should require additional information from the applicants regarding current conditions and future conditions, particularly in light of recent wildfire events.

Additionally, the Department should review the findings of the Joint Interim Task Force on Landslides and Public Safety that was established under SB 1211 in 1997 following the deaths of five people in Douglas County from landslides in 1996.[330] Specifically, as stated by the Task Force:

> …each occurrence of a landslide has the potential of causing loss: loss of natural resources, loss of wildlife habitat, destruction of migratory fish streams, loss of local, regional, and state economic bases, and loss of human life.[331]

In its 20 December 2018 letter, DEQ cautions that the PCGP is proposed to cross through the Tyee Core Area, stating:

> The Tyee Core Area is commonly associated with thick sandstone beds that have few fractures. These beds allow water to concentrate in shallow soils overlying these beds creating positive soil pressure and the hazard of shallow, rapidly moving landslides. Human-caused landslides diminish water quality when they discharge into surface waters.[332]

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330 Joint Interim Task Force on Landslides and Public Safety. Report to the 70th Legislative Assembly. 7 October 1998. https://www.oregongeology.org/Landslide/LandslideTaskForceResults.pdf.

331 Joint Interim Task Force on Landslides and Public Safety. Report to the 70th Legislative Assembly. 7 October 1998. https://www.oregongeology.org/Landslide/LandslideTaskForceResults.pdf. P. 22.

332 Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 6.

Throughout the 20 December 2018 letter, DEQ frequently points to the potential for landslides from the project, particularly related to new and existing road use related to construction. For example, DEQ states:

> Moreover, for public safety, under OAR 629-623-0000 – 0800, a forest harvesting operator must submit to ODF a detailed road design for all new or reconstructed roads crossing high landslide hazard locations. For water quality protection and compliance with OAR 340-041-0007(7), DEQ is requesting in Comment 31 that ***PCGP provide detailed road designs for new or reconstructed roads in landslide hazard areas and other locations where these roads are hydrologically connected to waters of the state***.[333]

It is clear that DEQ considers the applicants' analysis of landslide risk related to public safety to be inadequate. The following excerpts provide examples of the serious concerns raised by DEQ:

- "With the current submittal, DEQ cannot determine if the proposed slope breakers highlighted in the Erosion Control and Revegetation Plan will prevent landslides due to pipeline construction and operation."[334]

- "In Resource Report 6 (Geologic Resources), PCGP provides few specifics regarding controls to stabilize slopes to prevent landslides."[335]

- "PCGP is proposing to site another proposed new road labeled as PAR-132.66 and shown in the map excerpt below. PCGP proposes to locate this PAR in a Potential Rapidly Moving Landslide Hazard Area. This proposed PAR is also near landslides identified from Aerial Photos and from LiDAR. Moreover, PCGP is proposing to reconstruct BLM's Beaver Springs road (BLM Noninv 32-2-36.A) by widening it. According to PCGP's Geologic Hazard Map, this BLM road identified for widening is located above a landslide area that drains to intermittent stream discharging into Dead Horse Creek. PCGP has not provided DEQ with design information regarding the need for the creation of fill slopes for this proposed new road in an area with unstable slopes. PCGP has not provided DEQ with design information for the reconstruction of the BLM road above unstable slopes. Has PCGP conducted a geotechnical investigation of this road widening project? If performed, does this geotechnical investigation indicate the need for reinforced fill for this road widening project? Where will PCGP discharge the post-construction stormwater for this PAR? Given the lack of design details, these questions surface for DEQ while reviewing PCGP's submittal."[336]

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[333] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 18-19.
[334] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 16.
[335] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 18.
[336] Department of Environmental Quality. RE: Supplemental Information Request Response to October 8, 2018 Jordan Cove Correspondence. 20 December 2018. Attachment A: Response to Jordan Cove's October 8, 2018 Information Filing. P. 49.

The Department should carefully review these concerns and the lack of information concerning them from the applicants. In addition to the concerns related to potential violations of state water quality standards, the Department should comprehensively evaluate the inadequate information provided by the applicants regarding increased risks to public health and safety as a result of landslides.

b. Wildfires

PCGP's "Construction Procedures" indicate the 229-mile long, 36-inch pipeline would be buried at an average depth of 10 feet and cross 485 waterbodies and wetlands. Work would be done assembly-line style across each of at least five "spreads" of multiple miles each. The applicant plans for pipeline construction to begin in January 2021 and be completed in December 2022, with peak work during the summer of 2021. They anticipate a total of 1,500 workers across the five crews.[337]

As required by Oregon's Fish Passage law, the applicants have proposed to confine pipeline construction activities in almost all water crossings to Oregon Department of Fish and Wildlife ("ODFW") in-water construction windows. However, these time windows correspond in the vast majority of cases with southern Oregon's fire season.[338] Nearly 90% of the removal-fill activities in Coos, Douglas, and Jackson County is scheduled within fisheries windows that correspond with fire season.[339] It is not clear under PCGP's Construction Procedures when the applicants propose to conduct the out-of-water construction activities.

Construction of a buried pipeline requires the use of heavy equipment and explosives, activities that carry with them significant risk of starting wildfires. For example, to create a 95-foot-wide clear-cut right-of-way, trees would be felled using chain saws and feller-bunchers; brush would be cleared, including by bull-dozing across rocky ground; 10-foot-deep trenches would be dug, using where necessary rock-saws, rock drills, and blasting; and pipe would be laid and welded. After the pipeline is completed, water would be drawn from nearby sources to hydrostatically test for leaks. Any leaks found would be repaired, including with additional welding. Trenches would then be backfilled to bury the pipeline, again with heavy equipment in rocky terrain.

The past several years serve to highlight that the risk and incidence of accidental, human-caused fires getting quickly out of hand is increasing. The Department should comprehensively evaluate the proposed removal-fill activities and construction proposed by the applicants across fire-prone southern Oregon regarding potential increased risks of wildfire and impacts to public health and safety.

c. Earthquakes and Tsunamis

[337] PCGP Joint USACE/DSL Permit Application, Part 2, PCGP, Attachment A.2 (RR1 General Project Description), Construction Procedures, p. 10, PDF pp. 2128-2171.
[338] PCGP Joint USACE/DSL Permit Application, Part 2, PCGP, Attachment A.2 (RR1 General Project Description), Construction Procedures, Resource Report 1 (excerpt), p. 11.; ODFW, "Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources," June 2008.
[339] Application, Part 2, Table B.3-4, "Fish Utilization, EFH in, and Crossing Techniques and In-Water Work Windows for Waterbodies Crossed by the Proposed Route (revised April 2018), PDF pp. 1525-1585. Klamath in-water work windows are much broader than the other counties, but also include the months of fire season.

Direct exposure to earthquake and tsunami is a public health and safety hazard caused by this application. The Cascadia Subduction Zone (CSZ) is located off the Oregon coast and extends from Northern California to Vancouver, B.C, where the oceanic Juan de Fuca and Gorda Plates meet the North American Plate. A recent study based on 13 years of research finds that the Coos Bay area is more vulnerable than northern stretches of the CSZ, and concludes that there is a 40 percent chance of a major earthquake in the Coos Bay region during the next 50 years.[340] The study also found that "major earthquakes tend to strike more frequently along the southern end – every 240 years or so – and it has been longer than that since it last happened."[341] Forecasts predict that the CSZ is due for an earthquake similar in strength to the 9.0 magnitude earthquake felt off the coast of Japan in March 2011.[342] A high magnitude earthquake in this zone would create several different conditions that could severely impact the stability of the terminal and pipeline.[343]

Effectively all of the removal and fill work here will occur in a mapped tsunami inundation zone, and the on-water work will obviously be directly subject to tsunami risk. The fill associated with the APCO site, the trans-pacific parkway/Highway 101 interchange, and on the North Fill area are all in tsunami exposure zones. The Jordan Cove LNG Terminal will be constructed on dredged soils, and will thus be susceptible to earthquake liquefaction hazards, which occur when water-saturated sediment is exposed to strong seismic shaking.

Earthquake and/or tsunami response during dredging is not addressed in the application, imposing yet another public safety and navigation cost of the project. Anchored dredges and long slurry lines through the bay would be at risk during an event, and potentially pose additional hazard to others in the form of drifting debris and search and rescue burden. The estuary itself is an important safety feature in a tsunami or earthquake, providing both a refuge and navigation link.

i. Channel dredging would impact on tsunami behavior in unpredictable ways.

As a general rule, increasing the width and depth of the channel will tend to increase the amplitude of the tsunami as it strikes upstream facilities. It is likely that upstream areas would suffer from tsunami effects, specifically the docks and town of Coos Bay, and residences in the upper bay, the airport, highway 101 and both bridges, and the proposed LNG facility and fracked gas pipeline at Jordan Cove.

For these reasons, this project presents potentially extreme hazards to the local community. The project site on the North Spit is located at a bend in Coos Bay, where tidal energy is deflected. The elevation of the land at this location could significantly alter the direction and velocity of an incoming tsunami. For example, instead of running up onto the North Spit and inundating the

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[340] *See* Chris Goldfinger, et al., *Turbidite Event History – Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone*, 1661 (Robert Kayen, ed. 2012); Chris Goldfinger, 1*3-Year Cascadia Study Complete – And Earthquake Risk Looms Large*, OREGON STATE UNIVERSITY NEWSROOM (Aug. 1, 2012), http://oregonstate.edu/ua/ncs/archives/2012/jul/13-year-cascadia-study-complete- %E2%80%93-and-earthquake-risk-looms-large

[341] *Id.*

[342] *Id.*

[343] *Id.*

land there, the proposed sand wall, if it survives the liquefaction and lateral spreading effect of the earthquake, would deflect and redirect the force of a tsunami. The deeper channel could increase the amplitude of that deflected energy.

The proposed significant alteration of the shoreline at this location could have important effects on the inundation of other areas within the Bay Area communities. In other words, the risks of these types of hazards extend beyond just the inundation, liquefaction, and ground shaking at the project site. The project's proposed alterations of the shoreline at the project location could have significant impacts to the communities of the Coos Bay area.

The hydrodynamic analysis attached to the DSL application (Part 1 JCEP Attachment A.6, Document Number: J1-000-MAR-TNT-DEA-00008-00) does show that proposed dredging and fill associated with the project will change currents at various points in the estuary, generally increasing them.

However, this analysis leaves important gaps. As stated by Jesse Lopez doctoral student of Dr. Antonio Baptista with the Center for Coastal Margin Observation & Prediction in Appendix K:

> The studies conducted by Moffatt & Nichol rely on the results of two-dimensional model simulations that are ***inherently incapable*** of representing the dynamics required to assess impacts on physics and subsequently biology and habitat in Coos Bay. All studies were critically limited in temporal scope representing a small subset of the conditions exhibited in the system.[344]

Further, the hydrodynamic analysis does not include the large dredging project, ostensibly proposed by the Port (the Coos Bay Channel Modification project discussed in Chapter 6 *infra*). It says nothing explicitly about behavior in tsunami. The access channel changes combined with a relatively large amount of erosion and deposit of sediment[345] as well as the new slip and LNG facility, introduce new hydrologic features that could behave in unpredictable and potentially deadly ways in a tsunami.
Unconsidered channel dredging impacts to tsunami behavior represent a significant public health and safety impairment, that prevent the Department from being able to determine that the proposed removal-fill would not interfere with public health and safety, necessary to permit issuance.

ii. Impaired Stability of fill materials and dredged navigation channel in an earthquake and/or tsunami

Commenters are concerned about the behavior of the proposed soft, sandy fill materials, and of the dredged navigation channel and marine slips, in an earthquake and tsunami scenario.
The upland fill of the LNG facility itself, the APCO site, and the mitigation area at Kentuck slough, constructed of dredged material, would be exposed to tsunami and earthquake. Other than discussing integrity of its operations, we do not see any information in the application that

[344] Lopez, Jesse. Assessment of hydrodynamic studies by Moffat & Nichol for the Jordan Cove Liquefied Natural Gas Terminal Project LP Removal-Fill Permit. 20 January 2019.
[345] *See* Attachment A.7, Sediment Transport Analysis),

discusses what effect the fill might have in an earthquake/tsunami scenario. A major earthquake could very easily cause liquefaction of fill, with associated destabilization of infrastructure constructed on top. (*See* Image: liquefaction causes collapse of Vine Rd. in Mat-Su valley in 2018 Alaska earthquake; *Anchorage Daily News*, Marc Lester, Nov. 30, 2018).

Stability of the FNC is also a major concern in both earthquake and tsunami situations. Tsunamis, especially large ones, can radically change the shape of estuaries and bays. The application appears to lack any information explicitly recognizing this risk, but does indicate enough to show likely impairment. Physically, a deeper channel would present more tsunami force, and more of a chance of channel instability in an earthquake. Sidewalls of a deeply cut channel could collapse. Moreover, it is foreseeable that the removal-fill purpose of bringing bigger ships into the port would itself create a situation where vessels tend to get stranded upriver if channel depth reduces, presenting yet another risk to public safety.

2. Stream Crossings

The potential for high flow events that expose the pipeline at proposed stream crossings may result in increased risks to public health and safety. Absent additional information related to stream crossings, including but not limited to site-specific analysis of each stream crossing, the Department cannot make the determinations regarding health and safety required for permit issuance.

In fact, the New York Department of Environmental Conservation ("NYSDEC") denied 401 certification due to a LNG pipeline applicant's failure to provide site-specific analysis of each stream crossing.[346] In NYSDEC's assessment, the agency denied 401 certification for the Constitution Pipeline in part because:

> Without a site-specific analysis of the potential for vertical movement of each steam crossing to justify a burial depth, NYSDEC is unable to determine whether the depth of pipe is protective of State water quality standards and applicable State statutes and standards. In addition to impacts to water quality described above and without proper site-specific evaluations***, future high flow events could expose the pipeline, resulting in risks to the health, safety, and welfare of the people*** of New York State. Pipe exposure would require more extensive stabilization measures and in stream disturbances resulting in addition degradation to environmental quality. We note that flooding conditions from

[346] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf.

> extreme precipitation events are projected to increase on the operational span of the pipeline due to climate change.[347]

Water quality concerns regarding stream crossings are discussed in detail in Chapter 4 *infra* as well as Appendix A. Clean Water Act 401 Comments. However, the Department should also consider potential public health and safety risks from stream crossings and require additional site-specific information from the applicants.

Regarding the proposed HDD crossings for larger waterways, concerns regarding water quality in each impacted watershed are discussed in Appendix A. Clean Water Act 401 Comments. HDD crossings, even when successful, have impacts in areas adjacent to waters where staging and construction areas occur. HDDs also require the disposal of materials extracted from the drill hole. HDD attempts frequently fail, causing drastic impacts to water quality and fish habitat. In 2015, DEQ noted that the DEIS fails to disclose and analyze the likelihood and frequency of frac-out events.[348] The State re-iterated these concerns in its 2017 scoping comments.[349]

In recent history, 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. Bentonite clay and sediment released through frac-outs can disrupt fish spawning habitat, increase turbidity, and potentially introduce other contaminants to impacted waterways.

In summary, the applicants rely upon qualitative analysis and fail to comprehensively disclose and analyze the likelihood and frequency of frac-out events that could interfere with public health and safety. Absent that analysis, the Department cannot make the determinations required by ORS 196.085(e) that this project will not interfere with public health and safety.

a. Coos Bay HDD Crossing Example

Significant detail regarding each of the proposed HDD crossings for Coos Bay, the Coos River, the Rogue River, and the Klamath River, as well as the Direct Pipe technology proposed for the South Umpqua is provided in Appendix A. Clean Water Act 401 Comments.

As just one example, the applicants propose to install the 36-inch pipeline across Coos Bay using two horizontal directional drills (HDD) of 5,200 and 9,000 feet each. This is a significant change from the prior proposal, in both alignment and construction method. The prior proposed route would have crossed through Haynes Inlet at the north of Coos Bay and away from the navigation channel, constructed using an open wet cut method, after rejecting the use of HDD for the Coos Bay crossing. In 2006, when an HDD crossing of Haynes Inlet was proposed, the applicant's engineer concluded, "[a] crossing of this magnitude would not be considered routine and ***the potential for failure would be substantial***."[350]

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[347] Joint Application: DEC Permit# 0-9999-00181/00024 Water Quality Certification/Notice of Denial. New York State Department of Environmental Conservation. 22 April 2016. P. 13. http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf. Emphasis added.

[348] State of Oregon 2015 DEIS comments at 43 & 102.

[349] State of Oregon 2017 Scoping comments at 15.

[350] Geoengineers Memorandum to Lori Dalton, Williams Northwest Pipeline (Nov. 15, 2006). Emphasis added.

In the 2014 DEIS, FERC noted the high liquefaction and/or lateral spreading potential at Coos Bay:

> Because the crossing of Coos Bay (Hayes Inlet) would have the greatest potential along the proposed route for liquefaction and lateral spreading in the event of an earthquake, Pacific Connector had a geotechnical consultant perform a site-specific analysis (GeoEngineers 2007a).
>
> Pacific Connector also identified other measures that would reduce potential impacts on its pipeline in Haynes Inlet from liquefaction and lateral spreading. The route within the bay would keep the pipeline away from the navigation channel slope. In addition, Pacific Connector would bury the pipeline 5 feet below the estuary bottom within Haynes Inlet and use thicker wall pipe and concrete coating.[351]

The prior route is noted as reducing risk because "The route within the bay would keep the pipeline away from the navigation channel slope." As noted above, the current route proposal would cross the navigation channel in not one but two places.

In its 2017 scoping comments, DOGAMI noted that "geologic hazard evaluations and proper mitigation of hazards are needed."[352] The State requested "a thorough geologic characterization of the project area and surrounding area and a comprehensive site-specific geologic hazard and geotechnical assessment . . . at the proposed facility and along the pipeline with supporting evidence to explain that the facility can be appropriately constructed and operated throughout its existence."[353] Without this information, the Department cannot evaluate the impacts of the proposed project on public health and safety.

In addition to the two HDD crossings proposed for Coos Bay, the applicants propose to use HDD technology to cross the Coos River at MP 11.13R. Due to the soft silts and clays located at the exit and entry points proposed for the Coos River crossing, the 2017 GeoEngineers report states:

> The hydraulic fracture and drilling fluid surface release model indicates the risk of drilling fluid surface release is high along the first approximately 250 feet of the drill path. The risk becomes low from the northern edge of the Coos River Highway and across Coos River to approximate station 17+00. The risk becomes high within approximately 150 feet of the exit point.[354]

The 2017 GeoEngineers report describes how HDD alignment through fat clay soils is "typically more challenging than in other non-cohesive soils" and the potential for hydraulic fracture and drilling fluid surface release increases dramatically.[355] The report further concludes that:

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[351] 2014 *DEIS at 4-264 to 4-265.*

[352] State of Oregon 2017 Scoping comments at 8.

[353] Id.

[354] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. ES-1. PCP Part 2 Appendix B. P. 1471.

[355] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 13. PCP Part 2 Appendix B. P. 1484.

> It is our opinion that there is a relatively high risk of hydraulic fracture and drilling fluid surface releases along the first 500 feet and last 300 feet of the HDD, respectively.[356]

The proposed Coos Bay HDD crossings provide just one example of the inadequate information provided by the applicants. Without additional information regarding the potential for a frac-out and other risks to public health and safety, the Department is once again unable to make the public health and safety determinations required, and should deny the permit.

3. Airport Hazard

The Federal Aviation Association ("FAA") recently issued notices of presumed hazard for LNG Carrier vessels at Point 6, Transit East Point, Transit West Point, Transit Point 6, Transit Point 4, Transit Point 3, 2, and 1, the LNG Carrier Vessel Stack (in terminal), the Amine Regenerator, the Oxidizer, and the LNG Tanks North and South.[357] According to FAA's aeronautical study conducted under 49 U.S.C., Section 44718, heights above certain thresholds "exceed[] obstruction standards and/or would have an adverse physical or electromagnetic interference effect upon navigable airspace or air navigation facilities." [358] Their study disclosed a variety of problems at different locations, including penetration of 14 CFR Part 77 protected airspace at the airport. *Id.* This issue is discussed more extensively in Chapter 2 *infra*.

4. Navigation Safety Hazards

There are important health and safety implications of the navigation effects addressed in Chapter 5 *infra*, in terms of causing new hazards for mariners including with the removal-fill operation itself. Those navigation hazards should be considered under the statutory heading of public health and safety.

5. Additional Public Health and Safety Concerns

The Department should consider additional concerns regarding public health and safety, including but not limited to, process safety hazards, leak detection, incident response, chronic human health impacts, liability for damages, and compliance with U.S. Coast Guard requirements as well as the Coos Bay Geographic Response Plan. These issues are discussed in more detail in Appendix B. Clean Water Act 404 Comments.

C. Conclusions

In summary, the Department is required to consider whether the project conforms to the sound policies of conservation and whether the project would not interfere with public health and safety. ORS 196.825(3)(e). The applicants have failed to demonstrate compliance with the Clean Water Act, as discussed in detail in Appendix A. Clean Water Act 401 Comments and Chapter 4

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[356] Coos River HDD Pacific Connector Gas Pipeline Project. GeoEngineers. 1 September 2017. P. 13. PCP Part 2 Appendix B. P. 1484.

[357] FEDERAL AVIATION ASSOCIATION, NOTICES OF PRESUMED HAZARD 60 (2018),https://oeaaa.faa.gov/oeaaa/external/searchAction.jsp.

[358] *Id.*

infra. Further, the applicants have failed to demonstrate compliance with Total Maximum Daily Loads (TMDLs). The Department must not approve the permit without consultation with NOAA Fisheries and other federal agencies as required under the Endangered Species Act. Further, the applicants have failed to demonstrate compliance with state conservation policies, including but not limited to the Oregon Conservation Strategy and the Oregon Plan for Salmon and Watersheds.

Additionally, the applicants have failed to demonstrate that the project will not interfere with public health and safety. The removal-fill statute specifically requires that the Director consider potential interference with public health and safety, as a result of the proposed removal and fill. ORS §196.825(3)(e). Potential risks to public health and safety include natural hazards, such as floods, tsunamis, wildfires, landslides, and earthquakes identified under Statewide Planning Goal 7. The potential for high flow events that expose the pipeline or frac-outs at proposed stream crossings may result in increased risks to public health and safety. The Department should consider the airport hazard identified by the FAA and the navigation safety hazards discussed in Chapter 5 *infra*.

The applicants have failed to demonstrate that the project will not conform to sound policies of conservation or interfere with public health and safety and, therefore, the Department must deny the permit.

Chapter 9. CONFORMANCE WITH LAND USES

9.1 The Department Must Deny the Permit because the Applicants Have Failed to Provide Reasonable Assurances that the Project is in Conformance with Coos County's acknowledged Comprehensive Plan and Land Use Regulations (ORS 196.825(3)(g)).

In determining whether to issue a removal-fill permit, the Department must determine that the proposed fill or removal is compatible with the acknowledged comprehensive plan and land use regulations for the area where the proposed fill or removal is to take place or can be conditioned on a future local approval to meet this criterion. ORS 196.825(3)(g); OAR 141-085-0565(4)(g). The applicant bears the burden of providing the Department with all information necessary to make the required determination that a fill or removal project is consistent with the protection, conservation and best use of the water resources of the state and would not unreasonably interfere with the preservation of the use of the waters of the state for navigation, fishing and public recreation. OAR 141-085-0565(5).

The revised application fails to address the requirements of the acknowledged comprehensive plans and land use regulations for the area where the fill and removal are proposed necessary for the Department to determine whether the proposed fill is in conformance with existing public uses of the waters and adjacent lands, as required by OSR 196.825(3)(f). The applicant has failed to meet its burden of providing the Department with the information necessary to make the evaluation required by ORS 196.825(3)(g). Moreover, even assuming that the applicant had provided the relevant and required information, the project does not comply with land use laws and comprehensive plans. The application should therefore be denied.

A. LNG Terminal is not Compatible with Land Use Regulations and Coos County Comprehensive Plan for the Area Where the Project is Proposed

1. Applicable Comprehensive Plan and Land Use Regulations.

The LNG terminal property is located within the Coos Bay Estuary and is therefore subject to the Coos Bay Estuary Management Plan (CBEMP). The CBEMP serves as the basis of land, water use, and community development regulations for lands lying within the Coos Bay estuary and its shorelands. The CBEMP is based upon the Oregon Statewide Planning Goals, state statutes, and Oregon's Coastal Management Program. CBEMP § 1.2. The Coos County Zoning and Land Development Ordinance ("LDO") implements the comprehensive plan including the CBEMP. Among other laws, the CBEMP implements the requirements of Statewide Planning Goal 16. Goal 16 recognizes and protects the estuaries of the state through classification (natural, conservation, development) and evaluation of impacts to the estuary resources. Within Coos Bay in the vicinity of Jordan Cove, the estuary is designated in part Development and in part Natural classification.

The application proposes dredging within Development Aquatic Management Units (5-DA, 6-DA). The applicable zoning provisions for the 5-DA (LDO Section 3.2.271) and 6-DA (LDO Section 3.2.281) state that dredging is allowed "subject to finding that adverse impacts have been minimized (see Policy #5); and to Policy #8 requiring mitigation."

CBEMP Policy 5 governs estuarine fill and removal, and provides in pertinent part as follows:

> I. Local government shall support dredge and/or fill only if such activities are allowed in the respective management unit, and:
> a. The activity is required for navigation or other water-dependent use that requires an estuarine location or, in the case of fill for non-water-dependent uses, is needed for a public use and would satisfy a public need that outweighs harm to navigation, fishing, and recreation, as per ORS 541.625(4) and an exception has been taken in this Plan to allow such fill.
> b. A need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights.
> c. No feasible alternative upland locations exist; and
> d. Adverse impacts are minimized.
> e. Effects may be mitigated by creation, restoration, or enhancement of another area to ensure that the integrity of the estuarine ecosystem is maintained.
> f. The activity is consistent with the objectives of the Estuarine Resources Goal and with other requirements of state and federal law, specifically the conditions in ORS 541.615 and Section 404 of the Federal Water Pollution Control Act (P.L.92-500).[359]

The CBEMP requirements of Policy 5(I) implement and mimic the language of Statewide Planning Goal 16, Implementation Requirement 2:

"Dredging and/or filling shall be allowed only:

[359] *See* Appendix L.

a. If required for navigation or other water-dependent uses that require an estuarine location or if specifically allowed by the applicable management unit requirements of this goal; and,
b. If a need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights; and
c. If no feasible alternative upland locations exist; and,
d. If adverse impacts are minimized.

Other uses and activities which could alter the estuary shall only be allowed if the requirements in (b), (c), and (d) are met."

2. Coos County land use approval for the LNG terminal found to be flawed.

In November 2017, the Land Use Board of Appeals (LUBA) determined that the Coos County land use approval for the LNG terminal (sometimes noted as the "omnibus" land use permit by the applicant) was flawed in numerous ways, many of which relate directly to the Coos Bay Estuary Management Plan policies which protect waters of the state in and around Coos Bay. *See* Appendix M. Subsequent appeals of that decision did not alter LUBA's conclusion. Further, the pending "omnibus" application reflects the previous iteration of the project (the version that FERC denied). Since LUBA's decision, no land use application has yet been submitted, let alone approved by Coos Bay, that reflects the current proposed configuration of the LNG terminal. Because the applicant has failed to obtain land use permits for the project in Coos Bay, the Department cannot conclude that the project is compatible with land use regulations and acknowledged comprehensive plans.

In addition, the project cannot be conditioned on a future land use approval to meet this criterion. The reasons adopted by LUBA in remanding the prior land use application are directly related to the inconsistency of the proposed dredge and fill in wetlands and in the Coos Bay estuary with the Coos Bay Estuary Management Plan, demonstrating that serious questions remain as to whether the project can comply with the acknowledged comprehensive plan policies and related land use regulations. The Department's removal-fill guide provides that if a project is identified as being inconsistent with the local comprehensive plan, the Department will not authorize the project until a plan amendment or zone change is secured.[360]

a. Compliance with Coos Bay Estuary Management Plan Policy 5

LUBA found fault with Coos County's findings interpreting CBEMP Policy 5(I)(b), which allow dredging only if it will (1) provide a "substantial public benefit" and (2) "not unreasonably interfere with public trust rights." First, LUBA held that the "substantial public benefit" analysis "requires the county to evaluate the substantiality of the public benefits provided by the use that the proposed dredging serves, in this case the LNG terminal, or at least those components of the terminal that are properly viewed as water-dependent uses." LUBA Order at 10. LUBA also held CBEMP Policy #5 requires that even if the proposed dredging "serves a water-dependent use allowed under the county's code, the county can allow the dredging only if it also finds that the use provides a substantial public benefit." Id. at 12. Second, LUBA held that the county had

[360] Department of State Lands. A Guide to the Removal-Fill Process. December 2016.

failed to adequately support its conclusion that the project would not unreasonably interfere with public trust rights, specifically fishing and navigation uses in Coos Bay. Id. at 16.

b. The 5-DA (CCZLDO Section 3.2.271) and 6-DA (CCZLDO Section 3.2.281) zones

These zones allow dredging "subject to finding that adverse impacts have been minimized (see Policy #5); and to Policy #8 requiring mitigation." CBEMP Policy #5 incorporates the requirements of Policy #4 – "Identification and minimization of adverse impacts as required in 'd' above shall follow the procedure set forth in Policy #4." Appendix L. CBEMP Policy #4 provides that a decision to permit uses and activities (including fill in a development management unit) shall be "based upon a clear presentation of the impacts of the proposed alteration, as implemented in Policy #4a." *See* Appendix L.

The plain language of Policy 4 requires an impact assessment at the time of permit application for dredging in a Development Aquatic Management Unit. CBEMP Policy 4 is consistent with and implements Goal 16 Implementation Requirement 1: "Unless fully addressed during the development and adoption of comprehensive plans, actions which would potentially alter the estuarine ecosystem shall be preceded by a clear presentation of the impacts of the proposed alteration. Such activities include dredging, fill, in-water structures …."

Pursuant to CBEMP Policy 4a, the county "shall defer, until the time of permit application, findings regarding consistency of the uses/activities listed in Policy #4 with the resource capabilities of the particular management unit." Policy #4 lists dredging in the development aquatic management unit as one of the uses/activities for which the County deferred the impacts assessment. Appendix L.

In its flawed approval of the land use application, Coos County did not adopt any findings applying the procedures set forth in CBEMP Policies 4 and 4a. In Policy #5 findings, the county specifically rejected the argument that the public need/benefit standard requires the County to balance need/benefit with (and weigh against) public detriments. The county failed to explain how this finding is consistent with the CBEMP Policy 4 and Goal 16 IR1. The county did not offer any reason why Goal #4 and the impact assessment has been satisfied or does not apply. LUBA found the county's analysis inadequate, and remanded so that an impacts analysis under Policy #4 and #4a can be performed with input from the public. *See* Appendix M.

c. Development in the 6-WD and 7-D zones

Development in these zones requires compliance with CBEMP Policy 30. LDO 3.2.276, 3.2.286. Policy #30 restricts actions in beach and dune areas with "Limited Development Suitability" and requires that Coos County permit development within these areas "only upon the establishment of findings that shall include at least … [m]ethods for protecting the surrounding area from any adverse effects of the development." Policy 30(1)(c). Appendix L. This CBEMP language directly mirrors and implements the requirements of Goal 18 IR1(c).

The proposed dredge and fill in this area could have significant adverse impacts on the stability of the dunes. In reviewing the applicant's "Geotechnical Investigation" prepared by GRI (rev. 2013), DOGAMI and the State's geotechnical peer review raised concerns that the applicant had not adequately addressed potential subsidence from dewatering activities during construction of the tank/slip area, located within the 6-WD zone. *See* Carlson Geotechnical, Geotechnical Peer Review – Jordan Cove LNG Project (Feb. 3, 2015). Rec. 7751, 8178. Appendix N. The State's geotechnical peer review noted, "GRI does not include a discussion of groundwater relative to stability" and recommended "[d]iscuss groundwater relative to stability of project, as well as discussion of potential for subsidence during recommended dewatering within tank/slip area for grading." *Id.* at 8. LUBA held that Coos County failed to assess whether subsidence from proposed dewatering could constitute an adverse effect of the development on the surrounding area within the meaning of CBEMP Policy 30(1)(c).

d. Fill in the 7-D zone

Fill is this zone is a conditional use, subject to general and special conditions. LDO 3.2.286. The special condition for fill activities provides: "The wetland in the southeast portion of this district can be filled for a development project contingent upon satisfaction of the prescribed mitigation described in Shorelands District #5." *Id*. To demonstrate compliance with the 7-D zone, the land use application proposed: "Special Condition, Activities 5 applies to the proposed activity of fill in 7-D. The Application is proposing fill in the southeast portion of this district for a development project and will mitigate in accordance with all prescribed mitigation. The County can find the Application is compliant with this criterion." Jordan Cove Energy Project Land Use Applications Coos County File Nos. HBCU-15-05/FP/15-09/CD-15-152 at 32 (Nov. 3, 2015).

Coos County found that fill is a conditional use in the 7-D zone, subject to general and special conditions, and adopted the following findings specific to proposed fill in the 7-D zone:

> The Board finds that the application proposes fill in the southeast portion of this district for a development project and will mitigate in accordance with all prescribed mitigation. Therefore, the Board finds that the proposed fill is consistent with Special Condition 5.[361]

LUBA found Coos County had failed to identify, explain, or address what the "prescribed mitigation" is and how it will be performed to meet the requirements for filling wetlands in the 7-D zone. For example, LDO 3.2.286 references prescribed mitigation described in Shoreland Unit #5, which allows restoration activities "in the portion of the site agreed on for mitigation as per the Henderson Marsh Mitigation Plan." LDO 3.2.261. The county did not explain the requirements of the Henderson Marsh Mitigation Plan. The Plan is not addressed by the application, and does not appear in the record. No evidence, let alone substantial evidence, in the record supported the county's finding that the project will comply with the mitigation requirements of the 7-D zone. LUBA remanded the decision for analysis of compliance with this land use regulation. The applicant has not demonstrated how the fill proposed in the southeast portion of the 7-D zone will comply with the mitigation requirements in the CBEMP.

3. Coos County's Unjustified Reliance on FERC Permits to Satisfy Comprehensive Plan Criteria.

In its flawed approval of the prior land use application, Coos County expressly relied on the applicant obtaining FERC permits to satisfy applicable Coos County comprehensive plan

[361] Coos County Findings of Fact and Conclusions of Law HBCU-15-05 at 60 (Aug. 31, 2016).

criteria. At that time, FERC had already denied the application. LUBA held that, "given that the required FERC permit had, in fact, been denied during the proceeding before the county, the county erred in adopting findings of compliance with local approval standards that are unconditionally predicated on the applicant obtaining a FERC permit, without first addressing whether the denial means that JCEP is precluded, as a matter of law, from obtaining the FERC permit." LUBA order at 28.

4. Outstanding Issues Related to Compatibility with Land Use Regulations

These holdings from LUBA indicate that multiple outstanding issues related to whether the dredge and fill is compatible with the comprehensive plan provisions and land use regulations in the area of the terminal development remain. Furthermore, the project has once again changed significantly since even Coos County's last flawed approval that was rejected by LUBA. The applicant has not submitted new land use applications for the new project design. Therefore, the applicants have not presented no evidence that the new project proposal can comply with land use regulations and comprehensive plan provisions. Therefore, the Department cannot make the determinations required by ORS 196.825(3)(g) necessary to authorize the Project at this time.

C. Applicants Have Acknowledged that Other Elements of the Project are Inconsistent with Coos County Comprehensive Plan and Land Use Regulations by Seeking Post Application Submission Plan Modifications

The proposed alterations to the navigation channel are not consistent with the acknowledged Coos Bay Estuary Management Plan. The applicant is seeking approval for comprehensive plan amendments to change the estuary designation in areas proposed for dredging in order to make the comprehensive plan compatible with the proposal. See Coos County File AM-18-011/RZ-18—7/HBCU-18-003 (Nov. 21, 2018). These changes would require an exception to Statewide Planning Goal 16, which the current CBEMP requirements implement. In other words, by seeking these plan amendments, the applicants are acknowledging that their proposal is not compatible with the acknowledged comprehensive plan and land use regulations.

Similarly, for work related to the proposed HDD, the applicant is seeking a comprehensive plan amendment to allow subsurface "low intensity" utilities in the Development management unit of the CBEMP. See Coos County File No. AM-18-010/HBCU-18-002.

Finally, related to the Project's proposal to widen the TransPacific Parkway, the applicant is seeking an amendment of the comprehensive plan and zone change. See Coos County File No. AM-18-009/RZ-18-007/HBCU-18-003 (Nov. 2, 2018).

Because the project is not consistent with the local comprehensive plan, the Department cannot authorize the project unless and until the necessary plan amendments and zone changes are actually secured.

D. Conclusions

The applicants have failed to demonstrate that its Project is in conformance with existing public uses of waters and land designated in applicable comprehensive plan and land use regulations. Moreover, the applicants have failed to provide the Department with the information necessary to make the determinations required by ORS 196.825(3)(f) and (g) that the applicants' proposed fill or removal is compatible with the requirements of the comprehensive plan and land use regulations for the area in which it will take place. Finally, because the applicants have failed to obtain land use permits for the project in Coos Bay, the Department cannot conclude that the project is compatible with land use regulations and acknowledged comprehensive plans. Further, because the reasons adopted by LUBA in remanding the prior land use application are directly related to the inconsistency of the proposed dredge and fill in wetlands and in the Coos Bay estuary with the Coos Bay Estuary Management Plan, the project cannot be conditioned on a future land use approval to meet this criterion. Because the applicants have failed to meet its burden of providing the Department with the information necessary to make the evaluations under ORS 196.825(3)(f) and (g), the Department must deny the permit.

9.2 The Department Must Deny the Permit because the Applicants Have Failed to Provide Reasonable Assurances that the Project is in Conformance with Douglas County's acknowledged Comprehensive Plan and Land Use Regulations (ORS 196.825(3)(g)).

The pipeline will cross approximately 64 miles in Douglas County. A smaller portion of the pipeline (approximately 7 miles in length) in Douglas County also falls within the State's Coastal Zone. As a result, the pipeline is subject to review and must conform with Douglas County's land use regulations and acknowledged Comprehensive Plan. The application does not contain a Land Use Compatibility Statement from Douglas County. In any case, Pacific Connector's land use approvals from Douglas County are now void, as discussed below. The applicants have failed to demonstrate conformance with the Douglas County comprehensive plan and land use regulations.

Pacific Connector received approval from Douglas County for the pipeline as a conditional use to authorize the pipeline within the coastal zone in Timberland Resource, Farm Forest, and Exclusive Farm Use-Grazing Zoning Districts in 2009 (County File No. 09-045). At that time, the project was proposed to import natural gas (see project description Chapter 1). Since 2009, Pacific Connector has sought and received a series of 12-month extensions of the Douglas County authorization. In 2014, the applicants received an amendment of the conditional use permit to allow use for export consistent with the new project proposal.

In December 2016, Pacific Connector again sought an extension of the approval from Douglas County. However, Pacific Connector failed to request the extension prior to the expiration of the permit. After Douglas County's Planning Director approved the extension despite the late filing, affected landowners appealed the extension decision. The appeal was transferred from the Land Use Board of Appeals to Douglas County Circuit Court. While the appeal was pending, Douglas County again approved the extension request in December 2017. In January of this year, Douglas County Circuit Court Judge Kathleen Johnson held that "in issuing the extension of the permit on December 20, 2016, and subsequently on December 8, 2017, Douglas County injured a substantial interest of Petitioners and that it improperly construed the applicable law and in doing so exceeded its jurisdiction by improperly extending a permit that was void. I therefore reverse the County's extensions dated December 20, 2016 and December 8, 2017." *McLaughlin v. Douglas County*, 17CV32687 and 18CV04396 (combined) (January 23, 2019 email opinion J. Johnson).

A. Conclusions

As a result of this ruling, Pacific Connector does not have the required land use approval for the 7-mile segment of pipeline in Douglas County's Coastal Zone. Because the pipeline will require a new application for conditional use permit and utility facility necessary for public service, the applicant has not met its burden to demonstrate to the Department that the project conforms to Douglas County's acknowledged comprehensive plan and land use regulations.

Chapter 10. MITIGATION

10.1 The Department Must Deny the Permit because the Applicants have Failed to Provide All Practicable Mitigation to Reduce the Adverse Effects of the Proposed Fill or Removal (*ORS 196.825(3)(i)*)

Under ORS 196.825(3)(i), in determining whether to issue a removal-fill permit, the Department must consider:

> (i) Whether the applicant has provided all practicable mitigation to reduce the adverse effects of the proposed fill or removal in the manner set forth in ORS 196.800 (Definitions for ORS 196.600 to 196.905). In determining whether the applicant has provided all practicable mitigation, the director shall consider the findings regarding wetlands set forth in ORS 196.668 (Legislative findings) and whether the proposed mitigation advances the policy objectives for the protection of wetlands set forth in ORS 196.672 (Policy).[362]

In the Department's weighing whether the applicant has provided all practicable mitigation to reduce the adverse impacts of the proposed fill and removal, the Department must consider the legislative findings regarding wetlands that:

> (1) Wetlands provide a natural means of flood and storm damage protection through the absorption and storage of water during high runoff periods, thereby reducing flood crests and preventing loss of life and property;
> (2) Wetlands provide essential breeding, spawning, rearing, feeding, nesting and wintering habitats for a major portion of this state's fish and wildlife;
> (3) Wetlands provide essential habitat for waterfowl using the Pacific Flyway and for the rearing of salmon and other anadromous and resident fish;
> (4) Wetlands act as accumulation areas for sediments which retain nutrients and other pollutants that may prevent entry of the pollutants into other waterways;
> (5) Wetlands provide a valuable public service of maintaining clean water by retaining nutrients, metals and toxic materials from the water to protect water quality;
> (6) Wetlands provide significant opportunities for environmental and ecological research, public recreation and education and provide scenic diversity and aesthetic value as open space and areas of visual enjoyment;
> (7) Much of this state's original wetlands have been diked, drained, filled, dredged, ditched or otherwise altered;
> (8) There is continuing development pressure on wetlands in Oregon;

[362] ORS 196.825(3)(i); OAR 141-085-0565.

> (9) There are often conflicts between wetland protection and other resource values and uses;
> (10) Uncoordinated regulation of wetlands by local, state and federal agencies can cause confusion, frustration and unreasonable delay and uncertainty for the general public; and
> (11) Wetland management is a matter of this state's concern since benefits and impacts related to wetland resources can be international, national, regional and statewide in scope. [1989 c.837 §2]

Further, the Department must also consider the state of Oregon's policy to:

> (1) Promote the protection, conservation and best use of wetland resources, their functions and values through the integration and close coordination of statewide planning goals, local comprehensive plans and state and federal regulatory programs.[363]

For proposed removal-fill activities that occur within wetlands and tidal waters, "through its permitting and enforcement programs, the Department will seek to offset losses of the functions and values of the water resources of this state" (OAR 141-085-0506).[364]

Aligned with the federal sequencing for mitigation,[365] under OAR 141-085-0510(54), "mitigation" is defined as:

> …the reduction of adverse effects of a proposed project by considering, in the following order:
>
> (a) Avoiding the effect altogether by not taking a certain action or parts of an action;
> (b) Minimizing effects by limiting the degree or magnitude of the action and its implementation;
> (c) Rectifying the effect by repairing, rehabilitating or restoring the affected environment;
> (d) Reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action by monitoring and taking appropriate corrective measures; and
> (e) Compensating for the effect by creating, restoring, enhancing or preserving substitute functions and values for the waters of this state.[366]

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[363] ORS 196.672

[364] OAR 141-085-0506(7).

[365] See Appendix B for detailed discussion. In 1990, EPA and the Department of Army entered into a Memorandum of Agreement (MOA) to clarify the type and level of mitigation required under Section 404 regulations. 1) Avoid - Adverse impacts are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact; 2) Minimize - If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken; 3) Compensate - Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain. *See* Memorandum of Agreement Between the Department of the Army and the Environmental Protection Agency. The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines. 6 February 1990. https://www.epa.gov/cwa-404/memorandum-agreement.

[366] OAR 141-085-0510(54).

After the Department determines whether the applicant has taken all possible steps to avoid and minimize the impacts to wetlands and tidal waters, the Department must review the proposed compensatory mitigation.[367]

OAR 141-085-0680 establishes the principal objectives of Compensatory Wetland and Tidal Waters Mitigation ("CWM") to:

> (a) Replace functions and values lost at the removal-fill site;
> (b) Provide local replacement for locally important functions and values, where appropriate;
> (c) Enhance, restore, create or preserve wetlands or tidal areas that are self-sustaining and minimize long-term maintenance needs;
> (d) Ensure the siting of CWM in ecologically suitable locations considering: local watershed needs and priorities; appropriate landscape position for the wetland types, functions and values sought; connectivity to other habitats and protected resources; and the absence of contaminants or conflicting adjacent land uses that would compromise wetland functions; and
> (e) Minimize temporal loss of wetlands and tidal waters and their functions and values.
> (b) Applicants must demonstrate how the selected method of CWM (i.e., mitigation bank, in-lieu fee mitigation, advance mitigation, permittee-responsible mitigation and payment in-lieu mitigation) addresses the principal objectives.[368]

The applicants are not in compliance with these requirements and therefore, the Department must deny the permit. The application does not comply with the mitigation sequencing required by the Department, as well as by the Environmental Protection Agency ("EPA") and the Corps. Moreover, the proposed mitigation fails to avoid adverse impacts, practical steps were not taken to minimize the adverse impacts, and the appropriate compensatory mitigation was not selected.

A. Mitigation Sequencing

The Department must deny the permit because the applicants have not thoroughly demonstrated that adverse impacts have been avoided and that practicable alternatives have been selected (*See* Chapter 7). As discussed in detail in Appendix B. Clean Water Act 404 Comments, the applicants have further failed to demonstrate compliance with federal mitigation requirements. The applicants have failed to comprehensively demonstrate that there are no other, less damaging alternatives, such as those that do not damage special aquatic sites, including but not limited to wetlands, mud flats, vegetated shallows, and riffle and pool systems. Further, the applicants have failed to demonstrate that the proposed removal-fill activities would have less adverse impacts than the alternatives. Therefore, absent additional information provided by the applicants, particularly regarding direct, indirect, and cumulative impacts to special areas of concern, including but not limited to dunes, bogs or fens, mature forested wetlands, vernal pools, known

[367] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf Chapter 8, p. 139.

[368] OAR 141-085-0680(2).

use by any listed species, or documented high natural resource value, the Department must deny the permit.[369]

B. Off-Site, Out-of-Kind Compensatory Wetland Mitigation

In addition to the applicants' failure to demonstrate avoidance of adverse impacts and selection of practicable alternatives, the applicants have also failed to propose adequate compensatory mitigation. Specifically, the applicants propose to mitigate the impacts of the 229-mile pipeline and the terminal at two sites in Coos Bay. In the Compensatory Wetland Mitigation Plan, the applicants state:

> Pipeline impacts to wetlands will consist of several relatively small, individual impacts spread over a large geographic area, and ***therefore it was deemed impracticable to conduct wetland mitigation at multiple sites in the various watersheds the Pipeline crosses.*** Instead, wetland mitigation for the Pipeline emphasized consolidating mitigation in a single location that would have a high likelihood of success. Therefore, Pipeline mitigation is being incorporated into the same location as much of the LNG Terminal wetland mitigation, which will occur at the Kentuck Project site in Coos Bay, Oregon.[370]

In the application to the Department, the applicants have proposed both off-site and out-of-kind mitigation for the identified permanent impacts to wetlands and tidal waters. The Department should deny the permit for the project because the off-site and out-of-kind mitigation proposed is a less ecologically preferable method than a mitigation strategy that utilizes on-site and in-kind mitigation.

1. Off-Site Compensatory Wetland Mitigation

Compensatory wetland mitigation can be considered either "on-site" or "off-site." According to federal regulations, on-site mitigation is when the mitigation area is either located on the same parcel of land, or contiguous to, the impact site.[371] According to DSL's removal-fill guide, DSL interprets "off-site" to mean "a location that is not within the tax lot(s) of the proposed removal-fill activity or within tax lots adjacent to the removal-fill activity tax lot(s)."[372] Off-site mitigation must adhere to the following selection guidance:

- The off-site mitigation area ***must be located, at a minimum, within the 4th field HUC*** (hydrologic unit code) ***in which the removal-fill site is located***.
- DSL may direct applicants to more localized (e.g., 5th field HUC or smaller watershed) mitigation opportunities when warranted as a result of: application of the principal objectives for CWM; impact site functional assessment that identifies wetland service(s) of high function and value; input from public review process; or a

[369] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf Chapter 8, p. 8-3.
[370] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. Compensatory Wetland Mitigation Plan. P. 1. P. 1085.
[371] *Id.* § 332.2.
[372] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf Chapter 8. P. 8-9.

> watershed management plan or other locally adopted plan that identifies wetland services critical for retention within a smaller landscape.[373]

The State's removal-fill regulations under OAR 141-085-0680 prioritize on-site mitigation, listing the following principal objectives of Compensatory Wetland Mitigation to:

> (a) Replace functions and values lost ***at the removal-fill site;***
> (b) ***Provide local replacement*** for locally important functions and values, where appropriate…[374]

The DSL removal-fill guide provides further clarity by stating that providing local replacement for locally important functions and values is "considered and documented by showing ***how on- or near-site mitigation opportunities have been maximized*** when locally important wetland functions are anticipated to be lost at the impact site."[375]

In the current Compensatory Mitigation Plan, the applicants propose off-site mitigation at the Kentuck Project for removal-fill impacts all along the pipeline route. It is clear from the existing regulations, statute, and policy guidance that preference and priority is given to on-site mitigation rather than off-site mitigation. The applicants bear the burden of proof to demonstrate that on-site mitigation is not practicable.

Not only is the mitigation proposed off-site, but it is also outside the 4th field HUC. Specifically, the Umpqua, Rogue, and Klamath 4th field HUCs are far outside the 4th field HUC for the Coos watershed. The DSL removal-fill guide emphasizes the importance, even for linear projects like a pipeline, of restricting mitigation to at least the 4th field HUC, stating:

> Linear projects such as pipelines, roads, power lines, etc. that have permanent wetland impacts in multiple watersheds present a challenge for CWM… DSL offers the following additional guidance when planning CWM for linear projects in multiple watersheds:
> - Any proposed permanent impacts to "special wetlands" (as defined in Step 1) are subject to the standard CWM requirements.
> - For all other proposed permanent impact to wetlands, ***CWM may be combined at the 4th field HUC level*** with the mitigation requirement interpreted to mean replacement of the predominant wetland condition being impacted in that watershed.[376]

The applicants bear the burden of proof to demonstrate that on-site mitigation is not practicable, which they have failed to meet. OAR 141-085-0565(5). Absent a proposal from the applicants for that is, at the minimum, combined at the 4th field HUC level, the Department cannot determine that the applicants have provided all practicable mitigation, and therefore must deny the permit.

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[373] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf. Chapter 8. P. 8-9.
[374] OAR 141-085-0680. Emphasis added.
[375] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-6. Emphasis added.
[376] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-19. Emphasis added.

2. Out-of-Kind Compensatory Wetland Mitigation

As stated in DSL's removal-fill guide, "Generally, DSL requires 'in kind' replacement as a foundation to achieving the regulatory objective of functional replacement."[377] The guide clarifies that "in-kind" refers to the same Cowardin systems and class and HGM class and sub-class. [378] Out-of-kind mitigation may be permissible if the applicant demonstrates:

- Replacement of wetland function and values that address problems identified in a watershed management plan or water quality management plan
- Replacement of important wetland types, functions and values disproportionately lost in the region (watershed)
- Replacement of rare or uncommon plant communities appropriate to the region as identified from sources such as the Oregon Biodiversity Information Center and the Oregon Conservation Strategy
- Replacement of wetland types that are technically impracticable to replace (e.g. slope wetlands) [379]

As an example, the DSL removal-fill guide states:

> Out-of-kind mitigation must make ecological sense within the landscape proposed. For example, while a proposal to create an out-of-kind depressional wetland may address a documented critical flood storage need in the watershed, creating that wetland at the bottom of the watershed would not make ecological sense. [380]

In this case, the applicants propose out-of-kind mitigation for impacts to the identified 0.91 acres of forested and scrub-shrub wetland converted to emergent wetland with the Kentuck Project Site. The Kentuck Project Site will involve constructing levees to dike historical tide lands to allow for reconnection to the estuary. This mitigation component will cover 91.46 acres and, according to the applicants, will result in tide channels, mudflats, salt marsh, and freshwater wetland communities. At the northeast end of the former golf course, the applicants also propose to reconnect the freshwater floodplain to Kentuck Creek covering 9.14 acres. The mitigation proposed at the Kentuck Project site will itself require 5.47 acres of impacts to wetlands that must be mitigated.[381]

Permanent impacts to at least 0.91 acres of forested and scrub-shrub wetlands located along the pipeline route across eight fifth-field watersheds (HUC 10) that may include special areas of concerns, including but not limited to mature forested wetlands and known use by any listed species, are not likely to be adequately mitigated by the off-site and out-of-kind mitigation proposed by the applicants. Specifically, the off-site and out-of-kind mitigation proposed is a less ecologically preferable method than a mitigation strategy that utilizes on-site and in-kind

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[377] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-8.
[378] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-8.
[379] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-8.
[380] Department of State Lands. A Guide to the Removal-Fill Process. December 2016. Chapter 8. P. 8-8.
[381] Department of State Lands APP0060697. 7 November 2018. https://lands.dsl.state.or.us/index.cfm?fuseaction=Comments.AppDetailLF&id=60697. Compensatory Wetland Mitigation Plan. P. 4. P. 1088.

mitigation. OAR 141-085-0510 defines "ecologically or environmentally preferable" as "compensatory mitigation that has a higher likelihood of replacing functions and values or improving water resources of this state."[382]

Further, as discussed in more detail in Appendix B. Clean Water Act 404 Comments, prioritizing on-site and in-kind mitigation is aligned with federal mitigation requirements. Mitigating impacts to small streams, forested wetlands, and within watersheds that are hundreds of miles from Coos Bay by restoring eelgrass beds and an estuarine wetland is not "of a similar type to the affected aquatic resource" for many of the proposed pipeline impacts.[383] Therefore, while the applicants claim their selected mitigation is "in-kind," the mitigation actually proposed is both off-site and out-of-kind mitigation, contrary to the Corps' guidelines under 33 CFR 332.3(e).

C. Conclusions

The applicants have failed to demonstrate are that they have fully considered a range of less environmentally damaging (and likely more environmentally beneficial) mitigation alternatives that are likely available. Moreover, the off-site and out-of-kind mitigation that they have propose raises other environmental concerns, that contaminated soil will be disposed of on the Kentuck site which would be in opposition to the long-term conservation vision and harm the estuary. Commenters urge the Department to carefully evaluate practicable alternative restoration alternatives of that location that do not involve as much fill, as well as alternatives that ensure fill is not contaminated (*See* Chapter 8 *infra*). The applicants have not provided sufficient information, have not demonstrated that adverse impacts have been avoided or minimized, and have proposed the least preferable type of mitigation Because the applicants have failed to demonstrate that they have provided all practicable mitigation to reduce the adverse effects of their proposed removal-fill, the Department must deny the permit.

Chapter 10. CONCLUSIONS

10.1 Conclusions

It is the Commenters' position that the applicants have failed to provide reasonable assurances that the project will comply with Oregon's removal-fill law and related regulations and policies for the following reasons:

- **The application is incomplete (ORS 196.825(12)(b)):** The applicants fail to provide essential information and analysis of wetland and/or water impacts in areas where the applicants have been denied access by landowners; the application does not appear to contain cross-section drawings for fill and/or removal where the pipeline crosses jurisdictional waters; the presumed obstruction hazards identified by the Federal Aviation Administration will require termination or re-design of the project; the application fails to address deficiencies identified by DEQ in the 401 Water Quality Certification Joint Permit Application; the application fails to include referenced mitigation plans; and the application fails to include the necessary contaminant studies regarding the marine slip

[382] OAR 141-085-0510

[383] 33 CFR § 332.3(e)(2). § 332.3(e)(1); 40 CFR § 230.93(e)(1).

dock and access channel area. The Department must deny the permit because the application is not complete. ORS 196.825(12)(b)). (*See* Chapter 2 *infra*).

- **The purported public need is outweighed by the loss to Oregon's waters (ORS 196.825(3)(a)):** The Department must affirmatively determine that the project would address a public need consistent with *Citizens for Resp. Devel. In the Dalles v. Walmart* 295 Or App 310 (2018). For a privately-sponsored project of this scale and complexity, the Department must consider public need in a transparent and comprehensive analysis that weighs all of the relevant impacts and alleged benefits of the project. The Department cannot find there is a predominate public need for the project because the project is unnecessary and there is no evidence of demand for it, and the public need identified by the applicants is outweighed by the loss to Oregon's waters. (*See* Chapter 3 *infra*).

- **The project is not consistent with the protection, conservation, and best use of water resources of the State (ORS 196.825(1)(a)):** The project would likely do immense damage to water quality in Oregon, and the applicants have failed to demonstrate that the project is consistent with the protection, conservation and best use of the water resources of this state. The proposed project will likely impair designated beneficial uses, threatening drinking water supplies and fish habitat. It will also likely further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation. Because the applicants have not demonstrated that the state's waters' will be protected, the Department must deny the permit because the project is not consistent with the protection and conservation of Oregon's waters under ORS 196.825(1)(a). (*See* Chapter 4 *infra*).

- **The project would interfere with navigation, fishing, and public recreation:** The Director must conduct a weighing of the public benefits of the project against interference with factors including navigation, fishing, and public recreation (See *Citizens for Resp. Devel. In the Dalles v. Walmart,* 295 Or App 310 (2018)).[384] As part of this weighing of benefits, the legislature has clearly demonstrated that it is the State's "paramount policy" to preserve Oregon waters for navigation, fishing, and public recreation. ORS 196.825(1). The applicants have failed to demonstrate that the project will not unreasonably interfere with navigation, fishing, and public recreation and, therefore, the Department must deny the permit. ORS 196.825(1)(b). (*See* Chapter 5 *infra*).

- **The applicants have failed to demonstrate independent utility (OAR 141-085-0565(3)(a)):** The project is clearly connected to the Coos Bay Channel Modification project (*See* Appendix J). The applicants would be the primary benefactors from the proposed widening and deepening of the federal navigation channel as part of the CBCM project or similar efforts to expand the navigation channel. Further, there are serious questions about the feasibility of LNG vessels transiting the federal navigation channel under the dredging currently proposed as part of this application. The applicants have failed to demonstrate in the application that the project has independent utility as required under OAR 141-085-0565(3)(a) and, therefore, the Department must deny the permit. (*See* Chapter 6 *infra).*

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[384] ORS 196.825(1)(b).

- **The applicants have failed to demonstrate a comprehensive analysis of alternatives to the project (OAR 141-085-0550(5), ORS 196.825(3)(c) and (d)):** The applicants have failed to demonstrate a comprehensive analysis of alternatives to the project, and therefore, the Department does not have the information to consider the availability of alternatives both for the project and for proposed fill sites, and to determine that the project is the practicable alternative with the least adverse impacts on the water resource, as required under Oregon law. Consequently, without the information necessary to determine whether the applicant has considered a reasonable range of alternatives, the Department must deny the removal-fill permit. (*See* Chapter 7 *infra*).

- **The project will not conform to sound policies of conservation and will likely interfere with public health and safety (ORS 196.825(3)(e)):** The applicants have failed to demonstrate compliance with the Clean Water Act, as discussed in detail in Appendix A. Clean Water Act 401 Comments and Chapter 4 *infra*. The Department must not approve the permit without consultation with NOAA Fisheries and U.S. Fish and Wildlife as required under the Endangered Species Act. Further, the applicants have failed to demonstrate compliance with state conservation policies, including but not limited to the Oregon Conservation Strategy and the Oregon Plan for Salmon and Watersheds. Additionally, the applicants have failed to demonstrate that the project will not interfere with public health and safety. Potential risks to public health and safety include natural hazards, such as floods, tsunamis, wildfires, landslides, and earthquakes identified under Statewide Planning Goal 7. The potential for high flow events that expose the pipeline or frac-outs at proposed stream crossings may result in increased risks to public health and safety. The Department should consider the airport hazard identified by the FAA and navigation safety hazards discussed in Chapter 5 *infra*. Therefore, the Department must deny the removal-fill permit. (*See* Chapter 8 *infra*).

- **The project will not conform with existing land uses (ORS 196.825(3)(g)):** The applicants have failed to demonstrate that the project conforms with existing land uses designated in applicable comprehensive plan and land use regulations. Moreover, the applicants have failed to provide the Department with the information necessary to make the determinations required by ORS 196.825(3)(g) that the applicants' proposed fill or removal is compatible with the requirements of the comprehensive plan and land use regulations for the area in which it will take place. Further, the applicants have failed to obtain land use permits for the project in Coos Bay. Because of the reasons adopted by LUBA in remanding the prior land use application are directly related to the inconsistency of the proposed dredge and fill in wetlands and in the Coos Bay estuary with the Coos Bay Estuary Management Plan, the project cannot be conditioned on a future land use approval to meet this criterion. In January 2019, the Douglas County Circuit Court Judge reversed the Douglas County extensions from December 2016 and 2017 that approved the Pacific Connector Gas Pipeline as a conditional use. Because the pipeline will require a new application for conditional use permit and utility facility necessary for public service, the applicant has not met its burden to demonstrate to the Department that the project conforms to Douglas County's acknowledged comprehensive plan and land use regulations. The applicant has failed to meet its burden of providing the Department with the information necessary to make the evaluations under ORS 196.825(3)(g); therefore, the Department must deny the permit. (*See* Chapter 9 *infra*).

- **The applicants have failed to provide all practicable mitigation to reduce adverse effects of the proposed fill or removal (ORS 196.825(3)(i)):** The Department should carefully evaluate practicable alternative restoration alternatives of that location that do not involve as much fill, as well as alternatives that ensure fill is not contaminated (*See* Chapter 8 *infra*). The applicants have not provided sufficient information, have not demonstrated that adverse impacts have been avoided or minimized, and have proposed the least preferable type of mitigation; therefore, the Department must deny the permit.

For the foregoing reasons, the Commenters urges the Department to deem the application legally and factually insufficient and deny the removal-fill permit this project.

Dated this 30th day of January, 2019.

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Rogue Riverkeeper
Ashland, OR

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Rogue Climate
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Public Comment on DSL APP0060697 (Jordan Cove Energy Project and Pacific Connector Gas Pipeline) Application for Removal-Fill Permit – January 30, 2019

Jess Wallach
Keep it in the Ground Organizer
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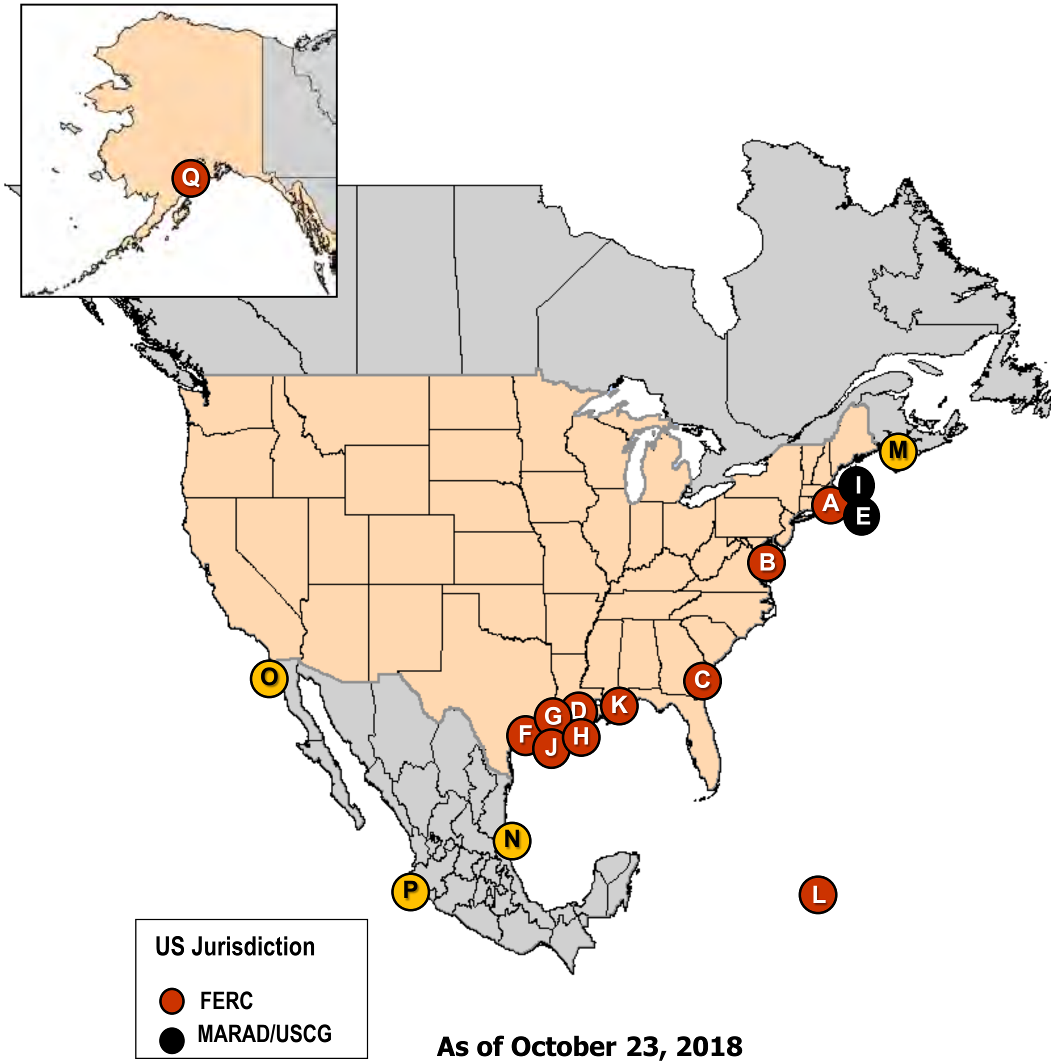
North American LNG Import/Export Terminals
Existing



As of October 23, 2018

★ **Authorized to re-export delivered LNG**

Import Terminals

U.S.

A. Everett, MA: 1.035 Bcfd (GDF SUEZ - DOMAC)
B. Cove Point, MD: 1.8 Bcfd (Dominion - Cove Point LNG)
C. Elba Island, GA: 1.6 Bcfd (El Paso - Southern LNG)
D. Lake Charles, LA: 2.1 Bcfd (Southern Union - Trunkline LNG) ★
E. Offshore Boston: 0.8 Bcfd (Excelerate Energy – Northeast Gateway)
F. Freeport, TX: 1.5 Bcfd (Cheniere/Freeport LNG Dev.)★
G. Sabine, LA: 4.0 Bcfd (Cheniere/Sabine Pass LNG)★
H. Hackberry, LA: 1.8 Bcfd (Sempra - Cameron LNG)
I. Offshore Boston, MA: 0.4 Bcfd (GDF SUEZ – Neptune LNG)
J. Sabine Pass, TX: 2.0 Bcfd (ExxonMobil – Golden Pass) (Phase I & II)
K. Pascagoula, MS: 1.5 Bcfd (El Paso/Crest/Sonangol - Gulf LNG Energy LLC)
L. Peñuelas, PR: 0.3 Bcfd (EcoElectrica)

CANADA

M. Saint John, NB: 1.0 Bcfd (Repsol/Fort Reliance - Canaport LNG)

MEXICO

N. Altamira, Tamulipas: 0.7 Bcfd (Shell/Total/Mitsui – Altamira LNG)
O. Baja California, MX: 1.0 Bcfd (Sempra – Energia Costa Azul)
P. Manzanillo, MX: 0.5 Bcfd (KMS GNL de Manzanillo)

Export Terminals

U.S.

B. Cove Point, MD: 0.82 Bcfd (Dominion–Cove Point LNG) (CP13-113)
G. Sabine, LA: 2.8 Bcfd (Cheniere/Sabine Pass LNG – Trains 1, 2, 3 & 4)
Q. Kenai, AK: 0.2 Bcfd (ConocoPhillips)

Canadian LNG Projects

Context

Much has changed in the North American liquefied natural gas (LNG) market in the past decade. Throughout the early to mid-2000's, concerns over decreasing conventional supplies of domestic natural gas led to bullish predictions about future LNG demand in North America, resulting in an investment boom to build new LNG import facilities.

Around 2008, dramatic changes in the North American natural gas market began, driven by surging U.S. unconventional natural gas production (mostly from shale gas). This changed the outlook for LNG imports. Natural gas production increased, North American prices fell significantly, and the expected need for imported LNG collapsed. In fact, LNG exports began to be contemplated.

As unconventional gas production increases, the U.S. is becoming increasingly self-sufficient with respect to natural gas. Pipeline exports from Canada to the U.S. are decreasing. With ample unconventional resources, industry has shifted its focus from importing LNG into North America to exporting LNG from North America. The export of LNG could facilitate Canadian natural gas production growth and result in significant investment, jobs and economic growth.

Canadian LNG Projects

Eighteen LNG export facilities have been proposed in Canada – 13 in British Columbia, 2 in Quebec and 3 in Nova Scotia – with a total proposed export capacity of 216 Million tons per annum (mtpa) of LNG (approximately 29 Billion cubic feet per day (Bcf/d) of natural gas). Since 2011, 24 LNG projects have been issued long-term export licenses. Canada's only operational LNG terminal (an import terminal) is Canaport LNG's regasification import terminal located in Saint John, New Brunswick.

According to a Conference Board of Canada study, which estimates the potential contributions LNG exports may make to the Canadian economy, an LNG export industry equivalent to 30 mtpa in British Columbia could add roughly $7.4 billion to Canada's annual economy over the next 30 years, and raise national employment by an annual average of 65,000 jobs. The Government of Canada is working closely with British Columbia, other provinces and industry partners to create conditions to support the development of an LNG industry in Canada.

EXISTING IMPORT TERMINAL

Project	Location
Canaport LNG	Saint John, New Brunswick

Canadian LNG Import and Proposed Export Facilities

Project	Export Licence	Export Volume Million Tons per Annum (Mtpa) - Billion Cubic Feet per day (Bcf/d)	Cost of the Project ($Billion)
13 West Coast (British Columbia) Export Terminals			
Kitimat LNG	20 Years	10 Mtpa - 1.3 Bcf/d	$15
LNG Canada	40 Years	26 Mtpa – 3.5 Bcf/d	$25-$40

Cedar LNG Project	25 Years	6.4 Mtpa – 0.8 Bcf/d	
Orca LNG	25 Years	24 Mtpa – 3.2 Bcf/d	
New Times Energy	25 Years	12 Mtpa – 1.6 Bcf/d	
Kitsault Energy Project	20 Years	20 Mtpa – 2.7 Bcf/d	
Stewart LNG Export Project	25 Years	30 Mtpa – 4.0 Bcf/d	
Triton LNG (On Hold)	25 Years	2.3 Mtpa – 0.3 Bcf/d	
Woodfibre LNG	25 Years	2.1 Mtpa – 0.3 Bcf/d	$1.6
WesPac LNG Marine Terminal	25 Years	3 Mtpa – 0.6 Bcf/d	
Discovery LNG	25 Years	20 Mtpa – 2.6 Bcf/d	
Steelhead LNG: Kwispaa LNG	25 Years	30 Mtpa – 4.3 Bcf/d	$30
Watson Island			
5 East Coast Export Terminals			
Goldboro LNG (Nova Scotia)	20 Years	10 Mtpa – 1.4 Bcf/d	$8.3
Bear Head LNG (Nova Scotia)	25 Years	12 Mtpa – 1.6 Bcf/d	$2-$8
A C LNG (Nova Scotia)	25 Years	15 Mtpa – 2.1 Bcf/d	$3
Energie Saguenay (Quebec)	25 Years	11 Mtpa – 1.6 Bcf/d	$7
Stolt LNGaz (Quebec)	25 Years	0.5 Mtpa – 0.7 Bcf/d	$0.6
Total		**216 Mtpa – 29 Bcf/d**	

Canadian Government Position

The Minister of Natural Resources Canada has stated "*The Canadian Government is taking steps to grow the Canadian economy, create good jobs and opportunities for Canadians, while protecting our environment for future generations. As the Prime Minister has emphasized, in the 21st century we must get our resources to market sustainably and responsibly. For all natural resource projects, the government is working closely with provinces and territories, Indigenous peoples, and other interested parties to ensure that the highest standards of public and environmental safety are being met, while creating new export opportunities for Canada's natural resources.*"

Regulations and Permitting

While the ongoing operation of LNG terminals generally falls under provincial regulation, most LNG terminal proposals require both federal and provincial environmental assessments and permits.

Most of the proposed LNG facilities require new pipelines or the expansion of existing pipelines. Intra-provincial pipelines are provincially regulated, while pipelines that cross a provincial or international border are federally regulated. For more information on pipelines, please see Frequently Asked Questions (FAQs) Concerning Federally-Regulated Petroleum Pipelines in Canada.

A permit from the National Energy Board (NEB), Canada's federal energy regulator, is required to export LNG from Canada. The NEB reviews export licence applications to ensure that the proposed volume of gas to be exported is surplus to Canadian requirements. Since 2011, 24 LNG projects have been issued long-term export licenses ranging between 20-40 years. More information on export licences is available on the NEB's website.

LNG Facilities and Safety Regulations

LNG facilities are classified as industrial sites and must meet all federal, provincial and municipal standards, codes and safety regulations. These regulations are constantly updated to ensure that the health, safety and security of the environment and Canadian public are protected. The Canadian Standards Association (CSA) has a specific standard for LNG production, storage and handling (CSA Standard CAN/CSA Z276-01). This standard establishes essential requirements for the design, installation and safe operation of LNG facilities.

Useful Links

These websites provide useful background information on LNG and LNG regulatory processes in Canada.

- Generation Energy
- National Energy Board
- Canadian Environmental Assessment Agency
- Major Projects Management Office
- BC Oil and Gas Commission
- LNG Projects in British Columbia
- BC LNG Alliance
- BC LNG First Nations Alliance

Date Modified:
2018-12-31

Channel Description

Coos Bay's short 15-mile channel helps ensure that inbound and outbound cargoes move rapidly and efficiently through the harbor's marine terminals to domestic and international markets. Travel time from ocean to land is only 90 minutes.

The following tables provide specific navigational information including location and channel specifications.

Entrance

Latitude 43° 22' North/Longitude 124 ° 22' West

The Coos Bay Sea Buoy is approximately 173 nautical miles/320 km south of the Columbia River, and 367 nautical miles/680 km north of the entrance to San Francisco Bay.

Time Zone

Pacific/ GMT -8h

UNCTAD Locode

US COB

NOAA Char

18587

Admiralty Chart/Pilot

3095. 3123 / NP8

47 feet/ 14.33 meters Mean Lower Low Water (MLLW)

Entrance Range D

Channel Depth

37 feet/11.28 meters MLLW

Channel Length

15.2 miles/ 24.5 kilometers

Width

- 1,150 feet/350.7 meters at the entrance mark
- Reduces to 700 feet/213.5 meters at Channel Mile 0
- Reduces through the entrance jetties to Channel Mile 1.0. From this point to the railroad bridge (see clearances below) at Channel Mile 9.2 authorized width is 300 feet/91.5 meters; authorized width from Channel Mile 9.2 through Channel Mile 15.0 is 400 feet/122.0 meters

Turning Basins

Mile 12.2 and Mile 14.6 in the upper bay

Clearances

- 197 feet/60.08 meters horizontal clearance at railroad bridge (Channel Mile 9.2)
- 149 feet/45.45 meters vertical restriction (0 tide) at McCullough Highway Bridge (U.S. 101, Channel Mile 9.5)

Tidal Ranges

- Mean 5.6 feet/1.7 meters
- Diurnal 7.3 feet/2.2 meters
- Maximum 12 feet/3.7 meters
- Tidal ebb to 3 knots

Winds & Weather

Prevailing winds from the NW

Storm events may produce winds from the SW and SE

Port Scholarship Application Deadline
Apr 1, 2019

Last Day to Submit Names for the Charleston Memorial
Apr 1, 2019

Port Commission Meeting
Apr 15, 2019

Charleston Oyster Feed
Apr 27, 2019

Oregon's Seaport

Welcome to the Oregon International Port of Coos Bay, where maritime and rail commerce thrives amidst the beauty of Oregon's South Coast. Every year, more than 1.5 million tons of cargo move through the Coos Bay harbor and over 10,000 tons of seafood are landed at the Charleston Marina.

Oregon's Seaport

WHAT WE DO

The Port

SHORT TRANSIT TIME

Deep-water terminals that are only a 90 minute transit from the open water ensuring efficient movement of cargo.

READY TO DEVELOP

Over 500 acres of industrial waterfront sites with access to the Coos Bay rail line and Coos Bay Harbor.

The Port >

Coos Bay Rail Line

PORT OWNED & OPERATED RAILROAD

134-mile rail line from Coquille to Eugene.

CONVENIENT ACCESS

Railroad access is available ensuring quick and efficient movement of cargo.

The Rail Line ›

Charleston Marina

WORKING WATERFRONT

Port owned facilities supporting both our commercial fishing fleets and recreational users of the marina and shipyard.

AVAILABLE PROPERTY

Ready to lease property in the heart of the Charleston Marina.

The Marina >

PORT NEWS

NEWS UPDATES AND PRESS RELEASES

PORT PERSPECTIVE

Submit Names for Charleston Memorial

This year's deadline to have names engraved on the Charleston Fishermen's Memorial at Charleston Marina is April 1st. Names may be engraved after review by members of the memorial committee. To add a name to the memorial, the person must have commercially fished out of the Charleston or Coos Bay area for a minimum of three years. Applications to add names to the memorial are available at the Charleston Marina Office, 63534 Kingfisher Road.

Read More →

Feb 22, 2019

OIPCB Launches Scholarship and Community Giving Program

The Port of Coos Bay will award two $500 scholarships to local graduating seniors who are pursuing educational advancement at an Oregon trade school, community college, or university. The Port has also released a new community giving process.

Read More →

Feb 15, 2019

How to Catch and Eat Oregon Dungeness Crab

Oregon Dungeness Crab is the biggest commercial fishery on the Southern Oregon Coast and is a unique commodity. It's economic impact on the South Coast and the various ways individuals and families can enjoy this Oregon delicacy cannot be understated. You can get a taste of this delicacy at the 35th Annual Charleston Crab Feed coming up on February 9th from 11 AM to 3 PM at the North Bend Community Center where the Charleston Merchants will be serving up fresh Oregon Dungeness Crab meals, homemade desserts and have great prize drawings!

Read More →

Jan 31, 2019

Three Ways to Use Social Media Data and Analytics

Many of us have heard of the terms "big data" and "data analytics" in the main stream media over the past decade. These terms may seem synonymous and although related, they do not have the same meaning. Big data is defined as the huge volume of data too large and complex for processing by traditional methods. Data analysis is taking extremely large amounts of data points (big data) with the purpose of drawing conclusions from that information. One area the Port interacts with big data and data analytics is through our social media channels. Thus, this article will outline three simple ways to use these social media analytics.

Read More →

Jan 24, 2019

UPCOMING EVENTS

March 2019

SU	MO	TU	WE	TH	FR	SA
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18 **6:30p** Port Commission Meeting	19 **1p** Coos Bay Harbor Safety Committee Meeting	20	21 **7:30a** CCURA Meeting	22	23

SU	MO	TU	WE	TH	FR	SA
24	25	26	27	28	29	30
31						

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

April 10, 2019

RL600/60697
JORDAN COVE ENERGY PROJECT, L.P.
ATTN DERIK VOWELS
111 SW 5TH AVE, STE. 1100
PORTLAND OR 97204

Re: DSL Removal-Fill Permit Application No. 60697-RF
Jordan Cove Energy Project, Multiple Counties

Dear Mr. Vowels:

The Oregon Department of State Lands' (Department) 60-day public review period has closed for the above-referenced permit application. Public comments submitted and other investigative work by the Department have raised various issues for which the Department needs additional information.

Overview of Decision Process and Need for Additional Information

Specific applicable portions of the Department's Oregon Administrative Rules (OAR) in the narrative below in order to help Jordan Cove Energy Project, L.P. (Jordan Cove) understand the Department's permit decision process and why the additional information is needed.

OAR 141-085-0550 addresses the level of documentation used by the Department to make decisions:

- Section (4) provides that "The applicant is responsible for providing sufficient detail in the application to enable the Department to render the necessary determinations and decisions. The level of documentation may vary depending upon the degree of adverse impacts, level of public interest and other factors that increase the complexity of the project."
- Section (7) provides that "The Department may request additional information necessary to make an informed decision on whether or not to issue the authorization."

The Department analyzes a proposed project using the factors and determination criteria set forth in Oregon Revised Statute (ORS) 196.825 and OAR 141-085-0565. The applicant bears the burden of providing the Department with all information necessary for the Department to consider the factors and make the determinations.

- Section (1) of the OAR provides that "The Department will evaluate the information provided in the application, conduct its own investigation, and consider the comments submitted during the public review process to determine whether or not to issue an individual removal-fill permit."

- Section (2) of the OAR provides that "The Department may consider only standards and criteria in effect on the date the Department receives the complete application or renewal request." This application was deemed complete for public review and comment on

December 6, 2018. OAR 141 Division 85 contains the standards and criteria that will be considered throughout the review of this application.

- Section (3) of the OAR provides that "The Department will issue a permit if it determines the project described in the application:
  (a) Has independent utility;
  (b) Is consistent with the protection, conservation and best use of the water resources of this state as specified in ORS 196.600 to 196.990, and
  (c) Would not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing and public recreation."

- Section (4) of the OAR provides that "In determining whether to issue a permit, the Department will consider all of the following:
  (a) The public need for the proposed fill or removal and the social, economic or other public benefits likely to result from the proposed fill or removal. When the applicant for a permit is a public body, the Department may accept and rely upon the public body's findings as to local public need and local public benefit;
  (b) The economic cost to the public if the proposed fill or removal is not accomplished;
  (c) The availability of alternatives to the project for which the fill or removal is proposed;
  (d) The availability of alternative sites for the proposed fill or removal;
  (e) Whether the proposed fill or removal conforms to sound policies of conservation and would not interfere with public health and safety;
  (f) Whether the proposed fill or removal is in conformance with existing public uses of the waters and with uses designated for adjacent land in an acknowledged comprehensive plan and land use regulations;
  (g) Whether the proposed fill or removal is compatible with the acknowledged comprehensive plan and land use regulations for the area where the proposed fill or removal is to take place or can be conditioned on a future local approval to meet this criterion;
  (h) Whether the proposed fill or removal is for stream bank protection; and
  (i) Whether the applicant has provided all practicable mitigation to reduce the adverse effects of the proposed fill or removal in the manner set forth in ORS 196.600."

- Section (5) of the OAR provides that "The Department will issue a permit only upon the Department's determination that a fill or removal project is consistent with the protection, conservation and best use of the water resources of this state and would not unreasonably interfere with the preservation of the use of the waters of this state for navigation, fishing and public recreation. The Department will analyze a proposed project using the criteria set forth in the determinations and considerations in sections (3) and (4) above (OAR 141-085-0565). The applicant bears the burden of providing the Department with all information necessary to make this determination."

Summary of Substantive Public Comments

DSL has reviewed all the comments received concerning Jordan Cove application for a removal-fill permit. The Department's summary of the substantive comments (below) is not exhaustive. Jordan Cove should review and address the substantive comments that relate directly to the proposed removal and fill or that relate to the potential impacts of the proposed removal and fill. All substantive comments received are provided here.

Jordan Cove failed to demonstrate the project is in the public interest, Jordan Cove failed to demonstrate a public need. (ORS 196.825(3)(a)): Comments received on this topic stressed that the Department must affirmatively determine that the project would address a public need consistent with *Citizens for Resp. Devel. In the Dalles v. Walmart* 295 Or App 310 (2018). With a privately-sponsored project of this scale and complexity, the Department must consider public need in a transparent and comprehensive analysis that weighs all the relevant impacts and alleged benefits of the project.

Jordan Cove failed to demonstrate the project is consistent with the protection, conservation, and best use of Oregon's waters. (ORS 196.825(1)(a)): Commenters are concerned that the project would likely do unnecessary harm and damage to water quality in Oregon and suggest the applicants have failed to demonstrate that the project is consistent with the protection, conservation and best use of the water resources of this state. The proposed project will likely impair designated beneficial uses, threatening drinking water supplies and fish habitat. It will also likely further degrade stream segments in which water quality is already impaired for temperature, dissolved oxygen, pH, turbidity, mercury, and sedimentation.

The project does not conform to sound policies of conservation and will likely interfere with public health and safety (ORS 196.825(3)(e)): The Department received comments with concerns that the applicant has failed to demonstrate that the project will not interfere with public health and safety. Potential risks to public health and safety include natural hazards, such as floods, tsunamis, wildfires, landslides, and earthquakes, identified under Statewide Planning Goal 7. The potential for high-flow events that expose the pipeline or inadvertent drilling fluid releases (frac-outs) during construction at proposed stream crossings may result in increased risks to public health and safety. Failure at any of the major waterbody crossings claiming avoidance by using either Hydraulic Directional Drill (HDD) method, conventional bore or direct pipe method would have detrimental impacts to waters of the state and potentially contaminate state waters. Several risks to public health and safety were raised during public review that need to be addressed by the applicant, such as the list provided below. Please address these adverse impacts of this project:

- An accidental explosion of a fully loaded Liquefied Natural Gas (LNG) ship or at the terminal, including the worst-case scenario for the immediate area;
- How are the Federal Aviation Administration (FAA) presumed hazard determinations being addressed by Jordan Cove;
- Tsunami risks increasing from the project dredging activities;
- Improper facility siting, Society for International Gas Tanker and Terminal Operators (SIGTTO) standards not followed (i.e., on the outside bend of the navigation channel, near other terminal users, near population centers);
- Impacts on municipal drinking water sources, private wells, irrigation sources and agricultural uses;
- Increased wildfire risks as construction season coincides with the in-water work period which also coincides with fire season; and
- Impacts of massive scale clearing and grubbing with pipeline installation on water quality, land stability, erosion and turbidity of doing these activities during the rainy winter seasons, all water flows downhill.

The project would interfere with navigation, fishing, and public recreation: Comments received on this topic addressed that the Department must conduct a weighing of the public benefits of the project against interference with factors including navigation, fishing, and public recreation (See *Citizens for Resp. Devel. In the Dalles v. Walmart,* 295 Or App 310 (2018)). As part of this weighing of public benefits, the Oregon Legislature has clearly demonstrated that it is the State's "paramount policy" to preserve Oregon waters for navigation, fishing, and public recreation. ORS 196.825(1).

The comments indicate that the applicant has failed to demonstrate that the project will not unreasonably interfere with navigation, fishing, and public recreation in this application. Potential conflicts include but are not limited to:

- Crabbing, fishing and all types of recreational uses in and around Coos Bay;
- Safe bar passage issues/LNG tanker bar crossings only at high tides conflict with recreational fishers and the commercial fleets that also cross the bar at high slack tides for safety reasons should be evaluated;
- Exclusion zones required around LNG tankers while the LNG tanker is in transit will impact the recreating public crabbing via the ring method. This is reportedly the most common recreational crabbing method in Coos Bay. High slack tides are optimum for crabbing and if an LNG tanker must transit only at high tides, given the security and exclusion zones, there is interference with existing recreational uses within Coos Bay; and
- Impacts on the commercial fisheries uses of Coos Bay and adjacent ocean resources.

Jordan Cove failed to demonstrate independent utility (OAR 141-085-0565(3)(a)): Commenters assert that the project is connected to the Coos Bay Channel Modification (CBCM) Project. The applicant would be the primary benefactor from the proposed widening and deepening of the federal navigation channel as part of the CBCM project or similar efforts to expand the navigation channel. Further, there are serious questions about the feasibility of LNG vessels transiting the federal navigation channel under the dredging currently proposed as part of this application. Oregon Department of Fish and Wildlife (ODFW) contends that the Jordan Cove Energy Project and Port of Coos Bay Channel Modification project are connected actions and should be evaluated that way. The applicant has failed to demonstrate that the project has independent utility as required under OAR 141-085-0565(3)(a)**.**

Jordan Cove failed to demonstrate a comprehensive analysis of alternatives to the project (OAR 141-085-0550(5), ORS 196.825(3)(c) and (d)): Commenters outline that the applicant has failed to demonstrate a comprehensive analysis of alternatives to the project, and therefore, the Department does not have the information to consider the availability of alternatives both for the project and for proposed fill and removal sites. Also, the Department was not able to determine that the project is the practicable alternative with the least adverse impacts on state water resources. Comments detail that through a flawed, overly-narrow purpose and need statement, the resulting biased alternative analysis prevents the Department from considering a reasonable range of alternatives to the project.

Navigation Reliability Improvements (NRI) Dredging: Comments indicate that there is no documented need for the 590,000 cubic yards to dredge the four corners outside the existing Federal Navigation Channel (FNC). Comments also state that Jordan Cove can export 99.5% of the anticipated annual output of the LNG facility (7.8 million tons) without the NRI dredging, which leaves the question, is there a 'need' to excavate 590,000 cubic yards of material for a nominal gain in transport capacity to allow Jordan Cove to travel at higher wind speeds than the current channel configuration could safely allow. Comments further suggest this minor economic benefit to only Jordan Cove does not equate to a 'need' to impact trust resources of the State of Oregon. The adverse impacts are understated or not explained in terms of the salinity impacts and hydrologic changes that will result from widening the existing navigational channel. The potential tsunami run-up impacts are not well explained either, nor are any hydrodynamic changes that would likely result or any analysis on potential increases to bank erosion adjacent to the proposed NRI channel improvements. The need should be substantiated, and a robust alternatives analysis prepared to address these issues and justify the dimensions and depths needed with supporting documentation in the form of simulation modelling showing that the current channel is insufficient for Jordan Cove.

Pile Dike-Rock Apron: Comments raised concerns that no alternatives were presented regarding the proposed 6,500 cubic yards (cy) of rock riprap proposed to protect the existing pile dike against erosion from the slip and access channel location, depth and dimensions. With no alternatives presented on the dimensions or design alignment of the slip and access channel, no reasonable range of alternatives can be considered. There is no discussion on impact avoidance, minimization, and/or mitigation to offset any adverse impacts to waters of the state. Please address:

- Why 6,500 cy?
- Why not more?
- Why not less?
- Why any at all?

Dredged Material Disposal (DMD) transfer of materials to APCO 1 & 2 from the NRI dredging: Comments received raised the following questions, please answer:

- How will the rock be excavated and transferred to the DMD site? Vague alternatives analysis presented, leaves more questions than answers.
- What types of equipment will be used to excavate the NRI's?
- Which works best in what type of materials (bedrock, rock, sand or silts), which has least environmental impacts depending on the material encountered?
- How will the rock be dredged? Different equipment?
- Can rock be transferred to a DMD site via slurry line as the application states? Inadequate discussion on alternatives, leaving the details to the contractor is insufficient.

Slip and Access Channel: Comments raised the concern of a lack of discernable alternative analysis for the precise dimensions and location of the slip and access channel. The slip and access channel are designed for a ship class of 217,000 cubic meters, yet the Coast Guard Waterway Suitability Analysis recommends allowing ships no larger than 148,000 cubic meters. Please answer the following questions and concerns:

- Why design a slip to accommodate a ship class that is not currently allowed nor physically capable of navigating into Coos Bay given the constraints of the Coos Bay bar and currently authorized limitations of the federal navigation channel?
- The application claims the stated depth needed for the slip and access channel is to maintain 'underkeel clearance' while an LNG ship is at dock. This is misleading as an LNG ship can only safely navigate the current channel at a high tide advantage, above 6ft tides to get through the channel to the slip before the tide recedes which would strand the vessel if it is not safely docked in the slip. Any LNG ship, 148,000 cubic meter class ship, would not be able to transit Coos Bay except periods of high tide, there would be no way for a ship to exit the slip at any lower tidal elevation as the ships draft would exceed navigational depth of the channel which could pose huge safety concern in the event of a tsunami.
- Water quality concerns from the 'sump effect' of having the proposed 45ft Mean Low Low Water (MLLW) deep slip and access adjacent to and on the outside bend of the 37ft MLLW navigation channel need to be addressed.
- What are the sedimentation impacts, salinity impacts, temperature and dissolved oxygen impacts that would likely result from a deep-water pocket created for the slip?

Questions were raised over whether the access channel dimensions can change, as no alternatives discussion exists, it is just one option, take it or leave it. Any reduction in the size of the slip or access channel would reduce water impacts and reduce the required mitigation. Any reduction in size or depth would also reduce adverse impacts associated with this project. The need should be substantiated, and a robust alternatives analysis prepared to address these issues.

DMD Alternatives: Commenters would also like to know why Jordan Cove will move 300,000 cubic yards of sand to the Kentuck site when other alternatives exist that would have less impact than transferring a line all the way across Coos Bay to Kentuck slough. The log spiral bay could accommodate more than 300,000 cubic yards, it is much closer to the dredge sites and would have significantly less impacts than the Kentuck proposal, yet it is dismissed. Please explain more thoroughly the alternatives that were considered and why those alternatives were dismissed within the greater DMD plan.

APCO DMD Site: Commenters have concerns over the capacity of the APCO site. Does this site have the capacity for the initial dredging and maintenance dredging over the lifespan of this project? Commenters also have site stabilization and liquefaction concerns over a mountain of sand piled up adjacent to Coos Bay in an earthquake and tsunami zone. There is safety, engineering, project feasibility, and water resources concerns that must all be addressed.

The project does not conform with existing land use laws (ORS 196.825(3)(g)): Commenters indicate that the applicant has failed to demonstrate that the project conforms with existing land uses designated in the applicable comprehensive plan and land use regulations. They also mentioned that the applicant has failed to provide the Department with the information necessary to make the determinations required by ORS 196.825(3)(g) that the applicant's proposed fill or removal is compatible with the requirements of the comprehensive plan and land use regulations for the area in which it will take place. Current, up-to-date Land Use Consistency Statements are required for all parts of this project in all jurisdictions with an explanation of the current status, pending or resolved local issues, processes, or appeals status.

Further, commenters are concerned the applicant has failed to obtain land use permits for the project in Coos Bay. Because of the reasons adopted by the Land Use Board of Appeals (LUBA) in remanding the prior land use application are directly related to the inconsistency of the proposed dredge and fill in wetlands and in the Coos Bay Estuary with the Coos Bay Estuary Management Plan, the project cannot be conditioned on a future land use approval to meet this criterion.

In January 2019, the Douglas County Circuit Court Judge reversed the Douglas County extensions from December 2016 and 2017 that approved the Pacific Connector Gas Pipeline as a conditional use. Because the pipeline will require a new application for conditional use permit and utility facility necessary for public service, the applicant has not met its burden to demonstrate to the Department that the project conforms to Douglas County's acknowledged comprehensive plan and land use regulations.

The comments received indicate that the applicant has not met their burden to demonstrate to the Department that the project conforms to Jackson County's acknowledged comprehensive plan and land use regulations.

Insufficient Mitigation-Kentuck Compensatory Wetland Mitigation (CWM) Site: Concerns were raised about the lack of a discernable alternative analysis on many components of the Kentuck mitigation proposal to see what alternatives were considered and on what basis were rejected. The mitigation proposal itself is the largest wetland impact in this project proposal. Please answer the following questions:

- Why import 300,000 cubic yards of sand?
- Why not more or less materials?
- Why not use more suitable materials native to the area?
- Why sand vs. native cohesive clay soils for use as fill?
- What are the alternatives to move the sand to the site?
- Why were upland routes dismissed without reasonable justification?
    - Trucking the materials is a viable option with no impact to waters of the state.
- What other mitigation sites or options have you looked at addressing the following concern?
- The Kentuck site is already a freshwater wetland and has increased its functions in the past 10 years to the point that the current mitigation strategy might be inappropriate to offset functional losses. Please answer these questions as well:
    - Why is the dike so big, long, and wide?
    - Why is there no justification given to support dimensions of the proposed dike?
    - Why are there no alternatives are presented to evaluate the adverse effects of the dike and mitigation strategy?
    - Address the landowner concerns regarding the Kentuck Mitigation proposal and the Saltwater Intrusion impacts on adjacent lands.
    - Further address the concerns of flooding and impacting agricultural activities and existing farm uses.
    - Why is the pipeline proposed under a proposed mitigation site?
    - Where is the avoidance and/or impact minimization, especially given that each impact reduces the overall size of the mitigation project, therefore diminishing its potential function and values? Concerns were raised about the suitability of having a pipeline under the mitigation site that is supposed to be protected in perpetuity.

Insufficient Mitigation-Eelgrass CWM Site: Comments raised concerns about the lack of a discernable alternative analysis on many components of the eelgrass mitigation proposal. The CWM citing was found not to be in-kind or in proximity mitigation which would replace similar lost functions and values of the impact site. Disturbing existing mudflats and adjacent eelgrass beds is likely to have additional adverse impacts from construction. The proposal is inconsistent with ODFW Habitat Mitigation Policy. Alternatives should be considered, in consultation with ODFW, that favor impact avoidance to adjacent high value habitats (mudflats and adjacent eelgrass beds) and seek out appropriate in-kind, in proximity mitigation. The project impacts are to eelgrass beds adjacent to deep water habitats, while the proposed mitigation is near the airport runway and in shallow water habitats a considerable distance from deep water habitats. There are likely unforeseen FAA issues with the proximity of the mitigation site to the airport runway, this should be explored in detail with the FAA. The location of the eelgrass CWM site is situated in a portion of the Coos Bay Estuary classified as “52-Natural Aquatic” in the Coos Bay Estuary Management Plan where dredging is not allowed. This issue needs to be clarified by Coos County with respect to land use consistency.

Insufficient Mitigation-Stream Impacts: Comments assert that the project will impact many waterways’ beneficial uses, water quantity and quality will be further impaired from construction of this project. Potential impacts include but are not limited to increased water temperatures, dissolved water oxygen, turbidity, etc. from riparian shade removal in 303(d) listed waterways and other waters. Disruption of fluvial processes, increased erosion and downstream sedimentation and turbidity from construction activities, impacts on spawning and rearing habitats, impacts on fish migration and passage.

Many people have raised concerns that Federal Energy Regulatory Commission (FERC) procedures are vague and will not provide assurances that water quality/quantity standards will be protected. Stream risk analysis, alternative ways to avoid and minimize impacts for each water crossing are not possible on properties with denied access. How are any reasonable alternatives considered if access is denied and unattainable without a FERC Order granting condemnation authority? Alternatives are not fully explored or explained to avoid and minimize impacts at every opportunity.

ODFW Habitat Mitigation Policy Inconsistencies: Commenters expressed that the applicants should work with ODFW to appropriately categorize each wetland and waterway impact from start to end along the proposed pipeline route. Once the appropriate habitat category has been assigned in agreement with ODFW, appropriate mitigation can be discussed based on resources impacted. Currently, temporary impacts mitigation is insufficient and inconsistent with the ODFW Habitat Mitigation Policy for streams and wetlands crossed by the pipeline.

Fish Passage-Coastal Zone Management Act (CZMA) and Non-CZMA Streams:
Comments expressed concern that fish passage has not been addressed by the applicant. According to ODFW, applications for fish passage have not been submitted and this is critical to the Department for impact analysis determinations yet to be made. Fish passage applications may need to include a contingency method for crossing each waterway. For instance, if any of the HDD's fail, what is next, certainly not open trench, wet cut methods that are not currently being evaluated as alternative crossing methods under consideration.

Wetland Delineations/Concurrence: Public comments point out that some of the wetland delineation reports have either expired or are about to expire, see C4, C5, C9 and C10 of the application.

Additional Information Requested by the Department

Delineation-status for JCEP/PCGP: To allow adequate review time of the wetland delineation report in order to meet the decision deadline, please submit the following data requests by the dates requested.

1) By April 17, 2019: GIS shape files of the new routes and re-routes so DSL can finish the initial review and provide any additional review comments in time to address this summer (involving additional field work, if needed);
2) End of April 2019: Responses to the initial delineation review questions and delineation maps (prototype subset of each map series for completeness review);
3) June 7, 2019: Responses to GIS review questions;
4) Last week of June 2019: Site visits (possible); and
5) August 9, 2019: Everything due: responses to all remaining requests for information based on site visits, GIS review responses and follow-up review requests, all final delineation maps, and all supporting materials for the concurrence.

Bonding Requirements: Prior to any permit issuance, a performance bond should be negotiated and put in place for the Eelgrass and Kentuck CWM projects. Bonds are required for non-public agencies that have permanent impacts greater than 0.2 acre. Proposed financial instruments need to demonstrate consistency with OAR 141-085-0700.

Administrative Protections Required for Eelgrass and Kentuck CWM projects: Administrative protection instruments need to demonstrate consistency with OAR 141-085-0695.

Oregon Department of State Lands, Land Management Issues: Any proposed uses or activities on, over, or under state owned lands requires Department proprietary authorizations.

Extensive Comments-Detailed response requested. The Department requests that the applicant respond to all substantive comments. Certain commenters provided extensive, detailed comments. The Department would like to call these comments to the applicant's attention to ensure that the applicant has time to sufficiently address them.

- Mike Graybill;
- Jan Hodder;
- Rich Nawa, KS Wild;
- Stacey Detwiler, Rogue Riverkeepers;
- Jared Margolis, Center for Biological Diversity;
- Jodi McCaffree, Citizens Against LNG;
- Walsh and Weathers, League of Womens Voters;
- Wim De Vriend;
- The Klamath Tribes, Dawn Winalski;
- Tonia Moro, Atty for McLaughlin, Deb Evans and Ron Schaaf;
- Regna Merritt, Oregon Physicians for Societal Responsibility;
- Oregon Women's Land Trust;
- Sarah Reif, ODFW;
- Margaret Corvi, CTLUSI;
- Deb Evans and Ron Schaaf;
- Maya Watts; and
- Steve Miller.

All comments received during the public review of this application were previously provided to Jordan Cove by the Department via Dropbox and should be responded to as well. Please submit any responses to the Department and copy the commenting party if contact information was provided.

The Department asks that any responses be submitted in writing within 25 days of the date of this letter to allow adequate time for review prior to making a permit decision. If Jordan Cove wishes to provide a response that will take more than 25 days to prepare, please inform me as soon as possible of the anticipated submittal date.

The Department will make a permit decision on your application by September 20, 2019, unless Jordan Cove requests to extend that deadline. Please call me at (503) 986-5282 if you have any questions.

Sincerely,

Robert Lobdell
Aquatic Resource Coordinator
Aquatic Resource Management

RL:jar:amf