July 4, 2019

Kimberly D. Bose
Secretary Federal Energy Regulatory Commission
888 First Street N.E. Washington, D.C. 20426

Re: OEP/DG2E/Gas Branch 3, Jordan Cove Energy Project, L.P. Docket No. CP17-495-000
Pacific Connector Gas Pipeline, LP Docket No. CP17-494-000 FERC/EIS-0292D

Dear Ms. Bose:

We write representing the League of Women Voters of Coos County (LWVCC), LWV of Umpqua Valley (LWVUV), LWV of Rogue Valley (LWVRV), and LWV of Klamath County (LWVKC). We are grassroots nonpartisan, political organizations operating in the four counties in Oregon that would be directly affected by the construction and operations of the proposed Jordan Cove Liquefied Natural Gas (JCLNG) and Pacific Connector Gas Pipeline (PCGP), commonly referred to collectively as the Jordan Cove Energy Project (JCEP). Our detailed review of the Draft Environmental Impact Statement (DEIS) for this project shows that **the projects are in direct conflict with many of the state and national League of Women Voters positions**. These positions are based on study documents and consensus evaluations regarding natural resources, water quality and air quantity, climate change, offshore and coastal management, land use, public health and safety, energy conservation, and seismic risks.

Since the 1950s, the League has been in the forefront of efforts to protect air, land, and water resources. The League of Women Voters of the United States (LWVUS) "believes that natural resources should be managed as interrelated parts of life-supporting ecosystems. Resources should be conserved and protected to assure their future availability. Pollution of these resources should be controlled in order to preserve the physical, chemical and biological integrity of ecosystems and to protect public health." The League of Women Voters of Oregon (LWVOR) " . . . opposes degradation of all of Oregon's surface and ground water. . . ." and declares that climate change is the greatest environmental challenge of our generation. The following resolution passed almost unanimously at the 2018 National LWV Convention: "The League of Women Voters supports a set of climate assessment criteria that ensures that energy policies align with current climate science. *These criteria require that the latest climate science be used to evaluate proposed energy policies and major projects* [emphasis added] in light of the globally-agreed-upon goal of limiting global warming to 1.5 degrees C, informed by the successful spirit of global cooperation as affirmed in the UN COP 21 Paris agreement." Finally, at the 2019 LWVOR Convention, a resolution declaring a "climate emergency" passed unanimously. We, as local Leagues, are part of the national and state LWV. Based on these positions and our understanding of the likely impacts of the proposed JCEP on critical environmental resources and communities in our areas, the LWVCC, LWVUV, LWVRV, and LWVKC submit jointly this comment on the DEIS for the JCEP project.

On the basis of LWV positions and for reasons we provide in this comment, we respectfully but strenuously urge the FERC to deny *with prejudice* any and all permits and approvals sought by the JCEP within your jurisdiction.

Our comments are organized as follows:

CHAPTER 1. PERMITTING CONSIDERATION CRITERIA

We understand the following about the authorizations sought by the Applicant.

> In FERC Docket No. CP17-495-000, Jordan Cove seeks an NGA [National Gas Act] Section 3 Authorization (Authorization) to construct and operate an LNG export terminal in Coos County, Oregon. The terminal would be capable of receiving, processing, and liquefying natural gas into LNG, then storing and loading the LNG onto LNG carriers. The Jordan Cove facilities could receive a maximum of 1.2 billion cubic feet per day (Bcf/d) of natural gas from the Pacific Connector pipeline and produce a maximum of 7.8 million metric tons per annum (MMTPA) of LNG.
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> In FERC Docket No. CP17-494-000, Pacific Connector seeks a Certificate of Public Convenience and Necessity (Certificate), under NGA Section 7, to construct and operate an approximately 229-mile-long, 36-inch-diameter natural gas transmission pipeline, crossing through Klamath, Jackson, Douglas, and Coos Counties, Oregon. The pipeline would transport about 1.2 Bcf/d of natural gas from interconnections with the existing Ruby Pipeline LLC (Ruby) and Gas Transmission Northwest LLC (GTN) systems near Malin, Oregon to the Jordan Cove terminal.[1]

We understand that the NGA prescribes that the Commission make decisions about applications under these two sections of the Act by two distinct criteria. The DEIS provides this summary statement,

> Specifically, regarding whether to authorize the siting of an LNG terminal under NGA Section 3, the Commission would approve the proposal *unless it finds the proposed facilities would not be consistent with the public interest* [emphasis added]. In considering whether or not to issue a Certificate to a natural gas pipeline under NGA Section 7, the Commission would *balance public benefits against potential adverse consequences*, as documented in the Order. The Commission bases its decision on technical competence, financing, rates, market demand, gas supply, environmental

[1] DEIS, p. 1-1.

> effects, long-term feasibility, and other issues concerning a proposed project [emphasis added].[2]

In 2016, the Commission denied PCGP's application for a Section 7 Certificate of Public Convenience and Necessity for the pipeline because the Applicant had failed to demonstrate adequate *purpose and need* for the project when weighed against the adverse consequences on private landowners. The denial of the Certificate for the pipeline resulted in denial of the Section 3 authorization to site the proposed LNG terminal since there would be no purpose for that facility without a pipeline to transport gas to it.

We discuss below our reasons for calling on the Commission to deny applications for this current project in relatively like manner. It is essentially the same project with similarly inadequate demonstration of need and limited public benefits in the face of still significant harm to landowners and communities. The numerous significant negative environmental impacts, including many not addressed appropriately in the DEIS, provide further cause for denial.

I. Section 7 Authorization of Certificate of Public Convenience and Necessity Sought for the Pacific Connector Gas Pipeline

A. The current application by PCGP for a Certificate of Public Convenience and Necessity should be denied because the Applicant has once again failed to demonstrate that there is adequate "need" for the Pacific Connector Gas Pipeline.

Regarding the adequacy of the Applicant's demonstration of need for the previous PCGP, the Commission explained in its 2016 Denial Order,

> 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, not conducted an open season, which might (or might not) have resulted in "expressions of interest" the company could have claimed as indicia of demand. . . .[3]

The Certificate Policy Statement indicates flexibility in the way in which the Commission determines "need" for a pipeline.

> Rather than relying only on one test for need, the Commission will consider all relevant factors reflecting on the need for the project. These might include, but would not be limited to, precedent agreements, demand projections, potential cost savings to consumers, or a comparison of projected demand with the amount of capacity currently serving the market."[4]

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[2] DEIS, p. 1-7, citing "Certificate Policy Statement" (see *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227 (1999), clarified in 90 FERC ¶ 61,128, and further clarified in 92 ¶ 61,094 (2000)), that established criteria for determining whether there is a need for a proposed [pipeline] project.
[3] FERC, "Order Denying Applications for Certificate and Section 3 Authorization, Jordan Cove Energy Project, L.P., Docket No CP13-483-000, Pacific Connector Gas Pipeline, L.P., Docket No. CP13-492-000," (hereinafter cited as FERC Denial Order), March 11, 2016, pp. 16-17.
[4] "Certificate Policy Statement," p. 23.

We base our assertion that the Commission should deny the current application for a Certificate in part because relatively little of substance has changed since the 2016 denial.

1. Agreements. The Applicant reports several differences from the situation in 2016, but it does not appear to us whether these subsequent activities move the needle appreciably towards demonstrating "need."

- JCEP now claims to have executed "precedent agreements" for 96% of the proposed Pacific Connector Gas Pipeline's capacity, but we understand that these are not with actual outside buyers or shippers, rather they are aggregate bookings.[5] If this is true, does this demonstrate need?

- JCEP finally conducted an open season in July of 2017, but we understand that it resulted in "no qualifying bids." Does the Commission find this to be meaningful "indicia of demand?"[6]

- In its application to FERC of September 21, 2017, JCEP was only able to report that they, ". . . *continue to negotiate* definitive liquefaction tolling agreements with two large LNG purchasers" and are "*involved in active discussions* with other potential tolling customers." With regard to JERA Co., Inc., the company indicates that it has "*finalized the key commercial terms* . . . for the sale of at least 1.5 mtpa [million tonnes per annum] of natural gas liquefaction capacity for an initial term of 20 years, *subject to customary conditions including the execution of a detailed liquefaction tolling agreement.* Similarly, "JCEP has reached *preliminary agreement* with ITOCHU Corporation ('ITOCHU'*) with respect to certain key commercial terms* for the purchase by ITOCHU of an additional 1.5 mtpa of natural gas liquefaction capacity for an initial term of 20 years [emphasis added].[7] It appears that more discussions with potential customers have been held since the 2016 Denial Order than before, but still nothing binding has been accomplished.

- In December of 2018, Pembina revealed a timeline for concluding binding off-take agreements:

  > In addition, the Company has executed non-binding off-take agreements, which include the substantive commercial terms for a total of 11 million tonnes per annum ("Mtpa") which exceeds the planned design capacity of 7.5 Mtpa. These non-binding agreements include 20-year, 100 percent take-or-pay tolling commitments with investment grade counterparties. The Company is working diligently to conclude binding off-take agreements in the first quarter of 2019, including the nominated capacity of Rockies basin producers.[8]

  That has not occurred. In fact, in May, halfway through the second quarter of 2019, Pembina disclosed this:

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[5] JCEP, PCGP, "Response to Removal-Fill Comments," Oregon DSL No.: 60697-RF, May 9, 2019, p. 11.
[6] JCEP, PCGP, "Response to Removal-Fill Comments," DSL No. 60697-RF, May 9, 2019, p. 11.
[7] Application to FERC, p. 15, citing *Veresen and ITOCHU Agree Key Terms for Jordan Cove Liquefaction Capacity*, Veresen Inc., dated Apr. 8, 2016 (no longer available online).
[8] Pembina News Release—December 10, 2018 - http://www.pembina.com/media-centre/news-releases/news-details/?nid=135415.

> Commercialization efforts have continued and as previously disclosed the Company has executed non-binding off-take agreements with customers in excess of the planned design capacity of 7.5 Mtpa. *Commercial discussions with prospective customers are continuing* as regulatory permitting is progressed and under the new timeline *the Company will work to conclude binding off-take agreements by early 2020* [emphasis added].[9]

As part of the same press release, they announced that they were cutting their 2019 investment in the project in half, pulling back "non-regulatory" expenditures and setting their projected operational date a year later at 2025.

It will be up to the Commission to decide whether the current scenario demonstrates "need" under the "agreement test" appreciably better than in 2016 or whether this project is still essentially a speculative venture in search of a clear demonstration of market demand.

2. Demand projections. In a recent document provided to the Oregon Department of State Lands (DSL), JCEP predicted U.S. LNG export growth of four percent to five percent per year between 2015 and 2030 (without citing a source).[10] Various countries are named as potential buyers, but the discussion is based on 2016 information. Perhaps the Applicant wasn't able to find any more recent projections, but between the geopolitical upheaval and global economic turmoil in the past three years and currently, it seems patently unwise to rely on information and predictions from what is, in effect, already a bygone era. We can mention, for example, the current trade war with China that includes a 15% tariff hike by that country on U.S. LNG, bringing the total tariff to 25% before as of June 1. The LNG market does not operate in isolation. Alliances have shifted or weakened or both, treaties have dissolved, sanctions have been put in place, internal disruption is occurring in various parts of the world, there is talk of war in the Middle East, and relations are again strained with North Korea. At this writing, the Trump Administration has left the door open to blanket tariffs on all imports from Mexico. The overall LNG market is flux. Things change daily. Predicting market demand under the circumstances can be expected to be challenging but using 2016 or older trendlines to read even the near-term future isn't compelling.

3. Cost savings to customers. There are no domestic customers claimed or even suggested by the Applicant for the current project, but to the extent that U.S. gas were to be exported, domestic consumers of natural gas would pay more, not less, as a result.

4. Comparison of demand with capacity. This is the final gauge of "need" mentioned in the Certificate Policy Statement. Since JCEP switched from an import project to an export one, four LNG export terminals have come online; seven are approved and under construction; six are approved and not yet begun; and 19 projects are, like JCEP, proposed and somewhere in the regulatory permitting process.[11] In Canada, 18 LNG export facilities are proposed; 13 of them are on the west coast in British Columbia, much closer to the Montney Basin-sourced gas that Pembina plans to export if the Jordan Cove Terminal is constructed. Twenty-four Canadian LNG

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[9] Pembina News Release – Pembina Pipeline Corporation Reports First Quarter Results. May 2, 2019. http://www.pembina.com/media-centre/news-releases/news-details/?nid=135432.

[10] The statement is simply asserted in JCEP, PCGP, "Response to Removal-Fill Comments," Oregon DSL No.: 60697-RF, May 9, 2019, p. 12.

[11] FERC, "LNG," https://www.ferc.gov/industries/gas/indus-act/lng.asp.

projects have been issued export licenses.[12] Mexico is a competitor, as well, with a project proposed in Sonora.[13] Venture Global LNG recently obtained an infusion of financing for three facilities on the Gulf Coast, one of which has received all necessary permits and has reliable global customers.[14] U.S. LNG export capacity from approved facilities is said to be on track to double by the end of 2020, from five billion cubic feet per day to ten Bcf/d.[15] It would appear that the Commission's commitment to avoid "overbuilding" may suggest that, by the time PCGP expects to come online—most recently set for 2025—the field will already be crowded, including on the west coast of North America both in Canada and Alaska.

In light of the above, we believe the Commission should find that PCGP is a project for which adequate need or public benefit still has not been established. The company has booked their own pipeline capacity, their discussions with potential Japanese customers are stale and non-binding, the project has been on the drawing board for well over a decade while several other LNG terminals that were begun more recently are already up and running and 13 more have been approved. JCEP sees so many regulatory challenges and even reversals that they have announced a 50% decrease in spending and a 12- month delay in projected start-date. The rosy picture painted in the DEIS in terms of global market demand is founded on national and international circumstances that are outdated and vastly different from today's realities, and those too are changing daily. Industry market analysts are paying increasing attention to public pressure to reduce fossil fuel emissions and refocus on non-polluting, renewable energy sources due to climate change. The myth of natural gas as "clean" is being exposed and replaced with understanding that methane is an even more harmful greenhouse gas than carbon. This may result in political conditions with a powerful market impact within a few years.

B. The current application by PCGP for a Certificate of Public Convenience and Necessity should be denied because, in addition to failing to demonstrate need for the project, they have once again failed to demonstrate that there are adequate public benefits associated with the Pacific Connector Gas Pipeline to outweigh adverse effects on landowners.

The Commission in the 2016 Denial Order documented the public benefits claimed by the Applicants for the entire project: ". . . 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.[16] The Commission's conclusion was as follows:

> 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, as well as the related blanket construction and transportation certificate applications.[17]

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[12] Natural Resources Canada, "Canadian LNG Projects," https://www.nrcan.gc.ca/energy/natural-gas/5683.
[13] https://www.chron.com/business/energy/article/KBR-lands-design-contract-for-planned-LNG-export-13652389.php.
[14] "New $1.3 Billion Equity Investment in Calcasieu Pass LNG Facility," *The Maritime Executive,* May 28, 2019, https://www.maritime-executive.com/article/new-1-3-billion-equity-investment-in-calcasieu-pass-lng-facility.
[15] "Additional LNG Exports Authorized from Freeport LNG," *The Maritime Executive,* May 29, 2019, https://maritime-executive.com/article/additional-lng-exports-authorized-from-freeport-lng.
[16] FERC Denial Order, pp. 16-17.
[17] FERC Denial Order, p. 18.

As with the proposal denied in 2016, the Applicants indicate that their desire is to facilitate the export of primarily Canadian natural gas to primarily Asian markets, but they again place their main focus in terms of public benefits for the PCGP on temporary job creation during the construction phase and increased tax revenue.

1. The number of jobs that would be created during pipeline construction—all temporary—does not offer enough of a public benefit to outweigh adverse impacts on landowners, communities, and the environment. The estimate of 885 jobs per month related to the pipeline project is not accompanied by enough detail to understand who would benefit and how much. But beyond that, the DEIS supports the Applicant in wrongly asking the Commission to find that jobs created by construction or operation of the *Jordan Cove LNG project* and revenue slated for Coos County and other municipal entities from the export facility are legitimate public benefits to weigh against adverse effects on landowners, communities, and the extensive additional human and natural environmental impacts of the *Pacific Connector Pipeline Project area*.

The Commission, following guidance in the Certificate Policy Statement, stated in 2016 that it balanced adverse impacts on landowners against public benefits claimed for the pipeline and found the latter lacking. The situation has not changed. We discuss below our reasons for concluding that the LNG project is in conflict with the public interest and therefore, authorization under NGA Section 3 should be denied. But whatever benefits are claimed for the JCLNG project are irrelevant to the Commission's consideration of the PCGP's Section 7 application. The 2016 Denial Order appears to underscore that conclusion. Therein, the Commission first considered the Section 7 application for the pipeline and determined that denial was warranted—and that, after performing only the first step in balancing benefits against adverse impacts. The foreclosure of a gas supply led the Commission to the separate denial of the Section 3 application for the JCLNG project.

2. The Policy Statement is not specific about what the Commission may elect to consider as public benefits, but applying the factors cited in the DEIS to the current PCGP proposal does not support a finding of public benefits outweighing adverse effects on landowners and communities.

The DEIS offers this explanation:

> "The Commission bases its decision on technical competence, financing, rates, market demand, gas supply, environmental effects, long-term feasibility, and other issues concerning a proposed project.[18]

We find the following to be pertinent:

- In terms of gas supply, new information shows that claimed public benefits are actually less significant than were expected during the previous iteration. As in the project version that FERC denied, JCEP cites as evidence of need the desire of Rocky Mountain and Canadian natural gas producers to find new markets for their product. In 2016 and until recently, the percentage of Canadian to U.S. gas the Applicant had in mind transporting has not been known. However, Pembina has now revealed that it

[18] DEIS, p. 1-7.

actually intends for relatively little benefit in terms of getting product to market—just 6-12 percent of pipeline capacity—to be realized by U.S. producers. At a meeting last fall in Grand Junction, CO, Stuart Taylor, a Pembina Senior Vice President, indicated that,

> Jordan Cove plans to specifically hold space in the project for Rockies producers. That space currently may amount to about 75 million to 150 million cubic feet a day, which Taylor acknowledged doesn't sound like a lot in the context of a project that could initially ship 1.3 billion cubic feet a day.[19]

While the DEIS is silent on this important matter related to need and public benefits, the above quotation indicates that the JCEP, "a market-driven response to the burgeoning and abundant natural gas supply in the US Rocky Mountain and Western Canada markets, and the growth of international demand, particularly in Asia,"[20] really is asking FERC to grant a Certificate of Public Convenience and Necessity to benefit almost entirely Canadian gas producers. As noted above, even before the company had disclosed how little of the pipeline capacity would be reserved for Rocky Mountain producers, public opposition to the project was founded heavily on the burden that would be placed on Oregon landowners, as well as harm to communities, and the environment (as we will demonstrate below) to build a 229-mile pipeline and liquefaction, storage, and export facilities to benefit a foreign corporation supplying gas to foreign markets. Our understanding of how handsomely the Canadian economy is to be rewarded at the expense of Oregon and U.S. has only grown and intensity of opposition along with it.

- The DEIS verifies that JCEP in the current application has dropped the previous suggestion that some of the gas may benefit the domestic market, resulting in accurate disclosure that the project would provide no energy on this continent in exchange for the eminent domain takings sought by JCEP.[21] While this corrects the record in terms of the company's intent, we raise it here to underscore the fact that, not only would the project provide little in terms of a new Asian market for U.S. gas producers, it would, in fact, offer no benefit whatsoever in terms of meeting future U.S. energy needs. We again contend that the power Congress has given to the Commission to convey, in turn, eminent domain authority on pipeline companies must stay within the bounds of the Fifth Amendment requirement for public use. Eminent domain power would be misapplied in this case where the Pacific Connector Gas Pipeline would be little more than a conduit from the Montney gas fields of western Canada to Asian markets.

- While the Commission did not comment in the 2016 Denial Order on "long term feasibility" of the project, that is another factor they may consider pursuant to the Certificate Policy Statement and if they do, there is reason for concern with regard to the PCGP and, indeed, the entire JCEP. Evidence of climate change is intensifying and with it, increasing demands from various sectors and the public for a more rapid conversion to renewable, non-polluting energy sources suggest that any new fossil fuel infrastructure projects may face higher costs or mandates to reduce emissions or both. Oregon's Governor and legislative majority has committed to passing a "cap and trade"

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[19] Dennis Webb, "Geopolitical case for Jordan Cove," *Grand Junction Sentinel*, September 12, 2019, https://www.gjsentinel.com/news/western_colorado/geopolitical-case-for-jordan-cove/article_cd728716-b64a-11e8-9ed7-10604b9f7e7c.html.
[20] JCEP, FERC Application, Resource Report 1, September 2017, pp. 1-2.
[21] DEIS, 4-745.

bill similar to one already passed and operating in California and Washington state is taking a similar stand. Public outcry over clear evidence of health and other risks posed by hydraulic fracturing is resulting in local and state governmental efforts to ban or place moratoriums on fracking. The state of Oregon passed such a law during the 2019 legislative session. Within the lifetime of this project, gas supply could potentially be limited. The myth that natural gas is a clean or bridge fuel is being replaced by understanding that pipelines and facilities leak, and methane is, in fact, a powerful greenhouse gas. Some have suggested that projects like this, and JCEP in particular, may be forced to close down long before they have run their expected useful lives.[22] Fossil fuel assets may be on their way to being stranded.

- The technical competence of the JCLNG (and of the PCGP) appears to be something the Commission should take a close look at; unfortunately, the DEIS falls short of performing that task and arguably should be pulled back and the deficiency rectified. We offer two of what we believe to be many examples of this concern. 1) While we have not yet had an opportunity to review subsequent analyses and comments of the Oregon Department of Geology and Mining Industries (DOGAMI), Brad Avy, chief geologist and executive director of the agency has raised numerous serious concerns about the design of the proposed Jordan Cove LNG terminal, especially with regard to its likely ability to withstand a major earthquake and associated tsunami.[23] 2) As we will discuss below, the Federal Aviation Administration (FAA) has issued 13 Notices of Presumed Hazard, each indicating design features of the proposed LNG terminal and operations that pose significant safety hazards due to the proximity of the Southwest Oregon Regional Airport. While these issues surfaced long before Pembina purchased the project—they were acknowledged in the 2015 FEIS—they too have not been able to resolve them and instead have convinced FERC staff to kick the problems to a later phase—a proposal that we find totally irresponsible and unacceptable. 3) Many of the 98 recommendations FERC staff found it necessary to make to correct deficiencies of various types in the DEIS Section 4.13 Reliability and Safety appear to point to technical incompetence. 4) We question why, after fourteen years of planning to build the Pacific Connector Gas Pipeline on largely the same route, Pembina's application to the Oregon Department of Environmental Quality (DEQ) was still so deficient in fulfilling the requirements to obtain the Section 401 Water Quality Permit that DEQ issued over 200 pages of information gaps and design inadequacies to accompany its Denial.[24]

- The DEIS, following the Applicant's lead, fails to acknowledge the science that shows methane is quite the opposite of a less significant source of greenhouse gas emissions. Throughout the DEIS, "methane" is used several times, including in a list of substances considered to be "greenhouse gases." However, we could find no acknowledgment of the now well accepted fact that methane, though different in behavior from carbon-based fuels, is a powerful GHG and contributes mightily to global warming and climate change.

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[22] Oil Change International, "Jordan Cove LNG and Pacific Connector Pipeline Greenhouse Gas Emissions Briefing," January 2018, p. 8.
[23] Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017.
[24] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019.

C. The Commission should deny the PCGP's Section 7 certification because, as in 2016, the harm to landowners that would be perpetrated to construct and operate the pipeline outweighs whatever public benefits that can be attributed to the PCGP.

Indeed, the Commission based the 2016 Denial Order in significant part on the likely substantial use of eminent domain to construct the pipeline:

> In this case, the Pacific Connector Pipeline will impact 157.3 miles of privately-owned lands, held by approximately 630 landowners (54 of which have intervened). As stated above, the landowners contend that the pipeline will have negative economic impacts, such as land devaluation, loss of tax revenue, and economic harm to business operations (e.g., oyster and timber harvesting and farming). While we cannot predict the outcome of the eventual negotiations*, it currently appears that at least some portion of the necessary property rights will need to be obtained through the exercise of eminent domain* [emphasis added]. The Certificate Policy Statement makes clear that holdout landowners cannot veto a project that the Commission finds is required by the public convenience and necessity after balancing all relevant factors and considerations. However, "*the strength of the benefit showing will need to be proportional to the Applicant's proposed exercise of eminent domain procedures* [emphasis added]."[25]

The Commission in its Denial Order did not indicate the impact of eminent domain on their decision in terms of any specific number of easement agreements, rather that they would balance the Applicant's demonstration of public benefit against that particular adverse impact. As of 2016, JCEP had failed to negotiate easement agreements with around 90 percent of private landowners. According to our best information, almost midway through 2019, 40 percent have still refused to sign.[26] Over 100 landowners would be subjected to eminent domain takings. There is no question that JCEP under Pembina has made obtaining easements a higher priority than the previous owner did. There is also no question that opposition to the project is growing, a large measure of it due to rejection of the prospect of eminent domain for a 100 percent export project that offers almost nothing to the state of Oregon and carries substantial cost, risk, and harm. A "public use" for the pipeline is totally lacking. The last sentence of the quoted portion of the FERC Denial Order above will be still be key in the Commission's decision on the current application. Where are the benefits to justify this degree of eminent domain?

D. The Commission should be even more mindful of adverse impacts to landowners in light of uncertainty about the Applicants' long-term business intentions or viability.
Landowner property rights issues are different in character from other environmental issues considered under the National Environmental Policy Act of 1969 (NEPA).[27] The Certificate Policy Statement calls on the Commission to pay special heed to this, as well. Of growing concern to landowners is understanding that construction, including tree cutting, can begin as

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[25] FERC Denial Order, p. 16.

[26] The specific number of landowners the Commission cited in the Denial Order included adjacent landowners, rather than just those owning property on the pipeline route. The public is not privy to proprietary information including about landowner negotiations, so the numbers we report here are based on landowner research of filed easement agreements in county recorders offices in the four counties affected by the project as of April 26, 2019. Alignment modifications, including those recommended by FERC staff in the DEIS, create some changes, including an increase in the number of affected private landowners.

[27] Certificate Policy Statement (1999), p. 24.

soon as a pipeline company obtains a Certificate of Public Convenience and Necessity, but before it is clear that the Applicant's project is viable. After over a decade of false starts, despite grand hopes JCEP is still operating without assurance of a market and like Veresen before it, Pembina may have taken on more than it can afford. The project has no buyers and its parent company is showing signs that it lacks necessary financing.[28] The company's CEO shared at their May 3, 2019 Annual General Meeting that they are still looking for up to 60% equity partners:

> . . . And we also, we just are not ready for $10 billion-dollar projects. We are a $35 billion-dollar company. $10 billion is just too big for us. It's the same reason insurance companies re-insure. We are re-insuring this risk because it's just a bit too big for us.[29]

The cumulative message from these recent communications to shareholders and investors recall this from the Certificate Policy Statement: "Landowners should not be subject to eminent domain for projects that are not financially viable and therefore may not be viable in the marketplace."[30] Elsewhere we raise concerns that this project may be beyond the technical grasp of the new owners. The Certificate of Public Convenience and Necessity would allow the immediate exercise of eminent domain taking, even though the application materials are so incomplete that the DEIS includes well over a hundred recommendations that FERC staff believe are critical to just project safety, many of which are not required until well into project construction. The possibility exists that landowners' property would be seized and damage done, and then the company would walk away. We urge the Commission to heed the many signs we and other commenters are reporting that this project is wrong for the site selected and with age, the serious flaws in the recycled design and application materials are only becoming more obvious. Landowners should not have to suffer the added grief of having their land damaged for nothing.

E. The Commission should deny the application for the Certificate because the limited need or public benefits the Applicant demonstrates are still outweighed by adverse impacts on landowners and communities.

The Certificate Policy Statement explains how this next step in the Commission's decision-making process works:

> Landowners whose land would be condemned for the new pipeline right-of-way, under eminent domain rights conveyed by the Commission's certificate, have an interest as does the community surrounding the right-of-way. The interest of these groups is to avoid unnecessary construction, and any adverse effects on their property associated with a permanent right-of-way. In some cases, the interests of the surrounding community may be represented by state or local agencies. Traditionally, the interests of the landowners and the surrounding community have been considered synonymous with the environmental impacts of a project; however, these interests can be distinct.[31]

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[28] Evans and Schaaf to Rosenblum, "Letter of Concern Regarding Jordan Cove/Pacific Connector State Permit Processes," May 15, 2019.
[29] Pembina May 3rd, 2019 Annual General Membership Webcast. Minute 54:40 to 55:06. http://www.pembina.com/investor-centre/presentations-and-events/
[30] Certificate Policy Statement, 1999, p. 20.
[31] Certificate Policy Statement, 1999, p. 24.

The DEIS has erred egregiously in acknowledging, but then dismissing with inadequate data or reasoning, numerous adverse effects that cannot realistically be mitigated to an acceptable level because they stem from natural forces and other pertinent factors that are outside of the control of the Applicants. (The issues raised below are discussed in more detail under "III. Section 4 Issues.")

1. Landowners and communities would suffer residual adverse effects due to increased risk of wildfire during construction. The substantial increase in human and equipment activity in heavily timbered areas during pipeline construction can by itself be expected to increase the risk of fire; 62 percent of the pipeline route is forested. Pipeline construction would take place primarily during "fire season," keeping a dawn to dusk, 60-hour work-week schedule. That means construction involving the use of feller-bunchers, chainsaws, bulldozers, track-hoes, rock saws, and other heavy equipment, as well as blasting would take place across four southern Oregon counties under high to extreme wildfire risk conditions. PCGP would seek waivers of restrictions. In current drought conditions with longer, more intense fire seasons this activity constitutes an unacceptable adverse effect on landowners and communities.

2. Landowners and communities would suffer residual adverse effects due to increased risk of wildfire and consequences due to landslide, seismic activity, or other natural phenomena during operation. The DEIS largely dismisses the risk of pipeline rupture and explosion, despite the extensive seismic characteristics present particularly in the Coos Bay and Klamath County portions of the pipeline alignment, evidence of numerous areas at risk of soil liquefaction and lateral spreading, and extensive landslide-prone conditions all across the 229-mile route. This nonchalance is inappropriate when the PHMSA has acknowledged an increasing number of ruptures and explosions nationwide due to particularly weather-related landslides and consequently has seen fit to issue two sets of protocols calling for renewed efforts to site, engineer, build, and monitor gas pipelines. [32] What we see of Applicant plans do not measure up to the additional caution needed. Landowners and communities are right to be concerned.

3. Landowners and communities would suffer residual adverse effects due to increased risk of landslide during construction. The Oregon Department of Land Conservation and Development (DLCD) lists as landslide triggers undercutting of a slope of cliff by erosion or excavation; shocks or vibrations from earthquakes or construction; vegetation removal by fires, timber harvesting, or land clearing; and placing fill (weight) on steep slopes.[33] A map set, prepared by the Applicant at the request of DOGAMI to allow assessment of pipeline rupture risk, shows numerous landslide-prone areas.[34] The maps are nonetheless referenced in several tables developed by the Applicant that report that the risk of landslide along the pipeline route is "low" or "none."[35] We believe this should have attracted the investigative attention of FERC staff while preparing the DEIS.

4. Landowners and communities would suffer residual adverse effects due to disruptions of services and road closure due to landslides. Mapping included in application materials appear to suggest some risk of landslides near at least Highway 140 and the Butte Falls Highway in

[32] Pipeline and Hazardous Materials Safety Administration (PHMSA), "Pipeline Safety: Potential for Damage to Pipeline Facilities Caused by Earth Movement and Other Geologic Hazards," *Federal Register*, 5/2/2019.
[33] DLCD, "Oregon's Natural Hazards," https://www.oregon.gov/lcd/NH/Pages/Natural-Hazards.aspx
[34] PCGP, Resource Report 6, Appendix F, Geologic Hazards Maps (2), Figures 24-35.
[35] PCGP, Resource Report 6, Appendix A.6 "Geologic Hazards and Mineral Resources Report;" compare with maps, Resource Report 6, Appendix F, Geologic Hazards Maps, Figures 26-33, 35.

Jackson County, as well as some areas in Coos and Douglas Counties. Landslide risk is very real in Oregon across the pipeline route, but the investigation and planning processes are generally dismissed. Respect for natural processes and the fact that laws of nature are paramount is lacking. Mitigation is only marginally possible. The project is poorly developed—there is repeated evidence that plans are boilerplate and not designed for the specific conditions on the ground.

5. Landowners and communities would suffer residual effects due to the risk of pipeline explosion or other hazard in the event of a wildfire caused by other means. The DEIS reveals that JCEP has yet to prepare an Emergency Response Plan designed to minimize risk in case of wildfire. A draft plan is said to be included in the Plan of Development POD), Appendix H.[36] What is actually there is only a concept paper, outlining an "Emergency Plan and Preparedness Manual" and a "Public Safety Response Manual." Attachments that would describe various kinds of safety procedures are all "forthcoming."[37] We cannot find any evidence of awareness that the presence of a buried pipeline may restrict fire-fighting activities. The DEIS does not discuss whether above-ground pipeline facilities would be vulnerable to over-heating and explosion and if so, how they plan to prevent an explosion and gas fire from endangering residents or fire-fighters or making an existing wildfire much worse.[38]

6. Landowners and communities would suffer residual effects due to the risk of pipeline accidents from other causes. Between 2010 and 2017, pipeline incidents resulted in almost 100 deaths, injured 500, and forced the evacuation of thousands of people.[39] The fact that almost the entire 229-mile PCGP would be built to Class I standards in terms of pipe gauge and weld standards increases the risk of leaks, explosions, and gas fires which may also spread to structures and ignite wildfires. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) reported in a letter to Congress in 2013 on a variety of scenarios that raise the likelihood of pipeline incidents, several of which match the Applicant's pipeline construction and routing plans.[40]

7. Landowners and communities would suffer residual effects in the event of groundwater disruption, contamination, or loss due to construction, blasting, or hydraulic directional drilling (HDD). The application does not identify the location of all wells, springs, and seeps near the construction right-of-way for the pipeline and construction. Trenching and blasting could substantially alter surface and subsurface flow patterns. Water wells could be disrupted or ruined.[41] Additionally, the pipeline would cross six wellhead protection areas (WHPA), vulnerable areas where contaminants can be introduced into groundwater and harm drinking water supply.[42] There are numerous sites with the potential to encounter contaminated soils within 0.25 mile of the pipeline route, posing another threat to groundwater.[43] This is a

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[36] DEIS, p. 4-775.
[37] DEIS, Appendix F.10 PCGP POD-Part 3-22.PDF, Appendix H, "Emergency Plan and Preparedness Manual," and "Public Safety Response Manual."
[38] DEIS, p. 4-775.
[39] Jonathan Thompson, "A map of $1.1 billion in natural gas pipeline leaks," *High Country News,* November 29, 2017.
[40] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration to U.S. Congress, August 27, 2013.
[41] DEIS, p. 4-81
[42] DEIS, p. 4-79.
[43] DEIS, p. 4-80.

significant and serious concern for impacted landowners along the pipeline route who rely on springs on their property for drinking water and domestic uses. Municipal sources for 160,000 are also at risk.[44]

8. Landowners and communities would suffer residual adverse effects due to multiple impacts on water quality, including in violation of Oregon's Water Quality Standards. Below in 4.3. we will raise a number of concerns with harm to water resources that would stem from both construction and operation of the PCGP, but for purposes of the discussion here, materials accompanying the Oregon Department of Environmental Quality's denial of the Applicants' Section 401 Water Quality Permit attests to the high level of harm that would be brought by the PCGP.[45]

9. Landowners and communities in some areas along the pipeline would suffer residual adverse effects, including possibly long-term health problems due to the release of Naturally Occurring Asbestos (NOA) into the air from blasting and other soil and rock disturbance activities. A minimum of 6.5 miles of pipeline alignment would require disturbance of this highly carcinogenic material in Ultramafic rocks and serpentinite. OSHA regulations designed to safeguard personnel and other individuals from this airborne hazard do not apply in this situation. This clear and dangerous adverse effect on landowners and communities is not mentioned in the DEIS.

10. Landowners and communities in the vicinity of project facilities such as the Malin Compressor Station would suffer multiple, ongoing adverse effects of that facility. Natural gas compressor stations are associated with serious health hazards. Harmful emissions include volatile organic compounds (VOCs) that are linked to cancers, respiratory and cardiovascular illness, and birth defects. Other impacts include throat irritation headaches, burning eyes, skin irritation, as well as respiratory, nervous, and cardiovascular effects. Chemicals present can include benzene, dimethyl disulfide, methyl ethyl disulphide, ethyl-methylethyl disulfide, trimethyl benzene, diethyl benzene, methyl-methylethyl benzene, tetramethyl benzene, naphthalene 1,2,4-trimethyl benzene, m-&p- xylenes, carbonyl sulfide, carbon disulfide, methyl pyridine, dimethyl pyridine.[46] In addition to emissions-related problems, many people living in the vicinity of compressors suffer from the impacts of noise. These concerns—related to both physical and mental health—are associated with construction, ongoing operation, and compressor blowdown activities.

11. Indigenous communities in the entire project area would face cultural resource destruction and loss, clearly an adverse impact that cannot be adequately mitigated. The project has sparked broad concern by Tribal Nations as it is planned to cross the traditional lands of 14 groups. Five Tribes have declared their opposition and six Tribes have filed as intervenors.

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[44] Research to compile the extent of potential impact was performed by Physicians for Social Responsibility and reported in Rogue Riverkeeper, et. al. to Bob Lobdell, Public Comment on DSL APP0060697 (Jordan Cove Energy Project and Pacific Connector Gas Pipeline) Application for Removal-Fill Permit, January 30, 2019, p. 29.

[45] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019.

[46] Southwest Pennsylvania Environmental Health Project, "Summary on Compressor Stations and Health Impacts," February 24, 2015, https://www.docdroid.net/rJdRls2/summary-on-compressor-stations-and-health-impacts-22415.pdf#page=15

Impacts to cultural resources are certain to occur and many groups have complained that harm to water and traditional fishing sources would have long-term or permanent effects on their way of life.

II. Jordan Cove LNG Terminal Application for NGA Section 3 authorization

The Commission in 2016 denied Jordan Cove's application for Section 3 authorization to site, construct, and operate an LNG liquefaction, storage, and export facility without applying project-specific criteria. The Denial Order states,

> We find that without a pipeline connecting it to a source of gas to be liquefied and exported, the proposed Jordan Cove LNG Terminal can provide no benefit to the public to counterbalance any of the impacts which would be associated with its construction.[47]

We have provided reasons we believe call for denial of PCGP's application to construct the pipeline, thereby leading to denial of the current Jordan Cove LNG project on the same basis as in 2016, but our analysis of the latter project application and the DEIS causes us to conclude that it should be denied in its own right because it is not consistent with the public interest.

The DEIS states two criteria the Commission would use in considering a Section 3 application. Both center on the public interest.

> 1) "Note that the Commission will consider as part of its decision whether or not to authorize natural gas facilities, all factors bearing on the public interest, including the project's purpose and need."[48]
> 2) " . . . the Commission would approve the proposal *unless it finds the proposed facilities would not be consistent with the public interest."*[49]

The Jordan Cove LNG Export Terminal project would be a highly complex undertaking under any circumstances, but the fact that first one company and now another one has remained committed to achieving it for over a decade, despite clear evidence of unsafe and inappropriate siting, raises serious concerns. First, this project has changed direction, beginning over a decade ago as an import scheme and then shifting to liquefaction, storage, and export purposes, as well as changed ownership and gone through myriad modifications resulting from extensive communications with regulators in attempts to obtain required permits and approvals. Across time, multiple consultants have prepared numerous reports and other documents regarding the various aspects of the design. The current application includes many of these materials, even though some are years old and were prepared for earlier iterations of the project.

Because the operation, begun by Veresen and then subsumed by Pembina, has been locked to the Malin to Coos Bay siting and began with a highly vested conclusion that the proposed location best meets the criteria, the current Applicant has inadequately assessed positive potential to meet the project purpose offered by other current-day alternatives. They have also

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[47] FERC Denial Order, p. 19.
[48] DEIS, p. 1-6, fn. 12.
[49] DEIS, p. 1-7, citing Certificate Policy Statement.

paid little attention to serious deficiencies that have emerged with regard to the time-worn proposed location and design.

As a result of this long history, the project application includes a confusing set of often outdated, disjointed, and conflicting information. We believe that these iterations and ownership changes have resulted in a plan that does not fit well into the existing site at the same time as the Applicants seek to move forward tenaciously despite clear evidence of serious problems. The DEIS takes the entirely inappropriate approach of allowing known deficiencies to slide by without resolution, consistently indicating that they will be handled at a later time.

What the DEIS should have done is directly confronted the flaws in this project, rather than put forward the contention of the Applicant that they can and will eventually be overcome. The public is put at serious risk by the majority of the following matters of safety, thereby putting this project in conflict with the public interest. The remaining issues highlighted below describe ways in which the project promises to seriously disrupt the economic underpinnings of the communities that would be impacted. Those, too, constitute a conflict with the public interest. The Commission should find that this project has always been a bad idea for this location and there is ample evidence that it still is.

A. The FAA has determined that the project LNG storage tanks are one of many flight hazards for the Southwest Oregon Regional Airport. The FAA determined that both LNG storage tanks constitute a "Determined Hazard to Air Navigation" at the Southwest Oregon Regional Airport due to excessive height. JCEP has stated that they cannot reduce tank height. The DEIS acknowledges the apparent impasse between the needs of the Applicant and the agency charged with protecting the public, but simply dismisses it as a significant problem and recommends that it be resolved at a later time.[50] A project that puts the lives of the flying public, flight crews, and the surrounding community in jeopardy is not in the public interest. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

B. The FAA has determined that excessive carrier vessel stack heights are a flight hazard that threatens the community. The FAA issued nine "Notices of Presumed Hazards" pertinent to the excessive height of LNG Carrier Vessel Stack Height (above 136' AMSL). The DEIS did not address this issue—a clear deficiency—but more importantly, an unresolvable public safety hazard is not in the public interest. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

C. The Applicant failed to disclose to the FAA that temporary construction equipment, such as cranes, derricks, etc., exceed allowable heights and would therefore pose flight hazards—this oversight is serious, whether deliberate or accidental. The DEIS correctly notes that JCEP did not notify the FAA of these hazards at all.[51] FERC staff included a recommendation that this be done, but there is no reason to expect that this issue would be resolved in a way that would make the public safe and such a serious oversight indicates poor judgment or ineffective planning or both. This conflicts with the public interest. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

D. The FAA has determined that a Thermal Plume Hazard exists as a result of an aspect of the project design. The DEIS also dismisses as outdated notice by the FAA of the

[50] DEIS, p. 4-751—4-752.
[51] DEIS, p. 4-750.

thermal plume hazard created by the gas combustion turbines used in the liquefaction process and the risk it poses to airport operations. Thorough study is needed to determine the accuracy of that assertion and until demonstrated to be true or false by factual information, the risk of in-flight hazards for aircraft is not in the public interest. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

E. The project poses a heavy hydrocarbon vapor cloud explosion hazard. LNG Export Terminals that handle and store large quantities of heavier-than-methane hydrocarbons pose hazards of Unconfined Vapor Cloud Explosion (UVCE). Expert testimony submitted to PHMSA addresses potential flaws in the Applicant's calculations that allegedly result in an underestimation of the risk of UCVEs by an order of magnitude. Until either the concerns are assuaged through scientific evidence or the Applicant has been mandated to install appropriate safety measures, moving forward with the project is contrary to the public interest. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

F. The project poses an LNG leak or spill and explosion hazard. The 2015 FEIS for the previous project acknowledged that around 16,000 residents of the Coos Bay/North Bend area would likely be at least injured if a release of highly flammable LNG were to be coupled with an ignition source. The current DEIS references the same matter and discloses that the US Department of Transportation (USDOT) has not yet evaluated the project for compliance with safety measures. FERC staff indicated that, if USDOT finds this hazardous situation in such a populous area unacceptable, the Commission could deny the project's certification application.[52]We sincerely hope that is the case. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

G. The project suffers from numerous hazardous siting and design factors that are contrary to SIGTTO recommendations. The Society of International Gas Tanker and Terminal Operators (SIGTTO) exists to minimize risks, including in the site selection and design for LNG ports and jetties. The proposed JCLNG Terminal conflicts with several of SIGTTO's best practices recommendations, one of which has already been implied in most of the above discussions of specific public safety hazards: avoidance of siting near population centers.[53] (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

H. The project of this nature sited in a major earthquake and tsunami zone should not even be considered. Both the Oregon Department of Oil and Gas Industries (DOGAMI) and independent seismic experts have raised serious concerns about the prospect of siting an LNG export facility in Coos Bay. The DEIS unacceptably indicates that this is not a problem. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.13.)

I. The communities of Coos Bay and North Bend face would almost certainly suffer the cascading results of housing shortage and unaffordability throughout the construction period, a short- and long-term situation that is not in the public interest. Even the DEIS, with repeated denials that acknowledged negative impacts of project activities would be significant concluded that the influx of outside workers for the LNG Terminal construction would create "high and adverse impacts." They conclude that, "the combined demand for housing from LNG terminal and pipeline workers would result in a significant impact

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[52] DEIS, p. 4-702.

[53] Society for International Gas Tanker and Terminal Operators, *Site Selection and Design for LNG Ports and Jetties,* Information Paper No. 14.

on housing in Coos County."[54] The results would include displacement of local resident renters due to rent hikes, homelessness and associated health and safety risks, increased pressure on social services from housing stress, increased domestic violence and family dissolution.[55] (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.9.)

J. The commercial and recreational fishing industries play a significant role in the economy of the bay area and would suffer from various aspects of the project to the detriment of the public interest. The DEIS fragments the potential negative impacts on fishing that can be expected during both construction and operation across numerous sections and concludes for each that impacts would not be significant. From destruction of species during dredging to exposing smaller vessels to dangerous weather and oceanic conditions, the entire fishing economy is jeopardized and undervalued by this project to the detriment of the entire community. (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.9.)

K. The negative visual impact of this high-profile industrial facility is in conflict with the public interest in a growing residential community that has been progressively building a viable economy based on tourism and recreation. This is another one of the rare negative aspects of the project that FERC staff concludes in the DEIS would have "high and adverse impacts." Contrary to the public interest are major effects including reduction in the recreational and residential appeal of the area and likely a reduction in property values and outmigration of current residents. A facility of this size, entertaining enormous ships, changes everything about Coos Bay and environs. As the DEIS says, "the size and location of the proposed LNG terminal and associated facilities would cause visual effects from many viewpoints that cannot be effectively mitigated."[56] (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.8.)

L. FERC staff correctly raises concerns about the Applicant's handling of interactions with Tribal groups in the LNG Terminal area, but their plan and recommendation that resolution can be put off until after the Commission makes its decision about the Section 3 authorization are unacceptable. The DEIS reveals that the Applicant has been ineffective in providing a required "Ethnographic Report describing sites of religious and cultural significance to Indian Tribes and other tribal information," and has been recalcitrant about responding to efforts to obtain compliance. It is appropriate for this issue to be raised in the DEIS, but the matter should have been dealt with and the results plainly reported in so that the public and other entities have the information before them. As it is, though, the DEIS indicates that resolution will not be required until "prior to construction of "facilities . . . ."[57] What recourse would the affected Tribal groups have at that point? (See also Chapter 4: DEIS Section 4 Issues, Subsection 4.11.)

[54] DEIS, p. 4-603.
[55] DEIS, p. 4-603.
[56] DEIS, p. 4-565-66
[57] DEIS, p. 4-647.

CHAPTER 2. ALTERNATIVES ANALYSIS

The alternatives analysis is central to the NEPA process and the project purpose and need statement is to be the basis of it. For that, the DEIS simply restates what the Applicant provided in their application:

> . . . Jordan Cove states the purpose of its project is to export natural gas supplies derived from existing interstate natural gas transmission systems (linked to the Rocky Mountain region and Western Canada) to overseas markets, particularly Asia. According to Jordan Cove, the project is a market-driven response to increasing natural gas supplies in the U.S. Rocky Mountain and Western Canada production areas, and the growth of international demand, particularly in Asia. *In its application, Pacific Connector states that the purpose of its project is to connect the existing interstate natural gas transmission systems of GTN and Ruby with the proposed Jordan Cove LNG terminal* [emphasis added].[58]

A. FERC staff should have recommended the No Action Alternative—thereby recommending denial of the project—because the Applicants' now stated intent to export the vast majority of Canadian natural gas causes the proposed project to defy common sense and reveals that the human and natural environmental costs associated with the entire proposed project are unnecessary to accomplish the true purpose and need of the project as it has evolved.

"A Citizen's Guide to the NEPA" indicates that, "If the agency is considering an application for a permit or other federal approval, the agency must still consider all reasonable alternatives."[59] It also says that, "Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the Applicant."[60]

Guidance provided in "Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements," (AKA "Green Book") for the current circumstance—where a private entity is seeking authorizations to construct and operate a project—instructs as follows:

> In some situations, no action taken by DOE [and we assume FERC, as an entity under the DOE's jurisdiction] may constitute the only alternative to the proposed action. Example: DOE may be involved with a private Applicant and faced with a go/no-go decision (e.g., fund or not fund, *approve or not approve*) [emphasis added]. In such a case, the no action alternative may include several sub-alternatives consisting of those reasonably foreseeable courses of action that would be available to the Applicant if DOE denies its application. DOE should describe such sub-alternatives and analyze their impacts to the extent they are reasonably foreseeable.[61]

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[58] DEIS, p. 1-6.
[59] "A Citizen's Guide to the NEPA," p. 16.
[60] "A Citizen's Guide to the NEPA," p. 16.
[61] U.S. Department of Energy, "Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements," Second Edition, December 2004, p. 11.

Per the explicitly narrow purpose and need statement, the objective of the JCEP is to export LNG to Asian markets, but within that, the purpose and need of the integral PCGP (italicized above) is the narrow specification that natural gas pipeline would begin near Malin, OR (the only place where the GTN and Ruby pipelines come together) and end "at the proposed Jordan Cove LNG terminal" which is nowhere else but on the North Spit of the Coos Bay. When this project was first developed for an import purpose, it could have made sense to utilize the site of the Port of Coos Bay as a west coast location due to its proximity to the intersections of the GTN and Ruby pipelines where both Canadian and U.S. markets could be served. But since conversion to an export purpose, the focus becomes gas source. While from Malin there would have been the potential to open new markets for natural gas sources from western U.S. gas fields in the Rocky Mountain states as the JCEP purpose and need statement allows, the Canadian corporate export project owner would also be free to set the percentage mix of the gas supply at will. In the previous iteration of the project, numerous commenters have pointed out that up to 100 percent could be Canadian if the parent company so chose.

As noted elsewhere in this comment (pp. 7-8), it is now known that the Applicant expects to source as little as six percent of the gas from U.S. producers. Going forward, it could be less or even none at all.

Therefore, FERC should recommend the No Action Alternative and outline sub-alternatives that would connect the preferred Canadian gas fields *directly* to existing or proposed LNG export terminals on the western coast of Canada. The Applicant's objective of exporting (Canadian) gas would be reasonably and feasibly accomplished by connecting those fields directly to an existing or proposed LNG facility on the west coast of Canada, thereby eliminating all human and natural environmental impacts across southern Oregon, from Malin to Coos Bay and in the bay area itself. This course would meet the actual Applicant purpose of exporting LNG from Canadian sources to Asian markets with dramatically lower net negative impacts. The Kitimat facility planned by Canada LNG appears to have adequate capacity to meet export needs, especially now that the Canadian government plans to invest an additional $275 million in the project.[62]

If Pembina, the current owner of the Ruby pipeline, so desired, they could perhaps find a profitable way to preserve some of their investment by connecting to Gulf coast facilities. For example, Cheniere Energy's Sabine Pass LNG terminal is already operational and expanding.[63] LNG plants in Corpus Christi, TX and Freeport, TX are under construction. Other Gulf Coast LNG terminals have been approved.[64] Under any of these scenarios, Pembina would have to develop its own project, rather than recycling the one developed years ago by Veresen.

We will grant that first Veresen and now Pembina combined have invested substantial resources to make this project happen—from editing and recycling thousands of pages of Resource Reports to hiring economic analyses to expensive promotional campaigns to incentive payments to obtain easement agreements with private landowners to paying filing and attorney fees to obtain required permits. But the human and natural environmental costs and public

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[62] "Government of Canada Invests in Kitimat LNG Facility," *The Maritime Executive,* June 27, 2019, https://maritime-executive.com/article/government-of-canada-invests-in-kitimat-lng-facility.
[63] Federal Energy Regulatory Commission (FERC), "North American LNG Import/Export Terminals—Existing," https://www.ferc.gov/industries/gas/indus-act/lng/lng-existing.pdf
[64] FERC, "North American LNG Import/Export Terminals—Approved," https://www.ferc.gov/industries/gas/indus-act/lng/lng-approved.pdf

safety hazards of locating this project where it has been envisioned for over a decade are clearly not worth it to facilitate expanding natural gas production in Canada. It is not FERC's purpose to protect a corporation's investments in a project, especially one that has minimal value to this country.

Given the miniscule percentage of natural gas that would be sourced from the U.S. western states, common sense and technical and economic feasibility coupled with substantial adverse human and natural environmental impacts associated with the pipeline and significant hazards and costs to the communities around Coos Bay—contrary to the public interest—FERC needs to take a hard look at letting this time-worn, problematic project go, as is. We strongly urge FERC staff to recommend the "No Action Alternative" and assist the Applicant in recognizing, if they continue to have interest in exporting LNG overseas, that the wiser choice is to connect Canadian gas fields directly with an LNG facility on the west coast of Canada, rather than to continue to pursue a project design that is, in effect, thwarting Pembina from its goal of exporting Canadian gas.

B. Related to the above, FERC staff erred in its consideration of the no action alternative by simply adopting the approach put forward by the Applicant.

Had FERC staff followed the above stated guidance in the Green Book, we believe they would have taken a different, more considered approach to the no action alternative, rather than simply following the lead of the Applicant. The DEIS says this,

> Given that the Project is market-driven, it is reasonable to expect that if the Jordan Cove LNG Project is not constructed (the No Action Alternative), export of LNG from one or more other LNG export facilities could also be authorized by the DOE and eventually be constructed. Thus, although the environmental impacts associated with constructing and operating the Project would not occur under the No Action Alternative, equal or greater impacts could occur at other location(s) in the region as a result of another LNG export project seeking to meet the demand identified by Jordan Cove.[65]

FERC staff should have recognized that what is stated is not a genuine no action alternative at all, rather it is a self-serving construct by the Applicant that turns on a prediction that, if not this project another similar one that may have greater impacts, is a foregone conclusion. This "deferred action alternative" grossly understates the complexity of both the future natural gas market and even the future national and global approach to the development of fossil fuels at a time when ever more urgency is being urged due to intensifying effects of climate change.

C. The DEIS fails to follow in its execution of the alternatives analysis the criteria therein stated on which the determination of alternatives to be analyzed is to be based.

The DEIS states inaccurately that the following process, based on three criteria, was used to determine what could be considered and analyzed as alternatives as follows:

> The purpose of this evaluation is to determine whether an alternative would be preferable to the proposed action. To determine if an alternative would be preferable to a proposed action, we generally evaluate an alternative using three criteria:

[65] DEIS, p. 3-4.

1. does the alternative meets the stated purpose of the project;
2. is technically and economically feasible and practical; and
3. offers a significant environmental advantage over a proposed action.

> The alternatives were reviewed against the evaluation criteria *in the sequence presented above* [emphasis added]. If the alternative would not meet the Project's purpose, or is not feasible or practical, we did not compare environmental information to determine if the third evaluation criterion was satisfied.[66]

It is important to pay close attention to amplification given to the first of the three criteria.

> The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the Project. As described previously, the purpose and need of the Jordan Cove Project is to export natural gas supplies derived from existing interstate natural gas transmission systems to overseas markets; and *the purpose and need of the Pacific Connector Project is to connect the existing interstate natural gas transmission systems of GTN and Ruby with the proposed Jordan Cove LNG terminal*. *Alternatives that do not achieve these purposes cannot be considered as feasible or reasonable alternatives* to the Project [emphasis added]. Furthermore, the Commission cannot simply ignore a project's purpose and substitute a purpose it or a commenter deems more suitable.[67]

To satisfy the purpose and need statement for the PCGP portion of the project per criterion #1 above and warrant even moving on the criterion #2, it appears to us that an alternative would need to include a pipeline that begins nowhere else but at Malin, OR and ends at "the proposed Jordan Cove LNG terminal" which is nowhere else but on the Coos Bay. With the beginning and end points of the pipeline thus fixed and in accordance with the above process, the only legitimate alternatives could be modifications to the proposed pipeline alignment (as FERC staff has actually done in recommending four minor route changes) or perhaps alternatives considered for other locations in Coos Bay.

However, rather than acknowledging that the extreme narrowness of the purpose and need statement forecloses almost all other alternatives, the DEIS proceeds for over six pages to raise "alternatives" primarily that would involve a different location for an LNG terminal/pipeline terminus other than the North Spit of the Coos Bay and would therefore fail to satisfy criterion #1. For example, the DEIS briefly discusses and then dismisses two proposed LNG facilities in Alaska—because the pipeline from Malin would be too long and therefore pose too many environmental disruptions (criterion #3). The numerous proposed LNG terminals that would be located on the west coast of Canada—which, as we noted, could play a role in a new strategy to export Canadian gas to Pacific Rim countries—were also dismissed for pipeline length from Malin (perhaps criteria #2 and #3) and lack of information.[68] Likewise, Mexican options were deemed unreasonable. FERC staff discuss Humbolt Bay in California as a possible alternative location for the LNG terminal. Humbolt Bay, too, fails to satisfy the purpose and need statement for location of the terminal, but FERC staff engages in some criteria comparisons and dismisses Humbolt Bay as offering no advantage in terms of environmental, etc., impacts over the proposed project.

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[66] DEIS. P. 3-2.
[67] DEIS, p. 3-2.
[68] DEIS, p. 3-7.

It is totally unclear to us why all of that useless exercise was performed. The Alternatives Analysis section of the DEIS is thus flawed and almost entirely meaningless.

D. The systematic alternatives analysis DEIS performs regarding LNG terminal locations proceeds to compare the proposed location and four others—ignoring again Criterion #1 that would make the latter irrelevant as alternatives—but the process reveals, in our view, the fact that the proposed location itself fails to meet the conditions the Applicant selected for the analysis alternatives for siting.

The history of the JCEP is provided in the DEIS, but very briefly, begun in 2005 as an import project designed and approved by FERC to supply natural gas to both U.S. and Canadian consumers. The rise of hydraulic fracturing resulted in a market-driven decision by the proponent to flip to an export purpose and another set of required applications was filed. As the project has been subjected to the scrutiny over the ensuing years by experts, state and other federal agencies, and the public, a range of types and degrees of problems have come to light. The most obvious are a conglomerate of serious public safety, environmental, and socioeconomic problems that stem from the siting of the LNG liquefaction, storage, and export terminal in Coos Bay, but public safety was not a central feature of the screening criteria or most certainly, the proposed location would have failed.

A problem is revealed via the project screening criteria. The DEIS reiterates from Resource Report 10 and Table 3.3.2-1 that five locations have been deemed as reasonable alternatives and provides an evaluation of the proposed location on Coos Bay, plus Astoria, Wauna, and Port Westward in Oregon and Grays Harbor in Washington. Each of the sites evaluated is said to meet the following four initial project screening criteria:

> 1. Available Land—a parcel or combination of parcels available for development and large enough to accommodate the proposed LNG terminal facilities and associated safety exclusion zone, about 200 acres.
> 2. Deep Channel Access—a channel with depth of at least 36 feet MLLW in order to accommodate the draft of anticipated LNG carriers.
> 3. Waterfront Access—a site that can safely accommodate the mooring of an LNG carrier and the facilities required to transfer LNG from the terminal to the carrier.
> 4. Comparable Pipeline – a site that could be reached by a comparable natural gas transmission pipeline from the intersection of the GTN and Ruby pipeline systems.[69]

From what is known now, the Coos Bay location fails to satisfy Criterion #1.

> 1. Available Land. The Coos Bay location on the North Spit includes 200 acres; however, the space available is highly compromised in meeting the project's needs due to its proximity to the Southwest Oregon Regional Airport. The FAA has issued numerous Notifications of Presumed Hazard and none have been resolved (see further discussion in Section 4.13 below). For example, one notification stems from the height of storage tanks. The FAA has indicated that JCEP must either reduce tank height or abandon the project. This issue is not a new one. It was acknowledged in the 2015 FEIS for the last iteration of this project. The current DEIS doesn't disclose the fact that the Applicant has been unable to reduce tank height, but other materials do. In the

[69] DEIS, p. 3-10.

alternatives analysis in their removal-fill permit application to the Oregon Department of State Lands (DSL), JCEP indicates that the 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 without violating safety regulations. That and another infeasible strategy to lower tank heights have resulted in the persistence of the FAA notification about tank height.[70] It appears that the proposed location does not meet the actual land availability selection criterion in a practical sense.

E. We are all faced with considering alternatives analyses for a proposed project that appears to constitute little more than justification for a pipeline and site location and design that was decided over a decade ago.

While 40 CFR § 1500.2.e. calls on the agency to "use the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment," the DEIS before us falls short. Because FERC staff began with the Applicant's highly vested conclusion that the proposed location best meets the criteria, the DEIS has both inadequately assessed positive potential to meet at least the central feature of the project purpose offered by other current-day alternatives. Likewise, it essentially ignored serious and persistently unresolved deficiencies that have emerged with regard to the proposed location and design. In the process, other agencies and the public have not been provided with a genuine evaluation of alternatives to this highly impactful project nor adequate informational means to do so.

F. The DEIS evaluation of what FERC staff has identified as reasonable site alternatives includes sites that do not meet the locations required by the purpose and need statement, but beyond that, it rejects at least one site that would involve significantly less serious impacts on the human environment than the prescribed site.

Environmental criteria were examined as summarized in the assessment in Table 3.3.2-1 of the DEIS.[71] They include the freshwater and estuarine wetlands affected at the site, endangered species and existing residences within one mile. With this assessment, Wauna, Oregon along the lower Columbia River appears to have several important factors that would be assets over the proposed location. The Wauna, OR site has low estuarine in-water issues, and very low level of existing residences within a 1-mile area. The Wauna location is also next to the Federal Navigation Channel of the Columbia River that is already 43 feet deep and most is 400 feet wide. A quick view of the land characteristics and development to compare the two sites shows the exceptionally different density of human development and infrastructure nearby, not only in the one-mile, but over the two to four-mile extent.

Moreover, there exist several options within the Pacific Northwest Pipeline infrastructure of existing pipelines within a close distance to the Wauna site on the lower Columbia River, even shown on their Fig. 3.2-1. These sources do not include the Ruby Pipeline. From a regulatory standpoint, we question why the alternative sources are not included in an assessment of the distance to the nearest pipeline as a criterion. But more importantly, the DEIS rejects all four alternatives that were evaluated because,

> When evaluating these potential impacts, we have not identified an alternative site that would result in a significant environmental advantage over the proposed site. Therefore,

[70] DSL Application APP0060697, Section 1 JCEP, Attachment B.1, "Reasonable site alternatives," PDF p. 231.
[71] DEIS, p. 3-11.

> we conclude that none of the regional alternative sites would result in a significant environmental advantage over to the proposed site in Coos Bay.[72]

We strenuously disagree with this assessment. FERC staff appears to have forgotten that the *human* environment is an essential consideration required by NEPA. A reasonable alternative that appears to pose an equally negative impact on the *natural* environment as the proposed alternative, but is located in a far less populated area and therefore guaranteed to pose a far less egregious negative impact on the *human* environment, should not be dismissed in favor of a project with the negative impacts on the communities of North Bend, Coos Bay, Empire, and Charleston, OR.

[72] DEIS, p. 3-11.

CHAPTER 3: CONCERNS RELATED TO NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PROCESS/COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) GUIDANCE

This DEIS fails to comply with NEPA.

> Agencies must integrate the NEPA process into their planning at the earliest possible time to ensure that planning and decisions reflect environmental values, avoid delays later in the process, and anticipate and attempt to resolve potential issues. NEPA should not become an after-the fact process that justifies decisions that have already been made. The CEQ Regulations emphasize early NEPA planning in the context of an EIS. The scoping process can be used before an agency issues a notice of intent to seek useful information on a proposal from agencies and the public. For example, agencies can commence the process to prepare an EIS during the early stages of development of a proposal, to ensure that the environmental analysis can be completed in time for the agency to consider the final EIS before making a decision on the proposal. Further, an agency shall prepare an EIS so that it can inform the decisionmaking process in a timely manner ''and will not be used to rationalize or justify decisions already made.''[73]

Throughout this DEIS, the Applicants' information appears to have been accepted without question and, in many cases on that basis alone, FERC staff has concluded that negative impacts on the human and natural environment would not be significant.

Moreover, since the current project is largely identical to the version that has been in play since 2012 and that was acquired by the parent company as part of a larger business investment in 2017, the EIS being prepared appears to us to be "an after-the-fact process that justified decisions that have already been made."

The DEIS is also deficient in complying with 40 CFR §1507.2. which states that the agency shall,

> (a) Fulfill the requirements of section §102(2)(A) of the Act to utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on the human environment. Agencies shall designate a person to be responsible for overall review of agency NEPA compliance.
> (b) Identify methods and procedures required by section 102(2)(B) to insure that presently unquantified environmental amenities and values may be given appropriate consideration.
> (c) Prepare adequate environmental impact statements pursuant to section 102(2)(C) and comment on statements in the areas where the agency has jurisdiction by law or special expertise or is authorized to develop and enforce environmental standards.
> (d) Study, develop, and describe alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. This requirement of section 102(2)(E) extends to all such proposals, not just the more limited scope of section 102(2)(C)(iii) where the discussion of alternatives is confined to impact statements.
> (e) Comply with the requirements of section 102(2)(H) that the agency initiate and utilize ecological information in the planning and development of resource-oriented projects.

[73] *Federal Register***,** Vol. 77, No. 48, Monday, March 12, 2012, pp. 14476-77.

(f) Fulfill the requirements of sections 102(2)(F), 102(2)(G), and 102(2)(I), of the Act and of Executive Order 11514, Protection and Enhancement of Environmental Quality, Sec. 2.

This document shows little if any integrated use of natural and social sciences and is unclear in the methods and procedures use to assess impacts.

CHAPTER 4. DEIS SECTION 4 ISSUES

Throughout the DEIS document are reported conclusions regarding the likely significance of adverse human and natural environmental impacts of the JCEP. It appears to us as reviewers that FERC staff relied excessively on Applicant information. Some of that information was provided by their own consultants—some conflicts with other sources. Some is outdated information, apparently recycled from previous iterations of the proposed project. This is concerning to us as reviewers, as is the supposition that so many of the clearly harmful effects can be mitigated with management practices and thereby reduced to insignificance.

The League of Women Voters is often skeptical of the practice of mitigation as a means to adequately reduce negative impacts. A large project such as this calls for comprehensive consideration of where the benefits and losses are occurring and a careful examination of alternative approaches and cumulative effects. Many small impacts add up. With so many individually negotiated mitigation measures, there is a potential likelihood for the needs of the Applicant to become paramount over the needs of the resource the various Acts are designed to protect. Mitigation conditions are difficult to enforce, especially for a project such as this where impacts would occur over many miles and acres, as well as in enormous volumes of water. And finally, this DEIS in particular in many cases bases conclusions of insignificant impact on nothing more than the claim that the Applicants' mitigation plans would be implemented, without actually describing what those plans would include. Often it is revealed that they are still being devised and will not be available until a later time.

We are hereby on record for our finding that the DEIS's treatment of mitigation as a panacea for significant negative impacts is highly unacceptable.

4.1 GEOLOGICAL RESOURCES

The DEIS is supposed to reveal the breadth of geologically related factors that have the potential to impact, or be impacted by, the JCEP and then provide an assessment of the human and natural environmental impacts. It fails to do so. The geologic features that potentially impact on the proposed Jordan Cove LNG terminal are deliberately omitted from this section—although without providing a reason. Only the proposed pipeline route is addressed, including geologic characteristics of four mountain ranges; minerals, mining, and mining hazards; seismic hazards including fault rupture, ground-shaking, soil liquefaction and lateral spreading; earthquake-induced landslides; and ground subsidence. Despite this inventory of geologically related challenges and hazards and the vast potential impacts of a major earthquake and tsunami on the human environment in the Coos Bay area (which FERC staff mentions, despite the missing discussion), the DEIS concludes the following:

> Much of the Project is located in the CSZ tectonic area (an area of potential earthquake and tsunami activity). Based on the documentation that mineral resources are not present along the Project; Jordan Cove and Pacific Connector's proposed construction and operations procedures, methods, and plans to appropriately design for geologic hazards; and their implementation of minimization and mitigation measures, we conclude that constructing and operating the Project would not significantly affect geology and would not be significantly affected by geologic hazards.[74]

[74] DEIS, p. 4-40.

We disagree with the conclusion.

A. The DEIS must be found to be deficient as it fails entirely to discuss the Cascadia Subduction Zone as it could impact on the proposed JCLNG Terminal in this subsection devoted to geological resources. Had that topic been raised, the above dismissal of significant impact on the project would have been impossible

It is unclear, but nonetheless disturbing, why FERC staff chose to exclude discussion in this subsection of the most dramatic geologic feature in the region of the proposed LNG terminal. Granted, discussion of the Cascadia Subduction Zone (CSZ) and associated tsunami warrants inclusion in subsection 4.13 "Reliability and Safety" where it does appear. However, it should be dealt with as a geological phenomenon of major importance in this subsection of the DEIS. The purpose of the various subsections is to ensure that all issues with potential impacts on the natural and human environment are explored and presented and that an assessment about impacts is rendered on the basis of that information. If FERC staff sees fit to offer a conclusion about the geological resources and impacts—especially one dismissive of significant impacts—the proposed LNG site and everything of geologic consequence must be included.

The Coos Bay/Pacific Ocean adjacent to the Bay is, in fact, an area of active seismic events. A summary of those that have occurred between 1969 and 2015 is provided in Fig. 1, as detailed in the "Physical Description in the Coos Estuary and the Lower Coos Watershed."[75]

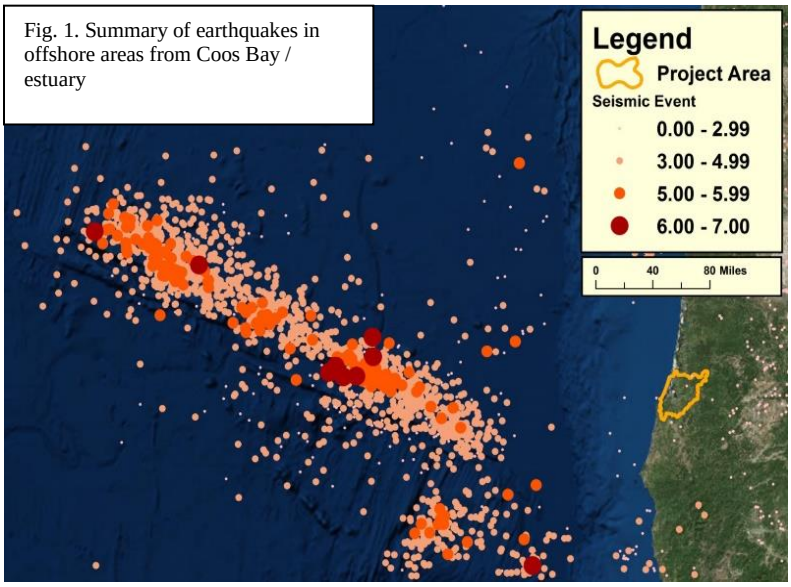

Fig. 1. Summary of earthquakes in offshore areas from Coos Bay / estuary

The bay itself has several faults as shown in the map below. Some have triggered significant earthquakes of 6.0 or more. One fault in particular is located at the proposed location of the LNG facility at Jordan Cove (Fig. 2). The underlying geology of the Coos estuary and surrounding watershed results from the tectonic interactions between the Pacific, Gorda, Juan de Fuca, and North American (i.e., North American continent) tectonic plates, and oceanic spreading from two ridges (Juan de Fuca and Gorda) as detailed by Rumrill (2006)[76]. Along the Oregon coast, pressure from these tectonic movements of the earth's crust have resulted in the folded and warped outer continental shelf margin and cycles of long term, incremental uplift of the coastal lands followed by rapid subsidence events as earthquakes.

[75] http://www.partnershipforcoastalwatersheds.org/

[76] Rumrill, S. 2006. *Ecology of the South Slough Estuary: Site profile of the South Slough National Estuarine Research Reserve*, South Slough National Estuarine Research Reserve, 259 pp.

The DEIS provides some discussion of seismic events in areas of the pipeline, particularly the hot zone in the Klamath Falls area; it also mentions the impacts of Tsunami and other associated risks. However, most all the description of the area and risks is provided with heavy citation of reports from Geo Engineers, unpublished documents. Why are there not references to the many peer reviewed and USGS reports associated with earthquake risks and subduction zone issues? The recent models provided by many highly qualified researchers indicate massive failure of infrastructure. Most seismologists predict an overdue Cascadian subduction earthquake event, and data from the Japan Tohoku quake and others have shown that models were not predicting the probability of events of such exceptional magnitude [77]

B. The DEIS is deficient by omitting substantive discussion of the potential for tsunamis associated with the CSZ.

The actions of tsunami following a subduction zone event in an estuary such as Coos Bay will be repeated wave events back and forth, upstream and downstream causing longer and more damaging events. Neither the likelihood of major destruction and resultant risks to the many populations nearby nor their effects on the facility and underlying geology of the entire area are addressed at all.

C. The construction of the facility includes filling, compaction, and dredging of the slip and access channel, all of which would change the hydrology of the site. This has implications for the stability with short- and long-term effects of the activity.

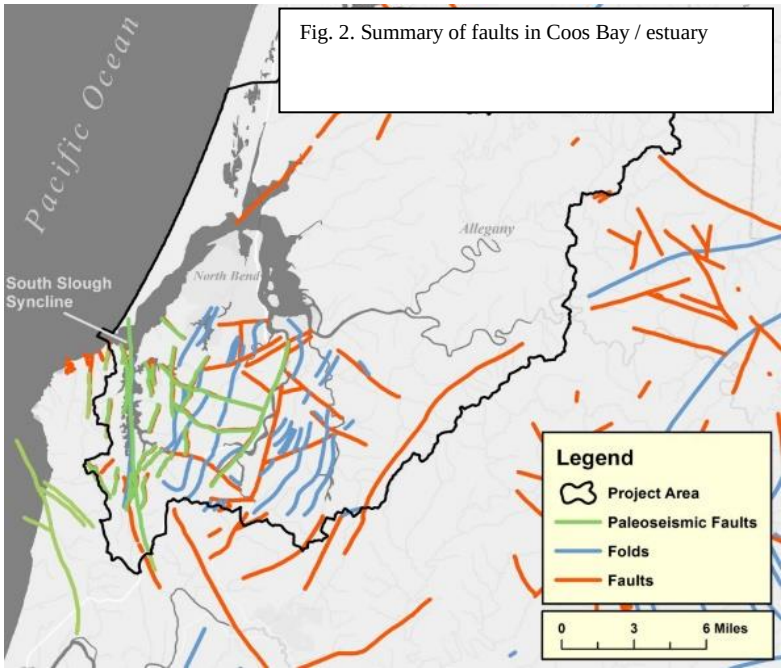

Fig. 2. Summary of faults in Coos Bay / estuary

The magnitude of the proposed removal of 5.7 mcy for the slip and access channel are not surficial changes alone, due to the likelihood of subsidence and the complex relationship of the hydrology of the spit, and erosion as a result of dredging and filling and changing of the patterns of recharge and discharge of water table. The use of sheet piles to secure the sides of the excavated slip and access areas does not prevent exchange of water or contain suspended sediments. The proposed changes in the shoreline and subtidal substrates as a result of dredging of the channel for access and the additional proposed removal of 584,300 cy from the four Navigation Reliability Improvements

[77] Goldfinger C, Ikeda Y, Yeats RS, Ren J (2013a) Superquakes and supercycles. Seismol Res Lett. doi: 10.1785/0220110135; Y. Rong, D. D. Jackson, H. Magistrale, and C. Goldfinger. 2014. Magnitude Limits of Subduction Zone Earthquakes. Bulletin of the Seismological Society of America, Vol. 104, No. 5, pp. 2359–2377; Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017.

(NRI) and compaction of filling of the spit area for construction of the terminal and associated structures would have a profound influence on the circulation of water in the area. We provide additional comments regarding this in subsections 4.2 Soils and Sediments and 4.3 Water Resources below.

Also not addressed are the effects of vibrations from the turbines at the liquefaction facility. These would also affect the sand sediments and sand fill that would occur at the site. The factors of this and the interactions of the ground water in the sand spit are all of concern and should not have been ignored in the DEIS.

D. The DEIS denies that a major earthquake would pose a significant risk to the pipeline.

We reiterate our concern that the DEIS relies on thin research on a topic, often provided by the Applicant in the form of studies and reports performed by their own consultants. The result is often a conclusion based on an overly narrow and potentially biased perspective. With regard to the risk of earthquake damage to the pipeline, the DEIS states this, on the basis of one historic event and a study done for the Applicant by GeoEngineers,

> If a Cascadia-type earthquake of magnitude 8 or greater occurred during the operating life of the pipeline, the ground shaking and possible ground subsidence would be strongest in the Coast Range province and in low-lying areas near Coos Bay. Although ground shaking would likely be felt throughout the length of the pipeline from a Cascadia event, hazards would diminish in the eastward direction, with increasing distance from the offshore epicenter. Documented subsidence zones associated with the 1960 subduction zone earthquake in Chile (Plafker and Savage 1970) indicate subsidence on the order of 3 to 6 feet vertically distributed over a wide trough of approximately 60 miles. Pacific Connector studies (GeoEngineers 2017a) have indicated that the resultant strain accrual on a welded steel pipeline distributed over that length of pipe would not pose a substantial risk to the integrity of the pipeline.[78]

Experts indicate that buried pipelines are at greater risk of rupture from liquefaction, lateral spreading, and landslides than from earthquakes, per se, but the above assessment is arguably overly optimistic.[79] Ruptures and their consequences do occur and when they do, the impacts are likely to be significant. A recent article exploring methodologies of analyzing natural gas transmission pipeline behavior during earthquakes said this,

> Indeed, the earthquake impact on pipelines may cause significant losses in terms of economic and environmental assets and human life. As a matter of fact, in some of the strong historical and recent earthquakes, the natural gas networks suffered heavy damages, causing abrupt service stop [sic] or fires and explosions in the most severe cases as in the catastrophic earthquakes of Northridge (1994), Kobe (1995) and Kocaeli (1999).[80]

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[78] DEIS, p. 4-12-13.
[79] Shirley Weathers phone conversation with Ian Madin, Geologist, DOGAMI, 8/30/2018.
[80] Giovanni Lanzano, Ernesto Salzano, Filippo Santucci de Magistris, Giovanni Fabbrocino, "Seismic vulnerability of natural gas pipelines," Reliability Engineering & System Safety, Volume 117, September 2013, 2013, https://www.sciencedirect.com/science/article/pii/S0951832013000951

Steve Barlett, Associate Professor of Civil Engineering at the University of Utah, stated, "If an earthquake occurs, high-pressure gas lines are one of the most important items to protect. If they rupture and ignite, you essentially have a large blowtorch, which is catastrophic." He noted that pipelines are generally installed to withstand some ground movement but cannot withstand extreme shaking and instantaneous impacts such as drops of earth of several feet that are characteristic of major earthquakes. [81]

Indeed, the harm a major earthquake of the type geologists predict could happen in the Pacific Northwest at any time would almost certainly be far more devastating for the LNG terminal than on the pipeline that feeds it, but the DEIS insufficiently explores the question of seismic impacts on the pipeline and the conclusion of no significance is unsupported and even contrary to expert opinion.

E. The DEIS inaccurately carries forward the Applicant's claim that there are minimal risks that landslides—a major geologic feature all across the pipeline alignment—would be triggered by pipeline construction activities.

This claim is inconsistent with the Oregon Department of Geology and Mineral Industries (DOGAMI) evaluations of the project, as well as DEQ's stated concerns leading to denial of the Applicant's 401 Water Quality Permit.[82] The latter agency's thorough review and evaluation of Applicant materials makes the "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project" an invaluable and reliable resource for assessing the adequacy of information and conclusions in the DEIS. The report provides several examples of deficiencies DEQ found in the Applicant's research, planning, and design that resulted in denial of the permit. Here are lengthy, but pertinent quotes bearing on the question of construction-triggered landslide risks and consequent increased sediment and turbidity:

> Construction ROW [right of way] Along Unstable Slopes. JCEP has not provided specific engineering drawings for its stormwater management system for the construction ROW and the 229-mile construction access road in areas of steep slopes and landslide susceptibility zones discussed below. JCEP is proposing to place grading spoils and, potentially, fill to level working surfaces, on geologically unstable slopes to support the 95-foot construction ROW including the Temporary Extra Work Areas (TEWAs). JCEP's Geologic Hazard Maps show geologically unstable slopes such as mapped landslides and rapidly moving landslide hazard areas in close proximity to the construction ROW. . . . For example, the Tyee Core Area Oregon's Coastal Range is an area of high landslide activity including both shallow and deep-seated landslides. The proposed pipeline traverses the Tyee Core Area from approximately Milepost 6 to 55. Research and technical references on slope stability are clear that land managers should avoid adding water or weight to unstable slopes and avoid cutting into unstable slopes without appropriate geotechnical engineering. Oregon has seen other linear infrastructure development (i.e., roads, pipelines) initiate landslides, particularly in the Oregon coast range (State Highway 20, and Coos County Natural Gas Pipeline).[83]

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[81] U News Center, University of Utah, "Protecting Pipelines from Earthquakes," October 2, 2012.
[82] Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017, p. 11-12.
[83] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove

PCGP's ECRP does not show the engineering analysis and its technical support for how PCGP will manage the construction and post-construction stormwater above the Area of a Rapidly Moving Landslide Hazard and convergent headwall as well as the mapped landslide 115 identified by the Oregon Department of Geology and Mineral Industries.[84]

Stormwater Discharge Relative to Unstable Slopes. To ensure compliance with statewide narrative criteria OAR 340-041-0007(1), DEQ developed the *Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines* (March 2018). In Section E.2.2 of these plan submission guidelines, DEQ requests that project proponents determine if infiltration of stormwater discharge should be avoided due to steep slopes or landslide risks (see Page 9). The proposed permanent ROW traverses over and along unstable slopes in numerous locations. . . . JCEP has not provided DEQ with a postconstruction stormwater plan for the permanent ROW demonstrating how JCEP would manage stormwater along the permanent ROW and, in particular, along landslide susceptibility zones. As discussed in Section 6.1.2.1 of this Evaluation and Findings Report, the stormwater discharge from slope breakers can reduce slope stability.[85]

F. The DEIS's conclusion that seismic issues in various areas along the 229-mile pipeline pose no significant risk of pipeline rupture from soil liquefaction is not compelling.

FERC staff acknowledge risk shortly after the pipeline connects to the LNG facility, "Quantitative evaluation of the potential for liquefaction, lateral spreading, and tsunami inundation was accomplished for the Coos Bay crossing, where liquefaction and lateral spreading hazards were identified during the initial assessment (GeoEngineers 2017a)."[86] Despite this, the conclusion is a blanket dismissal of significance of impact from geologic activities. Additionally, the Applicant states in FERC application materials that, "The PCGP Project is located in relatively sheltered areas of Coos Bay, where the effects of a tsunami on the pipeline are expected to be relatively minor."[87] This conclusion is just one of many that were challenged by Brad Avy, Executive Director and State Geologist of DOGAMI in comments on the project application submitted to FERC on December 1, 2017. Avy indicates that the claim was not backed up by any credible evidence. [88] DOGAMI considers soil liquefaction and associated lateral spreading as one of two primary causes of pipeline rupture in case of a seismic event.[89] This applies to the entire pipeline that would cross highly landslide-prone terrain and numerous waterbodies. Since any single pipeline rupture needs only an ignition source (including static electricity or a spark) to cause an explosion, resultant gas fire—and in a forested area—a conflagration, any

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Energy Project," May 2019, p. 24-25.

[84] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 17.

[85] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 37.

[86] DEIS, 4-12.

[87] FERC PCGP Application, Resource Report 6, Appendix A.6, "Geologic Hazards and Mineral Resources Report," p. 8.

[88] Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017, p. 7.

[89] Phone conversation with Ian Madin, Geologist, DOGAMI, 8/30/2018.

liquefaction-prone areas along the pipeline should be considered "significant." In fact, according to Table 4.1.2.3-2 in the DEIS, there are 10 areas the Applicant's research showed had a "high" likelihood of liquefaction and lateral spreading, interspersed across the 229-mile pipeline route from Coos to Klamath County for a total of seven miles.[90] We urge FERC staff to review thoroughly any comments submitted by DOGAMI as part of the current public comment period before persisting in the FEIS to render the same no significance assessment for this and all other geologic hazards.

G. The DEIS is supposed to convey the results of a reasonably thorough investigation of issues on which to base its assessment of environmental impacts of a project, but instead, the discussion in this section relies almost entirely on the work of the Applicant's consultant.

Brad Avy's comprehensive comments on Resource Report 6 - Geological Resources (of the FERC application) to the Department of Energy on November 6, 2017 outline 51 individual substantive concerns about information gaps and design deficiencies.[91] Among them, Mr. Avy notes the use of limited and outdated source materials. As we review the DEIS, this deficiency remains, suggesting that the Applicant has not adequately addressed Oregon's lead geologist's concerns, particularly with regard to geologic issues along the pipeline route. GeoEngineers is almost the only source noted throughout and it is almost solely on the basis of their work that DEIS conclusions of no significant impact are based. This is unacceptable.

4.2 SOILS AND SEDIMENTS

The DEIS concludes the following about the impacts of the project on matters related to soils and sediments:

> Constructing the Project would result in both short-term and long-term permanent impacts on soils, including soils characterized for reclamation sensitivity. However, based on the Applicants' proposed construction and operations procedures, methods, and plans to address known and unanticipated soil contamination, and the implementation of impact minimization and mitigation measures, we conclude that constructing and operating the Project would not significantly affect soils.[92]

We do not agree.

A. Proposed modifications to the marine waterway (i.e., dredging at four points along the Federal Navigation Channel), referred to as "marine waterway modifications" or "navigation channel modifications" would have serious negative impacts from sediment displacement, yet are treated superficially as enhancements in the DEIS and are not included in cumulative effects considerations.

The USACE is currently reviewing the current Applicant proposal to determine if these Project-related effects to the civil works projects would constitute an injury to the public interest or affect the COE project's ability to meet its authorized purpose or impair its usefulness. However, we

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[90] DEIS, p. 4-17.
[91] Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017.
[92] DEIS, p. 4-74.

find that these must be considered by the DEIS in the context of cumulative effects, and that the clarity of this needs to be included in weighing of alternatives. These four areas as associated with high value wildlife and fishery values, and the operations of these proposed activities have direct effects on the public use and access. The DEIS states in its updates of the project from previous submittals that the Applicant claims: "The proposal now includes the excavation of four submerged areas (removing about 700,000 cubic yards of material) lying adjacent to the existing federally-authorized Federal Navigation Channel, and dredge slurry pipelines in Coos Bay . . . ."[93] However, the David Evans document J1-000-TEC-PMT-DEA-00007-00 indicates 0.59 MCY, as does Table 2.1.1.8-1. We had previously pointed out this inconsistency with the USACE permit application. The document from the latter agency states that the Jordan Cove LNG project proposes to enlarge the Federal Navigation Channel at four locations. Approximately 584,000 CY of material would be initially dredged from four areas to facilitate Navigation Reliability Improvements (NRI).[94] They indicate this as 350,200 CY of sand and soft sandstone at RM 2; 184,000 CY of soft siltstone, sandstone, and sand from an area at RM4.5; an additional 25,200 CY of loose to dense sand to hard sandstone at RM 6; and 24,000 CY of loose to medium dense sand at RM6.8.

The method of removal by hydraulic dredging and placement of spoils from these sites includes a complex assembly of pipeline, booster pumps, and positioning within the bay. The Applicant proposes to lay a temporary pipeline along a total distance of ~ 8 miles to the proposed dredge material management area. The removal and disposal of wet sediments would require extensive dewatering, and the project provides no estimate of the proposed methods of dewatering or management of the area where the proposed spoils would be placed. These disposal areas (APCO Sites 1 and 2) are referenced with no clarification of the feasibility of dewatering and moving this quantity of sediment safely to this area at the bend of the bay. Moreover, the Applicant proposes to place future dredged materials during operations that would be part of maintenance of this enlarged Federal Navigation Channel at this same site. The Applicant estimates that maintenance dredging of these areas and other areas of the slip and access channel may yield approximately 37,900 to 49,800 CY every three years. The stability of this area, and the capacity for that area to receive and hold sediments is not considered, and the two sites are surrounded by wetland areas, as well. Has the Applicant considered the potential height of this, how the spoils would be contained, and the slopes of the placed materials? What will happen with storms and rain events on this pile of unconsolidated dredge spoil?

B. The DEIS has inappropriately dismissed contamination issues at the proposed LNG terminal.

"Appendix E: Contaminated Substances Discovery Plan" has the stated intent: "to outline practices to protect human health and worker safety and to prevent further contamination in the event of an unanticipated discovery of contaminated soil, water, or groundwater during construction of the [PCGP]." [95] In our review, we have several concerns with the thrust of this document and find the DEIS deficient in its consideration of the issues.

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[93] DEIS, p. 1-4.
[94] USACE Public Notice, p. 4.
[95] "Appendix E: Contaminated Substances Discovery Plan," found in Appendix F.10 PCGP POD-Part 2-21.PDF, p. 1.

Human-induced soil contaminants have been found wherever industrial activity has been occurred. The Applicant and the DEIS acknowledge contamination at the former Weyerhaeuser Containerboard/Mill property in the Jordan Cove area (ECSI Site #1083). In the past, DEQ has found mineral spirits, hydraulic oil, diesel, heavy-oil-range petroleum hydrocarbons, heavy metals, butylated tin compounds, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, and dioxins. The Applicant claims that "The Jordan Cove Meter Station (MP 0.00) is the only location associated with the Pipeline where excavation would have the potential of encountering known contamination." The DEIS generally dismisses the chances of contaminant release.

However, DEQ provides important feedback regarding hazardous waste risks.

> DEQ expects JCEP would consult with DEQ and provide additional information as directed by FERC to identify potential hazardous waste and cleanup sites within the project area. Absent this information, violations of toxicity water quality standards are likely, and DEQ concludes there is no reasonable assurance that the proposed activities would be conducted in a manner that would not violate the Toxic Substances water quality standard. OAR 340-041-0033, OAR 340-048-0020(3).

And,

> JCEP proposes a stormwater management plan that does not demonstrate the spill containment controls are designed, for example, to capture a spill from the largest storage vessel in a drainage area:
>
> > a. Without this demonstration, DEQ does not have reasonable assurance that Jordan Cove designed and located spill containment controls in manner to prevent a spill from causing a violation of the toxic substance standard. OAR 340-041-003.[96]

See also subsection A. in 4.3.1.1 Groundwater Resources—Jordan Cove LNG Project below for further discussion of contaminants known to the present in Jordan Cove and North Bend sites from historic paper and pulp milling industries.

C. Turbidity from dredging and drilling in Coos Bay is of great concern and is inadequately handled and estimated with their models.

With the extent of the dredging operations in Coos Bay and placement of spoils at several sites in the Coos Bay area, turbidity would be associated with all the operations. The DEIS relies on the Applicant's model of turbidity in affected areas and discusses likely effects with a series of assumptions. The Applicant indicates that the dredge would be dried before placement, but the quantity of substrates removed and the climate of our area do not appear to have been considered as factors. The Applicant states that all work within the Coos Bay estuary—including construction of the Materials Offloading Facility (MOF), dredging of the access channel and removal of the berm, and dredging associated with the NRI and eelgrass mitigation site—would be performed during the ODFW in-water work window (October 1 to February 15). However, this is a rainy season in the area; we question the ability of the Applicant to create dry dredge spoils and successfully dewater to reduce turbidity. The project proposal includes a permanent

[96] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, pp. 71-72.

impact on 15.078 acres of mud flats, 1.9 acres of vegetated shallows for a total of 16.978 acres with a permanent impact that is proposed for their mitigation. The total acreage affected is projected at 90.951, but much of this is considered temporary of which are 58.036 acres subtidal. These subtidal areas are highly likely to produce turbidity.

Deficiencies in JCEP plans for dealing with risks of frac-outs during HDD increase the potential for significant turbidity standard violations as well as other issues. The DEIS provides these proposed locations in Table 4.3.2.2-2. We discuss this here in soils and sediments section and again in water quality. Horizontal Directional Drilling (HDD) operations required to route the PCGP under the Coos estuary are expected to produce an estimated minimum of 3,900 cubic yards of excavated sediment. We do not know where these sediments would be placed or contained. What are the estimated volumes and chemical characteristics of the sediments? How are the fluids associated with the HDD operations to be treated and disposed of? The access areas for the leg under Coos Bay from Kentuck Slough to North Bend would have considerable activity and both areas are wetlands. Likely the sediments and drilled fluids would be brought to the surface in the vicinity of two or more of the proposed inbound and outbound pipeline HDD surface penetrations; 1) a site near the shoreline of Kentuck Slough; 2) two sites in the vicinity of the South end of the Highway 101 bridge over the Coos Estuary and; 3) one site at the proposed Pacific Connector pipeline terminus at the South Dunes LNG terminal location. Because the proposed HDD operations would take place in close proximity to the shoreline of the estuary, and because HDD operations would produce a considerable volume of drilled sediment and drilling fluids, an operations and management plan for the HDD operations is not available when one examines the document referenced in footnote 42.[97]

D. The DEIS fails to adequately consider the soils and stability of the land mass along the pipeline.

Landslides are well documented within areas of proposed Pacific Connector pipeline. The slides could be triggered by earthquake events or from storm related events, the instability of the geology, or construction activities. The proposed route crosses four regional physiographic provinces in Oregon: Coast Range, Klamath Mountains, Cascade Range, and Basin and Range. The Coast Range is especially vulnerable to slides and erosion, as it has relatively soft marine sedimentary rocks that overlie basalt, and the frequency of slides and erosion is high and well known. Moreover, areas that are disturbed and cleared of vegetation would have increased risks of failure. The proposed use of ridge tops would expose soils and erosion and channeling of overland water flow can be expected to result in increased risks for slides, slope failures, and mass wasting. Landslides are one of the most common and most devastating geohazards in Oregon and contribute over $10 million of economic losses every year[98], Seismically induced landscapes have been modeled for Oregon and show the highest risk in areas of southern Oregon that combine marine sediment and slopes with seismic risks to provide an overlay. In addition, below (Fig. 3) we note seismic risk areas from Sharifi-Mood et al. 2017.[99]

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[97] The footnote references PCGP FERC Application, Appendix G.2 of Resource Report 2 which indicates the information is forthcoming.

[98] Mahalingam, R., Olsen, M.J., O'Banion, M.S. 2016. Evaluation of landslide susceptibility mapping techniques using lidar-derived conditioning factors (Oregon case study), Geomatics, Natural Hazards and Risk, 7:6, 1884-1907,

[99] Sharifi-Mood, M., Olsen, M. J; Gillins, D. T., Mahalingam, R. 2017. Performance-based, seismically-induced landslide hazard mapping of Western Oregon. Soil dynamics and earthquake engineering 103:38-54.

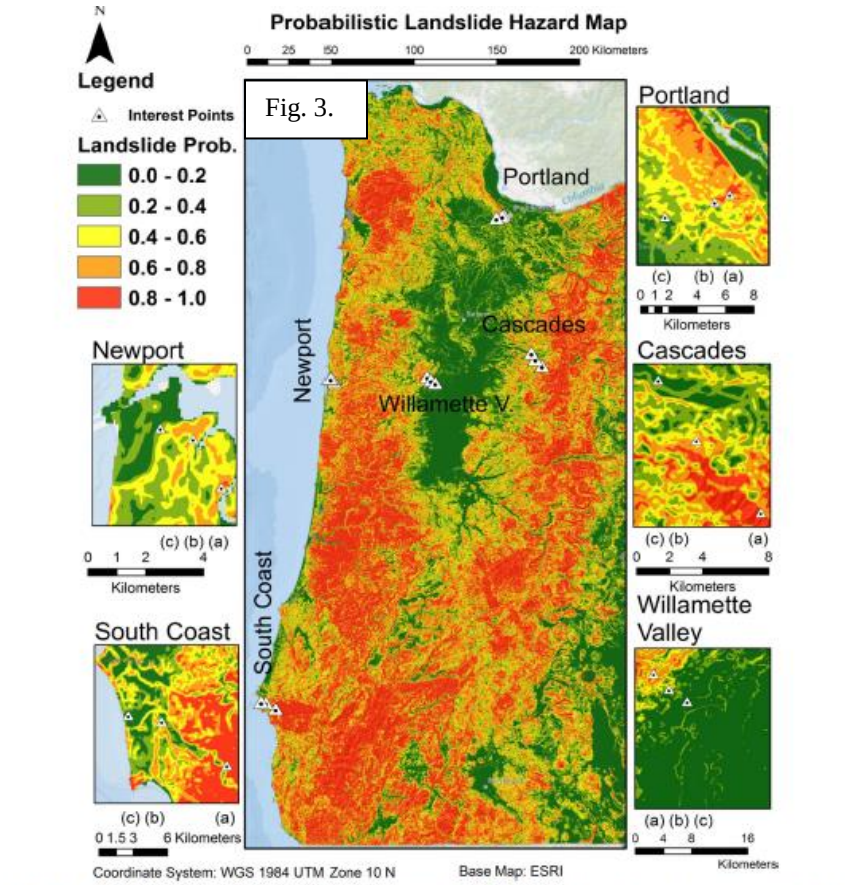

Fig. 8. Fully probabilistic landslide hazard map for western Oregon using Newmark's slope stability model. The figure depicts the map in 5 selected regions in more detail. Interest points (a) are in steep slopes (slope > 38°), (b) in hill sites (10° < slope < 20°) and (c) in relatively flat sites (slope < 5°). (For interpretation of the references to color in this figure, the reader is referred to the web version of this article.)

E. The DEIS wrongly dismisses the potential impacts of contaminated and toxic hazards caused by pipeline construction on the natural and human environment.

The potential for toxic and contaminated materials to find their way into the numerous water bodies to be crossed by the PCGP is dismissed as insignificant by the Applicant and the DEIS. We contend that the Applicant's investigation and description of potential contaminants is insufficient and the DEIS irresponsibly accepts their guarantees. The Applicant acknowledges that contamination exists, but claims use of Best Management Practices (BMP) would eliminate significant impacts. As we explain below, our review of project information indicates that they understate, underreport, and under-evaluate numerous potential issues. Reliance on their conclusion in the DEIS is evidence of insufficient investigation.

"Appendix E: Contaminated Substances Discovery Plan" included with the DEIS has the stated intent: "to outline practices to protect human health and worker safety and to prevent further contamination in the event of an unanticipated discovery of contaminated soil, water, or groundwater during construction of the [PCGP]." [100] We have several concerns with the thrust of

[100] DEIS, "Appendix E: Contaminated Substances Discovery Plan," found in Appendix F.10 PCGP POD-Part 2-

this document and believe the DEIS is deficient by accepting it as adequate for purposes of the NEPA analysis.

First, although in Appendix E, PCGP purports to have evaluated "sites within construction areas" and "sites in proximity to pipeline project area" by consulting DEQ's Environmental Cleanup Site Information Database (ECSI). They conclude "no risk of impact" for each one. The rationale most often provided is that the areas would only be used as pipe yards. We contend that this approach disregards the realities of how dangerous and harmful contaminants are acted upon by ongoing forces such that they can be released to cause deleterious impacts, regardless of use. Contaminated soils do not suddenly become stable and inert once a construction period is over. If that were the case, why would the EPA and DEQ concern themselves at all with contaminated sites, as long as human activity that created that situation has ceased. In fact, the massive disturbance the construction phase of this project would generate is just the beginning of a potential set of cascading and long-term circumstances. Every hard rainfall that sends water, if not mud, rushing across a clear-cut easement and eroding its way down a steep embankment poses the risk of contaminant release. And looking only at the construction phase, we are not assured by the Applicant's promise at 5.0 that, when ". . . unanticipated contaminated soil, water and/or groundwater is encountered during construction . . . . All construction work in the immediate vicinity of areas where hazardous or unknown wastes are encountered will be halted" and a long list of measures will be implemented before construction resumes.[101] Are we to be confident that work stoppage on a tightly budgeted project would be consistently implemented? Under what circumstances? Would blowing dust be considered adequate cause for action?

More concerning is that Appendix E is silent on other egregious sites of known contamination in close proximity to the pipeline construction route. Human-induced soil contaminants have been found wherever industrial activity has been done historically. The Applicant has not investigated and reported on the most enduring industry, timber and wood products, beyond the former Weyerhaeuser Containerboard/Mill property in the Jordan Cove area (ECSI Site #1083). The Applicant claims that "The Jordan Cove Meter Station (MP 0.00) is the only location associated with the Pipeline where excavation would have the potential of encountering known contamination." They go on to list nine ESCI or Leaking Underground Storage Tank (LUST) sites, none of which they expect would pose problems. Whether or not they are correct in that warrants further investigation, but what is missing is any mention of seriously contaminated sites that have been under investigation by the EPA and DEQ for decades to the east of the last site JCEP addresses, the Thomason Mining Property near MP 109-10, leaving almost 100 miles (over 40 percent of the total pipeline) without analysis.[102]

There are conceivably several unknown sites of contamination within that segment of proposed pipeline, but there is at least one known site of significance JCEP failed to discuss. A 660-acre site in Klamath Falls formerly owned by Weyerhaeuser and now owned by Collins Company is on DEQ's database (ECSI #655). It is located near MP 198 and bounded on the south side by the Klamath River. The site of concern includes an old landfill, storm water outfall, a sawmill and powerhouse, and sediment. Limited testing has been done and most is over a decade old. But extant test results show that all areas contain multiple contaminants. An excerpt from the ESCI

21.PDF, p. 1.

[101] DEIS, "Appendix E: Contaminated Substances Discovery Plan," found in Appendix F.10 PCGP POD-Part 2-21.PDF, pp. 7-8.

[102] Ibid., pp. 1-6.

states, “It should be noted that this segment of the Klamath River is listed as water-quality-limited. In particular, total maximum daily load (TMDL) limits for pH, dissolved oxygen, temperature, ammonia toxicity, and chlorophyll-a are exceeded. The primary reasons for this are thought to be unrelated to point sources, and include algae entering the river from Lake Ewauna and Upper Klamath Lake, agricultural runoff, and historic storage and transfer of logs on the river. The Klamath River National Wildlife Refuge is across the river from the plant.”[103] The ESCI database entry for the site indicates that appropriate cleanup measures have not been executed due to a disagreement over distribution of responsibility between the former and current owner. The fact that the Applicant presents no information about this only marginally tested, but clearly contaminated ESCI site, is deeply concerning and should have been investigated by FERC staff.

We note that DEQ, in its Evaluation Report accompanying denial of the 401 Water Quality Permit, indicates that information provided by the Applicant is deficient to ensure contaminants are not released to Oregon’s waters. We find it useful to again quote extensively from the Report:

> Trenched crossings across waterbodies can increase the mobilization, solubility, and availability of soil contaminants. As discussed above, sources of soil contaminants include naturally occurring minerals, legacy wastes from mining operations, and chemical contaminants from industrial operations.
>
> On March 11, 2019, DEQ requested JCEP develop site-specific water body crossing and restoration plans for each waterbody affected by the pipeline. The plans are necessary to address methods needed to restore hydrologic and habitat function to predevelopment conditions. At locations where toxic or hazardous substances may be present, DEQ would rely on these plans to determine that construction and site restoration is completed in a manner that prevents the mobilization of soil contaminants.
>
> DEQ has not yet received the waterbody crossing plans from JCEP. Absent such plans, DEQ cannot conclude that project actions avoid or minimize activities that discharge toxic substances into waters of the state.[104]

Dismissal of significant risk in view of these types of information gaps is unacceptable. It is also not acceptable for the right to the public to information and comment for the DEIS to simply ensure that the inadequacies in the contaminated substances plan will be rectified “before construction.”[105]

F. The DEIS should not go beyond following the Applicant’s lead in finding the potential for mercury contamination from historic mines of insignificant concern based solely on a report prepared in 2007 by the Applicant’s consultant.

The PCGP would be routed near the Red Cloud, Mother Lode, Nivinson, and Elkhorn mining groups, posing the potential for mercury contamination from historic cinnabar mines. The

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[103] Oregon DEQ, Environmental Cleanup Site Information (ECSI) Database Site Summary Report - Details for Site ID 655, Weyerhaeuser - Klamath Falls.
[104] Oregon DEQ, “Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project,” May 2019, p. 70.
[105] DEIS, p. 4-60.

Applicant's consultant, GeoEngineers, conducted sampling and produced a report on their findings in 2007. At 6.2.2 Ecological Health Risk Screening, the report notes,

> Mercury was detected in soil and stream sediment samples at concentrations that exceed ecological risk screening criteria at each of the sampling areas, except in presumed background areas. However, the proposed construction should not alter or adversely affect ecological health at the site or downstream areas because appropriate erosion and sediment control measures at upland and in-stream areas will be rigorously implemented in accordance with the PCGP Erosion Control and Re-vegetation Plan (ECRP) and the site-specific erosion and sediment control plan.[106]

GeoEngineers concluded: "It is our opinion that the relatively low concentrations of mercury in sediment in the EFCC channel at the proposed pipeline crossing, along with the limited disturbance area (less than 95 linear feet), does not pose a significant risk to downstream human and ecological receptors." [107]

We cannot assess the accuracy of Geoengineers findings or conclusions. However, the extent of disturbance required for this project coupled with factors such as the terrain, the potential for collapsing mining structures, and weather conditions over time suggest that at least more thorough study and consideration of operations and cumulative impacts is needed before any water quality permits are issued for this project. DEQ appears to be calling for that, too. GeoEngineers' work was done over a decade ago and some of the information they relied on is quite a bit older. The DEIS should have required more recent investigation and, as we have noted before, reliance solely on the work of the Applicant's consultant lacks credibility.

4.3 WATER RESOURCES AND WETLANDS

4.3.1.1 Groundwater Resources—Jordan Cove LNG Project.

The DEIS concludes that "impacts on groundwater resources at the Jordan Cove LNG Project would be minimized to the extent practicable and would not be significant."[108]

We disagree.

A. The DEIS treatment of groundwater resources is incomplete and assumptions as to the interactions with the aquifer, removal and fill operations affecting surface and estuarine tidal and subtidal areas are not considered in any cumulative effects model.

From our examination of information about the Dune-Sand Aquifer, there is a high potential that the land filling, road building, and excavating activities of the site would affect water wells. The report and modeling by USGS (Jones 1992)[109] of water levels in wells across this aquifer shows the contours of the water table. The general flow of the water table is toward the north and west;

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[106] "Mine Hazards Evaluation and Mercury Testing at the Red Cloud, Mother Lode, Nivinson, and Elkhorn Mining Groups, Jackson and Douglas Counties, Oregon, August 23, 2007." At Appendix R.2 of PCGP FERC application.
[107] "Mine Hazards Evaluation and Mercury Testing at the Red Cloud, Mother Lode, Nivinson, and Elkhorn Mining Groups, Jackson and Douglas Counties, Oregon, August 23, 2007." At Appendix R.2 of PCGP FERC application.
[108] DEIS, p. 4-77.
[109] Jones, M. A. 1992. Ground-water availability from a dune-sand aquifer near Coos Bay and North Bend, Oregon. U.S.G.S. Open-File Report 90-563.

the aquifer is highly permeable. The substrate permeability and slopes appear to support the expectation that runoff from the site and changes in water flow would likely influence and infiltrate the groundwater and groundwater-related surface water resources of the North Spit. The western and southern boundaries of the aquifer drain into the tidally influenced portions of the Coos estuary. The lateral boundaries are not bounded by impervious materials. The movement of water and horizontal flux is much greater than vertical flux rates, and thus the large excavation of the slip would provide a profound influence on flux.

Moreover, industrial wastewater contaminants from prior activities at the site should be carefully considered as these relate to the proposed JCEP and its permit application. In 1963, many years prior to JCEP's project proposal, a pulp and paper mill were built at Jordan Cove by Menasha Wooden Ware Company (now Menasha Corporation) and operated using a sulfite pulp process. The mill was purchased by Weyerhaeuser Corporation which operated it until 1995 when it ceased pulp mill operations and began making recycled paper. Effluent from the mill was pumped to a 230-acre wastewater treatment lagoon located approximately 0.5 miles from the proposed JCEP operation. An environmental assessment stated that the groundwater quality was slowly improving with time around the lagoon and a 30-acre aeration stabilization basin (later added by Weyerhaeuser) which was associated with the 230-acre lagoon.

The sulfite process of pulp bleaching used elemental chlorine in bleaching the pulp at the North Bend mill at least until 1981 and perhaps until 1995. In the process, it also produced highly toxic dioxins, dioxin-like PCBs, furans, and various metals, including mercury, lead, cadmium, and chromium. Dioxins, dioxin-like PCBs, and furans are very persistent in the environment and bio-accumulate in fish, shellfish and waterfowl. The half-life of some of these compounds in the environment range from 25-100 years according to the Environmental Protection Agency's (EPA) website. The wastewater treatment lagoon was used unchanged from 1963-1972, using evaporation and infiltration (dilution, essentially) to reduce the volume of effluent and disburse it into the sand. In 1972, a pipeline was constructed, and the effluent pumped from the lagoon to an ocean outfall, possibly reducing environmental exposure of the North Spit to the effluent as detailed by Oregon DEQ[110]

The DEIS follows the lead of the Applicant in failing to address issues relating to the extent and risk posed by previous industrial contamination at the proposed site and neighboring areas. The potential exists for the project's proposed dredging and excavation to expose the surface and groundwater to several subsurface chemical contaminants directly or by altering the hydrology around the site, mobilizing sequestered contamination to move into the aquifer.

Table 4.3.1.1-1 in the DEIS indicates that Jordan Cove estimates that it would need a total of about 667 million gallons of water for construction and operation of the Jordan Cove LNG Project. They indicate that three of four Roseburg Forest Products wells would be buried to create a construction staging area and would be permanently abandoned in accordance with state regulations.[111] Jordan Cove would drill new wells to the east to replace the buried wells. The understanding of this aquifer's ability to deliver these is not provided, and they Applicant claims that neither construction nor operation of the Project would impact the CBNBWB wells to the north due to the distance of the wells from the Project (the closest CBNBWB well is about 3,500 feet north of the terminal). Where are the data to support their conclusion? The quantity of

[110] 2006 Environmental Cleanup Site Information (ECSI) Database Site Summary Report—Details for Site ID 4704, Weyerhaeuser Ingram Yard.
[111] DEIS, p. 4-75-76.

removal expected for testing and construction needs is estimated by the Applicant to total 600 million gallons, with estimated peaking needs for grading and hydrotesting of the LNG tanks.

At the same time there would be massive dewatering during the excavation and grading required to create the marine slip. The Applicant considers this to be a minor effect. Moreover, the DEIS states that the contractor would determine the most appropriate method for dewatering excavations and appropriate permits.[112] These activities need to be considered up front in this DEIS, as they are all likely to be factors in the environmental consequences.

In addition, this section considers the aspects of operations on the groundwater with regard to spills of various types. Because of this, the project proposes to have a system of curbs, drains, and basins to collect and contain any spills of LNG during operation. They propose to have about 100 acres with impervious surface materials, such as asphalt, concrete, and compacted gravel. The conversion of pervious surface to impervious surface typically causes a decrease in the local recharge of shallow groundwater by converting infiltration to runoff. They propose to capture this runoff except during times of high flows where it would run off directly to the bay, yet provide no details as to the way this operation would be conducted.

4.3.1.2 Groundwater—Pacific Connector Pipeline Project

The DEIS concludes this about the potential impacts of the pipeline on groundwater resources:

> The construction of the Project would temporarily affect groundwater. However, based on the characteristics of underlying groundwater, the Applicant's proposed construction and operations procedures and methods, and their implementation of impact minimization and mitigation measures, we conclude that constructing and operating the Project would not significantly affect groundwater resources.[113]

We do not have confidence in the latter statement. It lacks basis in research or fact. It is further evidence of residual adverse effects from this project that the DEIS attempts to make by accepting Applicant assurances.

A. The DEIS does not adequately consider the potential for groundwater disruption or loss along the pipeline due to construction or blasting.

The Applicant 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. The pipeline and its bedding material would substantially alter surface and subsurface flow patterns. Blasting is planned for numerous locations along the pipeline route and could easily alter groundwater flow to the point where water wells would be disrupted or ruined. Pacific Connector has developed a *Blasting Plan,*[114] but a plan can't control the impact of blasting on complex geologic structures. 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.

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[112] DEIS, p. 4-76.
[113] DEIS, p. 4-82.
[114] DEIS, p. 4-81

Additionally, the pipeline would cross six wellhead protection areas (WHPA), vulnerable areas where contaminants can be introduced into groundwater and harm drinking water supply.[115] There are 116 sites with cleaned-up, potential, or confirmed soil and/or groundwater contamination within 0.25 mile of the pipeline route where there is the potential to encounter contaminated soil or groundwater during construction.[116]

B. The DEIS wrongly follows the Applicant's lead in dismissing the potential for groundwater harm from frac-outs during hydraulic directional drilling on major rivers along the pipeline.

Please see pp. 50-51.

4.3.2 Surface Water

4.3.2.1 Jordan Cove LNG Project

FERC staff depart in this subsection from the general pattern of phrasing a conclusion—generally of no significant impact—about the overall topic at the end. Instead, a number of potential impacts to surface water are dealt with separately. In addition to inaccurately assessing impacts, the segmentation inappropriately masks the cumulative impacts.

A. The DEIS erroneously claims that dredging and construction activities would result in, "temporary increases in turbidity and sedimentation in Coos Bay".[117]
Dredging of an access channel and slip that is deeper than the deepest of the navigation channel would change the nature of sediment and water flow, especially given the large outside bend with an access channel (nearly 10 feet deeper) over the depth of the navigation channel of the estuary. For this reason alone, there would likely be increased need for maintenance dredging in this reach. The fact that the access channel is deeper than that of the Federal Navigation Channel is a totally new condition, likely to complicate sedimentation and sediment dynamics.

In addition, added turbulence from the heavy use of the slip by carriers, propeller wash from the LNG carriers and tugboats associated with the Project can be expected. Clearly the increased wake, as well as ship wakes (waves) breaking on shore, could increase erosion along the shoreline and resuspend loose sediment along the shallow shoreline area, resulting in temporary increases of turbidity and sedimentation in the bay, both of which would affect water quality. The effects of these actions relating to sediment, bottom disturbance, and wave actions on marine aquatic resources are discussed further in our comments on DEIS subsection 4.5 Wildlife and Aquatic Resources.

Additional alterations of the bay—the so-called modifications to the marine waterway, include four dredge locations located adjacent to the Federal Navigation Channel The dredging of the tidal and subtidal areas to provide this modification would occur during one in-water work window of October through February 15.

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[115] DEIS, p. 4-79.
[116] DEIS, p. 4-80.
[117] DEIS, p. 4-83.

B. The DEIS erroneously claims that the effects of maintenance dredging and disposal would be localized and short term.

According to the DEIS,

> Based on the turbidity modeling conducted for both construction and maintenance dredging, the effects of maintenance dredging and disposal are predicted to be localized and relatively short term. Effects of maintenance dredging on suspended sediment concentrations and distribution in the slip, access channel, and Federal Navigation Channel would be similar to those discussed for the respective type of dredging methods used (Moffat & Nichol 2017c). However, the duration would be shorter for maintenance as less material would be removed than during construction.[118]

We disagree for the following reasons:

1. The Applicant provides minimal information to assure that maintenance dredging would not affect water quality. We instead foresee, due to the massive habitat alterations at the site, there would be need for frequent maintenance dredging throughout the lifetime of the project.

The process of hydraulically transferring dredged material to the APCO sites and discharge of the slurry material to temporary containment berms would be risky. Hydraulic transfer requires large volumes of water to maintain dredge material in suspension during transfer. JCEP's Dredge Material Management Plan includes no proposal to manage and treat discharge from these containment areas to remove suspended material and reduce turbidity. The deposition and dewatering of sediments dredged from the NRI sites at the APCO #1 and #2 dredged material disposal sites would initially elevate the soil surface a minimum of 37 to 49 feet above the existing soil surface elevations at these sites. These activities hold potential impact ground water quality and seasonal groundwater recharge dynamics in the vicinity of the dredged material disposal sites. This work window is also within a time of significant rainfall events and winter storms.

2. Operational impacts of ships entering, loading, and moving in and out of the slip and Federal Navigation Channel would introduce nearly constant, permanent disruptions to other use of the area by human or wildlife.

The propeller wash from LNG carriers and tug boats associated with the Project, as well as ship wakes (waves) breaking on shore, could increase erosion along the shoreline and resuspend loose sediment along the shallow shoreline area, resulting in temporary increases of turbidity and sedimentation in the bay, both of which would affect water quality. The effects of propeller wash related actions causing increased sediments, bottom disturbance, and wave actions on marine aquatic resources are discussed in section 4.5 of the DEIS, but the aspects of ship operations are highly relevant to water quality. Their effects are not temporary. They would be permanent alterations, especially with the predicted visitation of 100 to 120 ships each year for a total of 200 to 240 round trips. Given the loading times of at least 24 hours and limitation of travel to high tide, these disturbances would be long term and cumulative. The proposed additional space for ships in the slip provides insight that it is likely that at times, two ships would be there at once.

[118] DEIS, p. 4-86.

C. The DEIS erroneously claims that the discharge of ballast and engine cooling water into the slip would not negatively impact water quality in the Coos Bay.

According to the DEIS,

> While berthed, LNG carriers would release ballast water and engine cooling water into the marine slip. No wastewater would be discharged from the LNG carriers into the slip. The LNG carriers may arrange with licensed private entities for refueling, provisioning, and collection of sanitary and other waste waters contained within the carrier. The licensed private entities would transport the waste to a permitted treatment facility. Discharges from vessels are subject to regulation by EPA. EPA currently regulates these discharges via the Vessel General Permit.[119]

Each LNG carrier is expected to discharge approximately 9.2 million gallons of ballast water during the loading cycle to compensate for 50 percent of the mass of LNG cargo loaded. What would be the effect of these 9.2 million gallons of high salinity sea water released into the slip on the distribution of sediments and the dynamics of the area?

Without any supporting data the DEIS also states,

> Discharging ballast water would not substantially affect water quality in Coos Bay. At the point of discharge, the interface with Coos Bay would experience temporary changes in salinity, temperature, pH, and dissolved oxygen. However, these changes to water quality would be highly localized and would quickly dissipate. While open ocean water has generally higher salinity (e.g., 35 practical salinity units [psu]) than typically occurs in Coos Bay (range 16 to 33 psu; Shanks et al. 2010, 2011) due to the high volume of water passing by the loading area, the contribution of ballast water would be only about 0.3 percent of the water passing by the terminal. Therefore, no measurable changes in salinity, other than directly at the discharge port, would occur.[120]

We disagree.

Using the total volume of water in the slip area is not an appropriate way to address toxicity or impact. The relation of release of water to the fact that mixing may or may not occur, and the relation of temperature and salinity are complex considerations. Moreover, the release of cooling water discharge from the ship during filling is also a factor the DEIS does not take into account. These are interactive and cumulative effects are poorly dealt with here and will be part of discussion later in our comments in Section 4.14.

D. The DEIS erroneously claims that construction activities in the bay would have minimal effects on temperature and tidal and other water movement.

In section 4.3 Water Resources and Wetlands, the DEIS reports in discussions of turbidity and sedimentation that modeling conducted by Moffatt and Nichol (2017d) was done to determine the potential effects of all proposed actions, including slip and access channel excavation, marine waterway modifications, and Eelgrass Mitigation site dredging on flow hydraulics in the bay. They conclude:

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[119] DEIS, p. 4-88.
[120] DEIS, p. 4-88.

> Construction in these areas would produce no or negligible impacts on overall tidal flow, tidal range, current velocity, and circulation in Coos Bay. . . . Additionally, the result of the tidal flow circulation modeling and analysis predicts that there would be localized velocity reduction as well as localized small increases in velocity in portions of the bay. These would include slight velocity increases near the pile dikes at the eastern corner of the access channel. The deepening of the channel near the mouth of the bay (NRI 1 channel deepening area) at the entrance turn also appears to have resulted in locally increased currents to the north in Log-Spiral Bay. . . . Overall the effects of Project actions on the Coos Bay tidal prism were unsubstantial, and effects on tidal current velocity changes were also negligible except for a few localized areas.[121]

Again, we disagree with their conclusions.

The reported effects in the DEIS are supported by models and documents by Moffitt and Nichol (various dates), consultants of the Applicant, and they are not representative of other models in progress or published regarding the dynamics of the estuary. Current work provided in the Partnership for Coastal Watersheds by David Sutherland and his students provides a different perspective. A manuscript by Eidam et al. (in press[122]) documents that in the past 150 years, the total Coos Bay estuary area has decreased by 12% due to dredging, the primary navigation channel has 26 deepened from ~6.7 m to 11 m (a 64% increase), and the volume has increased by 21%. These changes have driven a 33% increase in tidal amplitude, an 18% increase in salinity intrusion length, and an increase in 28 ebb dominance of currents. They used the Finite Volume Coastal Ocean Model (Chen 2003)[123] to further simulate proposed changes to the navigation channel and provide evidence of further increase of salinity intrusion. They pose potential influence of this on the existing oyster restoration, existing oyster farming, healthy eelgrass communities, and hydrodynamic information relevant to navigability and larval transport. These authors suggest and support with reference to other studies (MacCready and Geyer 2010)[124] that in many estuaries, including Coos Bay, increase in channel depth increases both the estuarine circulation and residual stratification, resulting in a nonlinear increase in subtidal salt flux and landward expansion of the salinity field. We offer the limited nature of the models used by the Applicant and lack of peer review of the work provided as evidence that conclusions regarding impact by the Jordan Cove consultants should be questioned.

According to the Partnership for Coastal Watersheds, multiple waterways in the estuary are considered water quality-limited under the Clean Water Act for high temperatures and low dissolved oxygen. In addition, data regarding salinity and temperature provide a good basis for information that should be included in the assessments, but they are not.

Cindi Roye (1979) provided a comprehensive inventory of the estuarine resources at the time of delineating the zoning and scientific basis for the existing Coos Bay Estuary Management Plan (CBEMP). This is a substantial documentation of the condition and function of the estuary at the

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[121] DEIS, p. 4-85.

[122] Eidam, E.F, Sutherland, D.A., Ralston, D.K., Dye, B., Conroy, T., Schmitt, J., Ruggiero, P, Wood, J. *in press*. Impacts of 150 years of shoreline and bathymetric change in the Coos 1 Estuary, Oregon, USA.

[123] Chen, C., Liu, H., & Beardsley, R.C. (2003). An unstructured grid, finite-volume, three-dimensional, primitive equations ocean model: application to coastal ocean and estuaries. *Journal of Physical Oceanography, 20,* pp.159-186.

[124] MacCready, P., & Geyer, W.R. (2010). Advances in estuarine physics. Annual Rev. Mar. Sci., 2, 35-58, 719 doi:10.1146/annurev-marine-120308-081015.

date of publication. The DEIS uses some of these data in the description of the estuary water exchanges but ignores other information, such as her reference to temperature stratification. The lower bay was documented to have thermal stratification in summer months (see Fig. 4 and Fig. 5 below from temperature profiles from Roye). The operational window for ships is year around, and thus there are significant differences in the nature of the estuary during different times of the years. What the sediment models look like in the winter would be different from during low river flows in the summer, and all of these aspects are impacted by the inflows from the rivers feeding the estuary.

Nuisance phytoplankton growth could also be fostered with these discharges. We suggest that the alteration of landscape and changes in the flows, especially in the area of the slip, elevated temperature and dynamic nutrient and flow regimes could give rise to nuisance phytoplankton blooms. In addition, the wetland areas of the North Spit should be explored for consequences of disruption of the ground water flows and potential for developing nutrient related algal blooms. These are not investigated at all in the DEIS.

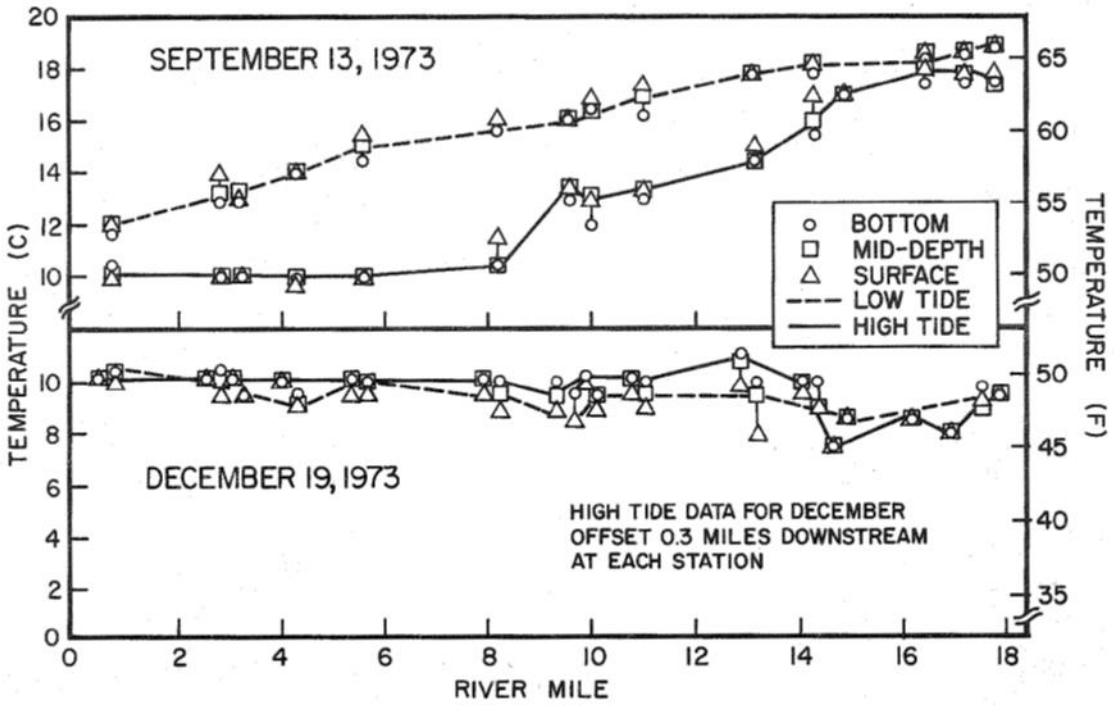

Fig. 4. Temperature vs. river mile, Coos Bay, September 13 and December 19, 1973 (Arneson 1976).

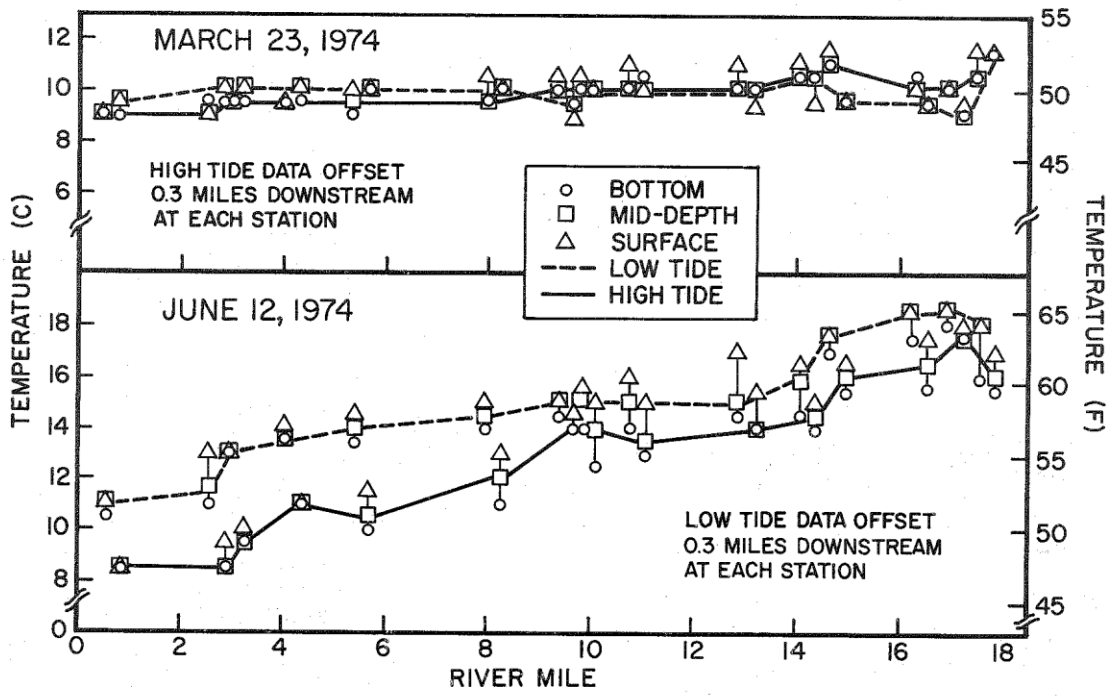

Fig. 5. Temperature vs. river mile, Coos Bay, March 23 and June 12, 1974 (Arneson 1976).

Southerland and O'Neill (2016)[125] studied dissolved oxygen variability and salinity in Coos Bay and found that there were different regimes affected by river flows and oceanic conditions. They documented further the temperature profile that as summer progresses, temperatures increase as does the variability, most likely due to the interplay between warmer riverine-influenced waters and colder, upwelled waters coming from the mouth of the bay. They also showed the changes in salinity in transects that are similar to those provided by Roye (1979) but provided in meters not miles. As a result, the Roye document provides a somewhat longer profile (Fig. 6). The increased intrusion of upwelled waters can alter dissolved oxygen profiles throughout the area during summer conditions.

[125] Sutherland, D.A. and O'Neill, M.A., 2016. Hydrographic and dissolved oxygen variability in a seasonal Pacific Northwest estuary. Estuarine, Coastal and Shelf Science, 172:47-59.

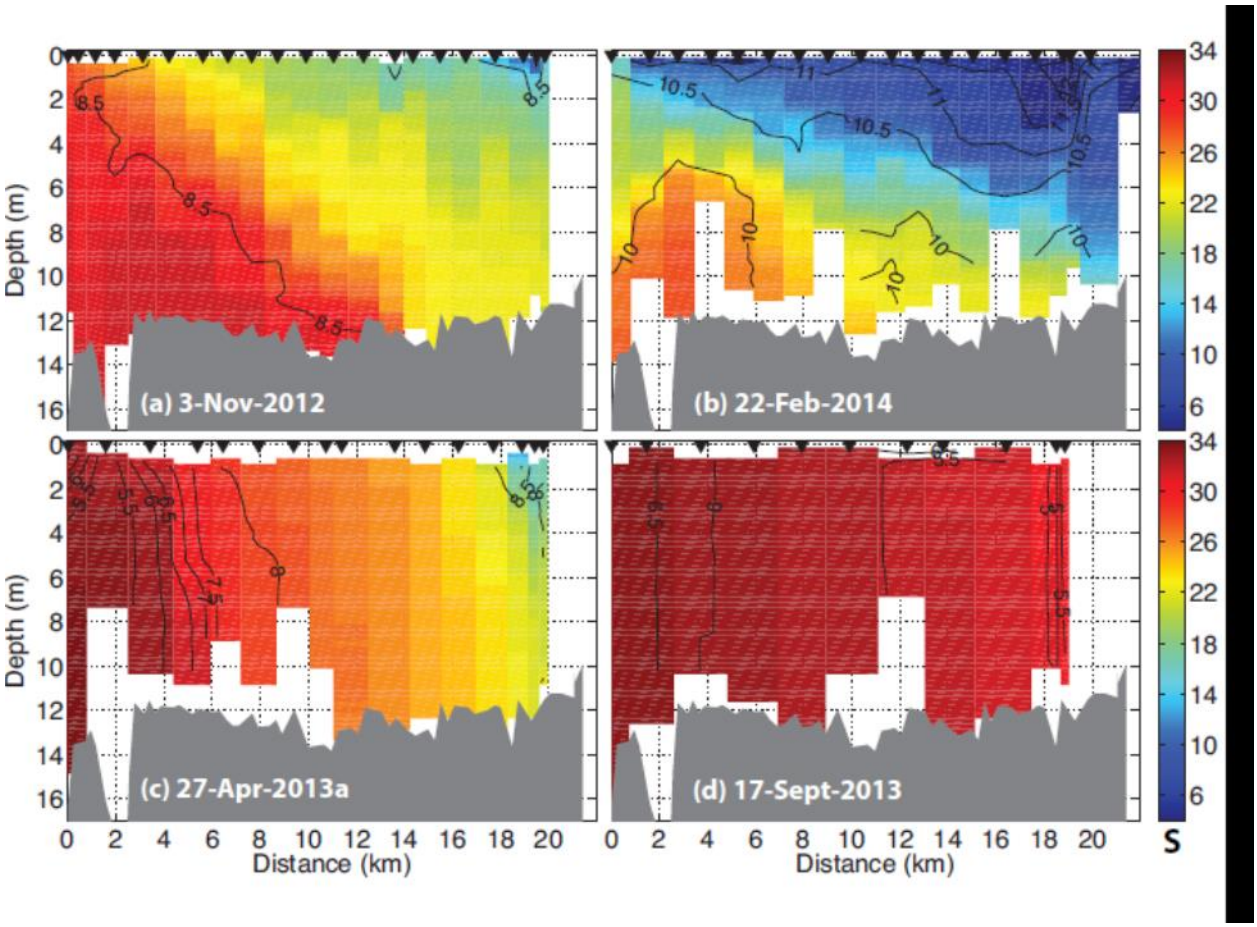

Fig. 6. From Sutherland and O'Neill 2016 showing salinity along the cross section of the estuary from the mouth (km 0) to the Coos River (km 20).

The DEIS indicates that wastewater generated during construction and operation of the Jordan Cove LNG Project would be treated by the City of North Bend's wastewater treatment system via a new sewer line, and therefore the Project is not likely to add fecal coliform to Coos Bay. We fail to understand how a new sewer line can handle this capacity and assure that water quality would be maintained, especially given extensive volumes of water proposed for testing of various systems, storage tanks, and distribution pipes.

4.3.2.2 Surface Water—Pacific Connector Pipeline Project

The DEIS again relies on the Applicant's assurances—those primarily based on studies done by their consultant, GeoEngineers—to make yet another claim of no significant impact on surface water along the pipeline alignment:

> Constructing and operating the Project would result in short-term and long-term impacts to surface water resources. However, based on Jordan Cove's proposed dredging and vessel operation methods and its impact minimization and mitigation measures (including its implementation of erosion controls, dredging procedures, construction and stormwater management procedures, and construction timing), as well as Pacific Connector's proposed waterbody crossing and restoration methods and its impact minimization and mitigation measures, we conclude that the Project would result in

> short-term, localized, construction-related water quality impacts, but would not significantly affect surface water resources.[126]

We disagree with the conclusion, but more importantly, Oregon's Department of Environmental Quality (DEQ)—charged with protecting the state's water resources—concluded on May 6, 2019 that the Applicant had failed to provide adequate information about how their construction and operations would comply with Oregon's Water Quality Standard and therefore denied JCEP's application for a 401 Water Quality Certification. We will discuss a few concerns below, including some examples of DEQ's concerns, but we call FERC's attention to the entire "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," a 200-page document DEQ prepared to accompany the 401 Denial and indicate deficiencies in the Applicants' materials.

We understand that the FERC cannot issue the Certificate of Public Convenience and Necessity the PCGP seeks to construct and operate the pipeline without the Applicant first securing a Section 401 Water Quality Certification from the state. We contend that the deficiencies DEQ identified in this project's plans and design underscore our point that FERC staff's reliance on those plans and design has resulted in a deficient DEIS and give evidence that the authorization and certification should be denied.

A. The critical importance of our water resources and the threats posed by the JCEP are a central reason for our opposition to this project.

In the pipeline construction, the proposed JCEP would have the following impacts that are against the public interest: 1) Further degrade stream segments that are already water quality impaired for temperature, dissolved oxygen, pH, turbidity, and sedimentation. 2) Increase water temperature to unacceptable and harmful levels by removing riparian vegetation that shades streams, causing stream heating along a minimum 95-foot wide construction easement. 3) Unacceptably increase turbidity by causing a more than 10% increase in natural turbidity levels in stream segments impacted by pipeline installations. 4) Impair beneficial uses in the Rogue, Umpqua, and Klamath Basins by engaging in blasting activities that would adversely impact surface water and groundwater used for drinking and commercial and recreational fishing. 5) Foul surface and groundwater by failing to adequately prevent herbicides from entering Impaired Waterways or their tributaries, as well as wetlands, again harming the habitat of endangered animals and fish and contributing to the overall degradation of Oregon waters. 6) Foul surface and groundwater by failing to adequately prevent fertilizers from entering Impaired Waterways or their tributaries and other waterbodies. 7) Expose through dredging and filling and other construction activities—both in the bay and along the pipeline—significant amounts of contaminated soils from various current and historical industrial activities, such as timber processing and mining. 8) Risk jeopardizing six major rivers with numerous important values, five by using hydraulic directional drilling (HDD) and one with an open cut across already impaired water.

According to the DEIS,

> Water quality parameters, including water temperature and intragravel dissolved oxygen, might potentially be affected at crossings where hyporheic exchange is extensive and active. Thus, streams with a "high" and "moderate" sensitivity would be the streams

[126] DEIS, p. 4-118.

> where water quality could potentially be compromised due to alteration of the hyporheic zone.[127]

We appreciate this acknowledgment, but the DEIS provides little to address these risks other than produce a set of protocols for implementation after the fact, rather than call for advance planning. They instead note: *Stream Crossing Risk Analysis and Stream Crossing Risk Analysis Addendum* (GeoEngineers 2017d, 2018a), that they would implement additional site-specific stream crossing restorations plans, of streams not yet field surveyed, after final pre-construction surveys. The Applicant proposes that blasting would be conducted on dewatered sections.

The DEIS notes that at least 15 crossing were proposed for streams categorized as having a high sensitivity to hyporheic zone alterations. Two of the "high" sensitivity crossings are the Coos River crossing at MP 11.13R and the Rogue River crossing at MP 122.65. Their solution to this is to use HDD, rather than open trenching across the stream channel. A "moderate" sensitivity indicates that the stream crossing displays some indicators that a hyporheic zone is active and functional. They note that approximately 66 crossings fit this category, most of them upper to middle watershed streams.

According to Table 4.3.2.2-2, Jackson County-Rogue River-Shady Cove and Lake Ewauna-Upper Klamath crossings would be accomplished using HDD. Pacific Connector proposes to cross 26 already impaired waterbodies using dry/diverted open-cut crossing techniques. Conventional boring, DP, or HDD methods would be used to cross 5 of the impaired waterbodies.

B. As discussed in section 4.1 Geologic Resources, the landslide-prone terrain crossed by much of the pipeline poses a risk that pipeline construction would trigger landslides and, among other hazards, potentially increase sedimentation and turbidity in violation of Oregon's water standards, resulting in harm to all water users, wildlife, and aquatic species.

We repeat here that the Applicant appears to be unwilling to accept or even adequately research the forces of nature that exist all across this project and instead, offers BMPs on the way to dismissing the likelihood of significant impacts. The DEIS appears to indicate comfort with that approach. Moreover, some of the designs the Applicant proposes are ill-suited to the terrain to be confronted and would exacerbate landslide potential and along with it, water degradation. DEQ's "Evaluation" describes just one example:

> PCGP's proposed activities create a significant risk of sediment transport to both perennial and intermittent streams. In Section 4.6.1 of Resource Report 6 (Geologic Resources), JCEP identifies two primary ways that pipeline construction methods would reduce slope stability and create a risk of sediment transport. Those are deep excavation perpendicular to the slope (i.e., creating a cut across a slope), and capturing and concentrating stormwater along the ROW and discharging this stormwater to potentially unstable slopes. Placing fill on a headwall is a third way that pipeline construction would reduce slope stability.[128]

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[127] DEIS, p. 4-113.

[128] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 28.

A primary reason for DEQ's denial was the inadequacy of information provided by the Applicant and, despite highly detailed requests for specific missing information, failure by the Applicant to fulfill the requests. This has been a consistent pattern, including during the last iteration of the project. The agency cannot fulfil its legal obligation to protect Oregon's water quality without enough information to determine whether compliance with the law is likely. Here is an example related to Oregon's narrative criteria:

> Without more developed information about the extent of areas of landslide risk and BMPs, DEQ is unable to determine what engineering controls for the design and construction of the pipeline are both feasible and reasonably likely to succeed in keeping waste materials out of public waters and minimizing erosion of cut banks, fills, and road surfaces. DEQ also is unable to determine whether JCEP can or would utilize the highest and best practicable treatment and/or control of wastes, activities, and flows 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. As a result, DEQ concludes that it is unable to determine that JCEP's proposed activities would be conducted in a manner that would not violate the statewide narrative criteria in OAR 340-041-0007."[129]

C. The JCEP is incompatible with water conservation and would reduce the supply available for other beneficial and legally required purposes.

It is unclear whether there are adequate available water rights in the pipeline corridor that could be appropriated for purposes of this project. Construction of the 229-mile pipeline would require water for dust control. In addition, hydrostatic testing of the completed pipeline would use an estimated 60 million gallons of water.[130] We find these uses of water, especially under current drought and weather conditions, to be an adverse impact on the natural and human environment that is not possible to mitigate.

D. Hydraulic Directional Drilling (HDD) is planned for use at several major river crossings and raises a number of concerns, none of which are adequately addressed in the DEIS.

Frac-outs in the performance of HDD are a known risk. Their frequency and difficulty of avoidance is well acknowledged.[131] However, we did not find the caliber of evidence of planning that we believe would allow FERC staff to be assured that frac-outs would be aggressively precluded. We have reviewed the Applicant's "Drilling Fluid Contingency Plan"[132] and find it unsatisfying in terms of acknowledgment of impact and evidence of preparedness. Another report, "Failure Mode Procedure for the HDD Pipeline Installation Method"[133] looked promising for detailed analysis and preparation tailored to specific conditions on pertinent water bodies. However, the majority consisted of generic discussions of HDD procedures.

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[129] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 29.
[130] PCGP FERC application, "Appendix V.2, Hydrostatic Test Plan," September 2017, p. 5.
[131] Jessica Dickers, "What is a Frac-out in HDD?" *Utility Magazine*, May 4, 2016; State of Oregon, DEIS comments, 2015, p. 102.
[132] PCGP FERC Section 7 Certification Application, Resource Report 2, Appendix H.2 of Attachment C, 2017.
[133] PCGP FERC Section 7 Certification Application, Resource Report 2, Appendix I.2 of Attachment C, 2017.

The DEIS states that, “Detailed surveys and plans have been made for each of the HDD crossing sites”[134] and cites Appendix G.2 of Attachment C of Resource Report 2. We are not certain what is meant by “detailed surveys and plans,” but GeoEngineers stated in the referenced document that, “Because most of the Rogue River HDD path is situated within bedrock, we did not perform a numerical hydraulic fracture analysis,” and instead based their design on a “. . . qualitative evaluation of the potential for drilling fluid surface releases along the Rogue River HDD.”[135] Might the volcanic nature of rocks in this area present special issues for HDD procedures that should be known prior to rendering an environmental assessment? Nonetheless, the DEIS dismisses the risk to water as temporary and therefore, acceptable.

One risk of a frac-out during HDD operations is contamination of drinking water. In addition to chemical release in drilling fluids, the Rogue River is known to contain mercury and arsenic from the surrounding soils. The consequences of a frac-out in any location could be significant. If one were to occur at the Rogue crossing near Shady Cove, Oregon, drilling pollutants and the naturally occurring toxic substances could easily find their way into this critical river. Shady Cove is a community of approximately 3,000 residents, most of whom obtain drinking water from private wells. These wells provide the only source of drinking water to residents. There are an estimated 150 wells within a mile of the planned HDD crossing. Additionally, several hundred residents obtain drinking water from a private water company that takes water from the Rogue to serve its customers. The Rogue River is also the back-up water supply for the City of Medford. Historically, Shady Cove has had challenges with private wells going dry as the population grew. The aquifer into which private wells are drilled has pockets of water that are interconnected in ways that are difficult, if not impossible, to discern. Drilling or fouling a well in one location could have widespread detrimental effects on wells throughout the system. Fouling of the Rogue could potentially affect the drinking water of 160,000 people.[136]

Klamath County offers an equally disturbing example of impacts from pipeline activities and an HDD frac-out. Above, we discussed soil contaminants at the Collins Company on the banks of the Klamath River and under a mile from the HDD location for the river crossing. It is unacceptable for the DEIS to conclude no significant impact for HDD operations at this site until a thorough investigation of potential interplay between planned activities and known and unknown potential contaminants has been conducted in any case. We are uncomfortable with the “self-reporting” approach taken by the Applicant in its “Contaminated Substances Recovery Plan.” State agencies are not adequately staffed to conduct monitoring to guard against violations. Responding to degradations with fines and enforcement actions after the fact is not a prudent approach to protect ecosystem services. The critical importance of our water resources and the threats posed by the JCEP are a central reason for our opposition to this project.

The Rogue is also home to several species of endangered fish we discuss elsewhere in this comment. Fouling the water of the Rogue and aquifer could have devastating consequences to the drinking water supply and to the local economy which depends on tourism, fishing, rafting

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[134] DEIS, p. 4-106.

[135] GeoEngineers, “Geotechnical Engineering Services and Hydraulic Directional Drilling Design, Rogue River HDD,” PCGP FERC Section 7 Certification Application, Resource Report 2, Appendix G.2 of Attachment C, September 1, 2017, p. 7.

[136]Research to compile the extent of potential impact was performed by Physicians for Social Responsibility and reported in Rogue Riverkeeper, et. al. to Bob Lobdell, Public Comment on DSL APP0060697 (Jordan Cove Energy Project and Pacific Connector Gas Pipeline) Application for Removal-Fill Permit, January 30, 2019, p. 29.

and recreation. The fact that a major additive to drilling mud, bentonite, is "naturally occurring" does not reduce the potential impact on fish and other aquatic life in the event that hundreds of gallons of tainted mud are released in Coos Bay or the Coos, Rogue, or Klamath Rivers. The DEIS fails to acknowledge the potentially severe impacts to Southern Oregon/Northern California Coast Coho (SONCC) and its designated critical habitat as a result of HDD failure. This area is a serious deficiency in the DEIS.

E. The use of an estimated 60 million gallons of water for hydrostatic testing of the completed pipeline is an irresponsible use of water resources when much of the area where it would be drawn from are already suffering drought conditions.

All 229 miles of pipeline would need to be tested for integrity and leaks. This would be done by hydrostatic testing, i.e., pumping water at high pressure through a run of pipe segments to check for leaks.[137] The DEIS reports that the Applicant proposes to withdraw up to 60 million gallons of water from Oregon waters. It is reasonable to expect that two or more tests could be required in some areas to ensure that the PCGP is leak-free. Some of the water acquired for hydrostatic testing would come from Impaired Waterways and their tributaries. It is also probable that the water table would be significantly impaired, harming wetlands and habitats of endangered species of fish and other animals. The Applicant does not address the impacts of removing such a significant amount of water from Impaired Waterways and their tributaries, such as increased temperature and FERC staff appears to accept that. They are nonspecific regarding the manner and location for removing and returning water used in hydrostatic testing to the watershed. The statement of work includes deliberate contamination with chlorine which would further degrade Oregon's Impaired Waterways and the habitat of endangered species of fish that the State of Oregon has spent so much time, money, and commitment to restore.[138] We do not share FERC staff's apparent satisfaction that, because the Applicant has prepared a "Hydrostatic Testing Plan," that the many issues related to the process are reduced to insignificant.[139]

4.3.3 Wetlands

The DEIS summary of wetland mitigation efforts states:

> In total the Project would impact a total of about 198 acres of wetlands, about 27 acres of which would be permanently lost. Based on our review of the Project and Jordan Cove and Pacific Connector's implementation of measure to reduce impacts on wetlands, we conclude that constructing and operating the Project would not significantly affect wetlands. Additionally, to mitigate wetlands impacts, Jordan Cove and Pacific Connector have prepared a Compensatory Wetland Mitigation Plan.[140]

We disagree with this conclusion.

The wetlands affected by this project are of a wide range of wetland categories. Wetlands identified in the area include estuarine subtidal, estuarine intertidal, palustrine unconsolidated bottom, palustrine aquatic bed, palustrine emergent, palustrine scrub-shrub, and palustrine

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[137] DEIS, p. 4-111.
[138] DEIS, Appendix F.10 PCGP POD-Part 4-23.PDF, Appendix M. "Hydrostatic Test Plan," p. 16.
[139] DEIS, p. 4-111.
[140] DEIS, p. 4-134.

forested wetlands. However, the majority of these are estuarine wetlands affected by construction of the ship and access channel and MOF and Navigation Reliability Improvement dredge areas.

USACE's "Permitting Process Information" states that, "A fundamental principle of the Section 404(b)(1) guidelines is that dredged or fill material should not be discharged into wetlands and other waters, *unless it can be demonstrated that the discharge will not have unacceptable adverse impacts on those waters [*emphasis added]."[141] Historically and to date, the Applicant has not only failed to demonstrate the absence of adverse impacts, they have not provided adequate information to allow the public or state and federal agencies to identify and assess project impacts to wetlands. A total of six miles of wetlands would be impacted across all four affected counties.

Resource Report 2 of JCEP's application to FERC inadequately describes the wetlands that would be impacted and misses entirely the fact that wetlands are ecosystems that are highly subject to disruption, degradation, and destruction. The Applicant acknowledges cumulative disruption of 169 acres of wetlands via construction of the Jordan Cove LNG Terminal and Liquefaction Facility, but dismisses that impact as "temporary," without regard for the fact that, even done right, living communities of flora and fauna disrupted by dredging, filling, earth-moving, draining, etc., may never recover. Their answer to these risks and certain negative impacts is the contention that all would be well under their Mitigation Plan. FERC must not assume that this plan provides an appropriate trade-off, nor should USACE. Below we provide a detailed discussion of issues related to wetlands and JCEP's dredging and mitigation plans.

A. The proposed mitigation for loss of wetlands is inadequate and poorly conceived.

Two areas in Coos County are addressed as mitigation sites for the loss of wetlands from the entire PCGP project and the LNG terminal. Those mitigations include a proposed eelgrass mitigation site of 6.03 acres near the airport terminal across the bay from the proposed LNG terminal, and the 100-acre proposed Kentuck mitigation project. Both sites contain wetland values that would be affected or destroyed by the projects. We question why this approach was even considered. The DEIS identifies that restoration efforts at the Kentuck project and Eelgrass Mitigation sites would result in some short-term and permanent impacts; however, the *Compensatory Wetland Mitigation Plan* provided by Jordan Cove is supposed to account for these impacts and provide mitigation to offset these impacts. The DEIS makes no ruling on these plans, as the USACE and Oregon DSL are still reviewing their applicability. The DEIS acknowledges that approval of these mitigation plans by these agencies would be required prior to issuance of federal and state wetland permits.

B. Kentuck inlet mitigation project poses numerous problematic issues.

The mitigation project at Kentuck has been proposed as a way to dispose of massive quantities (300,000 CY) of unconsolidated sand and silty sand sediments from dredging operations in the Coos Bay area, but also as wetland mitigation for the loss of all wetlands throughout the disruption of wetland, riparian, and associated areas by the proposed 229-mile pipeline project. The DEIS states that approximately 108.7 acres of wetlands (6.0 acres of estuarine wetlands and 102.7 acres of freshwater wetlands and open water) would be temporarily affected at the Kentuck project site in association with wetland restoration and mitigation activities. Potential

[141] USACE, "Permitting Process Information," p. 4.

impacts at the Kentuck project site include a temporary reduction in water quality due to an increase in sedimentation (e.g., resulting from import and grading of dredge material), temporary disturbances to adjacent wildlife, and a temporary impact on vegetation removed during restoration activities at the site. The mitigation contains no discussions of alternatives to this approach for the project or any other potential mitigation along the pipeline swath. Moreover, the Kentuck site already has substantial existing freshwater wetland values in this palustrine wetland/forest and its vegetative cover is used by migratory and resident wildlife and game and associated hydrological values. The eelgrass mitigation project at least proposes to provide a mitigation ratio of 3:1 to create 6 acres of eelgrass near the airport within a 9.3-acre site to replace the 1.9 acres of eelgrass destroyed on the north spit. Where is the accounting for this proposed freshwater/estuarine wetland?

The concept of reconnecting Kentuck Creek and slough within the Kentuck watershed to provide a wider wetland area rather than the narrow corridor that exists is a reasonable proposal, but the methods and design of the project fail to capture the full potential of this mitigation opportunity to further upstream mitigation. The fill of 4.3 acres proposed through construction of a high elevation dike or permanent levee around the area is not clear.

Moreover, the entire project at Kentuck poses a large risk from transporting the dredge material across the bay and navigation channel via scow, then through the temporary dredge transfer line, and then hydraulically pumped to the Kentuck mitigation site. There are no details for the protection of water resources during this activity, and a total absence of consideration of alternative sites or methods. The sediments destined for the Kentuck Project site would be transported using scows that would be moved to a location east of the Coos Bay Channel and the sediments on the scows would then be hydraulically pumped to the Kentuck mitigation site via a 1.3-plus mile-long pipeline. The pipeline route would traverse intertidal and shallow sub tidal portions of the estuary between the Coos Bay Channel and the Kentuck Project Site. This choice appears to be in direct contradiction to FERC's own procedural instructions.[142]

The lack of details and inherent risks of water movement and pipelines pose threats to any of the resource values in the region of the transfer. The Kentuck sub-basin watershed, including Kentuck Creek and its main tributary, Mettman Creek, are located upstream from the proposed Kentuck mitigation project. Approximately 81% of the land use is forestry and 11% agriculture (mostly livestock). Small farms and two rock quarries make up the remaining uses.[143] The forestry, livestock, and quarrying have impacted the watershed for nearly 100 years and there has been little significant positive change to date. Large recent forest clear-cuts have occurred in the Kentuck Creek sub-basin. Sediments are a problem. In April, quarry operators were issued citations and fined $68,000 by the Oregon DEQ for sediment releases 10,693% higher than the sediment level upstream.[144] Moreover, the stream surveys in the watershed show available spawning gravel is already fully utilized and much other gravel is embedded in sediments. Other features of the watershed documented by the Coos Watershed Association report show little promise and large challenges to provide appropriate habitat restoration in Kentuck drainage for increasing Coho salmon.

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[142] FERC, "Wetland & Waterbody Construction & Mitigation Procedures," May 2013, A.2.

[143] Coos Watershed Association, 2006, Coos Bay Lowland Assessment and Restoration Plan, March, 2006, Charleston, OR: Coos Watershed Association

[144] Oregon DEQ 2019. Notice of Civil Penalty Assessment and Order Case No. WQ/SW-WR-2019, April 29..

Other potential impacts associated with the proposed mitigation plan at Kentuck Inlet include the likely interference with existing mariculture operations located in the bay area near the Kentuck Inlet. Those operations would be harmed as habitat for other fish and shellfish and wildlife is disrupted by transfer and logistics of sediment movement and dewatering at Kentuck.

The other site that is proposed for mitigation is the Eelgrass Mitigation site. We provide detailed information about the value of eelgrass and the proposed mitigation project in Section 4.5 (B). Our comments here are to emphasize that the concept of replacing existing eelgrass beds that would be removed with the dredging of the access channel is highly problematic. Restoration projects for eelgrass are not always a success and the design of this project in particular has serious flaws. Moreover, the increased sediments that would be released with dredging and excavations throughout the bay would likely negatively affect the existing eelgrass beds not proposed for removal.

With the information and analysis we have provided and also for the fact that with the numerous permits that are still outstanding with regard to this project, how then can FERC be expected to be able to evaluate and complete a comprehensive evaluation of the benefits and impacts of this project?

4.4 UPLAND VEGETATION

The DEIS acknowledges impacts, but persists in dismissing their significance:

> Most of the vegetation types affected by the Project are common and widespread in the vicinity of the Project. Although constructing and operating the Project would result in the loss of 773 acres of LSOG forests, this represents only a small percentage of remaining LSOG forests in Oregon. Additionally, measures listed in section 4.4.3.3, as well as in the *BLM and Forest Service Compensatory Mitigation Plan and Amendment* (appendix F.2) and *Late Successional Reserves Crossed by the PGCP Project* (appendix F.3) would minimize or mitigate impacts to LSOG forests. Therefore, based on the types and amounts of vegetation that would be affected by the Project, the measures that would be implemented to avoid, minimize, and mitigate the resulting impacts, and the presence of similar vegetation in the affected watersheds, we conclude that constructing and operating the Project would not significantly affect vegetation.[145]

The DEIS and Applicant materials indicate that the PCGP right-of-way maintenance procedures will include application of highly toxic treatments including 2,4-D, glyphosate, and triclopyr.[146] Indeed, there is reason for concern about the spread of invasive plant species as a result of pipeline construction practices—despite the great care to prevent this promised by the Applicant. This, by itself, is a clear negative impact of the 229-mile pipeline that would bring harm to Oregon if the project is approved. But the cure for invasive species spread piles on yet another adverse impact that would be carried forward for the life of the pipeline—interjecting dangerous chemicals into the fragile environment, including waterways. We find this to be a highly risky practice.

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[145] DEIS, p. 4-178.
[146] DEIS, p. 4-224.

Invasive weeds are often able to outcompete desirable, native species. The disturbance of the land creates precisely the environment many of these plants thrive on, likely precluding the regrowth of desirable plants forever.

4.5 WILDLIFE AND AQUATIC RESOURCES

After presenting pages of discussion of negative impacts on terrestrial wildlife expected to be exerted by project construction and operations, the DEIS makes its standard conclusion:

> Constructing and operating the Project would have both short- and long-term adverse effects on wildlife habitat and terrestrial wildlife species. We expect that some wildlife individuals would experience displacement or mortality during construction and operation, and some wildlife habitat would be removed or modified temporarily or permanently. However, based on the characteristics of the terrestrial wildlife species and habitat, the Applicant's proposed construction and operations procedures and methods, and their implementation of impact minimization and mitigation measures, we conclude that the Project would not significantly affect terrestrial wildlife.[147]

We disagree and find that this standardized approach renders whatever information is provided in the DEIS meaningless. The repetitious conclusion of no significant impact, despite evidence of adverse impact and without evidence that refutes it, is unacceptable. The project's needs are clearly deleterious in their impact of wildlife and fish, but FERC staff continues to agree with the Applicant that the ends justify the needs—and the harm. We point out just a few of the areas of concern that defy the claim of no significant impact.

A. Almost all of construction and operations in the Coos Bay and estuary present further jeopardy to the already threatened Green Sturgeon, yet the DEIS says Coos Bay is considered part of the critical habitat for the threatened distinct population of Green Sturgeon and provides important summer habitat for subadult and adult Green Sturgeon.

According to the NOAA plan for recovery of sturgeon the following JCEP activities are threats,

> Road building (resulting in sedimentation), a proposed liquefied natural gas (LNG) project, dredging, urbanization (resulting in pollution and increased peak flows), commercial shipping, stream channelization, wetland filling and draining, and development and silviculture (resulting in the loss of large woody debris and forested land cover) . . . .[148]

B. Dredging would harm several of the many species of invertebrates that are recreationally and commercially important to the ecosystem of the bay.

[147] DEIS, p. 4-228.
[148] NOAA National Marine Fisheries Service Final Green Sturgeon Critical Habitat Biological Report – September 2009.

The removal with dredging would disrupt the water quality and the natural ecosystem of the sand/silty benthos of the bay. There are considerable areas near the target sites that are index areas for several species of clams and these populations are part of the monitoring program by ODFW (Fig. 7). They report high densities of cockle, gaper, and littleneck clams. In addition to the mollusks, these areas support beds of eelgrass as shown in the Fig. 8 below using data from ODFW in 2014.[149]

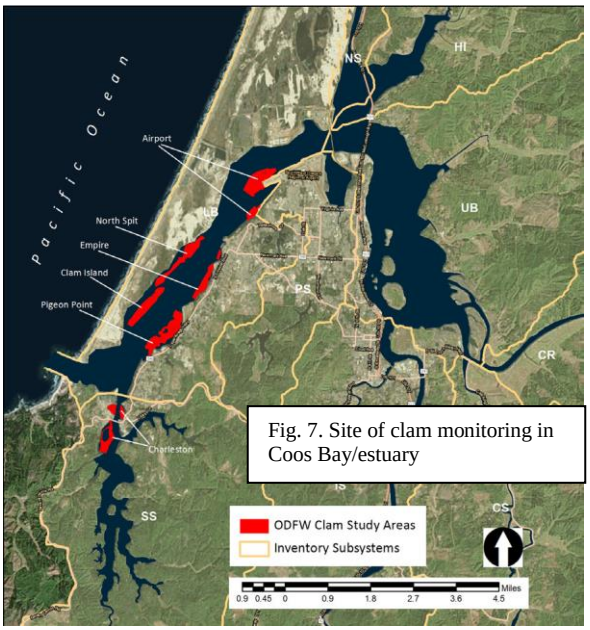

Fig. 7. Site of clam monitoring in Coos Bay/estuary

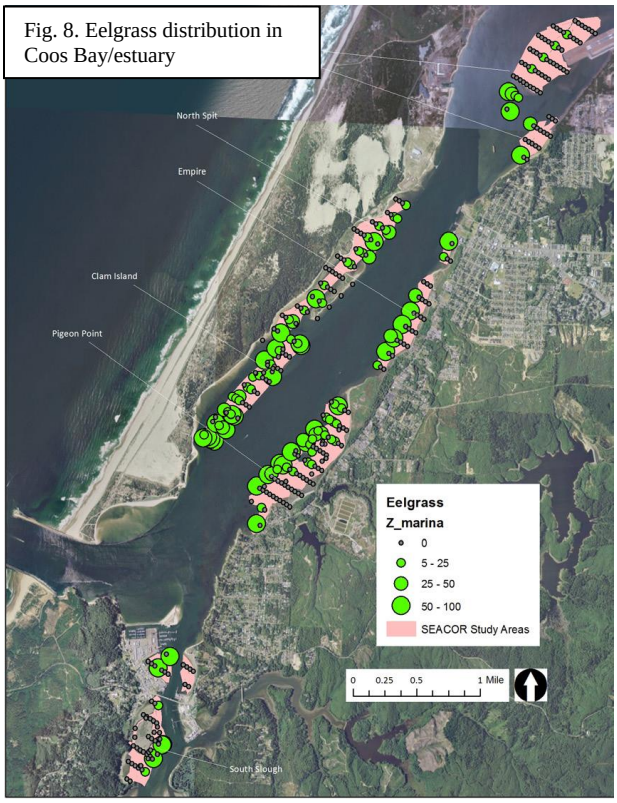

Fig. 8. Eelgrass distribution in Coos Bay/estuary

Eelgrass beds have an important role in the life cycles of fish, invertebrates and wildlife species. Because eelgrass is a rooted plant, it performs a vital function of stabilizing coastal sediments, preventing erosion. The eelgrass community provides direct and indirect food and cover for many marine species. Because the proposed development permanently destroys 1.9 acres of eelgrass, the developers propose to mitigate this through development of a larger eelgrass habitat across from the project that is currently an estuarine tideflat area south of the western tip of the North Bend Airport runway. The eelgrass mitigation site chosen already has some eelgrass associated and there are wetland values associated with the mud flats area that is proposed to be altered from its existing slope draining toward the north east. The biology and habitat requirements and constituents of eelgrass communities is complex and the biologists in the bay have been working to restore and reestablish these communities throughout the bay and estuary. The project needs to consider carefully the cumulative effects of destruction of eelgrass and how restoration practices should be accomplished using a careful scientific approach.

The importance of native eelgrass in estuarine systems cannot be understated. Faunal communities inhabiting eelgrass beds are comprised of organisms that occupy multiple trophic levels. Macrofaunal organisms utilize eelgrass rhizome layers as protection from predators and provide specialized assistance to the ecosystem through bioirrigation and bioturbation of

[149] Oregon Department of Fish and Wildlife (ODFW), "Status of Oregon bay clam fisheries, stock assessment, and research." [Information Report Series draft June 2014]. Oregon Department of Fish and Wildlife Marine Resources Program, 113 pp.

sediment and other enhancements. [150] Mitigative activities to restore beds of eelgrass may not always be successful. The proposed approach to replace a destroyed area with an additional area should be looked at suspiciously as the design is not appropriate to the habitat needs of the eelgrass. We have already provided input to other agencies regarding this design. The proposed development would alter existing habitat to provide additional eelgrass. The design shape proposed appears to be more of a pond environment with sharp slopes to a depth of -2 feet below mean tide. Likely that feature would provide a trap for invertebrate or vertebrates with tidal receding. Where would the sediments removed from this be placed? Furthermore, what would be the source of eelgrass used to seed this area as proposed as donor shoots or plugs? The biology and habitat requirements and constituents of eelgrass communities is complex and the biologists in the bay have been working to restore and reestablish these communities throughout the bay and estuary.

Other invertebrates affected by dredging of the navigation channel would be the species of crabs that use the area (Fig. 9 below). The crabs are harvested by recreational anglers, and they also play an important role as a food source for various other species. Large numbers of crab larvae (megalops) are in the bay in late spring and early summer and are found offshore at that time of year. They settle, and in fall they would be particularly vulnerable to dredging activities. Many of the regions that are proposed for dredging and are likely affected by the actions of dredging are important parts of the food base for fish and wildlife, as well as for human harvest. The direct impact of habitat disruption and elimination would be substantial, and the cumulative impacts of creating deep water habitats where there were more shallow beds and sandy shoals are not addressed at all. These shallow areas are used for a variety of fish species including flatfish and migrating salmonid smolts.

The DEIS states “Based on 1978 maps of shellfish (Gaumer et al. 1978), shrimp, soft shell calms, bentnose clams, and cockles are located within the intertidal areas near the slip and within dredge areas (west of the Roseburg Forest Products Company site). The four navigation channel modifications are not located in known clamming or crabbing areas, or shrimp or oyster habitat (figure 4.5-2).”

We disagree, as data regarding shellfish are provided by us in this document and are also provided in the digital resources resulting from the *Partnership for Coastal Watersheds* regarding resource distributions.

[150]Lewis, N.S., Henkel, S. K. 2016. Characterization of Ecosystem Structure within Transplanted and Natural Eelgrass (Zostera marina) Beds. Northwest Science, 90:355-375.

Other fish and wildlife values are at risk with this project development and operations. In addition to clams and crabs, other invertebrates that are harvested commercially and recreationally include oysters, bay mussels, ghost shrimp, kelp worms and mud shrimp. Each of these species has a different reproductive cycle and uses different aspects of the habitat. The placement of the activity of dredging in a winter window to avoid conflicts with salmonid populations may be in conflict with critical times for other species. A recent review by Fraser et al. (2016)[151] illustrated the difficulty of this approach. The potential impacts of dredging on benthic species depend on biological processes including feeding mechanism, mobility, life history characteristics, stage of development, and environmental conditions. Environmental windows (EWs) are a management technique in which dredging activities are permitted during specific periods throughout the year; avoiding periods of increased vulnerability for particular organisms in specific locations. However, their review concluded that large gaps in knowledge exist for the timing of life history characteristics for major species of marine invertebrates, seagrasses, and macroalgae, resulting in uncertainty around their vulnerability to an increase in suspended sediments or light attenuation. They found insufficient scientific basis to justify the adoption of generic EWs for dredging operations for wide groups of organisms.

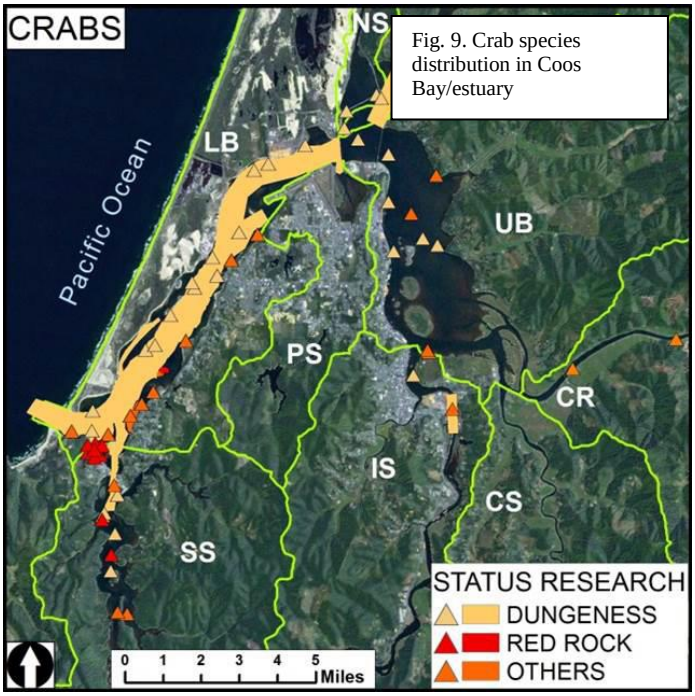

Fig. 9. Crab species distribution in Coos Bay/estuary

An active effort has been underway to increase and restore native Olympic oyster populations in the bay as part of a larger effort coastal wide [152]. In Coos Bay, despite massive shell deposits and oral history, live *O. conchaphila* were noted as absent upon European settlement. This appeared to be a recent event and is commonly attributed to the degradation of water quality from a massive fire in 1846. Commercial harvest in the late 1800s and early 1900s depleted native stocks, and sporadic repopulation efforts have taken place over time, most recently in Netarts, Yaquina, and Coos Bays. In 1986, only a few live oysters were found near commercial *Crassostrea gigas* aquaculture beds. Since that time, Olympic oyster populations in Coos Bay have expanded in range and abundance. Current work by the Oregon Department of Fish and Wildlife (ODFW) in Coos Bay focuses on establishing indices for future documentation of changes in range, abundance, and recruitment patterns.

[151] Fraser, M.W. and 21 coauthors. 2017. Effects of dredging on critical ecological processes for marine invertebrates, seagrasses and macroalgae, and the potential for management with environmental windows using Western Australia as a case study. Ecological Indicators 78: 229–242.

[152] NOAA Restoration Center. 2007. West Coast native oyster restoration: 2006 workshop proceedings. U.S. Department of Commerce, NOAA Restoration Center. 108 pp.

According to the recent documentation provided by the Partnership for Coastal Waters Data Sources in their Chapter 13: Clams and Native Oysters in the Coos Estuary, the area of the mitigation site near the airport is adjacent to an area with native oysters and clams (Fig. 10).

Oyster populations are highly susceptible to sedimentation effects and to toxic releases. The proposed movements of sediments from the navigation channel and facility construction would release suspended sediments that can be carried upstream and downstream of the actual area, depending on tidal influences.

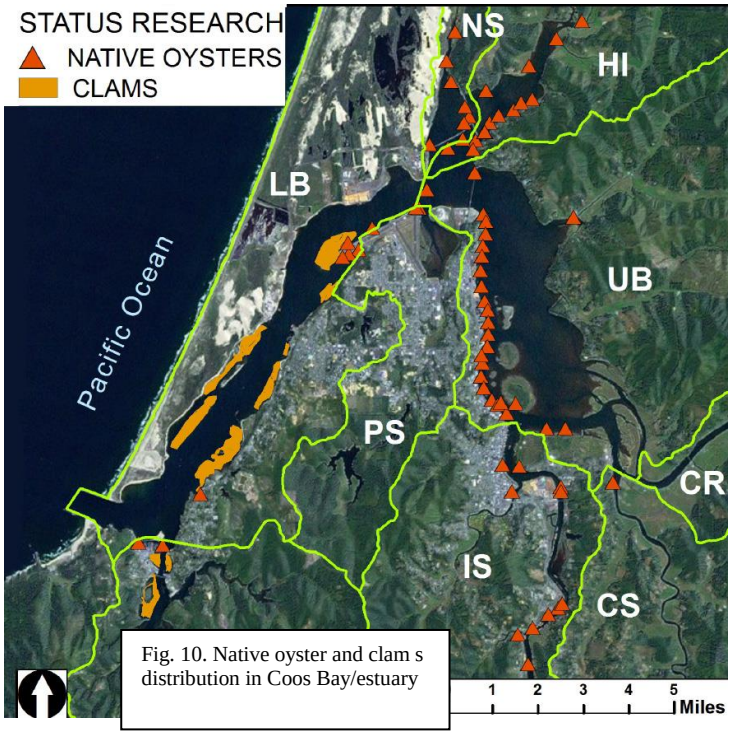

Fig. 10. Native oyster and clam s distribution in Coos Bay/estuary

C. Negative Effects on Aquatic Habitat and Aquatic Organisms are likely from ballast releases and cooling water intake and releases.

The DEIS states: “By following Coast Guard and EPA procedures for ballast water, Jordan Cove and the LNG carriers visiting its terminal would probably not introduce exotic non-native organisms from a foreign port into Coos Bay.”

We disagree for the following reasons.

Of all detected non-indigenous marine species (NIMS) of all major animal, plant, and algal phyla, macroalgae not only constitute a large component of the globally introduced biota, but also cause significant economic and environmental damage over which we have only limited post-invasion control and management options. Commercial shipping is an important invasion vector, making ports and harbors among the most vulnerable environments to biological invasions.

The Applicant, repeats the DEIS, indicates that biocriteria, and temperature would be affected by the cooling water intake and discharge. But the assumption that biocriteria and temperature releases from cooling water intake and discharge in this slip are devoid of effects on salinity, flow dynamics, and turbidity is naive. The models provided by the Applicant consider two existing cooling systems used in ships during loading process; they do not consider the effects of these releases on the dynamics in the adjacent area from continuous use for days at a time. Where are the data sources to support the features that are provided? The repeated and frequent arrival and departure of ships in the slip would have the opportunity to change the structural and biological habitat features, allowing colonization of exotic species that may provide other consequences in the area.

Sediment water retention that is related to sediment size has been reported as another important factor affecting non-indigenous species (NIS) distributions in the Pacific ports studied by DiBacco et al. (2012).[153] Many common intertidal non-indigenous species including pathogenic viruses and bacteria in this region are retained in sediments. Thus, their survivorship could be higher and increase the probability of spreading. Of particular concern to our review is that the creation and operations of this large slip, higher water temperatures from cooling water discharge, mixing from discharge, prop wash, and the general movement of ships and tugs could combine to provide an enhanced opportunity for propagation of non-indigenous organisms that could affect the local resources. This slip area could serve as a point source for further colonization of other areas. Moreover, it is well known that the repeated and frequent discharge of large quantities of ballast from LNG carriers would increase the propagule pressure for any of these events to happen. The need for careful analysis of these multiple factors that can affect the biological resources and existing resource values needs to be addressed by the Applicant. The DEIS should have required that. According to the model studies provided by the Applicant, the ambient water in the slip is non-stratified during summer with the salinity of seawater (O'Neill 2014)[154]. The regulatory mixing zone (RMZ) extent was investigated for an ambient temperature of 8°C to represent the lower limit temperature during winter. In addition, the representative winter stream flow stratification impact on the RMZ extent was modeled with a stratified condition of 25 ppm salinity at the bottom, linearly decreasing to 8 ppm at the surface, with ambient temperature of 10°C, based on the field measured values in February 2014 (O'Neill 2014). These conditions are challenged by data provided in our critique earlier on water quality modeling (see p. 46 above).

In addition to risks from ballast releases, there are serious risks from invasive species introduced by biofouling. World-wide estimates suggest that biofouling is responsible for between 55.5% and 69.2% of the currently established NIS in coastal waters globally.[155] Because biofouling accumulates on ships, it poses risk to all ports visited. The management of biofouling is complex and not well harmonized. (Davidson et al., 2014).[156]

D. Entrainment and Impingement from Vessel Cooling Water Intake

Jordan Cove estimates that a 148,000 m^3 steam-powered LNG carrier would take in about 69.7 million gallons (264,000 m^3) of water from the slip for engine cooling during their 24-hour loading period at the terminal dock. Dual-fuel diesel electric propulsion vessels (160,000 to 170,000 m^3) would take in 20.3 million gallons (76,800 m^3) less than steam-powered vessels over 24 hours.

The DEIS indicates that “Currently, no additional screening system other than that already employed on the LNG carriers is proposed for water intakes.” They also indicate “The result is likely to be that fish at fry and larger juvenile size salmonids near the intakes may be entrained

[153] DiBacco, C., D. B. Humphrey, L. E Nasmith, and C. D. Levings. 2012. Ballast water transport of non-indigenous zooplankton to Canadian ports. ICES Journal of Marine Science 69:483–491.
[154] O’Neill, M.A. 2014. Seasonal hydrography and hypoxia of Coos Bay, Oregon. Master’s Thesis. University of Oregon.
[155] Scianni, C., Falkner, M. DeBruyckere, L. 2017. Biofouling in the U.S. Pacific States and British Columbia. Coastal Committee of the Western Regional Panel on Aquatic Nuisance Species.
[156] Davidson, I., C. Scianni, C. Hewitt, R. Everett, E. Holm, M. Tamburri, G. Ruiz. 2016. Mini-review: Assessing the drivers of ship biofouling management – aligning industry and biosecurity goals. Biofouling 32: 411-428.

or impinged during cooling water intake. It is expected that a high portion of juvenile larval stages of fish and invertebrates entrained or impinged would result in mortality."[157]

We agree with this statement. However, the DEIS continues to indicate that this would not be consequential and provides the expert opinion, and then proceeds to make several assumptions and step through rationalization of the limited effect.

> Nevertheless, natural mortality of these early life stages is extremely high. The result would be less than 1 percent of earliest life stages reaching adult size, with natural mortality over 20 to 30 percent per day during earliest growth periods (Comyns pers. comm. 2003).[158]

These assumptions are not supported with data or modeling.

Without providing data, the support for their estimate is made with reference to a personal opinion expressed in conversations regarding the natural mortality of ichthyoplankton on 21 May 2003 at University of Southern Mississippi. We find it inconceivable that appropriate data and modeling of entrainment were not provided.

From this single statement they conclude that overall, the loss of marine fish and their prey resources from entrainment, relative to numbers in Coos Bay, would be small based on the information discussed.

We also question FERC as to why there are not requirements for model studies related to this entrainment. The current requirements for use of surface waters as cooling water at conventional power plants results in careful consideration of the impingement of aquatic organisms at cooling water intake structures (intakes). These are to be screened to limit the size of particles passing through condenser systems. In the absence of regulations, permitting authorities rely on impact assessments, regulatory decisions, EPA administrative findings, and resource management objectives to assess compliance on a case-by-case basis. The treatment of the organisms as food source for marine predators, rather than intrinsically important organisms to the ecosystem is also inappropriate. The data provided for estuarine entrainment was for larval invertebrates and larval fish.

E. The DEIS erroneously dismisses significant harm to fish reliant for survival on already degraded waterways in the vicinity of the pipeline.

The LWV of Umpqua Valley conducted a study of water issues on the Umpqua River in 2009.[159] The South Umpqua River is one of the nearly 500 waterways that would be impacted by the PCGP. The League found that over the last 100 years of forest management of both private and public lands, the South Umpqua River riparian zones have been severely degraded. The Umpqua is one of Oregon's most important producers of Spring Chinook, Fall Chinook, Winter and Summer Steelhead, Coho, and sea-run Cutthroat Trout. The Umpqua system accounts for more total and wild Coho spawners than any other river system in Oregon and about 15% of Coho spawners coast-wide.[160] Anadromous fish, such as Coho and Chinook Salmon and

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[157] DEIS, p. 4-256.
[158] DEIS, p. 4-256.
[159] League of Women Voters of Umpqua Valley, *Local Water Study, Phase One Report,* June 2009.
[160] *Partnership for the Umpqua Rivers Action Plan,* June 2007, p. 3.

Steelhead (and resident Rainbow and Cutthroat) Trout, swim, feed and spawn in the rivers and streams of the Umpqua National Forest. In the 1930s, the entire South Umpqua watershed was inventoried, and the data were vastly different from present conditions. Historically, the South Umpqua was a larger producer of salmon than the North Umpqua. By the time of the study, the South Umpqua was too warm to support salmon in the summer. Coho, once abundant there, had declined significantly. Juvenile salmon must spend two to three years in their natal stream before going to the ocean. They must have adequate stream flows and acceptable quality of fresh water.[161] Any construction associated with the PCGP in the South Umpqua River basin would almost certainly further degrade this already at-risk river and watershed and place the fish in even greater jeopardy.

F. The Oregon Department of Fish and Wildlife (ODFW) has articulated on many occasions its numerous concerns about detrimental potential impacts of the JCEP to fish and wildlife.

In its segment of the State of Oregon's Scoping Comment to FERC in the fall of 2017, ODFW provided a list of issues related to various species of fish, mule deer, elk, and wolves and described its responsibilities and protective plans for each. They mentioned that mitigation plans would likely be needed for many issues—a practice we find troubling and will discuss below—but we note ODFW's different approach to potential negative impacts to Category 1 habitats. These are defined as, "coniferous old growth and late successional forest (a portion of this acreage with spotted owl and marbled murrelet use); vernal pool wetlands; mature oak woodlands; and rare plant habitat." Citing the Applicant's "Fish and Wildlife Habitat Mitigation Policy," ODFW states, "The Department *shall* act to protect Category 1 habitats described in this subsection by recommending: (A) *avoidance* of impacts through alternatives to the proposed development action; or (B) *no authorization* of the proposed development action if impacts cannot be avoided [emphasis added)."[162]

G. The spread of invasive species as a result of construction activities over 229 miles multiplied by 95'-wide clear-cut, TEWAs and roads, hydrostatic testing, etc., seems highly likely to have an unacceptably significant cumulative impact.

1. Noxious weeds.

The Oregon Department of Fish and Wildlife (ODFW) has serious concerns about this. In their comment to the U.S. Army Corps of Engineers and the Department of Environmental Quality, they say this:

> Invasive species (e.g. noxious weeds) have been identified as one of the seven key conservation issues (threats to conservation) in Oregon in the Oregon Conservation Strategy (ODFW 2016). Hundreds of thousands of dollars are expended annually on both public and private lands to combat invasion and expansion of noxious weeds and their deleterious effects on fish, wildlife, and their habitats.[163]

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[161] LWVUV, p. 6.

[162] Ellen F. Rosenblum, Oregon Department of Justice to Kimberly D. Bose, Federal Energy Regulatory Commission, August 15, 2017, pp. 11-34.

[163] Sarah Reif, Oregon Department of Fish and Wildlife to U.S. Army Corps of Engineers and Oregon Department of Environmental Quality, RE: Jordan Cove Liquefied Natural Gas and Pacific Connector Gas Pipeline permit application to the US Army Corps of Engineers NWP-2017-41, and Oregon Dept of Env Quality Water Quality 401

ODFW goes on to provide two pages of recommendations designed to prevent the proposed project from dramatically exacerbating the already-existing problem.

It is well known that invasive plant species including noxious weeds thrive precisely because they prefer disturbed habitats. Conversely, native species often require established habitats. Once eliminated during the construction process and from the disruption of land by heavy equipment and even human trampling, preferred species may never have a chance to come back as they would be persistently out competed by invasive species. The DEIS fails to acknowledge the widespread permanence of vegetation destruction.

2. Invasive aquatic species and pathogens.

The DEIS admits that the hydrostatic testing process includes plans in some locations the discharge of waters from one watershed into another and, in the process, could spread undesirable or non-native aquatic species and pathogens. This outcome runs afoul of state and federal regulations, therefore in its "Hydrostatic Testing Plan," the Applicant indicates that it would disinfect the water with chlorine.[164]

In order to legally discharge hydrostatic test water in any location, the Applicant would have to obtain an Individual Industrial Water Pollution Control Facility Permit from DEQ. That agency, indicated among materials provided with its denial of the Applicant's Section 401 Water Quality Permit that they had not yet received the former application.[165] Since that information is not yet available, it is unknown whether DEQ will find the discharge of toxic chlorinated water to be acceptable. Chlorine can be expected to have a negative impact on water quality as well as on organisms living wherever water is discharged. We would expect concerns, either by DEQ or ODFW or both because the point of chlorine treatment is to kill organisms. Treated water discharged into a "new" watershed would not only kill invasive or unwanted species from the watershed of origin, it can be expected to kill any native organisms in the "new" watershed, as well.

DEQ points out in its 401 Denial materials that information providing assurances that construction activities would not harm resident biological communities is lacking.

> JCEP has not demonstrated that methods employed in pipeline construction, the development of the construction ROW, and the use of the construction access roads would sufficiently protect State waters to avoid detrimental changes in resident biological communities to comply with Oregon's biocriteria standard.[166]

H. The DEIS acknowledges that pesticides and herbicides with the potential to harm sensitive aquatic species would be applied as part of the Applicant's Pest Control Plan, but dismisses impacts as insignificant.

Certification Application, July 19, 2018, p. 40-42.

[164] DEIS, Appendix F.10 PCGP POD-Part 4-23.PDF, Appendix M, "Hydrostatic Test Plan."

[165] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, Attachment B, "Jordan Cove Energy Project / Pacific Connector Gas Pipeline Additional Information Request," p. 14.

[166] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 47.

The DEIS concludes that the Applicant's Plan would have adverse effects on various species. For example, it states:

> Control of noxious weeds helps to preserve native plants that pollinators require for survival; however, some chemicals used to control noxious weeds have been shown to have a detrimental effect on pollinators when used within typical to maximum application rates, such as 2,4-D, glyphosate, and triclopyr (Forest Service 2005b). These three herbicides are included in the Pacific Connector's *Integrated Pest Management Plan* and would likely have adverse effects on pollinators when applied in the immediate vicinity of project disturbances.[167]

Despite acknowledgment of harm, per the Applicant's Erosion Control and Revegetation Plan (ECRP) these dangerous herbicides would be used to control vegetation, including invasive noxious weeds, in the pipeline right-of-way throughout the lifetime of operations. These substances, even when used with care, cannot be considered harmless and have negative consequences for a wide variety of species. DEQ points out that the Applicant has committed to comply with less stringent federal regulations, thereby falling short of complying with Oregon's water quality regulations. The "Evaluation Report" says this,

JCEP would maintain portions of the permanent right-of-way in an herbaceous state to facilitate access for pipeline maintenance and inspection. Methods to control vegetation are described in the Erosion Control and Revegetation Plan and include the application of herbicides and pesticides. The plan references procedures in FERC's Waterbody and Wetland Construction and Mitigation Procedures that prohibit chemical applications within 100 feet of wetlands or waterbodies except as allowed by federal or state authorities. To comply with the Toxic Substances water quality standard, Applicants must comply with state regulations regarding the application of chemical herbicides and pesticides at locations that may directly or indirectly affect waters of the state.[168]

It makes no sense for FERC to accept practices that would violate the water quality standards of a state when the project cannot receive FERC certification unless the Section 401 Water Quality Permit which protects those standards is obtained.

We join the Oregon Department of Fish and Wildlife in raising the potential and likely harm use of these chemicals pose to both aquatic and terrestrial wildlife. ODFW has been clear in their concerns about the practice with regard to use near streams and wetlands: "ODFW recommends against general use of herbicides and pesticides in wetlands. ODFW recommends any use be judicious and meet federal, state, and local, regulatory requirements."[169]

We look forward to learning whether the Applicant has agreed to implement the agency's recommendations, although we believe that information should have been available for review

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[167] DEIS, p. 4-224.

[168] Oregon DEQ, "Evaluation and Findings Report, Section 401 Water Quality Certification for the Jordan Cove Energy Project," May 2019, p. 71.

[169] Sarah Reif, Oregon Department of Fish and Wildlife to U.S. Army Corps of Engineers and Oregon Department of Environmental Quality, RE: Jordan Cove Liquefied Natural Gas and Pacific Connector Gas Pipeline permit application to the US Army Corps of Engineers NWP-2017-41, and Oregon Dept of Env Quality Water Quality 401 Certification Application, July 19, 2018, p.32.

in this DEIS. In any case, it is deeply disturbing to contemplate the harm to wildlife and aquatic species, as well as other living things including humans from the extensive and widespread use of these toxic chemicals as a result of this project, and for the life of the project.

4.6 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

A. The DEIS admits and then erroneously and without support dismisses adverse impacts on numerous species.

The DEIS admits that the project would be harmful for Northern Spotted Owls (NSO).

> Jordan Cove has indicated an interest in working with the FWS to discuss possible mitigation and conservation measures but has not proposed compensatory mitigation. In the absence of mitigation other than avoidance and minimization, the Project would result in long-term negative effects on this threatened species.[170]

The DEIS indicates the absence of details about concerns about the Lost River sucker and its habitat. Failure to include information on this matter in the DEIS precludes the ability of the public and other agencies from evaluating and commenting. This is inappropriate.

> Below is the determination of effects summary for Lost River sucker and critical habitat. *Details will be provided in our pending BA* [emphasis added].[171]

The DEIS addresses the potential negative impacts on the shortnose [sic] sucker in the event of a frac-out during HDD crossing of the Klamath River. We do not agree with the claim below that the risk of frac-outs is "discountable." That does not align with the literature:

> However, the Project is not likely to adversely affect designated critical habitat for the shortnose sucker because:
> - HDD crossing methods would avoid critical habitat in the Klamath River;
> - the potential for hydraulic fracture during HDD drilling is so unlikely as to be discountable; and
> - in the event of released bentonite, corrective actions would contain and temporally limit drill mud volumes.[172]

Table 4.5.1.1-2 in the DEIS summarizes the assessment of impacts of the various proposed alterations of habitat by the project. The summary provides a total of permanent and temporary effects estimated at 576.9 acres. This definition of temporary alterations is not supported by any data from studies of such disruption, rather they rely on the inaccurate assumption that when the activity is completed, the effects are withdrawn.

The DEIS states that Jordan Cove has indicated that estuarine habitat values lost to the construction of the LNG terminal and related facilities would be replaced in-kind at the eelgrass and Kentuck mitigation sites.

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[170] DEIS, p. 4-329-330.
[171] DEIS, p. 4-340.
[172] DEIS, p. 4-340. Note, the above claim is included in the section of the DEIS for the Lost River sucker. It is unclear whether it is misplaced or a typographical error has occurred.

We disagree. Additionally, the losses of estuarine habitat are widespread and not equivalent with the two proposed mitigative measures. Support for this is in sections 4.3 and 4.5. above.

The DEIS states “Project-related construction noise is not expected to adversely affect wildlife in the region.”[173]

We disagree with that conclusion, also.

Pile driving and noise related to construction and dredging have the potential to affect migratory fish activities, settlement of invertebrates, movements of marine mammals, and a suite of other organisms.

Even after providing this statement claiming adverse impacts, the DEIS continues to indicate there could be effects on great blue heron rookery located 300 feet from the Jordan Cove Road. The comparisons made to support their little effect finding are not appropriate, as the intermittent truck traffic at the Roseburg wood chip facility is not the same as the magnitude of the noise and disruption of construction.

B. Fish and wildlife values would be reduced by aspects of the project.

The presence of federally protected species in the area of impact requires consultation with federal partners, as well as Indian tribes. The JCEP project would disrupt the critical habitat of federally protected aquatic species, including Coho Salmon (*Oncorhynchus kisutch*) and Green Sturgeon (*Acipenser medirostris*). Indian Tribes, NOAA fisheries, and the State of Oregon have worked hard to restore the salmon populations in the south coast. The State has invested significant amounts of Oregon taxpayer money to restore water quality and salmon in all six of the sub-basins that would be affected by the JCEP—the Coos, Coquille, South Umpqua, Upper Rogue, Upper Klamath, and Lost River sub-basins.

The Western Environmental Law Center (WELC) determined total expenditures by the Oregon Watershed Enhancement Board (OWEB) of over $37 million. The *ESA Coho Salmon Recovery Plan* produced by NOAA National Marine Fisheries Service outlines major threats, “Degraded water quality, reduced water quality, including high water temperatures, and increased fine sediment levels affect Coho Salmon production in several populations. Increased water temperature is the primary source of water quality impairment for Oregon Coast Coho Salmon, and rising water temperatures due to climate change could add to this problem. Land use activities have contributed to increased water temperatures in coastal streams by removing riparian vegetation, disconnecting streams from floodplains, and reducing streamflow through water diversions.”[174]

4.7 LAND USE

The DEIS’s conclusion is typically unacceptable in its unsupported dismissal of significant impact:

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[173] DEIS, p. 4-188.

[174] NOAA National Marine Fisheries Service, *ESA Coho Salmon Recovery Plan*, p. 6.

> Constructing and operating the Project would have both temporary and permanent effects on land use. Some land uses would be permanently converted to industrial use, others (such as affected orchards, vineyards, and forests) would no longer being permitted directly over the pipeline, Other land uses would be converted to more natural conditions than they are currently (as part of the proposed Project-related mitigation sites). Based on the proposed mitigation and minimization measures the Project would not significantly affect land use.[175]

We disagree and wish to note especially that the land-uses to be negatively impacted inventoried in the second sentence should be recognized for the real-life consequences they represent. The orchards, vineyards, and forests to "no longer [be] permitted directly over the pipeline" belong to private landowners whose lives, plans, and economic well-being will be harmed if this project is approved.

The League of Women Voters of Oregon supports the Land Conservation and Development Commission (LCDC) as the statewide planning agency and the 19 statewide land use goals. The League supports policies that promote both conservation and development of land as a natural resource, in accordance with Oregon's land use goals.

The Applicant describes land use as follows: "Approximately 61.86 percent of the land crossed by the Pipeline is classified as Forest Land; 13.68 percent is classified as Agricultural Lands; 14.43 percent as Rangelands and 8.05 percent as Urban or Built-up Lands. The other land classifications combined (Water, Wetlands, Barren Lands) comprise about 2 percent of the Pipeline."[176]

Throughout the history of this project, there have been land use conflicts in at least two of the four affected counties—Coos and Douglas. Most recently, the Land Use Board of Appeals (LUBA) rejected Coos County's earlier approval of JCEP's application, finding that the County erred with respect to

1) its treatment of the public benefit and trust standard for the estuary,
2) impacts to Henderson Marsh bordering the terminal site,
3) dredge and fill impacts,
4) impacts of dewatering at the terminal site,
5) approval of the Southwest Oregon Regional Safety Center; and
6) reliance on suspended FERC permits.[177]

There are currently three cases brought by four landowners against Douglas County pending in the Douglas County Circuit Court. The lawsuits are contesting the PCGP Conditional Use Permit extensions by the County and an amendment to the original permit to allow the pipeline to be used for export, rather than import, purposes.[178]
FERC is aware that the LUBA decision and other Land Use cases may have implications for a number of state and federal permits. We were unable to find any mention of this issue in the DEIS.

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[175] DEIS, p. 532.
[176] PCGP Resource Report 8: Land Use, Recreation, and Aesthetics, p. 8.
[177] Oregon Shores Conservation Alliance, "Land Use Board Blocks Jordan Cove Permit," 2016.
[178] Communication with Stacey McLaughlin, Plaintiff, July 13, 2018.

4.8 RECREATION AND VISUAL RESOURCES

Recreational water-based concerns: Public trust rights with respect to submerged lands and navigable waters are rooted in the principle that the Department of State Lands shall not authorize a proposed use if it would result in an unreasonable interference with the public trust rights of commerce, navigation, fishing and recreation.[179]

The proposed activities of dredging and the outcome of operation of the facilitywould encroach upon the public's rights to use the navigable waters in Coos Bay and Jordan Cove. Fishing activity in the bay occurs throughout the year for various targets.

The DEIS states,

> Recreational clamming and crabbing that takes place outside the navigation channel would not be directly affected by LNG carrier traffic transiting the waterway to and from the LNG terminal. *Effects would be similar to those presently experienced during the passage of other deep-draft ships* [emphasis added]. However, if crabbing or clamming activities were to occur within the established security zones, those activities may be required to cease, with attending vessels required to temporarily move out of the security zone while the LNG carrier in transit moves by.[180]

We disagree. This is a vast understatement of the negative impacts on recreation of the JCLNG project.

A. The recreational crab fishery would be among those most vulnerable and affected by the traffic in the navigation zone. This includes the effects from habitat alterations during construction, but also during operations.

All boat-based crab fishing takes place around the slack high tide water events. The fishers deploy rings and set them with bait and then the retrieval occurs during the two hours around high tide. The fishers retrieve each of these and harvest and sort the crabs. Many boats use up to a dozen rings, and all activity takes place in the two-hour slack high tide period. This same time is when the LNG ships would of necessity be moving fully loaded out of the bay. This would totally and thoroughly disrupt and interfere with the recreational access to what is a highly socially and economically important component of the functional use of the estuary. Clam harvest by scuba fishers is done at slack low and high tides.

Other ship traffic would be unreasonably affected by this high density of ship traffic in and out of the bay. Commercial fishing fleets depend on weather conditions for access. In the winter, often the access into and out of the bay can be limited by weather conditions. Having large ships with exclusion zones surrounding them would affect all other associated fish fleet traffic.

B. The loss of access for recreation from removal of the tidal areas in the Access Channel region is also of concern.

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[179] Oregon Department of State Lands. "Public Trust Doctrine," https://www.oregon.gov/dsl/About/Documents/Public_Trust_Doctrine.pdf.
[180] DEIS, p. 4-538.

Recreational boating and clamming and crabbing access from the nearby Bureau of Land Management (BLM) boat launch would be severely curtailed during some of the dredging operations. Even if access is possible, noise and interference from the activities would hamper most activities. The public access for hunting and access to open water areas is focused out of the BLM launch. Many recreationalists walk with their families and pets along the tidal areas. The proposed Access Channel dredging is just upstream from this important area with proposed channel alterations affecting 22 acres of tidal and subtidal habitat, 15 of which are deep subtidal habitat.

The enormity and unique needs of an LNG export operation of this nature can be expected to take precedence over all other uses of the channel. The two other LNG facilities in the U.S. are situated in ports with less complex multiple uses and without the limited geography of Coos Bay. Navigation in and around the project facilities in the Coos Bay by all other users would necessarily be curtailed and disrupted to make way for the tanker and facility operations. With the explosive nature and risks to safety of the project, existing recreational and commercial shipping in the area would be affected. This proposed dredging and construction, as well as operation of the facility would restrict in significant ways all other commercial and recreational water uses including fishing, a public trust right in Oregon.[181]

C. In addition to boating, the DEIS outlined considerable state, federal, tribal, county, and local recreational facilities in the area, but they, too, are included in the blanket dismissal by FERC staff of significant impact.

As will be covered in section 4.9 Socioeconomics, the estuary and associated coastal resources are an important resource. The BLM administered lands include 709 acres that are classified as an Area of Critical Environmental Concern (ACEC) and the remainder are designated as Recreation Management Areas (RMAs). Close to the project is the North Spit Trail System, which is approximately 300 feet from the Trans-Pacific Parkway. The DEIS indicates that more than 6,000 people travel annually on the sand road to the North Jetty. The traffic alone in the construction phase would interfere with access to and from the recreational areas of the North Spit. The southern boundary of the Oregon Dunes National Recreation Area (ODNRA) is about 100 feet north of the Jordan Cove LNG terminal site, across the Trans-Pacific Parkway, and the Horsfall Campground is located about 0.5-mile northeast of the LNG terminal site. According to the DEIS and 2011 data, the Forest Service identified 1.6 million visits to the Siuslaw National Forest, including the ODNRA, with 23.6 percent of visitors engaging in off highway vehicle (OHV).[182] There are frequent rally activities with large numbers of visitors. Access alone would be a challenge during construction. On the other side of the recreation area, off road vehicles are prohibited. There are bike trails, water trails, and many recreational assets that are near and associated with the general area of this facility.

The DEIS states:

> There may be some conflicts between recreational drivers on the Trans-Pacific Parkway and construction traffic traveling to and from the Jordan Cove LNG Project. Recreational drivers in this context could include recreationists using the Trans-Pacific Parkway to

[181] *Oregon Shores Conservation Coalition v. Oregon Fish and Wildlife Commission*, 62 Or 481, 493 (1983).
[182] DEIS, p. 4-535.

> access recreation sites, including the ODNRA, as well as people recreating by driving for pleasure.[183]

This is understated; the conflict is certain. The overall access to, and interest in, the area of recreation would be affected by the construction and the operation of the facility. In terms of tourism, the Coos Bay-North Bend-Charleston area is named "Adventure Coast," and opportunities for water and land based tourism and recreation are highlighted throughout the region and marketed by the Coos Bay–North Bend Visitor & Convention Bureau.[184] Additional discussion of this impact is provided in Visual Resources just below.

4.8.2 Visual Resources

The treatment of impacts to visual resources follows a general section on recreation. The two are most certainly related, particularly for those elements that consider the coastal features and importance of natural areas to perception, as well as function of an area.

The DEIS states,

> Constructing and operating the Jordan Cove LNG Project would result in substantial short-term and long-term changes to the existing landscape within the viewshed of the Project. As described in the preceding sections, the LNG tanks and related facilities at the terminal would be visible from a range of viewpoints within the surrounding area and the visual effects were assessed to be low to high dependent on the user and viewpoint location. Jordan Cove attempted to optimize design factors for the LNG tanks and has adopted various measures to mitigate for the visibility of the Project facilities, including use of landform contouring and stabilization, vegetative screening, architectural treatments, and use of hooded lighting. However, based on the size and location of the proposed LNG facilities we conclude that the Jordan Cove LNG portion of the Project *would significantly affect* visual resources for some views and viewing locations [emphasis added].[185]

The DEIS recognizes impacts to various areas, but the conclusions and evidence of the impact of visual resources in the area of the terminal and associated construction and operations have several misleading components. We provide evidence for the following:

1) Export terminal lighting is inadequately described and mischaracterized as to degree of impact.
2) New construction of various types is not included in the analysis of the viewshed, which appears based on dated information at least two years old.
3) With little description or analysis of the visual impact of LNG carriers visiting the bay, the degree of that impact is not fully assessed.
4) The major added impact on visual resources of dredge spoil disposal at APCO Sites 1 & 2 is not identified and analyzed in the DEIS.
5) Lack of Applicant plans and an established regulatory requirement with specific guidelines and financial guarantees providing for the retirement, reclamation, and

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[183] DEIS, p. 4-538.
[184] https://oregonsadventurecoast.com/.
[185] DEIS, p. 4-586.

restoration of the LNG terminal and associated infrastructure, neglects a highly significant impact on visual resources.

6) Due to various deficiencies and omissions in identifying, describing, and analyzing project visual impacts in the DEIS, the cumulative impacts on visual resources are far more significant than the DEIS concludes.

1. Lighting.

While the DEIS recognizes LNG facility lighting as having an impact, it does not adequately assess the nature or magnitude of that impact. The Applicant suggests care in design of facility lighting, including use of directional light sources and shielding fixtures, though little detail permits evaluation of the effectiveness of those measures, which the Applicant states would be provided in a final lighting plan.[186]

LNG facility lighting is known to be extensive and very bright, having a high impact on surrounding areas. The DEIS description that added lighting associated with the LNG project would approach a moderate incremental impact could mean that lighting might add 50-60% to nighttime light impacts combined with those already nearby. A review of more than 110 nighttime photos of various LNG facilities shows they are usually extremely brightly lit in all details, understandable with the unique security and safety concerns that must be addressed for such projects. An LNG carrier at berth while loading is also similarly illuminated for the same reasons. Nonetheless, the negative impact exists.

Light spillage may be controlled by a choice of fixtures, but that would not abate reflected light from light-colored tanks and other facility components, said by the Applicant to be required to reduce heat absorption.[187] Those brightly illuminated features would clearly be seen for miles as the highly visible mid-toned Roseburg Forest Products chip pile nearby shows at night.

It is certain--due to the size of the 240-acre site, extent of its infrastructure, and special security and safety requirements--that the proposed project area, including tanks, liquefaction trains, and berthed carriers, would be by far the most prominently lighted area on the entire North Spit. Terminal lighting impact would be highly visible to anyone having a daytime view and would introduce light pollution affecting westward views of sunsets and the night sky.

2. New Construction.

The FERC DEIS states the following: “The only projects listed in table 4.14-2 that involve new permanent aboveground facilities within the viewshed of the LNG terminal is the City of North Bend’s Department of Human Services Building and the CTCLUSI Hollering Place.”

This understates the actual situation going forward.

The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CITCLUSI) Hollering Place Cultural Visitor Center is under construction on the waterfront at a historic location and the narrowest spot on the Coos Bay Channel. However, several other building projects have been completed in the last 2-3 years which would also have continuous, permanent visual impacts resulting from the LNG export terminal and LNG carriers transiting the bay. These are not mentioned in the DEIS, which may have relied on information not completely up to date.

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[186] DEIS, p. 4-566.
[187] DEIS, p. 4-566.

Those impacts would also likely be reflected in the ability of owners to lease, rent, or sell their dwellings over the period of facility construction, during operation, and after closure. Coos Bay construction, having bay frontage, includes: 1) a 7-unit condominium overlooking the bay and export facility at Fenwick and Maxwell Streets (distance, 1.14 miles), and 2) three high value single family homes on Chickses Drive (distance, 1.5 miles), two of which have remained unsold for several months.

3. LNG Carriers.

A representation of an LNG carrier appears to be part of the simulation shown in Figure K-11. Visually comparing the size of one of the LNG storage tanks (measuring 180 ft. high by 267 feet wide) and located further away upland from the pictured LNG carrier, the carrier appears to be far too small to simulate the actual size of carriers visiting Coos Bay that would sit at berth in the facility slip. The simulated carrier placed in the JCEP-supplied photo should appear close to twice the length and twice the height of the one used in that 24mm wide-angle view to adequately represent the nearly 1,000-foot LNG carriers expected to visit the proposed terminal. A clear misrepresentation is caused by the Applicant's use of a simulated image of an LNG carrier at only half the size. It should be in proportion to the facility tanks and if it were, this subject would actually appear four times larger (in all dimensions) in our 50mm photo at the same location. Whether this was deliberate cannot be known, but the fact must be noted.

4. APCO sites 1 and 2.

A further important visual impact from disposal of up to 1.8 million cu. yds. of dredge spoils from construction and periodic maintenance dredging for the project at the APCO sites 1 & 2 has not been sufficiently described for reliable conclusions to be drawn regarding its impact. The dredge spoil piles that would be placed at APCO sites 1 and 2 would tower 50 to 60 feet above ground level of the bridge and would be highly visible from all traffic crossing the McCullough Bridge especially south bound traffic coming into North Bend. This bridge is listed on the National Register of Historic Places as a structure deemed worthy of preservation for their historical significance. Spoiling the view in this way would have an impact worthy of note. Visual pollution diminishes this value.

5. Retirement and Reclamation of Site.

Since there are no current federal, state, or local requirements and specific regulations for the retirement and restoration of LNG export facility sites after closure, the prospect that this expensive work would be thoroughly carried out seems slight. The fact that detailed plans for this post-closure work by the Applicant are not discussed at all in this DEIS, including financial guarantees for its completion, make that outcome extremely unlikely. Therefore, it is reasonable to expect the work of retirement, reclamation, and site restoration of the LNG export terminal and related infrastructure would pass to local, state, or federal governments and funding sources, with a highly uncertain timeline. As FERC recognizes in this DEIS, significant, permanent visual impacts would occur to visual resources from construction and operation of the proposed LNG terminal. The failure of the Applicant to address this additional cumulative factor on Visual Resources would appreciably lengthen the duration of the significant, permanent visual impacts of the LNG export terminal on visual resources of the Coos Bay area, potentially far beyond what is acknowledged.

6. Cumulative Impacts and misrepresented photos.

The DEIS discussion (4.14.1.6) accurately states that, "…because the Project's impact on Coos Bay's visual character would be significant, a significant cumulative impact would result." We appreciate that acknowledgment, but we assert that considering the discussion and the images submitted to support the Applicant's assertions regarding impact to Visual Resources from the construction and operation of its Jordan Cove Energy Project LNG export terminal, the conclusions reached by the FERC greatly understate the visual impact on those who reside in the Coos Bay area, visiting tourists, and recreationists who enjoy use of the resources of the Bay. Also, the large LNG carriers would produce visual impacts in-transit and while loading at-berth, both of which have not been fully described and adequately analyzed in the DEIS.

The photographic illustrations in Appendix K have been taken with wide angle lenses. Photographic images provided to FERC to support the analysis and conclusions regarding project impacts on Visual Resources from construction and operation of the export terminal are inadequate and very misleading. It is apparent that a lens with a wide-angle focal length was used for photos found in the DEIS, Appendix K.[188] A wide-angle focal length lens provides a wider field of view, but also, one where distant objects appear more distant and smaller than they appear to the human eye. This was readily confirmed by taking sample photos at various lens focal lengths from the actual locations JCEP obtained its images, then reviewing the EXIF data, or camera settings, that our digital cameras recorded with every image. The lens focal length used in the DEIS for all Coos Bay images showing visual impacts appears to have been of 24mm focal length--or very close to that—for both the existing views and views with added simulations. This is a very wide-angle focal length lens, which has implications for the accuracy of the Applicant's representations of visual impacts of the proposed project.

We repeated photos at four of the Appendix K Viewpoints, replicating as closely as possible the images supplied in the DEIS. A 24mm lens focal length was used to represent the same wide-angle view resulting in the reduced apparent size of objects in the Applicant's submitted photos found in Appendix K. For comparison, photos were made at the same four Appendix K Viewpoints, using a 50mm focal length lens (confirmed by EXIF data)—which very closely approximates the actual view of human eyesight and which is often referred to as a "normal" lens. No simulations for the LNG facility were applied to our images as that would change the EXIF data and show the images had been modified by software enhancement.

There being a direct optical relationship between lens focal length and image size, the size of an object in a view photographed at 24mm focal length will appear to be twice as large in the same view photographed with a 50mm focal length lens. It is easy to make a visual comparison of objects in the 24mm view of the Applicant's images and the same objects in our 50mm views to confirm the near doubling of the size of objects at 50mm (approximating human perception). It is also easy to visualize the size of the simulated objects in the Appendix K photos but represented at twice that size in our corresponding 50mm views.

We provide four pairs of digital images directly from the camera, unchanged in EXIF data and unedited by any image enhancement software (located either in-camera or on a computer). When compared with the images in Appendix K, these illustrate the inadequate, misleading characterization of visual impacts in all the images submitted by the Applicant for this section. The four pairs of images correspond to the locations photographed in Figures K-1, K-9, K-10,

[188] There are two appendixes in the DEIS designated as Appendix DEIS, Appendix K. We refer to Appendix K Visual Resources-30.PDF, "Appendix K, Visual Resources," pp. various.

and K-11 in the DEIS, are labeled as in Appendix K, but with the focal length of each added to the Figure number (i.e. K-1, 24mm, K-1, 50mm, etc.). These can be accessed at the following Dropbox link:
https://www.dropbox.com/sh/91p3on5rmqgr2md/AACM1gUaFSPOtUOLywapqzBya?dl=0

We also provide figures for comparison in this document to exemplify the issue (Fig 11 &12).

To emphasize the accuracy of photos, our EXIF data are embedded in our submitted images and can be read to verify camera settings using the available software features within PC and Apple operating systems, or several free applications for that purpose. A close visual correspondence to the Applicant-supplied images was determined by examination and place descriptions for Viewpoints given in Appendix K when establishing our photo locations and compositions. The JCEP photos were taken in late summer or fall judging from foliage color and possibly 1-2 years prior, noting vegetation growth and some brush removal at one site (Fig. K-1).

Another inadequacy appears in the DEIS Appendix K photographs illustrating impacts to visual resources. Photos submitted by the Applicant appear most sharply focused in the foreground (at approx. 10-30 ft. in front of the camera position), becoming progressively less sharp and blurred out to the horizon, where the simulated LNG facility is often located in pictures. The effect is to further soften the visual impact of the LNG export facility taken with a very wide-angle lens (24mm), which represents the facility at less than half the size it will appear to the human eye at that same location if photographed with a 50mm lens. The photos presented in the Appendix K simulations present visual predictions of the structures appearing much smaller than they would be seen with a 50 mm lens. Moreover, the focus softening of the subjects is unusual since the images appear to be taken on sunnier days, which usually produces automatic camera settings that result in great depth of field, appearing as generally having sharp focus from foreground to the horizon.

Finally, the location of one of the sets of images (Appendix K, Figure K-2), presumably shows a simulation of facility storage tanks (or possibly containment structures) at the export facility. This is confusing and mistaken. The pictured view is not the location of the facility site, which the simulation would imply. The viewpoint location of the Applicant's images for Figure K-2 is approximately ½ mile northeast of the actual proposed facility site. The simulation shows a structure at that location, but none exists there, nor does the DEIS discussion for Figure K-2 refer to the misapplied simulation at all.

The DEIS states that "Figures K-1 through K-11 in Appendix K show the existing conditions (or "before" view) for each viewpoint, and a visual simulation (or "after" view) illustrating the expected appearance of built portions of the Project."[189] It's also stated that the visual simulations "are accurate within the constraints of available site data, such as site topography, the proposed LNG terminal design, and photography obtained in the field." Our visits to Viewpoints photographed for Appendix K and photographic examples at four of them show that both the Appendix K existing and simulation views do not illustrate the existing views or the "expected appearance of built portions of the Project." The Applicant's use of a wide-angle focal length lens for both types of views show all objects in their images, including the simulated export facility at slightly less than half its actual size. As previously noted, the focus of all

[189] DEIS, p. 4-561.

images is oddly soft in the background of images, further reducing the visual impact of the simulated export facility.

The DEIS makes various conclusions based on a series of selected viewpoints and prominent features. We provide two plates with photographic comparisons of these visual images that show that the photographic representations of these areas and simulated viewscapes are deficient and misleading. The two view comparisons are of the tanks from the road and from the BLM boat launch as our Figs 11 and 12 shown below.

Fig. 11A.

Fig. 11B.

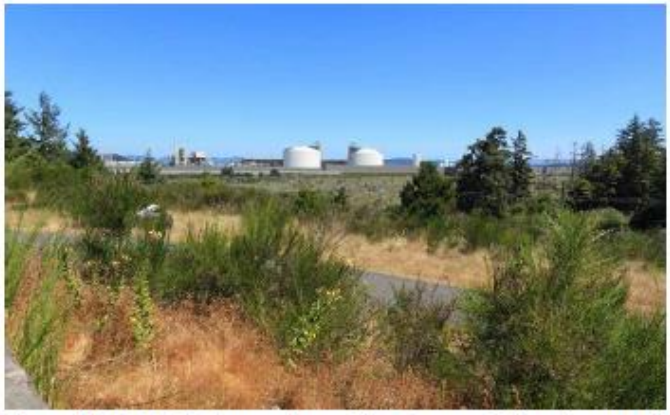

Fig. 11C.

Figure 11 A, B. C. Comparison of landscape of site photographed at Site K.1.
11A. Photo by our group of site with wide angle 24 mm lens.
11B. Photo of same site by our group with 50 mm lens.
11C. Photo of site provided by Applicant in Appendix K.

Fig. 12A.

Fig. 12B.

Fig. 12C.

Figure 12 A, B. C. Comparison of landscape of site photographed at Site K.11.
11A. Photo by our group of site with wide angle 24 mm lens.
11B. Photo of same site by our group with 50 mm lens
11C. Photo of site provided by Applicant in Appendix K.

4.9 SOCIOECONOMICS

The DEIS acknowledges some impacts on socioeconomic resources, but in typical fashion, they are dismissed as temporary and short term, associated only with the construction phase of the project, seemingly therefore not significant. Examples are increased demand for law enforcement and fire protection, and medical services. On the other side of the scale, benefits are named, "constructing the Project would provide direct employment for local workers, support jobs and income elsewhere in the local and state economies, and generate tax revenues for local, state, and federal agencies."[190]

In a rare acknowledgment of significant adverse impact on the human environment, FERC staff points out what the project's construction phase would do to housing availability.

> . . . when the combined effects of the Jordan Cove LNG Project and Pacific Connector Pipeline Project are taken into consideration collectively, construction of the Project has the potential to cause significant affects to short-term housing in Coos County. These impacts could include potential displacement of existing and potential residents, as well as tourists and other visitors. Tourists and other visitors could also be displaced during peak construction in Douglas and Jackson counties as Project-related demand for hotel and motel rooms would likely exceed the normally available supply. With the Applicant's proposed construction and operations procedures and mitigation measures in place, construction and operation of the LNG terminal and pipeline facilities are not expected to result in significant impacts on socioeconomic resources or services, with the exception of housing availability.[191]

We agree with the conclusion. The situation has also come to the attention of the U.S. Department of the Interior such that they included this in their comment on the DEIS:

> The Department recommends additional detailed analysis relative to identified significant impacts to housing in the Coos County area. Specifically, the BLM requests that project-related temporary housing needs for both the liquefied natural gas facility and the pipeline be addressed cumulatively with other projects relative to the displacement of visitors, recreationists, and low-income residents. Additional analysis regarding rental rates and housing costs associated with the demand for temporary housing is also requested.[192]

This type of "boom and bust" project is almost irrevocably tied to a variety of housing-related problems. However, we find FERC staff understates the seriousness of this situation, especially on low-income communities. We discuss this further below under the subheading Environmental Justice. The DEIS states that the Coos Bay area would be the only area that would suffer in this way. As noted, the Department of Interior disagrees with this, as do we.

A. The DEIS does an unbalanced and therefore ineffective presentation and analysis of the economic impacts of the JCLNG Project.

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[190] DEIS, p. 4-603.
[191] DEIS, p. 4-621.
[192] U.S. Department of the Interior to Kimberly D. Bose, Federal Energy Regulatory Commission, "COMMENTS – Jordan Cove Energy Project Draft Environmental Impact Statement, CP17-494-000 and CP17-495-000," July 3, 2019, p. 3, http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20190703-5127.

We believe there is ample reason to find that, on balance, JCEP is likely to result in more economic detriments than benefits. The Applicant cites jobs as a benefit, and we would agree that there is a need for good jobs in our state and local communities. However, we are not confident that this project would result in employment circumstances the Applicant describes. The number of temporary jobs claimed has been elevated from 2,000 in the previous submittal to up to 8,000 in the current application. The reason for the increase is unclear, since this project lacks the jobs associated with potential of construction of the power plant sector included in the earlier version. Around 100 permanent jobs are claimed. The Applicant implies, and supporters appear to believe, that these jobs would go to local, or at least state, residents. Over the decades, communities across the nation have learned that oil and gas projects don't necessarily deliver on those promises. One of the primary reasons is that the necessary skill sets workers need for a project of this magnitude and complexity must be gained by specialized training and experience. The DEIS acknowledges this,

> Jordan Cove's estimated construction workforce would average 1,023 workers over the 53-month construction period, with projected employment expected to peak in month 30 with an estimated 1,996 workers employed on site (ECONorthwest 2017a). Construction would require workers in highly skilled crafts, such as pipefitters, ironworkers, electricians, carpenters, and management staff, including safety specialists. Jordan Cove anticipates that the workers hired will already have these skills, having gained experience in other related industries, including the oil and gas and power industries.[193]

Clearly, Pembina is not planning to hire and pay the costs to train thousands of Coos County residents or southern Oregonians to lay 229 miles of 36-inch pipe through extremely challenging terrain when there are thousands of experienced pipefitters, welders, etc., in North and South Dakota, Pennsylvania, eastern Colorado, Texas, and so on who are looking for work. But full discussion of the claimed job creation benefit must also include factor in jobs lost as a result of the JCEP.

In the review of economics, many existing industries have potential to be harmed, e.g., oyster and other fishing, tourism, and private timber companies. The DEIS, however, largely glosses over these impacts. In its comments on the 2015 DEIS, the Oregon Department of Agriculture pointed out that the adverse impacts on the commercial oyster industry in the Coos Bay project area had not been disclosed such that the state and the public were not adequately informed. The Department outlined operations of the two major producers and indicated how dredging and access restrictions during construction and operation would likely jeopardize this local established industry. While the current DEIS does rectify the earlier silence on the subject, we find the treatment unsatisfactory.

B. Key contributions to the local economy from commercial fishing are at risk of being lost if the project goes forward.

The Coos Bay area is an important port for commercial fishing and the third largest working waterfront on the Oregon Coast.[194] The Charleston Boat Basin, which is outside of the Coos

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[193] DEIS, p. 4-588.

[194] Port of Coos Bay 2018 Annual Report; https://www.oipcbannualreport18.com/charlestonmarina, extracted June 20, 2019. Also, Port of Coos Bay, "Year in Review: Letter from the CEO," June 30, 2019; https://www.portofcoosbay.com/news-releases/2019/1/30/year-in-review-letter-from-the-ceo.

Bay city limits and closer to the mouth of Coos Bay, is the primary area that houses the commercial fleet, processing infrastructure, and marine-related services. A small number of commercial vessels dock in downtown Coos Bay.

Between 200 and 250 commercial fishing vessels operate out of the Charleston boat basin during the spring, summer, and fall months when major fisheries for Pacific pink shrimp (*Pandalus jordani*), Chinook salmon (*Oncorhynchus tshawytscha*), Pacific hake (whiting; *Merluccius productus*), albacore tuna (*Thunnus alalunga*), and market squid *(Doryteuthis [Loligo] opalescens*) are operating. A number of these are transient vessels that deliver product to processors or offload for shipment to other processing facilities out of the area. They also take advantage of the ice facilities and marine supply stores that operate near Charleston and in the city of Coos Bay. The boat basin is considered the home port to more than 200 commercial fishing vessels year-round that range in size from about 30 feet long (salmon trollers and small combination vessels) to almost 100 feet long (trawlers and seiners). The Port of Coos Bay facilities (ice plant, docks, moorage, etc.) can support a commercial fishing fleet of 250 vessels.[195]

Two small fishermen's markets offer retail services on the docks, one in Charleston and one in Coos Bay. Retail seafood stores and seafood restaurants operate in Charleston, Coos Bay, and the adjacent city of North Bend.

Commercial landings are increasing in volume and value in the Charleston/Coos Bay area. In 2017, commercial harvests were seven percent of the Oregon landings by volume but accounted for 21 percent of Oregon's ex-vessel value (ex-vessel value is based on the prices paid by processors to fishermen) for all species for a total of $30.6 million. In 2018, those figures increased to 10 percent of statewide landings by volume and to 23 percent by value to $40.2 million.[196] A standard economic multiplier of 2.5 increases the commercial seafood industry's value to the local community to $76.5 million in 2017 and $100.6 million in 2018.

Pink shrimp and other shrimp species, including spot prawns, account for the highest landings volume, but Dungeness crab and related crab species account for the greatest value. In 2018, shrimp and prawn landings were 5,440.8 metric tons or 11,994,911 pounds, followed by Dungeness crab/crab species at 2,721.6 metric tons or 6,000,101 pounds. However, Dungeness crab remains the primary economic driver of commercial fisheries, with a value of $19.7 million in 2018, followed by pink shrimp at $9.3 million.[197]

Carefully managed fisheries have been recovering and adding to the economic value of the coastal economy. In 2018, West Coast trawl fishermen increased their groundfish catch by more than 14 million pounds, a 300 percent increase over what they caught in 2017.[198] Trawlers

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[195] Port of Coos Bay 2018 Annual Report; https://www.oipcbannualreport18.com/charlestonmarina, extracted June 20, 2019. Also, Port of Coos Bay, "Year in Review: Letter from the CEO," June 30, 2019; https://www.portofcoosbay.com/news-releases/2019/1/30/year-in-review-letter-from-the-ceo.

[196]Pacific States Marine Fisheries Commission; Pacific Fisheries Information Network (PacFIN) APEX fish ticket reporting system for Oregon data. Report: ALL005, WOC All Species by Port Group, with filters for data by year. Extracted at 10:17 p.m. on June 13, 2019 (https://reports.psmfc.org/pacfin/f?p=501:1000::::::).

[197]Pacific States Marine Fisheries Commission; Pacific Fisheries Information Network (PacFIN) APEX fish ticket reporting system for Oregon data. Report: ALL005, WOC All Species by Port Group, with filters for data by year. Extracted at 10:17 p.m. on June 13, 2019 (https://reports.psmfc.org/pacfin/f?p=501:1000::::::).

[198] SeafoodNews.com, "West Coast Trawlers see Highest Groundfish Landings Since 2000 with Rockfish Resurgence," Feb. 12, 2019; https://www.seafoodnews.com/Story/1131867/West-Coast-Trawlers-see-Highest-

delivering to Charleston share in some of that increase that is expected to continue to grow over time. Much of Oregon's trawl industry relied on groundfish, a federally managed group of almost 100 species of midwater and bottom-dwelling rockfish (yellowtail rockfish, widow rockfish, and others in the genus Sebastes); roundfish (such as sablefish, Pacific hake, lingcod); flatfish (such as starry flounder, soles, petrale); sharks and skates; and other species.[199]

In 2000, the West Coast groundfish fishery was declared a failure due to undetermined, but likely natural causes. Managing the fishery conservatively, in order to account for scientific and management uncertainty, contributed to reduced quotas. Factors that may have contributed to the declines include changes in ocean conditions, low productivity, and five El Nino events since 1982, according to the U.S. Department of Commerce.[200] Between 1999 and 2002, nine species of groundfish were listed as overfished, which meant draconian management measures had to be taken to rebuild the long-lived species.[201] Now, roughly 20 years later, all but two of the stocks have been rebuilt (recent stock assessments for some species show they were never overfished in the first place) and both sport and commercial fishermen are enjoying the benefits. Sport fishermen have had longer seasons and increased bag limits. Commercial fishermen have begun to reclaim markets lost almost two decades ago.[202]

The detailed table report below was generated using state agency fish ticket data from the PacFIN comprehensive fish ticket table. This report includes all U.S West Coast catch areas including the Puget Sound and other inland areas where marine fish are caught. (Only the portion relating to Charleston/Coos Bay and Oregon statewide landings have been included here; Canadian and Alaskan catches have been excluded).[203] Shoreside reported catches have species and area composition samples applied. Data that involve fewer than three vessels or dealers have been withheld to preserve confidentiality.

Many of Oregon's fisheries are certified as sustainable according to global Marine Stewardship Council certification standards. Oregon pink shrimp, several rockfish species, Chinook, and Dungeness crab are either certified, have been certified or are undergoing re-certification under the MSC. This certification makes these fisheries more marketable both locally and globally.

We provide this detailed information to illustrate the economic importance and future promise of the fishing sector in the Coos Bay area. As we discussed above, all of these endeavors are threatened by the proposed JCLNG facility and export activities. It should be clear, although the

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Groundfish-Landings-Since-2000-with-Rockfish-Resurgence, extracted June 30, 2019.

[199] National Marine Fisheries Service Northwest Fisheries Science Center, Fisheries Resource Analysis and Monitoring Division. "What are groundfish?"; https://www.nwfsc.noaa.gov/research/divisions/fram/economic/economic_data_groundfish.cfm, extracted June 30, 2019.

[200] U.S Department of Commerce, National Oceanic and Atmospheric Administration press release No. NOAA 00-R103, "Commerce Secretary Daley Announces West Coast Groundfish Fishery Failure," January 19, 2000; https://www.fisheries.noaa.gov/webdam/download/65032875, extracted June 30, 2019.

[201] National Marine Fisheries Service/NOAA Fisheries West Coast Region, "Rebuilding plans pay off for West Coast groundfish fishery," April 2016.

[202] National Marine Fisheries Service/NOAA Fisheries, feature story: "Rebounding Populations and New Flexibility Boos Catches by West Coast Groundfish Fleet," April 15, 2019; https://www.fisheries.noaa.gov/feature-story/rebounding-populations-and-new-flexibility-boost-catches-west-coast-groundfish-fleet.]

[203] Pacific States Marine Fisheries Commission; Pacific Fisheries Information Network (PacFIN) APEX fish ticket reporting system for Oregon data. Report: ALL005, WOC All Species by Port Group, with filters for data by year. Extracted at 10:17 p.m. on June 13, 2019 (https://reports.psmfc.org/pacfin/f?p=501:1000::::::).

DEIS does not acknowledge it, that LNG tanker activity would both take precedence over and otherwise interfere with all other boating uses. Security measures due to the potential for terrorist activity add to this conclusion. The economic cost to the communities that rely on the Coos Bay for their livelihood must be fully considered.

Year	Management Group	Common Name	COOS BAY, OR AREA Round Weight (mt)	COOS BAY, OR AREA Revenue ($)	STATEWIDE TOTAL Round Weight (mt)	STATEWIDE TOTAL Revenue ($)	CB area as a percent of statewide landings and volume Round weight	CB area as a percent of statewide landings and volume Revenue
2017	CPEL SUBTOTAL	__ALL COASTAL PELAGIC	0.0	$0	473.5	$38,500	0%	0%
2017	CRAB SUBTOTAL	__ALL CRAB	2,193.8	$15,249,301	8,625.8	$58,728,089	25%	26%
2017	GRND SUBTOTAL	__ALL GROUNDFISH	1,444.8	$4,458,179	112,344.2	$51,274,338	1%	9%
2017	HMSP SUBTOTAL	__ALL HIGHLY MIGRATORY	793.2	$3,728,572	2,152.5	$10,803,127	37%	35%
2017	SAMN SUBTOTAL	__ALL SALMON	17.9	$256,568	542.8	$5,556,227	3%	5%
2017	SHLL SUBTOTAL	__ALL SHELLFISH	0.0	$0	317.4	$624,444	0%	0%
2017	SRMP SUBTOTAL	__ALL SHRIMP & PRAWNS	3,753.3	$4,760,327	10,458.5	$12,688,375	36%	38%
2017	XXXX SUBTOTAL	WITHHELD FOR CONFIDENTIALITY**	985.9	$1,485,885	1,642.9	$2,426,192	60%	61%
2017			**9,251.1**	**$30,619,374**	**137,132.6**	**$144,071,592**	**7%**	**21%**
2018	CPEL SUBTOTAL	__ALL COASTAL PELAGIC	2,171.7	$2,025,316	2,343.9	$2,028,961	93%	100%
2018	CRAB SUBTOTAL	__ALL CRAB	2,721.6	$19,728,194	10,494.6	$74,527,007	26%	26%
2018	GRND SUBTOTAL	__ALL GROUNDFISH	1,695.2	$3,683,147	107,051.1	$47,832,282	2%	8%
2018	HMSP SUBTOTAL	__ALL HIGHLY MIGRATORY	850.0	$3,071,173	2,638.7	$9,722,792	32%	32%
2018	OTHR SUBTOTAL	__OTHER SPECIES (NO M-GROUP)	43.4	$511,198	411.3	$1,660,408	11%	31%
2018	SAMN SUBTOTAL	__ALL SALMON	45.3	$712,994	444.7	$5,727,903	10%	12%
2018	SHLL SUBTOTAL	__ALL SHELLFISH	0.0	$0	308.9	$710,041	0%	0%
2018	SRMP SUBTOTAL	__ALL SHRIMP & PRAWNS	5,440.8	$9,298,541	16,271.5	$26,908,622	33%	35%

2018	XXXX SUBTOTAL	WITHHELD FOR CONFIDENTIALITY**	660.1	$1,197,456	2,095.4	$3,337,850	32%	36%
2018			**13,628.1**	**$40,228,019**	**142,060.1**	**$172,455,866**	**10%**	**23%**
2019	CPEL SUBTOTAL	__ALL COASTAL PELAGIC	173.1	$187,586	901.5	$1,047,350	19%	18%
2019	CRAB SUBTOTAL	__ALL CRAB	2,304.7	$18,640,937	8,375.0	$65,611,817	28%	28%
2019	GRND SUBTOTAL	__ALL GROUNDFISH	604.5	$814,637	14,787.5	$9,771,434	4%	8%
2019	HMSP SUBTOTAL	__ALL HIGHLY MIGRATORY	-	-	0.0	$0		
2019	OTHR SUBTOTAL	__OTHER SPECIES (NO M-GROUP)	0.0	$0	16.5	$40,848	0%	0%
2019	SAMN SUBTOTAL	__ALL SALMON	0.2	$4,686	15.8	$321,898	1%	1%
2019	SHLL SUBTOTAL	__ALL SHELLFISH	0.0	$0	132.9	$366,080	0%	0%
2019	SRMP SUBTOTAL	__ALL SHRIMP & PRAWNS	0.0	$0	1,616.5	$2,041,596	0%	0%
2019	XXXX SUBTOTAL	WITHHELD FOR CONFIDENTIALITY**	315.7	$467,547	787.0	$1,385,343	40%	34%
2019			**3,398.2**	**$20,115,393**	**26,632.7**	**$80,586,366**	**13%**	**25%**

C. The unique and historical value of Oregon Coastal communities and resources would be jeopardized at significant economic and social loss by construction and operation of the proposed Project.

Although only about 225,000 of the state's nearly four million residents live in coastal counties, many Oregonians use, rely on, or benefit from the coastal region that supports almost $60 billion annual coastal and ocean economy driven by fisheries, agriculture, timber, tourism, and ocean industries. As articulated in the Oregon Sea Grant Strategic Plan 2014-2017, the state has pioneering land-use laws to conserve marine resources and ecological function for long-term benefits.[204] In addition, the Oregon Beach Bill of 1967 guarantees public access to our beaches; there is an average of two public beach-access sites per mile of coastline. Coos Bay is the largest estuary within the state, and is the location of two educational institutions, the Southwestern Oregon Community College and the University of Oregon's Institute of Marine Biology. In addition, the estuary is the site of the South Slough National Estuarine Research Reserve (SSNERR). The SSNERR agreement between Oregon and the federal government was the first estuarine sanctuary in the United States created under Section 312 of the Coastal Zone Management Act (CZMA) of 1972 (P.L. 92-583) and redesignated as the South Slough National Estuarine Research Reserve by federal law (P.L. 99-272). The management policy for the reserve is to:

- Maintain the integrity of the estuary;
- Protect the estuary from uses and activities, both within and beyond its boundaries, that may alter or affect the ecosystem and its natural dynamic processes; and
- Preserve the area for long-term scientific and educational uses.

In addition to these educational and research related assets, the area is surrounded by major parks owned and managed by the county, state, and cities.

This unique position provides economic benefits felt throughout the coastal regions. According to a Travel Oregon study, outdoor recreation continues to be one of the fastest-growing travel markets in the United States. On the Oregon Coast, outdoor recreation accounted for about 10 percent of all visitor spending in 2017, amounting to about $200 million. In 2017, visitors to Coos County spent more than $258.1 million on hotel stays, food & beverage, shopping, recreation, fuel, and more.[205] Even more importantly, visitor spending in Coos County supports more than 3,300 jobs, more jobs than Bay Area Hospital and the forestry/wood products industry combined.[206] Travel generates $1.5 million in local tax revenues. In comparison, direct visitor spending in the state of Oregon topped $11.8 billion in 2017, a 4.7 percent increase over 2016 spending and increased to $12.3 billion in 2018. This spending supports more than 112,000 Oregon jobs and generates $314.5 million in state tax revenues. Visitor spending in Oregon in 2017 divided by the total population of Oregon, 4,141,100 is $2,850. This number goes up exponentially when you look solely at Coos County. For every resident in Coos County, approximately 63,310, visitors to the county spent $4,076 per resident. The Cities of Coos Bay and North Bend, as well as the Coquille Indian Tribe, collect a 7 percent tax on overnight stays in

[204] Oregon Sea Grant Strategic Plan 2014-2017. Oregon Sea Grant, Oregon State University, Corvallis, OR 97333. https://seagrant.noaa.gov/Portals/1/Strategic%20Plans/OR_2014-2017plan-Final_glossy.pdf.
[205] Runyan and Associates 2019. Oregon Travel Impacts Statewide Estimates 1992 – 2018. Oregon Tourism Commission.
[206] Nicolas, A. Johnson, "Visitor spending data released by Travel Oregon," *The World*, July 16, 2018

hotels, motels, bed & breakfast inns, RV parks and vacation rentals and a portion of this provides a portion of this tax revenue to help with marketing.[207]

The recreational fishing industry in Oregon has broadscale economic impact and is tied to trips out of regional bays. Recreational angling for finfish contributes substantially to coastal economies. Trip spending generated $66.7 million in 2013 of total personal income to coastal economies and $68.9 million in 2014. These numbers do not include shellfish harvesting trips that are more tied to the bays.[208] In addition, the commercial fisheries and working waterfronts are essential sources of jobs and economic growth, according to the Oregon Coastal Zone Management Association (OCZMA), which conducts studies of Oregon's coastal economy and provides information to an extensive network of government and other agencies, aiming to improve the region's standard of living. "Fisheries also provide part of the overall ambience folks want to experience when visiting the Oregon coast or opting to live there. They help attract artists, writers and others, including a growing number of retirees, who in turn make their own contributions to an ever-changing diverse economy and culture. Travelers spend time watching and photographing the fishing fleets, and visitors often show up at the coast seeking fresh, locally caught seafood."[209] To the extent that the JCEP would disrupt the above activities, the area would suffer losses in both jobs and tax revenues.

D. Tax revenue is cited by the Applicant as a public benefit, but we do not see appropriate discussion of cost-benefit analysis.

No doubt, additional money would help the affected counties. However, the equation is far more complicated than just dollars-in. The costs to county government directly related to JCEP activities—especially Coos County where most of the construction would occur—would be significant. These must be factored into any responsible balancing of benefits and detriments. Socioeconomic studies and law enforcement records show that boom projects of this type can lead to community disruption of many sorts that put strains on local and state government budgets and service capacity, e.g., domestic violence, drug and alcohol abuse, increased crime, and homelessness. [210]

Communities that host boom and bust economic events such as in Wyoming, Utah, Colorado, the Dakotas, and Louisiana, have found their economic development has down sides. During the boom phase, they struggle, often unsuccessfully, to meet adequately the shared and disparate needs of both temporary and permanent residents. When boom projects end, there are employment constrictions and other economic complications.[211] And project-wide, the expected costs can include lost forest and agricultural productivity on the pipeline route, decreased property values, increased fire danger and costs, landslide events and road repair, water resource loss and quality degradation, invasive species risks, and damage to fish and other

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[207] League of Oregon Cities Transient Lodging Tax.
https://pamplinmedia.com/documents/artdocs/00003561114159.pdf.

[208] *Oregon Marine Recreational Fisheries Economic Contributions in 2013 and 2014, Revision 2.2,* prepared by The Research Group, LLC for Oregon Department of Fish and Wildlife and Oregon Coastal Zone Management Association, September 2015.

[209] Terry Dillman, "Oregon Ports Stimulate Coastal, State Economy," *Fisherman's News,* May 1, 2013.

[210] Uintah Basin Homeless Coordinating Committee, "Homelessness Research Project Phase II: Community Impacts of the Oil & Gas Boom," 2007.

[211] Numerous studies support this contention, for example Bret A. Weber, Julia Geigle, and Carenlee Barkdull, "Rural North Dakota's Oil Boom and Its Impact on Social Services," *Social Work,* January 2014, pp. 62-72; Ruth Seydlitz, Shirley Laska, "Social and Economic Impacts of Petroleum 'Boom and Bust' Cycles," U.S. Department of the Interior, Minerals Management Service University Research Initiative, June 1994.

ecosystem services. There is the potential for additional costs later in the life of the project that may have to be borne by local governments, as well. One notable example is costs to eventually decommission and clean up the site. We have not seen evidence that JCEP has completed binding agreements with local governments and other government agencies to accomplish that. Those costs could exceed tax revenues and even constitute a sizable net loss to communities and taxpayers.

We noted above that the JCEP would provide no energy to U.S. customers; it may also raise domestic gas prices. Industrial Energy Consumers of America (IECA) has submitted detailed communications to FERC in opposition to the project, including this concern. IECA is an association of energy-intensive, trade-exposed (EITE) manufacturing companies. They stated in one filing, "EITE industries use 75 percent of the natural gas and 73 percent of electricity consumed by the manufacturing sector and would be negatively impacted if natural gas prices increase as a result of exporting LNG. EITE industries account for over 40 percent of all manufacturing jobs."[212]

E. Environmental Justice is undervalued as an issue in the DEIS.

The League of Women Voters has strong positions on the need for governmental decisions to be based on open processes that are inclusive of all people, most especially low-income and minority populations. We supported creation of the Environmental Justice Task Force (EJTF) by the 2007 Legislature (SB 420) to help protect Oregonians from disproportionate environmental impacts on affected populations. The EJTF encourages state agencies to give all people knowledge and access to decisions that affect environment and the health of all Oregonians.

The EJTF considered the JCEP proposal at its June 8, 2018 meeting and concluding by finding it to be not to be in Oregon's best interests.[213] Tribal leaders from four tribes testified at that meeting in Klamath Falls, voicing their concerns and opposition. The Klamath Tribes, the Yurok and the Karuk have all come out in strong opposition to the proposed project, and six Tribes have filed as intervenors in the federal regulatory process.

The League greatly appreciated the public hearing opportunities DSL Director Walker provided during January 2019 in all four counties that would be affected by the JCEP, as well as in Salem, and her insistence that the voices of Oregon's tribal communities be heard, including with regard to environmental justice concerns. From our observations, opposition to the JCEP by tribal leaders and members at those hearings was almost universal and in large part, a key consideration was the potential harm to the precious, life-giving waters of the state and all living things that rely on them. The pipeline route and LNG liquification facility and LNG shipping channel work would impact the traditional homelands and culturally significant landscapes of six federally recognized tribes. The rivers, streams, wetlands, shoreline, intertidal resources, and subtidal habitats continue to be used as locations for fishing, gathering and transportation by native American and low-income residents. Local Native American communities, in particular the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians have Tribal holdings and development plans in Empire at the Hollering Place and in Coos Head in Charleston. Traditional

[212] Paul N. Cicio, President, Energy Consumers of America to FERC (filing), June 1, 2016.
[213] Minutes from that EJTF meeting are not yet available publicly, but the decision was captured and is available on video at "Live video feed of the June 8, 2018 meeting of the Environmental Justice Task Force Meeting," Rogue Climate Facebook Page, https://www.facebook.com/rogueclimate/videos/905631742943143.

subsistence would be affected, and the cultural resources of the Coos Indians are likely to bear significant impact.

Indeed, this project holds potential to disproportionately impact minority and low-income populations. Coos County, where the impacts of the proposed JCLNG project would be felt, has a higher than average proportion of people at or near poverty. The DEIS acknowledges this, but concludes that the impacts would be low with the exception of a brief mention of the outsized impact of the housing shortage.[214] We applaud FERC staff for recognizing that the project would put significant pressure on housing, but there is too little discussion of the meaning of that situation on local residents, especially when it is estimated to go on for at least four years. Despite the DEIS's denial (without factual basis) that the project can be characterized as creating a boom and bust phenomenon, that is precisely what would occur. Sudden booms in communities are documented to create housing shortages, domestic violence, and homelessness.

The many safety hazards we have pointed out in these comments would be visited on everyone in the Coos Bay vicinity. But on balance, the considerable health and safety risks associated with this project would be disproportionately borne by communities identified by the EJTP and Executive Order 12898 because of their financial vulnerability. And, the facts that low-income people in general have a lower health status than those with more financial resources and may lack access to adequate health care suggest that the DEIS inappropriately understates the issue.

Hazards of concern to environmental justice of this project include the risks of spill, explosion and fire, particularly for the areas along the pathway of dredging, filling, and ship operations when the facility is under construction and operation. The extensive habitat alterations of the project create a large carbon footprint for the facility and proposed navigation features. The public consequences of these operations would dramatically enhance Oregon's CO2 footprint and have been estimated and evaluated for other projects (Anderson and Barkdoll 2010).[215] Additional continuous releases of CO2 would occur with emissions from operation, as the facility would require a 60-megawatt chiller to cool the gas to liquid that would be running 24 hours per day.

The results of increased CO2 in the oceans ready have affected our local and regional fishermen. Fishing is often their only source of livelihood. Elevated concentrations of CO2 are promoting toxic algae growth and increasing ocean acidity.[216] Elevated ocean temperatures have reduced growth of many species and these three factors resulted in the delay in the Dungeness crab season again this past year. The review of these issues, consequences, and summary of the multi-nation coastal effort in ocean acidification and its urgency are provided in the Oregon Ocean Coordinating Council report[217]. Last year a law suit from the Pacific Coast Federation of Fisherman was filed against major oil companies.[218] The consequences of elevated CO2 on

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[214] DEIS, p. 4-603.

[215] Anderson, MJ and Barkdoll, BD. 2010. Incorporation of air emissions in dredging method selection. Journal of Waterway, Port, Coastal, and Ocean Engineering, Vol. 136, 136: 191-199.

[216] Howarth, R., F. Chan, D. J. Conley, J. Garnier, S. C Doney, R. Marino,and G. Billen. 2011. Coupled biogeochemical cycles: eutrophication and hypoxia in temperate estuaries and coastal marine ecosystems. Front Ecol Environ. 9(1):18–26.

[217] Barth, J.A., C.E. Braby, F. Barcellos, K. Tarnow, A. Lanier, J. Sumich, S. Walker, F. Recht, A. Pazar, L. Xin, A. Galloway, J. Schaefer, K. Sheeran, C. M. Regula-Whitefield. 2018. The Oregon Coordinating Council on Ocean Acidification and Hypoxia. First Biennial Report. September 2018. *oregonocean.info/index.php/ocean-acidification.*

[218] Benjamin Hulac, "Fishermen Sue Oil Companies Over Rising Ocean Temperatures," *E&E News,* November 15,

crabs are shown in a recent peer reviewed study on closely related European brown crab that the growth and behavior of individuals is altered by decreased pH resulting from CO2 content of the oceans.[219]

As for the PCGP part of the project, the DEIS erroneously concludes that negative impacts on communities entitled to environmental justice consideration would be low:

> The preceding review suggests the presence of potential environmental justice or vulnerable populations in several of the census block groups that would be crossed by the Pacific Connector pipeline. Construction and operation of the pipeline are not expected to result in high and adverse human health or environmental effects on any nearby communities and the likelihood that these potential environmental justice and vulnerable populations will be disproportionately affected relative to other populations in the census tracts crossed by the pipeline is low.[220]

We disagree.

As noted above, the Coos Bay area and communities all along the pipeline route would face housing shortages due to the influx of outside workers and, in some cases, their families. The DEIS denies that the Applicant would establish "man camps," rather workers would stay in campgrounds. The point is to suggest thereby that higher crime rates and other forms of social disruption associated with "man camps" would not occur, but we fail to see anything in that regard but a semantic difference between company-owned congregations of outside workers and those created informally in public campgrounds. But from a housing perspective, the latter arrangement would most certainly close off camping options for low-income individuals, as well as local residents seeking recreational camping, and fire-fighters. Other housing options planned by the Applicant would also be reduced to the greatest detriment to low-income residents. Without accommodations provided by the Applicant, workers would stay in motels and rental units, guaranteeing displacement or reduction in living options for low-income populations.

We discuss below in subsection 4.12 the health and wellbeing concerns related to the compressor station to be expanded near Malin, OR. The community where a large compressor station would subject the surrounding community to unhealthy levels of noise and air pollution is over 70% Latinox, while the rest of Klamath county is only about 13% Latinox, placing a disproportionately harmful burden on people of color.

Regulatory elements of the project bear the signature characteristics that are the focus of Executive Order 12898 on Environmental Justice. The astoundingly voluminous, disjointed, and highly technical manner in which material is presented in the application severely limits review and comprehension by individuals across the spectrum of educational levels, including those with no technical expertise or with intellectual, language, or literary challenges. People with any of those challenges are almost automatically excluded from participating in the process. The insistence on using acronyms, each set specific to its own agency or field of expertise, is in conformance with the times and desire for efficiency—we all err in this regard—but it is exclusionary. The FERC applications plus subsequent filings and responses to information

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2018, https://www.scientificamerican.com/article/fishermen-sue-oil-companies-over-rising-ocean-temperatures/

[219] Wang, Y. Wang Y, Hu M, Wu F, Storch D and Pörtner H-O (2018) Elevated pCO2 Affects feeding behavior and acute physiological response of the Brown Crab Cancer *pagurus*. Front. Physiol. 9:1164.

[220] DEIS, p. 4-617.

requests must number over 30,000 and the DEIS includes 5,000 pages. These volumes are beyond the ability of any audience to review, evaluate, and respond to within a 90-day period. There is no basis to claim that the process is accessible to individuals with average or below average English proficiency. It is certainly inaccessible to those groups the Legislature had in mind when it established the EJTF and committed to give them a voice in matters with an outsized impact on them.

4.11 CULTURAL RESOURCES

The DEIS indicates that the Applicant has not yet completed all required phases of cultural investigations and considerations, but without evidence expresses confidence that there would be no difficulties associated with finalizing MOAs and moving on. This approach ignores entirely extensive and widespread concern among Tribal communities and, for several, official opposition to the project. FERC staff states this,

> We have not yet completed the process of complying with Sections 101 and 106 of the NHPA. Additional cultural resource inventories, evaluations, and associated reports are to be completed, as are a final ethnographic study, HPMP, and UDP. Consultations with tribes, SHPO, and applicable federal land-managing agencies have also not been concluded. As such, the Project would result in an adverse effect under Section 106 of the NHPA and a significant impact under NEPA. However, should the Project be approved by the Commission, an MOA would be developed with the goal of resolving adverse effects under Section 106. It is expected that the resolution of adverse effects through an MOA and implementation of treatment plans would mitigate impacts at affected historic properties to a less-than-significant finding under NEPA."[221]

This assessment does not correspond to what we know of the views and concerns of affected Tribal groups. We cannot speak for them, but we find appalling the cavalier assurance in the DEIS that, when the time comes, the Applicant and the federal government will prevail.

The Karuk Tribe, Klamath Tribes, Yurok Tribe, Round Valley Tribe, and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI) have all expressed deep concerns about cultural resources that would be endangered, destroyed, or otherwise harmed by the JCEP. They have also noted repeated failures of governmental entities and the Applicant to properly and lawfully consult them regarding the project.

For example, the Karuk Tribe said this to FERC in their request for formal, government-to-government consultation:

> For the Karuk Tribe, cultural resources need to be understood in the context of a living culture, of all species and not just humans within the environment, and within a defined Klamath Riverscape. The Klamath River is on course to be substantially restored by 2021 by the removal of four dams upstream. The Pacific Connector project would cross under the Klamath River in the vicinity of Klamath Falls. It threatens the integrity of Karuk cultural resources, and of the lifeways of the Karuk people, by threatening the fish on this vital salmon-rearing watershed.[222]

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[221] DEIS, p. 4-655.
[222] Alex R. Watts-Tobin, Ph.D., Karuk Tribe THPO/Archaeologist to Kimberly Bose, FERC, May 3, 2018.

The Klamath Tribal Council stated that,

> . . . the Klamath Tribes strongly oppose the Pipeline because a significant portion of the proposed construction would take place on lands that are within the traditional territory of the Klamath Tribes, where there are located many significant cultural resources and waters of current and historical and spiritual importance to the Tribes. The Klamath Tribes have a long-standing policy that all cultural and traditional sites are sacred, and therefore any risk of disturbance to human remains and cultural sites is unacceptable.[223]

The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI) have stressed,

> . . . specific problems faced by the Confederated Tribes, and by our neighboring Tribes, as we have struggled to compel FERC and USACE to consult openly and willingly with our Tribes, and to compel FERC and USACE to adequately address the many concerns we have raised about the archeological resources, human burials, and sacred places that will be utterly destroyed if the Jordan Cove LNG project is approved as currently designed.[224]

Tribal spokespersons for the CTCLUSI, the Klamath Tribes, the Yurok Tribe, and the Cow Creek Band of Umpqua Tribe of Indians shared their concerns about the impacts of the JCEP at the June 8, 2018 meeting of the Oregon Environmental Justice Task Force in Klamath Falls. As noted above, the Task Force concluded that the project is not in the best interests of the State of Oregon and indicated that they would convey that finding to the Governor and other decision-makers.[225]

In contrast to the concerns and positions expressed by affected Tribal groups, a general description of traditional, cultural resources is included in the DEIS, but we see no weighting factor associated with the cumulative social, environmental, and economic effects. The lands of the North Spit and the Coos watershed and geographic area of Coos Bay is considered by the CTCLUSI to be a Traditional Cultural Property (TCP), "Q'alay ta Kukwis schichdii me."

The DEIS does acknowledge a number of types of evaluations that have not been done:

> Of the 125 sites on non-federal land (including one site that is on private and federal land), 26 have been evaluated as not eligible for the NRHP and require no further work. The Oregon SHPO has concurred with these recommendations and we agree (see appendix L). Seventy-nine sites are outside the APE or can be avoided. Six sites were previously recorded by other investigators and not relocated by Pacific Connector's consultants. The remaining sites are either NRHP-eligible or unevaluated. Avoidance plans can be found in the draft HPMP filed with the FERC on October 5, 2018. The HPMP is subject to revision based on ongoing consultations between Pacific Connector, tribes, SHPO, and cooperating agencies. However, not all unevaluated,

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[223] Donald C. Gentry, Chairman, Klamath Tribes of Oregon to Kimberly D. Bose, FERC, May 2, 2018.
[224] Mark Ingersoll, Chairman, Confederated Tribes of Coos, Lower Umpqua, and Suislaw [sic] Indians to Larry Roberts, Assistant Secretary – Indian Affairs (Acting), U.S. Department of the Interior, November 30, 2016, pp. 3-4.
[225] Minutes from that EJTF meeting are not yet available publicly, but the decision was captured and is available on video at "Live video feed of the June 8, 2018 meeting of the Environmental Justice Task Force Meeting," Rogue Climate Facebook Page, https://www.facebook.com/rogueclimate/videos/905631742943143.

> potentially NRHP-eligible, and NRHP-listed sites that can be avoided by the Project have avoidance plans; therefore, the draft HPMP still needs further revision. Forty-three sites are unevaluated and cannot be avoided, so they need additional investigations, either survey or testing. The unevaluated sites requiring additional work are listed in in appendix L. Twenty sites, listed in appendix L, have been determined to be eligible for or listed on the NRHP and cannot be avoided. Data recovery excavations are recommended as mitigation for these sites. In most cases, the Applicants prepared treatment plans for these sites, which were reviewed and accepted by appropriate interested Indian tribes, federal land management agencies, the Oregon SHPO, and the FERC staff.[226]

The qualifier—"in most cases"—and the practice of simply listing what has not yet been done appears to us to be an attempt by FERC staff to minimize the degree of disagreement with JCEP plans held by key tribal nations and understate the level of opposition that exists. The Applicant appears willing to more opening misrepresent the situation, stating to investors in a May meeting, "Looking down at Oregon . . . the First Nations are by and large in favor."[227]

The planned destruction of resources and disrespect for the needs and values of these sovereign nations amount to adverse impacts that cannot be mitigated and must not be allowed.

4.12 AIR QUALITY AND NOISE

The DEIS acknowledges, but then dismisses without rationale or factual bases, negative impacts on landowners and communities of air quality and noise as follows:

> Constructing and operating the Project would result in short and long-term impacts on air quality. However, based on the implementation of the required BMPs, the Project would not significantly affect air quality.[228]

> Constructing and operating the Project would result in noise-related impacts. However, based on the implementation of the proposed BMPs as well as inclusion of the recommendations made in this EIS, the Project would not cause significant noise-related impacts.[229]

We disagree with these conclusions.

A. The DEIS fails to fully discuss health concerns associated with compressor station operation noise.

The DEIS reveals that the design plans of the Klamath Compressor station have not been completed so that the discussion is theoretical. Still, noise impacts during operation are dismissed as insignificant.[230]

First, this conclusion is not consistent with findings for compressors stations already in operation. In a recent study specifically relating to natural gas compressor stations, the author indicated,

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[226] DEIS. P. 4-652-53.
[227] Mick Dilger, Pembina Investor Day – May 14, 2019 Transcript at 02:37:46.
[228] DEIS, p. 4-678.
[229] DEIS, p. 4-697.
[230] DEIS, pp. 4-693-696.

"We found that five out of six homes that we monitored which were located within 750 meters of a compressor station had combined outdoor average sound levels greater than 55 decibels over a 24 hour period."[231] Various other studies have shown that long-term exposure to noise levels associated with compressor station operations have been associated with "sleep disruption, poor academic performance, and hypertension." Also, "Noise-induced hearing loss, oxidative stress, increased cardiovascular effects, endocrine disruption, and an increased risk of developing diabetes" have been implicated.[232] Adverse effects on individuals may vary by age or health status—children, elderly, people with hearing impairments, those who take certain drugs, and others may be more heavily affected.[233]

Second, we find it disturbing that, although the DEIS spends considerable time discussing regulatory limits on noise levels and for each, indicates that the Applicant intends on ensuring those levels are not exceeded, we could find no discussion of the impacts on humans, a central point of NEPA requirements for an EIS. The research on this topic is readily available, therefore we must conclude that FERC staff simply accepted the Applicant's choice to protest significant impact, rather than attempting to truly assess what that impact could be on nearby residents. This is unacceptable.

B. The DEIS ignores the well-documented adverse health impacts on people living near pipelines and compressor stations due to emissions.

Pipelines and compressors stations leak. Emissions (volatile organic compounds or VOCs) can be particularly strong in the vicinity of compressor stations. Type of emissions can vary, but for example, in Dish, TX, ". . . some chemicals identified as exceeding Texas's ambient air standards, measured at a variety of locations near and on residential properties include: benzene, dimethyl disulfide, methyl ethyl disulphide, ethyl-methylethyl disulfide, trimethyl benzene, diethyl benzene, methyl-methylethyl benzene, tetramethyl benzene, naphthalene 1,2,4-trimethyl benzene, m-&p- xylenes, carbonyl sulfide, carbon disulfide, methyl pyridine, dimethyl pyridine.[234]

Health issues range widely from annoyance and discomfort to debilitating and life-threatening. There is evidence that the distance of homes from compressor stations is one determining factor about the seriousness of impacts. For example, a much higher percentage of people living 500 feet away from the facility suffered from sinus problems, burning eyes, headaches, rashes, and throat irritation than those living 1,500 feet away.[235] The cumulative effect of long-term exposure to emissions, most severe during periodic blowdowns, can bring more serious health impacts, including cancers, respiratory and cardiovascular illness, and birth defects.

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[231] Meleah D. Boyle et. al., "A pilot study to assess residential noise exposure hear natural gas compressor stations," *Plos,* April 3, 2017, https://doi.org/10.1371/journal.pone.0174310.
[232] W. Passchier-Vermeer, W.F. Passchier, "Noise exposure and public health," *Environmental Health Perspectives*, March 2000, http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1637786&tool=pmcentrez&rendertype=abstract.
[233] I van Kamp, H. Davies, "Noise and health in vulnerable groups: a review," *Noise Health*, January 21, 2013, https://www.ncbi.nlm.nih.gov/pubmed/23689296.
[234] Clean Water for North Carolina, "Dangerous Neighbors: Pipelines, Compressor Stations, and Environmental Injustice," 2016, https://cwfnc.org/documents/Dangerous-Neighbors-Final-6-8-2016.pdf.
[235] Clean Water for North Carolina, "Dangerous Neighbors: Pipelines, Compressor Stations, and Environmental Injustice," 2016, https://cwfnc.org/documents/Dangerous-Neighbors-Final-6-8-2016.pdf.

As with noise impacts on residents forced to live near compressors stations, the DEIS repeats the Applicant's claims that allowable regulatory levels would not be exceeded. We question how well such measures are adequate to protect nearby residents, but the DEIS is entirely deficient by omitting critical information about associated health impacts. And as with the air quality discussion, facility design has not been finalized so as to allow regulatory measures to even be considered. For example,

> New large storage tanks containing liquids that can emit significant amounts of VOCs—i.e., where the equilibrium partial pressure exerted by the VOC exceeds 3.5 kPa—are subject to NSPS Subpart Kb. While the design of the Klamath Compressor Station has not been finalized, a condensate storage tank is likely to be installed. The potential applicability of NSPS Subpart Kb will be determined once the final storage tank specifications are known.[236]

It is entirely unclear why an effective project design cannot be available for scrutiny after over a decade of being on the drawing board, but a DEIS is premature when this and so many other matters have not been completed.

C. Landowners and communities, as well as workers, would suffer residual adverse effects due to emissions from equipment and fugitive dust.

The DEIS admits that these,

> . . . will result from earthmoving (dust generation) and heavy equipment use, which is typically diesel fueled. These emissions would be generated from timber clearing, grading activities associated with right-of-way construction, trenching activities, and laying the pipeline (stringing, welding, laying, backfilling) as well as restoration activities.

However, the matter is dismissed as follows:

> Timber removal and pipeline construction equipment will typically include yarders, loaders, skidders, feller-bunchers, bulldozers, graders, backhoes, front-end loaders, welding machines, trucks, pickups, and other miscellaneous equipment, each of which will have normal types of silencers and emissions control equipment (catalytic converters) commonly used for these types of equipment.[237]

Again, the health impacts are avoided.

D. The DEIS admits the potential health risks posed by construction activities that act on serpentinite rocks and soils that would be disturbed by the Pipeline, but it is unclear that construction activities in areas where it is found would be done in a manner that is safe for workers and nearby communities.

The DEIS acknowledges that there are areas where pipeline construction would encounter a type of soils and rocks that, if disturbed, would present serious health problems associated with naturally occurring asbestos (NOA). The Occupational Safety and Health Administration (OSHA) has included this phenomenon in its Final Rule Making on asbestos (OSHA 2009b),

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[236] DEIS, p. 4-660.
[237] DEIS, Appendix F.10 PCGP POD-Part 1-20.PDF, Appendix B, "Air, Noise and Fugitive Dust Control Plan," p. 2.

acknowledging that, ". . . airborne asbestos during earthmoving activities may result in significant exposures." However, we are shocked to see that OSHA regulations are so lax as to go on to state that,

> In such cases, wetting of the excavation site, often required by local authorities, should be sufficient to suppress measurable airborne asbestos concentrations. In the absence of information which is readily available showing asbestos contamination of soil in the immediate vicinity of a construction site, the employer is not required to take any action under this standard. [238]

To PCGP's credit, the DEIS reports that the Applicant has put some effort into seeking information. It states that GeoEngineers reviewed existing maps and a Table 1 provides milepost ranges where Ultramafic rocks and serpentine soils have been reported to exist. However, given the serious potential health consequences of exposure by workers and nearby communities, we have three concerns with the apparent comfort level in the DEIS with the Applicants planned response.

1. The DEIS indicates that the Applicant found "existing geologic mapping" across the entire 229-mile pipeline alignment, including in the many remote areas to be crossed, does not reflect all deposits where these conditions exist. [239]

2. Regardless of what OSHA regulations allow, "wetting of the excavation site" does not appear to be adequate, or even a possible, under the circumstances of pipeline construction. Materials exposed and roiled by excavation required to bury the pipeline cannot reasonably be "wetted" sufficiently to hold down asbestos, but the Applicant is clear that a significant amount of blasting would be required. The regulation is clearly not applicable if worker and community safety is to be considered at all.

3. The plan to "prior to construction" does not satisfy our concerns and we don't believe the DEIS should sign off on this plan either.

E. Noise from equipment, blasting, etc., during construction constitute adverse impacts on communities along the pipeline route.

The DEIS indicates that blasting is highly likely to be used to excavate pipeline trenches along almost half of the route although FERC staff have concluded that adverse impacts would not be significant due to the Applicants use of mitigation and best management practices.[240] We stated our concerns with blasting in areas with NOA formations just above.

Nonetheless, blasting would have adverse consequences for communities in terms of noise and transportation delays, as well as other inconveniences related to public safety. Additionally, blasting has the potential to disrupt groundwater, including permanently; kill fish; harm aquatic life cycles by creating turbidity; cause injury; frighten and stampede livestock; trigger landslides that would pollute surface water and could destroy property and disrupt transportation; and discourage travel and tourism.

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[238] DEIS, Appendix F.10 PCGP POD-Part 1-20.PDF, Appendix B "Air, Noise and Fugitive Dust Control, pp. 7.
[239] DEIS, Appendix F.10 PCGP POD-Part 1-20.PDF, Appendix B "Air, Noise and Fugitive Dust Control, pp. 3-6.
[240] DEIS, p. 4-27.

4.13 RELIABILITY AND SAFETY

4.13.1 Jordan Cove LNG Project

Before discussing our many individual concerns, it is our view that the JCEP as a whole poses an unacceptably high risk public safety hazard and should be denied due to the countless residual adverse effects on landowners; the communities of Coos Bay, North Bend, Empire, Charleston, and Malin; communities along the pipeline route; and at least in terms of the high risk of wildfire, the entire southern Oregon region.

For one instance, we made the point in Chapter 2. Alternatives Analysis that safety should be a paramount concern in any analysis of the human environment. Any comparison between a potential alternative location for the LNG terminal and the proposed location on the bay side of the North Spit of Coos Bay in such close proximity to population centers would need to take into account the numerous and egregious risks to human safety and therefore should find the alternative of significantly lesser negative environmental impact than the proposed project. These hazards are natural and beyond avoidance or mitigation. They are hazardous as a direct result of the fact that the location is excessively proximate to a significant population center with attendant vulnerabilities due to, for example, an airport, as well as schools, hospitals, and so on.

In this context, the DEIS has been issued without resolution of innumerable identified safety issues. It notes countless instances of required design and technical plans that are incomplete or have not yet been submitted. With regard to the Jordan Cove LNG facility, it acknowledges and discusses the various issues, but then dismisses all impacts as insignificant and pronounces the project safe and reliable, *providing that 14 pages of FERC staff's own recommendations have been implemented*. The DEIS thereby denies the public and other agencies the ability to assess, evaluate, and comment on this most essential element of the human and natural environmental impacts of the project, leaving us with this referencing the LNG terminal:

> Based on our preliminary engineering and technical review of the reliability and safety of the Jordan Cove LNG Project, we recommend the following [98] mitigation measures as conditions to any order authorizing the Project. These recommendations would be implemented prior to the end of the DEIS comment period, prior to initial site preparation, prior to construction of final design, prior to commissioning, prior to introduction of hazardous fluids, prior to commencement of service, and throughout the life of the facility to enhance the reliability and safety of the facility and to mitigate the risk of impact on the public.[241]

We find it instructive to quote extensively from the DEIS description of how the process by which FERC authorizes the siting and construction of LNG terminals in compliance with USDOT safety requirements.

> The FERC authorizes the siting and construction of LNG terminals under the NGA and delegated authority from the DOE. The FERC requires standard information to be submitted to perform safety and reliability engineering reviews. FERC's filing regulations are codified in 18 CFR 380.12 (m) and (o), and requires each Applicant to identify how its proposed design would comply with the USDOT's siting requirements of 49 CFR 193 Subpart B. The level of detail necessary for this submittal requires the Applicant to

[241] DEIS, pp. 4-755-68.

> perform substantial front-end engineering of the complete project. The design information is required to be site-specific and developed to the extent that further detailed design would not result in significant changes to the siting considerations, basis of design, operating conditions, major equipment selections, equipment design conditions, or safety system designs. As part of the review required for a FERC order, we use this information from the Applicant to assess whether the proposed facilities would have a public safety impact and to suggest additional mitigation measures for the Commission to consider for incorporation as conditions in the order. If the facilities are approved and the suggested mitigation measures are incorporated into the order as conditions, FERC staff would review material filed to satisfy the conditions of the order and conduct periodic inspections throughout construction and operation.[242]

A project proposal that is so unsatisfactory that it requires 98 recommended additions or modifications must be adjudged as, at least, vastly incomplete as provided and doesn't appear to meet the minimum requirements of the above process. The public's right to comment is so vastly diminished by this construct as to be meaningless. FERC staff's recommendations may or may not be made conditions of the Commission's Order. Or perhaps only a percentage of them would be adopted—80 percent? 50 percent? 5 percent? And of those, which ones? We see nothing that in any way binds the Commission to ensure conditions are implemented.

Moreover, although some of the recommendations pertain to requirements known to, but not yet carried out by, the Applicant. Others, though, call for other actions to be taken. The additional cost to the Applicant of a percentage of 98 changes or additions to their plans has not been revealed, but it most certainly would be substantial. As noted elsewhere in this comment, Pembina has already acknowledged insufficient financial resources to carry out this project. This mechanism opens the door to the Applicant to attempt to negotiate away especially some of the more expensive requirements. Even if all recommended conditions were to be included in a Record of Decision by the Commission, are we not asking, through such a process, for the Applicant to be unmotivated to comply, cut corners, or short-change other costly elements of the proposed project to make up for additional costs?

Additionally, we identify and comment on the following safety hazards that we believe stretch the bounds of reasonableness in terms of putting the public at risk via a facility of this type, noting that this is not an exhaustive list.

A. Flight hazards from LNG storage tanks identified by the FAA conflict with the public interest.

The FAA determined that both LNG storage tanks constitute a "Determined Hazard to Air Navigation" unless they are reduced in height to below 204' Above Mean Sea Level (AMSL). The DEIS concludes that "FERC needs to identify the "Determined Hazard to Air Navigation" and demand that the LNG Storage Tanks be reduced in height to 204' AMSL. On 7 May 2018, the FAA issued thirteen "Notices of Presumed Hazards" pertaining to JCEP structures violating obstruction standards for the nearby Southwest Oregon Regional Airport (SORA). Two of these notices discussed the proposed LNG Storage Tanks. [243]

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[242] DEIS, p. 4-699.

[243] DEIS, p. 4-750. Copies of these notices are included in the docket at Accession No. 20180510-5165, Part 8.

In the DEIS, FERC staff deals unacceptably with the FAA's Determined Hazard to Air Navigation and subsequent requirement for the Applicant to lower the stack height.[244] Instead, FERC describes the LNG Tanks heights as "presumed" rather than "determined," and recommends that the Applicant resolve the issue with the FAA, even though the FAA explicitly states that leaving the tank heights taller than 204' AMSL is unacceptable. . We are alarmed that this matter is being pushed into the future beyond the ability of the public and other entities to ensure that it is resolved appropriately. The FAA must not be influenced or pressured to sign off on the project since it does not appear that a solution can be found.

B. Flight hazards from carrier vessel stack heights identified by the FAA conflict with the public interest.

The FAA requires the Applicant to lower the LNG Carrier Vessel (aka Tanker) Stack Height to 136' AMSL. Nine of the FAA's "Notices of Presumed Hazards" addressed the LNG Carrier Vessel Stack Heights at various transit points. FERC failed to discuss the identified hazard that the LNG Tankers constitute at their current proposed size.[245] The public and other agencies need to know the dimensions for the largest LNG tanker anticipated to call on the Port, including total stack height, beam, length, and draught. The total stack height must not exceed the maximum 136' AMSL limit identified by the FAA. The FAA must not be pressured or influenced to sign off on the project since it does not appear that a solution can be found.

C. Thermal plume hazards identified by the FAA conflict with the public interest.

FERC ignores the thermal plume hazard created by the gas combustion turbines used in the liquefaction process. According to a study by the National Academy of Sciences, *"*Exhaust plumes from (power plant) cooling systems have the potential to create in-flight hazards that affect the control and maneuver-ability of aircraft. Under certain conditions, the plumes generated by the facilities can create turbulent conditions for aircraft that fly over or through the plumes."[246] FERC addressed this concern by stating, "Jordan Cove commissioned a thermal plume study for the previously proposed LNG terminal in 2013 . . . which showed that the combustion turbines that were part of the previously proposed South Dunes Power Plant were identified as the main potential source of thermal plumes from the terminal. The South Dunes Power Plant is not part of the current proposal and therefore the LNG terminal would not general [sic] thermal plumes."[247] This statement is incorrect. First, the referenced study did not assign 100 percent of the potential thermal plumes to the South Dunes Power Plant. But more importantly, in lieu of building the South Dunes Power Plant to power the liquefaction train, the current proposed JCEP terminal would be equipped with five direct-drive combined-cycle combustion turbines to power refrigerator compressors, each rated at 524.1 MMBTU/hour. These turbines—which are proposed to be located closer to SORA than the South Dunes Power Plant—would, in fact, generate thermal plumes, and thus the risk to airport operations for the new design needs to be studied, not dismissed as the DEIS does.[248]

D. Heavy hydrocarbon vapor cloud explosion hazards conflict with the public interest.

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[244] DEIS, p. 4-750.
[245] DEIS, p. 4-750.
[246] Patricia T, Weber, P.E., "Jordan Cove Export Project—FERC Recommendations Place Oregonians at Risk."
[247] DEIS, 4-625-26.
[248] Patricia T, Weber, P.E., "Jordan Cove Export Project—FERC Recommendations Place Oregonians at Risk."

LNG Export Terminals that handle and store large quantities of heavier-than-methane hydrocarbons are attended by hazards of Unconfined Vapor Cloud Explosion (UVCE). FERC underestimates the risk of UCVEs by an order of magnitude. According to Jerry Havens, (Distinguished Professor Emeritus Department of Chemical Engineering, University of Arkansas),

> The new Draft Environmental Impact Statement (DEIS) for the Jordan Cove Export Terminal, just issued, continues to seriously underestimate vapor cloud explosion overpressures (damage) that could occur following credible releases of heavy hydrocarbons at the JCET site. The latest predictions that I am aware of appear to be an order of magnitude lower than are indicated by physical evidence of numerous documented UVCEs that have occurred worldwide with the potential to cause injuries and deaths to persons and result in destruction of the facility.[249]

FERC needs to evaluate the potential for unconfined vapor cloud explosions (UVCEs) using the best available research from the scientific community.

E. Several hazardous siting and design factors are contrary to SIGTTO Recommendations specifically designed to protect public safety; these conflict with the public interest.

The Society of International Gas Tanker and Terminal Operators (SIGTTO) exists to minimize risks, including in the site selection and design for LNG ports and jetties. The proposed JCLNG Terminal conflicts with several of SIGTTO's best practices recommendations, one of which has already been implied in most of the above discussions of specific public safety hazards: avoidance of siting near population centers. Additionally, SIGTTO recommends against siting on a bend, where vessels with be berthed adjacent to each other, near other docking facilities, in a channel that is less than five times the minimum width of tankers, or where tankers would not have ready escape to the open seas at all times.

F. Numerous factors make this siting for the LNG terminal accident-prone and therefore contrary to the public interest.

Additional constraints regarding access of the proposed facility are of concern. The entrance to the bay and navigation channel from open waters has a history of problems since the time of early navigation into the bay due to the nature of shore winds, and sea conditions. These problems continue to the present. There is a 90-degree turn from the entrance into the bay, and then another bend near the proposed site that other ship traffic, including commercial and recreational uses, must navigate past to enter the Coos Bay, North Bend harbor. The DEIS fails to consider these factors or the fact that the Applicant has not addressed how such an eventuality as an LNG running aground would be handled.

G. LNG leak, spill, and explosion hazards conflict with the public interest.

The 2015 FEIS for the previous project acknowledged that around 16,000 residents of the Coos Bay/North Bend area would likely be at least injured if a release of highly flammable LNG were to be coupled with an ignition source. We have searched both the JCEP application and the current

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[249] Jerry Havens, "Comment by Jerry Havens, Distinguished Professor Emeritus, University of Arkansas," submitted to U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, September 22, 2018.

DEIS and found no mention of this threat to public safety and life. This omission is unacceptable. *An unacknowledged hazard must be defined as a residual adverse effect*.

> In accordance with the August 31, 2018 MOU, USDOT will issue a LOD to the Commission after USDOT completes its analysis of whether the proposed facilities would meet the USDOT siting standards. The LOD will evaluate the hazard modeling results and endpoints used to establish exclusion zones, as well as Jordan Cove's evaluation on potential incidents and safety measures incorporated in the design or operation of the facility specific to the site that have a bearing on the safety of plant personnel and surrounding public. The LOD will serve as one of the considerations for the Commission to deliberate in its decision to authorize or deny an application.[250]

What is the timing for USDOT analysis and issuance of the LOD? Certainly, it cannot occur before all of the required but still missing information from the Applicant is available. Would the Commission delay their ROD if the Applicants' tardiness in providing information to USDOT delays issuance of the LOD? It would seem that they should. Would USDOT issue the LOD without having full access to, and performing a thorough investigation of, all pertinent information? That would be unconscionable given the potential consequences.

H. Derelict infrastructure and potential for partial completion of projects is not addressed and is contrary to the public interest.

There is concern of the potential environmental and human risk of partially completed projects, if there were construction, and unforeseen events that caused for abandonment of the facility or any of the infrastructure to and from the terminal including the pipelines. What would result if any stage of the project were abandoned, and who would assume the risk and responsibility of containment or removal?

I. Building the massive proposed LNG liquefaction, storage, and export terminal in the Cascadia Subduction and tsunami zones defies reason, given the horrific and unimaginable ways it would exacerbate the already overwhelming human cost.

4.13.2 Pacific Connector Pipeline LNG Project

The DEIS begins this section by acknowledging hazards,

> The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural gas. The greatest hazard is a fire or explosion following a major pipeline rupture. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiant, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Methane has an autoignition temperature of 1,000°F and is flammable at concentrations between 5.0 percent and 15.0 percent in air. An unconfined mixture of methane and air is not explosive; however, it may ignite and burn if there is an ignition source."[251]

The DEIS concludes, however,

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[250] DEIS, p. 4-702
[251] DEIS, 4-768-69.

> The pipeline would be constructed in compliance with the USDOT pipeline standards (as published in 49 CFR Parts 190-199; Part 192 of 49 CFR). Based on the implementation of the required BMPs and adherence to USDOT standards, the Project would not significantly affect public safety.[252]

We disagree.

The proposed Jordan Cove LNG Export Project would rely on a 229-mile, highly pressurized 36-inch natural gas pipeline to bring gas from Malin, OR in Klamath County to the liquefaction facility and export terminal in Coos Bay, OR. Pembina has been in the oil industry since 1954. This would be the first natural gas project Pembina has constructed and the first LNG facility it has operated.[253]

The 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 37-59 miles. 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.[254] Due to the largely rural nature of the route, the majority of the pipeline would be of Class 1 construction, employing the thinnest pipe gauge and lowest quality welds allowed by the Pipeline and Hazardous Materials Safety Administration (PHMSA).

We have a number of concerns about the pipeline, especially regarding the difficulty of the terrain it would cross and the potential for rupture, explosion, and fire, but upon reviewing the DEIS discussion about these and other possible risks, we found few answers and little actual information about how PCGP plans to proceed with the project in terms. The multi-page discussion of pipeline reliability and safety provides almost no project-specific information, rather most topical subsections begin with reference to USDOT standards that PCGP must meet and then proceeds to describe the pertinent standard. DEIS Table 4.13.2.1-1 informs the reader that all but five percent of the pipeline would be constructed to Class 1 standards—the lowest legally allowable—because of the single factor of population.[255] There is note that commenters have expressed concerns about that fact, but the response is that "FERC does not have the jurisdiction to require safety standards beyond those outlined by Part 192 of 49 CFR (which are required and enforced by the USDOT).

It appears that the public and the governmental entities that are bound to protect us and our property from wildfire are caught in a regulatory vacuum while the Applicant protects their bottom line by keeping their construction materials costs as low as possible.

A. Pipeline Accidents cannot be fully mitigated and therefore must be considered to be residual adverse impacts on landowners and communities.

It is a well-documented fact that pipelines leak and accidents occur. An estimated $1.1 billion worth of natural gas (17.55 billion cubic feet) leaked from pipelines in the U.S. between 2010 and 2017. During that same period, pipeline incidents resulted in almost 100 deaths, injured 500, and

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[252] DEIS, p. 4-781.
[253] http://www.pembina.com/about-us/history.
[254] PCGP FERC Application, Resource Report 1, General Project Description, "Construction Procedures," p. 10.
[255] DEIS, p. 4-770.

forced the evacuation of thousands of people.[256] Pipeline accidents may be triggered by rupture caused, for example, by pipe damage during installation; third-party, post-construction activity; seismic activity; soil liquefaction or lateral spreading; and landslides. An ignition source in the presence of released gas can result in explosion and gas fire. The fact that almost the entire 229-mile PCGP would be built to Class I standards in terms of pipe gauge and weld standards increases the risks of leaks, explosions, and gas fires which may also spread to structures and/or ignite wildfires. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) reported in a letter to Congress in 2013 on a variety of scenarios that raise the likelihood of pipeline incidents, several of which match the Applicant's pipeline construction and routing plans.[257]

The PHMSA letter stated that,

> Hazardous liquid pipeline operators reported 5,094 accidents from 1991 to 2009 and 2,653 exceeded PHMSA's significant incident threshold. The PHMSA determined that 13 accidents from this time period occurred at inland water crossings. All 13 failures exceeded PHMSA's significant incident threshold. . . . A depletion of cover, sometimes in the waterway and other times in new channels cut by flood waters, has been a factor in all 13 of these failures. [258]

The Applicant's project anticipates almost 500 stream crossings. The PHMSA Report goes on to identify that one incident occurred in a buried pipeline water crossing that had a defective weld. Two incidents resulted from internal corrosion, one was caused by scouring during flooding, and two were caused by failures at the girth weld as a result of external loading caused by exposure to flood conditions.[259] The 36-inch pipeline proposed by Applicant would have thousands of such welds, almost all of which would be installed at the lowest allowable standards, making each weld more susceptible to failure.

B. Various factors pose increased risk of wildfire during construction and would constitute residual adverse impacts.

The substantial increase in human and equipment activity in heavily timbered areas during pipeline construction can by itself be expected to increase the risk of fire; 62 percent of the pipeline route is forested. PCGP plans to construct 229 miles of pipeline simultaneously in five spreads. For various reasons, the Applicant indicates that pipeline construction would take place during the "dry season," apart from some areas of Klamath County where the Applicant has agreed to construction during the winter months to avoid disrupting irrigation practices. In an average year in southern Oregon, that would put the construction phase for the bulk of the pipeline from mid-May or early June through October. However, the Applicant has committed to

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[256] Jonathan Thompson, "A map of $1.1 billion in natural gas pipeline leaks," *High Country News,* November 29, 2017, https://www.hcn.org/issues/49.22/infographic-a-map-of-leaking-natural-gas-pipelines-across-the-nation. We note that DEIS-provided statistics are not for comparable years, but still appear to conflict (are significantly lower) than our source. The DEIS provides no source for verification purposes (p. 4-779).

[257] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration to U.S. Congress, August 27, 2013.

[258] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration to U.S. Congress, August 27, 2013, p. 7.

[259] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration to U.S. Congress, August 27, 2013, p. 8.

avoid construction activities in certain areas along the pipeline route during critical bird nesting and other wildlife protection periods. That would push the construction period further into the summer in applicable areas.

The proponent would need to obtain permits or authorizations to operate heavy equipment from landowners, including the Oregon Department of Forestry (ODF), the U.S. Forest Service, and the Bureau of Land Management. For example, ODF requires a Permit to Operate Power Driven Machinery (PDM). Authorizations require the Applicant to agree to comply with prescribed practices to minimize the risk of a fire being ignited and be prepared to respond in the event of fire.[260] ODF evaluates requests for waivers of restrictions on the basis of conditions at the time and place of work and the willingness of the operator to agree to take precautions to make the operation fire safe.[261] PCGP can be expected to commit to comply with necessary procedures, but fire officials can expect public apprehension about all summertime pipeline construction, let alone waivers allowing work during Industrial Fire Prevention Level IV periods when work stoppage is generally enforced.

The last step of the pipeline construction process is reclamation. Among other activities, an average of 1 ton per acre of slash left by the original clearcutting would be spread over the right-of-way, adding to already existing fuel loads. This amount exceeds the Federal Energy Regulatory Commission's (FERC) "Upland Plan;" the Applicant has indicated that they would seek a waiver.[262]

In recent years, due at least to climate change caused increased temperatures and drier conditions, the risk and incidence of accidental, human-caused fires getting out of hand is increasing. More fires are becoming conflagrations. Circumstances in the wake of the two most recent destructive and deadly fires in California may suggest liability issues could be raised.

C. Increased risk of wildfire and consequences due to landslide, seismic activity, or other natural phenomenon during operation constitutes a residual adverse impact on landowners and communities.

The DEIS indicates that PCGP's practices would reduce the risk of fire to insignificant levels and points to Appendix K—"Fire Prevention and Suppression Plan." Review of the plan's brief discussion of procedures once the pipeline is operational reveals its inadequacy with this description of the minimal circumstances under which fire would occur:

> During pipeline operation, the risk of fire danger is minimal. The primary causes of fire on the right-of-way result from unauthorized entry by individuals utilizing the right-of-way for recreational purposes and from fires started outside of the right-of-way. In the latter case, the right-of-way can be used by authorities as a potential fire break provided that the grade is not altered above the pipeline. During maintenance operations, PCGP will equip personnel with fire-fighting equipment including fire extinguishers and shovels. Maintenance crews will also carry fire suppression contacts as listed in Table 4-1.[263]

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[260] Oregon Department of Forestry, "Industrial Fire Precaution Levels (IFPLs) for Oregon Department of Forestry Protection west of the Cascades." https://www.oregon.gov/ODF/Fire/Documents/2017%20IFPL%20for%20Web.pdf
[261] Email from Dave Lorenz dated 1.8.2019.
[262] PCGP FERC Application, Resource Report 1, General Project Description, "Construction Procedures," p. 18-19.
[263] DEIS, Attachment 1, p. 3 of Appendix K – Fire Prevention and Suppression Plan in Appendix F.10_PCGP_POD-Part 3-22.PDF.

The conclusion is false and overly simplistic. Pipeline rupture during operation and gas release as a cause of fires cannot be ignored as a possibility. In fact, the greatest clear and present dangers of pipelines are explosion and resultant fire. Gas release can occur in various ways, as can sparks that ignite it. A gas pressure surge can create a rupture by itself or can hit a weak spot such as a stressed or inadequate weld, pipe corrosion, or damage during or after burial. Third-party activities such as logging and other heavy equipment are another frequent cause for explosion and fire.

The plan is clearly boilerplate and should not have been accepted by FERC staff. The template PCGP selected was not even developed for hilly or mountainous terrain and ignores the excessively dry conditions along the pipeline route. A pipeline crossing southern Oregon, is at particular risk of pipeline rupture due to our unique geologic conditions. The most dramatic of geologic hazards related to this pipeline is the potential for seismic events. A pipeline rupture could occur during an earthquake where subsidence affects the pipeline where it crosses a fault line, ground-shaking from an earthquake may also cause pipeline failure and even more likely to cause rupture are landslides and soil liquefaction or lateral spread where pipelines cross water.[264] PCGP acknowledges that there are several sites susceptible to liquefaction or lateral spreading along the pipeline route, yet did not manage to even mention any of these potential causes of fire during operation in their prevention and response plan.[265]

The Oregon Department of Land Conservation and Development (DLCD) lists as landslide hazards during operation:

- Intense or prolonged rainfall, or rapid snow melt, that causes sharp changes in groundwater levels;
- Undercutting of a slope of cliff by erosion or excavation;
- Shocks or vibrations from earthquakes . . . ;
- Vegetation removal by fires, timber harvesting, or land clearing; and
- Placing fill (weight) on steep slopes.[266]

Application materials include narrative assurance that "The Pipeline route was selected through an iterative process to avoid areas with high risk of geologic hazards,"[267] but the terrain between Malin and Coos Bay makes that a false claim. For example, a map set, prepared by the Applicant at the request of DOGAMI to allow assessment of pipeline rupture risk, shows numerous landslide-prone areas. The terrain from PCGP Mile Post (MP) 110 to 168—the Jackson County portion--is marked by scores of landslide-prone areas that could be activated by an earthquake and potentially result in a pipeline break.[268]The maps are referenced in several tables developed by the Applicant that report that the risk of landslide along the pipeline route is "low" or "none."[269]

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[264] Conversation with Ian Madin, Geologist at Oregon Department of Gas and Mining Industry (DOGAMI), 8/30/2018.
[265] PCGP FERC Application, Resource Report 6, Appendix A.6, Geologic Hazards and Mineral Resources Report," p. 23.
[266] https://www.oregon.gov/LCD/HAZ/pages/landslidesgeninfo.aspx
[267] DEIS, p. ___.
[268] Ibid, Appendix F, Geologic Hazards Maps (2), Figures 24-35.
[269] Resource Report 6, Appendix A.6 "Geologic Hazards and Mineral Resources Report;" compare with maps, Resource Report 6, Appendix F, Geologic Hazards Maps, Figures 26-33, 35.

D. Risk of pipeline explosion or other hazard in the event of a wildfire caused by other means cannot be entirely mitigated and therefore is a residual adverse impact on landowners and communities.

It is disturbing to learn in the DEIS that JCEP has not yet prepared and made available for review their Emergency Response Plan (ERP), designed to minimize risk in case of wildfire. A draft is said to be included in the Plan of Development, Appendix H, but what is there is a concept paper, outlining an "Emergency Plan and Preparedness Manual" and a "Public Safety Response Manual." [270] Attachments that would allegedly provide instructions on various kinds of safety procedures are all blank and marked "forthcoming." The narrative states that these essential materials will not necessarily be available until "prior to the pipeline being placed in service."[271] Here again, there will be no opportunity for public, or perhaps even agency, review or comment.

Additionally, important topics are not even referenced in the DEIS. For example, we cannot locate any acknowledgment that the presence of a 36-inch pipeline within a minimum of 24" of ground level may restrict fire-fighting activities. We also note that, even if a buried pipeline would not be harmed by a wildfire, the DEIS did not acknowledge or describe how above-ground pipeline facilities would not be vulnerable to over-heating and explosion.[272] Those include three meter stations, five pig launcher/receiver assemblies, 17 mainline valves (MLV), and 15 communications towers.[273] There is ample evidence of the damage the intense heat of wildfires can do to all types of structures and materials. It is alarming that neither the Applicant nor FERC staff have addressed this rather obvious fact.

E. The DEIS accepts the Applicant's contention that the risk of landslide during operation is low and as a result, states concurrence with PCGP's plan for minimal measures to monitor the pipeline.

The Applicant relies on their consultant GeoEngineers' assessment that "High-risk landslides (active or dormant young) that pose a hazard to a Pipeline are typically instrumented so that movement can be measured," but then goes on to state that "The proposed PCGP Pipeline does not cross known active or recently active landslides that require installation of instrumentation." Instead, "All Class 1 and 2 areas will have annual air patrols and semi-annual land patrols."[274] Given that, as we have stressed elsewhere, a major consequence of landslides in terrain crossed by or overlain by pipelines can be rupture, explosion, and fire. In the largely dry, forested area along the majority of the pipeline, Oregon can't afford for the Applicant and the DEIS's conclusion to be wrong, but we believe it is. In fact, Brad Avy, Executive Director of DOGAMI outlined in a letter his disagreement with GeoEngineer's generalizations and called for further investigation. We have not learned whether that has occurred or the current view of DOGAMI on this or any of the other numerous concerns Mr. Avy expressed about the entire project at that time.[275]

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[270] DEIS, p. 4-775.
[271] DEIS, Appendix F.10 PCGP POD-Part 3-22.PDF, "Appendix H."
[272] DEIS, p. 4-775.
[273].DEIS, p. 2-19.
[274] PCGP FERC Application, Resource Report 6, Appendix A-6, GeoEngineers, "Geologic Hazards and Mineral Resources Report," September 2017, p. 37.
[275] Oregon Department of Justice to FERC, December 1, 2017 conveying "DOGAMI Comments Related to Geologic Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Gas Connection Pipeline," November 17, 2017, p. 7.

4.14 CUMULATIVE IMPACTS

A. We have reviewed the DEIS and concluded that this evaluation of cumulative impacts is wholly inadequate.

This massive project, likely the largest in the area since building of the railroads, affects land movement across approximately 229-mile-long route and multiple crossings of waterways to the largest estuary within Oregon. In the DEIS, the Appendix Table N-1 illustrates the absence of any integrated approach to cumulative effects for aquatic or terrestrial systems and their interactions. The only somewhat interactive and interdisciplinary approach was to provide assessments at various Hydrologic Unit Code (HUC) levels for the terrestrial components across the pipeline.[276]

According to 40 CFR §1508.7,

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period.

The science of understanding cumulative effects requires up to date tools and methodology. In aquatic systems particularly the complexity of habitats and life histories requires advanced tools to appreciate and understand the connected nature of the system. A recent modeling of quantitative values of habitats for marine and estuarine populations provides insight into Coastal habitats—such as seagrass beds, shallow subtidal and intertidal habitats, kelp beds, near-shore open water, salt marshes, and rocky bottom—that serve as locations for spawning, nurseries, feeding, sheltering, and migration corridors. Understanding the roles and absolute value of each of the multiple habitats is an emerging science, as recently shown in modeling by Lipcius et al. (2019).[277] Moreover, consideration of the effects of climate change on each of the actions is an important part in future scenario building. The consequences of exported gases would result in increasing the global emissions during transportation and use in Asia. A 2018 study of lifecycle project emissions found that the JCEP would result in a global GHG emissions of 36.8 million metric tons of CO2e per year, or the annual equivalent of 7.9 million passenger vehicles.[278]

Since the passage of the requirements for environmental assessments and requirements to evaluate cumulative effects, scientists and managers have provided examples of appropriate modeling that includes making assumptions transparent and building of scenarios in coupled human and natural systems. This area of study is replete with review of methods and analyses,

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[276] DEIS, Appendix N Cumulative Effects-33.PDF, "Table N-1—Past, Present, or Reasonably Foreseeable Actions that May Cumulatively Affect Resources."

[277] R.N. Lipcius, D.B. Eggleston, F.J. Fodrie, J, van der Meer, K.A. Rose, R.P. Vasconcelos, K.E. van de Wolfshaar, "Modeling quantitative value of habitats for marine and estuarine populations," *Frontiers in Marine Science*, 2019, 6. doi: 10.3389/fmars.2019.00280.

[278] Oil Change International, "Jordan Cove LNG and Pacific Connector Pipeline Greenhouse Gas Emissions Briefing,", January 2018, p. 5.

such as those by Jones (2016),[279] Foley et al. (2017),[280] and Willsteed et al. (2018).[281] These assessments provide insight for the challenges and tools for evaluating multiple factors.

The DEIS articulates each of the disclosure of impacts into separately listed impacts or effects and then proceeds to rank each these with a relative scope of short term, temporary, longer term, or permanent. There are no metrics that explain these qualitative judgements, not one reference to scientific studies, but just speculation from the description of each of these.

In doing so, the DEIS fails to follow the Federal guidance provided in 40 CFR §1502.16, wherein it is said that the assessment of environmental consequences should include a discussion of:

> (a) Direct effects and their significance (40 CFR §1508.8).
> (b) Indirect effects and their significance (40 CFR §1508.8).

With regard to those instructions, the DEIS mentions direct and indirect effects and provides estimates of the limits of indirect effects, but without substantial evidence and is therefore presenting arbitrary analysis. One example of this is provided in the following about Coho salmon:

> Direct and indirect effects on SONCC Coho salmon are not expected within the marine analysis area. Coho salmon can avoid acoustic effects from LNG carriers during transit. Potential oil and gas spills from LNG carriers in the marine analysis area are highly unlikely to occur; even if LNG spilled or leaked, it would turn to vapor and would not mix with water, and vessel response plans required to address accidental spills of LNG and other petroleum products onboard would be implemented. Effects within the riverine analysis area are expected from in-water construction activities resulting in short-term increased sediment levels that would be stressful to fish, short term benthic food source reduction, temporary migration impedance, short-term terrestrial/riparian habitat modifications, and limited long-term reduction in LWD sources. Limited fish mortality would also occur from fish salvage.[282]

Thusly, FERC staff have failed to provide evidence for their conclusions, failed to use any more modern tools to integrate single impacts at one location to other potential risks, and failed to provide any assessment of the losses against the benefit of no action. The only detailed elements provided are series of proposed mitigative measures, and most all the proposed mitigative measures are vague and involve nothing beyond best management practices. How would these be monitored and would they be applicable to these sites?

Moreover, the document further defines impacts in Section 4 that are not part of the categories used in the EIS guidance and have highly subjective decision criteria, such as is defined in their document as follows:

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[279] Jones, F. C. 2016. Cumulative effects assessment: theoretical underpinnings and big problems, *Environmental Review*. 24: 187–204.
[280] Foley, M., Mease, L.A., Martone, R.G., Prahler, E.E., Morrison, T.H., Murray, C.C., Wojcik, D. 2017. The challenges and opportunities in cumulative effects assessment. *Environmental Impact Assessment Review*. 62:122-134.
[281] Willsteed, E.A., Birchenough, N.R., Gill, A.B., Jude, S. 2018. Structuring cumulative effects assessments to support regional and local marine management and planning obligations. *Marine Policy* 98:23-32.
[282] DEIS, p. 4-330.

> . . . temporary impact generally occurs during construction with the resource returning to preconstruction condition almost immediately afterward. A short-term impact could continue for up to three years following construction. An impact is considered long-term if the resource would require more than three years to recover. A permanent impact would occur if an activity modifies a resource to the extent that it would not return to preconstruction conditions during the life of the Project. Permanent impacts may also extend beyond the life of the Project. For example, we consider the clearing of mature forests a permanent impact because it would take several decades for these habitats to attain their pre-construction condition.[283]

These assumptions of condition are provided without any transparent criteria used for determination and ranking of assessments. They are arbitrary, and without evidence, they are clearly in violation of guidance 40 CFR §1502.24 regarding methodology and scientific accuracy that states,

> Agencies shall insure the professional integrity, including … identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix.

In reference to the guidance provided in 40 CFR §1502.16, the assessment of environmental consequences should also include a discussion of:

> (c) Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned.

In the DEIS's treatment and discussion of the cumulative effects and conflicts of this project, there is no treatment of the social components of the significant conflicts that are underway in local permitting at the county and city level. The proposals for alternation of the lands and waterways of the Coos Bay estuary and surrounding lands are in conflict with various elements of local Coos Bay Estuary Management Plan and associated zoning. The Applicant has been seeking variances and special permitting as a result of these conflicts. None of these issues is clearly resolved and remands and appeals are in progress. The entire project and management of the estuary is part of the Coastal Zone Management obligations and use permits, and compliances with coast wide policies and values have not been resolved either locally or state-wide.

The following components of the Federal requirements are listed below and the DEIS is deficient in the treatment of cumulative effects, particularly with regard to the no action alternative and the requirement for interdisciplinary preparation to include nature and social sciences as per 40 CFR §1502.6.

> (d) The environmental effects of alternatives including the proposed action.
> (e) Energy requirements and conservation potential of various alternatives and mitigation measures.

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[283] DEIS, p. 4-1.

(f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
(g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
(h) Means to mitigate adverse environmental impacts.

Many of the environmental impacts of the terminal and associated facilities must be dealt with separately from the pipeline, but the cumulative effects must consider both components. We note here that this project has impacts at multiple scales—from local to state, national to global—by creating 36.8 million metric tons (MMT) of lifecycle greenhouse gas (GHG) emissions annually for at least 30 years of projected operations.[284] Oregon is far from being on track to meet its GHG emissions goals of 10 percent below 1990 levels by 2020 and 75 percent below 1990 levels by 2050.[285] That projection is based on the assumption that the Boardman Coal Power plant will be closed in 2020. It does *not* consider the 2.6 MMT per year of "new," in-state emissions that would be generated if the JCEP were to be built. It is sobering to realize that, if JCEP were to be built and if Oregon were to manage to meet its GHG goal for 2050 of 14.1 MMT/year, 16% of Oregon's GHG emissions would be squandered to support this corporate enterprise's operations without delivering one kilowatt hour of energy to Oregonians. There is little on a cost-benefit balance sheet to weigh against the momentous environmental detriments—from GHG emissions to water degradation to harm to fish and wildlife to increased risk of wildfire to risks of spreading of invasive species to disruption of water rights to seizure of/control over private land through eminent domain without a clear public use, and other deleterious effects that this project would pose.

The DEIS proceeds to refuse to address climate change impacts in its subsection 4.14 Cumulative Impacts, contending that,

> Climate change is a global phenomenon; however, for this analysis, we will focus on the existing and potential cumulative climate change impacts in the Project area.
>
> The GHG emissions associated with construction and operation of the Project are identified in section 4.12.1.1 for the Jordan Cove LNG Project and section 4.12.1.2 for the Pacific Connector Klamath Compressor Station and pipeline. Both the Jordan Cove LNG Project and the Pacific Connector Klamath Compressor Station and pipeline would remain below PSD major source thresholds and are therefore not required to conduct a Best Available Control Technology analysis for mitigating GHG emissions. The construction and operation of the Project would increase the atmospheric concentration of GHGs, in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts. Project emissions would contribute incrementally to future climate change impacts.[286]

In discussing climate change with regard to the state, they simply describe without analysis:

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[284] Oil Change International, *Jordan Cove LNG and Pacific Connector Pipeline Greenhouse Gas Emissions Briefing,* January 2018, http://priceofoil.org/2018/01/11/jordan-cove-lng-and-pacific-connector-pipeline-greenhouse-gas-emissions/.
[285] Oregon Global Warming Commission, *Biennial Report to the Legislature, 2017*, p. 24, http://www.keeporegoncool.org/reports/.
[286] DEIS, p. 4-806.

> We have not been able to find any GHG emission reduction goals established at the federal level. The State of Oregon has set GHG reduction goals with a state-wide target of 51 million metric tons of CO2e by 2020 (a 10 percent reduction from 1990 levels), and 14 million metric tons of CO2e by 2050 (a 75 percent reduction from 1990 levels) (Oregon Global Warming Commission 2017). The Oregon Global Warming Commission projects that Oregon will fall short of these goals without additional legislative action. Direct emissions from the Jordan Cove LNG and Pacific Connector Pipeline Projects would result in annual CO2e emissions of about 2.14 million metric tons of CO2e, which would represent 4.2 percent and 15.3 percent of Oregon's 2020 and 2050 GHG goals, respectively.[287]

The DEIS does not provide any comprehensive effort to provide even a range of estimates, and instead states, "Without the ability to determine discrete resource impacts, we are unable to determine the significance of the Project's contribution to climate change."[288]

The requirements of the cumulative effects and evaluations of environmental effects asks only that the application follow the NEPA regulations that require:

> (e) Energy requirements and conservation potential of various alternatives and mitigation measures.
> (f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.

We invite the preparers to examine climate models provided in publications such as those by Jenkins et al. (2018)[289] who suggest ways to model CO2 to account for various tools to improve on radiative forcing. Scientists such as Jenkins et al. propose new ways of comparing greenhouse gases by converting them into a "forcing equivalent" quantity of CO2.

We also suggest that *at a minimum* this DEIS should have provided life cycle assessments of the range of emissions with each stage of the project and present these in understanding alternatives. The US Army Corps of Engineers has produced publications that provide the emissions from dredging[290] and other sources that allow for estimation of GHG from road in different geological bases, e.g. Karlsson et al. 2017.[291]

In the last 50 years, world population increased from 2.5 billion in 1950 to 7.6 billion in 2017 bringing in the most extensive change in the world's ecosystems. This new Epoch has been termed the Anthropocene where humans are major factors in ecosystem.[292] Even with mitigation

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[287] DEIS, p. 4-807.
[288] DEIS, p. 4-805.
[289] Jenkins, S., Millar, R. J., Leach, N., Allen, M. R. (2018). Framing climate goals in terms of cumulative CO2-forcing-equivalent emissions. *Geophysical Research Letters*, *45*, 2795–2804.
[290] Anderson, M.J., Barkdoll, B. D., 2010. Incorporation of Air Emissions in Dredging Method Selection *Journal of* Waterway, Port, Coastal, and Ocean Engineering. 136: 191-199.
[291] Karlsson, C.S.J, Miliutenko, S., Björklund, A. Mörtberg, U., Olofsson, B., Toller, S. 2017. Life cycle assessment in road infrastructure planning using spatial geological data. Int J Life Cycle Assess. 22:1302–1317.
[292] Steffen, W., Grinevald, J., Crutzen, P., Mcneill, J., 2011. "The Anthropocene: conceptual and historical perspectives." Phil. Trans. R. Soc. A Math. Phys. Eng. Sci. 369:842-867.

of the drivers and pressures (exogenic and endogenic) of global change soon, estuarine and coastal baselines and coastal forests will continue to shift. We would expect that the evaluation of cumulative effects would consider the resilience of the estuary and coastal watershed to respond to the emerging challenges.

CHAPTER 5. CONCLUSION

At the end of their evaluation and assessment of the project, FERC staff stated this:

> We conclude that constructing and operating the Project would result in temporary, long-term, and permanent impacts on the environment. Many of these impacts would not be significant or would be reduced to less than significant levels with the implementation of proposed and/or recommended impact avoidance, minimization, and mitigation measures. However, some of these impacts would be adverse and significant. Specifically, we conclude that constructing the Project would temporarily but significantly impact housing in Coos Bay and that constructing and operating the Project would permanently and significantly impact the visual character of Coos Bay. Furthermore, constructing and operating the Project is likely to adversely affect 13 federally listed threatened and endangered species including the marbled murrelet, northern spotted owl, and Coho salmon.[293]

In response to the first part of that conclusion, we have shown in numerous subsections of Section 4 that the JCEP has fallen short of providing the information FERC staff needed to have at hand to be able to determine whether or how they would avoid or minimize impacts. And yet, the DEIS proceeds with its conclusion of minimal adverse impacts.

We have shown in numerous subsections that JCEP's mitigations measures appear to fall short of serving the purpose for which they were proposed.

We have shown that allowing this project to go forward would do serious harm to endangered species. DEIS acknowledges this impact, but will that be taken into account?

We have shown that the downside socioeconomic impacts of the lengthy construction period of the Jordan Cove LNG Project, despite the costs and lengths to which the Applicant has gone to show net benefits to the community, in fact are almost certain to result in significant net harm, especially, but not exclusively in the long-term. The DEIS acknowledges adverse housing impacts in the Coos Bay area and we agree with that, but we contend that there are many more socioeconomic impacts that have been dismissed by FERC staff as not significant.

We understand that the Commission is not bound by conclusions of impact in an FEIS. That is only one factor to be considered. However, the Commission should, in accordance with its Certificate Policy Statement, decide against the JCEP applications because of the many additional factors arguing for denial in its step by step guidance for decision-making.

As in 2016, the Commission should deny the Section 7 application because the Applicant fails to demonstrate adequate need, demand, or public use for the pipeline through any binding contracts . . . while construction and operation of the pipeline would require significant use of eminent domain and resultant further harm to private landowners on top of the past 15 years of harm to force this project into existence.

If the Commission decides against denial on the above bases, they should deny the Section 7 application because the public benefits conveyed by the PCGP pale in comparison to the

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adverse impacts on communities caused by a pipeline slated to be built over terrain and under conditions almost certain to result in ruptures, explosions, and fire across . . . as well as almost certain fouling of water quality, including for drinking and as habitat for the iconic and culturally significant salmon . . .

If the Commission is not prepared to deny the project on the above bases, they should do so because the Coos Bay area is simply and profoundly wrong for the site for which it has been continuously and repeatedly proposed for all these years. Tremendous natural safety hazards attend the project—many of which are beyond mitigation or the control of humans whatsoever. In a DEIS where the preparers managed to acknowledge that the LNG terminal would pose a significant negative visual impact, it is astounding to find near to total dismissal of the deadly hazards posed by locating the project in the CSZ and tsunami zone, in the flight line of an airport, without adequate design sophistication to address the potential of a thermal plume, and so on as we have described.

We urge the Commission to deny with prejudice these two applications.

The League of Women Voters is a volunteer organization without any motive other than to work for the best interest of all our citizens. Thank you for accepting and considering our thoughts and concerns and thank you for your service.

Sincerely,

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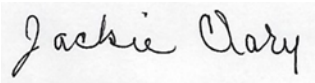

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Oregon Senator Floyd Prozanski
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Jackson County Commissioners Rick Dyer, Colleen Roberts, Bob Strosser
Klamath County Commissioners Donnie Boyd, Derrick DeGroot, Kelley Minty Morris
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North Bend Mayor Rick Wetherell
Shady Cove Mayor Lena Richardson
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Myrtle Creek Mayor Matthew Hald
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Winston Mayor Dick Hayes
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