Oregon State Agency Comments
Jordan Cove Energy and Pacific Connector Gas Pipeline Project
Draft Environmental Impact Statement
(Docket # CP17-494-000 and CP17-495-000)
July 3, 2019

Contents

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Introduction

The State of Oregon reviewed and analyzed the draft Environmental Impact Statement ("draft EIS") to ensure it provides a full and fair disclosure of the significant environmental impacts that may result from the siting and operation of the Jordan Cove LNG export terminal facility and the Pacific Connector Pipeline project (hereinafter collectively referred to as, the "Project") as well as the comparative impacts resulting from a reasonable range of alternatives to the proposed action. *See* 40 C.F.R. § 1502.1; *see also* 40 C.F.R. § 1502.1 ("An environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions."). Accordingly, Oregon provides the following general comments as well as specific comments and recommendations from each state agency with technical expertise in its respective program area to assist the Federal Energy Regulatory Commission ("Commission") refine this draft EIS to meet the National Environmental Protection Act's ("NEPA's") requirements.

1. ***The Commission and Other Agencies May Not Rely Upon Insufficiently Detailed and Unenforceable Mitigation in this Draft EIS to Justify its Conclusion the Proposed Action Will Result in "Less-Than-Significant" Impacts***

Agencies relying upon this draft EIS to support their decisions must ensure that mitigation measures alleged to be reducing impacts to less-than-significant levels, see Section 5.1 ¶1, are mandatory, specifically described, and fairly evaluated. *See* 40 C.F.R. §§ 1502.14(f) (requiring discussion of possible mitigation measures in alternatives), 1502.16(h) (requiring discussion of mitigation in addressing environmental consequences of proposed action). The U.S. Supreme Court has stated that "omission of a reasonably complete discussion of possible mitigation measures [] undermine[s] the 'action-forcing' function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989). If proposed mitigation measures are unenforceable, or lack monitoring commitments or sufficient resources to assure performance, the Commission has no reasonable basis to conclude that such measures will effectively reduce environmental impacts. *See* 40 C.F.R. §§ 1505.2(c), 1508.25(b). Here, the Commission has represented to decision-makers and the public in this draft EIS that mitigation measures will effectively reduce environmental impacts to less-than-significant levels. As identified in the specific state agency comments that follow, the Commission has not sufficiently identified or analyzed possible mitigation measures to support that conclusion in the draft EIS, and must address the agencies' recommended mitigation measures in the final EIS.

Significantly, the draft EIS states at various points that the Commission's staff finds that adverse environmental impacts would be reduced to less-than-significant levels with the implementation of the applicants' proposed mitigation measures and additional measures recommended by Commission staff. *See* draft EIS, section 5.1. Thus, the Commission is *relying upon* the applicant's proposed mitigation to conclude that the disclosed significant environmental impacts will be reduced to less-than-significant levels. But the Commission staff only recommends a generic condition requiring the applicants to "follow the…mitigation measures described in its applications and supplemental filings (including responses to staff data requests)." *See* draft EIS, section 5.2.1. This generic condition, without any further identification as to what those mitigation measures might be, is insufficient to establish that relied upon mitigation are mandatory, specifically described, and fairly evaluated. Any mitigation that support's the Commission's conclusion that significant environmental impacts have been reduced to less-than-significant levels should be specifically listed as required measures in Section 5.2. This omission is misleading to the public and decision-makers, who would have no recourse to require the applicant to comply with its *proposed* mitigation measures disclosed and analyzed in this draft EIS if such measures are not incorporated as required conditions in the Commission's authorizations.

Further, Council on Environmental Quality ("CEQ") regulations clarify that mitigation includes "[r]ectifying the impact by repairing, rehabilitating, or restoring the affected environment." 40 C.F.R. § 1508.20(c). However, the draft EIS does not disclose whether sufficient resources are available to ensure that if an accident were to occur involving a LNG vessel that there would be sufficient funds available to carry out the necessary environmental clean-up. At present, a law may limit the liability of vessel owners to the amount of its cargo. *See* Owner's Liability Act, 46 U.S.C. 181, *et seq*. To appropriately mitigate the potential significant environmental impacts, the State urges the Commission to ensure additional resources are available to correct any resulting environmental damage from a vessel accident. We recommend FERC require the applicant to enter an agreement with each LNG vessel owner intending to berth at the terminal in which such vessel owner waives its right to (or attempt to) limit its liability under that law and to require the vessel owner provide the applicant at all times sufficient evidence that the vessel's protection and indemnity association has agreed to cover the vessel as a member of the association against the liabilities pertaining to such an accident. This is a common method in the industry of helping to ensure sufficient funds are available to respond and correct environmental disasters, and we urge the Commission to require this reasonable mitigation measure.

2. The Commission and Other Agencies Relying Upon this Draft EIS Must Correct the Deficiencies Related to Missing or Inaccurate Data and Scientific Analysis, as well as Unconsidered Environmental Impacts of the Proposed Action and Alternatives

NEPA requires that the Commission utilize "high quality" information and accurate scientific analysis," see 40 C.F.R. § 1500.1(b), and ensure "professional integrity, including scientific integrity, of the discussions and analyses" within an EIS. 40 C.F.R. § 1502.24. Oregon state agencies have identified numerous errors and deficient analysis in the draft EIS, as specifically set forth below, which the Commission must address to appropriately disclose and analyze potential significant environmental impacts to comply with that mandate.

In addition, NEPA requires disclosure and analysis of *all* direct, indirect, and cumulative environmental impacts of the proposed action. *See* 40 C.F.R. §§ 1508.7, 1508.25(c), 1502.16. Further, NEPA specifically defines "indirect effects" as those that are "caused by the action and are later in time or farther removed in distance,

but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b). Accordingly, the State urges the Commission to resolve the following deficiencies in this draft EIS relative to undisclosed and unconsidered environmental impacts of the proposed action. First, the draft EIS fails to describe and assess the potential impacts on Oregon's lands and state waters due to air contaminant emissions, including greenhouse gas ("GHG") emissions, from the transportation of LNG during natural gas exploration, collection, distribution, and export to markets outside the United States. The draft EIS refers to these impacts as "'life-cycle' cumulative environmental impacts associated with the entire LNG process," but nonetheless states such impacts are "outside the scope" of the draft EIS. See draft EIS, Section 1.4. This conclusion is legally incorrect. For example, as the Ninth Circuit Court of Appeals has explained relevant to the U.S. Army Corps' similar error in construing NEPA, "while it is the development's impact on jurisdictional waters that determines the scope of [that federal agency's] *permitting authority*, it is the impact of the permit on the environment at large that determines [a federal agency's] NEPA responsibility." *See Save Our Sonoran v. Flowers,* 408 F.3d 1113, 1122 (9th Cir. 2005) (emphasis added).

Notably, the U.S. Supreme Court held that when "an agency has no ability to prevent a certain effect due to its limited statutory authority over the relevant actions, the agency cannot be considered a legally relevant 'cause' of the effect" so as to require that agency to disclose such effects in its EIS. *Dep't of Transp. v. Pub. Citizen,* 541 U.S. 752, 770 (2004). Here though, in contrast, there is no doubt that if FERC did not approve the siting of the Project the "life-cycle" emissions associated with this Project would not be emitted into the atmosphere – no Presidential authorization allows for LNG to be extracted, sent to Coos Bay, and then shipped overseas. *See id.* at 769. Further, this is not a case where the effect is a "risk" as opposed to an effect on the physical environment. Instead, there is a direct (not attenuated) causal connection between FERC's approval of the LNG export facility and the impact on the physical environment (e.g., emissions) resulting from transportation, for example, of that LNG from where it is extracted, to Oregon, and then overseas. *See Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774-75 (1983). Moreover, the State is not asking for more than a "reasonably thorough discussion" and disclosure of the air contaminant emissions that may result as a consequence of this approval – even if the extent of such emissions are uncertain. *See S. Coast Air Quality Mgmt. Dist. v. FERC*, 621 F.3d 1085, 1094-95 (9th Cir. 2010) (holding that an EIS's reasonable, even though limited, disclosure and analysis of emissions resulting from burning of natural gas supplied by a pipeline subject to FERC's approval "contain[ed] a reasonably thorough discussion of the environmental impact of its actions, based on information then available to it."); 40 C.F.R. § 1502.22 (addressing how an agency should handle incomplete or unavailable information in an EIS). We urge the Commission to adhere to the CEQ guidance released on December 18, 2014, which describes how the Commission should consider the effects of GHG emissions and climate change in their NEPA reviews.

The State also notes that even with respect to the proposed project's direct emissions, the DEIS only quantifies such emissions. It does not attempt to assess their significance, despite readily available tools to do so. Draft EIS, pages 4-804 through 4-807. This approach violates NEPA (*See* 40 C.F.R. §§ 1508.7, 1508.25(c), 1502.16), as two of FERC's Commissioners have acknowledged. Commissioners Glick and LaFleur have each described the inadequacies in FERC's approach to greenhouse gas emission analysis under NEPA in recent decisions on LNG terminal and natural gas pipelines pursuant to Sections 3 and 7 of the Natural Gas Act. *See*, *e.g.*, Concurrence of Commissioner Cheryl A. LaFleur on Port Arthur LNG, LLC and PALNG Common Facilities Company, LCC, dated April 18, 2019; Commissioner Richard Glick Dissent Regarding Freeport LNG Development, L.P. and FLNG Liquefaction 4, LLC, dated May 16, 2019. Commissioner Glick writes in his dissent:

> As an initial matter, identifying the consequences that those emissions will have for climate change is essential if NEPA is to play the disclosure and good government roles for which it was

> designed. By contrast, the Commission's approach in this order, where it states the volume of emissions as a share of national emissions and then describes climate change generally, tells us nothing about the "'incremental impact' that these emissions will have on climate change." It is hard to fathom how hiding the ball on a project's climate impacts is consistent with NEPA's purpose.

(Internal citations omitted). The State agrees, and urges the Commission to fully analyze the significance of GHG emissions resulting from the proposing project, as required by NEPA.

Secondly, with respect to natural gas price increases, this indirect effect will likely result in socioeconomic impacts on the State and beyond; therefore, this EIS should disclose and analyze such impacts to inform decision-makers and the public that these consequences have been considered. Although CEQ regulations state that "economic or social effects are not intended by themselves to require preparation of an environmental impact statement," in this instance the economic and social effects are interrelated with the impacts on the physical environment such that this EIS should address all such impacts. *See* 40 C.F.R. § 1508.14. This draft EIS should, therefore, disclose the potential increase in domestic natural gas prices and resulting socioeconomic impacts, including the number of affected landowners and land values reduced due to the pipeline or terminal's location. Further, since the applicant has made several claims regarding the positive potential economic effects of its planned terminal and pipeline, the Commission should assure itself that no potentially adverse economic effects negate those claims if it will rely upon this draft EIS to justify its conclusion as to whether this terminal is in the public interest or whether the construction and operation of the pipeline is required by the present or future public convenience or necessity. *See* Natural Gas Act, 15 U.S.C. §§ 717b(a), 717f(e); *see also* Certification of New Interstate Natural Gas Pipeline Facilities, 88 FERC ¶ 61,227, at 27 (Sept. 15, 1999) ("The strength of the benefit showing will need to be proportional to the applicant's proposed exercise of eminent domain procedures."). *See generally* 40 C.F.R. § 1500.1(b).

3. The Commission and Other Agencies Relying Upon this Draft EIS Must Not Foreclose Consideration of Reasonable Alternatives to the Proposed Action

The State of Oregon recommends that the Commission abandon its practice of issuing conditional orders before receiving authorizations delegated to the State under the Clean Water Act (CWA), the Coastal Zone Management Act (CZMA), and the Clean Air Act (CAA). The State urges the Commission to await such authorizations to avoid violating NEPA's procedural provisions, see 40 C.F.R. 1502.14[1], as well as the substantive provisions of the above-listed federal laws. *See* 33 U.S.C. § 1341(a); 16 U.S.C. § 1456(c)(3)(A); 42 U.S.C. § 7416; 16 U.S.C. § 1536(d); *see also* 40 C.F.R. § 402.09. NEPA mandates that federal agencies "[r]igorously explore and objectively evaluate all reasonable alternatives" as well as to "[i]nclude appropriate mitigation measures not already in the proposed action or alternatives." 40 C.F.R. § 1502.14(a),(f). However, if the Commission issues a conditional approval (after completion of this NEPA process and) before completion of necessary state authorizations under the CWA, CAA, and CZMA, see 5 U.S.C. § 717b(d), this practice will foreclose the formulation of an alternative that an Oregon state agency may deem necessary when carrying out its delegated authority under those laws. It is unwarranted to assume that the Oregon Department of Environmental Quality's ("ODEQ's") review in accordance with CWA section 401, for example, will lead to a determination that the proposed Project will not violate state water quality standards (or alternatively to assume that any

[1] Or alternatively, requiring FERC to issue a supplemental EIS, see 40 C.F.R. 1502.9(c)(1).

exceedance may be effectively mitigated) without potentially necessitating a change in routing of the pipeline. We urge the Commission not to circumvent ODEQ's review that may disclose a potentially significant environmental impact that this draft EIS did not disclose and consider. In short, the Commission's completion of its NEPA process before issuance of the state's necessary authorizations under the CWA, CAA, and CZMA will foreclose the consideration of reasonable alternatives to the proposed action raised as part of, for example, the Department of Land Conservation and Development's consistency review under the CZMA. We urge the Commission to negate the necessity of supplementing its EIS or otherwise violating NEPA by conditionally approving this Project before the relevant state agencies complete their on-going authorization processes.

In light of the Commission's NEPA obligations, the State of Oregon urges the Commission to consider carefully each of Oregon's comments and recommendations and to modify specified sections of the draft EIS to address cited concerns, and where appropriate, to incorporate agency recommendations as required conditions in the Commission's authorizations to support the Commission's conclusion that significant environmental impacts have been reduced to "less-than-significant levels."

Oregon Department of Energy

Siting Division

Contact: Sean Mole, 503-934-4005, sean.mole@oregon.gov

The Oregon Department of Energy expects FERC and the applicant to meet Oregon siting standards found in Oregon Revised Statute and Administrative Rules. These include Oregon's CO2 emissions standards, the provision of a legally enforceable retirement bond for the project, and a comprehensive discussion of, and preparation for, emergency situations that could endanger humans and the environment from construction and operation activities.

Citation	Issue Identification	Recommended Solution
1.5.2.3 p. 1-31	Oregon Energy Facility Siting Council Site Certificate is not listed as a required State permit, prior to construction of the terminal. The applicant had applied for an exemption to Site Certificate as a jurisdictional energy facility, on June 14, 2018.	Include Energy Facility Siting Council Site Certificate as a necessary State Agency Permit and Approval under Oregon Department of Energy, should the applicant propose designed electrical generation components which are EFSC jurisdictional.
2.1.1.5 p. 2-7 Supplemental Resource Report 13 p. 5	Electrical Systems design changes are not addressed in the dEIS. According to Jordan Cove's supplemental Resource Report 13, the facility will reduce its on-site power production by more than 50% (down to 24.4 MW from 50.4 MW). This change is not detailed in the dEIS. Without the detailed engineering description of the power production components, in this case the 3 Steam Turbine Generators, there is uncertainty about whether or not Jordan Cove will require an Oregon Department of Energy Site Certificate. Should the engineering design require components which are subject to Oregon Energy Facility Siting	Include condition requiring the applicant to obtain an EFSC Site Certificate should the final electrical design incorporate jurisdictional components.

	Council jurisdiction, the facility may find itself in violation of ORS 469.320(1) concerning the construction and operation of energy facilities.	
Appendix F.10, 1.6 Termination and Abandonment p. 22	The dEIS describes terms for termination and abandonment of the Pacific Connector Gas Pipeline, but not for the Jordan Cove terminal. The described terms for termination and abandonment do not contemplate involuntary abandonment on the part of the applicant and/or subsequent owners.	Require abandonment planning for the LNG terminal as well as the pipeline. Previous iterations of this project have addressed this issue by entering into an MOU with Oregon Department of Energy which requires the procurement of financial bonds in the amount commensurate with the needs to return the site to its useful, non-hazardous condition, which existed prior to construction. These requirements ensure that taxpayers are not "footing the bill" to acceptably retire these facilities in the event that Pembina is fiscally incapable or otherwise disinclined to do so.

Emergency Preparedness

Contact: Deanna Henry – 503-032-4429 – deanna.henry@oregon.gov

EPAct – Section 311: According to the EPAct, the Governor of a state in which an LNG terminal is proposed is to designate an appropriate state agency to consult with the Commission. The state agency should provide the FERC with an advisory report on state and local safety concerns, within 30 days of the FERC's notice of an application for an LNG terminal, for the Commission to consider prior to making a decision.

Designated Authority: In January 2006, Governor Ted Kulongoski designated the Oregon Department of Energy (ODOE) as the lead state agency to: 1) ensure Oregon's interests are protected in the federal siting process of LNG terminals in Oregon, 2) develop LNG emergency preparedness program to protect Oregonians from an LNG incident, and 3) provide safety and security oversight throughout the life of an LNG terminal sited in Oregon.

State Established LNG Emergency Preparedness Standards - Memorandum of Understanding: In 2006, there were five proposed LNG terminals in Oregon. Four terminals were proposed along the Columbia River along with the Jordan Cove Terminal near Coos Bay. Each developer had a different interpretation of what was "adequate" LNG emergency preparedness and the appropriate approach to coordinating with state and local agencies. As a result, ODOE worked with the Governor's Office, Oregon Department of Justice, and the Oregon State Fire Marshall's Office to develop minimum requirements for LNG safety, security, and emergency preparedness and coordination in Oregon. Each LNG developer is required to enter into a Memorandum of Understanding (MOU) with ODOE demonstrating the company's commitment to meet state established standards for LNG security and emergency preparedness at their proposed facility.

Fort Chicago entered into the MOU with ODOE for the Jordan Cove LNG Terminal in February 2009. The MOU was updated under Veresen ownership in June 2014. ODOE is currently working with Pembina to update the MOU for the Jordan Cove LNG Terminal, associated waterway, and pipeline system in 2019.

History of Jordan Cove Safety, Security, and Reliability Coordination: Beginning in April 2006, ODOE began working with Fort Chicago to address the safety, security, and reliability issues involving the proposed Jordan Cove LNG Terminal. Fort Chicago conducted quarterly meetings workshops, training, tabletops, and exercises with federal, state, and local agencies that would be affected by the construction and operation of the Jordan Cove LNG Terminal. This included the U.S. Coast Guard (USCG), ODOE, Oregon State Fire Marshall's Office (OSFM), Oregon State Police (OSP), Port of Coos Bay, Coos County Emergency Management, Coos County Sheriff's Office, Coos County Public Health, city of Coos Bay, city of North Bend, and various local volunteer fire districts.

Fort Chicago conducted quarterly meetings, workshops, training, tabletops, and exercises to identify and vet risks, response measures, resource needs, and coordination protocols among the agencies and Fort Chicago in response to LNG incident scenarios at the proposed Jordan Cove LNG Terminal. After three years of coordination and collaboration, the December 2009 Jordan Cove Emergency Response Plan (ERP) and Resource List identifying gaps required to implement the ERP were developed. The Jordan Cove ERP and Resource List were approved unanimously in concept by the state, local emergency response organizations, and USCG on the condition that the 2009 draft ERP and Resource List would be working documents and updated as needed. An approved Jordan Cove ERP and the Resource List are essential to the development of a Cost Share Agreement between Jordan Cove and impacted state and local agencies as required by FERC.
Developers Fort Chicago and then Veresen continued to work collaboratively with federal, state and local agencies to revise and refine the Jordan Cove ERP and Resource List.

Current Evaluation of Jordan Cove Safety, Security and Reliability Coordination: Safety, security, and reliability coordination for the Jordan Cove LNG Terminal stalled significantly in May 2017 under new Jordan Cove owner Pembina. Pembina proposed a new Jordan Cove ERP, which resembled a template oil spill response plan, without consultation with key federal, state, and local agencies dismissing more than 10 years of work collaboration amongst all entities. This ERP was unanimously rejected by federal, state, and local agencies, which Pembina rescinded.

After a rough start and staff re-organization, Pembina reset its approach and are taking initial steps to get back on track. This includes working with ODOE to: 1) update the original Jordan Cove ERP for review by all agencies; 2) update the Jordan Cove MOU on LNG safety, security, and emergency preparedness for the terminal and waterway; and 3) develop a MOU on safety, security, and emergency preparedness along the pipeline. In addition, Pembina provided ODOE an assurance letter committing to work with all key federal, state, and local agencies on safety, security and emergency preparedness planning and coordination involving the terminal, waterway, and pipeline.

However, much work remains for Pembina to regain the momentum lost over the last two years. Pembina must reinstate the quarterly planning and coordination meetings and re-engage with key federal, state, and local emergency response agencies that have been a part of the project safety, security, and emergency response planning process for over a decade. In addition to ODOE, this includes the U.S. Coast Guard (USCG) Sector Columbia River, USCG Sector North Bend, Oregon State Fire Marshal's Office, Oregon State Police (OSP), Oregon State Marine Board, Port of Coos Bay, Coos Bay Sheriff's Office, Coos County Emergency Management, Coos County Public Health, Bay Area Hospital, Southwestern Oregon Community College, City of Coos Bay Police and Fire, City of North Bend Police and Fire, Charleston Fire, North Bay Fire, and Hauser Fire. This team of agencies

have been meeting quarterly on Jordan Cove safety, security, and emergency preparedness planning and coordination since April 2006.

Pembina will also need to re-engage and re-establish planning and coordination meetings with key agencies along the pipeline route. This includes, but is not limited to Bureau of Land Management, U.S. Forest Service, ODOE, OSP, Oregon Department of Forestry, and local emergency management agencies and sheriff offices in Coos, Douglas, Jackson, and Klamath counties.

State Advisory Report and DEIS Safety, Security, and Reliability Concerns: The following comments address ODOE's safety and security issues for the State Advisory Report and specific DEIS comments on ODOE's safety, security, and reliability concerns for the Jordan Cove LNG terminal, waterway, and pipeline.

Overarching Concerns:

- Issue 1 – Pembina has not provided a construction phase emergency response plan or security plan for the terminal, waterway, and pipeline. This includes strategies to address the workforce population and housing. Project construction activities directly impact federal, state, and local emergency management and law enforcement agencies tasked with ensuring public safety and security in Coos, Douglas, Jackson, and Klamath counties.

  Recommended Resolution – As a condition of the certificate, require the applicant to provide federal, state, and local agencies a construction ERP and security plan for review, approval, and coordination prior to initial site preparation. Also as a condition of the certificate, require Pembina to enter into a Cost-Sharing Plan that contains a description of any direct cost reimbursements to each state and local agency with responsibility for security and safety during the construction of the LNG terminal, associated waterway, and pipeline system.

- Issue 2 – To protect public health and safety and ensure the safe and secure construction and operation of the Jordan Cove LNG terminal, waterway, and pipeline requires the full participation and coordination of federal, state, and local law enforcement, fire service, and emergency managements agencies with legal jurisdiction (USCG NVIC 01-2011). Pembina recently suspended funding to the Coos County Sheriff's Office (SO) preventing the SO from participating in Jordan Cove emergency planning activities. ODOE strongly encouraged Pembina to re-engage the Coos County SO. There is currently no resolution. The SO is the key local law enforcement agency with legal jurisdiction over the proposed Jordan Cove terminal, waterway, and the 46 mile section of the pipeline in Coos County. As a result, the participation of the Coos County SO is required to complete the development and implementation of the following documents: 1) Jordan Cove Emergency Response Plan (ERP), 2) Facility Security Plan, 3) LNG Carrier Transit Management Plan, and 4) Pipeline ERP and Security Plan.

  Recommended Resolution – As a condition of the certificate, require the applicant to enter into a Cost-Sharing Plan that contains a description of any direct cost reimbursements to each state and local agency with responsibility for security and safety at the LNG terminal and in proximity to LNG marine vessels that serve the facility as required by the natural gas act.

Specific Concerns:

Citation	Issue Identification	Recommended Resolution
Executive Summary, Conclusions, 1st Paragraph, Page ES-5	The DEIS concludes that constructing the Project would temporarily but significantly impact housing in Coos Bay. Issue: Impact to housing from construction would not only significantly impact house in Coos Bay, but North Bend, Charleston, and other nearby communities as well as the housing and campgrounds in Coos County.	Include language in the DEIS that accurately reflects the housing impacts. The DEIS should state that "constructing the Project would temporarily but significantly impact housing in Coos Bay, North Bend, Charleston, and surrounding cities. This includes housing and campgrounds in Coos County.
1.0 Introduction, 1.5 Permits, Approvals, and Consultations, Table 1.5.1-1, Page 1-23	Table 1.5.1-1 references ODOE's authority to furnish an advisory report on state safety and security issues to FERC regarding the Jordan Cove LNG terminal proposal and conduct safe operational safety inspections if the facility is approved and built. Issue: Table 1.5.1-1 does not include the state's minimum standards established for LNG safety, security, and emergency preparedness in Oregon at proposed LNG terminals, associated waterways, and pipeline systems. The state established standards were established by ODOE in consultation with the Governor's Office, the Oregon Department of Justice, and the Oregon State Fire Marshal's Office. As lead state agency designated by the Governor to oversee the safety, security, and emergency preparedness of the Jordan Cove LNG Terminal, associated waterway, and pipeline system throughout the operational life of the project, ODOE requires all applicants to enter into an Memorandum of Understanding (MOU) to meet the state established minimum standards for LNG safety, security, and emergency preparedness.	Include the following language to Table 1.5.1-1: - State established minimum standards for LNG safety, security, and emergency preparedness to "Authority/Regulation/Permit." - ODOE requires all applicants to enter into an MOU to meet state established minimum standards for LNG safety, security, and emergency preparedness to "Agency Action." - Pending to "Initiation of Consultations and Permit Status As a condition of the certificate, require the applicant to enter into an MOU with ODOE to meet state established minimum standards for safety, security and emergency preparedness for the Jordan Cove LNG Terminal, associated waterway, and pipeline system.
1.0 Introduction, 1.5.2.3 Oregon Department of Energy, Pages 1-31	The DEIS states that ODOE has been designated by the Governor of Oregon as the lead state agency to coordinate the review of proposed LNG projects by other state agencies and consult with FERC. Issue: The DEIS does not include ODOE's authority as lead state agency to provide oversight on all aspects of the development and implementation	Include language in section 1.5.2.3 that states "As lead state agency, ODOE provides oversight on all aspects of the development and implementation of safety, security, and emergency response plans and strategies of the proposed projects throughout the federal application process to the end of the

	of safety, security, and emergency response plans and strategies throughout the federal application process to the end of the operational life of the LNG terminal should FERC authorize the project. The DEIS does not include the state's minimum standards established for LNG safety, security, and emergency preparedness in Oregon at proposed LNG terminals, associated waterways, and pipeline systems. The state established standards were established by ODE in consultation with the Governor's Office, the Oregon Department of Justice, and the Oregon State Fire Marshal's Office. As lead state agency designated by the Governor to oversee the safety, security, and emergency preparedness of the Jordan Cove LNG Terminal, associated waterway, and pipeline system throughout the operational life of the project, ODOE requires all applicants to enter into an Memorandum of Understanding (MOU) to meet the state established minimum standards for LNG safety, security, and emergency preparedness.	operational life of the LNG terminal should FERC authorize the project." As a condition of the certificate, require the applicant to enter into an MOU with ODOE to meet state established minimum standards for safety, security and emergency preparedness for the Jordan Cove LNG Terminal, associated waterway, and pipeline system.
2.0 Description of the Proposed Action, 2.1.1.7 Marine Access Facilities, Materials Offloading Facility, Page 2-12	The DEIS states that the Marine Offloading Facility (MOF) would be constructed to receive components of the LNG terminal that are too large or heavy to be delivered by road or rail. The MOF would cover about 3 acres on the southeast side of the slip. Following construction, the MOF would be retained as a permanent feature of the LNG terminal to support maintenance and replacement of large equipment components. Issue: All construction activities, including the transportation of materials and personnel to Jordan Cove, directly impact the safety and security of the public. Jordan Cove has not provided an ERP or security plan for the construction phase for federal, state, and local emergency response agencies review and approval. The ERP and security plan for the construction phase must be validated by and coordinated with federal, state, and local emergency management, law enforcement, fire service, public health, and other key stakeholders tasked with ensuring public health and safety.	As a condition of the certificate, require the applicant to provide an ERP and a security plan for the construction phase prior to initial site preparation. The construction phase ERP and security plan must be coordinated with and approved by federal, state, and local agencies tasked with ensuring public health and safety. This includes a Cost-Sharing Plan identifying federal, state, county, and local resources needed to implement the construction ERP and security plan.
2.0 Description of the Proposed	The DEIS states that Jordan Cove proposes to construct a temporary workforce housing facility	As a condition of the certificate, require the applicant to provide a

Action, 2.1.1.10 Workforce Housing, Page 2-18	within the South Dunes portion of the LNG terminal site that could accommodate common facilities and 200 to 700 beds. Parking would be provided onsite, and shuttle buses would be provided to and from local communities to reduce traffic on the road network after working hours. After completion of construction and commissioning activities the entire facility would be decommissioned and removed from the site. Inadequate to address all of the construction workers required for the project. Issue: The DEIS concludes that constructing the Project would temporarily but significantly impact housing in Coos Bay. (Page ES-5). The workforce housing plan Jordan Cove proposed in this DEIS is inadequate to support the anticipated thousands of construction workers anticipated on site during the height of construction. Jordan Cove needs to provide a comprehensive housing plan that addresses the peak construction workforce and impacts on housing in Coos Bay, North Bend, Charleston, and other nearby communities as well as housing and camp ground in Coos County as a part of the construction phase ERP and security plans. The workforce housing plan and must be reviewed and approved by federal, state, and local agencies tasked with ensuring public health and safety.	comprehensive workforce housing plan that addresses the peak construction workforce and impacts on housing in Coos Bay, North Bend, Charleston, and other nearby communities as well as housing and camp ground in Coos County. The workforce housing plan will be part of ERP and security plans for the construction plan and must be reviewed and approved by federal, state, and local agencies tasked with ensuring public health and safety prior to initial site preparation.
2.0 Description of the Proposed Action, 2.4.1.2 Material Deliveries, Page 2-46	The DEIS states that the transportation of materials, supplies, and staff to the LNG terminal site would be accomplished via a combination of road, marine transport, and rail. Issue: All construction activities including the transportation of materials and personnel to Jordan Cove directly impacts the safety and security of the public. Jordan Cove has not provided an ERP or security plan for the construction phase for federal, state, and local emergency response agencies review and approval. The ERP and security plan for the construction phase must be validated by and coordinated with federal, state, and local emergency management, law enforcement, fire service, public health, and other key stakeholders tasked with ensuring public health and safety.	As a condition of the certificate, require the applicant to provide an ERP and a security plan for the construction phase prior to initial site preparation. The construction phase ERP and security plan must be coordinated with and approved by federal, state, and local agencies tasked with ensuring public health and safety. This includes a Cost-Sharing Plan identifying federal, state, county, and local resources needed to implement the construction ERP and security plan.

Table 2.6.3-1 Pacific Connector's Plan of Development, Appendix C: Blasting Plan, Page 2-68	Table 2.6.3-1 details Pacific Connector's Plan of Development. Appendix C states that the purpose of the Blasting Plan is intended to help ensure the safety of construction personnel, the public, nearby facilities and sensitive resources. Issue: Pacific Connector has not provided a Blasting Plan for federal, state, and local agency review and approval. Blasting hazards directly impact federal, state, and local agencies tasked to ensure public safety and security during the construction of the pipeline. As a result, blasting hazards should be included in the Emergency Response Plan for the pipeline for the construction phase.	As a condition of the certificate, require Pacific Connector to provide an ERP identifying blasting hazards and response measures to ensure the safety of construction personnel, the public, nearby facilities and sensitive resources. The pipeline construction ERP must be completed and provided to federal, state, and local agencies tasked with ensuring public safety and security along the pipeline route for review, approval, and coordination prior to the initial site preparation.
Table 2.6.3-1 Pacific Connector's Plan of Development, Appendix H: Emergency Response Plan, Page 2-69	Table 2.6.3-1 details Pacific Connector's Plan of Development. Appendix H states that the purpose of the Emergency Response Plan is to identify the standards and criteria that Pacific Connector would follow to minimize the hazards during pipeline operation resulting from a gas pipeline emergency in accordance with the Pipeline and Hazardous Materials Safety Administration's regulations in 49 CFR 192.615 and 192.617. Issue: Appendix H does not include an ERP that identifies standards and criteria that Pacific Connector would follow to minimize the hazards during pipeline construction. This includes hazards from blasting, landslides, fires, injuries, safety and security threats to construction workers and the public, and other emergencies threatening public safety and security along the pipeline route. Pacific Connector has not provided a pipeline ERP for construction or operation. Pipeline construction activities directly impact public safety and security. As a result, a comprehensive ERP for construction and operation must be developed and maintained throughout the life of the project in coordination with federal, state, and local agencies tasked with ensuring public safety and security along the pipeline route.	As a condition of the certificate, require Pacific Connector to provide a comprehensive ERP for pipeline construction and operation that identifies all potential hazards and response measures to federal, state, and local agencies tasked with ensuring public safety and security along the pipeline route for review, approval, and coordination prior to the initial site preparation.
Table 2.6.3-1 Pacific Connector's Plan of	Table 2.6.3-1 details Pacific Connector's Plan of Development. Appendix K states that the Fire Prevention and Suppression Plan describes the	As a condition of the certificate, require Pacific Connector to provide an ERP identifying fire hazards and

Development, Appendix K: Fire Prevention and Suppression Plan, Page 2-69	measure to be used by Pacific connector and its contractors to ensure that fire prevention and suppression techniques are carried out in accordance with federal, state, and local regulations. Issue: Pacific Connector has not provided a Fire Prevention and Suppression Plan for federal, state, and local agency review and approval. Fire hazards directly impact federal, state, and local agencies tasked to ensure public safety and security during the construction and operation of the pipeline. As a result, fire hazards should be included in the Emergency Response Plan for the pipeline for construction and operation.	response measures to ensure the safety of construction personnel, the public, nearby facilities and sensitive resources. The pipeline construction ERP must be completed and provided to federal, state, and local agencies tasked with ensuring public safety and security along the pipeline route for review and approval prior to the initial site preparation.
Table 2.6.3-1 Pacific Connector's Plan of Development, Appendix V: Safety and Security Plan, Page 2-70	Table 2.6.3-1 details Pacific Connector's Plan of Development. Appendix V states that the purpose of the Safety and Security Plan is to describe safety standards and practices that would be implemented to minimize health and safety concerns related to the construction of the pipeline project. Issue: Pacific Connector has not provided a Safety and Security Plan for the construction phase for federal, state, and local agency review, approval and coordination.	As a condition of the certificate, require Pacific Connector to provide an ERP identifying fire hazards and response measures to ensure the safety of construction personnel, the public, nearby facilities and sensitive resources. The pipeline construction ERP must be completed and provided to federal, state, and local agencies tasked with ensuring public safety and security along the pipeline route for review and approval prior to the initial site preparation. This includes a Cost-Sharing Plan that contains a description of any direct cost reimbursements to each state and local agency with responsibility for security and safety along the pipeline route.
4.13 Reliability and Safety, 4.13.1 Jordan Cove LNG Project, 4.13.1.1 LNG Facility Reliability, Safety, and Security Regulatory Oversight, Paragraph 3, Pages 4-698 – 4-702	The DEIS states that USDOT has the authority to enforce the federal safety standards for the location, design, installation, construction, inspection, testing, operation, and maintenance of onshore LNG facilities under the Natural Gas Pipeline Safety Act. In an MOU signed with FERC on August 31, 2018, USDOT agreed to issue a Letter of Determination (LOD) stating whether a proposed LNG facility would be capable of complying with location criteria and design standards contained in subpart B of Part 193. The LOD serves as one of the considerations for the	FERC should postpone its decision on whether to authorize or deny Jordan Cove a permit to proceed with construction until USDOT completes and issues its LOD. Upon completion of the LOD, FERC should allow adequate time for federal, state, and local agencies tasked with ensuring public health and safety to review and comment on the LOD prior to issuing the FEIS

	Commission to deliberate in its decision to authorize or deny an application *(Page 4-702, 1st paragraph, last sentence).* Issue: USDOT has yet to issue a LOD. Without USDOT's LOD, crucial reliability and safety information on the potential impacts of the facility design and operation on public health and welfare is unavailable to assist FERC in making a knowledgeable and accountable decision to authorize or deny Jordan Cove's application. In addition, without USDOT's LOD, federal, state and local agencies tasked with ensuring public health and safety are unable to complete a thorough assessment of whether the applicant accurately evaluated the potential incidents and safety measures incorporated in the design or operation of the facility that have direct impact on the safety of plant personnel and the surrounding public. As a result, safety and security strategies identified in the Jordan Cove ERP may not be sufficient	and issuing its decision on whether to authorize or deny a permit on this project. In addition, the incidents and safety measures incorporated in the design or operation of the facility directly impact the safety and security of facility personnel and the surrounding public. As a condition of the certificate, require the applicant to take into account LOD incident scenarios and safety measures in the development and implementation of the ERP and security plans for the Jordan Cove terminal, waterway, and pipeline.
4.13 Reliability and Safety, 4.13.1 Jordan Cove LNG Project, 4.13.1.4 LNG Facility Security Regulatory Requirements, Pages 4-710 – 4-711	The DEIS states that the security requirements for the proposed project are governed by 33 CFR 105, 33 CFR 127, and 49 CFR 193 Subpart J – Security, Title 33 CFR 105, as authorized by the MTSA, requires all terminal owners and operators to submit a Facility Security Assessment (FSA) and a Facility Security Plan (FSP) to the Coast Guard for review and approval before commencement of operations of the proposed Project facilities (page 4-710, first paragraph). Title 49 CFR 193 Subpart J also specific security requirements for the onshore components of LNG terminals, including requirements for conducting security inspections and patrols and liaison with local law enforcement officials (page 4-711, second paragraph). Issue: The DEIS does not include state security requirements identified in the ODOE MOU that the applicant must comply with if the project is authorized and constructed. The applicants FSA and FSP must also be reviewed, approved, and coordinated with federal, state and local law enforcement tasked with ensuring public safety and security for the LNG terminal, waterway, and pipeline.	Include language in section 4.13.1.4 that states the applicant must also comply with state established security requirements for the LNG terminal, waterway, and pipeline for construction and operation. As a condition of the certificate, require the applicant to comply with state established security requirements in the ODOE MOU for the LNG terminal, waterway, and pipeline for construction and operation. As a condition of the certificate, require the applicant to provide a FSA and FSP to federal, state and local law enforcement tasked with ensuring public safety and security for the LNG terminal, waterway, and pipeline. The FSA and FSP must be completed for review, approval, and coordination with law enforcement agencies prior to initial site preparation.

4.13 Reliability and Safety, 4.13.1 Jordan Cove LNG Project, 4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Design, Onsite and Offsite Emergency Response Plan, Page 4-753 – 4 -755	The DEIS states that as part of its application, Jordan Cove indicated that the Project would develop a comprehensive ERP with local, state, and federal agencies and emergency response officials to discuss the Facilities. Jordan Cove would continue these collaborative efforts during the development, design, and construction of the Project (Page 4-753, first paragraph, Onsite and Offsite Emergency Response Plan). The emergency procedures would provide for the protection of personnel and the public as well as the prevention of property damage that may occur as a result of incidents at the Project facilities. Issue: The DEIS only discusses Jordan Cove's intention to continue collaborative efforts with local, state, and federal agencies and emergency response officials during the development, design, and construction of the Project. However, the DEIS does not discuss the ongoing collaboration required with local, state, and federal agencies tasked with ensuring public safety and security during facility operation. The need for safety, security, and emergency response to incidents at the Jordan Cove terminal do not stop at the end of construction, but continues into operation and throughout the life of the project.	Include language in section 4.13.1.5 on the first paragraph under Onsite and Offsite Emergency Response Plan to state "Jordan Cove would continue these collaborative efforts during the development, design, construction, and throughout operations of the Project." As a condition of the certificate, require the applicant to develop and maintain a comprehensive ERP with local, state, and federal agencies tasked with ensuring public safety and security through the life of the project. This includes a Cost-Sharing Plan that contains a description of any direct cost reimbursements to each state and local agency with responsibility for security and safety at the LNG terminal and in proximity to LNG marine vessels that serve the facility, and along the pipeline route.
4.0 Environmental Analysis, 4.1 Geological Resources, 4.1.1 Jordan Cove LNG Project, 4.1.2.3 Seismic and Related Hazards, Page 4-1 – 4-30 November 6, 2017 DOGAMI Letter	ODOE shares the Oregon Department of Geology and Mineral Industries' (DOGAMI) concern regarding the possible deficiencies in the scientific and engineering analyses relating to geologic hazards in the DEIS. With the proposed Jordan Cove LNG Terminal located in the Cascadia tsunami inundation zone, ODOE strongly agrees with DOGAMI that it is critical that all geologic hazards are identified and mitigation measures approved before design and construction to ensure the protection of public health and safety. Issue: Jordan Cove has yet to address the scientific and engineering analyses deficiencies relating to geologic hazards raised in DOGAMI's November 6, 2017 letter. Additional site-specific geologic hazard evaluations to identify accurate risks and proper mitigation measures for the hazards are required to ensure public safety. This	As a condition of the certificate, require the applicant to meet with DOGAMI and ODOE to address and resolve issues raised in the November 6, 2017 letter prior to the end of this draft EIS comment period. As a condition of the certificate, require the applicant to provide the following assessments and hazards analysis prepared by a qualified licensed professional to DOGAMI for review and approval prior to initial site preparation: 1) Probabilistic seismic hazard assessment, which includes the ground motions and duration of

	information is critical for federal, state, and local agencies tasked with protecting public health and safety for the LNG terminal, waterway, and pipeline. The results and findings of these hazards analyses directly impact the planning, development and implementation of response and recovery strategies in the Jordan Cove Emergency Response Plan under development.	shaking for the terminal facilities and entire pipeline route using accurate and up-to-date date methods and data. 2) Comprehensive tsunami hazard analyses for the facility and surrounding areas. 3) Comprehensive liquefaction hazard analysis and mitigation design with supporting data. Comprehensive landslide hazards analysis, which includes co-seismic landslides and lateral spreads for the proposed facilities (including the pipeline) and surroundings.
2.11.1 JCEP-Final Resource Report 11, Page 56	Resource Report 11 (RR11) states that a distant earthquake in Alaska or Japan could result in a tsunami with a relatively long lead-time (12 to 24 hours). RR11 also states that all ships in Coos Bay, including an LNG carrier, would be directed to depart the harbor by the USCG Captain of the Port (COTP). LNG carriers at the LNG Terminal will be facing the basin entrance and Coos Bay and would be adequately manned, as required by the USCG, with the ability to get underway in a short time period while berthed. Therefore, the LNG carriers would be able to depart relatively quickly from the LNG Terminal and head out to sea in the event of a distant tsunami, in response to notice and instructions from the USCG COPT. This amount of time would be adequate for the terminal to stop loading operations and disconnect from the LNG vessel and use two tug boats already in the slip to counteract the forces placed on the LNG carrier hull by the arriving tsunami. If the LNG carrier is traversing in the channel during the tsunami, the tugs would also provide assistance against the force of the tsunami wave coming up the channel. Issue: Both the RR11 or the DEIS fails to sufficiently and accurately identify and mitigate tsunami impacts to the LNG terminal, navigational channel (other vessels and waterway traffic), LNG carrier, and the LNG berth from a Cascadia earthquake. The USCG Waterway Suitability Assessment (WSA) Validation Committee did not address tsunami impacts to	4) As a condition of the certificate, require the applicant to provide for DOGAMI review and approval a comprehensive tsunami hazard analysis, which includes Cascadia tsunami arrival times and distant tsunami hazards. This assessment must address tsunami impacts to the estuarine area surrounding the proposed modifications (e.g., dredged channel, construction modifications), document the analyses, data, assumptions, results, and proposed mitigations. The tsunami analysis is to be prepared by a qualified licensed professional.

	the LNG terminal, navigational channel, LNG carrier, or the LNG berth because it was beyond the scope of the WSA. DOGAMI established that it would take approximately 25-30 minutes for a large tsunami generated from the Cascadia earthquake to reach Coos Bay following the 3-5 minute shake. Additional site-specific tsunami evaluations to accurately identify risks and proper mitigation measures for tsunamis are required to ensure public safety. This information is critical for federal, state, and local agencies tasked with protecting public health and safety for the LNG terminal, waterway, and pipeline. The results and findings of these hazards analyses directly impact the planning, development and implementation of response and recovery strategies in the Jordan Cove Emergency Response Plan, LNG Carrier Transit Management Plan, and the LNG Carrier Emergency Response Plan under development.	

Oregon Department of Environmental Quality

Contact: Mary Camarata,
Ph: 541-687-7435,
Email: camarata.mary@deq.state.or.us

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Section 1.5.1.6, P. 1-28	DEQ has the authority to approve or deny water quality certifications under section 401 of the CWA.	DEIS Section 5.1.3.2 states "the Project would not result in significant impacts on surface water resources." This conclusion is inaccurate and inconsistent with DEQ's recent review of the proposed project's impacts on state water quality. On May 6, 2019, DEQ denied without prejudice Jordan Cove's request for section 401 water quality certification for the U.S. Army Corps of Engineers' issuance of Clean Water Act Section 404 and RHA Section 10 permits. DEQ found that Jordan Cove failed to provide reasonable assurance that construction and operation of the Project would comply with applicable Oregon water quality standards, as described in the May 6, 2019, Evaluation and Findings Report, which DEQ incorporates in these comments in their entirety by this reference. (See Appendices C and D.) This EIS should be amended to include an accurate representation, analysis and conclusion regarding the direct, indirect, and cumulative impacts of the proposed project, and all similar, connected and cumulative actions, on the water quality of affected State waters.
Section 1.5.1.6	Section 401 of the Clean Water Act bars federal agencies from issuing a license or permit for an action that may result in a discharge to Oregon waters without first obtaining water quality certification from DEQ. DEQ anticipates Jordan Cove's construction and operation of the Project will require authorizations from multiple federal agencies, including but not limited to a Section 404 permit from the U.S. Army Corps of Engineers and authorizations from the Federal Energy Regulatory Commission (FERC) pursuant to the Natural Gas Act.	FERC requires Jordan Cove to apply for and DEQ to approve water quality certification under Section 401 of that Act that the proposed project will comply with Oregon's federally-approved water quality standards.

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4.14.1.2	The DEIS considers the cumulative effects of the Project with other, reasonably foreseeable actions including the Port of Coos Bay's proposed Channel Deepening project. The projects, though proposed separately, are connected and must, therefore, be considered and analyzed as connected actions. The Port of Coos Bay proposes to increase the depth of the channel to -45 feet, the same depth as Jordan Cove's proposed Slip, from the channel entrance to river mile 8.2, just beyond the Jordan Cove LNG Export Terminal. Jordan Cove requires a depth of -45 feet to accommodate the expected class of LNG carriers with a minimum 10-percent under-keel clearance while ships are in dock. Because the draft of these vessels exceeds the present depth of the Federal Navigation Channel, these vessels cannot fully utilize the current channel on all tides.	FERC's EIS must analyze all related actions in this EIS, meaning the cumulative impacts of the proposed project (including alterations to the federal navigation channel), together with the effects of a deepened navigational channel, as connected, similar, and cumulative actions. DEQ understands that the proposed navigational improvements, together with the proposed deepening of the channel will permanently affect water quality parameters including salinity, dissolved oxygen, turbidity, and total dissolved solids. The EIS must analyze the cumulative effects on water quality of changes to the navigation channel resulting from both the Jordan Cove and the Port of Coos Bay Channel Deepening projects.
Executive Summary, p. ES-3	The DEIS states that the pipeline would be located across steep terrain through the Cascade Mountains and planned accordingly. However, the pipeline also crosses the Coast Range with its deep-seated and shallow-seated landslide-prone Tyee Core Area. In its evaluation of Jordan Cove's application for 401 water quality certification, ODEQ presents several concerns with Jordan Cove's landslide hazard assessment in preparation for constructing the pipeline. For example, Jordan Cove did not evaluate the landslide risk associated with the pipeline's construction and operation particularly near headwalls (head scarps) and other unstable slopes. Right-of-way initiated landslides at headwalls connected to bedrock	FERC must address the water quality concerns raised in ODEQ's May 6, 2019 denial without prejudice of Jordan Cove's application for 401 water quality certification. ODEQ evaluated Jordan Cove's landslide hazard assessment in Sections 6.1.2.1, 6.1.2.3, 6.1.2.4, 6.2.2.1, 6.2.2.3, 6.2.2.4, 6.9.2.1, 6.9.2.3, and 6.9.2.4 of Evaluation and Findings Report for ODEQ's 401 water quality certification denial decision. ODEQ's evaluation presented the procedures for a landslide hazard assessment that Jordan Cove should use in the future. Jordan Cove should use Department of Geology and Mineral Industries' protocols to: 1) Identify landslide risks. 2) Identify areas in need of mitigation measures for these risks. To resolve this lack of evaluation criteria and determine the need for mitigation measures, FERC should request that Pacific Connector use the following protocols for landslides developed by

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	hollows and first order streams will violate Oregon sediment and turbidity standards. Given the proposed placement of trench and grading spoils and, potentially, fill placed on the rapidly moving landslide risk area from Pipeline Milepost 8.56 to 8.75, ODEQ reviewed Table B-3a in Resource Report 6 as a quality assurance check on Jordan Cove's Phase I landslide hazard evaluation. Table B-3a summarizes the sites investigated in Jordan Cove's Phase II field reconnaissance. In its review of this table, ODEQ determined that Jordan Cove did not include the area from between Milepost 8.56 to 8.75 in its field data collection and risk assessment. Jordan Cove also did not conduct a surface reconnaissance for the areas of concern featured in Figures 6 and 7. Given this, ODEQ referenced the methodology for identifying moderate and high rapidly moving landslide risks in Resource Report 6 as described below. On Page 31 in Section 4.5.3.2 of Resource Report 6 (Geologic Resources), Jordan Cove indicates it used LiDAR, 10-meter DEM, and aerial photography to identify moderate and high RML sites. This section in Resource Report 6 provides the risk criteria Jordan Cove used to identify the RML sites selected for surface reconnaissance and included in Table B-3a. Jordan Cove's selection criteria were to identify the potential for a RML to induce strain on the pipeline and for RML erosion to expose a pipeline. These two selection criteria would not ensure the identification of RML sites posing a risk to streams and water quality. The above quality assurance check confirmed ODEQ's concerns	DOGAMI: 1. Special Paper 42 (2009) – Protocol for Inventory Mapping of Landslide Deposits from Light Detection and Ranging (LiDAR) Imagery (https://www.oregongeology.org/pubs/sp/p-SP-42.htm) 2. Special Paper 45 (2012) – Protocol for Shallow-Landslide Susceptibility Mapping (https://www.oregongeology.org/pubs/sp/p-SP-45.htm) 3. Special Paper 48 (2016) – Protocol for Deep Landslide Susceptibility Mapping (https://www.oregongeology.org/pubs/sp/p-SP-48.htm) DOGAMI considers the method outlined in Special Paper 42 as the state-of-practice method. Special Paper's 45 and 48 present methods for determining shallow and deep landslide susceptibility, respectively. Jordan Cove's states that it used DOGAMI's state-of-practice method citing DOGAMI's 2002 "Text to Accompany Hazard Map of Potential Rapidly Moving Landslides in Western Oregon" by Hofmeister, Miller, Mills, and Beier. This 2002 document is an introduction to the risks of rapidly moving landslide hazards in Oregon and not a substitute for DOGAMI's SP-42 (2009), SP-45 (2012), and SP-48 (2016) noted above.

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	presented in the December 20, 2018 Supplemental Information Request that Pacific Connector's landslide hazard evaluation did not consider the landslide hazard risks to streams initiated by the construction and operational right-of-way.	
Section 2.3.2.1, Access Roads, P. 2-41 Section 4.3.2.2, Page 4-103	The DEIS erroneously concludes that only 21 existing road segments related to the pipeline project could potentially deliver sediment to streams. In its evaluation of Jordan Cove's application for 401 water quality certification, ODEQ presented several issues with Jordan Cove's analysis of road segments with the potential to deliver sediment to streams. Jordan Cove's assessment grossly underestimates the expected sediment discharge from the use of several hundred miles of unpaved existing access roads. For example, Jordan Cove proposes to use the Washington Road Surface Erosion Model to identify roads hydrologically connected to streams. However, in its analysis, Jordan Cove uses WARSEM incorrectly. ODEQ informed Jordan Cove that it needed to perform a field inventory not a desktop inventory of all roads segments to identify those hydrologically connected to streams. Jordan Cove attempted to identify road segments hydrologically connected to streams using maps during its desktop analysis. In Table 2 of the WARSEM Manual, the authors of this model clearly indicate that a determination of hydrologic connectivity requires field verification. As a result, ODEQ requested a Level IV Inventory using WARSEM as this allows Jordan Cove to document the erosion reduction from road surfaces using Jordan Cove's maintenance and	FERC must ensure that Jordan Cove's methods used to identify unpaved road segments that are likely to be hydrologically connected to streams are reasonably accurate. Please refer to ODEQ's May 6, 2019 denial without prejudice of Jordan Cove's application for 401 water quality certification. ODEQ evaluated Jordan Cove's assessment of existing access roads and their potential to discharge sediment to streams in Sections 6.1.2.3, 6.2.2.3, and 6.9.2.3 of the Evaluation and Findings Report for its decision on the 401 certification. In its evaluation, ODEQ identifies several deficiencies in Jordan Cove's application of the Washington Road Surface Evaluation Model that contribute to Jordan Cove's gross underestimation of road segment hydrologic connectivity and the need for existing access road improvements and maintenance to protect water quality.

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	improvement plan. Jordan Cove's conclusion that only 21 existing access roads have the potential to discharge sediment to streams is based upon road system surveys using aerial photos, maps, or other remote sensing Tools and generalized assumptions about distance and hydrologic connectivity. Remote sensing tools cannot serve as a substitute for a field inventory as explained below. For example, Pacific Connector cannot determine using maps if the surface of a road segment is out-sloping and, therefore, draining overland via the road's fill slope and undisturbed landscape. In addition, maps do not indicate if the surface of a road segment is in-sloping and draining to a ditch carrying stormwater to a stream over several hundred feet or more downslope from this road segment. Moreover, maps do not indicate if a road surface drains to an in-slope ditch that drains to a cross culvert (or drain) which discharges to a zero order stream connected to a first order stream. Given this, Pacific Connector's desktop analysis of road segments is making significant assumptions that incorporate considerable error into its estimate of the number and location of road segments hydrologically connected to streams.	
Section 2.0, P. 2-1	The DEIS fails to identify actions necessary to fully characterize the scope of the proposed project. 40 CFR 1508.25 requires lead agencies to consider actions that may be connected, cumulative, and/or similar to the proposed activity. This deficiency has direct consequences on the ability of the DEIS to fully consider project alternatives and/or develop appropriate controls to minimize water	FERC must include all actions in the project scope to determine project impacts and identify needed mitigation, including but not limited to: 1) Post-construction stormwater discharge to streams from the permanent pipeline right-of-way carrying sediment discharging to streams (See Section 6.1.2.4 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 2) Post-construction stormwater discharge at new

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	quality impacts. In its 12/20/18 supplemental request in the Evaluation and Findings Report, ODEQ identifies several actions proposed by Jordan Cove requiring full consideration of project alternatives and/or appropriate controls. ODEQ considered many of these proposed actions in its May 6, 2019 denial without prejudice of Jordan Cove's 401 water quality certification application. For example, ODEQ's evaluation for this denial consider the proposed actions in Sections 6.1.2, 6.2.2, 6.6.2, and 6.9.2. Example actions are briefly highlighted in the column to the right. In its September 7, 2018 Additional Information Request (see Page 6 of 15, Attachment B in the Evaluation and Findings Report), ODEQ also requested information summarizing Jordan Cove's actions relating to Temporary to first avoid riparian impacts. Only if avoidance is not possible, is it appropriate to consider minimization and mitigation of these impacts prior to siting TEWAs and the construction right-of-way parallel to streams. In ODEQ's information request, ODEQ noted it was seeking the location of these riparian impacts and the detailed rationale justifying these impacts. Specifically, ODEQ was seeking information on the specific constraints and operational procedures at each site preventing avoidance or minimization. In January 2019, ODEQ received information from Jordan Cove that the detailed justification for riparian impacts that ODEQ was seeking was in Table A.1-1 of the Department of State Lands and Army Corps of Engineers Joint Permit Application. ODEQ reviewed this information and found that it focuses primarily on wetland	and altered road stream crossings (See Section 6.1.2.4 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 3) Sediment discharge from the use of hundreds of unpaved segments of existing road surfaces and roadside ditches during pipeline construction. These segments are hydrologically connected to streams (See Section 6.1.2.4 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 4) Placement of fill to develop the construction right-of-way and TEWAs on headwalls/unstable slopes such as headwalls along Pipeline Milepost 8.56 to 8.75 as well as numerous other locations (See Section 6.1.2.1 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 5) Placement of construction overburden (i.e., rock, soil, tree root wads, slash etc.) on TEWA supported by fill placed on headwalls/unstable slope such as headwalls along 8.72 to 8.75 (See Section 6.1.2.1 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 6) Constructing a 229-mile construction access road to build the pipeline (See Section 6.1.2.1 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 7) Siting the construction and permanent right-of-way parallel to streams thus reducing effective riparian shade necessary for thermal regulation of streams (See Section 6.6.2.4 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 8) Construction of a new Temporary Access Road on steep slopes that are a hazard area for rapidly moving landslides such as TAR 101.70 identified in Jordan Cove 401 water quality certification application (see Drawing No. 340.31-Y-Map 14, Sheet 27 and Geologic Hazard Map Figure 22 of 47 and see Section 6.1.2.3 of ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application). 9) Placement of fill above identified landslides (e.g., Landslide 43) when widening Beaver Springs Sp (BLM NonInv 32-2-36.A) 113.66 (see Drawing No. 340.31-Y-Map 14, Sheet 27 and Geologic Hazard Map Figure 25 of 47 and see Section 6.1.2.3 of

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	impacts associated with the siting of a Temporary Extra Work Area rather than riparian impacts and temperature changes in streams. The modification rationale presented in this Table A.1-1 provides no information regarding alternative locations for TEWAs that Jordan Cove considered and provides no detailed explanation why these alternative locations were unsuitable. Moreover, ODEQ cannot determine from the information in Table A.1-1 if riparian impacts from the construction right-of-way are a result of FERC's 15-foot buffer guidelines or some other factor, as the columns of information in this table present only information on the wetlands impacted, Cowardin Type for each wetland impacted, and TEWAs involved in the impact. From Table A.1-1, ODEQ cannot find information on why Pacific Connector could not avoid or minimize impacts to effective shade to streams when siting TEWAs and the construction right-of-way parallel to a stream. Use of FERC's standard 15-foot buffer guidelines conflicts with Oregon's water quality standards in the significant number of areas for the pipeline route where the state's temperature standard is not met. In these areas, Pacific Connector must demonstrate consistency with the surrogate measures for effective stream shade adopted by DEQ in the Rogue TMDL. Moreover, in a late response to an ODEQ information request, Jordan Cove provided information regarding its rationale for not avoiding impacts to effective riparian shade. As a rationale for not avoiding impacts, Jordan Cove uses "emergent pasture vegetation" as a justification for proposing to remove	ODEQ's Evaluation and Findings Report for Jordan Cove's 401 WQC application).

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	effective riparian shade while paralleling a stream. Emergent pasture vegetation is essentially wetlands impacted by agricultural practices. Jordan Cove's goal to avoid causing a loss of wetlands substantially altered by agricultural production is not a lawful basis for instead removing effective riparian shade that is required by Oregon water quality standards during pipeline construction and operation. Wetlands altered by agricultural activity does not take precedence over effective riparian shade in Jordan Cove's alternatives analysis. Moreover, FERC must assure that Jordan Cove does not use a perpendicular approach to a stream crossing as a rationale for reducing effective riparian shade. Jordan Cove can design bends in the pipeline to avoid impacting riparian areas and to ensure a perpendicular stream approach. These two desirable water quality objectives are not mutually exclusive.	
Table 1.5.1-1, P. 1-23 (ODEQ)	The DEIS fails to include the need for Jordan Cove to obtain Oregon's Water Quality Pollution Control Facility (WPCF) Permit for wastewater discharges to land during pipeline construction. The DEIS also fails to indicate that Jordan Cove will need to use an ODEQ-approved septic tank for the guardhouse at the LNG Terminal. Jordan Cove fails to identify the locations where it will dispose putrescible waste (tree stumps, slash, and roots) from construction overburden and seek a permit for this disposal. ODEQ provides the basis for seeking a solid waste disposal permit in 12/20/18 supplemental request (See Pages 54 – 57 of Attachment A in the	FERC must include the following under ODEQ in Table 1.5.1-1: 1) ODEQ has not issued a NPDES 1200-C permit for the terminal or pipeline construction in regards to FERC's description of permit status. 2) Before ODEQ can review 1200-C permit applications, ODEQ needs Jordan Cove to submit complete NPDES 1200-C permit applications for: a. Pipeline construction and associated structures b. Existing access road improvements c. LNG Terminal d. All Off-Site Project Areas associated with Terminal construction and dredging e. Kentuck mitigation site 3) WPCF permit for vehicle and equipment wastewater during pipeline construction. 4) WPCF permit for the hydrostatic test water discharge. 5) WPCF permit for the trench dewatering

Citation	Issue Identification	Recommended Resolution
	Evaluation and Findings Report).	discharge. 6) Use an approved septic tank for the LNG Terminal. 7) Construction and Demolition Landfill Permits for several Jordan Cove proposed disposal sites as required Oregon Revised Statute 459.005 through 418.
Section 4.1.3.5, Pages 4-435 to 4-436	Completion of the pipeline project will require amendments to Rogue, Umpqua, and Winema National Forest Land and Resource Management Plans (LRMPs). Jordan Cove seeks amendments to these plans to allow work in restricted riparian corridors, removal of effective shade on perennial streams, and the creation of detrimental soil conditions in riparian areas. Some amendments require reductions in riparian buffer protections. Specifically, Jordan Cove proposes 50-foot setbacks from streams for Temporary Extra Work Areas (P. 28, Section 1.2.1.1 of Resource Report 1, Construction Right-of-Way). Additionally, FERC guidance allows right-of-way riparian impacts within 15-feet of streams. Such limited riparian setbacks result in thermal loading from the loss of riparian shade from Jordan Cove's proposed actions for pipeline construction and operation, and are in conflict with surrogate measures implementing Oregon temperature TMDLs in the Rogue basin. The proposed TEWA and ROW impacts also conflict with key Aquatic Conservation Strategy (ACS) and CWA Section 303 objectives (i.e., temperature standard, Temperature Total Maximum Daily Loads) related to water quality. There are 922.64 acres of TEWAs and, presumably, a portion of these acres will result in the loss of effective riparian shade. At ODEQ's request,	The Northwest Forest Plan (NWFP) Standard and Guideline WR-3 stipulates that Forest Service cannot use mitigation as a substitute for preventing habitat degradation. Moreover, before impacting riparian buffers for TMDLs, ODEQ requires 401 water quality certification applicants to first avoid riparian impacts and, if avoidance is not technically infeasible, then minimize these before moving to mitigation. ODEQ discusses this in Section 6.6.2 of Evaluation and Findings Report for ODEQ's denial without prejudice of Jordan Cove's application for 401 water quality certification. FERC must ensure the EIS considers all reasonable alternatives which eliminate or reduce riparian impacts before considering amendments to existing land and resource management plans to avoid conflicts with Aquatic Conservation Strategy objectives and TMDLs. To avoid these conflicts, FERC must require Jordan Cove to incorporate detailed justifications in Table A.1-1 that identify all physical and/or technical constraints preventing Jordan Cove from locating TEWAs beyond 50 feet from streams for TEWAs and the construction right-of-way beyond 15 feet from streams when paralleling these streams. Moreover, as a rationale for not avoiding impacts, FERC cannot accept Jordan Cove's use of "emergent pasture vegetation" as a justification for proposing to remove effective riparian shade. Emergent pasture vegetation is essentially wetlands impacted by agricultural practices. Jordan Cove's goal to avoid a loss of wetland functions and values substantially altered by agricultural production cannot serve as a legitimate reason for removing effective riparian shade during pipeline construction and operation. Protecting diminished wetland functions and values legally altered by agricultural activity cannot take precedence over protecting effective riparian shade

Citation	Issue Identification	Recommended Resolution
	Jordan Cove is currently compiling the proposed impacts from TEWAs and right-of-way construction parallel to streams. In responding to ODEQ's information requests during the review of Jordan Cove's 401 water quality certification application, Jordan Cove states that site-specific justifications for amendments to riparian buffers are in Table A.1-1 of Appendix B to Part 2 of the USACE Joint Permit Application (P. 399). This table lacks the information needed to evaluate Jordan Cove's requests to amend the Forest Service's Land and Resource Management Plans rather than avoid impacting riparian shade in establishing TEWA set-backs. Moreover, as noted in ODEQ's September 7, 2018 Additional Information Request (AIR) and December 20, 2018 Supplemental Request in the Evaluation and Findings Report, amendments to Land and Resource Management Plans will necessitate changes to BLM and Forest Service Water Quality Restoration Plans. BLM and the Forest Service use Water Quality Restoration Plans (WQRPs) to meet TMDLs. ODEQ approves WQRPs for this purpose. Amendments to Land and Resource Management Plans without ODEQ's review and input undermine ODEQ's actions to ensure compliance with TMDLs.	in Jordan Cove's alternatives analysis. Moreover, FERC must assure that Jordan Cove does not use a perpendicular approach to a stream crossing as a rationale for reducing effective riparian shade. Jordan Cove can design bends in its pipeline to avoid removing effective riparian shade when paralleling streams and to ensure a perpendicular stream approach when crossing streams. These two desirable water quality objectives are not mutually exclusive.
Section 2.1.6, Pages 2-35 and 2-36	The DEIS states that Jordan Cove must secure a Right-of-Way (ROW) Grant from the Bureau of Land Management to cross BLM, USDA Forest Service, and Bureau of Reclamation Lands. In its May 6, 2019 denial without prejudice of Jordan Cove's 401 water quality certification, ODEQ evaluated both pipeline construction (see Sections	FERC must ensure that ODEQ evaluates Right-of-Way Grants for Jordan Cove's proposed pipeline construction and operation activities. This evaluation will ensure these grants incorporate the information presented in Section 2.1.6 of the DEIS such as "stipulations, project design features and mitigation." ODEQ's evaluation will ensure compliance with applicable water quality standards.

Citation	Issue Identification	Recommended Resolution
	6.1.2.1, 6.2.2.1, 6.6.2.1, and 6.9.2.1) and the permanent pipeline right-of-way (see Sections 6.1.2.4, 6.2.2.4, 6.6.2.4, and 6.9.2.4) in its Evaluation and Finding Report for this denial decision. In this evaluation, ODEQ detailed the deficiencies in Jordan Cove's proposed plans and best management practices for pipeline construction and operation. For example, in the December 20, 2018 supplemental request in the Evaluation and Findings Report, ODEQ provided Jordan Cove with the basis for ODEQ's concerns about slope stability along the construction and operational right-of-way. ODEQ's concerns included the potential for pipeline ROW construction and ROW stormwater discharge to initiate landslides (see Pages 68 – 79 of Attachment A). Given its concern about slope stability above zero order streams, ODEQ requested and received in February 2019 the LiDAR shapefiles used in their landslide hazard evaluation. ODEQ performed a preliminary review of the LiDAR maps in a sample section of the Tyee Core Area and found many headwalls in close proximity to the construction and permanent ROW. During this review, ODEQ searched for site-specific geo-engineering measures for fills and cuts on unstable slopes in information provided to-date by Jordan Cove but found this information lacking as noted in ODEQ's December 20, 2018 supplemental information request (see Page 70 – 73 and 75 to 79 of Attachment A in the Evaluation and Findings Report).	Jordan Cove's 401 water quality certification application to ODEQ lacked key project design features to demonstrate Jordan Cove will comply with water quality standards as detailed, for example, in Sections 6.1.2.1 and 6.1.2.4 of ODEQ's Evaluation and Finding Report for the denial decision on Jordan Cove's application. Moreover, Jordan Cove's application lacked a mitigation plan for offsetting the loss of effective riparian shade during construction and operation of the pipeline and associated roadways and work areas as discussed in Sections 6.6.2.1 and 6.6.2.4 of ODEQ's Evaluation and Finding Report.
P. 4-114 & 4-115, Table 4.3.2.2-9	In ODEQ's September 7, 2018 Additional Information Request (AIR), ODEQ determined that Pacific	FERC must direct Pacific Connector to submit a revised Thermal Impact Assessment that includes an evaluation of all the impacts from vegetation removal

Citation	Issue Identification	Recommended Resolution
and Section 4.7.3.5, Watersheds Crossed by the Pacific Connector Pipeline Project, P. 4-495 and P. 4-503 (federal lands)	Connector did not consider the following impacts: 1) Development of the construction and operational right-of-way removing riparian vegetation up to 15 feet from stream based on FERC national guidance. 2) The location of Temporary Extra Work Areas (TEWAs) 50 feet from stream crossings. 3) The location of vegetation clearing associated with new and improved roadways. Pacific Connector has not demonstrated that it first avoided then minimized these impacts before moving to mitigation. Pacific Connector did not provide a detailed justification identifying all the constraints necessitating a move to mitigation of riparian impacts. Pacific Connector only references Table A.1-1 of Appendix B to Part 2 of the USACE Joint Permit Application (P. 399). This table lacks the detailed justification to evaluate the need to amend the Forest Service land management plan rather than avoid riparian impacts when establishing TEWA set-backs. Pacific Connector has not provided a mitigation plan for addressing the loss of riparian shade from ***all aspects of*** pipeline construction and operation. In Sections 6.6.2.1 and 6.6.2.4 of its Evaluation and Findings Report for its denial decision, ODEQ noted Pacific Connector did not provide plans for mitigating the loss of riparian shade and identified the components that Pacific Connector's mitigation plans should contain. Finally, this analysis is not sufficient to determine compliance with Oregon's temperature standard and	from the pipeline right-of-way, associated roadways, and TEWAs and providing a revised mitigation plan addressing unavoidable impacts to riparian shade. As noted above in ODEQ's comment above, FERC must ensure Pacific Connector provides detailed justification for each action to mitigate rather than avoid or minimize the riparian impacts from the development of the construction and operation of roadways, pipeline right-of-way and TEWAs. FERC must consider in the EIS the cumulative thermal impact resulting from shade loss at all stream crossings within each watershed. FERC must consider the proposed loss of effective riparian shade on streams impaired for temperature but not under a TMDL and those subject to OAR 340-041-0028(11). As noted on Pages 65 and 68 of Section 6.6.2 of DEQ's Evaluation and Findings Report for its denial decision without prejudice, the human use allowance in Oregon's temperature standard does not permit a pollution source to cause more warming of a Category 5 stream than allowed under this allowance as stated OAR 340-041-0028(12)(b). Category 5 streams are **impaired** water bodies on the 303(d) list that are not under a Total Maximum Daily Load (TMDL) and therefore have no allocation with a reserve capacity. FERC must analyze and disclose and analyze cumulative effects from all aspects of Jordan Cove's proposed pipeline, and require avoidance, minimization and for any remaining impacts full mitigation within the same subbasin where the thermal impacts would occur.

Citation	Issue Identification	Recommended Resolution
	implementing TMDLs. The DEIS does not consider the cumulative thermal impact resulting from shade loss at all stream crossings within each watershed. The DEIS does not disclose and analyze this cumulative effect analysis.	
Section 2.4.2.1, Cleanup and Permanent Erosion Control, P. 2-57	Jordan Cove proposes to use open trench cutting to create stream crossings for its pipeline. At ODEQ's request, Jordan Cove's 401 WQ certification application proposed an approach to designing and reviewing stream crossings based on: • Castro, J.M., A. MacDonald, L. Lynch, and R. Thorne. 2014. *Risk-Based Approach to Designing and Reviewing Pipeline Stream Crossings to Minimize Impacts to Aquatic Habitats and Species*. River Research and Applications. In its 3/11/19 Additional Information Request in the Evaluation and Findings Report, ODEQ requested that Jordan Cove collect field assessment data that is also consistent with Castro et al. (2014). ODEQ requested that Jordan Cove use the risk based approach presented in Castro et al. (2014). This assessment data is necessary to develop site-specific restoration plans. These field assessments include the documentation and quantification of aquatic habitat units that Jordan Cove's open trench cutting will impact. Jordan Cove's 401 water quality certification application does not contain this information for each stream crossed by open trench cut method. Moreover, Jordan Cove has not developed site-specific restoration plans for all these crossings that use site-specific assessment data.	FERC must request that Jordan Cove collect the field data recommended by Castro et. al. (2014) (see Table 1, Basic Data Needs) during pre-construction surveys of all stream crossings where Jordan Cove will use the open trench cut method. FERC must request that Jordan Cove use the basic data needs noted above to develop site-specific stream restoration plans for ODEQ and other Oregon natural resource agencies to review.
Section 2.4.2.1,	The DEIS states that Jordan Cove will	FERC must correct the discrepancy concerning the

Citation	Issue Identification	Recommended Resolution
Cleanup and Permanent Erosion Control, P. 2-57 and Table 2.4.2.1-1	install permanent erosion control devices consistent with the requirements of Section V.B of FERC's "Plan" as described in Jordan Cove's Erosion Control and Revegetation Plan. Table 2.4.2.1-1 of the DEIS presents spacing requirements that conflict with Section V.B of the FERC's "Plan." In its ECRP, Jordan Cove identifies this "Plan" as FERC's 2013 Upland Erosion Control, Revegetation, and Maintenance Plan. On page 14 of Section V.B, FERC presents slope breaker spacing that conflicts with the spacing in Table 2.4.2.1-1. FERC's requirements specify a spacing of 100 feet on slopes greater than 30%. This spacing will create a larger drainage area for each slope breaker than presented in the DEIS. FERC's required spacing and its drainage area has implications for slope stability as noted in the comments above. FERC's requirements in its 2013 Upland Erosion Control, Revegetation, and Maintenance Plan are part of Jordan Cove's 401 water quality certification application to ODEQ. In Section 6.1.2.4 of the Evaluation and Findings Report for ODEQ's denial decision without prejudice (See Pages 36 and 37), ODEQ evaluated Jordan Cove's slope breakers using FERC's spacing requirements in landslide susceptibility zones. ODEQ's evaluation raised concerns regarding these slope breakers and their potential to initiate landslides in these zones.	permanent slope breaker spacing in the DEIS Table 2.4.2.1-1 and FERC's spacing requirements in Section V.B of the 2013 Upland Erosion Control, revegetation, and Maintenance Plan. FERC must request Jordan Cove propose alternatives to slope breakers for managing stormwater in the construction and operational right-of-way in landslide susceptibility zones given the literature recommending that land managers avoid the discharge of additional water to unstable slopes.
Section 2.1.1.5, Other Terminal Support Systems, Page 2-8 Section 4.3.2.1, Jordan Cove	The DEIS states that Jordan Cove will manage runoff from impervious surfaces within the Terminal and this runoff will be directed to designated areas for disposal. The collection systems for rain in the Terminal are the storm water system and the oily waste system. In its 9/25/18 information	FERC must ensure the design of Jordan Cove's stormwater controls for the Terminal's Construction Facility Areas and the spill containment areas is complete and available for ODEQ's 401 Water Quality Certification Program to review and evaluate if these proposed controls will comply with Oregon's water quality standards.

Citation	Issue Identification	Recommended Resolution
LNG Project, Page 4-83 Section 4.3.2.1, Spills or Leaks of Hazardous Materials, Page 4-87 and 4-88	request in the Evaluation and Findings Report, ODEQ requested changes to and information on the Storm Water Management Plan provided in the Jordan Cove's 401 water quality certification application. Jordan Cove addressed some of ODEQ's concerns. However, ODEQ still has concerns with this plan and detailed information is still lacking, for example, on managing the discharge from Construction Facilities Areas and managing spills from discharging to the oily waste system. These deficiencies were evaluated in Section 6.1.2.5 of the Evaluation and Findings Report for ODEQ's denial without prejudice decision for Jordan Cove's 401 water quality certification application.	
Section 4.3.2.1, Jordan Cove LNG Project, Page 4-83 and 4-84	The DEIS states that dredging activity associated with the Marine Slip, Access Channel, temporary material barge berth, Material Offloading Facility, and marine waterway modifications will create turbidity and sedimentation. In its September 7, 2018 Additional Information Request and December 20, 2018 Supplemental Request in the Evaluation and Findings Report, ODEQ requested a detailed pollution control plan for its dredging activities. As noted in Section 6.1.2.6 of the Evaluation and Findings Reports for ODEQ's denial without prejudice decision, ODEQ did not receive this information prior to the development of the denial decision.	FERC must require Jordan Cove to submit to ODEQ;s 401 Water Quality Certification Program a dredging pollution control plan to determine if these proposed controls will comply with Oregon's water quality standards.
Section 4.2.1.2 Project Specific Soil Limitations P 4-47	The DEIS indicates ODEQ "recommended" a No Further Action determination in 1996 for the Ingram Yard (Terminal Site) and the former Weyerhaeuser Containerboard Mill. ODEQ issued a No Further Action determination in 2006 for both of these cleanup sites.	Change the text to state, that based on the findings of previous environmental investigations, the ODEQ <u>issued</u> a "No Further Action" determination for the former Weyerhaeuser mill site and the LNG terminal site (aka Ingram Yard site).

Table 4.2.1.2-1	Metals natural background concentrations for the Cascade Range Physiographic Province appear to have been incorrectly listed in the table. The cleanup sites that are the focus of this section and table are located in the Coast Range province, and the Coast Range background concentrations should be used.	Revise the table using Coast Range background metals concentrations from ODEQ's Development of Background Metals Concentrations in Soil technical report dated March 2013.
Section 4.2.1.2 Project Specific Soil Limitations Potentially Contaminated Soils and Groundwater 2018 Data Gap Investigation P 4-48	Jordan Cove conducted a Data Gap Investigation on the Containerboard Mill Site in 2018. The DEIS indicates residual contamination remains at levels above ODEQ risk based concentrations (RBCs). However, in ODEQ's review of the Data Gap Investigation, it was pointed out that much of the contamination is deep and not accessible to occupational workers. Only deep excavation work could expose workers to these residual levels of contamination. ODEQ's No Further Action remains in place for this site with the understanding that future deep excavation activities would require extra care to protect workers.	Change the text to state that ODEQ approved the Data Gap Investigation in its letter dated February 12, 2019. If deep excavation work (deeper than 10 feet) is planned, a health and safety plan should be prepared to limit worker exposures and ensure workers are aware of the presence or possible presence of contamination, and steps to take if contamination is encountered.
Section 4.2.2.3 Soil Limitations Jordan Cove Meter Station (MP 0.0) P 4-65	The DEIS references ODEQ No Further Action letter (1996, footnote 62) when describing how clean backfill should be used when filling excavations on this site. The No Further Action letter for the two North Spit sites generally describes how contaminated media should be handled (in accordance with ODEQ rules). The letter does not describe what kind of fill should be used.	The EIS should remove references to ODEQ's Cleanup Program advising or requiring the use of clean backfill when excavations are completed on the site.
Table 1.5.1-1, P. 1-23	The DEIS states that a Title V Acid Rain Permit will be issued.	An Acid Rain Permit is not required for Jordan Cove LNG and will not be issued by ODEQ.
Section 1.5.2.4	The DEIS says that Jordan Cove will be part of the acid rain program.	The Jordan Cove's LNG facility is not subject to ODEQ's acid rain program.

P. 1-31		
Section 4.12.1.1 P. 4-657	The DEIS lists the emissions from the emission units that were in the permit application. The emission units listed includes five combustion turbines, a thermal oxidizer, a boiler, two flares, seven engines, two storage tanks, and fugitive emissions. These emission units could change.	If any of the emission units or number of emission units change, ODEQ' Air Quality Program would need to be notified to update Jordan Cove's application.
Section 4.12.1.1 P. 4-658	Second to last paragraph. The Pacific Connector Pipeline Project, Klamath Compressor Station will not be subject to Prevention of Significant Deterioration (PSD) requirements contained in OAR 340-224-0070.	Correct error. The Pacific Connector Pipeline Project, Klamath Compressor Station will be subject Type B State NSR. [OAR 340-224-0010(2)(d)(B)]
Section 4.12.1.2 P. 4-667	First paragraph. The compressor station location.	Clarify by stating, The compressor station is to be located in an unclassified area, approximately 14 miles to the southeast of the southeast corner of the non-attainment area.
2.1.1.5 Water Systems 4.3.1.1 Groundwater	The Coos Bay-North Bend Water Board (CBNBWB) has 18 groundwater wells located within the Oregon Dunes National Recreation Area (ODNRA) to the north of the LNG terminal. There is a possibility that the water withdrawn from these wells for this project could dry up wetlands or lower water levels in nearby wetlands shallow dunal lakes. The bulk of the water use if related to building the project in the Jordan Cove area.	Correct Reference: Sand Dune Aquifer Groundwater Availability Study. Referenced in Livesay, D., 2006, Jordan Cove Energy Project, Groundwater Review, Groundwater Solutions, Inc., Portland, attached as Appendix E.2 to Resource Report 2 filed with Jordan Cove's May 2013 application to the FERC.
4.1.3.3 Rock sources and disposal sites	Note that "clean fill" as defined in ORS 340-093-030 may be disposed in upland areas without ODEQ approval. However wood waste is putrescible and must be disposed of in a manner consistent with ODEQ solid waste rules	Dispose of all wastes within ODEQ Solid Waste Rules.
4.2.1.2 Potentially Contaminated	"Soils and/or sediments containing residual contamination must be managed and/or disposed in	Any other contaminated soils encountered shall either remain in place under supervision of ODEQ's Cleanup Program or be properly disposed of in

Soils and Groundwater	accordance with ODEQ rules. Per guidance from the ODEQ, Jordan Cove would provide prior notice to the ODEQ when grading or ground disturbance activities are planned to occur on the LNG terminal site."	accordance with ODEQ's solid waste rules. Note – this applies to both the pipeline and the LNG sites.
4.2.1.2 Potentially Contaminated Soils and Groundwater	Similar to the above comment, in the same section of the document. Any wastewater treatment sludges that require removal for structural reasons must be managed in accordance with ODEQ's Solid Waste Rules.	Any wastewater treatment sludges that are removed from the Ingram Yard Site must be properly disposed of in accordance with ODEQ's Solid Waste Rules.
4.2.1.2 Potentially Contaminated Soils and Groundwater	This section discusses removal of boiler ash from the Ingram Yard area.	Per solid waste rules, ODEQ expects industrial derived boiler ash material to be disposed of in a properly designed landfill. Either in a cell of the current permitted landfill on site or an appropriately permitted off-site landfill.
Section 2.4.1.2, p. 2-46 And Section 4.10.1.1, p. 4-622	Operation of the temporary barge berth and storage materials area may require 1200-Z NPDES industrial stormwater general permit coverage, with a Primary Standard Industry Classification (SIC) Code of 44 – Water transportation marine cargo handling.	The EIS should reference the requirement for applicant to apply for and obtain 1200-Z NPDES industrial stormwater general permit coverage with ODEQ.
Section 2.1.1.5, pp. 2-7,8 And Section 4.10.1.1, p. 4-622	The LNG Terminal operation is subject to 1200-Z NPDES industrial stormwater general permit coverage. At a minimum, stormwater exposed to the steam electric power generation activities (Sector O) will require 1200-Z permit coverage. In addition, the primary standard industry classification (SIC) code for the LNG terminal appears to be 44 – water transportation, which also requires 1200-Z permit coverage, as well as any co-located industrial activities at the LNG Terminal site.	The EIS should reference the requirement for applicant to apply for and obtain 1200-Z NPDES industrial stormwater general permit coverage with ODEQ.
Section 2.4.1.1, p. 2-46	A concrete batch plant in a location with the ability to discharge stormwater to surface waters will require 1200-A NPDES stormwater	The EIS should reference the requirement for the concrete batch plant to operate under an ODEQ 1200-A NPDES mining stormwater general permit.

	mining general permit coverage.	
Section 2.1.1.5, p. 2-8 And Section 2.4.1.8, p. 2-51 And Section 2.4.2.1, p. 2-56-57 And Section 4.3.4.2, p. 4-138 Section 4.5.2.2, p. 4-255	Wastewater generated from hydrostatic testing is not an authorized non-stormwater discharge under a 1200-series stormwater permit. The inclusion of a plan to discharge this wastewater to surface waters within an internal management plan, such as the Hydrostatic Test Plan referenced on p. 4-138 is not authorization to discharge this wastewater by Oregon ODEQ.	Ensure all future 1200-series stormwater permit applications and associated stormwater plans clearly describe how this wastewater will be managed and disposed, which may not include discharging to surface waters under a 1200-series stormwater permit.
Section 2.4, p. 2-45	All activities conducted under an ODEQ 1200-series NPDES general stormwater permit must create and implement an acceptable stormwater plan. The 1200-C (construction) must implement an Erosion and Sediment Control Plan (ESCP), and the 1200-Z (industrial) must implement a Stormwater Pollution Control Plan (SWPCP). The DEIS does not reference the requirements of either of these plans, and only references the requirement of a 1200-C permit on p. 4-87 for the construction of the LNG Terminal facility. The existence of other permits or stormwater management plans will not exempt projects from ODEQ's 1200-series NPDES general stormwater permitting requirements.	Apply for and obtain all required 1200-series NPDES general stormwater permits with ODEQ. Complete applications must include complete Erosion and Sediment Control Plans (ESCPs for 1200-C permits) or Stormwater Pollution Control Plans (SWPCPs for 1200-Z permits) that will be reviewed by ODEQ prior to permit assignment.
Section 4.2.2.3, Table 4.2.2.3-2, p. 4-66 And Section	The DEIS only mentions the need for an ODEQ 1200-C NPDES construction stormwater permit for the construction of the LNG Terminal facility on p. 4-87. However, all construction related land	Apply for and obtain all required 1200-C NPDES construction stormwater permit coverage with ODEQ. Complete applications must include complete Erosion and Sediment Control Plans (ESCPs) that will be reviewed by ODEQ prior to permit assignment.

4.3.2.2, p. 4-103, 4-107 And Section 2.4.2.2, p. 2-60 And 2.6.1, p. 2-66 And Section 4.2.2.3, Table 4.2.2.3-2, p. 4-68 And Section 4.5.2.2, p. 4-254 And Table 4.5.1.1-2, p. 4-185 And Section 4.10.2.1, p. 4-627	disturbance, including materials or equipment staging and stockpiling areas that exceeds one acre with the potential for stormwater runoff to enter waters of the state, or that is less than one acre but part of a common plan of development that will exceed one acre (such as the new and expanded access roads), must be conducted under 1200-C permit coverage. The following projects will likely need to be covered by the 1200-C permit: • The 36 potential temporary storage yards (p. 4-66). It is not clear if the staging and spoils storage areas referenced on page 4-107 are considered TEWAs or temporary storage yards, but are also subject to 1200-C coverage. • Access Roads - for all new roads, expansion of roads, anything beyond maintenance of existing road footprint. • The pipeline project. • The LNG Terminal facility. All other project areas identified in Figure 2.1-1 as needed, such as the Park & Ride and housing facility.	
Section 2.6.1, p. 2-66	The 1200-C permit specifies the specific monitoring and inspection frequency of erosion and sediment controls and written documentation requirements. The DEIS indicates monitoring will be at the discretion of contracted environmental inspectors and internal management plans, but does not specify the monitoring requirements of the 1200-C construction stormwater permit or the required erosion control certifications required of inspectors for sites greater than 5 acres.	Apply for and obtain 1200-C permit coverage for all projects as discussed in the above comment.

P. 4-298 - 4-300	Total water used for hydrostatic testing would be about 39 million gallons. Pacific Connector would obtain its hydrostatic test water from commercial or municipal sources or surface water rights owners to lakes, impoundments, and streams from possibly 12 different locations. About half of the water would be from impoundments or lakes, and the rest may come from up to nine streams, including Coos River, East and Middle Fork Coquille Rivers, Olalla Creek, South Umpqua River, Rogue River, Lost River, and Klamath River. Table 4.5.2.3-6 Shows a 35% Flow reduction for the Middle Fork Coquille River during October at the start of coho salmon migration and spawning. ODEQ has concerns that such flow reduction will have impacts to ESA listed salmonid beneficial uses and further limit dissolved oxygen levels in a 303(d) listed MF Coquille River.	Correct deficiency: If dewatering is likely to or is resulting in adverse impacts to waters of the state, the EIS should identify and calculate flow reduction impacts and clearly discuss mitigation efforts to prevent a water quality violation as per the numeric dissolved oxygen standard (OAR 340-041-0016). The dewatering process should be re-evaluated prior to commencement. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
	ODEQ has concerns about the temperature impacts that may occur due to water withdrawals during low flow periods. ODEQ does not know enough about where these withdrawals will occur to evaluate these potential impacts. Three Oregon Administrative Rules state that no single activity is allowed to increase water temperature by more than 0.3 degrees Celsius (0.5 degree Fahrenheit) above the applicable criteria prior to the development of a Total Maximum Daily Load (TMDL). The Oregon Administrative Rules which place this limit on allowable stream warming are: Anti-degradation rules and policy, 340-041-0004(3)(c),	Correct deficiency: the Appendix M: Hydrostatic Test Plan does not provide enough detail to safeguard that the cumulative impacts of surface withdrawals will not increase water temperature by more than 0.3 degrees Celsius (or lesser amount specified in any applicable TMDL load allocation) above the applicable criteria prior to the development of a Total Maximum Daily Load (TMDL) for the South Coast Basin. Potential temperature impacts must be represented as changes in percent effective shade or actual thermal loads in Kcals/day. Near and long-term impacts must be quantified as requested in ODEQ's September 2011 and September 7, 2018 Additional Information Request which identified deficiencies in the scope of Project activities that could impact effective shade and associated thermal load on streams. ODEQ Recommendation: FERC **not** issue license to

	Protecting Cold Water OAR340-41-0028 (11)(a), Implementation of the Temperature Criteria OAR340-41-0028 (12)(e). Following adoption of a TMDL, particularly temperature TMDLs, the amount of allowable impact may be lower (0.04 degrees Celsius in the Rogue basin, for instance). The DEIS indicates thermal impacts of riparian clearing that are likely to exceed this level in several locations.	Pacific Connector until this deficiency is corrected
P. 4-119, 4-425	"Pacific Connector would prepare and submit to the ODF State Forester for approval a written plan describing how the pipeline would be in compliance with the Forest Practices Act (FPA) (OAR 629-605-0170), prior to harvesting activities."	Correct error: The EIS should identify the specific Oregon FPA stream protection requirements that Pacific Connector must comply with, as these laws implement federal Clean Water Act requirements on non-federal forest lands. Any plans that waive Oregon FPA water quality protections require ODEQ approval.
P. 4-246,	The statement about "typical" Total Suspended Solids (TSS) is unsupported. TSS was calculated based upon a formula derived from a turbidity TSS statistical regression equation based on data from Washington State. ODEQ's has TSS measurements which do not support this statement.	Correct error: TSS modeling was not calibrated upon TSS data. The model calibration might be tested using TSS data. In addition, the TSS turbidity relationship should be derived from paired TSS turbidity data from Coos Bay. The TSS modeling is not applicable as presented in the DEIS. "Background" TSS and turbidities vary based upon precipitation whereas "elevated" TSS and turbidity are "typically" related to rainfall and runoff events or disturbance of bed or banks. ODEQ will base compliance determinations on direct measurements of turbidity rather than through surrogate measures such as TSS. If the applicant resubmits its request for 401 certification, ODEQ will develop conditions to ensure that temporary increases in turbidity do not impair beneficial uses and the EIS should reflect that requirement. If the Commission authorizes the Project, ODEQ is recommending that the following measure be included as specific condition in the Commission's Order. Jordan Cove shall not begin construction until the TSS

		- turbidity statistical relationship is derived from paired TSS turbidity data from Coos Bay. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
P. 2-58, P. 4-117 P. 4-117	"Pacific Connector would use a standard fertilization rate of 200 pounds per acre bulk triple-16 fertilizer on disturbed areas to be seeded." "Fertilizer would not be used in wetlands unless required by the land-managing agencies and would not be applied within at least 100 feet of flowing streams that have domestic use or support fisheries and would not be applied during heavy rains or high wind conditions." "No application would occur within 100 feet of flowing water and would be avoided during heavy rain and windy conditions. Aerial broadcast spreaders would only occur with federal land-managing agency approval. Fertilizer would be added directly to hydroseeding slurry." Fertilizer should be applied at agronomic rates according to environmental conditions. The reference to refraining from application during heavy rains (0.3"/hour or greater) does not account for accumulative rainfall, saturation of soils, and the potential for runoff.	Correct deficiency: A rainfall index accounting for previous and predicted rainfall should be developed to guide the application of fertilizer and identified in the DEIS. The EIS should require that fertilizing near intermittent stream channel should be prohibited and identify specific setbacks. Identify conditions that will trigger the evaluation of a site specific buffers to protect water quality (e.g. steep slopes, etc) when applying fertilizers. ODEQ Recommendation: if FERC issues license to Pacific Connector include conditions responding to this issue.
P. 2-71, 4-170, 4-211, 4-303	"Vegetation at aboveground facilities would be periodically maintained using mowing, cutting, trimming and the selective use of herbicides." Pesticide applicators must be in compliance with Oregon Department of Agriculture licensing requirements and	The EIS should identify, discuss and require that Jordan Cove and Pacific Connector secure required licensing and permits for these actions. ODEQ Recommendation: if FERC issues license to Pacific Connector include conditions responding to this issue.

	ODEQ's Pesticide General Permit 2300A (http://www.deq.state.or.us/wq/wqpermit/genpermits.htm) should be secured if permit eligible activities are proposed.	
P. 4-114 P. 4-115	The DEIS does not address the cumulative thermal impacts resulting from shade loss at all stream crossings, adjacent work areas, and temporary and permanent ROW maintenance within each watershed. The DEIS does not disclose and analyze the Project's cumulative thermal load analysis. The DEIS only reports results of temperature modeling using SSTEMP at a subset of stream crossings. The applicant performed a shade assessment and associated cumulative thermal impacts analysis by basin. The results are documented in the Thermal Impacts Assessment Resource Report Appendix Q.2 (August 31, 2017). In ODEQ's September 7, 2018 Additional Information Request, ODEQ identified deficiencies in the scope of Project activities that could impact effective shade and associated thermal load on streams. Table 4.3.2.2-9 while informative for predicted modeled temperatures, does not align with Oregon's water quality standards and TMDLs implementing those standards in areas that are not in attainment. DEQ has adopted TMDLs in the basins impacted by the project that include effective shade as a surrogate measure as provided under EPA regulations (40 CFR 130.2(i)) to address heat loading. Pacific Connector must demonstrate compliance with these measures.	Correct error: The Project's thermal impacts must be represented as changes in percent effective shade or actual thermal loads in Kcals/day. Construction and operational (near and long-term) impacts must be quantified as requested in ODEQ's September 2011 letter. If the Commission authorizes the Project, ODEQ is recommending that the following measure be included as specific condition in the Commission's Order. Jordan Cove and Pacific Connector shall not begin riparian vegetation removal, construction of facilities and/or any staging, storage, or temporary work areas and new or to-be-improved access roads until site-specific riparian management area prescriptions are developed for all Project activities that comply with applicable local, state or federal regulations and are consistent with established natural resource management plans. Those site specific plans will include assessment of effective shade reduction due to short-term and long-term reductions in effective shade at the stream surface. Those estimates will be used in developing riparian shade mitigation plans. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until addressing thermal impacts from shade loss is corrected.

	Potential temperature impacts must be represented as changes in percent effective shade or actual thermal loads in Kcals/day. Near and long-term impacts must be quantified as requested in ODEQ's September 2011 letter and consistent with the information requests in the WQ 401 certification review and evaluation documentation.	
P. 4-21 - 4-22	The DEIS does not clearly identify the mechanism or methods to be used for determining whether a slope failure in proximity to a pipeline construction area is related to the pipeline. The DEIS does not clearly identify how slope failures and/or mass wasting events triggered by pipeline construction will be assessed and mitigated.	Correct deficiency: EIS needs to identify the mechanism and methods for the determination of pipeline related slope failures. Explain how slope failures and/or mass wasting events triggered by pipeline construction will be assessed, avoided, minimized and mitigated to prevent water quality impacts. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
P. 4-245	"Disturbance to 17 acres of other estuarine habitats (non-eelgrass) would be mitigated with reestablishment of estuarine habitat on about 91 acres of unvegetated mudflats at the Kentuck project site. This mitigation site would re-establish 67 acres of tideland habitat and additional wetland acreage." Both Isthmus and Kentuck Sloughs are water quality limited for dissolved oxygen. Disturbance and Mitigation activities in these areas that have the potential to increase total organic carbon (TOC) or biochemical oxygen demand (BOD) will need to determine the effects of this increased load on water column dissolved oxygen conditions. Dike breeching that allows marine waters to come in contact with high organic matter environment (pasture land) can result in increased loads of oxygen demanding substances.	Correct deficiency: The DEIS indicates that applicant will be opening up an area that was previously diked. The EIS should evaluate and disclose the potential impacts to the environment that would likely result from such an action and recommend appropriate mitigation measures that are enforceable and sufficiently detailed. For example, the paper Biogeochemical Effects of Seawater Restoration to Dike Salt Marshes (1997) indicates that tidal restoration should be conducted gradually and be carefully monitored to prevent large releases of nutrients. FERC should disclose and evaluate whether the proposed mitigation actions in these sloughs will result in negative impacts to water column dissolved oxygen levels, and if so, FERC should recommend controls that will reduce such impacts. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected

P. 4-73, Table 4.2.3.2-1 and P. 4-74	Identifies areas with erodible soils and steep slopes	Correct Deficiency: These areas represent high risk areas for soil erosion and as such will require frequent monitoring of erosion controls. The EIS should identify and discuss a separate monitoring plan specifically for these erosion high risk areas. Erosion controls are expected to need more inspection and maintenance in these areas than controls in other areas. If the Commission authorizes the Project, ODEQ is recommending that the following measure be included as specific condition in the Commission's Order. Jordan Cove and Pacific Connector shall not begin riparian vegetation removal, construction of facilities and/or any staging, storage, or temporary work areas and new or to-be-improved access roads until a statistically valid monitoring plan is developed for a representative range of locations , including ongoing assessment of water quality impacts to ensure project impacts are identified and understood at multiple scales (site and cumulative). The monitoring plan should (a) establish baseline (pre-project) conditions and (b) monitor and report construction and post-project conditions and indicators. ODEQ Recommendation: if FERC issues license to Pacific Connector include response to this issue.
P. 4-246 – 4-247	"Model results for the access channel and slip construction indicate that elevated TSS above background would extend about 0.2 to 0.3 mile beyond the dredge sites during a full tidal cycle with any method considered and would exceed about 500 mg/l for about 0.1 mile. Maximum concentrations outside of the specific dredge location would only occur for about 2 hours or less over the tidal cycle with the plume moving upstream or downstream of the dredge site on flood or ebb tide, respectively." Fecal indicator bacteria can adhere to suspended particles in water which	Correct Deficiency: The potential to increase water column bacteria concentrations in Coos Bay should be evaluated. Shellfish harvesting is especially sensitive to increases in bacteria and potential pathogens. Impacts to commercial, recreational and subsistence shellfish harvesting should be identified along with closure plans if monitoring indicates that elevated bacteria levels are present in the bay during construction activities. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected

	then settle causing an accumulation of bacteria in the bottom sediment (Davies et al., 1995). Numerous studies have found fecal indicator bacteria at greater concentrations in the sediment than in the overlying water in rivers, estuaries and beaches (Stephenson and Rychert, 1982, Struck 1988, Obiri-Danso and Jones, 1999, Byappanahalli, et al. 2003, Whitman and Nevers, 2003). Concentrations in the sediment can range from 10 to 100 times greater than in the overlying water. Resuspension of bottom sediment has been shown to increase in fecal indicator bacteria concentrations in the water column. (Sherer et. al., 1988 and Le Fever and Lewis, 2003).	
P. 2-59 4-114, 4-138, 4-115-116 4-291	In riparian areas, shrubs and trees would be replanted across the right-of-way for a width of 25 feet from the waterbody bank. Within Riparian Reserves, Pacific Connector would replant shrubs and trees to within 100 feet of the ordinary high-water mark (OHWM). A riparian strip at least 25 feet wide on private lands, including widths ranging from 50 to 100 feet on fish-bearing streams as designated for Oregon State Riparian Management Areas, and 100 feet wide on federally managed lands, as measured from the edge of the waterbody, would be permanently revegetated. For private lands, vegetative buffers should be restored to widths equal to or above pre disturbance conditions at each site. Re-vegetation scenarios should be compliant with applicable regulatory mechanisms including the Oregon Forest Practices Act, Oregon Department of Agriculture rules	Correct Deficiency: The EIS should identify and recommend that Pacific Connector comply with current regulatory mechanisms for all Project activities (work areas and rights of way), not just stream crossings, consistent with applicable land use and Designative Management Agency requirements (where TMDLs are issued) unless variance, waiver, or exemption has been granted to appropriately mitigate environmental impacts to an alternate level. In areas with temperature TMDLs, this will normally require replacement of equivalent effective shade losses via replanting. That mitigation needs to occur in physical proximity to the location of impacts. Site-specific riparian management area prescriptions must be developed for all Project activities, not just stream crossings that comply with applicable local, state or federal regulations and are consistent with established natural resource management plans. Those site specific plans must include assessment of effective shade reduction due to short-term and long-term reductions in effective shade at the stream surface. Those estimates must then be used in developing riparian shade mitigation plans. ODEQ Recommendation: FERC **not** issue license to

	relating to agricultural lands, as well as those ordinances implemented by local jurisdictions. For federal lands, The NWFP identifies the riparian management areas as two mature tree heights. The USFS document, Northwest Forest Plan Temperature TMDL Implementation Strategies, 2004, determined that harvest in the secondary tree zone (the second tree height) could result in increases in stream temperatures primarily from the loss of angular canopy density. Impacts to riparian vegetation on federal and non-federal lands should include an assessment of the impacts of riparian removal to a distance of two tree heights.	Pacific Connector until these deficiency are corrected.
General Comment	As per the State's Anti-degradation Rule (Oregon Administrative Rule (OAR) 340-041-0004(7): "Water quality limited waters may not be further degraded except in accordance with section (9)(a)(B), (C) and (D) of this rule." In allowing new or increased discharged loads, the Commission or Department must make the following findings as per rule: (A) The new or increased discharged load will not cause water quality standards to be violated; (B) The action is necessary and benefits of the lowered water quality outweigh the environmental costs of the reduced water quality. (C) The new or increased discharged load will not unacceptably threaten or impair any recognized beneficial uses or adversely affect threatened or endangered species. (D) The new or increased discharged	Correct deficiency: The EIS should fully analyze whether the project can comply with applicable Clean Water Act Antidegradation requirements as set out in 40 CFR 122.4(i), 40 CFR 131.12, OAR 340-041-0004, ODEQ's Antidegradation Policy, Implementation Internal Management Directive for NPDES Permits and Section 401 Water Quality Certifications (March 2001), and EPA's August 8, 2013, Review of Oregon's Antidegradation Internal Management Directive. These antidegradation regulations, rules, and policies require, *inter alia,* maintaining and protecting existing instream uses, protecting and maintaining existing high quality waters unless certain state findings are made, and prohibitions on certain new point source discharges to water quality limited water bodies. The only reference to anti-degradation is provided on page 4-94 in the DEIS and lacks substance or evaluation using the above rules and other guidelines. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.

	load may not be granted if the receiving stream is classified as being water quality limited under sub-section (a) of the definition of "Water Quality Limited" in OAR 340-041-0002. The applicant must demonstrate that these findings are supported in the DEIS.	
General – Table 1.5.1-1 and TABLE 4.4.2-1	The DEIS does not adequately describe the role of Oregon Dept of Agriculture (ODA) and its authority under Oregon Revised Statute 568: Water Quality Management or Agricultural Water Quality Management Area Rules and Plans; see OAR 603 Division 90 & Division 95 pertaining to the regulatory role of the Oregon Dept of Agriculture and implementing OARs to areas affected by the pipeline. ORS 568.900 to 568.933 authorizes the Oregon Department of Agriculture to develop and carry out an agricultural water quality management area plan for agricultural and rural lands where a water quality management plan is required by state or federal law. Under this program, ODA has responsibility for protection of impacts to water quality from for "Agricultural activities" but does not regulate WQ impacts for other activities (commercial ventures, forestry, rural residential, etc.) even if occurring on land zoned for agriculture. These Agricultural Area Rules and Plans have been developed under OAR 603 Divisions 90 & 95 for all of the counties in the pipeline path, including those without TMDLs in place. Therefore, it is important that pipeline construction and operation not negatively impact	The EIS should clearly identify the authority and role of Oregon Department of Agriculture's (ODA) Agricultural Water Quality Management Area Rules and Plans. These Area rules and plans provide the framework for how lands and activities under the jurisdiction of ODA will meet the total maximum daily load (TMDL) requirements. There is brief reference to ODA's regulatory authority in Table 1.5.1-1; however there is no mention of evaluating or managing impacts to water quality associated with agricultural lands. ODEQ Recommendation: if FERC issues license to Pacific Connector include response to this issue.

	implementation of the Area Rules and Plans. The proposed pipeline waterbody crossings and riparian activities would reduce stream-side shade thereby negatively affecting the potential to reach TMDL identified shade targets on private lands supporting agricultural activities. See individual Agricultural Water Quality Management Area Rules and Plans for riparian management goals and requirements at the Oregon Department of Agriculture Water Quality Plans web page: https://www.oregon.gov/ODA/programs/NaturalResources/AgWQ/Pages/AgWQPlans.aspx	
Page 4-114 Table 4.3.2.2-9	The DEIS does not explicitly consider the cumulative thermal impact resulting from shade loss at all stream crossings, adjacent work areas, and permanent ROW maintenance within each watershed. The DEIS does not disclose and analyze the Project's cumulative thermal load analysis. The DEIS only reports results of temperature modeling using SSTEMP at a subset of stream crossings. The applicant performed a shade assessment and associated cumulative thermal impacts analysis by Basin. The results are documented in the Resource report Appendix Q.2 In 9/7/18 Information Request, ODEQ identified deficiencies in the scope of Project activities that could impact effective shade and associated thermal load on streams. Associated with these disturbances to the streams and wetlands themselves, are significant impacts to riparian and	Correct deficiency. The DEIS isolates impacts from the pipeline alone to draw the conclusion that there will be minimal impacts to water quality benefits of shading, etc. The EIS must address the cumulative thermal effects occurring in the areas that will be impacted by pipeline construction and long-term operation. Site-specific riparian management area prescriptions must be developed for all Project activities that comply with applicable local, state or federal regulations and are consistent with established natural resource management plans. Those site specific plans must include assessment of effective shade reduction due to short-term and long-term reductions in effective shade at the stream surface. Those estimates must then be used in developing riparian shade mitigation plans. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.

	wetland vegetation. For instance, most existing riparian trees along the pipeline route will be removed. The DEIS states: "9 linear stream miles of streambank could be affected along the whole Project route (GeoEngineers 2017)." These activities will result in a significant removal of riparian shade. Completed TMDLs identify riparian shade surrogates to meet the thermal load allocations required in the TMDL. Selective replanting is proposed except for areas within 15 feet over the center of the pipeline. Even so, temporal losses of wetland and water quality function will be experienced for 1-3 years for wetland shrubs and up to several decades for trees in forested wetland areas and riparian areas. This riparian vegetation, and in particular trees, is essential to providing water quality and habitat functions. Riparian ecological services - shade to reduce stream temperature, nutrient and pollutant uptake, stormwater treatment and infiltration, and bank stabilization through root structure - will be lost in the impacted areas for years to decades. Although mitigation through replanting lengths are proposed for Riparian Reserve areas, the sensitivity of all riparian areas is not accurately described in the DEIS.	
Page 4-96 Mercury in eroded soils. Page 4-289	The Rogue River has been identified as impaired for mercury based on fish tissue analysis (2012 303(d) list: Category 5 – water quality limited). A TMDL for mercury in the Rogue River will be developed in the future. The Willamette basin TMDLs provided estimates that up to 47% of the mercury entering the Willamette River mainstem is coming from the erosion of	Correct error: Mercury impairments in the Rogue River (River Mile 0-216.8) must be acknowledged in the EIS. FERC should require that all necessary steps be taken to prevent erosion during and after construction are implemented including soils testing and implementing the measures outlined in the Contaminated Substances Discovery Plan where warranted.

	native soils. Willamette Basin Mercury TMDL, 2006 https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLs-Willamette-Basin.aspx The DEIS addresses mercury in isolated areas of East Fork of Cow Creek and in the vicinity of legacy mercury mines only (Page 4-96). Given the high potential for mercury in soils within the Rogue Basin, mercury should be addressed across the proposed pipeline route in the context of erosion prevention/sediment control in the ECRP. The DEIS (page 4-289) states, "With adjacent upland disturbance following the standard ECRP and supplemental erosion control actions, additional site-specific ground cover actions would be taken at this crossing, and upslope potential sediment entry into the stream would be controlled and minimized. Overall, adverse effects on fish from mercury would not occur from Pacific Connector Pipeline" Project actions and construction sites must be stabilized following construction to ensure no erosion occurs with wet weather as per the ECRP. If soils containing high levels of mercury are encountered in the Rogue Basin or other mercury containing areas including the East Fork Cow Creek drainage during Project construction, Pacific Connector must implement the measures outlined in its *Contaminated Substances Discovery Plan*.	ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected
4-27, 4-31-32, 4-297, Table 4.1.2.6-1	As per the DEIS the blasting potential was classified as high for about 100 miles of the proposed pipeline route (4-27). All blasting would be done by	Correct deficiency: The EIS should identify the water quality impacts caused by blasting. The EIS should also disclose that permits from Oregon Department of Fish and Wildlife and coordination

Blasting	licensed contractors under the terms of applicable regulatory requirements. Although there is a discussion of minimizing impacts to wetlands and water wells and springs in the text (pages 4-31-32), there is no discussion of minimizing the impacts to streambeds and stream water quality as a result of blasting. Blasting should be a last resort option which must be thoroughly analyzed regarding potential impacts and damage minimization options. Permits from ODFW and coordination with ODEQ are required for blasting in waters of the state.	with ODEQ are required for blasting in waters of the state. The EIS should discuss measures that will be applied to minimize and mitigate adverse impacts when blasting is determined to be the only option. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
Section 4.1.2.6. Page 4-32. Impacts to private and public water wells.	The DEIS states "Pacific Connector would request authorization from landowners to test and document the baseline condition, yield, and water quality of any private wells located within 200 feet of the pipeline construction right-of-way. This testing would occur before the pipeline construction starts in the nearby area, and the testing results would be shared with the property owner, if requested. Similar information would be gathered for any public water wells located within 400 feet of the pipeline construction right-of-way. Based on testing results, if it is determined after construction that there has been an impact on groundwater supply (either yield or quality), Pacific Connector would work with the landowner to ensure a temporary supply of water, and, if determined necessary by the landowner, Pacific Connector would provide a permanent water supply." ODEQ recommends that if surface and/or groundwater connectivity extends beyond 400 feet or 2-yr time of travel, whichever is larger, that these	Correct deficiency: ODEQ recommends that if source water impacts have the potential to extend beyond the distances specified in the DEIS that these private and public wells are monitored as well. ODEQ Recommendation: if FERC issues license to Pacific Connector include response to this issue.

	private and public wells are also monitored for impacts.	
P. 4-795 and Table 4.14-2 Cumulative Effects: Water Resources.	P. 4-795 states, "However, based on available information (see table 4.14.-2) and the temporary and localized impacts of the Project on surface waters as described in the preceding environmental analyses, Pacific Connector's use of HDDs to cross major waterbodies, and its implementation of erosion and sediment control measures as well as other impact minimization measures, we conclude that these impacts and the potential impacts of the other projects would result in a cumulative impact; but, this impact would not be significant."	Correct omission: Erosion and sedimentation potential and the associated impacts associated with specific activities are examined on a site-by-site basis, and the EIS must include such an analysis. Oregon's numeric turbidity standard OAR 340-041-0036 and Statewide Narrative Criteria OAR 340-041-0007(11) (see also Prohibited activities in ORS 468B.025(1)(a)) are not to be exceeded at any project site along the pipeline route. No individual actions can exceed water quality standards for sediment or turbidity except where authorized by permit. https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1458 https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=68690 ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
P. 2-42, 2-60 Temporary Extra Work Areas	Page 2-42 of the DEIS states that Pacific Connector has identified approximately 920 acres of TEWAs that would be disturbed during construction of the pipeline. All of these areas are considered temporary disturbance and would be restored upon completion of construction. All TEWAs that were forested prior to construction would be replanted with trees. Page 2-60 of the DEIS states that "TEWAs would be located more than 50 feet away from the edge of waterbodies where possible, and Pacific Connector has identified locations where site-specific conditions or other constraints prevent a 50-foot setback (see appendix E)."	Correct error: Eventual re-vegetation and restoration does not obviate the requirement to quantify the cumulative thermal impacts. Since TEWAs will result in the additional disturbance and overstory removal in riparian, the EIS should include an analysis of the thermal impacts of this activity, and quantify those impacts. Those impacts must avoided and minimized to the extent possible, and mitigated where they are unavoidable. Subsequent increases in solar radiation should be included in the solar loading assessment and include these thermal units in thermal mitigation calculations. TEWAs will result in the additional removal of riparian vegetation at pipeline waterbody crossings. FERC must include a requirement that TEWA thermal impacts be quantified and mitigated. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
P. 4-116	DEIS text on page 4-116 states "To	Correct error: Cumulative thermal impacts need to be

Thermal impact from riparian vegetation removal	minimize the potential effects of pipeline construction on stream temperatures by the removal of riparian vegetation, Pacific Connector has incorporated the following measures into its Project design: narrowing the construction right-of-way at waterbody crossings to 75 feet where feasible based on site-specific topographic conditions; locating TEWAs 50 feet back from waterbody crossings to minimize impacts on riparian vegetation, where feasible; replanting the streambanks after construction to stabilize banks and to re-establish a riparian strip across the right-of-way for a minimum width of 25 feet back from the streambanks; and replanting riparian areas equal to 1:1 ratio to temporary riparian shading vegetation losses and 2:1 ratio for permanent riparian losses from the 30-foot operational easement clearing. Based on these measures and the studies summarized above, we conclude that the construction and operation of the pipeline would have no discernible effect on stream temperature."	assessed as changes in percent effective shade or thermal load. Mitigation will be based upon the increase in thermal units not discernable changes in stream temperature. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.
P. 4-114 & 4-115, Table 4.3.2.2-9 Temperature Impacts Nonpoint Source Load Allocations - Site Specific Effective	The DEIS does not consider the cumulative thermal impact resulting from shade loss at all stream crossings, adjacent work areas, and permanent ROW maintenance within each watershed. The DEIS does not disclose and analyze the Project's cumulative thermal load analysis. The applicant performed a shade assessment and associated cumulative thermal impacts analysis by basin. The results are documented in the Thermal	Correct error: Potential temperature impacts must be represented as calculated changes in percent effective shade or thermal loads in Kcals/day. near and long-term impacts must be quantified as requested in ODEQ's September 2011 letter. If the Commission authorizes the Project, ODEQ is recommending that the following measure be included as specific condition in the Commission's Order. Jordan Cove and Pacific Connector shall not begin riparian vegetation removal, construction of facilities

Shade	Impacts Assessment Resource Report Appendix Q.2 (August 31, 2017). ODEQ's September 2011 letter provided Pacific Connector guidance on using shade as a surrogate for temperature and using methods to estimate long term impacts to shade and subsequently thermal loading to be consistent with the TMDLs approach. In this section, the DEIS only summarizes results of temperature modeling using a model SSTEMP at a subset of stream crossings. While the assessment of measurable temperature impacts to stream segments as a result of specific crossing or action is informative it does not align with Oregon's water quality standard or TMDLs implementing that standard. TMDLs in the basins impacted by the Project use "*other appropriate measures*" (or surrogate measures as provided under EPA regulations (40 CFR 130.2(i))) in the form of percent effective shade to address heat load. Potential impacts to waters of the state by the removal of riparian vegetation should be quantified as loss of effective shade as measured on the streams' surface. As per the temperature TMDLs, attainment of the effective shade surrogate measure is equivalent to attainment of the nonpoint source heat load allocations. System potential vegetation is the typical shade target for streams with no assimilative capacity. System potential vegetation represents the maximum possible effective shade for a given location, assuming the vegetation is fully mature. **Note:** In general the Rogue and Klamath, and Umpqua Basins,	and/or any staging, storage, or temporary work areas and new or to-be-improved access roads until site-specific riparian management area prescriptions are developed for from all Project activities, not just stream crossing that comply with applicable local, state or federal regulations and are consistent with established natural resource management plans. Those site specific plans will include assessment of effective shade reduction due to short-term and long-term reductions in effective shade at the stream surface. Those estimates will be used in developing riparian shade mitigation plans. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected

	temperature TMDLs and associated shade targets apply to all perennial and intermittent streams within the project area. Solar gain and thermal loading are not limited only to 303d listed segments, but are an issue for all perennial and intermittent streams in a TMDL basin. See individual TMDLs for more information: https://www.oregon.gov/deq/wq/tmdls/Pages/TMDLS-Basin-List.aspx	
P. 4-140 Stream Temperature Assessment See also comment 61 P. 4-114 & 4-115, Table 4.3.2.2-9 Temperature Impacts	The DEIS summarizes results of temperature modeling using SSTEMP at a subset of stream crossings. Project-specific temperature modeling that was conducted on federal lands stream crossings using Stream Segment Temperature Model (SSTEMP) (Bartholow 2002), was conducted at the perennial stream crossings on BLM lands at Middle Creek Deep Creek and Big Creek, and NFS lands at multiple crossing on the East Fork Cow Creek in 2009 and again in 2013 to reflect new pipeline alignment and lower flow conditions (NSR 2009, 2015b,c). ODEQs' TMDLs are based on achieving and maintaining site potential vegetation, recognizing that natural disturbance will occur that prevents full potential from being achieved at any given time & location.	Correct deficiency in DEIS: Anthropogenic heating and stream temperature increases above natural rates of heating are a violation of state water quality standards in TMDL basins. Effective shade is the surrogate measure for compliance in these basins. The EIS should clarify that impacts to riparian vegetation must be fully mitigated by offsetting increases in thermal loading by ratios of 1:1 and 2:1. See ODEQ's September 2011 letter to Jordan Cove and Pacific Connector. These mitigation ratios are consistent with ODEQs 2009 Water Quality Trading Internal Management Directive. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected
4-411	Section provides incomplete and inadequate description or analysis of Oregon CZMA/CZARA status. Oregon developed a Coastal Nonpoint Pollution Management Plan (CNPCP) that was finally disapproved by EPA and NOAA in 2015. The primary basis for disapproval is failure to resolve the outstanding management measures for private forestry. Specifically, three areas have	In order to demonstrate that the Project will be consistent with Oregon's existing CNPCP and address outstanding management measures: The EIS will need to address how the Project will ensure that BMPs are implemented to address CNPCP outstanding management measures when conducting operations on private lands. At a minimum, the Project should fully implement practices consistent with those developed under the Oregon Plan (see

	been identified as not met associated with operations on private forest lands (and so-called legacy roads).	Private Forest Landowners and the Oregon Plan (February 2012): https://www.oregon.gov/ODF/Documents/WorkingForests/Oregon_Plan_PFguide.pdf
4.3.1.2 Pacific Connector Pipeline Project p. 4-100: Impacts and Mitigation pp. 4-104 to 4-108: Turbidity and Sedimentation 4-273 to 4-284:	Sources of turbidity and sedimentation and waterbody impacts of these potential characteristics or pollutants are addressed in multiple sections of the DEIS. The DEIS (p 4-273) states "Pipeline crossings of surface waterbodies would cause some downstream turbidity and sedimentation." The DEIS summarizes the evaluation performed by the Project on construction phase impacts of crossings and concludes: "Overall cumulative effects [of sedimentation on aquatic resources] would be unsubstantial based on the dispersed distribution of crossings and magnitude of effects at each and lengths of stream channel potentially affected". ODEQ disagrees with the DEIS' principal conclusion regarding sedimentation. The reasons are that Oregon's Statewide Narrative Criteria In OARs 340-041-0007(7), (8), and (11) and OAR 340-041-0011. **Biocriteria** set forth performance standards that the Project (due to its multiple waterbody intersections in a variety of geographies) cannot demonstrate will be met without site-specific & project-specific monitoring activities that evaluate pre- and post-project conditions of the "Resident Biological Community" (OAR 340-041-0002(50)). Assessing whether there are aquatic life	The EIS must include an analysis of target turbidity values or fine sediment (e.g. TSS) levels and require monitoring to assure that those levels are not exceeded. This must include an assessment of post-construction, operational phase total suspended sediment or turbidity levels in waterbodies hydrologically connected to drainages along the pipeline. The EIS must be based on a statistically valid monitoring plan developed for a representative range of locations, including ongoing assessment of water quality indicators and macroinvertebrate condition, to ensure project impacts are identified and understood at multiple scales (site and cumulative). The monitoring plan must (a) establish baseline (pre-project) conditions & (b) monitor and report construction and post-project conditions and indicators. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected

	impacts from anthropogenic sources of fine sediment is normally based on macroinvertebrate condition (compared to reference or pre- & post-activity). Physical survey methods could be employed to assess whether the standard in OAR 340-041-0007 (11) is met. The discussion of Project effects on sedimentation and turbidity levels are linked to a range of monitoring approaches and their respective effectiveness. Turbidity levels upstream of an activity are generally used to establish the target turbidity value (downstream from an activity) and assess compliance with Oregon's turbidity standard (OAR 340-041-0036). For disturbance associated with construction of stream crossings, assume turbidity is associated primarily with generation and suspension and transport of fine sediment rather than organic matter. Establishing the target turbidity level and assessing compliance with that target depends on the water body conditions at the time of the activity. These levels should be explicitly identified in the joint permit conditions (JPA). For the post-construction, operational phase, no specific estimates of total suspended sediment or turbidity levels was provided. The DEIS largely assumes that full site stabilization will occur in disturbed areas. Follow-up with federal agencies for areas not meeting the ECRP is included, but no post-construction monitoring plan on private	

	lands was identified. In contrast, a channel condition monitoring plan is explained (p. 4-102)	
P. 4-104 Turbidity and Sedimentation	The DEIS discusses several impacts of fine sediment suspension and subsequent deposition. The DEIS does not explicitly address whether the pipeline construction activities and operation will achieve compliance with OAR 340-041-0011-Biocriteria and OAR 340-041-0007 Statewide Narrative Criteria (11) Oregon's sedimentation and biocriteria standards are not explicitly linked to highly variable in-stream turbidity levels but rather are associated with impacts on stream bottom habitat or aquatic life, respectively.	Correct deficiency: The EIS should more effectively address whether the pipeline construction and operation can meet narrative state water quality standards, and if so, what mitigation measures will be needed to meet these standards and monitoring to demonstrate that standards are, in fact, being met as a result of Project activities. See preceding comment above. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected
Stream Temperature pp. 4-114 to 116 p. 4-291;	The DEIS summarizes the riparian setbacks for Project and concludes (p. 4-116): "Based on these measures and the studies summarized above, we conclude that the construction and operation of the pipeline would have no discernible effect on stream temperature." As stated in other comments, ODEQ does not agree with this conclusion for several reasons. First, the DEIS fails to address the primary thermal load surrogate (effective shade) and fails to address thermal load. Second, thermal impacts that exceed OAR 340-041-0028(11) Protecting Cold Water (PCW) criterion have been documented by ODF from harvest using FPA private forest RMAs for small and medium fish-bearing streams (Groom et al 2011; see Board of Forestry Rules analysis).	The EIS should recommend that state forest Riparian standards (for RMAs) be followed. See Forest Management Plans (FMP) [ODF, 2010]) riparian buffers https://www.oregon.gov/ODF/Working/Pages/StateForests.aspx Revise ECRP and other documents accordingly to reflect level of RMA protection needed to meet shade targets and protect cold water on waterbodies where riparian management is conducted on private lands. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected.

	The minimum 25-foot riparian management area (RMA) is not adequate to ensure thermal load reduction and meet TMDL shade targets on small perennial streams or meet OAR 340-041-0028(11). The DEIS also does not describe Oregon's Riparian Protection Rule in sufficient detail to evaluate whether the Project will be in compliance with the FPA where applicable. It can be complex to determine RMA requirements under "alternate practices" likely to be employed for pipeline construction. See Oregon's Forest Protection Laws : An Illustrated Manual -Chapter 2: Planning a timber harvest https://oregonforests.org/pub/oregons-forest-protection-laws-illustrated-manual Finally, in its 9/7/18 information request, ODEQ identified deficiencies in the scope of Project activities that could impact effective shade and associated thermal load on streams.	
p. 4-105 Major Waterbody Crossings	DEIS (4-105) states: "The South Umpqua River diverted open-cut crossing would have similar effects on downstream sediment and turbidity, in the short term, to those from other dry crossings." The DEIS evaluation concluded that turbidity generated during construction may exceed the Oregon water quality standard for short distances and short durations downstream from each crossing. *Further*, "There would be short-term turbidity increases for several hours during portions of the installation and removal of the diversion structures for	The EIS should reflect the need to provide a more robust evaluation of: (a) the amount and characteristics of fine sediment that is expected to be generated, and (b) fate of fine sediment and impacts to aquatic habitat and aquatic life expected to be produced by the pipeline Project under a normal range of environmental scenarios, including discharge and precipitation events. FERC should develop license conditions that would better ensure protection of water quality and aquatic resources If the Commission authorizes the Project, ODEQ is recommending that the following measure be included as specific condition in the Commission's Order.

	the proposed diverted open-cut crossing of the South Umpqua River." ODEQ concludes that the Project expects that turbidity standards will be exceeded for unknown periods of. These exceedences are not authorized. In the South Umpqua sub-basin, there are 22 segments that are Category 5: Water quality limited, 303(d) list, TMDL needed for Biological Criteria. For many of these segments fine sediment has been identified as a significant stressor. The DEIS minimizes adverse downstream impacts of fine sediment deposition on aquatic habitat and aquatic life. Major waterbody crossings are risky. If construction is planned for an unanticipated period of wet flows or heavy precipitation occurs, the Project's response isn't clear. These low frequency - high impact scenarios are not adequately addressed.	Jordan Cove and Pacific Connector shall not begin construction of diverted open-cut crossings until project provides a more robust evaluation of: (a) the amount and characteristics of fine sediment that is expected to be generated, and (b) fate of fine sediment and impacts to aquatic habitat and aquatic life expected to be produced by the pipeline Project under a normal range of environmental scenarios, including discharge and precipitation events. ODEQ Recommendation: FERC **not** issue license to Pacific Connector until this deficiency is corrected
Mitigation on Non-Federal Lands P. 2-36	The DEIS provides a short description on how impacts on non-federal lands will be mitigated. It provides information on plans that are currently being drafted.	Complete plans on mitigation measures on non-federal lands must be included in the EIS.
Environmental Analysis Pipeline: P. 4-71	The Pacific Connector Pipeline Project would likely result in a degraded soil condition on an estimated 30 to 70 percent project right-of-way on NFS lands in the Winema National Forest (all in the Spencer Creek Watershed) due to displacement and compaction (Orton 2009). Compaction can largely be addressed by subsoil ripping, but displacement would be unavoidable because of the nature of the project.	The DEIS provides information on streamside vegetation mitigation. However, due to the unprecedented amount of disturbed land and degraded soil, mitigation measures must be included to minimize sedimentation in the watershed as a result of the degraded soil conditions. Furthermore, efforts will need to be made to revegetate these areas.
Klamath River	Table 4.7.3.5-10 outlines specifics in the	Spencer Creek is the main tributary in the Upper

Basin, Spencer Creek Fifth Field Watershed, HUC 180102206, Winema National Forest P 4-512 to 4-516	Spencer Creek watershed. However, there is no analysis of the sediment listing for Spencer Creek as it pertains to the Clean Water Act. In addition, there is no analysis of impacts to spawning grounds for Redband Trout and no analysis of protections for anadromy.	Klamath River watershed and will host salmonids upon dam removal for spawning purposes. Include protections for sediment loading that will impact both water quality in the watershed and potentially impact spawning habitat for Redband Trout and Salmonids.
Measures That Would Mitigate Effects on Aquatic Resources on Federal Land P. 4-307- 4-308	Mitigation has been mentioned throughout the document in regards to the various impacts related to stream crossings. However, there is little detail on mitigation on non-federal lands.	In areas where the pipeline crosses sensitive streams such as the Spencer Creek, alternative methods for stream crossings must be used to reduce significant impacts to environment. These alternative methods could include horizontal boring or changing the route of the pipeline. Otherwise, the EIS should identify and discuss other specific mitigation measures for water quality improvement projects that will appropriately protect water quality in these sensitive streams. In addition, other areas outside of the federal nexus need to be evaluated. Private lands should have an additional section on how the mitigation practices will work to protect them as well.

Oregon Department of Fish and Wildlife

Contact: Sarah Reif
sarah.j.reif@state.or.us
503-947-6082

The Oregon Department of Fish and Wildlife (ODFW) provides the following comments on the Federal Energy Regulatory Commission's (FERC) 2019 Draft Environmental Impact Statement (DEIS) for the Jordan Cove LNG Terminal and Pacific Connector Pipeline Projects (JCEP/PCGP) in the state of Oregon (FERC Docket No. CP17-494-000 and CP17-495-000). The DEIS was published in March 2019 by FERC and its Cooperating Agencies (US Bureau of Land Management – BLM, US Forest Service – USFS, US Fish and Wildlife Service – USFWS, US Army Corps of Engineers – USACE, National Oceanic and Atmospheric Administration's National Marine Fisheries Service – NMFS, US Coast Guard, Coquille Indian Tribe, and the Pipeline and Hazardous Material Safety Administration).

These comments are a compilation of ODFW comments over the 11-year history of the JCEP/PCGP project, including ODFW comments on the FERC Notices of Intent (NOI; 2008, 2012, 2017), Draft Environmental Impact Statements (DEIS 2015, 2019), as well as comments submitted to USACE and state permitting agencies over the years. All comments reflect careful long-term refinement and assessment by ODFW, but are lengthy due to the extended history of the proposed project and its widespread impacts. ODFW has reviewed and updated previous comments that remained fully relevant. Where the project actions have changed or new information was available, ODFW has modified or added comments that reflect these aspects.

ODFW provides the following comments aimed at the sufficiency of the DEIS in its consideration of impacts to fish, wildlife, and their habitats, as guided by the implementing regulations for NEPA documents at 40 C.F.R Part 1502 and 18 C.F.R. Part 380. ODFW comments are also submitted under provisions of the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661-667e; the Act of March 10, 1934; Ch. 55; 48 Stat. 401) which, as amended in 1946, requires consultation with the Fish and Wildlife Service and the fish and wildlife agencies of States where the "*waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified*" by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources" and to allow FERC and its Cooperating Agencies to consider state fish and wildlife agencies concerns.

Relevant ODFW Authorities:

ODFW recommendations on the JCEP/PCGP project are guided by the following statutes, rules, and plans. *(An asterisk (*) indicates those authorities also listed as Enforceable Policies for the Jordan Cove Energy Project by ODFW of Land Conservation and Development Oregon Coastal Management Program for their Federal Consistency determination, pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act.)*

- Wildlife Policy (ORS 496.012*): Establishes wildlife management policy to prevent serious depletion of any indigenous species and maintain all species of fish and wildlife at optimum levels for future generations.
- Threatened or Endangered Wildlife Species Protection and Conservation Programs (ORS 496.171-182*): Authorizes ODFW to develop conservation and recovery plans for listed wildlife species, including guidelines that it considers necessary to ensure the survival of individual members of the species. These guidelines may include take avoidance and protecting resources sites such as spawning beds, nest sites, nesting colonies, or other sites critical to the survival of individual members of the species (496.182(2)(a). Directs state land management agencies to work with ODFW to determine their agency's role in conservation of endangered and threatened species. At ORS 498.026(1), prohibits "taking" of any listed species. Illegal take is a violation of the wildlife laws, subject to criminal prosecution as a Class A misdemeanor or violation pursuant to ORS 496.992.
- Prohibition of harassment, etc. of wildlife (ORS 498.006): Prohibits chasing, harassment, molestation, worrying or disturbing any wildlife, except as the Fish and Wildlife Commission may allow by rule.
- Criminal penalties for wildlife violations (ORS 496.992): Makes violation of any wildlife statute or Fish and Wildlife Commission rule subject to prosecution as a Class A misdemeanor or violation.
- Food Fish Management Policy (ORS 506.109*): Establishes production, utilization, and conservation goals for food fish to provide optimum economic, commercial, recreational, and aesthetic benefits for present and future generation for the citizens of this state.
- In-Water Blasting (ORS 509.140*): Any entity that desires to use explosives or any substances deleterious to fish for the construction of a dam, bridge, or other structure shall make application to the State Fish and Wildlife Commission for a permit to use explosives in such waters. This statute also creates the authority for ODFW designation of in-water work windows (time periods appropriate for working within fish-bearing waters).
- ODFW Fish Passage Law (ORS 509.580 - 509.645*): Requires upstream and downstream passage at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present.
- ODFW Fish Screening Policy (ORS 498.301*): Prevents appreciable damage to game and nongame fish populations as a result of the diversion of water for nonhydroelectric purposes from any body of water in this state.
- Fish and Wildlife Habitat Mitigation Rule (OAR 635-415-0000-0025): Governs ODFW's provision of biological advice and recommendations concerning mitigation for losses of fish and wildlife habitat caused by development actions. Follows a mitigation hierarchy of avoid, minimize, and mitigate impacts to fish and wildlife habitat. Goals of the policy include no loss, no net loss, and net benefit depending on the category of habitat impacted. This rule is the framework ODFW uses to implement ORS 496.012, 506.109, 496.182, 509.140, and 509.180, among other statutes.
- General Fish Management Goals (OAR 635-007-0510): Establishes the goals that fish be managed to take full advantage of the productive capacity of natural habitats, and that ODFW address losses in fish productivity due to habitat degradation through habitat restoration.

General Comments and High Priority Issues

This narrative section highlights ODFW's primary concerns with the JCEP/PCGP project, and focuses on the key areas of the DEIS that did not sufficiently demonstrate how serious depletion of Oregon's fish and wildlife resources will be avoided (ORS 496.012). By way of summary, those key areas of insufficiency include:

- The need for a Natural Resource Technical Advisory Group
- Economic Impact
- Connection to Port of Coos Bay Channel Modification Project and their Cumulative Effects
- JCEP LNG Terminal Impacts to the Coos Bay Estuary
- Dredging Impacts to Estuarine Habitats and Communities
- Impacts to Eelgrass
- Introduction of Non-indigenous Species through Ballast Discharge
- Disturbance to Marine Mammals
- Impacts to Wildlife in Freshwater Wetlands, Uplands, and Beaches on the North Spit
- Impacts of the LNG Terminal on Snowy Plover Nesting and Foraging Habitat
- Impacts to Coastal Marten Habitat
- Habitat Loss at the JCEP LNG Terminal Site
- Impacts from the PCGP Pipeline to Fish and Wildlife Habitat
- Impacts to Marbled Murrelet and Northern Spotted Owl Habitat
- Fish and Wildlife Habitat Mitigation
- Fish Passage
- In-Water Blasting, In-Water Work.

Each of these bulleted issues is discussed in detail below.

Natural Resource Technical Advisory Group – ODFW recommends FERC and/or JCEP/PCGP create a Natural Resource Technical Advisory Group (NRTAG) to serve as a technical team to minimize environmental impacts and oversee the comprehensive mitigation plan (mentioned in Section 4.5.1.1 on Page 4-186). A Natural Resource Technical Advisory Group could include the Applicant, and natural resource knowledgeable professionals. ODFW recommends the NRTAG be comprised of members from federal agencies, tribes, state agencies, science-based organizations, and other stakeholders. The role of the NRTAG would be to assist project managers with project planning, adaptive management, and implementation assuming FERC authorization. The NRTAG could interact with FERC and JCEP/PCGP to provide specific guidance/feedback, evaluation of potential ecological impacts risks, needed monitoring/studies, and post-study ecological assessment relating to:

- Direct and indirect construction impacts of the project.
- Post-construction legacy impacts to fish and wildlife production.
- Precise methods of study to determine/measure the magnitude of both project impacts and restoration/mitigation effectiveness.
- Mitigation strategies, and monitoring of mitigation to ensure effectiveness.

Economic Impact - ODFW recognizes the project is anticipated to provide immediate economic benefits to the local communities of Coos County and other counties within the range of the pipeline portion of the project. However, this benefit should be evaluated in the context of both the potential adverse environmental effects and negative impacts to the long-standing current and future economically important industries (e.g. commercial fishing, recreational fishing and hunting, aesthetics, wildlife viewing, and aquaculture) that depend on healthy and abundant fish, wildlife, and habitats. Section 4.9 of the DEIS briefly discusses the potential impacts to commercial and recreational fishing and its contribution to the economy. However, ODFW contends the DEIS's discussion grossly underestimates the impact. Fish and wildlife recreational expenditures in 2008 accounted for $2.5 billion in income for the state of Oregon (Runyan and Associates 2009). In Oregon, the commercial crabbing fishery is a tremendous economic engine with potential to be impacted by this project. For example, the 2017-2018 Dungeness crab season (December to August) generated $74 million in ex-vessel value (see https://www.dfw.state.or.us/MRP/shellfish/commercial/crab/docs/Crab%20Newsletter_2018_final.pdf, and https://www.dfw.state.or.us/MRP/shellfish/commercial/crab/news_publications.asp). Like many other important fisheries, Dungeness crab use Coos Bay and the surrounding nearshore area for nursery habitat that may be affected by this project's proposed dredging activity, and the Coos Bay fishing fleet relies heavily on crab for its profits.

Connection to Port of Coos Bay Channel Modification Project, Cumulative Effects - The JCEP terminal will dredge a combined total of 5.7 million cubic yards (CY) from North Spit and Coos Bay in order to create the slip for ships to load liquefied natural gas (LNG) and navigate along the Coos Bay channel to the ocean. The Port of Coos Bay has also proposed a navigation channel modification project (US Army Corps of Engineers – USACE Environmental Impact Statement, see Federal Register 82 FR 39417) that will also highly benefit the JCEP/PCGP project. ODFW recognizes that the Port of Coos Bay channel modification project will convey benefit to the JCEP/PCGP project both in terms of financial savings and through increased transport efficiency. Accordingly, ODFW recommends that the FERC jointly consider the impacts of the USACE Port of Coos Bay Channel Modification Project, because they are connected, similar, and cumulative actions. Some of the impacts of the combined projects include:

- Deepening and widening of the existing Coos Bay navigational channel to 37' deep and 300' wide
- Expansion of the Coos Bay navigational channel to 45' deep and 450' wide from the channel entrance to River Mile 8.2
- Alteration of the hydrodynamic characteristics of the Coos Bay estuarine tidal basin in response to deepening and widening, including:
    - Physical changes in the intrusion of marine waters, coupled with alteration of the salinity regime, conductivity, exchange volume, tidal prism, tidal currents, and other parameters
    - Shifts in the location, configuration, and spatial extent of marine-dominated, estuarine, and freshwater-tidal habitats
    - Changes in the composition of ecological communities that reside within the water column, marine-dominated, estuarine, and freshwater-tidal habitats
    - Changes in the location and potential for rearing of juvenile fish
- Disposal of 18 million CY of dredge material at upland sites on the JCEP project lands

located southwest of the OR Highway 101 bridge at the APCO Sites, and disposal of dredged material at the Kentuck Project Site;

- Impacts to the ocean floor outside the mouth of Coos Bay where a large quantity of dredged material (estimated at 18-25 million CY) will be deposited at an ocean disposal site, or multiple sites, that have not been fully identified, including:
    - Deposition of dredged materials on the ocean floor will alter the physical characteristics of the benthic habitat due to both the substantial modification of the bottom topography and the anticipated characteristics of the dredged material (e.g. estimated 8.5 million CY of sandstone and siltstone debris);
    - Deposition of dredged materials on the ocean floor will impact the benthic communities of resident marine fish and invertebrates, as well as transient species of concern including green sturgeon (*Acipenser medirostris*);
    - Dredged materials transported away from the deposition sites have the potential to negatively affect important nearby rocky reef habitats;
    - Disposal of dredged materials may occur in areas of heavy Dungeness crab commercial fishing activity, potentially interfering with crab habitat and fishing vessels; and
    - Excessive mounding of sediments can alter the wave climate, creating enhanced risk to commercial fishing vessels that navigate nearshore waters during stormy conditions.
- Installation of a large rock apron at the toe of the North Jetty at the entrance to Coos Bay;
- Excavation of a new vessel turning basin with a length of 1400 feet, width 1100 feet at -37 feet deep (constructed approximately between River Miles 7.3 to 7.8);
- Disposal of 700,000 CY of dredged material through mechanical or hydraulic methods (24 inch pipeline laid on bottom of Coos Bay 8.3 miles) then distributed between the APCO 1 and 2 disposal sites between River Mile 2 to 7;
    - Dredge Area #1, RM 2: 150-feet wide and 550-feet long, 15.1 acres, 350,020 CY
    - Dredge Area #2, RM 4.5: 200 ft wide and 2500 ft long, 13.4 acres, 184,000 CY
    - Dredge Area #3, RM 6: 150 ft wide, 1150 ft long, 2.9 acres, 25,200 CY
    - Dredge Area #4, RM 6.8: 100 ft wide, 625 ft long, 4.0 acres, 24,000 CY
- Dredging will affect 35.4 acres of subtidal habitat within Coos Bay that is important for production of species such as Dungeness crab (*Cancer magister*), white sturgeon (*Acipenser transmontanus*), and California halibut (*Paralichthys californicus*);
- 300,000 CY of dredge material from the JCEP project will be disposed of at the Kentuck Mitigation Site.

Marked change will occur to the productivity of the dredged portion of the bay and little recovery is expected over time due to the continual need for maintenance dredging. In the DEIS (Section 2.1.1.8), JCEP proposes to conduct maintenance dredging every 3 years with about 115,000 cy of material removed per dredging interval for the first 12 years of operation. The DEIS states that maintenance dredging could be done every 5 years with up to 160,000 cy of materials removed during each dredging event. In the marine waterway, dredging would also be conducted about every 3 years with roughly 27,900 cy of materials removed during each dredging event. Dredging operations of this magnitude will result in a continually disturbed condition preventing development of any reliable estuarine production in the affected areas. Additionally, the Port of Coos Bay project will likely dredge substantially more on an annual basis.

To not consider the combined impacts of the Port's channel modification project and the JCEP project will effectively underestimate the biological and economic impacts to the State's fish and wildlife habitat resources in the Coos Bay estuary, due to these connected, similar, and cumulative actions.

JCEP LNG Terminal Impacts to the Coos Bay Estuary - The proposed project is large in scope, will likely incur deleterious ecological impacts, and have legacy implications for aquatic habitats of Coos Bay and upland habitats on the North Spit. The North Spit is one of the only ocean peninsula land features in the state with estuarine, ocean, wetland, and upland habitats available for fish and wildlife within a very small geographical area. This unique landform and bay provide a number of strategic benefits for production of fish and wildlife. Coos Bay is the largest estuary located entirely in Oregon and supports populations of fish and shellfish that contribute to large commercial and recreational fisheries. The aquatic and upland habitats encompassed by the JCEP terminal and associated facilities have been subjected historically to a number of landscape and waterway alterations including: dredging, riprap installation, leveling, and removal of native coastal pine forest, filling of wetlands, and other development related impacts. These habitats historically would have been primarily characterized as Category 2 or 3 habitats, (providing essential, important, and/or limited habitat function for fish and wildlife) under the ODFW Fish and Wildlife Habitat Mitigation Policy. Although negatively impacted historically, much of the tidal, subtidal, and upland habitats at the proposed project site have received only minimal disturbance in the past two decades and substantial recovery of ecological function has occurred.

The subtidal, tidal, intertidal, and shoreline features of the Coos Bay estuary tidal basin provide critical habitat for a number of culturally and economically important game and non-game species including, but not limited to: Dungeness crab (*Metacarcinus magister*), red rock crab *(Cancer productus*), cockles (*Clinocardium nuttallii*), gaper clams (*Tresus capax)*, butter clams (*Saxidomus giganteus)*, littleneck clams (*Protothaca staminea*), rockfish (*Sebastes spp.*), lingcod (*Ophiodon elongates*), greenling (*Hexagrammos decagrammus*), California halibut (*Paralichthys californicus*), English sole (*Parophrys vetulus*), Pacific sand dabs (*Citharichthys sordidus*), ghost shrimp (*Neotrypaea californiensis*), mud shrimp (*Upogebia pugettensis*), starry flounder *(Platichthys stellatus)*, smelts (Osmeridae family), (Engraulidae family), sardines (Clupeidae family), fall run Chinook salmon *(Oncorhynchus tshawytscha)*, green sturgeon *(Acipenser medirostris)*, white sturgeon *(A. transmontanus)*, (OC) ESA threatened coho salmon *(Orncorhunchus kisutch)*, and possibly Pacific lamprey (*Entosphenus tridentata*). There is some potential that Pacific smelt (eulachon) (*Thaleichthys pacificus)* may also occur in the JCEP area of Coos Bay. Additionally, the tideflats and subtidal regions of the lower Coos estuary are sites for the commercial harvest of bay clams (gaper clams, butter clams, cockles) and the mudflats in the JCEP area support a commercial fishery for ghost shrimp (*Neotrypaea californiensis*).

Scattered populations of the native Olympia oyster (*Ostrea lurida*) have recently become re-established within the marine and polyhaline regions of the Coos Bay estuary where they typically occur as individuals or small clusters attached to rip-rap, rock, shell, or other hard substrata. The recovering populations of *O. lurida* are considered as a Strategy Species by the Oregon Department of Fish and Wildlife / Nearshore Conservation Plan (www.oregonconservationstrategy.org). Section 4.5.2.2 (page 427) of the DEIS states that suspended sediments from the dredging will not significantly affect oysters in Coos Bay. ODFW does not agree with FERC's determination. These at-risk populations of Olympia oysters are particularly sensitive to smothering and burial by silt and other suspended materials, and it is likely that they will be exposed to heavy loads of suspended sediment and excessive siltation during dredging activities associated with excavation of the new JCEP Terminal. ODFW recommends further evaluation and development of mitigation strategies for impacts to Olympia oysters.

The proposed slip will create a new deepwater alcove backwater likely resulting in a number of significant biological effects (e.g. change to water flow patterns in the vicinity, salinity patterns, turbidity associated with initial and repeated dredging, and shallow water conversion to deepwater). While hydrodynamic models provide some insight into the physical changes that the site and bay may undergo, biological changes should be studied in situ to accommodate unknown variables. The actual JCEP longer-term, indirect impacts to the larger estuary may not be accurately predicted prior to construction.

Dredging Impacts to Estuarine Habitats and Communities – The JCEP DEIS describes the location and extent of dredging and removal of unconsolidated sediment from the intertidal and subtidal zones of the Coos estuary, but only superficially considers the potential effects of dredging on aquatic habitat and species that are expected to occur in response to construction of the different components of the JCEP terminal (Section 4.5.2.2). Direct impacts to estuarine habitats associated with construction of the vessel slip, access channel, temporary material barge berth, the material offloading facility, and rock pile apron (Table 4.5.2.2-2; page 4-241) are expected to be long-lasting and substantial. In particular, the estuarine portion of the Jordan Cove LNG Facilities would include direct impacts to 37 acres of estuarine habitat, including 2 acres of eelgrass habitat, 13 acres of intertidal habitat, 4 acres of shallow subtidal habitat, and 18 acres of deep subtidal habitat. The JCEP also includes extensive dredging and excavation of four submerged areas of the sub-tidal zone in Coos Bay (total 40 acres) along the Federal Navigational Channel and vessel access route to improve navigation reliability for the LNG carriers.

Unconsolidated soft-sediment habitat is widespread in the Coos Bay estuary tidal basin where it occurs extensively throughout the intertidal zone and sub-tidal zone along the bottoms, sides, and margins of primary and secondary tidal channels (Cortright *et al*., 1987). Soft-sediment habitats provide a series of diverse, productive, and dynamic ecological functions in the estuary, including provision of habitat and forage areas for invertebrates, fish, birds, and marine mammals, as well as serving as an important source of detritus. Soft-sediments also play an important role in the microbial and biogeochemical transformations of organic materials and nutrient cycling, and they typically serve as a sink or reservoir for the deposition of water-borne particles. Diverse communities of motile, epifaunal, and infaunal invertebrates inhabit the soft-sediments, and the communities of crabs, shrimp, amphipods, polychaete worms, copepods, hydroids, anemones, clams, and other invertebrates are specifically adapted to survive, feed, grow, and reproduce themselves in the unconsolidated sediments (Simenstad 1983; Emmett *et al*., 2000). Microbial activity and deposition of organic matter associated with fine-grained sediments together support a complex food web that includes multiple resident (infaunal, epifaunal, motile) and transitory (seasonal, migratory) species.

The JCEP DEIS incorrectly illustrates the major known oyster and shrimp habitat and clamming and crabbing areas in the bay relative to the Project activities (Figure 4.5-2). In particular, mixed communities of bay clams (*i.e.*, gaper clams, butter clams, cockles, and other species) are known to occur throughout the intertidal zone in the area immediately west and north-west of the airport runway (ODFW 2009; area AP). These areas are illustrated only as “Shrimp Habitat” and “Oyster Habitat” in Figure 4.5-2. It is not clear why the known clam beds located nearest the JCEP project area were omitted from Figure 4.5-2, when the map incorporates spatial information about the other clam beds throughout the intertidal zone of the Coos Bay estuary tidal basin further distances away from the JCEP project area. The known clam beds within ODFW area AP (Airport Runway) are

located within 50 m of the Temporary Dredge Line for the Federal Navigation Channel and within about 500 m of the proposed JCEP Access Channel, as illustrated in Figure 4.5-3 of the JCEP DEIS. In addition, it is also unclear what species of oyster is intended to be represented by the broad polygon that extends throughout the intertidal zone as "Oyster Habitat" in Figure 4.5-2. Commercial mariculture of Pacific oysters (*Crassostrea gigas*) does not occur anywhere in the intertidal zone near the airport runway, and patchy clusters of Olympia oysters (*Ostrea lurida*) only occur on the rocky rip-rap that extends around the periphery of the airport runway. The spatial distribution for major clam beds and shrimp beds should be corrected and updated with relevant information generated by ODFW for Coos Bay (2009).

Mixed communities of shellfish, such as Dungeness crab, red rock crab, bay shrimp, gaper clams, butter clams, littleneck clams, softshell clams, cockles, and many other species are year-round residents of the intertidal and sub-tidal areas of the Coos Bay estuary. Some of these shellfish are motile (*i.e.*, crabs and shrimp) and periodically move to different locations or migrate through the intertidal and sub-tidal zones, while others are stationary (*i.e.*, bivalves) and remain largely in place over the duration of their adult lives. The mixed communities of living bivalves and the beds of their non-living shells (*e.g.*, shell rubble or shell hash) are particularly important because they function to stabilize unconsolidated sediments and provide heterogeneous habitat for numerous species of adult and juvenile fishes, crabs, shrimp, amphipods, worms, and other estuarine organisms. Moreover, filter-feeding by dense populations of living clams can sometimes play an important role in the removal of phytoplankton and smaller particulate materials, thereby decreasing turbidity and increasing light penetration through the estuarine water column. Consequently, maintenance of suitable soft-sediment habitat is essential for survival of the moderately long-lived (life-span 10-15 years or longer) gaper, butter, and cockle clams, particularly in the sub-tidal zone. When soft-sediment habitat is chronically disturbed and altered by dredging of the subtidal zone, there may be a permanent loss and impact to benthic invertebrate populations and a decline in the biodiversity of benthic communities. Loss of some or all of these sub-tidal populations of bay clams has implications for both the ecological functioning of sub-tidal habitats and the ability of the bay clams to serve as broodstock to support the recreational and commercial shellfish fisheries in Coos Bay (D'Andrea 2012).

It is expected that dredging and removal of the soft-sediments will likely have substantial and immediate local impacts on the sub-tidal populations of benthic invertebrates and shellfish, such as gaper clams, butter clams, and cockles. This may include the physical removal of the clams and their surrounding sediments, as well as a disruption of the mixed ecological communities of shellfish, mobile and infaunal invertebrates, and fish that make use of the sub-tidal habitats. The JCEP DEIS states that dredging would directly remove benthic organisms (e.g., worms, clams, benthic shrimp, starfish, and vegetation) from the bay bottom within the access channel and navigation channel modifications. Mobile organisms such as crabs, many shrimp, and fish could move away from the region during the process, although some will be entrained during dredging so that direct mortally or injury could occur (Effects on Aquatic Habitat and Aquatic Species from Construction of the Jordan Cove LNG Facilities; 4-247).

The JCEP DEIS acknowledges that dredging, removal, and disturbance of the soft-sediment habitats will directly remove benthic organisms from the bay bottom, and the DEIS also states that it is likely that recovery would

occur in about one year for benthic resources particularly in the area of navigation channel modifications (4-248). This estimate of the rapid rate of community recovery is problematic, however, because the technical references cited by the JCEP DEIS (4-248) are drawn from earlier investigations of dredging impacts that generally used a group small-bodied, rapidly-growing invertebrates (including amphipods, polychaete worms, small bivalves, etc. that have life-spans on the scale of months to a few years) as the focal species to provide metrics for the estimates of species and habitat recovery. These small opportunistic species are not representative of the large-bodied, long-lived bay clams that typically exhibit episodic recruitment and have life-spans on the scale of 10-20 years in the Oregon estuaries. Moreover, large-scale dredging modifications that include subsequent maintenance dredging every 5-10 years may not provide the opportunity for bay clams and other shellfish to recruit successfully and fully re-colonize after the repeated disturbance events. It is also likely that benthic food resources may also be impaired or lost for other estuarine species (*i.e.*, forage fish, salmonids, crab) as a result of dredging actions. Consequently, dredging activities that significantly disturb and/or remove the mixed communities of long-lived bay clams from soft-sediment habitat in the sub-tidal zones of Coos Bay are expected to have longer-term impacts that extend well beyond a time period of many years.

As proposed, the JCEP also includes extensive dredging and excavation of four submerged areas of the sub-tidal zone in Coos Bay along the Federal Navigational Channel and vessel access route to improve navigation reliability for the LNG carriers. These actions include dredging of 27 acres of deep subtidal habitat at bend areas along the Federal Navigation Channel, and the dredge lines for this additional activity would include disturbance and modification of another 13 acres of mostly deep subtidal habitat. The JCEP DEIS points out that these additional dredging activities and follow-up maintenance dredging would disturb the 40 acres of subtidal habitat and result in a short-term reduction in the ecological function of these areas by disturbance of the benthic and epibenthic organisms.

Impacts to Eelgrass - The proposed JCEP project includes construction of a marine terminal slip and dredging of an access channel. These activities will permanently destroy about 1.9 acres of established native eelgrass (*Zostera marina*).

Dredging in the intertidal and shallow subtidal zones within the JCEP project area is expected to have significant deleterious effects on native eelgrass habitats and the species found therein. Beds of eelgrass occur at several locations throughout the Coos Bay tidal basin where they provide numerous ecological functions, including heterogeneous habitat for a number of fish and wildlife species, nursery habitat for invertebrates and fish, forage areas for shorebirds and waterfowl, primary production and a source of organic-rich detritus, stabilization of unconsolidated sediments, trapping of suspended sediments, and contribute to improvements to estuarine water quality (Thom et al. 2003; Kentula and DeWitt 2003). In particular, the emergent blades and rhizomes of eelgrass beds provide complex and heterogeneous multi-dimensional habitat within the unconsolidated soft-sediments in the intertidal and shallow subtidal zones. In many cases, the abundance and species composition of macroinvertebrate, shellfish, and fish communities differ within eelgrass beds in comparison with un-vegetated areas where eelgrass is absent. Eelgrass beds are known to provide habitat for numerous species of invertebrates, including polychaete worms, cockles, gaper clams, butter clams, littleneck clams, Dungeness crab, grass shrimp and epibenthic invertebrates such as harpacticoid copepods, isopods, and gammerid amphipods, In addition, eelgrass beds also provide habitat for a diverse community of fishes, including juvenile salmonids, sculpin, English sole, shiner perch, lingcod, rockfish, pipefish, and herring.

Long-term efforts to remove root wads, large woody debris, and other natural structures embedded in the un-vegetated soft sediment of Coos Bay in order to facilitate commercial shipping and recreational boating have greatly exacerbated the lack of structural complexity along the shoreline and further increase the ecological importance of eelgrass beds. The heterogeneous canopies of eelgrass beds provide both primary complexity and an ecological edge effect that presents an important biophysical transition zone for fish and invertebrates that forage in adjacent un-vegetated habitats.

Introduction of Non-indigenous Species through Ballast Discharge – Movement and translocation of ballast water associated with vessels is widely considered as the most significant transfer mechanism for non-indigenous species in the marine environment. Filling of LNG carriers at the JCEP Terminal will be coupled with concurrent discharge of ballast water that will exit the terminal area and mix with the tidal waters of the Coos Bay estuary. Consequently, it is expected that the Coos estuary will receive a very large volume of estuarine / ballast water that originated in foreign ports, as well as seawater that was pumped into the vessel at sea during transit. This ballast water typically contains a taxonomically diverse and reproductively viable community of estuarine and marine organisms that have potential to establish themselves as non-indigenous species within the estuarine tidal basin.

The DEIS (Section 4.3 Water Resources and Wetlands; and 4.5.2 Aquatic Resources) states that while berthed the LNG carriers would release ballast water and engine cooling water into the marine slip. It is estimated that each LNG carrier would 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, and that the ballast water discharge rate would be approximately 20,250 gallons per minute (gpm). The DEIS states that the newer LNG carriers are expected to conform to the "D-2" standards that require ships to utilize on-board ballast water treatment systems. In contrast, existing LNG carriers that do not currently have on-board ballast water treatment systems must continue to, at a minimum, conduct open-sea exchanges of ballast water in conformity with the "D-1" standard. The DEIS concludes that the effects of ballast water exchange and the measures that will be implemented to minimize or avoid effects from ballast water introductions are adequate to ensure that operation of the JCEP would not significantly affect marine resources. However, the DEIS does not contain any information about the timing of ballast water discharge events to coincide with flood or ebb periods of the semi-diurnal tidal cycle, nor any estimate of the retention time for the ballast water discharged from the individual LNG carriers. The conclusion reached by the DEIS is further is flawed because earlier research conducted by the Smithsonian Environmental Research Center (Ruiz et al., 2005) demonstrated that flow-through ballast water exchange (or the open-sea exchange; D-1 standard) is not an effective deterrent to ensure that organisms are not entrained, transported, and discharged from ballast tanks. Furthermore, the ballast water discharge standard (33 CFR 151.2030(a)) requires all vessels calling at U.S. ports to be equipped with a Coast Guard-approved Ballast Water Management (BWM) system. The DEIS, however, does not provide details about the BWM systems that will be used within the fleet of bulk carriers and LNG carriers that are expected to discharge about 6.8 million cubic meters of ballast water each year into the tidal waters of the Coos estuary. Discharge of this large volume of saline water that originated in foreign ports into the Coos estuary has a very high potential to introduce non-indigenous species into the estuarine waters in the vicinity of the JCEP Terminal. Consequently, the conclusion reached by the DEIS that ballast water discharged from the LNG carriers and other vessels associated with the JCEP Terminal will not provide a vector for introduction of new non-

indigenous species is not fully supported, and ODFW recommends this issue be re-analyzed and impacts fully addressed through appropriate minimization and mitigation measures.

Disturbance to Marine Mammals – Numerous species of marine mammals routinely occur in the nearshore marine waters immediately outside the mouth of Coos Bay, and several species temporarily or permanently reside within the Coos estuary tidal basin (Rumrill, 2003). The JCEP – DEIS properly recognizes that many species of marine mammals species are common in the waterway leading to the Jordan Cove LNG Terminal, including eight species of whales and one species of sea lion (Appendix I, Table I-1). However, the DEIS does not point out that California sea lions (*Zalophus californianus*) are common near the docks and marinas immediately inside the mouth of Coos Bay, and that Steller sea lions (*Eumetopias jubatus*) sometimes forage in the estuary from haul out sites at nearby Cape Arago. In addition, juvenile northern elephant seals (*Mirounga angustirostris*), orca (*Orcinus orca*), harbor porpoise (*Phocoena phocoena*), and gray whales (*Eschrichtius robustus*) are occasional visitors to the tidal waters of the Coos estuary.

In contrast to the temporary use of the estuary by the species of marine mammals described above, the tidal waters and submerged/submersible lands within the Coos estuary are inhabited year-round by populations of Pacific harbor seals (*Phoca vitulina*). Pacific harbor seals haul out in large numbers on the exposed tideflats at multiple sites located in the lower region of the Coos estuary and in South Slough, and they forage in the estuary where they prey upon numerous species of resident and transitory estuarine fish. Breeding activities typically occur between February and May, and the harbor seal pups are born and weaned in the estuary from March to June. The Oregon populations of *P. vitulina* are considered as a Strategy Species by the Oregon Department of Fish and Wildlife / Nearshore Conservation Plan, and priority conservation actions have been identified to limit anthropogenic disturbance, adhere to the federal protections developed by NMFS, and capitalize on opportunities to generate new information and fill data gaps.

Construction and operation of the JCEP and the subsequent increase vessel traffic by large LNG carriers to 140 trips per year raises primary concerns about disturbance to the Pacific harbor seal populations that reside year-round within the Coos estuary tidal basin. In particular, it is expected that harbor seals will be susceptible to immediate and acute disturbance by noise associated with construction of the JCEP Terminal as well as longer-term chronic disturbance from vessel wakes and noise generated by passage of the LNG carriers through the Coos Navigational Channel. The DEIS includes recommendations that JCEP prepare a Marine Mammal Monitoring Plan that identifies specific measures that would be implemented to reduce noise impacts and to ensure compliance with NMFS underwater noise criteria pertaining to ESA-listed species of whales. To the extent possible, the department urges that the scope of the Marine Mammal Monitoring Plan prepared by JCEP be expanded to also include consideration of the effects of noise on resident populations of adult and juvenile harbor seals and to minimize potential disturbance to early season harbor seal breeding and pupping activities. In addition, the DEIS and Marine Mammal Monitoring Plan should also acknowledge the potential for chronic disturbance to the harbor seal haul out sites associated with vessel wakes generated by the passage of the LNG carriers. Hauled out harbor seals are known to exhibit an increased likelihood of entering the water when they are disturbed by the presence of large vessels (2X increase in disturbance), and when the vessels are within 100 m of the haul out site (3.7X increase in disturbance; Mathews et al., 2016). Moreover, adult harbor

seals also exhibit an increased likelihood of entering the water in response to vessels whenever a pup is present (1.3X increase in disturbance). These observations made in Alaska indicate that harbor seal haul-outs are disturbed by the passage of large vessels, and they suggest that local fitness of the resident population of harbor seals may be reduced by vessel disturbances particularly when they occur during breeding and pupping seasons (Mathews et al., 2016).

The department is in agreement with the DEIS recommendation that construction of the JCEP Terminal should not occur until consultation with USFWS, NMFS and ODFW regarding potential disturbance and impacts to marine mammals is complete. Accordingly, it is premature at this time for the DEIS to conclude that constructing and operating the JCEP would not significantly affect the species of marine mammals within the project area.

Impacts to Wildlife in Freshwater Wetlands, Uplands, and Beaches on the North Spit – ODFW considered the impacts of this project to all relevant wildlife in its review of the DEIS, but the purpose of this section is to highlight some of the priority issues ODFW found within the DEIS.

Freshwater wetland habitats on the North Spit provide functionally important ecological features as they contribute to nutrient cycling where the sandy soil types are very limited in primary nutrients, and they provide freshwater refugia within a short distance of saline habitats. The wetlands and open water ponds are important for production of a number of amphibians including rough skinned newts (*Taricha granulosa*), red-legged frogs (Rana aurora), as well as several species of tree frog (i.e. Pacific tree frog *Pseudacris regilla*). Three-spined stickleback (*Gasterosteus aculeatus*) occupy a number of the ponds and deeper wetlands. Numerous waterfowl species transition through these ponds including mallards (*Anas platyrhynchos*), bluebills (*Aythya marila*), wood ducks *(Aix sponsa*), and Canada geese (*Branta Canadensis*). ODFW recommends that FERC condition the project such that these impacts be avoided, minimized, and mitigated to the maximum extent practicable.

It is ODFW's understanding that unavoidable impacts to freshwater wetlands will be mitigated for at the Kentuck Mitigation Site (comments on Kentuck provided below). ODFW uses the Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415, described more fully below) to determine necessary mitigation offsets depending on the functions and values of the habitat being impacted (what the policy refers to as habitat categories). In previous iterations of this project, the applicant's consultant (David Evans and Associates; DEA) provided ODFW with preliminary categorizations of impacted habitats according to this ODFW Mitigation Policy. From 2011-2014, ODFW and DEA determined that within the project area for the JCEP liquefaction and workforce housing there is an approximate total of 33.9 acres of Category 2 habitat as follows: 16.7 estuarine/intertidal habitat; 0.3 acres of low salt marsh; 5.8 acres of intertidal unvegetated sand; 4.7 acres of algae/mud/sand; 3.4 acres of shallow subtidal; and 3.0 acres of eelgrass habitat within the project location where estuarine dredging is proposed. There is 15.4 acres of deep subtidal Category 3 habitat that is proposed for dredging as well. ODFW has requested updated Habitat Categorization, per the ODFW Fish and Wildlife Habitat Mitigation Policy, and acreages from the Applicant but has not received this information at the time of these comments. In addition, the DEIS does not make it clear whether this mitigation is addressing temporal loss for those impacts lasting longer than 2 years but something less than permanent. As per the ODFW Fish and Wildlife Habitat Mitigation Policy (described below), offsets should be provided for those temporarily impacted areas that may be unavailable to fish and wildlife while vegetation is recovering. It is difficult for ODFW to determine from the existing information in the DEIS whether or not the State of Oregon's fish and wildlife resources are being

adequately addressed in freshwater wetlands impacted by the JCEP project.

ODFW also considered the wildlife resources in the uplands that will be displaced by this complete conversion of upland habitat to a new deepwater terminal/zone, construction of facilities, deposition of dredge materials, and long-term daily disturbance factors attributable to project activities. The North Spit is used by a variety of important wildlife such as the snowy plover (*Charadrius nivosus nivosus*), coastal marten (*Martes caurina*), pacific fisher (*Pakania pennantii*), bald eagle (*Haliaeetus leucocephalus*), rookeries for great blue heron (*Ardea herodius*), black-tailed deer (*Odocoileus hemionus*), American beaver (Castor Canadensis), mountain lion (Puma concolor), Roosevelt elk (*Cervus elaphus rooseveltii*), porcupine (*Erethizon dorsatum*), various bat species, and black bear (*Ursus americanus*). There are also 11 species of amphibians (8 salamanders, 3 frogs) and at least 10 species of reptiles that have been found to occur on the North Spit. It is ODFW's understanding that three potential mitigation sites have been identified to address upland habitat impacts on the North Spit, however it is not clear based on information provided in the DEIS if or how those sites offset the functions and values being lost through this project (more discussion below).

ODFW also found the DEIS provided insufficient information and assessment for the following key wildlife species and their habitats.

Impacts of the LNG Terminal on Snowy Plover Nesting and Foraging Habitat – ODFW is particularly concerned about the JCEP project's impacts to western snowy plover (hereafter, snowy plover) nesting and foraging habitat. This species is federally listed, but is also listed as Threatened on the Oregon Endangered Species Act (ORS 496.171-192, also see OAR 635-100-0105). ODFW's understanding from reading the DEIS is that FERC and its Cooperating Agencies have not yet developed a biological assessment (BA) or begun consultation with the USFWS, which has federal jurisdiction per the federal ESA. ODFW understands that consultation will fall under Section 7 for the federal action and for the federal lands within the project, but that Section 10 of the federal ESA will also apply to the non-federal portion of the project. The DEIS does not discuss how this consultation will occur on the non-federal portion of the project, or how this relates to FERC's authority and decision making for a project that crosses multiple land ownerships, and ODFW recommends this information be provided.

Snowy plovers populations have declined on the Pacific coast over the past century, but recent nest monitoring has shown stable to increasing populations. The reason for the recent increase is the intensive and coordinated management by state (ODFW, OPRD) and federal agencies (USFWS, USACE, USFS, BLM) to address the threats to the plover including 1) habitat destruction caused by development and recreation, 2) resource extraction, 3) invasion of non-native beachgrass (*Ammophila* spp.), and 3) increased predation by corvids (ravens and crows) and other predators (gulls, coyotes, skunks, etc..) (USFWS 2007). The North Spit is a particularly important component of snowy plover habitat along the Oregon coast, with the highest numbers of nesting plovers and the highest nest success rates among all plover sites (Lauten et al. 2018, M. Nugent ODFW personal communication). One of the primary reasons for the North Spit's success is the multi-agency maintenance of grass-free sandy beaches within snowy plover habitat restoration areas (HRA) as well as recreation management by OPRD and predator control by US APHIS Wildlife Services. Significant funding and resources have gone into snowy plover recovery on the North Spit. Without this constant management, it is without question that snowy plover abundance and productivity at the North Spit would decline and the species would be at risk of serious depletion.

Despite these constant and expensive management efforts, there are additional threats which cannot be managed locally. With climate change, the North Spit is experiencing an increased frequency and intensity of storm events. Overwash from high tide events during these storms destroy nests, and prevailing winds during these storm events can cause blowing sand to bury nests. With the predicted rise in sea levels associated with climate change, this only increases the risk of loss of beach habitat for snowy plovers.

Any additional threat puts the snowy plover at risk of declining again. Impacts to plover nesting and foraging areas may come from the noise associated with construction and operation, but more likely from the increased recreational pressure and subsequent increase in predators on the North Spit. On page 4-322 of the DEIS, FERC states *"Jordan Cove terminal construction and operations personnel would likely use the North Spit for recreational purposes and increased recreational use could result in increased plover disturbance including destruction of nests by dogs, off-road vehicle traffic, inadvertent trampling, or increased predation if scavengers and predators (corvids, coyotes, striped skunk, feral cats) are attracted to nesting areas due to the presence of trash and food remains".* ODFW contends that given the other threats this plover colony is facing on the North Spit, these new threats would likely tip the scales toward declining performance and abandonment of the colony. ODFW expects the BA and consultation with USFWS to give adequate attention to the additive threats posed by the JCEP project to the snowy plover, and would appreciate consultation with ODFW to identify appropriate avoidance, minimization, and mitigation measures (further discussed below in the mitigation section of this letter).

Impacts to Coastal Marten Habitat – Adjacent to the slip is a large dune occupied by a mature shore pine vegetation community that is potential habitat for the coastal marten (*Martes caurina*). Coastal martens have a limited range and occur in coastal shore pine as well as late-successional mixed conifer forests. Coastal martens have an apparently low survival rate in fragmented forests elsewhere in the United States, and habitat connectivity has been identified as one of the key conservation strategies for this species. Abundance and distribution of the coastal marten in Oregon is still largely unknown at this time, though ongoing research by ODFW, universities, and federal partners is underway. Coastal martens have been documented on trail cameras in close proximity to the site in 2018, easily within range of the JCEP project site and in identical shore pine habitat.

Conservation concern for the coastal marten is on the rise. Currently ODFW considers the coastal marten a State Sensitive Species and an Oregon Conservation Strategy Species for the reasons described above. Coastal martens were recently petitioned for listing on the federal Endangered Species Act list (80 FR 18741) and the USFWS has not yet issued its decision as of the writing of this letter. Conservation organizations also recently petitioned the Oregon Fish and Wildlife Commission to consider listing the coastal marten on the Oregon ESA, however the Commission decided not to consider a petition to list due to a lack of substantial scientific information (see OFWC Sept 2018 Staff Report Exhibit H and Meeting Minutes). Additionally, the OFWC was petitioned in 2018 to close fur-trapping of coastal martens west of Interstate 5, as well as all furbearer and unprotected mammal trapping in the Oregon Dunes National Recreation Area (see OFWC Aug 2018 Staff Report Exhibit D and Meeting Minutes). The OFWC will make its decision on this petition in 2019.

Habitat Loss at the JCEP LNG Terminal Site - ODFW recognizes that a substantial proportion of the upland habitats at the JCEP sites adjacent to the bay are not in pristine condition. However, they have been in a relative state of quiescence for more than a decade and are predominantly considered Category 3, 4, and 5 habitats (per OAR 635-415-0000 through 0025). A substantial component of forested dune habitat remains in Category 3 condition at the site. These lands will be altered from their current condition through several pathways including:

- Conversion of terrestrial lands into submerged lands.
- Elimination of the viability of remaining dune and forested dune habitats (largely due to encroachment, removal, disturbance, etc.) and reduction in the viability of immediately adjacent habitat as a result of construction of the LNG storage tanks and pipeline network, installation of road networks to support the site, and direct forest clearing of at least 90.0 acres.
- Impacts to the uplands and wetlands at the JCEP sites will essentially render much of the affected habitats area incapable of supporting the native plant and wildlife species that currently occupy the site due to a number of factors including, but not limited to:
    - Direct removal and disturbance (e.g. disturbance factors such as ship moorage/loading activities and road traffic, machinery and compressor noise). The DEIS notes that during construction sound levels will be similar to the city of North Bend. The DEIS states, "We predict that operational noise from the LNG terminal would have an equivalent sound level (Leq) of 49 dBA and day-night sound level (Ldn) of 55 dBA when measured about 0.7 miles away".
    - Alteration of the surfaces through paving, placement of gravel, removal of the organic layer on the sandy soils, etc. that eliminate capacity of the habitats to support fish and wildlife
    - Invasion of competitive plants and non-native or native plant and animal colonists such as crows, starlings, and Scotch broom (*Sarothamnus scoparius*) that result in a loss of habitat capacity and function due to competitive interactions.
- Institution of daily human disturbance that will likely occur post-construction during the operations at the site.
- Creation of the slip/berth and associated LNG facility will further fragment the North Spit peninsula. Peninsula type habitats are uniquely rare on the Oregon Coast.

Impacts from the PCGP Pipeline to Fish and Wildlife Habitat - The FERC DEIS description for the PCGP (pipeline) portion of the project outlines proposed construction of a 36" steel gas pipeline from the North Spit of Coos Bay, Oregon (229 miles) to Malin, OR in order to connect the JCEP export facility to the Ruby LNG pipeline carrying gas primarily from the Rocky Mountain region. The pipeline will cause significant direct and indirect impacts to fish and wildlife habitat, as well as the indirect impacts to water quality associated with an increase in watershed runoff caused by this project, particularly in areas where the pipeline is proposed on slopes exceeding 50%, and where vegetation will be removed from riparian corridors. Impacts are likely within the Coos, Coquille, South Umpqua, Upper Rogue, Upper Klamath, and Lost River watersheds. According to the DEIS, the pipeline would affect 352 waterbodies, including 69 perennial streams, 270 intermittent streams, 9 perennial ponds, and 4 estuaries (Page 4-93). This is significant because all of these waterbodies provide habitat for fish and wildlife.

The applicant proposes to utilize horizontal directional drilling (HDD) for the crossing of the Coos Bay estuary, Coos River, Rogue River, and Klamath River. The applicant would use dry open-cut crossing methods where HDD methods are not planned. These actions will have temporary and permanent impacts to fish and wildlife

habitats, which ODFW recommends be addressed consistent with the ODFW Fish and Wildlife Habitat Mitigation Policy, be performed consistent with ODFW recommended In-Water Work Windows, and be permitted where applicable via ODFW In- Water Blasting and Fish Passage authorizations.

ODFW acknowledges that some of the aquatic habitats in Coos Bay have been impacted historically from dredging, rip-rap installation, upland and tidal mudflat leveling, filling of tidal wetlands/saltmarsh, and other development/utilization impacts, However, substantial recovery of ecological potential has occurred due to improvements in forest management (reducing sediment inputs) and regulations conserving wetlands and waterways. The current and desired future condition of the waterbodies that will be affected by the pipeline is predominantly linked to management actions in the riparian habitats and adjacent uplands. Many of the streams that will be impacted by the pipeline have been ecologically degraded historically by a number of human impacts including: removal of native coastal riparian forest, road construction with subsequent chronic sediment contribution, and debris torrent/mass-wasting events related to forestry activities. The majority of these streams, many of which are critical for native salmon, trout, sculpin, lamprey, and other aquatic species production, are in a gradual trend of recovery following management guidelines and Best Management Practices implemented through agency and private ownership coordinated efforts (Oregon Coast Coho Conservation Plan; ODFW 2007). Actions such as pipeline construction and maintenance with associated long-term disturbance introduce an added burden inhibiting ecological recovery. Pipeline stream crossings have the potential to negatively affect watercourse ecosystems through alteration of channel beds and banks, increasing total suspended solids (TSS), alteration of substrate size and quantity in the reach and changes to the immediate area benthic community. These impacts can result in deleterious impacts for fish due to decreased food availability, changes in foraging range increasing predation, aquatic habitat simplification, and decrease in overall health.

ODFW recommends robust emergency preparedness plans be developed for the long-distance HDD across Coos Bay (along with other waterway crossings) to prepare for catastrophic failures, and that these plans be developed in coordination with State of Oregon agencies including ODFW.

There are numerous critical concerns with placement of the pipeline on steep slopes and direct routing parallel to the slope. Coastal sandstone soils are highly susceptible to mass-wasting when undercut and generally disturbed. A relatively extensive access road network will be created to access the pipeline installation and facilitate pipeline maintenance, which will further create potential for mass-wasting slope failures and general sediment production over the current condition. Stream health related to anadromous fish production has largely been assessed to be predominantly “Poor” (Scale: “Very Poor”; “Poor; Fair”; “Good”; “Excellent”) in the Coos and Coquille River basins, with similar stream health conditions in the South Umpqua River basin. This “Poor” condition rating is largely related to upland disturbance increasing sediment loading and loss of riparian forest since 1900. Additionally, the proposed access road networks will likely have long-term chronic effects to fish and wildlife unless seeded, mulched, and closed. Sediment transport to streams is considered a substantial factor currently suppressing recovery of OC Endangered Species Act (ESA) threatened Coho salmon. Extensive research has documented the impacts of sediments to salmonids. Work to reduce sediment input into coastal and inland streams that will be impacted by the pipeline is foundationally critical for enhancing spawning and rearing habitat for fall Chinook salmon, Oregon Coast (OC) threatened Coho salmon, Pacific lamprey (Entosphenus tridentata), winter steelhead (O. mykiss irrideus) and coastal cutthroat trout (O. clarki clarki) as water quality is directly linked to hatch rates and food available for these species. Sediment loading above natural background levels contributes to embedding of substrates, which often results in reduced hatch rates for eggs in redds, inability of fry to emerge from redds, inhibited production of macroinvertebrates (invertebrates

largely live in the interstitial spaces of gravels), and impacts on the ability of fish to obtain food due to the nature of salmonids to feed predominantly by using their sight (Burns 1970; Hall and Lanz 1969; Weiser and Wright 1988; Suttle et al. 2004; Tripp and Poulin 1992; Waters 1995). For these reasons, ODFW recommends FERC and the Cooperating Agencies include ODFW in coordination discussions with NMFS to identify appropriate take mitigation strategies.

FERC should also be aware that Oregon Department of Forestry (ODF) fish presence/absence surveys represent "present conditions", and although highly useful, do not comprehensively represent historical fish usage as some watersheds have culvert barriers, man-made dams, etc. that are as of yet undocumented. For this reason, ODFW recommends coordination with ODFW to identify streams that should be surveyed, and where appropriate avoidance, minimization, and mitigation measures should be designed prior to construction.

Impacts to Marbled Murrelet and Northern Spotted Owl Habitat - ODFW is particularly concerned about the PCGP project's impacts to late-successional forest wildlife such as the marbled murrelet (MAMU) and the northern spotted owl (NSO). Both of these species are also listed as Threatened on the Oregon Endangered Species Act (ORS 496.171-192, also see OAR 635-100-0105). Both species are experiencing declines in higher-suitability habitat in Oregon. For example with regard to MAMU habitat, Raphael et al. (2016) estimated that higher-suitability habitat in Oregon declined from 853,400 acres in 1993 to 774,800 acres in 2012, a net loss of 78,600 acres (-9.2%). On federal lands, losses were mostly due to wildfire, whereas those on nonfederal lands were largely the result of timber harvest.

The DEIS does not acknowledge the state's authority (Section 1.5.2.5) and ODFW recommends this be rectified. The Oregon ESA's primary authority is related to state agency actions on state-owned or managed lands; and in so doing prohibits 'take' (killing or obtaining possession or control) without an incidental take permit. Where approval for take is given by USFWS, then this is taken as a waiver under Oregon ESA. ODFW defers to USFWS take permit determinations for species that are listed both at the state level and federally per the Endangered Species Act (ESA, 1973 as amended). ODFW can be more restrictive than the USFWS in its protection of listed species, but cannot be less restrictive. Moreover, ODFW can address habitat mitigation needs for listed species per the Oregon Wildlife Policy (ORS 496.12) and the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 435 Division 415), on both federal and non-federal lands (see *California Coastal Commission v. Granite Rock Co.*, 480 U.S. 572 (1987); 43 CFR 24.3(a) ("In general the States possess broad trustee and police powers over fish and wildlife within their borders, including fish and wildlife found on Federal lands within a State.")).

ODFW's understanding from reading the DEIS is that FERC and its Cooperating Agencies have not yet developed a biological assessment (BA) or begun consultation with the USFWS who has federal jurisdiction per the federal ESA. ODFW understands that consultation will fall under Section 7 for the federal action and for the federal lands within the project, but that Section 9 and Section 10 of the federal ESA will also apply to the non-federal portion of the project. The DEIS does not discuss how this consultation will occur on the non-federal portion of the project, or how this relates to FERC's authority and decision making for a project that crosses multiple land ownerships, and ODFW recommends this information be provided.

Based on the projected impacts to MAMU and NSO owl habitats, and the lack of inclusion of the USFWS Jordan Cove Conservation Framework (USFWS 2014, included in the FERC 2014 DEIS but absent from the 2019 DEIS), ODFW does not see how this project will avoid a determination of jeopardy and 'take'. According to the DEIS (Page ES-4), the pipeline would impact over 2,000 acres of forest including over 750 acres of late-stage old-growth forest that provides habitat to marbled murrelet, northern spotted owl, and other federally-listed and state-listed (ORS 496.171-182) threatened and endangered species. The federal ESA mandates that any project authorized by a federal agency should "not jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined…to be critical". The DEIS Section 4.6 (page 4-323-330) details the potential impacts to both MAMU and NSO, including clearance of large trees and understory essential for nesting habitat to create the pipeline right-of-way and for temporary work areas, as well as impacts from ambient noise and human disturbance. Furthermore, for the MAMU, which forages at sea, LNG carrier traffic and their associated impacts (ballast water, dredging, risk of fuel and lubricant spills, etc.) creates additional risk for the species. The DEIS describes the minimization measure proposed by the applicant to mitigate for these risks, which simply involves a timing restriction for tree removal within the breeding season. ODFW finds this measure to be inadequate, and looks to the suite of minimization and mitigation measures identified in the 2014 *Revised Conservation Framework for the Northern Spotted Owl and Marbled Murrelet: Jordan Cove Energy and Pacific Connector Gas Pipeline Project* (USFWS 2014) as essential to addressing the take and jeopardy anticipated with this project. Furthermore, ODFW contends that the amount of habitat removal for MAMU and NSO suitable or occupied habitat is not lawful without an incidental take permit developed under a federal Habitat Conservation Plan. ODFW recommends consultation with USFWS as soon as possible, and that the 2014 USFWS Conservation Framework be fully re-incorporated into the applicant's plans and into the FERC and Cooperating Agencies' NEPA process.

It is not clear to ODFW whether all of the MAMU habitat and NSO habitat has been surveyed throughout the project. ODFW understands that the applicant does not have access to some lands where the project is proposed. However, surveys are essential prior to disturbance in order to establish appropriate avoidance, minimization, and mitigation measures. ODFW recommends FERC require that MAMU surveys be conducted on all lands (federal and non-federal) according to the Pacific Seabird Group Protocol (Mack et al. 2003, revision pending), which requires at least two years of survey prior to construction. ODFW recommends full NSO surveys also be conducted according to protocol (USFWS 2012). Given ODFW's jurisdiction per the Oregon ESA, ODFW also recommends that the data resulting from those surveys be provided to ODFW as well as access to all information in the upcoming BA.

Fish and Wildlife Habitat Mitigation – ODFW recommends that aquatic and upland impacts to fish and wildlife habitats be addressed consistent with the Oregon Wildlife Policy (ORS 496.012) and implemented through the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000 through 0025). This rule governs ODFW's provision of biological advice and recommendations concerning mitigation for losses of fish and wildlife habitat caused by development actions. Based on standards in the rule, the applicant seeks ODFW concurrence on the appropriate category to apply to land or water where a development action is proposed. If the habitat is Category 1, ODFW must recommend that impacts to the habitat be avoided. If impacts cannot be avoided, ODFW must recommend against the development action. If ODFW determines that such habitat is Category 2, ODFW must recommend that impacts to the habitat be avoided and if impacts cannot be avoided, ODFW must recommend a high level of mitigation (as specified in more detail in the rule). If such mitigation is not required,

ODFW must recommend against the development action. Subsequent specific mitigation goals follow for habitats determined to be Category-3, 4, 5 and 6, and for which impacts cannot be avoided.

In previous versions of the JCEP/PCGP project, the applicant was working cooperatively with ODFW to develop habitat mitigation plans for the LNG terminal area and for the pipeline. Draft plans included habitat categorization for areas of direct impact, and lists of potential mitigation options were in development. In the current DEIS, the habitat categorization is provided for the LNG terminal but not for the pipeline and is not taken further to identify mitigation obligations for those habitat categories that will be impacted. On Page 4-186 the DEIS states "*More details on these upland mitigation sites will be provided in a Wildlife Habitat Mitigation Plan that will be provided by the applicant as an appendix to their Comprehensive Mitigation Plan*". However the DEIS does not include any conditions of approval requiring completion of this work and mitigation that offsets the impacts. ODFW deems a mitigation plan essential to avoiding serious depletion of - and significant adverse impacts to - the fish and wildlife resources of the State of Oregon. Fish and wildlife habitat mitigation is also essential per the Oregon Wildlife Policy (ORS 496.12), and ODFW contends that this mitigation should pertain to both federal and non-federal lands. ODFW recommends that FERC include a condition requiring development of a fish and wildlife habitat mitigation plan in consultation with ODFW, and that mitigation commence concurrent with construction.

Since the inception of the JCEP/PCGP project, ODFW has been calling for a comprehensive mitigation plan that provides the public and the reviewing agencies with 'one-stop shopping' for all of the various mitigation pieces. The primary purpose of this comprehensive mitigation plan would be to ensure that all natural resource impacts are adequately addressed in a seamless fashion both geographically and jurisdictionally, in part to avoid duplication, but also in part to ensure nothing slips through the cracks. To date, a comprehensive mitigation plan has not been developed by the applicant and does not appear in the DEIS. ODFW recommends FERC, the Cooperating Agencies, and the USFWS work with the applicant and the State of Oregon natural resources agencies to develop a comprehensive mitigation plan. A comprehensive mitigation plan should follow the mitigation hierarchy of avoid, minimize, and mitigate and include at least the following components of mitigation to address:

- ESA listed species per USFWS and NFMS consultation in Section 7 and Section 10 processes,
- Migratory Bird Treaty Act species including golden and bald eagles,
- Marine mammals per the Marine Mammal Protection Act,
- Fish and wildlife habitat loss (on all land ownerships) per the ODFW Fish and Wildlife Habitat Mitigation Policy,
- Fish passage mitigation,
- In-water blasting impacts,
- Water quality/quantity mitigation per DEQ 401 Water Quality Permitting and through WRD Limited License Approvals,
- Wetland/waterway mitigation per DSL removal fill and US Army Corps of Engineers 404/408 permits,
- USFS, BLM, BOR, and USACE mitigation.

Oversight for implementation of this comprehensive mitigation plan could become part of the role for the NRTAG, see above.

ODFW acknowledges that some mitigation for fish and wildlife impacts has been identified in the DEIS, and

views this work as a good start. However, many habitats and the impacts to the State's fish and wildlife resources remain unaddressed through these measures. In particular, ODFW notes that mitigation for upland wildlife habitat impacts along the PCGP pipeline have not been addressed at all in the DEIS.

The DEIS identifies five mitigation areas, which ODFW addresses more specifically below.

1 – Compensatory Wetland Mitigation Plan and the Kentuck Slough Wetland Mitigation Project (information found at Chapter 2.1.1.9; Chapter 4.5.2.2; pgs 4-245 to 248; TABLE 4.11.3.1-1 (continued) Chapter 5.1.3.3 within the DEIS)

It should be noted that the numbers for waterbody crossings vary across documents. ODFW found differing numbers in the applicant's Compensatory Wetland Mitigation Plan (CWMP) as compared to the Applicant Prepared Biological Assessment. Those numbers differed again from the numbers reported in the FERC Resource Reports and those were again different from the DEIS. Recognizing that project design shifts over time while documents remain static depending on time of publication, it does make it difficult to assess impacts without consistent numbers as well as inconsistent definitions of waterbody (as opposed to the normal terminology used by the state for 'waterway' and 'wetland') and FERC's usage of the terms "coldwater" and "coolwater" which are not defined in the DEIS and which have no definition in State of Oregon regulations. ODFW recommends state definitions be used for the aquatic resources of the state (ORS 196.800 and OAR 141-085).

With regard to avoidance and minimization measures discussed in the plan, ODFW appreciates the applicant's efforts to co-locate facility components with existing infrastructure and previously disturbed areas where possible. ODFW supports the minimization measures and best management practices identified in the CWMP, but also directs FERC and the applicant's attention to the comments provided throughout this letter that would further help to minimize impacts to fish and wildlife habitats.

ODFW believes wetland impacts were underestimated for this project because the applicant did not consider temporary impacts in its calculations. Per OAR 141-085-0510(99), the Oregon Department of State Lands (DSL) treats temporary impacts as adverse impacts to waters of the state that are rectified within 24 months from the date of the initiation of the impact. DSL considers any impact duration longer than two-years as permanent, even though the US Army Corps of Engineers does not define temporary. The CWMP states that for the sake of consistency, the plan only addresses 'actual' permanent impacts and temporary impacts will be addressed in a separate site restoration plan. ODFW interprets this to mean that the applicant is considering anything less than a permanent impact to be temporary and therefore not requiring a mitigation offset. This interpretation does not meet the ODFW Fish and Wildlife Habitat Mitigation Policy which directs ODFW to consider the nature, extent, and ***duration*** of impacts and that offsets should persist for the life of the impact. Because of the 'duration' language in the mitigation policy, ODFW bases its recommendations not only on the physical loss of habitat, but also the length of time for which that habitat is unavailable to fish and wildlife (referred to as temporal loss of habitat). Impacts that the applicant might consider temporary in nature might actually result in temporal loss of habitat that should be mitigated in order to prevent depletion of a species with short generational turnover, and to meet the mitigation policy's goal of 'no net loss'. ODFW contends that unavoidable impacts (i.e., greater than two years) should be addressed in the CWMP.

ODFW notes that mitigation for the unavoidable impacts to freshwater wetlands along the 229-mile pipeline will be consolidated into the uppermost 10 acres of the Kentuck Mitigation Site in Coos Bay. ODFW reviewed the

section of the CWMP that discussed the reasoning for consolidation (page 2). The ODFW Fish and Wildlife Habitat Mitigation Policy recommends in-proximity mitigation for impacts to Habitat Categories 2 and 3. Since the CWMP did not provide a categorization of habitats for the pipeline, ODFW is not clear whether and/or how in-proximity mitigation options were considered and found to be untenable, or that the Kentuck option provided greatest overall net benefit to Oregon's wetland resources.

ODFW notes that the Kentuck Wetland Mitigation Project forms the basis of mitigation in the CWMP for all estuarine and freshwater wetland mitigation impacts associated with the LNG facility and the pipeline. Overall, ODFW supports the Applicant's proposal for restoration at Kentuck Slough because, if successful, the project will improve the quality and diversity of rare estuarine habitats as well as freshwater habitats.

The Kentuck mitigation site is approximately 100 acres in size. The current mitigation plan proposes a network of tidal channels and removal of a segment of East Bay Drive in order to connect these channels to Coos Bay tidal inflow/outflow. Additionally a portion of Kentuck Creek streamflow will be guided through the new channel network using a modestly complex configuration of culverts and tidegates. The habitats at the Kentuck site have been diked, drained, tidegated, cultivated, grazed, and stream networks channelized since the late 1800's resulting in substantial degradation of the ecological productivity. Historically the site would have been defined as Habitat Category-2 intertidal Algae/Mud/Sand habitats, under ODFW Fish and Wildlife Habitat Mitigation Policy. However, currently the function for native fish and wildlife species is considered Category-4 and 5 in some locations.

Mitigation restoration will reestablish natural hydrologic regimes to a substantial degree at the site, although the entrance of tidal flow will be truncated partially due to the limited opening through East Bay Drive and partial reintroduction of Kentuck Creek flow. Historically, full volume flood flows from Kentuck Creek would have been able to support a broader range of euryhaline conditions for native fish and wildlife. Additionally, tidal flows would have been a combination of sheetflow and channel flow prior to installation of East Bay Drive. The mitigation restoration proposes to establish tidal channel flow. However, without full removal of the length of East Bay Drive (which ODFW is not suggesting as an option), sheetflow will not be reestablished. As a result, full hydrologic connectivity will remain limited.

Algae-mud-sand habitats, as well as saltmarsh habitats are considered Habitat Category 2 per the ODFW Fish and Wildlife Habitat Mitigation Policy. The JCEP project impacts to intertidal habitats include primarily: Habitat Category 2 Intertidal Unvegetated Sand; Habitat Category 2 Shallow Subtidal; Algae/Mud/Sand; Habitat Category 2 eelgrass; and Habitat Category 3 Deep Subtidal. The majority (very roughly 82 acres; based on LiDAR evaluation) of the Kentuck Slough within the proposed mitigation area is currently below elevation 5.0ft MLLW. Excavation of a tidal channel through East Bay Drive with the current elevations within the mitigation area would allow nearly all lands within the site to be inundated with the majority of tides. The JCEP project proposes using the Kentuck Mitigation site for dredge material disposal (300,000 CY) that would elevate a substantial proportion of the project area above elevation 5.0ft MLLW, which decreases the land area that will be inundated regularly and prevents inundsation with the majority of tides. However, ODFW recognizes the potential for the higher elevation areas as a result of the fill to eventually vegetate to saltmarsh ecotype, which is considered high in value and limited in Coos Bay.

While there may be sufficient acreage at this site to meet the Oregon DSL's standard for a 3:1 restoration ratio as a result of the dredging impacts at the JCEP site, a number of potential impacts (e.g. salinity gradient issues, changes in bay turbidity, creation of a deepwater zone) that will occur due to construction of the JCEP will not be compensated in-kind as the salinity gradients are out of the range that is present at the project location.

Public access is currently not allowed at the Kentuck Mitigation site, however, it is allowed on the water at the North Spit and South Dunes portions of the bay. Recreational access to the estuary and shoreline habitats of the bay is an important component of the local economy. It is expected that the security zone in the JCEP project area following construction will significantly reduce public use of the bay and adjacent uplands, and the Kentuck Slough will likely see increased public recreation interest for clamming and birding. JCEP will need to work with ODFW and other relevant state agencies to determine appropriate recreation management strategies that address the lost recreation opportunity while sustaining the likelihood of success of the mitigation efforts.

Saline waters will move upstream into the Kentuck mitigation site via restoration actions allowing more viability of mariculture (i.e. Pacific oyster farming). The effective area available for expansion of mariculture will not only be within the new mitigation site, but there will also be an increase in the particle range (i.e. drift of Oyster spat) of these operations up bay. The spread of the footprint of mariculture operations just down Bay (defined as within ¼ mile) from the mitigation site may retard the creation of this restored estuarine habitat in Kentuck Slough. These types of mitigation may not be effective in the context of future expansion of mariculture which would likely defeat mitigation goals. Although it will likely be practical for oyster cultivation on the mitigation site, this would be counter-productive to the intended goals of mitigating for fish and wildlife. ODFW recommends careful consideration of restricting commercial oyster cultivation from the Kentuck mitigation site as a condition of the FERC approval.

ODFW also requests that FERC require coordination between JCEP/PCGP and ODFW during the development/construction of the Kentuck Mitigation site, so that ODFW will be able to provide JCEP/PCGP with recommendations for the planning, construction, and long-term monitoring of the ecological functions.

2) Eelgrass Mitigation Plan (DEIS Section 4.3.2.1, and see *Jordan Cove Energy Project Compensatory Wetland Mitigation Plan* filed with the FERC in May 2018)

Native eelgrass is recognized by ODFW as a Habitat Category 2, and the ODFW goal is no net loss of either habitat quantity or quality and to provide a net benefit of habitat quantity or quality (OAR 635-415-0025). To achieve the mitigation goal, ODFW recommends avoidance of the impacts through alternatives to the proposed development action, or mitigation of the impacts (if unavoidable) through reliable in-kind, in proximity habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality.

In order to offset the loss of 1.9 acres of eelgrass, the JCEP includes a proposed eelgrass mitigation plan that relies on the “best case scenario” for full success by creating 6.03 acres of eelgrass (3:1 ratio) within a 9.34 acre site in the intertidal zone near the impact area. ODFW has noted a number of potential issues associated with the proposed JCEP mitigation plan that have not been considered/addressed fully by the applicant.

The DEIS does not demonstrate that serious consideration has been given to avoidance of the impacts to eelgrass beds. In this regard, the JCEP Mitigation Plan should describe the alternative sites that were considered, characterize the location, species composition, and abundance of the eelgrass and other submerged aquatic vegetation at the alternative sites, and provide the rationale for rejection of the alternative sites and preference for the proposed site. The existing JCEP Mitigation Plan is incomplete because it does not provide a full description of the steps that were taken to avoid adverse impacts to existing eelgrass beds in Coos Bay.

The proposed eelgrass mitigation plan does not give serious consideration to the difference in habitat quality that is anticipated between the eelgrass impact area and the eelgrass mitigation site. The plan proposes to excavate 9.34 acres of existing algae/mud-sand algae habitat located in the intertidal zone near the North Bend Airport to an elevation of -2.00 ft NAVD, and to convert the algae/mud- sand habitat into 6.03 acres of eelgrass. The proposed conversion of algae/mud-sand habitat to eelgrass habitat is problematic, because eelgrass and algae-mud-sand is also recognized as Habitat Category 2 value habitat under ODFW Fish and Wildlife Habitat Mitigation Policy. While these habitats are both considered as Habitat Category 2, they provide different functions and values. Accordingly, diminishing the quantity and quality of algae/mud-sand habitat in order to offset the loss of eelgrass habitat is not 'in kind' and does not create a 'net benefit', and therefore does not meet the ODFW Fish and Wildlife Mitigation Policy goals for Habitat Category 2.

Earlier attempts to mitigate for the damage or loss of eelgrass beds have met with limited success in Pacific Northwest estuaries. For example, Thom et al. (2008) conducted a review of 14 eelgrass mitigation and transplant projects, and they concluded that it is sometimes possible to restore eelgrass under favorable site conditions when the reason for the initial loss of eelgrass is understood and corrected. The authors also noted, however, that eelgrass restoration science is hampered by knowledge gaps which reduce restoration success. The underlying mechanisms for recent eelgrass loss in the Pacific Northwest region are not obvious, which suggests that the scientific understanding of eelgrass biology and ecosystem conditions is currently inadequate to fully support environmental management actions (Thom et al. 2008).

There are often hydrologic flow regime complexities that affect potential for success in eelgrass restoration:

- Habitat conditions created through excavation or filling are often ephemeral and subject to subsequent deposition/erosion that results in movement of conditions outside of the range of preferred variability for eelgrass.
- Flow regimes including severity of wave action and current speed contribute to the potential success of a site for eelgrass establishment and growth. Sites that are created through excavation or fill are an artificial modification of conditions that have formed through the geomorphological features that drive flow regimes. Factors such as water depth reflect deposition/erosion rates from water transported sediments. Excavation or filling to a specific elevation is attempting to alter the natural elevation conditions in relation to hydrologic conditions for many sites that might serve as potential mitigation. Resultantly there is limited potential for success of projects that modify water depth/elevation of the substrates for creating conditions appropriate for eelgrass mitigation unless the site chosen has substrate elevation that has been artificially created from previous disturbance or the conditions are dominated by factors other than hydrology.
- Use of eelgrass sites immediately adjacent to or within the mitigation area for obtaining plants/shoots results in impacts to these locations, potentially weakening the vigor of eelgrass at these locations which is counter to goals.
- Excavation of locations adjacent to existing eelgrass beds can result in hydrologic changes such as erosion of surrounding substrates resulting in impacts to currently productive stands.
- The monitoring plan should include more robust methods such as diver or low tide visual count surveys with established known planting densities at time-0 and subsequent measurable surveys with quantifiable methods.
- Due to the potential for minimal success the eelgrass mitigation ratio is likely insufficient to offset impacts at the JCEP project impact location.

For all of the reasons listed in the discussion above, ODFW recommends the eelgrass mitigation strategies be re-evaluated to favor avoidance.

3, 4, and 5) Panhandle, Lagoon, and North Bank Mitigation Sites (Section 2.1.1.9 in the DEIS)

The DEIS reports three upland habitat mitigation sites. The Panhandle site is approximately 133 acres and is located north of Trans-Pacific Parkway. The Lagoon site is approximately 320 acres and is located adjacent to the meteorological station. The North Bank site is approximately 156 acres and is located on the north bank of the Coquille River adjacent to the Bandon Marsh National Wildlife Refuge (NWR). ODFW is aware of these locations and acknowledges that these sites have been part of preliminary discussions with JCEP/PCGP about potential mitigation sites. During those discussions, ODFW expressed reluctance to accept those sites as appropriate mitigation because much of the habitat types were out-of-kind. For example, ODFW expressed reluctance over the North Bank land purchase as complete mitigation for the loss of forested dune habitat (coastal marten Category 2 shore pine habitat), because the North Bank site is largely Douglas fir forest and not shore pine forest. Without a habitat mitigation plan that details categories of habitat impacts by the LNG facility and how these mitigation sites offset the functions and values being lost, it is difficult for ODFW to determine if these sites will meet the criteria outlined in the ODFW Fish and Wildlife Habitat Mitigation Policy. ODFW recommends these sites be evaluated in coordination with ODFW as part of a larger habitat mitigation planning effort.

Additional Mitigation Recommendations

- **MAMU and NSO Habitat and the ODFW Fish and Wildlife Mitigation Policy**

The DEIS identifies seasonal restrictions for tree removal and construction activity as the only mitigation measure to address impacts to MAMU and NSO habitat. ODFW finds this wholly inadequate for avoiding take and jeopardy of both species given the significance of predicted impact (see comments above) and federal ESA obligations. The proposed seasonal restrictions are a minimization measure that does not address the net loss in habitat. ODFW had expected these species to be foremost in a comprehensive mitigation plan for the JCEP/PCGP project. However, that plan has not been included in the DEIS. ODFW recommends a comprehensive mitigation plan be developed that includes adequate measures to achieve the goals of avoidance, as well as no net loss and net benefit. In addition, the mitigation plan should be developed for all land ownerships, consistent with the recommendations provided below and with the guidance provided by the USFWS in the 2014 Conservation Framework.

In the 2014 version of the PCGP project, a habitat categorization effort was underway with the PCGP's biological consultants. In the current project, PCGP has stated verbally their plan is to continue using that previous work to develop a wildlife habitat mitigation plan for the pipeline. However the DEIS does not provide any indication that this effort or evaluation has been initiated or developed. PCGP has also met with ODFW in early 2019 to discuss potential revisions to the categorization of Category 1 habitat for MAMU. ODFW requested additional information prior to providing feedback to PCGP. That data request included access to Appendix Z from the Applicant Prepared Draft Biological Assessment (provided to the FERC docket in September 2018), as well as greater detail on the definitions and methods used to delineate potential MAMU habitat, and spatially-explicit information on survey areas and results. At this time, the applicant has provided ODFW with a qualitative description of methods and results but has not provided ODFW with the previously requested information (Appendix Z, the spatially-explicit information). Until that information is provided and reviewed by ODFW, ODFW continues to provide the following recommendations.

In the ODFW Fish and Wildlife Habitat Mitigation Policy, Habitat Category 1 is irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population or unique

assemblage. The mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality. For Category 1 habitat, ODFW recommends avoidance of impacts through alternatives to the proposed development action; or no authorization of the proposed development action if impacts cannot be avoided (OAR 635-415-0025(1)(b)).

For the NSO, the nesting habitat for the owl is extremely limited on a physiographic basis, and the structural characteristics of their nesting sites (old growth trees, complex understory, available prey base, connectivity of habitat) are irreplaceable within the life of this project. . Therefore, ODFW deems the 70-acre nest patch as Habitat Category 1 (consistent with the Oregon Forest Practices Act ORS 197.277 and OAR 629 Division 665, as well as the federal ESA). ODFW recommends avoidance of any habitat loss within presumed-occupied and occupied nest patches (as per protocol-level survey – see above) for the NSO. This recommendation applies to any season, not just the active breeding season, especially given the NSO's strong nest site fidelity.

The DEIS states "*The Project would affect habitat within 97 NSO home ranges and 9 nest patches. About 37 miles of pipeline route would cross 7 designated critical habitat sub-units. Project construction would remove a total of about 517 acres of nesting, roosting, or foraging (NRF) habitat for NSO, of which 134 acres would be permanently lost within the 30-foot-wide corridor maintained in an herbaceous state. Additionally, 214 acres of NRF habitat for NSO would be modified and used as UCSAs. Approximately 1,158 acres of dispersal habitat (high NRF, NRF, and dispersal only habitat) would be removed by the Project. Approximately 919 acres of NSO capable habitat would be removed by construction of the proposed Project, of which 216 acres would remain in a permanent herbaceous/shrub state within the 30-foot operational ROW. Approximately 13,294 acres of NSO habitat (1,307 acres of high NRF/NRF habitat, 4,147 acres of dispersal only habitat, and 5,690 acres of capable habitat) occur within 100 meters (328 feet) of habitat removal, of which 4,326 acres (or 32.5 percent of NSO habitat within 100 meters of habitat removal) of interior NSO habitat would be indirectly affected (1,586 acres of high NRF/NRF habitat, 1,388 acres of dispersal only habitat, and 1,352 acres of capable habitat). The Pacific Connector Pipeline Project would remove 442 acres from LSRs , of which 379 acres is NSO habitat or capable of becoming NSO habitat (approximately 69 acres of high NRF, 93 acres of NRF [includes about 9 acres of "post-fire" NRF], 71 acres of dispersal only habitat, and 146 acres of capable habitat)".*

ODFW does not support any impact within the 70-acre nest patch and believes allowance of such activities will result in net loss of habitat and 'take' per the federal ESA and potentially per the Oregon ESA if NSO are physically harmed in the process. Therefore, ODFW recommends the PCGP project explore alternatives that avoid direct impacts and habitat loss within NSO nest patches, as those impacts are not mitigatable.

Beyond the NSO nest patch, ODFW defines the remainder of Nesting Roosting Foraging Habitat (as defined in the USFWS 2014 Conservation Framework) as Category 2 habitat. While avoidance and minimization is prioritized, impacts to Category 2 habitat are mitigatable at the high standard of 'no net loss of either quantity or quality and to provide a net benefit in habitat quantity or quality'. To meet that mitigation goal, ODFW recommends those acres in Nesting Roosting and Foraging Habitat (beyond the 70-acre nest patch) be identified as Category 2 habitat and that mitigation strategies be developed consistent with the guidance provided by the USFWS in the 2014 Conservation Framework.

Similar to the NSO, nesting habitat for the MAMU is extremely limited on a physiographic basis, and the structural characteristics of their nesting sites (primarily mature and old growth trees, the presence of nesting platforms, complex understory, and connectivity of habitat) are irreplaceable within the life of this project. For this reason, ODFW considers occupied MAMU sites (as defined by Mack et. al. 2003) Category 1

habitat in the context of an impact such as the PCGP project. According to Mack et al. 2003 an occupied site would be where protocol level surveys were performed for a minimum of two years in suitable habitat, and where a sub-canopy detection of a MAMU was made. The extent of the occupied habitat is based on all suitable habitat encountered until interrupted by a 100-meter break in habitat continuity. ODFW recommends avoidance of any habitat loss within occupied MAMU habitat. This recommendation applies to any season, not just the active breeding season, especially given the MAMU's strong nest site fidelity. These recommendations should apply to all land ownerships, as they match what ODFW would recommend to state agencies per OAR 635-100-0137.

The DEIS states "*Construction of the Project would remove a total of about 806 acres of MAMU habitat (suitable, recruitment, capable), including about 78 acres of suitable habitat removed from 37 stands (18 occupied MAMU stands and 19 presumed occupied stands). There is the potential that effects could extend over a total of about 7,145 acres of suitable nesting habitat in the terrestrial nesting analysis area (i.e., the extent of disturbance/disruption of MAMU during the breeding season; FWS 2014c), where Project-related noise, primarily use of access roads, may affect MAMU behavior, including breeding activities. HDD and DP activities are not anticipated to disturb nesting MAMU as noise associated with this work would attenuate to ambient levels before reaching MAMU stands. Ten occupied and 24 presumed occupied MAMU stands occur within CHU OR-06 (b, c, and d) within the proposed terrestrial nesting analysis area. Overall, construction of the Pacific Connector Pipeline Project would remove about 4 acres of suitable MAMU nesting habitat (PBF- 1) and about 12 acres of recruitment habitat and 15 acres of capable habitat (both of which make up PBF-2) within CHU OR-06-d*". Impacts would occur in the form of tree removal, trenching, ROW maintenance, noise disturbance, by the PCGP project. However, it is not clear whether PCGP had access to all potentially suitable habitat for surveys. ODFW believes allowance of any impacts in MAMU occupied nesting habitat will result in net loss of habitat and 'take' per the federal ESA and potentially per the Oregon ESA if MAMU are physically harmed in the process. Therefore, ODFW recommends the PCGP project explore alternatives that avoid direct impacts and habitat loss within occupied MAMU nesting habitat, as those impacts are not mitigatable.

Beyond the Category 1 occupied MAMU nesting habitat, ODFW considers suitable MAMU nesting habitat (where structural characteristics exist but sub-canopy detections were not made) to be Category 2 habitat given its essential and important role as potential MAMU nesting habitat (and to account for missed detections of elusive birds). While avoidance and minimization is prioritized, impacts to Category 2 habitat are mitigatable at the high standard of 'no net loss of either quantity or quality and to provide a net benefit in habitat quantity or quality'. To meet that mitigation goal, ODFW recommends those acres in suitable MAMU nesting habitat be identified as Category 2 habitat and that mitigation strategies be developed consistent with the guidance provided by the USFWS in the 2014 Conservation Framework.

- **Snowy Plover Habitat**

ODFW defines snowy plover nesting and foraging habitat as Category 2 per the ODFW Fish and Wildlife Habitat Mitigation Policy (essential and limited, but can be replaced and enhanced). At a minimum, an area of beach/dune habitat, from 1-2 km in length north of the current nesting area (Oregon Dunes National Recreation Area) would be an appropriate set-aside to be managed for nesting snowy plovers). Habitat preparation and management (dune sculpting, physical removal and disposal of non-native beach grasses, predator management, and public outreach and control) would all be appropriate forms of mitigation uplift. These mitigation options are an opportunity to create a success story for snowy plover recovery and community engagement. ODFW recommends FERC require JCEP to coordinate with ODFW to develop

mitigation strategies to offset the direct and indirect impacts expected from this project, so that take/jeopardy determinations can be avoided in the Section 7 and Section 10 (if applicable) consultations.

- **Coastal Martens**

The JCEP LNG terminal would remove shore pine habitat that is important and limited for the coastal marten. The shore pine forest habitat that would be impacted by the JCEP is limited in abundance on the Oregon coast. While information on patterns of habitat use and distribution is still somewhat limited, it appears to ODFW that what is known about coastal marten distribution in the Coos Bay area seems to be based on the existence of this shore pine habitat type. Given the close proximity of known detections of coastal martens relative to the project area, the limited extent and importance of the habitat type, and the desire to keep martens off the endangered species lists, ODFW considers the forested dune in the JCEP project area to be Category 2 habitat. ODFW recommends FERC and JCEP/PCGP work cooperatively with ODFW to incorporate coastal martens into a fish and wildlife habitat mitigation plan.

- **Big Game Winter Range**

The PCGP project bisects a significant amount of big game winter range, which ODFW prioritizes given its importance to sustaining big game populations and its limited extent. ODFW has digitized biological winter habitats for mule deer, Rocky Mountain elk, and bighorn sheep in both eastern and western Oregon and has provided this information to PCGP previously (ODFW 2013, and 2017). ODFW recommends PCGP work with ODFW to ensure the best available science is used to assess and mitigate for impacts to big game. ODFW recommends that a comprehensive mitigation plan be developed for this project to ensure impacts are offset and serious depletion (see ORS 496.012) does not occur for Oregon's big game species. Examples of possible mitigation may include purchasing degraded properties within designated winter range and performing habitat improvement projects to mitigate for damage to winter range through likely noxious weed establishment and increased OHV activity. See Appendix A Table 3 for a list of possible improvement projects, and Figure 4 and Table 4 for a list of possible mitigation properties.

- **Other Sensitive Wildlife Habitats**

Oak woodlands are a unique and highly productive habitat that is limited in quantity. Oak Woodlands have been classified by ODFW under the agency Habitat Mitigation Policy (OAR 635-415-0000-00025) as Category 2. Many of these woodlands have critical function as winter range for big-game and meet life history needs for a variety of migratory birds (e.g. Acorn woodpeckers), forest herps and small mammals. Oak woodlands require a long-time (100+ years) to reach full productivity and function as habitat, and are a limited habitat type in Oregon. For these reasons ODFW recommends oak woodlands receive particular attention in the DEIS and that the Applicant work with ODFW to develop avoidance, minimization, and/or mitigation plans for this important habitat type.

Vernal pools are also a unique and highly productive habitat that is limited in quantity. Vernal pools, when functional, provide essential habitat for vernal pool fairy shrimp which are listed as Threatened on the federal ESA and which are an Oregon Conservation Strategy Species. Vernal pool fairy shrimp require vernal pools or similar, ephemeral pools to complete their life cycle. They prefer small pools with cold water. Prior to seasonal drying of the pools, females produce eggs ("cysts"). These cysts can dry out and lie dormant until pool re-filling occurs, at which time the eggs will hatch. There is little genetic variability within vernal pool fairy shrimp populations. Many vernal pools have been drained or have modified hydrology unsuitable for

fairy shrimp. Remaining pool habitat is increasingly isolated. Stormwater run-off containing pesticides, chemical residues, and other contaminants are also harmful to vernal pool fairy shrimp. For these reasons ODFW considers vernal pool habitat to be Category 2 and recommends they receive attention in the DEIS and that the applicant work with ODFW to develop avoidance, minimization, and/or mitigation plans for this important habitat type.

- **General Inequity of Mitigation between federal and non-federal lands in the DEIS**

ODFW notes that the DEIS identifies that non-federal lands make up approximately 70+% of the area affected by this pipeline. Yet most or nearly all the mitigation recommended through the document is on federal lands. ODFW recognizes the federal agencies were Cooperating Agencies, and that many of the projects outlined on federal land had previous planning from internal agency effort. However, ODFW recommends the DEIS recognize the ecological gap created by impacted habitats at a location and conducting mitigation that may be out-of-kind or out-of-proximity. These types of issues create complications for ecological function in relation to compensating for impacts. ODFW finds that much of the federal land mitigation discussed in the DEIS for would not meet the goals of the ODFW Fish and Wildlife Mitigation Policy, and notes that the DEIS refers to the 'POD' which ODFW was unable to locate.

In Section 2.1.5 the DEIS discusses how USFS mitigation plans are programmatic, and may include projects where NEPA is not complete. Completion of additional NEPA for these mitigation options could take years beyond the construction of the JCEP/PCGP project. ODFW recommends that mitigation occur prior to or concurrent with the development action (OAR 635-415-0025).

Table 2.1.5-1 lists mitigation actions for USFS lands. These actions were identified by USFS to address the Aquatic Conservation Strategy, habitat for federally listed species, Late Successional Reserves, compliance with the various Forest Plans, as well as specific resource issues by watershed. Given these criteria for identifying mitigation, not all projects listed in the DEIS for USFS lands are designed to offset the losses of fish and wildlife habitat and therefore do not achieve the goals of no net loss and net benefit as set forth in the ODFW Fish and Wildlife Habitat Mitigation Policy. To remedy this issue, again ODFW recommends FERC condition their approval such that JCEP/PCGP works with ODFW, the federal agencies, tribes, and other relevant state natural resource agencies to develop a comprehensive mitigation plan that aligns with the ODFW Fish and Wildlife Habitat Mitigation Policy.

Fish Passage - It is the policy in the State of Oregon to provide upstream and downstream passage for native migratory fish (see ORS 509.580 through 509.910 and corresponding Administrative Rules OAR 635-412-005 through 0040). Fish passage is required in all waters of Oregon in which native migratory fish are currently or were historically present. With some exceptions defined in ORS 509.585, a person owning or operating an artificial obstruction may not construct or maintain any artificial obstruction across any waters of this state that are inhabited, or historically inhabited, by native migratory fish without providing passage for these fish. Projects that construct, install, replace, extend, repair or maintain, and remove or abandon dams, dikes, levees, culverts, roads, water diversion structures, bridges, tide gates or other hydraulic facilities can be "triggers" to Oregon's fish passage rules and regulations. Specific information relating to Oregon Fish Passage Law can be viewed on our website at the flowing location: http://www.dfw.state.or.us/fish/passage/

At this time, ODFW has received Fish Passage Plans for the portion of the project located within the Coastal Zone Management Area (CZMA). ODFW has not received detailed fish passage design plans for the rest of the pipeline and its associated infrastructure.

In April 2019, ODFW received the PCGP fish passage plan for pipeline and stream crossings within the CZMA. This fish passage plan submittal included approximately fifty eight (58) locations where the proposed 229-mile long, 36-inch diameter natural gas pipeline would intersect waterways in Coos and Douglas Counties. As proposed, four (4) of the 58 waterway crossings would be Horizontally Directionally Drilled (HDD) and the remaining would be open trench installations. Open trench natural gas pipeline installations generally consists of either a flume or a dam and pump water management installation method. Additionally, at each pipeline crossing except the HDD installations, temporary water crossing structures (bridges) would be necessary at all locations to facilitate project construction and pipeline installation.

ODFW also received a Fish Passage Plan for a road-stream crossing for a temporary bridge installation at MP 44.29 (Upper Rock Creek). This submittal package was for a temporary bridge structure to provide construction equipment access to the proposed pipeline route where access is presently inaccessible.

Finally, ODFW also received a JCEP fish passage plan for the Kentuck-APCO estuarine habitat restoration at the Kentuck mitigation site in Coos County on March 2019. This packet addressed five (5) primary compensatory restoration actions as a result of impacts associated with the JCEP export liquefied natural gas terminal. These five actions include fish passage plans for:

- East Bay Drive Bridge,
- Golf Course Lane Culvert,
- Kentuck Tide Gate,
- Kentuck Creek Restoration, and
- APCO Bridge

Based on the materials received to date (described above), ODFW does not have sufficient data, information and design details necessary to process and authorize the state's fish passage approvals for the various project components where ODFW has fish passage authority.

General areas where insufficient information, data and design details exists include:

- Streambed and stream bank restoration best management practices at high risk pipeline sites
    - Limited to no fish passage engineering design details exist for these high risk sites
- Short and long term post project monitoring, evaluation and reporting for all project sites associated with pipeline and restoration actions
- Temporary water management and fish passage during pipeline installation at sites determined "high risk" by ODFW
    - Presently at sites where dam and pumping water management strategies will be implemented, no fish passage is proposed during construction. Further discussion is necessary for some of the sites determined by ODFW to be high risk for passage of native migratory fish species.

Downstream fish passage during project implementation for high-risk sites determined by ODFW will be required.

- As identified in the pipeline installation plans, no in-water blasting is proposed. There are conflicts with some of the design detail notes where it appears in-water blasting may be necessary and "at the direction of the engineer and to be determined during project construction". Any and all in-water blasting requires a blasting plan to be submitted to ODFW (as per ORS 509.140). Additional discussions and design details are necessary with the project design team regarding in-water blasting plans associated with pipeline installation.
- Kentuck – APCO Project Site – numerous design details continue to be developed by the design team associated with the proposed tide gate structure and other restoration components of this proposed action. These include:
    - Ownership, long-term operational and maintenance responsibilities, water management plans, final engineering design details of East Bay Drive Bridge and tide gage, temporary water management, work area isolation, fish salvage and removal and fish passage during project implementation

Just as the ODFW fish passage application is not yet sufficient, the FERC DEIS also does not elaborate on this necessary fish passage information. Without consideration for the details enumerated above, the project does not demonstrate its ability to provide adequate fish passage, and therefore ODFW contends the JCEP/PCGP project has the potential for significant impact on native fish who rely on fish passage for population maintenance. Given the insufficient information for fish passage in the DEIS, ODFW questions FERC's determination of no significant adverse impact.

ODFW recommends the JCEP/PCGP applicant work with ODFW to provide the additional necessary data and information for the fish passage plans received to date. Furthermore, ODFW recommends JCEP/PCGP submit the fish passage plans for the remainder of the project assuming there are a number of stream crossings beyond the CZMA that will trigger Oregon's fish passage rules.

ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and receive approvals under Oregon Fish Passage Fish Passage Law (ORS 509.585) for each individual stream crossing which triggers this policy prior to authorization of project construction.

In-Water Work/In-Water Blasting – The JCEP/PCGP project will involve construction work within waters of the state inhabited by fish and aquatic wildlife. ODFW has guidelines for appropriate timing of in-water work which can be found at http://www.dfw.state.or.us/lands/inwater/. These guidelines provide a way of planning in-water work during periods of time that would have the least impact on important fish, wildlife, and habitat resources. Specific recommendations related to in-water timing are also briefly discussed in the comment tables below, however ODFW recommends FERC require the Applicant to work with ODFW to identify appropriate in-water timing windows on a site-specific basis and according to the above guidelines and pursuant to ORS 509.140 and implemented through OAR 635 Division 425.

As required by OAR 635-425-0000 through 0050 (In-water Blasting Permits) the project shall apply for in-water blasting permits at any stream crossing locations where the use of explosives is desired in the course of removing any obstruction in any waters of this state, in constructing any foundations for dams, bridges, or other structures, or in carrying on any trade or business (OAR-635-425-0005). Further, it is the policy of the Oregon Fish and Wildlife Commission to discourage in-water blasting unless it is the only practicable method to accomplish project goals. ODFW may issue in-water blasting permits only if they contain conditions for preventing injury to fish and wildlife and their habitat (OAR 635-425-0015).

The applicant has engaged ODFW in discussions regarding the need for and intent to apply for in-water blasting permits before construction begins, however specific locations and details had not been discussed nor has ODFW received any in-water blasting applications. In those discussions the applicant informed ODFW that in-water blasting would not be undertaken with the Coastal Zone. However, the DEIS and the applicant's fish passage applications submitted to ODFW in April 2019 indicate that in-water blasting may be performed at sites to be determined during construction at the discretion of the project engineer. In fact the DEIS Section 4.6.1.3 discusses the potential for 13 blasting sites within the Southern Oregon Northern California Coho (SONCC) Essential Salmonid Unit (ESU), and another 22 blasting sites within the Oregon Coast coho ESU, both of which are in the coastal zone.

In-water blasting has the potential to injure fish and aquatic wildlife due to percussive shock waves produced by the energy associated with the explosion. This percussion can cause direct injury and stressors including bursting of swim bladder, hemorrhage, damage to sensory organs, and trigger displacement behavior in fish species. Given the significance of the impact, ODFW only issues blasting permits when the applicant demonstrates that all alternatives to blasting have been considered, and that this method is the least impactful to fish, wildlife, and their habitats. If blasting is unavoidable, ODFW expects applicants to identify appropriate mitigation offsets pursuant to the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415).

ODFW understands the applicant has not been able to physically access all stream crossing locations preventing the collection of necessary site-specific geotechnical information necessary to determine if in-water blasting is the only practicable method. However, the DEIS lacks an assessment of alternatives to blasting and lacks a thorough description of the significance of the blasting effect. The DEIS states that fish salvage prior to blasting will offset the impact but goes on to acknowledge that coho are particularly sensitive to electroshocking and handling without providing any comparative analysis of this minimization measure. Furthermore, the DEIS does not identify any compensatory mitigation options when avoidance and minimization cannot be achieved.

ODFW recommends this issue receive further consideration and analysis, given the high potential for significant adverse impact, between the draft and the final EIS. ODFW also recommends that FERC condition any approval such that the JCEP/PCGP applicant will have applied for and received any in-water blasting approvals from ODFW prior to beginning construction.

Specific Comments

In addition to the comments provided above, ODFW offers the following more site-specific comments in tabular form. These comments are a compilation of input from ODFW Fish and Wildlife Districts over the last 11 years that the JCEP/PCGP project has been proposed, in its various iterations. Table 1 includes ODFW comments and recommendations specific to the JCEP LNG Terminal and the Coos Bay Estuary. Table 2 includes ODFW comments and recommendations specific to the PCGP Pipeline. ODFW has attempted to update page and section numbers, and new information is added as necessary throughout both tables.

JCEP LNG TERMINAL SPECIFIC COMMENTS:

Citation	Issue Identification	Recommended Resolution
Table 1.5.1-1	**US Army Corps of Engineers Consultations:** In Table 1.5.1-1 the DEIS does not make mention of the US Army Corps of Engineers' jurisdiction and management authority on a parcel of land on the North Spit at Coos Bay. This has implications for snowy plover protection and management.	**US Army Corps of Engineers Consultations:** ODFW recommends Table 1.5.1-1 be corrected to include the US Army Corps of Engineers management authority for the parcel of land on the North Spit, specifically with regard to Section 7 ESA consultation for snowy plovers.
	US Fish and Wildlife Service Jurisdiction per the Endangered Species Act: Table 1.5.1-1's treatment of USFWS jurisdiction per Section 7 of the ESA does not describe their authority adequately. Take of listed species is always prohibited unless it is specifically permitted.	**US Fish and Wildlife Service Jurisdiction per the Endangered Species Act**: ODFW recommends Table 1.5.1-1 be corrected to more adequately describe the authority and Agency Action associated with Section 7 of the ESA. Furthermore, there is no mention of Section 10 authority regarding federally listed species and incidental take on non-federal lands. ODFW recommends this also be discussed in the table.
	Oregon Endangered Species Act (ORS 496.171-192) is omitted from Table 1.5.1-1: The table does not list the Oregon Endangered Species Act. The OESA's primary authority is related to state agency actions on state-owned or managed lands; and in so doing prohibits 'take' (killing or obstaining possession or control)	**Oregon Endangered Species Act (ORS 496.171-192) is omitted from Table 1.5.1-1:** To ensure that any state agency actions associated with this project do not overlook their obligations per the OESA, ODFW recommends Table 1.5.1-1 be updated to include reference to this statute.

	without an incidental take permit. Where approval for take is given by USFWS, then this is taken as a waiver under OESA.	
Section 1.5.2.5	**Omission of reference to Oregon Endangered Species Act (ORS 496.171-192):** This section does not describe ODFW authority for state-listed species. Furthermore, this section refers to the state's Wildlife Diversity Plan. Although the plan still exists, the Oregon Conservation Strategy is the wildlife conservation blueprint for ODFW and the State of Oregon as a whole.	**Omission of reference to Oregon Endangered Species Act (ORS 496.171-192):** ODFW recommends this section be updated to include reference to OESA. Please replace reference to the Wildlife Diversity Plan with Oregon Conservation Strategy. www.oregonconservationstrategy.org.
Chapter 2.1.1.6; pgs 2-10-17	**Maintenance of the slip:** It is unclear if the Port of Coos Bay will maintain access channel depth into Slip. Will this become part of the Port's Unified Dredging Permit, which maintains the depth of several access channels and vessel berths connected to, but outside of, the navigational channel? Port has recently been granted extensions outside of the ODFW-recommended in-water work windows for the Unified Permit, despite ODFW's request to dredge only within the window to protect estuarine resources.	**Maintenance of the slip:** ODFW recommends clarification of whether or not the access channel dredging and maintenance dredging will be part of Port of Coos Bay's Unified Dredging Permit. ODFW recommends all dredging of the portions of the project outside of the footprint of the current federal navigation channel or within the current upland be fully isolated from the bay by the proposed soil berm, and occur only with in the ODFW' in-water work window: http://www.dfw.state.or.us/lands/inwater/
Chapter 2.1.1.6; pgs 2-10-17; Chapter 4.6.1.3; pgs 4-330 to 4-441	**Direct Construction and Maintenance Dredging Impacts:** Lethal and non-lethal impacts to marine fish, crab, shrimp, bivalves, juvenile Chinook salmon, white sturgeon; ESA listed coho salmon, green sturgeon, and Pacific eulachon; as well as non-listed Pacific lamprey, and other species may occur:	**Direct Construction and Maintenance Dredging Impacts:** ODFW recommends: • During the initial dredging and excavation, monitoring of the dredge output at the storage site, ODFW recommends the Applicant access/estimate the magnitude (quantification of organisms in the dredge spoils) of impact to shellfish and non-game/game fishes.

	• Through entrainment in the hydraulic dredge at the time of the initial construction. • Be impacted by entrainment during future maintenance dredging required to keep the berth and access to the berth serviceable. • Become attracted to the alcove and away from natural habitats, introducing risk of industrial impacts to these species (e.g. metabolic expenditure from disturbance; entrainment into cooling intakes, entrainment into ship ballast water intakes). • The access channel from navigational channel to terminal is approx. 30 acres; will dredge 1.4 MCY; turbidity will likely last for 4-6 months; "localized". Four to six months could affect the life history of several estuarine species (fish and invertebrates), depending on timing. ODFW in-water work window is shorter than six months long.	• ODFW recommends a biological assessment of the JCEP deepwater access and slips be completed following construction to determine the degree that production of shellfish/gamefish will recover and stabilize. ODFW recommends this recovery assessment be scaled based on productivity in undisturbed regions in the Bay (reference sites). • ODFW recommends this information be provided to ODFW, NRTAG (see above), local tribes, and other interested parties within one calendar year after construction of the slip and berth is completed and annually thereafter for a period of 10 years. • The direct impacts of initial construction are clearly identifiable. However, post-project indirect impacts are likely not. ODFW recommends appropriate monitoring/study plans for the project area and mitigation sites be developed by and formally agreed upon by the Applicant and pertinent stakeholders. • The expected hydrological changes at the site due to the project development will potentially result in a number of changes to the biological communities at those locations (e.g. densities, species composition, predatory interactions, etc.). • These changes may occur in areas adjacent to or a considerable distance from the project area where there is little or no construction activity (see Deepwater Zone recommendations below). • Long-term monitoring/study (i.e. majority of the FERC certificate duration) is appropriate to understand/mitigate for ecological and biological changes associated with the project. • Clarify whether or not extension of IN-WATER WORK WINDOW would be requested. Issue is similar to Port's Unified Dredging Permit extension request, which ended with DSL issuing extension despite ODFW's recommendation of dredging only within the recommended IN-WATER WORK WINDOW. • ODFW recommends costs for monitoring/studies and mitigation are borne by the Applicant.
Chapter 2.1.1	**Omissions:**	**Omissions:**

pgs 2-1-4; 2-9 to 2-16; Chapter 4.5.1	• ODFW should be identified as an "appropriate agency" with regard to consultation on the Wetland Mitigation Plan. • ODFW should be identified as an "appropriate agency" with regard to consultation on the Aquatic Species Nuisance Treatment Plan. The JCEP project needs to report to FERC any abnormal operating incidents that result in harassment or mortality of fish and wildlife species.	• Clarify ODFW's role/authorities for wetland habitat mitigation. Confirm ODFW is an "appropriate agency" with this regard. • Clarify ODFW's role/authorities for Aquatic Nuisance Species prevention/mitigation. Confirm ODFW is an "appropriate agency" with this regard. • ODFW recommends the DEIS add, "…mortality or sub-lethal injury to fish or wildlife species," as information that needs reported to ODFW.
Chapter 2.1.1.6; pgs 2-10-17	**Hydrological/Water Quality Changes:** ODFW points to three anticipated changes in the hydrology/water quality of the site that will impact fish and wildlife due to the JCEP/ PCGP Coos Bay development: A) Turbidity; B) Salinity intrusion; and C) Water temperature changes. **Turbidity:** Mobilization of substrates will occur during the initial dredging and with continued regular disturbance associated with maintenance dredging (estimated 115,000 CY every three yrs.; ~383,000 CY in the first 10yrs) within the project area. Turbidity will increase over an unknown portion of the Coos Bay during construction and when maintenance dredging is conducted. The 2019 DEIS relating to the Easement permit application indicates that dredging will occur on the regular three year interval.	**Hydrological/Water Quality Changes:** The 2019 DEIS has addressed ballast water temperature exchange suggesting pg 4-91 that ballast and bay waters will likely be similar. ODFW questions FERC's assumption. Further information is needed to determine if increased salinity intrusion has the potential to change the ecological conditions in Coos Bay to a notable degree. Turbidity can reduce primary and secondary productivity, while salinity intrusion can have a myriad of effects (e.g. change in species distribution, invasive species colonization ability, reproduction changes). ODFW recommends that all three factors A) Turbidity; B) Salinity intrusion; and C) Water temperature changes are monitored and addressed in the following ways: Predictive Hydrologic Model: ODFW recommends the Applicant(s) consultant(s) develop of a predictive hydrologic model to estimate how creation of the slip and maintenance dredging of the main Coos River channel will affect salinity intrusion into the bay *(ODFW recognizes the efforts of the Applicant that have been completed to date, however, these focus primarily on hydraulic flow rather than salinity patterns).* This model should be developed and distributed for review to the NRTAG and department prior to initiation of construction at the site.

	However, the slip and berth represent additional acreage that will be impacted over current levels and may require an increased dredging frequency. Additionally, the hydrodynamic modeling indicates the slip will become an alcove, likely collecting sediments at a greater rate than the main shipping channel. Increased turbidity levels in the open water column can result in suppression of primary production, affecting a number of ecological factors: • Survival and growth of estuarine plankton (Cloern 1987; Irwin and Claffey 1966). • Potential effects to feeding capability and subsequent reduction in planktivorous organisms (Carter et al. 2009; Horppila et al. 2004; Bash et al. 2001). • Survival and growth of species such as eelgrass are affected by factors that decrease total solar input and depth to which light penetrates into the water column. • Potential reduction in production of mollusks, Dungeness crab, juvenile coho, Chinook salmon and other species. • Comments received from DEA on 01/07/11 have been considered. **Salinity Intrusion:** The current 2019 DEIS does not note the *Oregon International Port of Coos Bay Section 204(f)/408 Channel Modification Project*, which ODFW	Inclusion of Hydrologic Factors in the Monitoring Plan: ODFW recommends the Applicant develop a monitoring plan (in combination with the biological monitoring plan as described above) in collaboration with ODFW/NRTAG to study/quantify/qualify: Turbidity effects; • Salinity intrusion effects; • Water temperature issues at the site. ODFW recommends this monitoring/study plan be developed in collaboration with the NRTAG/Department. Studies outlined in the plan should be completed for a time period necessary to meet the goals, which should be determined in collaboration with the NRTAG/department. Data Sonde Network: As part of the monitoring plan, ODFW recommends: • A network of data sondes be deployed to collect data on A) Turbidity; B) Salinities; C) Water temperature both at the surface and depth. • If salinity intrusion, thermal changes, or turbidity are determined to impact fish and wildlife resources, mitigation should be appropriately identified by the JCEP, department and NRTAG as consistent with OAR 635-415-0000 through 0025. ODFW recommends a monitoring/study plan be developed in collaboration with the NRTAG and department. This plan should include: • Biological information (e.g. abundance, species composition, behavior; for both native and invasive species) project in the bay. • Hydrological information (turbidity, salinity intrusion, water temperature changes) and specifically address ecological impacts related to the deepening of the JCEP site due to dredge activities. • Modeling that has been conducted by the Applicant to date has been informative. However, it may not accurately and precisely predict what actual post-construction hydrologic and ecological condition will be. The study should use an experimental design that includes before and After Controlled Impact

	suggests is linked to the JCEP project. The Applicant noted that hydrologic modeling has indicated sediments will likely accumulate at an accelerated rate in the berth area. To date, the Applicant has not modeled the potential that actions of the JCEP will increase the distance to which highly saline waters intrude due to the above noted Port project; into Coos Bay and the effects to residence time of highly saline waters. Increased salinity intrusion likely would affect Category 2 habitats in the JCEP area, but also in an unknown portion of the remainder of the bay. Effects may include: • Ecotone boundary changes altering aquatic plant growth patterns and distribution. • Distribution changes for plant and animal organisms vulnerable to salinity levels. • Changes to the available zones for reproductive success (e.g. Dungeness crab, striped bass Morone saxatilis). • Phytoplankton community productivity change related to nutrient regime shifts (i.e. the time of year freshwater dominates for a given reach of the Bay). Saline intrusion associated with increased dredging in the 1980's was thought to have had a notable negative impact on several fin fish species in the Bay including striped bass and American shad (*Alosa sapidissima*), although study results	techniques aimed at elucidating changes in shallow and deepwater communities, correlations between biological indices, and hydrological changes.

	were inconclusive. The impacts that this intrusion would have on native shellfish and finfish species such as fall Chinook, coho salmon, Dungeness crab, and native oysters cannot be modeled and would only be detectable through real-time monitoring. Salinity ecotones are known to highly affect the zones habitable for shellfish. Productive commercial oyster farms, which occur in euryhaline waters upstream of the project site, are currently protected from many fouling organisms and predators that occur in more stable salinities. Further intrusion of salt water will contribute to more stenohaline waters thus presenting new risk to a currently economically viable industry. Effects of the dredging may be detectable over the entire bay. Mitigation at the Kentuck site is not In-Kind when considering salinity intrusion. Ecological benefits at the Kentuck site would not be able to compensate for impacts that increased salinity could have throughout the Bay. Some understanding and determination of changes in salinity pattern (e.g. results from a salinity study), could guide adaptive management/mitigation.	

	Water Temperature: Ships loading at the facility will discharge heated engine cooling water that may be as much as 3°C warmer than the surrounding water. Fish that come in direct contact with this plume will experience stress. ODFW recognizes that significant cooling of this water will occur soon after it is released from the vessel and sees this issue as less concerning, however, remains interested in potential for deleterious effects.	
Chapter 2.1.1.6; pgs 2-10-17	**Deepwater Zone Biological Communities:** Construction of the JCEP LNG slip and offloading site will create a new deepwater zone that is 25+ft in depth: This new deepwater zone will be constructed at 90˚ to the axis of the river channel forming a type of alcove morphologic feature that currently does not exist in Coos Bay. Deepwater zones that exist in Coos Bay tend to attract specific species compositions (e.g. white sturgeon, Dungeness crab, California halibut). However, these deepwater zones are in line with the main flow of the channel. Due to the location and hydrologic patterns associated with this new alcove, there needs to be monitoring to determine the species benefitted and or detrimental effects. The slip area will be highly disturbed during dredging and recover slowly, with re-disturbance at regular	**Deepwater Zone Biological Communities:** It is critically important to understand what impacts the development of a large "alcove" deepwater zone at the JCEP site will have on finfish and shellfish populations. Changes may occur to life-history patterns, movements, concentrations, overall abundance, and perhaps reproductive aspects of affected organisms in the Bay. Identifying these changes will be essential to development of a mitigation plan to compensate for negative impacts as they occur and are detected. ODFW recommends that specific studies be designed through coordination with ODFW and NRTAG to determine these changes or lack thereof. As described above long-term monitoring is critical to define the effects of this substantial proposed change to habitats in Coos Bay. ODFW recommends study of the effects of creating deepwater zones be conducted on an on-going basis through the majority of the JCEP/PCGP FERC license period. ODFW recommends this study attempt to document

	intervals associated with maintenance dredging. Installation of rip-rap and sheet-pile in the berth are expected to maximize the simplicity of the zone inhibiting the productive capacity for fish and wildlife. Consequently, there is concern with how construction of this site will affect life cycle patterns, population concentrations, overall abundance, and movements of certain affected species in Coos Bay. Specifically, e.g. will additional deepwater zone in this region of the bay affect the following: • Finfish/shellfish species densities in the JCEP area and other regions of the bay. If change occurs, how will this affect production of affected species in relation to current levels (e.g. predator-prey relationships with avian predation of salmonids, seal and sea lion predation to salmonids; avian predation to finfish)? • Competitive interactions associated with the habitat value or lack of value of the slip. Additionally, it is of concern if the slip will become a zone of higher density of predatory fishes. • Recreational opportunities related to current finfish/shellfish distributions (e.g. alteration of the distribution of Dungeness crab; salmon movement changes; influx of larger rockfish; etc.).	changes to populations including, but not limited to: change in species diversity, abundance, behavior, distribution, and species composition caused by the project. ODFW recommends Before and After Control Impact (BACI) study methods be used to provide before, after, and control structure for the investigations. ODFW recommends the Applicant receive guidance from ODFW/NRTAG for methods and timing (beginning, sampling frequency, and ending) for these studies. Study results should be distributed annually to ODFW/NRTAG, other interested agencies/parties. ODFW recommends a biological assessment of the JCEP deepwater access and slips be completed following construction to determine the degree that production of shellfish/finfish will recover and stabilize. This recovery assessment should be scaled on a percentage basis compared to productivity in undisturbed regions in the Bay. ODFW recommends reports be completed annually and information provided to ODFW, NRTAG, local tribes, and other interested parties within one calendar year after construction of the slip and berth is completed and annually thereafter for a period of 10 years. The DEIS needs to fully acknowledge the potential for use of the slip by juvenile salmonids and other fish or invertebrate species and monitor, and mitigate for use of terminal slip impacts to these species.
Chapter	**Recreational Users:**	**Recreational Users:**

4.13.1.3 Table 4.13-2; 4.14.1.6 pg 4-799, 80	It is ODFWs understanding that the U.S. Coast Guard typically requires exclusion zones of up to 500 meters surrounding LNG tankers transiting the bay and potentially while at dock for safety and national security purposes. The 2019 DEIS does not address this very serious potential impact to recreational and commercial boat and/or bank use of Jordan Cove and the surrounding bay areas. Any such actions by the US Coast Guard would likely result in a notable impact to public recreation for fishing, shellfish, or hunting which should be analyzed as part of the cumulative impacts of the project and fully mitigated for should they occur: The DEIS states that LNG ship traffic would not significantly impact recreational users because the # of vessels would equal the historic # of deep-draft ships that once called on Coos Bay. This does not take into account that: • Recreational use of the Bay has increased, with greater numbers of crabbers, clammers, and anglers participating. • The Bay area from the jetties to Jordan Cove is a high-use area for crabbing and salmon angling from boats. • It is uncertain whether or not USCG security/safety measures will require boats to completely leave the area, or simply require boats to clear the navigational channel to allow the ship to pass.	ODFW recommends FERC clarify safety/security requirements for recreational boaters when LNG ships are in transit within the K Buoy to terminal zone, specifically including any such future safety or national security exclusion zones likely to be implemented by the U.S. Coast Guard or any other state of federal enforcement agency. ODFW recommends that FERC and/or the applicant conduct a more thorough economic analysis of the shellfish (crabbing/clamming) and finfish (rockfish, salmon, steelhead) fisheries in Coos Bay, their contribution to the economics of Coos County and Southwest Oregon and address the potential impacts of the JCEP. The economic impact to these recreational opportunities and the local businesses that depend on them is directly related to this environmental concern. ODFW recommends FERC more carefully weigh the impact that any such loss of recreational access and fisheries revenue would have for local business and the State of Oregon's economy.
Chapter 4.5.2.2; pgs 4-	**Aquatic Resources:**	**Aquatic Resources:** Should use most up-to-date species status, which has

245-248; TABLE 4.11.3.1-1 (continued)	Omissions: • ODFW should be identified as an "appropriate agency" with regard to consultation on the Wetland Mitigation Plan. • ODFW should be identified as an "appropriate agency" with regard to consultation on the Aquatic Species Nuisance Treatment Plan.	changed for some species since 2005 report. ODFW Recommends: • Clarify ODFW's role/authorities for wetland habitat mitigation. Confirm ODFW is an "appropriate agency" with this regard. • Clarify ODFW's role/authorities for Aquatic Nuisance Species prevention/mitigation. Confirm ODFW is an "appropriate agency" with this regard. • ODFW recommends the JCEP project report to FERC any abnormal operating incidents that result in harassment or mortality of fish and wildlife species.
Chapter 2.4.1.5 pg 2-48	**In-Water Dredging/Work:** The DEIS outlines that dredging of the bay, placement of sheet pile, etc. will occur**.** At the JCEP project site there is some potential that Pacific smelt (eulachon) may be in this reach of the bay from January 15 until April annually. Although the presence of eulachon is considered highly unlikely.	**In-Water Dredging/Work:** The DEIS outlines the project's intent to complete work below the high tide zone. For work that will occur below the high tide watermark, ODFW recommends that these actions coincide with the In-Water Work window for the Coos Bay estuary (October 1 to February 15). At this particular site there is some potential that Pacific smelt (eulachon) may be in this reach of the bay from January 15 until April annually. Although the presence of eulachon is considered highly unlikely, as a precautionary measure ODFW recommends adjusting the normal In-Water Work window to October 1 to January 31. ODFW notes the 2019 DEIS reference to the in-water work window on pg 2-48.
Not located in 2019 DEIS	**Nest Site Searches:** The Applicant identified in the 2014 DEIS that nest site searches would be conducted prior to tree clearing to eliminate the risk that trees will be cut during nesting season, (although they will be harvested at a later date). ODFW was unable to locate language in the 2019 DEIS related to sensitive birds.	**Nest Site Searches:** ODFW recommends that the Applicant have qualified, trained staff complete surveys for Great Blue Heron Rookeries and Osprey nest sites prior to any timber harvest or pipeline construction at the appropriate time of year to complete surveys.
Chapter 4.3.3.1 pg 4-128; pg 210; Chapter 5.1.4 pg 5-4	**Exotic Plants and Wildlife:** Disturbed soils and removal of vegetation at the site combined with the installation of artificial tanks/pipeline/other structures will present opportunity for invasion of	**Exotic Plants and Wildlife:** ODFW recommends that the Applicant continue development and implantation of an upland invasive plant management plan in collaboration with ODFW and NRTAG to assist with concerns such as minimizing the potential for inadvertently benefiting exotic plants and wildlife. BMPs might include actions to

	non-native plants and are anticipated to result in further loss of habitat for native wildlife species (e.g. replacement of mourning doves *Zenaida macroura* with ring-necked doves *Streptopelia capicol*; native sparrows with house sparrows *Passer domesticus* and European starlings *Sturnus vulgaris*). There is also concern that corvid bird species (ravens, crows, jays) that are predators on snowy plover may benefit from the project. Often, exotic invasive species have a higher tolerance for direct association with humans; benefit from food wastes associated with daily human activities, and will potentially use perching and nesting opportunities that may become available due to this project, furthering displacement of native species.	minimize garbage and other human related factors which could lead to increased presence of exotic or otherwise undesirable predatory bird species such as starlings or corvids.

PCGP PIPELINE SPECIFIC COMMENTS:

Citation	Issue Identification	Recommended Resolution
Exec. Sum pg. 3; Chapter 4.2; pgs 4-72; 102; 268; 295; others	**Avoidance, Minimization, and Mitigation of Impacts to Habitat and Water Quality Associated with Stream Crossings:** Turbidity control measures for sediment generated at stream crossings, isolation of the work area, salvage of fish, Best Management Practices (BMP's) for equipment operation, measures for handling frac-outs if they occur, minimizing impacts to the riparian zone, and revegetation strategies are factors that need to be addressed for stream crossings. These have been partially, but not fully addressed by materials supplied by the applicant consultants, but not defined as a FERC permit requirement in the DEIS. It is known that ESA-listed fish specie(s) and or State Sensitive species will be present at the South Coos, North Fork Coquille, and East Fork Coquille river crossings include OC Coho salmon. State Sensitive-Vulnerable species include Coho salmon (coastal coho salmon SMU/Oregon Coast ESU). Winter steelhead (Oregon Coast ESU/coastal winter steelhead SMU) are considered Sensitive-Vulnerable in the Coquille River	**Avoidance, Minimization, and Mitigation of Impacts to Habitat and Water Quality Associated with Stream Crossings:** ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and construct all fish bearing stream crossing actions within the periods identified in ODFWs standard In-Water Work timing guidance document unless otherwise approved in writing by ODFW. ODFW's standard In-Water Work timing guidance document can be viewed on our website at the flowing location: http://www.dfw.state.or.us/lands/inwater/ **Note:** ODFW advises it is not *biologically defensible to support any in-stream work during time periods when fish are actively spawning, migrating or when eggs or juveniles may be present in the gravels.* ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and construct all stream crossing in a manner which avoids, minimizes and fully mitigates any residual impacts to fish and wildlife habitats consistent with the expectations identified in ODFW's Fish and Wildlife Habitat Mitigation Policy (OAR-635-415-0000 through 0025). The Department's Fish and Wildlife Habitat Mitigation Policy can be viewed on our website at the flowing location: http://www.dfw.state.or.us/OARs/415.pdf *Please see Oregon Fish and Wildlife Habitat Policy General Comment above.*

	basin, however, not in the Coos River basin. Pacific lamprey (*Entosphenus tridentata*) are considered Sensitive-Vulnerable in the Coos River, Coquille River, and Umpqua River basins making turbidity concerns heightened throughout in these watersheds, in addition to the concern within the Rogue River watershed. **Pipeline Crossing Across Coos Bay to East of Hwy 101** **Potential for Frac-Out with long distance HDD Drilling:** ODFW recognizes the JCEP/PCGP Applicant's efforts to reduce environmental impacts of the pipeline crossing to the east side of Coos Bay and foothills from the previously proposed "Open Cut" methods to HDD drilling methods. However, given the very long (> 8000 feet) HDD strategy, there remains a substantial potential for frac-out issues (defined here as the unintentional return of drilling fluids to the surface during HDD **Additional Concerns Specific to Subsurface Boring and Drilling Stream Crossing Methodologies:** ODFW's experience with other pipeline construction projects has shown that stream crossings and overland disturbance can be damaging to	ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and acquire all needed state and Federal authorizations to salvage fish and/or aquatic wildlife which would otherwise be likely subject severe stress or mortality as a result in-water work, as appropriate at a site specific level . ODFW recommends salvage of fish and/or aquatic wildlife occur as appropriate and as feasible throughout the project locations. Detailed information on necessary state authorizations for fish and aquatic wildlife salvage, recommended protocols, and standard BMPs is available from ODFW upon request. • The JCEP/PCGP project needs to address turbidity control measures for sediment generated at stream crossings, isolation of the work area, salvage of fish, Best Management Practices (BMP's) for equipment operation, measures for handling frac-outs if they occur, minimizing impacts to the riparian zone, and revegetation strategies for all stream crossings containing native and migratory fish. • ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and construct all fish bearing stream crossing actions within the periods identified in ODFW's standard In-Water Work timing guidance document unless otherwise approved in writing by ODFW. ODFW's standard In-Water Work timing guidance document can be viewed on our website at the following location: http://www.dfw.state.or.us/lands/inwater/. **Note:** ODFW advises this it is not *biologically defensible to support any in-stream work during time periods when fish are actively spawning, migrating or when eggs or juveniles may be present in the gravels.* ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW and acquire all needed state and Federal authorizations to salvage fish and/or aquatic wildlife which would otherwise be likely subject severe stress or mortality as a result

	watercourses if not carried out with extreme diligence. During construction of the Coos County Gas Pipeline horizontal directional drilling (HDD) was stated as being "clean and not impacting streambeds", however, "frac-outs" occurred and incurred environmental damage caused by drilling fluids leaking into fish-bearing streams. Drilling fluids can be water or oil-based and can include other additives. Although the bentonite base is claimed to be a benign ingredient, ODFW is unaware of what the other additives are and how harmful they can be to fish and aquatic wildlife. Between August and October of 2003 MasTec North America, Inc. was cited by DEQ for a series of water quality violations. The violations were a result of frac-outs during the horizontal drilling work for the construction of a natural gas pipeline under the North Fork of the Coquille River in Coos County. If similar frac-out related turbidity discharge impacts were to occur at the proposed Rogue River crossing, they would likely impact the significant spawning habitat for spring-run Chinook salmon in the Rogue River Basin. It is known that ESA-listed fish specie(s) and or State Sensitive	in-water work, as appropriate at a site specific level. • ODFW recommends salvage of fish and/or aquatic wildlife occur as appropriate and as feasible throughout the project locations. Detailed information on necessary state authorizations for fish and aquatic wildlife salvage, recommended protocols, and standard BMPs is available from ODFW upon request. ODFW recommends FERC require JCEP/PCGP develop frac-out containment and mitigation plans in coordination with the State of Oregon. ODFW recommends that emergency plans include immediate notification of any turbidity exceedance, frac-outs, and spills and pipeline leaks in Coos Bay. Sensitive marine environments can be severely impacted by these types of occurrences. However, impacts can be greatly minimized if ODFW biologists can quickly & accurately assess potential damages and recommend remediation actions. Should an incident like those described above occur, the project should contact Oregon Emergency Response System immediately (1-800-452-0311). In the case of leaks during pipeline operation or offloading or loading at the JCEP facility, ODFW recommends that emergency plans include surveys for fish and wildlife kills immediately following a release. **Additional Recommendations Specific to Subsurface Boring and Drilling Stream Crossing Methodologies:** Pipeline crossings using HDD or other subsurface methodologies can be expected to cause frac-outs in Coos County geology and possibly throughout the project. The Applicant should be prepared for construction stoppages, cleanup, and remediation of damages caused by frac-outs. For that reason,

	species will be present at the South Coos, North Fork Coquille, and East Fork Coquille river crossings include OC Coho salmon. State Sensitive-Vulnerable species include Coho salmon (coastal coho salmon SMU/Oregon Coast ESU). Winter steelhead (Oregon Coast ESU/coastal winter steelhead SMU) are considered Sensitive-Vulnerable in the Coquille River basin, however, not in the Coos River basin. Pacific lamprey (*Entosphenus tridentata*) are considered Sensitive-Vulnerable in the Coos River, Coquille River, and Umpqua River basins making turbidity concerns heightened throughout in these watersheds, in addition to the concern within the Rouge River watershed. **Non-fish Bearing Stream Crossings and Other Storm Water Drainage Conveyance Structures:** Although non-fish bearing stream crossings and stormwater conveyance infrastructure are not subject to the same design criteria identified above for fish bearing stream, ODFW remains concern with regard to sizing and instillation of these types of infrastructure. Culverts or other crossing infrastructure should be sized in excess of hydraulic capacity need to help facilitate wildlife connectivity between habitats and minimize potential downstream water	crossings construction timing should occur during ODFW's recommended in-water timing guidance or as otherwise approved by ODFW in writing. HDD and other subsurface boring or drilling crossing design locations should pro-actively address the risks associated with the potential for a "frac-out" or inadvertent loss of drilling fluid to the extent practicable: ODFW recommends FERC condition the project certificate such that the Applicant is required to complete consultation with ODFW including submittal of any risk assessment and geotechnical documentation for any stream crossing which are proposed as subsurface boring or drilling stream crossing actions. Submittals should also include descriptions of alternate or contingency crossing methods should the primary method result in an inadvertent loss of drilling fluid, otherwise known as a "frac-out" or otherwise fail as a successful crossing action. ODFW further recommends FERC condition the project certificate such that the Applicant is required to: • Conduct adequate geotechnical analysis to ensure frac-outs will not occur (e.g. identify vulnerable geologic issues, adjust the depth of drilling, etc.). • Provide a list of the additives used in drilling fluids and their potential effects on the aquatic environment. • Implement specific drilling BMPs to ensure constant monitoring of drilling fluid return volume so that drilling can cease immediately if drilling fluid is not returning at the expected/standard volume for a successful HDD attempt. • Identify measures that will be taken to minimize impacts of a frac-out if a frac-out occurs and mitigation that will be implemented if a frac-out occurs as cleanup is not feasible and attempts will

	quality impacts such as turbidity sedimentation transport resulting from scour at undersize infrastructure.	create additional damage. Mitigation could include: Placement of LWD; placement of clean washed spawning gravel; road drainage improvements (cross drains, improved surfacing); road decommissioning. • Establish performance bonds and/or require performance bonds of drilling subcontractor to ensure adequate funding is immediately available to address/mitigate a frac-out or other drilling failure which results in damage to fish, wildlife, or the habitats they depend on. <u>HDD Actions in the Lost River Drainage.</u> The Klamath Fish District of ODFW requests that drilling any HDD activities are implemented between July 1, and October 31, or as soon as water conditions are deemed uninhabitable by fish due to poor water quality. Shortnose suckers (*Chasmistes brevirostris*), Lost River sucker (*Deltistes luxatus*) and redband trout (*Oncorhynchus mykiss*) inhabit this stretch of river from November to July; poor water quality triggers migration to upstream refuge habitats. Fish are highly sensitive to sound waves that could be caused by drilling disturbances and sound waves could act as a migration barrier. **Non-fish Bearing Stream Crossings and Other Storm Water Drainage Conveyance Structures:** ODFW recommends that all streams be considered fish bearing unless documented to be absent of fish. If a stream crossing or storm water conveyance structure is determined to be non-fish bearing, ODFW still recommends the work be completed: • ODFW's standard In-Water Work timing guidance document or if the stream or storm water conveyance structure is dry. (see reference above). • The Applicant consider oversizing the infrastructure and installing it in such a manner to maximize its performance as a suitable wildlife crossing structure and to minimize potential for

		downstream water quality impacts such as turbidity sedimentation transport resulting from scour at undersize infrastructure.
Chapter 1.5.2.5 pgs. 1-31,32 Chapter 2.1.5 pg 2-34,35; Chapter 4, pgs 4-268-289. Appendix I Table I-2 pgs I-2-1 to I-2-47	**Site Specific River/Stream Crossing Concerns:** <u>Lost River Crossing-</u> See above specific timing recommendation <u>Rogue River Stream Crossing-</u> Pacific Connector states that if HDD of the Rogue River is unsuccessful Direct Pipe (DP) methods would be a potential option. Previously wet, open-cut crossing were also proposed. ODFW **does not** consider a wet, open-cut to be an acceptable contingency method. <u>South Umpqua Direct Pipe Technique Site #1 at MP 71.27), and South Umpqua Open Cut Site #2 at MP</u> <u>94.73; see Tables 2 and 3 -</u> This proposed crossing occurs at an ecologically important site. A gravel bar is located approximately 300 m downstream. The gravel bar at this site provides river complexity, high flow refugia and summer slow water habitats which are considered to provide both essential and limited habitat function for a variety ESA-listed	**Site Specific River/Stream Crossing Concerns**: ODFW encourages both the Applicant and FERC to acknowledge the potential for severe impacts to fish, aquatic wildlife, and the habitats they depend on by ensuring the above recommendations become conditions of any Federal Authorizations or permits for the PCGP project. ODFW recommends site specific coordination and consultation between the Applicant and Department staff to fully identify unique site specific resource concerns at these crossing locations. ODFW anticipates that significant resource impact avoidance and minimization can be realized through collaboration with local Department staff throughout the crossing design, construction, and restoration/mitigation recovery phases at these river crossing locations. **Fate Creek:** ODFW recommends the Applicant engage Department staff for assistance identifying appropriate mitigation needs at this site.

	fish, state-sensitive listed fish and aquatic wildlife. **Fate Creek:** The DEIS does not provide a site specific plan for Fate Creek. The resource plans do not address or mitigate for all impacts associated with stream crossings under ODFW's Fish and Wildlife Habitat Mitigation Policy.	
Chapter. 2.7.2 pg 2-71; pg 2-171 Chapter 4.4.3.4, pg. 4-176; pg 4-210;	**Aquatic Habitat Impact/Mitigation Concerns:** **Points of Diversion Fish Screening:** The Applicant has identified Points of Diversion (POD's) that are within 150 feet of the work area. Many POD's have water conveyance ditches outfitted with fish screens. Not all fish screens are located in the immediate vicinity of the POD. **Herbicide Use Near Streams/Wetlands:** The Applicant states that pesticides or herbicides will not be used in or within 100 feet of wetlands unless allowed by the land management or permitting agency. **Small Stream Temperature Issues:** The DEIS states in pg 4-503; that temperature increases	**Aquatic Habitat Impact/Mitigation Concerns:** **Points of Diversion Fish Screening:** ODFW recommends that the PCGP project precisely identify the location of fish screening equipment as it relates to the work area. **Herbicide Use Near Streams/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. **Small Stream Temperature Issues:** ODFW recommends FERC condition the certificate to direct the Applicant to treat all intermittent waterbodies within the Coast, Umpqua, and Rogue basins the same as perennial streams and provide these streams the same level of protection, as stated in the DEIS, comparable streams on Federally managed lands. **Large Woody Debris (LWD) as Mitigation** (See Appendix A below)**:** ODFW recommends a stream habitat mitigation plan be developed for every fifth field watershed crossed in order to effectively

	on streams will be minor. However, Rogue summer steelheads primarily rely upon streams with low or intermittent flow for spawning and brief periods of rearing. Numerous intermittent streams within the Coastal Range are also important for Coho production. **Large Woody Debris (LWD) as Mitigation:** ODFW, recommends revisiting analysis and discussion of LWD as mitigation as in many cases placement of a small number of pieces of LWD do not address impacts (sediment, disturbance of channel morphology, long-term canopy removal etc.). LWD treatments as mitigation are not considered "In Kind" for impacts to riparian canopy. ODFW believes this approach, without further augmentation, would likely fall short of compensating for loss of habitat functions and values from anticipated project impacts. LWD placed haphazardly and not within a continuous project typically do not provide immediate or long term benefits for adult or juvenile salmonids. Forested riparian areas	mitigate for the life-long impacts of the project. In addition the Applicant should fully mitigate for the multiple impacts at stream crossing sites including, but not limited to: • Access roads and associated sediment production to streams. • Loss of riparian canopy that increases solar input. • Elimination of much of the filtering capacity of the RMA due to removal most other lost habitat values/benefits of riparian habitat as well. • Destabilization of stream channels and streambanks. ODFW recommends that in addition to placement of LWD at stream crossing sites the following restoration and mitigation actions may greatly complement the functional habitat benefits provide by LWD placement : • Placement of forest vegetation (limbs, small woody debris, etc.) scattered on bare soils following disturbance within 50ft. of each pipeline approach to streams. This material will be readily available due to land clearing efforts • Purchase of riparian easements on private timber or agricultural lands in the HUC 6 watershed. Appendix A below contains a number of potential mitigation options. • Placement of washed spawning gravel at all stream crossing impact sites in the Coastal Zone and considered on a site by site basis for all other stream locations. Spawning gravel is often a limited quantity habitat feature in the Coastal Zone and placement will augment productive capacity of reach impacted for salmonids. • Gravels should consist of washed drain rock from an upland source (such as the Elk River Pit in Langlois, OR • Gravels should consist of 1.5 inch diameter washed drain rock for Coho and steelhead spawning streams; 0.75 inch washed drain rock for streams where only cutthroat trout are present. • Gravels should be applied at the rate of 8.0 inch depth over the reach impacted to the width of the ACW and up the banks 2.0 feet (which will reduce bank instability). Thus if a 40 foot reach of stream

	contribute more than LWD (e.g. shade, nutrients, predatory cover, wildlife habitat, etc.) to streams.	channel is disturbed and the ACW is 8 feet wide, then the quantity needed would be 40.0 feet x (8.0 feet ACW+ (2x2 banks)) x 0.67 ft. (8.0 inches) or a total of 321 cubic feet or roughly 12.0 cubic yard (CY).
Chapter 4.6, pgs. 4-270-291; Appendix C 36pgs; Appendix H 36pgs;	**Water quality Impacts from Sedimentation, Storm water Runoff, and Roads:** **Sedimentation Impacts from Clearing and Grubbing Large sections of ROW:** This section lists actions designed to reduce run off and catch sediment. One thing missing is a discussion identifying how much area will be cleared and grubbed at one time. Lessons learned from the ODOT's Pioneer to Eddyville project (in the Coast Range Mountains) include the need to limit the amount of ground cleared of vegetation at any one time. The pipeline will cross 71 miles of the Coast Range, so special care should be taken to limit erosion and sediment loss in this section as well as any other areas of significant rainfall with steep slopes. The timing of the pipeline construction should allow for ground clearing to occur after the spring rainy season and any areas opened up should be seeded and vegetation established before the fall rains. Distance and slope can be taken into account regarding the amount of land cleared and	**Water quality Impacts from Sedimentation, Storm water Runoff, and Roads:** **Sedimentation Impacts from Clearing and Grubbing Large sections of ROW:** Given the known instability and potential precipitation levels in the Coast Range Mountains ODFW recommends: ODFW recommends that the Applicant develop a detailed written plan that identifies the maximum amount of land cleared and grubbed at one time. The plan should also identify (1) areas of high, medium, and low levels of risk for sediment escape and impacts to water bodies. Based on slope and proximity to water bodies, and (2) include a re-vegetation section that ensures re-establishment of vegetation in high and medium risk areas prior to the fall rains. **Pipeline Steep Slope Concerns and Roads:** Pipeline Steep Slope Concerns: Stabilization/erosion control of upland slopes following pipeline construction will be nearly as important as stabilization/erosion control in riparian areas adjacent to streams. Some extremely steep slopes will be encountered in the Coos County portion of the pipeline. ODFW recommends the following for locations where the pipeline will traverse or the route will be placed on slopes which qualify as High Landslide Hazard Locations (HLHL as defined in ***Oregon Dept. of Forestry Technical note 2.0 vers 2.0; (ODF Jan 1, 2003)***; in Tyee Sandstone over 65% slope on headwall locations and 75% ridges): • ODFW recommends the pipeline construction route incorporate cross slope trenching as

	grubbed, i.e. the greater the distance from a creek and the flatter slope, the less concern for down slope sediment escape and erosion that can ultimately impact water bodies. The DEIS recognizes the geological instability of the Coast Range in the following sections: Chapter 4.1; pg 4-6 , under Landforms and Erosional Coast Range paragraph 1: *"The wet conditions of the western slopes of the Coast Range, along with steep terrain composed of relatively weak rock, contribute to an active erosional environment with frequent landslides."* The Coast Range receives some of the highest precipitation totals in the continental U.S., with some areas receiving up to 200 inches per year." **Pipeline Steep Slope Concerns and Roads:** A number of miles of the pipeline will be constructed on slopes that exceed 50%. Tyee sandstone geology in the Coos and Coquille River basins and the geology of the Rogue Basin to a lesser degree are highly prone to landslides if the supporting matrix is disturbed. Additionally numerous access roads will be built to harvest timber and access construction	opposed to routing parallel to the slope whenever possible to reduce the risk of soils moving laterally in the trench downslope (mass wasting slides). • Placement of erosion control matting has been outlined as an upland soil disturbance control measure. This, in combination with cross slope placed large wood, stumps, and other wood material, is considered a modestly reasonable attempt for erosion control. ODFW recognizes that pipeline corridor management strategies are not likely to allow for placement of large wood in pipeline corridors. • ODFW recommends rock or other structures be placed across the pipeline trench at a 90˚ angle and be embedded in the undisturbed walls of the trench a minimum of 4ft. to prevent free movement of soil in the disturbed pipeline trench. These structures should be placed at 100ft. intervals. • Steep slope pipeline locations should receive additional efforts with seeding and mulching. Additionally these segments of the pipeline route should have cross slope structures and drainage networks to reduce failure risk. ODFW recommends the road network: • Have surfacing that is sufficient to accommodate travel loading and prevent erosion of the road surface through all months. • Have cross drains installed at a density/spacing that is equivalent or exceeds to recommendations in the ODF Forest Practices Technical Note Number 8 vers.1 (ODF Jan 2003). • Have mitigation for sedimentation/mass wasting issues clearly identified in-proximity regardless of ownership (federal or non-federal) as these locations have the greatest potential for measurable improvements in reducing sediment loading to streams impacted.

	of the PCGP. Essentially the pipeline route is a 229 mile road through the landscape. Mass wasting debris torrents and general erosion are considered substantial threat to ESA listed and non-ESA listed salmonids as well as amphibians. Extensive research has documented the impacts of sediments to salmonids. Work to reduce sediment input into coastal and inland streams that will be impacted by the pipeline is foundationally critical for enhancing spawning and rearing habitat for fall Chinook salmon, Oregon Coast (OC) threatened Coho salmon, Pacific lamprey (*Entosphenus tridentata*), winter steelhead (*O. mykiss irrideus)* and coastal cutthroat trout (*O. clarki clarki)* as water quality is directly linked to hatch rates and food available for these species. Sediment loading above natural background levels contributes to embedding of substrates which often results in reduced hatch rates for eggs in redds, inability of fry to emerge from redds, inhibited production of macroinvertebrates (invertebrates largely live in the interstitial spaces of gravels), and impacts on the ability of fish to obtain food due to the nature of salmonids to feed predominantly by using their sight (Burns 1970; Hall and Lanz 1969; Weiser and Wright 1988; Suttle et al. 2004; Tripp and Poulin 1992; Waters 1995). See Appendix A Figure 1-3.	**Emergency Response Notification Water Quality:** ODFW recommends that emergency plans include immediate notification of: • Turbidity exceedances, frac-outs, and spills and pipeline leaks for both the JCEP facility and PCGP. • ODFW recommends that emergency plans include surveys for fish and wildlife kills immediately following a frac-out, spill, or gas release. Should an incident like those described above occur, the project must contact Oregon Emergency Response System immediately (1-800-452-0311) in the case of leaks during pipeline operation or offloading or loading at the JCEP facility or along the PCGP route. **Natural Gas Pipeline Shut-Off Valves-LNG Control at Large Rivers:** ODFW recommends that options to have shut-off valves on each side of large stream crossings such as the South Umpqua, Rogue, and Klamath Rivers be evaluated.

	Emergency Response: Emergency plans, including immediate notification of turbidity exceedances, frac-outs, spills, and pipeline leaks for both the JCEP facility and PCGP, are considered critically important. Sensitive fish and wildlife habitats can be severely impacted by these types of occurrences. However, impacts can be greatly minimized if remediation actions are initiated quickly upon discovery of an incident. **Natural Gas Pipeline Shut-Off Valves:** ODFW remains concerned with potential impacts to fish, wildlife, and their habitats from unanticipated failures or gas releases: Is it possible to have a shut-off valve on each side of large stream crossings, such as the South Umpqua, Rogue and Klamath Rivers? If there is a rupture and a natural gas release, how long will it take for the spilling to cease? How far apart are the proposed shut-offs?	

		Natural Gas Pipeline Shut-Off Valves Controlling Transmission Pipeline Failures: ODFW remains concerned with potential impacts to fish, wildlife, and their habitats from unanticipated failures or gas releases. Therefore, ODFW recommends frequent and strategically located shut-off valves, to the extent practicable, in order to minimize the location of and extent potential impacts to fish, wildlife, and the habitats they depend on should failures or gas releases occur during construction or over the life the project. An Operations and Maintenance (O&M) plan should be developed with contingencies identified for any need repair, maintenance, or in case of a failure in and around sensitive aquatic habitats such as waterway crossings.
Chapter 2.0 Chapter 4-298-301; Appendix M 302 pgs	**Hydrostatic Testing:** The DEIS describes use of 64 million gallons of water to complete hydrostatic testing. Removal of 11,193,575 gallons from the South Umpqua fourth field HUC, including an estimated 4,562,407 gallons from the South Umpqua alone will possibly be a substantial impact on fish and wildlife resources, especially during periods of low flow and poor water quality. Transport of invasive species is a substantial concern with transport of water from a source basin and release at another point in an adjacent watershed. Damage and control costs of invasive species in the United States are estimated to be more than	**Hydrostatic Testing:** ODFW recommends: • ODFW notes changes to the Hydrostatic Testing Plan that assist with guiding erosion potential and encourages continued efforts to alleviate this impact to reduce erosion impacts due to pipeline testing discharge. • In addition, the project proponents need to continue to incorporate methods to eliminate the possibility of spreading invasive species (such as New Zealand mud snails, smallmouth bass fry) especially given that the pipeline may convey water between non-hydraulically connected basins and in some instances, be “cascaded” across the landscape to be used for the next segment. Minimizing the risk, as discussed in the plan, is not adequate. Water diverted will need to be tested along with water at the nearest discharge waterbody to see if stream pathologies are similar or measures taken to ensure water released is sterilized. • NMFS-approved screening on diversions is required and fish passage at these locations must be maintained. • In addition, test water should not be allowed to drain into waters of the State and chlorinated

	$138 billion annually and 80% of endangered species are deleteriously impacted by these species through predation or competition (Pimental et. al). Impacts from invasive fish species alone cost $6.03 billion annually (Cusack et. al.). If testing occurs in the fall this is a period of adult anadromous migration including fall Chinook, coho, and winter steelhead. Also, this can be the period of lowest stream flow, and water for hydrostatic testing water may be unavailable unless purchased from existing available water sources such as reservoirs. Inter-basin mixing of water could adversely affect migration of adult anadromous fish (salmon, steelhead and lamprey) to their natal streams through a phenomenon known as false attraction. Supplying water from an Oregon Department of Environmental Equality 303(d) TMDL Water Quality limited waterbody to a basin of higher water quality may result in reduced water quality in the source watershed. Hydrostatic testing will require additional staff to survey for the Northern Spotted owl due to noise disturbance on the pipeline route. It is uncertain	water should not be used for the testing unless the release location will not enter a stream, wetland, or waterway. • ODFW recommends continued efforts to develop the Hydrostatic Testing Plan as well as a Hydrostatic Monitoring protocol with the intent of approval of the plan by ODFW, other state and federal agencies. The survey will monitor ramping, fish stranding, and water temperature at pumping and release sites, salvage fish, and document fish losses. The project proponents should conduct the surveys with competent biological staff. • A summary report of monitoring would be submitted to the agencies, along with compensation for losses to fish and wildlife resources.

	and not addressed in the DEIS as to if this will have additional impacts on nesting Northern Spotted Owls.	
DEIS Section 4.1, 4.3, 5.3, and Condition #25; Also Appendix F-10 Part 4 Hydrostatic Testing	**Water Quantity and Quality related to Hydrostatic Testing:** Groundwater impacts: Section 4.3, Page 4-81 discussion of construction impacts does not acknowledge impacts to local landowners or impacts to fish and wildlife. **Instream Flow:** Section 4.3, Page 4-109 does not discuss whether and how the use of this water for hydrostatic testing represents a change in character of use, which would trigger a WRD Water Rights Transfer per ORS 540.505 to 540.580 and OAR 690 Divisions 380 and 382. **Hydrostatic test water treatment:** Section 4.3, Page 4-109 the DEIS discusses treatment of the discharge water with a 'mild chlorine treatment', however the temporary impacts to water quality are not evaluated. **Instream Water Rights at Hydrostatic Source Locations:** Table 4.3.2.2-7, Page 4-110 outlines the potential water sources for hydrostatic testing	**Water Quantity and Quality related to Hydrostatic Testing:** Groundwater impacts: Section 4.3, Page 4-81 ODFW recommends this section more fully address how the pipeline could impact groundwater supplies, springs, seeps, and wells. **Instream Flow:** ODFW recommends the DEIS more fully address whether the hydrostatic uses will require water rights transfers and what that will mean for impacts to fish and wildlife and to other local uses. **Hydrostatic test water treatment:** ODFW recommends the DEIS more fully describe the chlorine application rates and potential impacts to water quality even with the minimization measures described therein.

	but does not identify potential impacts to existing instream water rights. **Cross-Basin Discharge**: Section 4.3, Page 4-111 discusses the plan for cascading test water across watershed basins. While the DEIS discusses how it will minimize introduction of pathogens across basins it does not address the impacts of overall decreased water quantity within the source basin. **Water Availability for Intake:** Section 4.3, Page 4-111 also Page 4-98 (mention of Coos River, East and Middle Fork Coquille Rivers, Olalla Creek, South Umpqua Riger, Rogue River, Lost River, and Klamath River) discusses the potential effects on downstream flow associated with hydrostatic testing. The DEIS estimates reduction of less than 10% of typical monthly flow. However the DEIS does not acknowledge that in some years there may not be water available even for a Limited License. In low-water years, existing instream water rights might not be met already during the "dry season" so further withdrawal could cause additional harm. **Point of Diversion Effects**: Section 4.3, Page 4-118 the DEIS	**Instream Water Rights at Hydrostatic Source Locations:** ODFW recommends FERC include a condition for PCGP to check for Instream Water Rights at all hydrostatic sources, and evaluate the timing of water use when water is available. **Cross-Basin Discharge**: ODFW recommends FERC evaluate the impacts of an overall decrease in water quantity within source basins that may result from hydrostatic testing. If water quantity may decrease in source basins, ODFW also recommends FERC include a condition for the applicant to consult with ODFW and WRD to mitigate for this lost water quantity. **Water Availability for Intake:** ODFW recommends FERC evaluate low-water years when instream water may not even be available for hydrostatic testing, even with a Limited License. The DEIS should examine what alternate strategies might be used in these situations, and also how these additive impacts to fish and wildlife will be minimized or offset. The DEIS should also mention decreased flow as a potential impact to fish in Section 4.6.1.3.

	states "*Pacific Connector would consult with the landowner if impacts on a water supply's point of diversion cannot be avoided, and prior to construction would work together to identify an alternate location to establish the diversion*". Moving a point of diversion has the risk of causing injury to instream water rights. Moving a point of diversion requires a WRD water right transfer application, which can take significantly more time to review than a limited license application. A water right transfer can also require fish and wildlife habitat mitigation, if the transfer may cause permanent impacts to the instream flows. See ORS 540.530. **Cumulative Impacts to Water Quantity**: Section 4.1.4.1.2 does not consider the cumulative impacts to water quantity, which may result from hydrostatic testing, dust abatement, and other water uses. **Dust Abatement**: Section 5.3 bottom of page 5-3. The DEIS concludes that 75,000 gallons per day of water for dust control would not result in significant impacts on surface water resources. However, ODFW contends that further withdrawal from the streams and rivers named in the DEIS	**Point of Diversion Effects**: FERC and the PCGP should be aware of the State of Oregon's statutes regarding Point of Water Diversion (ORS 540.530) and build in adequate time for the process.

	may have an adverse impact to fish and wildlife due to reduced flow. Instream water rights are already not met much of the year in these areas. **Instantaneous Flow Reduction**: Condition #25 on Page 5-18. This condition requires PCGP to file a Hydrostatic Test Plan allowing water withdrawal not to exceed an instantaneous flow reduction of more than 10% stream flow. This condition is problematic because existing instream rights are often not met much of the year on small streams. Ten percent on a small stream in summer may have a large impact on instream flow. This metric of 10% is not consistent with state water allocation based on water availability.	**Cumulative Impacts to Water Quantity**: ODFW recommends cumulative impacts to water quantity be addressed in the DEIS. **Dust Abatement**: ODFW recommends the DEIS reanalyze its determination for the impacts to fish and wildlife associated with dust abatement water withdrawals.

		Instantaneous Flow Reduction: ODFW recommends PCGP coordinate with WRD and ODFW to establish the appropriate metric for downstream flows in the Hydrostatic Test Plan, and that Condition #25 in the DEIS be amended to reflect this coordination.
Chapter 4.3 pgs 4-131-134; Appendix H 37pgs	**Wetland Habitat Impact/Mitigation Concerns:** The project is anticipated to produce substantial turbidity to wetlands adjacent to the pipeline Right of Way and road networks associated with the project. Additionally, noise from hydrostatic testing will likely impact amphibian populations, potentially disrupting breeding cycles. Table 4.3.3.2-1 Summary of Wetland Impacts by notes 112.2 affected wetland acres 0.91 acres of permanent impacts within the pipeline route. Major wetland functions include water storage, carbon sequestration, slow water release, maintenance of high water tables, temperature regulation, nutrient cycling, sediment retention, accumulation of organic matter, filtration, and maintenance of plant (by provision of substrate for plant colonization) and animal communities. Measures need to be taken to eliminate the risk of spreading invasive	**Amphibian Direct Mortality and Long-Term Passage:** ODFW recommends the Applicant meet with a Department biologist to discuss the need for amphibian salvage depending on the specific proposals for construction through or near waterways and wetlands. ODFW recommends surveys are completed for both amphibians and reptiles. Additionally: • ODFW recommends that final constructed designs provide for amphibian passage along the pipeline route (i.e. installing cross drains under access roads that connect wetlands). Installation of culverts with stream simulation design is considered to fully provide for amphibian passage. There will be a number of locations where fish are not present that passage for amphibians may need to be provided on a case by case basis. • ODFW recommends the PCGP project staff consult for all wetland locations >0.1 acre in size with Department staff at least 1.0 months prior to disturbance to determine methodologies to reduce impacts to amphibians and identify if salvage is necessary.

	plants and noxious weeds. The monitoring needs to contain specific goal criteria and contain contingency plans if restoration attempts are not successful. **Big Butte Creek Fifth Field HUC:** The DEIS notes that an extremely long wetland crossing 1,680 feet (0.31 mile) and 4.21 acres of wetland impact is proposed in this watershed **Amphibian Direct Mortality and Long-Term Passage:** The PCGP project is anticipated to incur notable mortality to amphibians resulting from proposed construction methods in riparian areas, stream adjacent wetlands, and perched wetlands. Amphibians range in mobility from highly mobile to extremely limited. Installation of crossings where there is currently stream/wetland connectivity can result in increased predation and reduced capacity of amphibians to access needed habitats. This is critical where wetland are ephemeral. The DEIS does not outline that reptile surveys will be	

	conducted.	
Chapter 1.0, pgs 1-31, 32; 2-56, 61, 69; Chapter 3.0 pgs 3-20-23 Chapter 4.2.3.1 pgs 4-72 Appendix H 37p	**Amphibian Salvage Expectations:** **ODFW's Scientific Take Permits:** Scientific take permits are relevant to coordinate salvage and movement of fish and wildlife species impacted during a project. **Amphibian Salvage:** The JCEP staff proposed that in order to mitigate potential impacts on amphibians and reptiles it would conduct pre-construction surveys for the northern Pacific pond turtle, northern red-legged frog, and clouded salamander. Individuals located within the construction area would be captured and transported to suitable nearby habitats, agreed to with the ODFW.	**Amphibian Salvage Expectations:** **ODFW's Scientific Take Permits:** ODFW recommends a condition be included for the Applicant to apply for and comply with state scientific taking permits. • ODFW recommends that the pipeline staff report quantified known injuries and mortalities by species during construction of the project. • ODFW recommends that the PCGP staff report injuries and mortalities of fish and wildlife by species associated with operation of the pipeline or in an emergent condition. **Amphibian Salvage:** ODFW recommends FERC condition the project certificate such that the Applicant is required to acquire all needed state and Federal authorizations to salvage amphibians which would otherwise be likely subject severe stress or mortality as a result in-water work or wetlands impacts, as appropriate at a site specific level . ODFW recommends salvage of amphibians occurs as appropriate and as feasible throughout the project locations. Detailed information on necessary state authorizations for fish and aquatic wildlife salvage, recommended protocols, and standard BMPs are available from ODFW upon request. ODFW also recommends increasing the number of wildlife ramps to avoid reptile and amphibian entrapment in the pipeline trench (Section 4.5).
Chapter 4.5 pgs 289-291; Table 4.5.2.3-5	**Riparian Habitat Impact/Mitigation Concerns:** Riparian vegetation within the Riparian Management Area (RMA) zone near streams, wetlands, and waterways is	**Riparian Habitat Impact/Mitigation Concerns:** (See Appendix A below): ODFW recommends that riparian vegetation buffers that: RMA vegetation meet or exceed State and local

	critically important for the health of Oregon's native fish populations, especially in the drier parts of the pipeline corridor such as the Rogue and Klamath watersheds. Native fish in the state are predominantly cold water species that evolved in stream conditions that were in most cases facilitated by climax or second growth hardwood and conifer forest, thus near maximum shade that the stand would produce. The Oregon Dept. of Environmental Quality has identified 303d temperature listed streams including numerous streams through the pipeline route. These listings relate directly to removal of riparian vegetation since the 1800's. ODFW notes that PCGP staff have developed a water temperature model to evaluate the impacts of the project at specific stream crossings. Table 4.3.2.2-9 identifies through modeling efforts that some streams impacted by the PCGP will be cooler following removal of the riparian corridor. The results of this model seem counterintuitive to the principle of riparian width and size having a direct positive correlation with shading and cooler micro-climates to help	government requirements be implemented on non-federal lands. All disturbed areas need to be replanted with native vegetation. ODFW recognizes that the proposed crossing locations may be on lands where private landowners may not allow the full setback to be replanted. In these situations, ODFW does not object if mitigation for permanent riparian impacts occurs off-site provided that it occurs within proximity within the same HUC 6 watershed and on private lands. <u>Thinning as Mitigation:</u> ODFW recommends this treatment is unlikely to produce results that benefit fish and their habitats as the results are distant in the future due to the long period for trees to grow and mature. Accordingly this action should not be assumed to provide fish/stream benefits and should be used only on a very limited basis with clearly defined objectives that address location specific limiting factors.

	keep stream temperatures cold. In addition BLM modeling in 2013 showed notable temperature increase potential for very small streams of 1˚-5˚F. (Additional information about the scientific merit of different types of Riparian treatment is explored in Appendix B of these comments and recommendations below.	
DEIS ES pgs 1-6; Chapter 2.1.2-2.7.2 Chapter 4.6	**Upland Impact/Mitigation Concerns:** ODFW has previously provided feedback to the Applicant: • Regarding snag creation, and elk habitat/forage. Previous feedback for creating forage areas for deer and elk using ODFW's recommended forage seeding mixture has not been addressed. • ODFW's recommended snag retention concept has been addressed, but the species of conifers, minimum diameter at breast height (dbh) used, and number per acre or linear foot were not estimated. • ODFW's recommended down wood concept has been addressed, but the species of trees, minimum dbh used, linear feet per acre, and number per acre were not estimated. • ODFW's recommended legacy tree concept was not addressed at all including the species of trees, minimum	**Upland Impacts/Mitigation Concerns:** (See Appendix A below): ODFW recommends further discussion of upland mitigation proposals, including: • Mitigation in the form of incorporating specific snag densities, down wood, danger tree replacement, and legacy trees. Many of these rare upland habitat types may provide essential habitat function for critical life stages of fish and wildlife. If habitats or habitat function are mis-categorized and/or critical habitat functions are not adequately compensated for, the proposed mitigation sites may fail to meet or exceed ODFW's specific mitigation recommendations. • ODFW recommends further discussions regarding elk and deer forage plantings within the pipeline corridor with the recommendation that production wildlife forage be considered a goal of the final vegetative community in the pipeline corridor.

	dbh used, and number per acre were not estimated.	
Chapter 4.14.13; Appendix I, 174pgs	**Forest and Vegetation Impacts:** Table 4.5.2.3-1 (Summary of Construction and Operation-related Disturbance states that 433 acres of Lowland Conifer/Hardwood; 722 acres of Montane Mixed Conifer and Mixed Conifer Hardwood; 3 acres of Western Juniper/Mountain Mahogany; 68 acres of Shrub Steppe; 17 acres of Westside Grassland; 2 acres of Eastside Grassland and <2.0 acres of Westside Riparian, Eastside Wetland/Riparian Wetlands will be crossed. The DEIS provides reference to documents on proposed wetland and waterway mitigation and some planting methods, however, there needs to be continued development of the BMP's for impacts to vegetation and soils in the pipeline corridor as erosion along pipeline corridors during and immediately following pipeline construction can hinder land restoration work, expose shallow laid pipes and risk negative impacts for on- and off-site fish and wildlife habitat resources (Hann et al.). Use of only native herbaceous, shrub, and tree species is prescribed in the DEIS. However; the establishment of vegetation using native grasses,	**Forest and Vegetation Impacts:** ODFW recommends the following: • Additional development of BMP's for pipeline vegetation/soil disturbance is recommended. • Only native herbaceous (grass/forb), shrub, and tree species be used for restoration of disturbed sites unless natives will be unsuitable for site stabilization or specific species of non-natives are recommended to wildlife forage value. The establishment of vegetation using native grasses, trees and shrubs (although preferable in most instances) may prove ineffective if there is a lack of understanding of local conditions and their influence on vegetation growth, poor plant/seed selection, inappropriate soil management practices and inadequate vegetation management plans. • Generally, ODFW recommends choosing: 1. In-kind native species are used to ensure local ecological integrity, 2. Use of species adapted to the local climatic and soil conditions, use species with appropriate engineering properties for erosion control, 3. Mixture of species with a range of establishment rates, including rapidly establishing species to colonize the area and stabilize the surface and slower establishing species which will determine the composition of the mature vegetation cover. • Surveying stocking density of forest vegetation on the third growing season across the pipeline route, not only selected segments. • Include prescriptions for restoring shrubs to the corridor, especially in Jackson County's designated deer winter range. Plans should include efforts to restore *Ceanothus spp*., which may require scarification.

	trees and shrubs is often ineffective if there is a lack of understanding of local conditions and their influence on vegetation growth, poor plant/seed selection, inappropriate soil management practices and inadequate vegetation management plans. Typically, choosing in-kind native species for revegetation helps ensure local ecological integrity. The use of species adapted to the local climatic and soil conditions include those with appropriate properties for erosion control and mixtures of species with a range of establishment rates. Mixtures should include rapidly establishing species to colonize the area and stabilize the surface and slower establishing species which may also influence the composition of the mature vegetation cover. The mitigation will need to address the permanent loss of vegetation and mitigate for the loss of function that will occur until the vegetation compares to pre-project conditions. Vegetation not directly on waters of the United States may still lead to impacts that have the potential to affect water quality. Human-induced fragmentation of the landscape is among the factors reducing the number of natural corridors and the possibilities of re-colonization	

	of plant and animal species with poor dispersal capacities. This is especially true of amphibians in forested habitats (Todd et. al). A mitigation plan needs to be developed that addresses project related forest, vegetation, and grassland impacts. In fact, the mitigation plan (Appendix I) provides documentation on wetlands and waterbodies, but does not address upland habitat and forest impacts. In the context of described limits to revegetation of the ROW, the currently proposed impacts to riparian areas may result in net loss of habitat function. The Applicant proposes to keep a ten foot wide area over the pipeline in an herbaceous state and a 30 foot wide area with no trees or shrubs greater than fifteen feet tall. If these impacts are unavoidable, they need to be addressed in the mitigation plan. **Monitoring of forest Vegetation (Erosion Control and Revegetation Plan) pg. 42 Table 13.13-1:** Monitoring of reforestation will take place the first and third fall following planting, on Lakeview BLM and Forest Service lands, but only the first year on the Coos, Roseburg, and Medford BLM	

	Districts and on Private Lands. No shrubs are included in the planting mix, except for Klamath County. Shrubs are an important component of upland habitats in southern Oregon. They are especially important as winter forage on deer winter range in Jackson County. *Ceanothus cunneatus* is especially important but may require seed scarification.	
Chapter 2.1.2-2.7.2 Chapter 4.6	**Non-Forested Habitats, Duration of Habitat Mitigation/Restoration Benefits Commensurate to Habitat Impacts:** The DEIS indicates that non-forested habitats within the temporary construction right-of-way would be restored relatively quickly. Shrub steppe habitats can take considerable time to restore to pre-project functional condition especially sage brush species which can take decades to regrow to their previous structural condition.	**Non-Forested Habitats, Duration of Habitat Mitigation/Restoration Benefits Commensurate to Habitat Impacts:** ODFW recommends impacts to habitats be quantified into reasonably likely time frames measured in years. ODFW recommends mitigation be proposed to compensate for the temporal loss of impacted and then restored habitats. ODFW recommends the functional benefits of mitigation meet or exceed the likely duration of impacts regardless of if they are estimated to be shorter term, longer term, or life of the project in duration.
Table 4.6.1-1, also Section 4.6.1.2 and Table 4.6.2-1	**Species Status Corrections:** The gray wolf is incorrectly labeled as delisted in the state of Oregon Western snowy plover nesting area on the North Spit likely to be impacted by increased recreational pressure associated with the new JCEP	**Species Status Corrections:** The gray wolf is still state-listed as Threatened in the western half of Oregon, including this project area. ODFW recommend the table be updated to reflect this potential impact to western snowy plovers.

	facility employees and construction crews. Short-tailed albatross is state-listed as endangered, but this section says no state status. In the Western snowy plover section, the DEIS does not mention the federal Habitat Conservation Plan which was approved by the USFWS in 2010. The four federally listed sea turtles discussed in this section are also state listed on the Oregon Endangered Species Act. In Table 4.6.2-1 the western snowy plover is omitted. Gray whale is a state endangered species, but has been federally delisted.	ODFW recommends the DEIS be corrected for state status of short-tailed albatross. ODFW recommends the DEIS consider how the proposed action aligns with decisions made in the 2010 Western Snowy Plover Habitat Conservation Plan. The DEIS should also discuss in this section how state agencies' actions on state-owned land are regulated through OAR 635-100-0000-0040. The DEIS should also reference that the plover was state listed in 1987. Sea turtles' state status should be included in the DEIS. The green sea turtle and leatherback sea turtle are listed as endangered on the OESA, and the loggerhead sea turtle is listed as state threatened. ODFW recommends the table be corrected to add in the western snowy plover. ODFW recommends correction for gray whale status as state endangered and federally delisted.
Chapter. 4.6.1, pgs.4-310-329 Table 4.6.1-1	**Species Occurrence/Status Species Corrections:** **Pacific Fisher:** Fisher are mentioned in the DEIS.	**Species Occurrence/Status Species Corrections:** ODFW recommends revision of information in the DEIS to reflect the following species occurrence/status information:

	However, Fisher may become a listed species in the near future and their presence has been documented in the PCGP route through BLM sampling efforts. **Oregon Spotted Frog:** This species is now federally listed. **Bald Eagle:** There are a number of nest sites known within a five mile distance of the pipeline route. **Western Pond Turtles and Yellow-legged Frogs** are not addressed in the T&E Section of the DEIS, however both of these species have been proposed for federal listing per the ESA. **Wolverines** are listed as threatened under the Oregon Endangered Species Act.	**Pacific Fisher:** ODFW recommends the Applicant considers how this project may contribute to a federal listing decision. **Oregon Spotted Frog:** ODFW recommends the Applicant conduct surveys to identify use of habitats in the pipeline corridor by this species. **Bald Eagle:** Department recommends nest surveys be completed to document bald eagle nesting locations within 1.0 mile of the pipeline route as well as consistent descriptions of nest surveys. **Western Pond Turtles and Yellow-legged Frogs**: ODFW recommends that FERC analyze effect for both of these species, and that they be included in the consultation with the USFWS. ODFW believes the determination will be a likely to affect for both species. **Wolverine:** ODFW recommends correction.
Section 4.6.2.2	California brown pelican – The DEIS states that "brown pelicans are regularly seen in moderate numbers during the summer months in Coos Bay". This is very out of date. Many more birds have recently been present along the Oregon Coast, attempted nesting activity has also occurred, and birds have also stayed later into the fall each year.	ODFW recommends correction.

Section 4.6.3.2	The ODFW responsibility for state-listed species under the Oregon Endangered Species Act is incorrectly omitted from this section. This section is also incorrect about ODFW authority for invertebrates – ODFW has authority for marine and intertidal invertebrates.	ODFW recommends correction.
2014 DEIS Appendix L Draft Biological Evaluation, pg. 97; **2019 DEIS** Not addressed	**Bald Eagle Impacts:** The draft Biological Evaluation lists only 2 nest sites within 1-5 miles of the proposed pipeline. A number of other nest sites exist on non-federal lands in Klamath County. The Draft Biological Evaluation states that disturbance to breeding individuals is not anticipated yet, construction activities are planned (pending waiver) for the Klamath County portion of the pipeline which could cause disturbance to nesting eagles. Bald eagles generally begin nesting in early February. Where in the DEIS are potential impacts to bald eagles addressed on non-federal lands?	**Bald Eagle Impacts:** ODFW recommends the Draft Biological Evaluation be updated to correct these inaccuracies and address potential impacts to bald eagles and nest sites on Federal and non-Federal lands. ODFW recommends the Draft Biological Evaluation also be updated to correct these inaccuracies and address potential impacts to bald eagles and nest sites during winter construction in Klamath County and on Federal and non-Federal lands alike.
Chapter 4.5; pg 4-191	**Eagle nests:** Permits are required to remove eagle nests	**Eagle nests:** If eagle nests are present, ODFW recommends the Applicant coordinate with USFWS prior to removal of potentially empty or abandoned nests to ensure compliance with the Bald and Golden Eagle Protection Act (BGEPA).
2014 DEIS Appendix L Draft Biological	**White-headed Woodpecker Impacts:** The Draft Biological Evaluation	**White-headed Woodpecker:** ODFW recommends correcting this information in the Draft Biological Evaluation to reflect adjustments to timber harvest management within the range of this species and

Evaluation, pg. 102 **2019 DEIS** Not addressed	states that timber harvest on federal lands target large diameter ponderosa pine. This was most certainly true in the past but since the 1990s, Forest Service standards and guidelines mostly prohibit harvest of trees greater than 21 inch diameter. A larger threat to white-headed woodpecker habitat is overstocked forest stands as a result of fire suppression and lack of disturbance.	impacts related to habitat transition.
2014 DEIS Appendix L Draft Biological Evaluation, pg. 120 **2019 DEIS** Western Pond Turtle distribution not updated	**Western Pond Turtle:** The Draft Biological Evaluation states that western pond turtles have not been documented on Fremont-Winema National Forest. However, they are documented on non-federal lands in Klamath County, specifically at proposed crossing at Klamath River and potentially at Lost River crossing. The Draft Biological Evaluation also states that in Oregon, WPT are found up to elevations of 3,000 feet, yet in Klamath County pond turtles are known to occur at elevations of 4,200 feet elevation and likely higher elevations. Potential impact to WPT is likely underestimated and should be reevaluated.	**Western Pond Turtle:** ODFW recommends correcting information for western pond turtle in the Draft Biological Evaluation.

2014 DEIS Appendix L Draft Biological Evaluation, pg. 124, Lines 25-30 **2019 DEIS** Western Pond Turtle Nesting Habitat not addressed	**Western Pond Turtle Nesting Habitat:** The Determination of Effects with regard to the western pond turtle (WPT) states*: "In considering the potential direct, indirect, and cumulative impacts, it is determined that the proposed action "may impact individuals or habitat, but is not likely to contribute to a trend toward federal listing or loss of viability of the species" "for the Western pond turtle because impacts would be limited to dispersing individuals as there are no known nesting or overwintering sites within 1 mile of the Project on NFS land, and the Project would impact only approximately 3 percent of potentially suitable habitat within the analysis area."* This determination is based on limited and incomplete information regarding the known or potential presence of WPT in Coos, Douglas, Jackson, and Klamath Counties (see BE Page 120, Lines 25-28, and Page 122, Lines 16-20). To date comprehensive WPT surveys have not been conducted in Oregon, however, some work has been done. ODFW is aware of over 1630 records of captured animals from 69 unique sites within the four counties named above. It is likely local Department office observation databases contain many more observations. WPT nests are known to be very difficult to find, and can be located as far as ½ mile from their aquatic habitat. WPT are	**Western Pond Turtle Nesting Habitat:** ODFW recommends either the Applicant should conduct Western Pond Turtle nesting habitat surveys or should assume all habitats within ½ mile of a waterway or wetland known to contain Western Pond Turtles be assumed to be suitable nesting habitat if all of the below are present: • Clay soils are present; • Vegetation consists of primarily of sparse gasses and forbs; • The slope is less than 60%; • And the habitat is outside of the floodplain. Department biologists can assist the Applicant with narrowing down the likely locations of Western Pond Turtle nesting habitat.

2014 DEIS; Chapter 4.6, pg. 525 2nd paragraph **2019 DEIS** There is no mention of raptor surveys	**Wildlife Survey Methodology #1:** The following discusses known raptor nest surveys: *"Surveys of known nests of raptor species with nesting buffers that intersect the pipeline right-of-way would be conducted prior to tree clearing. Those species include bald eagle, great gray owl, and peregrine falcon. If nests are active, clearing trees and disturbance by airplane or helicopter within buffers would be delayed until after the nesting period."* This statement raises the following questions/concerns: • When would the surveys occur? And if during the early part of the nesting season would there be follow up surveys to determine that the nest was truly inactive? For example, due to the possibility of re-nesting attempts, it would be premature to determine that a golden eagle nest was inactive prior to May 15th. • Some raptors have multiple nests and nest establishment can occur within a territory during the onset of any breeding season. Many raptors do not nest in the same nest on individual years. "Surveying known raptor nests" would not be sufficient to find and avoid new nests of established	**Wildlife Survey Methodology:** ODFW recommends the Applicant provide detailed documentation on proposed nest survey methodology including: • Protocols, survey timing, and minimum experience requirements for surveyors. • Information should be species specific and include means to address all four components of corresponding issue/concern. • Raptor nest surveys should occur for both known and new nests prior to clearing of the PCGP ROW. • The list of raptors identified for pre-timber falling surveys should be expanded to include golden eagle, northern goshawk, Swainson's hawk, flammulated owl, and short-eared owl. With the exception of golden eagle, which is a federally protected species, the other species are Oregon Conservation Strategy species and/or state Sensitive Species.

	pairs and surveying ahead of the construction would also be necessary to find and avoid nests of new raptor pairs that choose to nest in the pipelines path. The qualifications of personnel tasked with conducting the surveys and the survey methodologies are not provided. However, the potential for inappropriate survey methodologies or timing, and the use of unqualified personnel is a concern.	
2014 DEIS Appendix L, Biological Evaluation, pg. 7, Line 2-4 Not addressed in 2019 DEIS	**Wildlife Survey Methodology #2:** *"Initial surveys were conducted in the spring of 2007. Additional surveys were conducted in 2008 and 2010….."* In order to attain viable survey results, it is imperative that appropriate survey methodologies are used and the timing of surveys be tailored to each species life history. However, it is unclear (1) what survey methodologies were used; (2) when surveys occurred; (3) where the surveys occurred, or (4) which species were surveyed. One might assume red tree vole, northern spotted owl, and great gray owl as those are the only three vertebrate terrestrial species identified in the BE or EA for which surveys were reported.	**Wildlife Survey Methodology:** ODFW recommends the Applicant provide detailed documentation on proposed occurrence survey methodology including: protocols, survey timing, and minimum experience requirements for surveyors. Information should be species specific.
2014 DEIS	**Scope of Wildlife Surveys:**	**Scope of Wildlife Surveys:** Although surveying for

Appendix L, Biological Evaluation, pg. 9-23, Table 1. Not addressed in 2019 DEIS	Based the table of the 42 vertebrate species considered in the document, only 3 (7%) received surveys. 93% of all vertebrate species considered in the document did not receive surveys. ODFW is concerned that not only is the level of survey effort is insufficient to identify specific locations of all species identified by PCGP, and the lack of survey effort may have missed many other species not considered by PCGP. For example those species on the Oregon Conservation Strategy and state Sensitive Species lists that were not considered by PCGP.	every possible species and habitat which could occur along the alignment is beyond the scope of reasonableness, surveying for only 3 of 42 likely vertebrates may be too narrow of survey scope. ODFW recommends the Applicant complete some type of general wildlife surveys perhaps during the spring when the likelihood of observing many of the herptile, bird, and small mammal species would be likely. ODFW recommends any general wildlife survey methodology be coordinated with both ODFW and the USFWS prior to implementation to maximize efficiency and efficacy.
Chapter 4.5 pg 4-188-189; 4-211-217	**Noise and Direct Impacts to Wildlife:** The PCGG project will incur substantial disturbance due to direct interaction of construction activities as well as the associated noise. These impacts will likely displace a number of species including MAMU, NSO, and golden eagles, others during construction, with long-term impacts due to the change of the habitat with clearing of the pipeline route. "*We estimate that noise from general construction of the pipeline would*	**Noise and Direct Impacts to Wildlife:** ODFW has previously recommended that when any blasting, pile driving, or other loud noise producing activity takes place. ODFW requests clarification regarding the potential daily magnitude and duration of construction and operational related disturbances, and determination if these disturbances are likely to occur during periods when currently existing (non-related) disturbances are minimized or absent. ODFW recommends: • The Applicant consult the Oregon Forest Practices Act guidelines for ospreys and great blue herons protections; • The Applicant consult USFWS under the Bald and

	range from the Leq of about 93 dBA at 50 feet, to 85 dBA at 100 feet, and 72 dBA at 300 feet. *Ambient sound levels in much of the Pacific Connector pipeline route area probably would be similar to the Arcata Fish and Wildlife Office's projections (FWS 2006a)."* Construction noise concerns are considered a substantial disturbance factor for the sum of the PCGP project. It is unclear from the above if the timing of disturbance has been considered. For example, if construction of the terminal and related facilities will occur during a 24 hour period, or only during daylight periods.	Golden Eagle Protection Act for federal recommendations to protect bald and golden eagles nests; and, • The applicant consult with USFWS for potential impacts to snowy plovers; • The Applicant consults USFWS under the Federal Endangered Species Act for federal recommendations to protect spotted owls and marbled murrelets. ODFW recommends the Applicant re-analyze potential noise impacts to wildlife using a more robust and suitable methodology acceptable to ODFW and the USFWS. If further analysis indicates greater likely impacts to wildlife than this analysis estimates, those additional impacts should be avoided, minimized, and mitigated for (mitigation sequencing), as practicable and in collaboration with Department and USFWS.
Chapter. 4.5 pg. 4-273; 4.6, pg 4-324-329	**Conflicting Construction Timing Restrictions:** To date the PCGP application has only partially defined the timing of construction actions that will have impacts to fish and wildlife resources (e.g. stream crossings, marbled murrelet nesting, spotted owl habitat impacts). Managing the timing of impact is directly related to minimizing impacts (e.g. rainfall/water quality, sediment transport, nesting of murrelets). **Conflicting Avian Impact Avoidance Timing Restrictions:** Site clearing and timber	**Conflicting Construction Timing Restrictions:** ODFW recommends more fully developing defendable guidelines for: • Construction timelines and recommended timing restrictions in coordination with ODFW to minimize impacts to species that have specific vulnerability due low abundance and habitat selection. • The current documents still include potential for unresolved timing restriction and construction scheduling conflicts: i.e. conflicts between seasonal restrictions for bird nesting, winter range habitat, in-water work periods, and T&E species. • Conflicting Avian Impact Avoidance Timing Restrictions: ODFW believes potential impacts to Spotted owls and marbled murrelets from timber cutting, timber removal, clearing and grubbing, blasting, and any other form of disturbance could be further minimized during the breeding season. Specific buffer distances for each potential

	removal is to occur between October and March to avoid impacts to Spotted Owls and Marbled Murrelets. However, Chapter 4, page 4-637, 2nd and 3rd bullet state: • Blasting for the pipeline trench may occur within 0.25 mile of MAMU stands between April 1 and September 30; • Helicopter use for removal of timber during pipeline construction within 0.25 mile of 9 MAMU stands (7 occupied and 2 presumed occupied) during the breeding period (between April 1 and September 15) could occur and disturb MAMU adults and nestlings, as well as potentially blow nestlings out of the nest tree within 7 MAMU stands (5 occupied and 2 presumed occupied) from rotor wash. And further, on Chapter 4.6, Page 4-329: *Noise from blasting and helicopter use during pipeline construction within 0.25 mile of NSO sites during the late breeding season would occur and could increase the risk of predation to fledglings that are generally not as able to escape as adults during the latter part of the breeding season;* Based on the above, it appears timber cutting and grubbing will	disturbance type should be coordinated with the USFWS.

	occur outside the breeding season to protect spotted owls and marbled murrelets, but timber removal via helicopter and blasting at locations with spotted owls and marbled murrelets will occur during the breeding season. Biologically, protecting the birds from some forms of disturbance during the breeding season while allowing other forms of disturbance may not result in the overall desired avoidance and minimization outcomes for spotted owls and marbled murrelets.	
Chapter 4.1 pg 4-31	**Use of Blasting Mats to Minimize Noise Disturbance:** The following quote states that blasting mats will be used where the use of explosives is required: *"Blasting mats or padding would be used on all shots where necessary to prevent scattering of loose rock onto adjacent property and to prevent damage to nearby structures and overhead utilities."*	**Use of Blasting Mats to Minimize Noise Disturbance:** ODFW recommends that in order to minimize noise impacts to wildlife, blasting mats are used wherever the use of explosives is required.
Chapter. 4, pg. 4-181- Table 4.5.1.1-1; Table 4.5.1.2-3; Table	**Likely Underestimate of Migratory Bird Take:** Site clearing and timber removal is to occur between October and March to avoid impacts to Spotted Owls and Marbled Murrelet, but areas without either species will be grubbed	**Likely Underestimate of Migratory Bird Take:** ODFW recommends a complete reassessment of potential migratory bird take including direct and indirect take occur in coordination with the USFWS - Migratory Bird Program experts.

4.6.3.5-1	and cleared year round. This will result in significant take of migratory birds. Based on the 2014 DEIS there were estimates that 1660 individual birds were estimated to be displaced, resulting in the loss of close to 10,000 eggs/young by pipeline construction actions. The 2019 DEIS does not address this issue or make note. This estimate only considers take from physical clearing and grubbing, but does not include noise or other forms of take.	
Chapter 4.4.1.6; and Integrated Pest Management Plan (IPMP)	**Noxious Weeds/Invasive Plants:** 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 (Oregon Conservation Strategy; ODFW 2005). 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. Specific invasive concerns include: • Gorse in the Coos Bay region	**Noxious Weeds/Invasive Plants:** ODFW recognizes the efforts of the Applicant in developing the "*Integrated Pest Management Plan".* However, ODFW recommends that the Applicant complete a more comprehensive noxious weed control plan prior to issuance of a site certification or completion of the NEPA process. ODFW recommends broader scale monitoring for noxious weeds, beyond the targeted sites discussed. ODFW recommends that performance metrics be included in order to document success or failure of the "*Integrated Pest Management Plan",* and that additional mitigation be undertaken if the final state of the pipeline is not satisfactory regarding avoidance, prevention, and minimization of noxious weeds.

	has had substantial negative impacts on elk production in the Coastal frontal zone. • Scotch broom is considered a substantial factor decreasing production of elk and deer forage across the Coast range and some of the interior locations of Oregon. • It is strategically important that equipment be cleaned prior to being mobilized from locations where gorse is present and when moving to different sections of the pipeline. • ODFW considers the risk of weed spread on mitigation sites and where mitigation measures are employed to likely be high rather than low. • ODFW is not listed as a consulting agency in the IPMP. The local ODA's weed expert did not know her agency had provided comments when contacted by ODFW. ODFW has concerns that the ODA may not have been coordinated with by the Applicant. • The IPMP states "These surveys were conducted by local biologists who are familiar with priority listed noxious weeds." ODA weed experts have previously expressed concern about people's ability to properly identify noxious weeds. ODFW expresses concerns relating to the credentials/experience of the biologists used? • Pacific Connector's Environmental inspectors	ODFW recommends wash stations for equipment be set up to handle aquatic invasive species as well. Equipment should be cleaned between individual subbasins at the HUC 6 level or if the machinery has been in a known area with invasive/noxious weeds. ODFW recommends that FERC include conditions outlining that the noxious weed plan have specific strategies (i.e. cleaning of equipment, monitoring, and control measures) for the JCEP project and individual reaches of the PCGP project. Mowing is considered a preferential treatment to herbicides when effective. ODFW recommends the Applicant acknowledge that the risk of invasion of noxious weeds on the pipeline route and mitigation sites is likely high and ensure the following: • ODFW recommends the Applicant fund an Oregon Dept. of Agriculture (ODA) weed extraction teams within the affected counties (See Appendix A, List 4). • ODFW recommends the PCGP project include ODFW in the list of agencies consulted and include our comments for noxious weed management. • ODFW recommends the Applicant describe the experience/qualifications of the staff used to conduct noxious weed surveys. • ODFW recommends the PCGP project should provide some level of assurance that environmental inspectors will have the capacity in their schedule to ensure noxious weed management concerns are addressed. • ODFW recommends that EI's should inspect new equipment arriving on site. Any protections given to federal lands should also be given to non-federal lands • ODFW recommends the PCGP project develop an incentive/dis-incentive program to greatly increase the likelihood the potential for a contractor driven inspection system (with random EI investigations)

	will make determinations about washing equipment. How will decision of environmental inspectors be protected from logistic pressures? • IPMP notes contractors will inspect their own equipment prior to moving from construction yards to federal lands. This brings up two issues: 1. Can contractors adequately perform their own inspections? 2. Why is there a distinction between federal and non-federal land for the noxious weed management efforts? • The IPMP notes that EI's will perform random inspections. What kind of consequence will there be if inspections fail? Is there a reward system for compliance? • The IPMP indicates that during reclamation the contractor will return any graded material to infested sites. • The IPMP has indicated cleaning stations will be established at borders of NFS lands and on adjacent BLM lands. • The IPMP indicates that extra monitoring will occur along the ROW in areas with increased likelihood of noxious weed contamination (i.e. known infestations, hydrostatic testing stations) on federal lands for 3-5 years after construction, with additional surveys for 3	to function effectively. • ODFW recommends a buffer should be applied to known noxious weed infestation areas. Accordingly, soil should not be moved out of these sites. These sites should be treated to prevent spread of noxious weeds to uninfested areas. • ODFW recommends that protection measures for federal lands should also be applied to non-federal lands. • ODFW recommends the PCGP project needs to provide extended monitoring at known infestation sites, dewatering stations, and all other high-risk sites on private lands as well. Monitoring the ROW only likely inadequate. ODFW recommends that PCGP employ independent consultant noxious weed specialists to conduct periodic on-going monitoring to maintain a sufficient level of certainty that noxious weed issues are addressed. Periodic monitoring needs to be completed for the life of the project on all disturbed ground with special emphasis at known infestation, dewatering stations, and equipment cleaning locations.

	years after presumed eradication. The IPMP details that monitoring of disturbed sites will occur throughout the life of the project by PCGP operational personnel. Properly identifying noxious weeds before they are fully established is an acquired skill. ODFW has concerns with the PCGP ensuring continuous monitoring capable of documenting invasive weeds effectively.	
Erosion Control and Revegetation Plan, Chapter 10.10 Erosion Control and Revegetation Plan, Chapter 10.9-1, pg. 33	**Seeding Prescriptions:** **Timing of Seeding** The ECRP calls for seeding to be conducted within 6 days of final grading, weather and soil conditions permitting, according to FERC's Upland Plan. Seeding in late winter for potions of the ROW in Klamath County could be too late for successful revegetation. This may require coming back the next fall/early winter to conduct seeding to insure that revegetation objectives are met. **Seed Mixes:** Specific Seed Mix 6 and 7 could be improved upon to be more effective and provide greater wildlife habitat function.	**Seeding Prescriptions:** **Timing of Seeding: ODFW recommends** the Applicant plan for additional seeding as a contingency if the initial seeding occurs too late to be effective **Seed Mixes:** ODFW recommends: • For Seed Mixture 6, recommend addition of bitter cherry and serviceberry as shrub species to be seeded for M.P. 181-198 in Klamath County, in addition to antelope bitterbrush and birchleaf mountain mahogany. • For Seed Mixture 7, recommend addition of curleaf mountain mahogany to be seeded for M.P. 198-228 in Klamath County in addition to antelope bitterbrush. ODFW recommends that private properties be surveyed prior to construction to determine if non-native plants are dominant. Non-native seed mixes should only be used on properties that already have a significant presence of non-native seed. • Some of the non-native grasses listed tend to establish permanently and out-complete native grasses. Replace non-natives such as bentgrass, red fescue, tall fescue, and ryegrass (annual or perennial) with blue wildrye, California brome, or California oatgrass.

		• Where needed to compete with established non-native plants (as determined by pre-surveys) ODFW recommends the following non-natives: timothy, orchard grass, white clover, red clover, birdsfoot trefoil, and subterranean clover.
ES pgs Chapter 4.6; 4.7 Integrated Pest Management Plan Chapt. 1, Chapt. 2, Chapt. 4, Chapt. 5, Chapt. 6, Chapt. 7. Erosion Control and Revegetation Plan, Chapter 12.9-1, pg. 51 Chapter 4.5 pg. 458	**ROW Maintenance:** Maintenance of the PCGP Right of Way (ROW) will likely restrict natural revegetation, particularly any larger tree or shrub recruits which exceed allowable height thresholds. The method of management (herbicides or mechanical) has potential to impact the capacity, albeit highly altered to support some wildlife. From experience on previous utility ROWs, herbicides were used to control vegetation resulting in erosion and lack of vegetation for wildlife forage and habitat. **Mowing of ROW Corridors:** The DEIS indicates that there will be moving to maintain the 30-foot wide pipeline corridor maintenance from April 15th to August 1, during the growing season. Conducting vegetation clearing during this time frame will likely impact nesting grassland and shrub-adapted birds.	**ROW Maintenance:** ODFW recommends use of mechanical means to maintain the ROW, with use of herbicide as an exception. An exception would be in cases where herbicides may be necessary to control noxious weeds at specific locations with specific difficult issues, which should be defined by the Applicant. ODFW recommends that if herbicides are needed at specific locations, weeds be spot sprayed. **Mowing of ROW Corridors:** ODFW recommends maintaining corridor vegetation from September-November to more effectively avoid potential impacts during migratory bird nesting periods.
General	**Capping Piling to Prevent Perching:** For both the JCEP and PCGP project ODFW recommends fitting any new pilings with devices to prevent	**Capping Piling to Prevent Perching:** Predatory piscivorous birds strategically perch around industrial facilities on piling that do not have measures to eliminate the ability of these birds to perch/roost. Ecologically the relevance is related to an increased capacity to feed within the area and impact species

	perching of piscivorous birds. This is a standard request from ODFW to Applicants on Fill/Removal permits when the Applicant installs pilings. These caps are readily available.	such as fall Chinook, coho salmon, and steelhead juveniles. If additional perch locations are created for piscivorous birds as a result of the proposed project, predation on resident and juvenile fish will likely increase along the project, and would be of particular concern in the vicinity of the project terminus at Coos Bay and near larger rivers such as the South Coos River, South Umpqua, and Rogue.
Chapter 4.5 misc. Recreation Management Plan (RMP)	**Direct Mortality of Terrestrial Wildlife Species Due to Collisions with Construction Related Traffic:** What conditions will be required to minimize vehicle collisions. A fairly high number of deer vehicle collisions were documented during construction of the Ruby Pipeline in eastern Klamath County. In addition, there very likely were numerous other wildlife species killed by construction vehicles (small avian species, small mammals, etc.) Will there be additional mitigation for direct mortality of wildlife species? **Off-Highway Vehicle Barriers:** Road closures on pipeline access roads that do not have other utility will be critical to reducing impacts to species such as elk, MAMU, and NSO. Closure of these roads will also reduce winter travel and damage related to recreational motorsport activities that commonly occur in wetlands	**Direct Mortality of Terrestrial Wildlife Species Due to Collisions with Construction Related Traffic:** ODFW recommends the Applicant develop and enforce credible series construction traffic related BMPs such as speed limits to minimize direct mortally of wildlife due to collisions with construction related traffic. **Off-Highway Vehicle Barriers:** ODFW recommends revisiting analysis and discussion of methods for ensuring that road closures are effective during and post-construction. • Off-highway vehicle (OHV) barrier proposals were modified by the Applicant through previous comments from ODFW to include boulders and tank traps in addition to signage. • ODFW recommends that contingencies be planned in case the proposed OHV exclusion efforts prove ineffective. Such contingencies may require maintenance measures. • ODFW recommends security patrols along ROW to discourage OHV use. • ODFW recommends a regular schedule for inspection of all OHV barriers along the pipeline route and repair OHV barriers throughout the life of the project. Where necessary exclusion devices should be upgraded. • ODFW recommends the PCGP project develop a plan in coordination with ODFW to Plan to mitigate for OHV damage at least in part by Funding law-enforcement patrols within the Jackson TMA, and purchasing and restoring property that has been previously damaged.

	and streams. Anti-OHV devices are passive and as such will likely only detect damage as it occurs with no capacity to prevent OHV impacts directly when they are occurring. There is no mention of monitoring of the effectiveness of the OHV barriers in the RMP. Despite best management practices and patrols, illegal use of the ROW by OHVs is expected to occur. The need for mitigation should be expected by the PCGP project. ODFW notes that there are numerous locations in the pipeline route where OHV issues occur. ODFW works cooperatively with partners to maintain Travel Management Areas in the Camel Hump and Obenchain areas to minimize OHV disturbance to wintering wildlife. Department staff is available for consultation on minimizing impacts in these areas.	
General	**Environmental Inspectors:** ODFW fully recognizes that properly trained environmental inspectors are able to greatly increase the potential for maximizing habitat	**Environmental Inspectors:** ODFW recommends that the Applicant determine the number of environmental inspectors they will need and coordinate with state and federal agencies depending on the training they will receive.

	conservation measures.	ODFW recommends that the PCGP project have environmental inspectors on all active construction segments of the pipeline project.
General	**Public Communications:** There is currently a significant need for a representative of the JCEP/PCGP project to serve as a public communications specialist to the project area constituents. Additionally, there is a need for planning regarding how recreational users of fish and wildlife resources in Coos Bay and along the pipeline route will obtain information concerning the project: e.g. will recreation be restricted at the JCEP site, mitigation site access, pipeline route access; access to the PCGP corridor during construction, etc.) Restrictions to recreational accessibility can result in substantial impacts to the local economic conditions of affected communities.	**Public Communications:** The JCEP/PCGP project needs to develop a project communication plan in collaboration with ODFW to consult with and inform fishing groups and other recreational users on construction actions on a real time basis. Including but not limited to: • Will recreation (clamming, crabbing, and duck hunting) be restricted at the JCEP site during construction/following construction? • Will mitigation sites (Kentuck, wetland mitigation sites) be open to public recreation, hunting, and fishing access during construction/following construction? • Will the pipeline route be open to access for fishing and hunting (the route will cross major salmon and steelhead fishing streams as well as historical hunting locations) during construction/following construction? • Will the Coast Guard restrict recreational access to any portion of the bay, other than the shipping channel during the period when a LNG ship is moving into or out of the bay. Will there be safety restrictions on any portion of the bay when the ship is docked in the slip? • How and where will any residual impact to public access or recreational opportunities be fully mitigated?

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Oregon Department of Geology and Mineral Industries

The Oregon Department of Geology and Mineral Industries (DOGAMI) is providing review comments on the Draft Environmental Impact Statement (DEIS), dated March 2019, and relevant supplemental resource reports, dated September 2017.

DOGAMI finds the information in the DEIS to be incomplete; has comments on DOGAMI's regulatory requirements; has comments about possible deficiencies in the scientific and engineering analyses relating to geologic hazards; and at this point is not satisfied that regulatory requirements will be met and geologic hazards will be adequately addressed to ensure public safety. We provide herein 1) General Review Comments, and 2) Specific Comments on the DEIS.

As noted in our comments, DOGAMI is reiterating a number of unresolved comments on JCEP and PCGP resource reports that were first included in a memo to the Oregon Department of Energy (ODOE), dated November 6, 2017 (https://www.oregon.gov/energy/facilities-safety/facilities/Documents/JCEP-PCGP/2017-11-06-DOGAMI-Comments.pdf). At that time, DOGAMI found that many geologic hazard analyses were inadequate. Now, DOGAMI is concerned that key portions of the DEIS were insufficiently prepared, and in some cases either wrong or inadequate. This raises questions about the process undertaken to develop the DEIS and, more importantly, elevates DOGAMI's concerns about public safety.

DOGAMI has regulatory and statutory authority on mining operations and building of certain structures in the tsunami inundation zone. The Applicant must comply with Oregon laws and Oregon building code requirements. This includes Oregon Revised Statute Chapter 517.750(16)—the JCEP project will need one (1) Operating Permit for the LNG terminal facility and the PGCP project will need one (1) or more Operating Permits for the pipeline facility, any applicable requirements of ORS 455.446-455.447 and Section 1803.2.1 Tsunami Inundation Zone of the Oregon Structural Specialty Code (Oregon Revised Statutes [ORS] 455.446 and 455.447).

Thank you for the opportunity to assist with this project. If you have any questions, please contact me at 971-673-1555 (brad.avy@oregon.gov) or Yumei Wang at 503-913-5749 (yumei.wang@oregon.gov).

Sincerely,

Brad J. Avy

Director and State Geologist

General Review Comments

Geologic hazards are prevalent in the proposed project area. The proposed project is in a high seismic hazard area due to the Cascadia Subduction Zone, which can produce a magnitude 9 earthquake, and the proposed JCEP terminal facility is located in the Cascadia tsunami inundation zone. If all geologic hazards are not carefully identified and addressed before design and construction, then the possible impacts could negatively impact human and environmental safety. Significant earthquake hazards include but are not limited to the Cascadia Subduction Zone and crustal faults (e.g., Basin and Range faults), especially in Klamath County. Landslide hazards exist in the coastal plains, Coast Range, Klamath Range, Cascade Range and Basin and Range.

DOGAMI's concerns relate to the expected performance of the proposed facilities, the possible impacts and the safety of people. Geologic hazards have not been adequately characterized and proposed mitigation of the hazards is incomplete. Specific unresolved concerns include:

1. Key portions of the DEIS were insufficiently prepared, and in some cases either wrong or inadequate, raising questions about the process undertaken to develop the DEIS (i.e., a lack of sufficient Applicant technical review), which could lead to adverse consequences for public safety;
2. Seismic hazards, including Cascadia earthquakes and identification, characterization and mitigation of quaternary faults and their hazards;
3. The long duration of shaking expected with a magnitude 9 earthquake;
4. Ground failure of the softer and looser soils, including earthquake-induced liquefaction and lateral spreading;
5. Landslide hazards, including earthquake-triggered landslides, require the use of lidar to identify as a first step in characterizing hazards and proposing mitigation;
6. Tsunami hazards analyses, including tsunami hazards with the proposed channel and estuarine modifications, and how currents, debris and ballistics may negatively impact the surrounding areas and safety of people;
7. Tsunami scour in the nearby area, including dynamic erosion of the North Spit dunes, and how the Maximum Considered Tsunami (MCT), that is, the design tsunami, may impact the local landforms, proposed facilities, nearby development and safety of people;
8. Tsunami design criteria. Will the design meet and/or exceed the minimum design requirements specified in the International Building Code's reference to the American Society of Civil Engineers 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures Chapter 6 on Tsunami Loads and Effects?;
9. Tsunami safety action plans, including tsunami evacuation plans and an evaluation of the response time to mobilize an LNG vessel during a distant tsunami;

10. Appropriate application of best management practices (BMP). For example, the best practice described in the DEIS using slope gradients to define where BMPs are implemented during construction is inadequate;
11. Instrument monitoring safety programs. For example, the landslide monitoring method described in the DEIS would not allow adequate time to mitigate landslide hazards during a Cascadia earthquake where many co-seismic landslides could be simultaneously triggered in direct response to the shaking; and,
12. Dependencies on existing infrastructure, such as roads and levees, which may fail during disasters causing safety concerns.

DOGAMI encourages designing and building for ***disaster resilience*** and ***future climate*** using science, data and community wisdom to protect against and adapt to risks. This will allow people, communities and systems to be better prepared to withstand catastrophic events and future climate—both natural and human-caused—and be able to bounce back more quickly and emerge stronger from shocks and stresses. This includes:

- Using best practices supporting public safety
- Using a long-term view to protect citizens, property, environment, and standard of living
- Integrating resilience, where possible, by avoiding high risk areas or embracing higher performance standards than may be required by building codes and regulations. This will lessen damage and speed recovery after disasters and improve continuity of operations.

Finally, all relevant laws and regulations (e.g., State of Oregon's Oregon Revised Statutes, Oregon Administrative Rules, Oregon building codes, Federal Laws, and local regulations), standards, guidelines should be met, clearly documented and, where helpful, explained. Additional site-specific geologic and tsunami hazard evaluations and proper mitigation of hazards are required to ensure public safety. All methods should be documented and described, including assumptions and uncertainties.

Specific Comments on the DEIS

Citation	Issue Identification	Recommended Resolution
1.5.1 Federal Environmental Laws, Regulations, Permits, Approvals, and Consultations: Table 1.5.1	Oregon Department of Geology and Mineral Industries – Mineral Land Regulation and Reclamation (MLRR) Program is not listed as a permitting agency in Table 1.5.1. The JCEP project will need one (1) Operating Permit for LNG terminal facility and the PGCP project will need one (1) or more Operating Permits for the Pipeline per Oregon Revised Statutes (ORS) Chapter 517.750	Include DOGAMI – MLRR as a State permitting agency in Table 1.5.1
1.5.2 State Agency Permits and Approvals: Section 1.5.2.1, Page 1-30	Add DOGAMI-MLRR to text in Section 1.5.2. The JCEP project will need one (1) Operating Permit for LNG terminal facility and the PGCP project will need one (1) or more Operating Permits for the pipeline per Oregon Revised Statutes (ORS) Chapter 517.750	Add DOGAMI MLRR to section 1.5.2.1, page 1-30: The mission of the DOGAMI is to provide earth science information **and regulation** to make Oregon safe and prosperous. DOGAMI identifies and quantifies natural hazards, and works to minimize potential effects of earthquakes, landslides, and tsunamis. Its administrative rules at OAR chapter 632 includes the identification of Tsunami Inundation Zones under division 5. The agency is also the steward of Oregon's mineral resources, and it regulates mining activities, and oil and gas exploration and production on non-federal lands. **The JCEP and PGCP projects fall under the definition of "surface mining" under ORS Chapter 517.750(16). The JCEP project will need one (1)**

		Operating Permit for the LNG terminal facility and the PGCP project will need one (1) or more Operating Permits for the pipeline facility.
2.1.3 BLM and Forest Service Land Management Plan Amendment Actions (whole section)	Any quarry sites, on land managed by the BLM or Forest Service, used as aggregate material sources for ANY construction activities related to either the JCEP or the PGCP facilities, will need to obtain either Exclusion Certificates (excavating less than or equal to 5,000 cubic yards) or mine Operating Permits (excavating more than 5,000 cubic yards) from DOGAMI – MLRR. Note quarries permitted under DOGAMI permits must have approved fill plans (OAR 632-030-0025(bb)) prior to the placement of imported fill used for permanent reclamation purposes. Imported fill must meet DEQ's definition of Clean Fill (OAR 340-093-0030 (18)) or the use must be specifically allowed by Department of Environmental Quality by rule, permit or other written authorization.	Identify ALL quarry site locations via coordinates (latitude and longitude) that will be used as sources of construction aggregate. Identify ALL quarry site locations via coordinates (latitude and longitude) that will be used as fill disposal. Ensure that ALL quarry sites used as sources of construction aggregate are covered under Exclusion Certificates or mine Operating Permits issued by DOGAMI – MLRR. Any of those sites used for the disposal of fill must have approved fill plans on file with DOGAMI – MLRR.
2.4 CONSTRUCTION PROCEDURES (whole section)	Any quarry sites used as aggregate material sources, for construction activities related to either the JCEP or the PGCP facilities that excavate more than 5,000 cubic yards of material need to obtain mine Operating Permits prior to initiating excavation/construction activities.	Place a requirement and/or a condition ensuring that ALL quarry sites used as aggregate material sources, for construction activities related to either the JCEP or the PGCP facilities that excavate more than 5,000 cubic yards of material obtain mine Operating Permits prior to initiating excavation/construction activities.
3.4 PIPELINE ROUTE ALTERNATIVES AND VARIATIONS (whole section)	The PGCP requires one (1) or more Operating Permits from DOGAMI (as noted above). DOGAMI cannot have overlapping permit boundaries covering the same land. Therefore, the pipeline route must avoid intersecting the permit boundary of any quarry site that is covered under a DOGAMI Operating Permit. Any areas where there is the	Require that the pipeline route avoid the permit boundary for any quarries covered by existing DOGAMI Operating Permits.

	potential for overlap of two or more Operating Permit boundaries must be resolved in advance of DOGAMI permitting.	
Section 4.1.2.2 Mineral Resources – Mine Hazards - Heppsie Quarry (pg 4-10) pdf pg. 198/1120	The Heppsie Quarry site will need to be covered under a DOGAMI Operating Permit prior to the excavation of aggregate for construction activities.	Place a requirement and/or a condition ensuring that ALL quarry sites used as aggregate material sources for construction activities related to either the JCEP or the PGCP facilities that excavate more than 5,000 cubic yards of material obtain mine Operating Permits prior to initiating excavation/construction activities.
Section 4.1.2.5 Rock Sources and Permanent Disposal Sites (pg 4-25 and 4-26) pdf pg. 213/1120	As noted above: Any quarry sites used as aggregate material sources for ANY construction activities related to either the JCEP or the PGCP facilities, will need to obtain either Exclusion Certificates (excavating less than or equal to 5,000 cubic yards) or mine Operating Permits (excavating more than 5,000 cubic yards) from DOGAMI – MLRR prior to the initiation of excavation activities. Further, quarries permitted under DOGAMI Operating Permits must have approved fill plans (OAR 632-030-0025(bb)) prior to the placement of imported fill used for permanent reclamation purposes. Imported fill must meet DEQ's definition of Clean Fill (OAR 340-093-0030 (18)) or the use must be specifically allowed by Department of Environmental Quality by rule, permit or other written authorization.	Place a requirement and/or a condition ensuring that ALL quarry sites will have the appropriate certificate or permit issued by DOGAMI in advance of initiating excavation activities. Any of those sites used for the disposal of fill must have approved fill plans on file with DOGAMI – MLRR.
Section 4.1.2.6 Blasting During Trench Excavation pg 4-27 pdf pg. 215/1120	Ensure that there are no impacts from blasting to properties not owned or under the control of the PGCP permittee. Ensure that ALL federal guidelines for quarry blasting are followed (NFPA 495 Ch. 11).	Place a requirement and/or a condition prohibiting impacts beyond the right-of-way boundary under the control of the PGCP permittee. Place a requirement and/or a condition requiring that the federal guidelines for quarry blasting are followed (NFPA 495 Ch. 11).
Section 4.1.3.2 Mineral Resources on	Any quarry sites, on land managed by the BLM or Forest Service, used as aggregate material sources for ANY construction activities related to either the JCEP or the PGCP	Place a requirement and/or a condition ensuring that ALL quarry

Federal Lands pg 4-35 pdf pg. 223/1120	facilities, will need to obtain either Exclusion Certificates (excavating less than or equal to 5,000 cubic yards) or mine Operating Permits (excavating more than 5,000 cubic yards) from DOGAMI – MLRR. Note quarries permitted under DOGAMI permits must have approved fill plans (OAR 632-030-0025(bb)) prior to the placement of imported fill used for permanent reclamation purposes. Imported fill must meet DEQ's definition of Clean Fill (OAR 340-093-0030 (18)) or the use must be specifically allowed by Department of Environmental Quality by rule, permit or other written authorization.	sites used as aggregate material sources, for construction activities related to either the JCEP or the PGCP facilities that excavate more than 5,000 cubic yards of material obtain mine Operating Permits prior to initiating excavation/construction activities.
Section 4.1.3.3 Rock Sources and Permanent Disposal Sites on Federal Lands pg 4-36 pdf pg. 224/1120	Quarries permitted under DOGAMI permits must have approved fill plans (OAR 632-030-0025(bb)) prior to the placement of imported fill used for permanent reclamation purposes. Imported fill must meet DEQ's definition of Clean Fill (OAR 340-093-0030 (18)) or the use must be specifically allowed by Department of Environmental Quality by rule, permit or other written authorization.	Place a requirement and/or a condition ensuring that ALL quarry sites covered under DOGAMI Operating Permits have a fill plan approved by DOGAMI prior to being used for permanent fill disposal.
4.2.1.2 Project-Specific Soil Limitations pg 4-44 pdf pg. 222/1120	The DEIS notes that some soils at the JCEP terminal site may not meet DEQ's definition of Clean Fill (OAR 340-093-0030(18). A fill plan per OAR 632-030-0025(bb) is required as part of the Operating and Reclamation Plan prior to placement of permanent reclamation fill. All fill must meet DEQ's definition of clean fill or be specifically authorized for placement in writing by ODEQ.	Place a requirement and/or a condition ensuring that a fill plan per OAR 632-030-0025(bb) is required as part of the Operating and Reclamation Plan submitted to DOGAMI as part of the Operating Permit application for the Terminal site.
4.2.2.3 Pipeline-Specific Topics - Soil Limitations - Reclamation Sensitivity pg 4-60 pdf pg. 248/1120	The approved EIS revegetation plan for areas identified to be revegetated in this section should be included in the Operating and Reclamation Plan submitted to DOGAMI as part of the Operating Permit application for the Terminal site.	Place a requirement and/or a condition ensuring that the revegetation plan be consistent with the Operating and Reclamation Plan submitted to DOGAMI as part of the Operating Permit application for the Terminal site.
Appendix D Table D-7 Rock Sources and Permanent Disposal Sites identified for the	These sites will need to obtain either Exclusion Certificates (excavating less than or equal to 5,000 cubic yards) or mine Operating Permits (excavating more than 5,000 cubic yards) from DOGAMI – MLRR. Note quarries permitted under DOGAMI permits must have approved fill plans (OAR 632-030-0025(bb)) prior to the placement of imported fill used	Place a requirement and/or a condition ensuring that ALL quarry sites will have the appropriate certificate or permit issued by DOGAMI

construction of the pipeline pg D7-1/7-2	for permanent reclamation purposes. Imported fill must meet DEQ's definition of Clean Fill (OAR 340-093-0030 (18)) or the use must be specifically allowed by Department of Environmental Quality by rule, permit or other written authorization.	in advance of initiating excavation activities. Any of those sites used for the disposal of fill must have approved fill plans on file with DOGAMI – MLRR.
Appendix F.10, Appendix Q Overburden and Excess Material Disposal Plan	DOGAMI issues life of mine permits. Material placed in DOGAMI permitted sites as reclamation backfill cannot be considered temporary. Permanent areas should be identified for those currently designated as "Permanent or Temporary".	Acknowledge that material placed in DOGAMI permitted sites as reclamation backfill cannot be considered temporary. If the placement is temporary the material must be removed from the disposal site prior to the closing of the DOGAMI permit.
4.14 CUMULATIVE IMPACTS – Appendix N, Table N-1 pg N-1 to N-8	Activities listed in the past, present, or reasonably foreseeable actions that may need to be permitted by DOGAMI. Instances where the pipeline is in proximity to existing quarry operations may require modification to those quarries blasting plans to prevent impacts to the pipeline. Any aggregate sources used for construction may need DOGAMI Exclusion certificates or Operating Permits. Any additional gas wells or activity associated with the (MEC) coal bed methane sites may need additional permits from DOGAMI.	Acknowledge that past, present, or reasonably foreseeable actions may require additional permitting and/or approvals from DOGAMI – MLRR.
DEIS Section 13.3 Natural Hazards and Conditions; starting on page 17	DOGAMI concludes that the current level of geologic hazard evaluations and proposed mitigation are inadequate to ensure public safety.	DOGAMI recommends that additional site-specific geologic and tsunami hazard evaluations and proper mitigation of hazards are performed to ensure public safety.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. DEIS states that there are two primary mechanisms for generating earthquakes of design significance along pipeline route, CSZ event and local earthquakes associated with Klamath Falls seismic "hot spot". This list should include intraplate earthquakes in the subducting slab, and seismicity in the Klamath Falls area is only a seismic "hot spot" because of the occurrence of two M 6 earthquakes in 1993 and their associated aftershocks, otherwise the seismicity of the area	Revise assessment of major earthquake source zones with accurate and properly referenced information and include intraplate earthquakes.

	is not unusual.	
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. The DEIS incorrectly states that there were two large (M 6.3 and 7.0) earthquakes in the area in 1873. There was only one, its location and magnitude are poorly constrained, and it has been interpreted by many as an intraplate event.	Revise description of major historic earthquakes with accurate and properly referenced information.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. The DEIS notes that most of the pipeline construction area has experienced few historical earthquakes but fails to note that the period of historical record is short in this lightly populated region, and that the historical record is probably only complete for magnitudes > ~4.	Revise description of major historic earthquakes with accurate and properly referenced information. That includes discussion of the completeness and length of record.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. The DEIS appears to base its assessment of geologically mapped faults along the pipeline alignment on an outdated and very small scale statewide geologic map (Walker and McLeod 1991).	Revise assessment of geologically mapped faults with up to date information from DOGAMI digital geologic map (OGDC-6) at a minimum, preferably by reference to all existing geologic maps along alignment. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. The DEIS states that most faults along the pipeline alignment are not considered active in the USGS Quaternary fault database. DOGAMI staff have identified dozens of active faults in Oregon over the last decade using high resolution lidar data, virtually none of which were in the USGS database. The database is incomplete and inaccurate and should not be used as the sole source of information about fault activity.	Revise assessment of geologically mapped faults by study of the high resolution lidar topography for the entire pipeline alignment. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-11	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate or detailed to ensure public safety. The DEIS states that many earthquakes of M 2 or larger have occurred	Accurately and consistently characterize historical seismicity in the Klamath Falls area and assess its tectonic

	during historical times in the Klamath Falls area, in direct conflict with an earlier statement that very few historical earthquakes have occurred along the pipeline alignment. It notes a geographic association of these events with the boundary between the Basin and Range and Cascade Range but fails to note that the virtually all recorded earthquakes in the area are aftershocks from the 1993 M 6 events.	significance with updated references. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-12	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate, detailed or referenced to ensure public safety. The DEIS lists earthquake-induced landslides as one of the primary seismic hazards to pipelines. This statement is true, and earthquake-induced landslides are arguably one of the greatest threats to the proposed pipeline, yet there is no evaluation of the hazard in the Seismic and Related Hazards section and only a cursory and totally inadequate mention in the landslide hazard section.	Provide an in-depth, quantitative evaluation of the potential for earthquake induced landslides along the segments of pipeline where expected ground shaking is high enough to potentially trigger such events. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-12	DOGAMI concludes that inaccurate and incomplete information in the DEIS raises concern that the seismic hazard evaluations presented in the DEIS are not sufficiently accurate, detailed or referenced to ensure public safety. The DEIS asserts that empirical studies “demonstrate that welded steel pipelines are not prone to failure during earthquakes”, which overstates conclusions of the references cited to support it. One of the two studies cited indicated that during the 2011 Tohoku M 9 subduction earthquake, welded steel water pipe experienced failures at a rate of 1 per ~ 10km, which contradicts the assertion that such pipelines are not prone to failure.	Revise the assessment of pipeline vulnerability with consistent and properly referenced information. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparent lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS notes the distinction between earthquake magnitude and ground motion, which while correct is such a basic distinction that it is questionable to be included in an engineering seismology discussion for a major project like this. Probabilistic spectral ground motions are the standard of practice for this kind of design, and the DEIS should detail how the study was done, including methods, data and assumptions used.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparently lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS states that the pipeline would be designed using PGA values that correspond to an M 8-9 CSZ	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire

	earthquake and a specific return period (a deterministic hazard assessment, though the range of M 8-9 is huge), but the standard of practice for such design is to do a probabilistic seismic hazard assessment (PSHA). Regardless of whether the intent is to design using deterministic or probabilistic ground motions, the DEIS should present the most current recurrence and probability data for Cascadia earthquakes. There is no discussion, in this section or Section 4.13.1.5 (Earthquakes, Tsunami and Seiche) of Cascadia recurrence or probability. The issue of up-to-date Cascadia recurrence information was raised in the DOGAMI November 6, 2017 review memo (comment 19), and has still not been adequately addressed.	pipeline using accurate and up to date methods and data, and specifically addressing Cascadia recurrence.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparently lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS asserts that the USGS has prepared a PSHA for the US in general (true) and "for the region that would be crossed by the pipeline in particular" which is true only in that the pipeline area is in the US. The DEIS also cites the wrong reference for the USGS National Seismic Hazard Maps (NSHM), instead referencing the Quaternary Fault Database, which is one dataset underpinning the NSHM.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparently lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS states, "PGAs for the Project were calculated for the specific 475-year and 2,475-year return periods and the site-specific PGA of 0.5g for each corresponding milepost interval of the pipeline alignment". This statement does not make sense. The issue of providing clear and complete ground motion information was raised in the DOGAMI November 6, 2017 review memo (comment 10), and has still not been adequately addressed.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparently lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS and the lack of accurate use of data suggests that it may not be relied on to ensure public safety. The DEIS states "The highest 475-year return period PGAs expected along the pipeline alignment are about 17 percent (MP 0 to 2.0 and MP 9R to 16BR) of gravity." This is not supported by data and appears to be incorrect. The USGS NSHM 2014 PGA data for the 10% in 50 years return period has values that range from 10.5%g to 29.5%g for sites within 5 km of the pipeline alignment. The issue of providing clear and complete ground motion information was raised in the DOGAMI November 6, 2017 review memo (comment 10) and has still not been adequately addressed.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data. Accurately report data from USGS NSHM.

DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-13	DOGAMI is concerned that the apparently lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS follows the previously referenced statement about probabilistic PGA values for the pipeline with "The University of Washington (2001) noted that these intensities are moderate and relate Instrumental Intensity VIII and a "Moderate to Heavy" potential damage to aboveground structures as described by the Modified Mercalli Intensity scale". There is no place in a modern PSHA discussion for the conflation of probabilistic ground motions with seismic intensities, which very crudely quantify earthquake effects. Intensity is completely irrelevant to designing a pipeline, and its inclusion in this paragraph suggests that the DEIS preparer has little expertise in seismic hazard assessment.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-14	DOGAMI is concerned that the reliance on literature for determining whether there are active faults along the pipeline alignment may miss potentially hazardous fault crossings and result in a pipeline design that fails to ensure public safety. High resolution lidar is publicly available for approximately 99% of the pipeline alignment, and it should be evaluated by a trained professional geologist for geomorphic evidence of young faults beyond those identified in the literature. In the last 10 years, DOGAMI has identified dozens of previously unknown active faults by this method, and we know that the USGS Quaternary fault database contains only a small percentage of the actual active faults present in Oregon. The issue of inadequate fault hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 23, 24, 25, 34) and has still not been adequately addressed.	Conduct a detailed evaluation of lidar topographic data along the pipeline alignment for evidence of Quaternary surface faulting. Follow up on any identified features with appropriate field investigations including trenching if warranted. The assessment must be prepared by a qualified and licensed professional.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-14	DOGAMI is concerned that the DEIS has overlooked or ignored published information about Quaternary faults crossed by the pipeline alignment, and this oversight fails to ensure public safety. Near mile 215, the pipeline alignment crosses the Adams Point Fault, which forms 2-4 m scarps in latest Quaternary lake sediments (DOGAMI Open File Report 03-03). The issue of inadequate fault hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 23, 24, 25, 34) and has still not been adequately addressed.	Properly evaluate the hazard associated with the Adams Point fault and design any necessary mitigation measures.
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-16	DOGAMI is concerned that scope limiting assumptions about liquefaction hazards may result in liquefaction assessment that is not adequate to ensure public safety. The DEIS states "Areas along the proposed pipeline that are subject to being under water-saturated soils within the pipeline depth…" which implies that there is no concern about liquefaction occurring below the depth of the pipeline trench. Lateral	Liquefaction potential should be evaluated for the entire susceptible section where ever the alignment crosses susceptible soils.

	spreading resulting from liquefaction at depths below the pipeline trench could pose a serious threat to the pipeline even if the soil surrounding the pipeline itself was not liquefied. The issue of inadequate liquefaction hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 2, 12, 13, 26) and has still not been adequately addressed.	
DEIS Section 4.1.2.3 Seismic and Related Hazards; page 4-16	DOGAMI concludes that inadequately evaluated or referenced liquefaction evaluations are not adequate to ensure public safety. Table 4.1.2.3-2 lists river or stream crossings with potential liquefaction/lateral spreading hazards but no references or supporting borehole, geotechnical or geologic data for the sites are provided. It is not possible to determine whether the liquefaction potential assessments are adequate in the absence of such data. The issue of inadequate liquefaction hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 2, 12, 13, 26, 28, 29) and has still not been adequately addressed.	Provide a detailed, accurate and comprehensive liquefaction hazard analysis and mitigation design with supporting data. The assessment must be prepared by a qualified and licensed professional. For site specific liquefaction and liquefaction consequences evaluations, DOGAMI considers methods outlined in the following as state-of-practice: National Academies of Sciences, Engineering, and Medicine. 2016. *State of the Art and Practice in the Assessment of Earthquake-Induced Soil Liquefaction and Its Consequences*. Washington, DC: The National Academies Press. https://doi.org/10.17226/23474. https://www.nap.edu/catalog/23474/state-of-the-art-and-practice-in-the-assessment-of-earthquake-induced-soil-liquefaction-and-its-consequences
Section 4.13.1.5 FERC Engineering and Technical Review	DOGAMI concludes that the evaluation of potentially active faults near the terminal facility is inaccurate and incomplete and may not ensure public safety. The discussion of the Barview Fault misstates the age of the youngest features	Conduct seismic hazard analyses that include paleoseismic studies of potentially active faults

of the Preliminary Engineering Designs (Earthquakes, Tsunami and Seiche); page 4-735	offset by the fault by millions of years. The DEIS also ignores the Charleston Fault, which offsets Quaternary surfaces 19 m and whose northward projection offshore passes within a few km of the terminal site. The DEIS also makes no note of paleoseismic data that suggests quaternary offset across a buried fault in Pony Slough, immediately south of the terminal site. (Briggs, 1994 PSU Thesis https://pdxscholar.library.pdx.edu/open_access_etds/4739/) The issue of inadequate fault hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 23, 24, 25) and has still not been adequately addressed.	that might impact the proposed facilities. Evaluate the potential presence of buried extensions of the Charleston fault or Pony Slough fault near the site. The assessment must be prepared by a qualified and licensed professional.
Section 4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Designs (Earthquakes, Tsunami and Seiche); page 4-735	DOGAMI is concerned that the apparent lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS twice mentions “Affection faulting” or “affecting faulting” which are not terms in use in seismic hazard assessment.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for terminal facilities using accurate and up to date methods and data.
Section 4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Designs (Earthquakes, Tsunami and Seiche); page 4-737	DOGAMI is concerned that the DEIS does not mention certain critical ground motion parameters that are essential for a design that will ensure public safety. For large magnitude Cascadia Subduction Zone earthquakes, the duration of shaking can be in the range of 3-5 minutes, which has a huge impact on the performance of structures and soils. The DEIS has no discussion of this problem. This issue was raised in the DOGAMI November 6, 2017 review memo (comment 1) and has still not been adequately addressed.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for terminal facilities using accurate and up to date methods and data and addressing all relevant ground motion parameters including duration of shaking.
Section 4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Designs (Earthquakes, Tsunami and Seiche); page 4-738	DOGAMI is concerned that the apparent lack of familiarity with seismic hazard assessment procedures evidenced in the DEIS suggests that it may not be relied on to ensure public safety. The DEIS includes a long discussion of the correlation between PGA, Mercalli Intensity and Richter magnitude. This has no relevance to a modern seismic hazard assessment for a project of this scale and importance and calls into question the credibility of this section of the report. Probabilistic spectral ground motion parameters are the standard of practice for evaluating and designing this kind of facility.	Provide a probabilistic ground motion assessment prepared by a qualified and licensed professional for the entire pipeline using accurate and up to date methods and data.

Section 4.13.1.5 FERC Engineering and Technical Review of the Preliminary Engineering Designs (Earthquakes, Tsunami and Seiche); page 4-739	DOGAMI is concerned that the cursory treatment of liquefaction hazards at the JCEP terminal site is not adequate to ensure public safety. Liquefiable soils have been identified throughout the site, and CSZ M 8-9 earthquake ground motions will certainly be large enough to trigger liquefaction. The DEIS appears to leave the management of this known and great hazard to future design work. Liquefaction, along with tsunami inundation and earthquake induced landslides are among the greatest threats to the project's integrity and safety, and all should be rigorously evaluated and have detailed mitigation measures developed prior to approval. The inadequate treatment of this severe acknowledged hazard in the DEIS is completely inconsistent with the risk it poses to the public safety and the scale of mitigation required. The issue of inadequate liquefaction hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comments 2, 12, 13, 26) and has still not been adequately addressed.	Provide a detailed, accurate and comprehensive liquefaction hazard analysis and mitigation design with supporting data. The assessment must be prepared by a qualified and licensed professional.
DEIS page 1-22 Table 1.5.1-1	The Applicant suggests "Review of Structural Designs in Tsunami Zone" is within DOGAMI's purview, which is incorrect.	Based on Building Code Division requirements, the Applicant may be required to consult with DOGAMI "for assistance in determining the impact of possible tsunamis on the proposed development and for assistance in preparing methods to mitigate risk at the site of a potential tsunami."
DEIS page 1-22 Table 1.5.1-1	The DEIS incorrectly refers to Building Code Section 1802.1 for DOGAMI's authority on "Review of Structural Designs in the Tsunami Zone" (which as noted in the above comment is incorrect). Building Code Section 1802.1 includes definitions.	Cite correct Building Code Sections and refer to the correct authorities. Based on Building Code Division requirements, the Applicant may be required to consult with DOGAMI "for assistance in determining the impact of possible tsunamis on the proposed development and for assistance in preparing methods to mitigate risk at the site of a potential tsunami."
DEIS page 4-739	"Jordan Cove conducted hydrodynamic and tsunami	Provide a detailed

	modeling studies for the Project site and indicated a tsunami generated by a megathrust earthquake on the CSZ would present the greatest tsunami inundation risk at the project site and the maximum design tsunami run-up elevation for the project site is no greater than 34.5 feet NAVD 88 including co-seismic subsidence and sea level rise effects."	tsunami hazard analyses prepared by a qualified professional for the proposed facilities and its surroundings. Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Explicitly specify in the DEIS report, which earthquake scenario (L1, XL1, XXL1 or ASCE7) was used for modeling the runup elevation. Per reports +34.5 ft navd88 corresponds to the L1 model scenario.
DEIS page 4-739	"For the Project site and in accordance with more recent tsunami modeling completed for the Southern Oregon Coast (Witter et al. 2011), the estimated subsidence would be on the order of 7.6 feet."	Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Explicitly specify in the DEIS report, that the referenced subsidence is associated with an L1 earthquake scenario.
DEIS page 4-739	"Jordan Cove also indicated that furthermore tsunami protection berms, safety critical elements of the facility, point of support elevations, invert levels and underside of essential equipment, would be at least 1 foot above the estimated maximum run-up elevation and most will be far above that elevation."	Explicitly specify in the DEIS report, which earthquake scenario (L1, XL1, XXL1 or ASCE7) is being referenced here.
2.11.1-JCEP-Final-RR11, p56	"A distant earthquake in Alaska or Japan could result in a tsunami with a relatively long lead-time (12 to 24 hours) before reaching the Oregon coast."	Provide a detailed tsunami hazard analyses, including distant tsunami hazards, prepared by a qualified professional for the proposed facilities and its surroundings. The results should be integrated into tsunami safety plans.

		DOGAMI estimates that an Eastern Aleutian generated tsunami is expected to arrive on the Oregon coast in 3 hours 40 minutes to about 4 hours (Allan et al 2018). Conversely, a Japanese tsunami is expected to arrive on the Oregon coast in as little as 9 hours 40 mins (Allan et al. 2012)
2.11.1-JCEP-Final-RR11, p56	"All ships in Coos Bay, including an LNG carrier, would be directed to depart the harbor by the USCG COTP. LNG carriers at the LNG Terminal will be facing the basin entrance and Coos Bay and would be adequately manned, as required by the USCG, with the ability to get underway in a short time period while berthed. Therefore, the LNG carriers would be able to depart relatively quickly from the LNG Terminal and head out to sea in the event of a distant tsunami, in response to notice and instructions from the USCG COTP."	An evaluation of the time taken to mobilize a vessel and get underway should be described in more detail. Typical large vessel mobilization generally takes at minimum 30 minutes, though times closer to 1 hour are more common (Allan et al, 2018). Consideration should therefore be given to vessel mobilization time, and the time taken to transit along the navigation channel and offshore into deep water prior to the arrival of the tsunamis. For example, a vessel traveling at 12 knots along the 7 mile navigation channel from the JCEP site, will take ~30 minutes to reach the mouth of Coos Bay.
2.11.1-JCEP-Final-RR11, p56	"It is established that it would take approximately 25 to 30 minutes for a large tsunami generated from the CSZ to reach Coos Bay after the earthquake event occurs."	Provide a detailed tsunami hazard analyses, including Cascadia tsunami arrival times, prepared by a qualified professional for the proposed facilities and its surroundings. DOGAMI's analyses indicate that the

		local tsunami arrives @ 24 minutes at the JCEP site. Maximum inundation occurs at 31 minutes.
2.11.1-JCEP-Final-RR11, p56	"This amount of time would be adequate for the terminal to stop loading operations and disconnect from the LNG vessel and use two tug boats already in the slip to counteract the forces placed on the LNG carrier hull by the arriving tsunami."	Bear in mind that the region would be subject to 3-5 minutes of strong shaking, when normal operations would be severely challenged. Hence, this statement seems optimistic at best. Does the presence of the two tugs in the slip mean that these vessels would already be underway?
2.11.1-JCEP-Final-RR11.pdf, p56	"If the LNG carrier is traversing the channel during the tsunami, the tugs would also provide assistance against the force of the tsunami wave coming up the channel as described above."	This statement seems optimistic at best. Recommend JCEP re-evaluates their vessel emergency response plan to a local tsunami.
2.13.1-JCEP-RR13-Public-1-of-7-1.pdf, p64	"A uniform roughness was used for these simulations."	Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Please specify the roughness used.
2.13.3-JCEP-RR13-Public-3a-of-7-2.pdf, p7	"To assess the effect of roughness, M&N simulated Scenario L1 with a composite roughness map where areas below 0.0 MSL (pre-event conditions) have a roughness defined by a Manning number of 0.0313 representing channel conditions and areas above 0.0 MSL (pre-event conditions) have a higher roughness defined by a Manning number of 0.05."	Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Please justify choice of roughness criterion (n=0.05) adopted for areas above 0.0 MSL, versus n=0.0313 used for the seabed.
2.13.3-JCEP-RR13-Public-3a-of-7-2.pdf, p15	"According to a study published by the U.S. Geological Survey in 2008, there is a 10% probability that a CSZ earthquake of magnitude 8–9 will occur over the next 30 years (DOGAMI, 2012)."	USGS (2012) estimated a full margin rupture at 7-12% next 50 years; 37-42% for southern Oregon.

		Goldfinger (2017) revised downward (i.e. more frequent) the recurrence of CSZ earthquakes for the central northern Oregon coast to ~340 years. He estimates that the conditional probability of a major event taking place is 16-22 % chance in the next 50 years.
2.13.3-JCEP-RR13-Public-3a-of-7-2.pdf, p29 to33	"As it can be seen from the figures, the comparison shows a very good agreement between the two models for surface elevation and flow velocities of the leading wave as well as time of tsunami arrival at all stations."	We agree, though note that there are significant phase differences in the tsunami time series after the initial wave arrives. Please explain these discrepancies.
2.13.3-JCEP-RR13-Public-3a-of-7-2.pdf, p34	"Based on the comparison of model results presented in Section 4.0 between M&N and DOGAMI, the simulation used uniform roughness defined by a Manning number of 0.0313 and uniform eddy viscosity defined by a Smagorinsky coefficient of 0.28"	This is confusing. Do you mean another suite of modeling was performed where a uniform surface roughness was used that equaled 0.0313? Please clarify with respect to a previous comment noted above on surface roughness.
2.13.5-JCEP-RR13-Public-4-of-7.pdf, p10	"According to a study published by the U.S. Geological Survey in 2008, there is a 10% probability that a CSZ earthquake of magnitude 8–9 will occur over the next 30 years (DOGAMI, 2012)."	USGS (2012) estimated a full margin rupture at 7-12% next 50 years; 37-42% for southern Oregon. Goldfinger (2017) revised downward (i.e. more frequent) the recurrence of CSZ earthquakes for the central northern Oregon coast to ~340 years. He estimates that the conditional probability of a major event taking place is 16-22 % chance in the next

		50 years.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	How the proposed facilities may negatively impact the tsunami hazards in the surrounding areas and safety of people;	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #3) and has still not been adequately addressed. What are the impacts to the surrounding area? What are the tsunami evacuation plans during construction? What are the tsunami evacuation plans during operations? What are negative impacts to the people in the surrounding area and revised evacuation plans for those areas?
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Tsunami scour in the nearby area and how the Maximum Considered Tsunami (MCT), that is, the design tsunami, may impact the local landforms, including the dunes, and proposed facilities and safety of people;	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #4) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas	Dynamic erosion of the North Spit dunes in response to the design tsunami and how it may impact tsunami runup at the proposed facilities and safety of people;	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #5) and has still not been adequately addressed.

Pipeline.		
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Tsunami debris impacting the nearby area and how it may impact the local landforms, including the dunes, proposed facilities and safety of people;	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #6) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Section 6.4.1.4 Tsunamis of the Resource Report 6 Jordan Cove Energy Project refers to the existing Trans Pacific Parkway/US- 101 Intersection as being in the tsunami inundation zone. The Applicant states, "To maintain grades, improvements to the intersection will not remove the intersection from the tsunami inundation zone." There appears to be only one access road for the proposed Jordan Cove LNG facility. This access road is in the tsunami inundation zone. In order for the access road to be reliably useable for safety purposes after a future tsunami disaster, it would need to incorporate both earthquake and tsunami resistant designs. These designs would need to factor in potential cyclic strain, liquefaction and lateral spreading from ground shaking. In addition, the designs would need to account for tsunami forces, including flooding, velocities, scour, buoyancy and debris impact. Has this roadway and access to the proposed facilities been evaluated for possible damage due to tsunami forces, such as tsunami scour and tsunami debris impact? Please provide analyses, results and, if needed, proposed mitigation that addresses both post-earthquake and post-tsunami safety for proposed berms, roadways and elevated ground. Related documents should be complete, clearly organized and presented to allow for peer review by qualified specialists.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #15) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological	The Applicant states (on page 8): "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". DOGAMI requests the tsunami analyses that supports this statement. What tsunami modeling was conducted for the proposed pipeline alignment? What are the tsunami flow depths used to estimate scour potential? Were tsunami scouring forces evaluated for both the	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #18) and has still not been adequately addressed.

Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	incoming (inflow) and outgoing (outflow) tsunami waves?	
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	The Applicant states (on page 46): "As currently planned the portions of the pipeline that are crossing waterbodies that have the potential to be impacted by tsunami scour, will be installed using trenchless methods at depths well below the potential scour depths. Therefore, tsunami scour is not considered a hazard to the pipeline project." The Applicant further states, "The modeling analysis showed that some temporary scour may occur in Coos Bay along the pipeline during inundation of the tsunami (approximately 1 to 2 hours)." The Applicant indicates that scour from tidal currents and river flows are approximately 3 feet at the pipeline crossing, and "it is recommended to use a 3-foot depth of scour resulting from tsunami impact". DOGAMI requests the Applicant provide information on maximum potential scour depth from a Cascadia tsunami. Also, DOGAMI requests information on the minimum factor of safety the Applicant applied to address the maximum potential scour depth from Cascadia tsunamis along the proposed alignment in greater Coos Bay area.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #38) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	The Applicant, in general, found that their MIKE21 modeling matched the DOGAMI L1 first wave arrival (which reflects the largest wave), although wave amplitudes and phase differences were observed for later wave arrivals. No explanation is provided to account for the latter differences. DOGAMI requests further discussion of differences in the modeling results after the initial wave arrival to account for phase and amplitude differences observed in the modeling results.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #39) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to	DOGAMI requests that the Applicant provide peer reviewed documentation that describes the MIKE21 FM model and its ability to model tsunami inundation. Many issues are unclear, for example, does MIKE21 adequately account for the (vertical) wave runup on the wall and/or composite structure?	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #40) and has still not been adequately addressed.

Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.		
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	DOGAMI requests that the Applicant provide further explanation of the approach used to define the digital elevation model (DEM). In particular, how does the developed grid differ from the tsunami grids generated by NOAA's National Center for Environmental Information (NCEI). These data may be obtained here: https://www.ngdc.noaa.gov/mgg/inundation/tsunami/.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #41) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	DOGAMI requests that the Applicant explain to what extent has the model been tuned to match the DOGAMI L1 scenario and inundation results.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #42) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan	DOGAMI requests that the Applicant provide a better depiction of the three cases used to define the design crests. It is unclear whether the design reflects a berm, wall, or a composite structure around the perimeter of the entire complex, or portions of the complex. Please provide figures that characterize the proposed design.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #43) and has still not been adequately addressed.

Cove LNG Terminal and Pacific Connector Gas Pipeline.		
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	DOGAMI requests that the Applicant explain why mean high water (MHW) was used as opposed to MHHW (as used by DOGAMI).	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #44) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Values of future sea level rise (SLR) presented by the Applicant are based on existing (historical) trends derived for the Charleston tide gauge. Based on its current rate, estimates were made out into the future (i.e. 30 years). This is an overly simplistic approach that assumes the past is the key to the future and hence discounts possible acceleration of SLR in the future. A more effective approach would be to base future estimates on the National Research Council (2012) SLR study that was completed for the US West Coast. National Research Council estimates account for expected local tectonic changes as well eustatic and steric responses and are a more reasonable (and current) estimates for the future. Please address SLR using current scientific data and methods.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #45) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific	Provide analysis of the potential role of sediment erosion of the North Spit dunes caused by the design tsunami. Research on the US East Coast suggests that sediment erosion during a tsunami may be significant and could impact inundation extents and runup (Tehranirad et al., 2015, 2016; Tehranirad, 2016). This notion is also supported by field studies following the March 11, 2011 Tohoku, Japan tsunami (Goto et al., 2012; Tanaka et al., 2012).	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #46) and has still not been adequately addressed.

Connector Gas Pipeline.		
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Provide analyses of the potential role of tsunami wave reflection/focusing/defocusing as the tsunami impacts the proposed LNG facilities and its possible public safety implications for the surrounding Coos Bay environment. Tsunami waves that impact against proposed protective structures (e.g., berm, wall or composite structure) and the subsequent transfer of that energy to other areas within the bay is a public safety concern. DOGAMI requests additional modeling for the purposes of addressing public safety. All documents should be complete, clearly organized and presented to allow for peer review by qualified specialists.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #47) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	DOGAMI requests that the Applicant provide analysis of maritime vessels and their potential to become ballistics within the bay be submitted to Oregon Department of Energy as part of the Emergency Response Plan. Maritime evacuation planning in response to the tsunami should be conducted and provided.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #48) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	DOGAMI requests that the Applicant provide analysis on the potential for off-site debris impacting the facilities and the potential ramifications with respect to public safety.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #49) and has still not been adequately addressed.
DOGAMI memo	DOGAMI requests that the Applicant provide information on	This issue was raised in

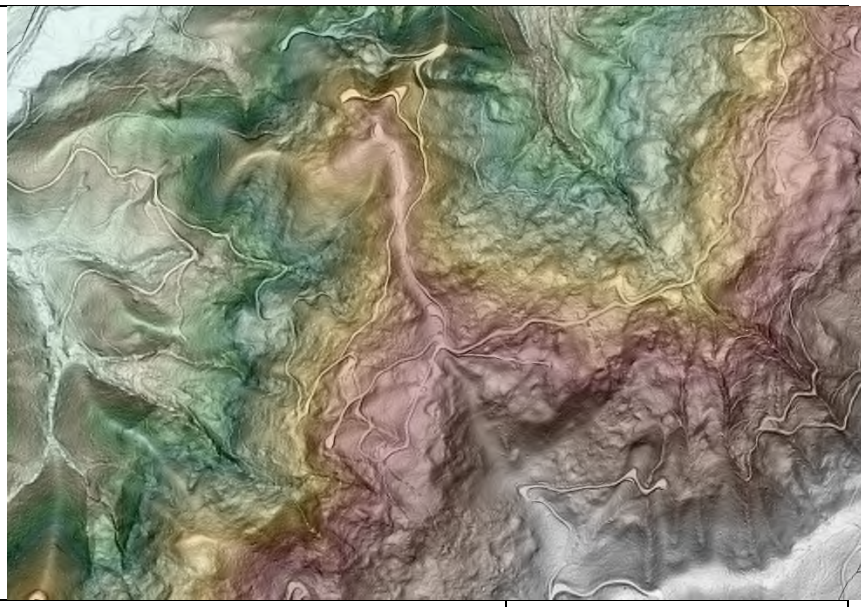
dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	each of the DEMs used for the tsunami model. For example, were three different DEMs used that reflect the three different case studies: berm, wall and composite structure? Please provide the DEMs.	the DOGAMI November 6, 2017 review memo (comment #50) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Elevated structures, including elevated berms, used for assembly areas in the tsunami inundation zone are subject to ASCE 7-16 chapter 6 requirements. The Applicant must design all elevated structures in the ASCE tsunami zone to be used as assembly areas in accordance with ASCE 7-16 chapter 6 to ensure public safety. Design documents should be complete, clearly organized and presented to allow for peer review by qualified specialists.	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #51) and has still not been adequately addressed.
PCGP RR6 App A.6 Part 1, section 4.5.3.2, page 30	The applicant states it used ODF guidelines and DOGAMI RML hazard zones.	Provide a detailed landslide hazard analyses prepared by a qualified professional using current state of practice methods that include lidar as a base map for the proposed facilities and its surroundings. Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Both the DOGAMI RML and ODF RML methods are for preliminary screening and/or used outdated data sources.

DEIS, p4-18	"Mass-movement of rapid-shallow landslides is typically triggered by large, infrequent storm events."	"infrequent" is a relative term. Define and reference this conclusion. There is data in SLIDO which confirms shallow landslides in the Tyee occurring within basins on the 5-10 year time frame.
DEIS, p 4-18	"These features can usually be identified on topographic maps or aerial photos based on distinctive contour or vegetative patterns."	Lidar has been concluded to be the only definitive method for finding deep slides in western Oregon. Restate the sentence or provide modern reference to support this conclusion or complete mapping using lidar along the entire length of the route. Burns, W. J., 2007, Comparison of remote sensing datasets for the establishment of a landslide mapping protocol in Oregon. AEG Special Publication 23: Vail, Colo., Conference Presentations, 1st North American Landslide Conference.
DEIS, p 4-19	"Shallow-rapid landslides are unlikely to induce long-term strain to a pipeline, but rather more likely to expose the pipe and result in a loss of support where it crosses a debris slide source area."	This is completely site dependent. If the pipe is at the surface, a shallow slide could run into the pipe. Define the situations where this occurs.
DEIS p 4-19	"The purpose of the first phase study was to identify existing landslides as well as areas susceptible to landslides within one-quarter mile of the initial alignment by reviewing published maps and digital data (Burns et al. 2011a, 2011b), aerial photographs and LiDAR-generated hillshade models. The purpose of following two phases was to further evaluate only those landslide hazard sites that represent potentially moderate or high risk to the pipeline, based on the results of the previous phase of evaluation."	SLIDO is a compilation of published data and ranges from very poor older data from decades ago to the best available modern lidar based data. We don't recommend using it to make decisions about where to look

		further and in more detail. Site specific evaluations should be completed using lidar data in order to complete phase 1 correctly and completely.
DEIS p 4-20	"The intent was to identify areas that have some potential to be affected by RMLs so that they would be considered and evaluated appropriately."	Potential Rapidly Moving Landslide Hazards in Western Oregon (Hofmeister et al. 2002) is a preliminary screening tool and based on outdated datasets. Site specific evaluations including modern methods should be completed using lidar data in order to evaluate areas that have potential for shallow landslides.
DEIS p 4-20	"Based on available topographic mapping, no slopes along the pipeline alignment east of MP 166 exceed 65 percent or appear to be at high risk of rapidly moving landslide occurrence."	Conclusions should be supported by modern references. Site specific evaluations should be completed using lidar data to evaluate areas that have potential for shallow landslides.
DEIS p 4-20	"Using LiDAR where available, 10-meter digital elevation model, and aerial photography, Pacific Connector identified moderate and high risk RML sites along the proposed route."	Site specific evaluations should be completed using lidar data to evaluate areas that have potential for shallow landslides.
DEIS p 4-20	"Larger, deep-seated landslides can usually be identified from topographic maps (including LiDAR) and aerial photographs."	Lidar has been concluded to be the only definitive method for finding deep slides in western Oregon. Site specific evaluations should be completed using lidar data to evaluate areas that have potential for shallow landslides. Burns, W. J., 2007,

		Comparison of remote sensing datasets for the establishment of a landslide mapping protocol in Oregon. AEG Special Publication 23: Vail, Colo., Conference Presentations, 1st North American Landslide Conference.
DEIS p 4-21	"the Klamath Falls region (with relatively recent events of magnitudes 5.9 and 6.0) and the Coos Bay region (with the potential for very large, long recurrence interval, Cascadia megathrust events)."	USGS Cascadia ground motion maps predict the effects of a Cascadia will be much further inland that just the Coos Bay region. The entire pipeline route is in a high seismic zone. Revise the sentence to reflect current science on earthquake hazards.
DEIS p 4-21	"Six landslides were identified as posing a moderate to high potential risk and were evaluated further in the field."	This number of landslides is very low compared to what has been recently mapped in areas just north of the pipeline route using lidar based mapping. Lidar has been concluded to be the only definitive method for finding deep slides in western Oregon. We recommend the applicant use lidar data to map the landslides. Burns, W.J., Duplantis, S., Jones, C.B., and English, J.T., 2012. Lidar data and Landslide Inventory Maps of the North Fork Siuslaw River and Big Elk Creek Watersheds, Lane, Lincoln, and Benton Counties: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-

			07. http://www.oregongeology.org/pubs/ofr/p-O-12-07.htm Burns, W.J., Herinckx, H.H., and Lindsey, K.O., 2017. Landslide inventory of portions of northwest Douglas County, Oregon, Oregon Department of Geology and Mineral Industries, Open-File Report O-17-04. Esri geodatabase with internal metadata, external metadata in .xml format, 4 map plates (in both print and onscreen resolutions), scale 1:20,000. http://www.oregongeology.org/pubs/ofr/p-O-17-04.htm
DEIS p 4-21	"Ridgetops are generally considered to be stable"		Provide a modern reference for this statement. Recent mapping in the coast range has found landslides propagating to and over the ridges. See references in above comment.
DEIS p 4-22	"All of the moderate- and high-hazard deep-seated landslides identified along the alignment were avoided"	If lidar and site-specific landslide hazard mapping was not performed to locate these areas, there are likely many areas missed and therefore not "all" are identified or avoided. An example can be seen in the following lidar image of the route from MP89-90. The PCGP mapping in Appendix F identified one landslide on the NE side of the route ridge. However, as a qualified professional can see in the lidar image, landslides are located along both sides of the ridge and on the slope down to the valley towards the NW.	

		
DEIS p 4-22	"All known hazardous landslides thought to pose a risk to the pipeline have been avoided through routing."	If lidar and site-specific landslide hazard mapping was not performed to locate the hazardous areas, there are likely many hazards missed and therefore not "all" have been identified or avoided.
DEIS p-4-22	"Following Pacific Connector's proposed BMPs described in the ECRP would limit potential adverse impacts on slope stability for those side slopes segments that are less than 30 percent gradient. In general, these BMPs include using well-drained structural fill placed in lifts and compacted for the side slope sites with gradients of 30 percent or greater oriented perpendicular to the pipeline."	Using slope gradient alone does not work in areas of existing landslides. Many deep landslides are on slopes with very low gradients. A critical component is identifying where the existing landslides and hazards are located and addressing each one individually regardless of slope gradient. Even small amounts of grading on existing landslides can cause significant problems.
DEIS p 4-23	"Monitoring higher-risk areas along the pipeline can aid in detecting landslide occurrence and movement so that action can be taken to prevent damage to the pipeline."	This method only applies to very limited group of types of landslides and triggering types. For example, during a future

		Cascadia earthquake, it will be very difficult to monitor, detect movement and take action before the co-seismic landslides have already moved and damaged the pipeline.
DEIS p 4-24	"Although the pipeline route does not cross active or recently active landslides, if any landslides do occur or become reactivated after the pipeline is installed, Pacific Connector would monitor the slide movement so that mitigation can be identified and implemented prior to damage occurring to the pipeline."	This unsubstantiated conclusion needs analyses and data to support it. For example, collecting lidar for the entire route and mapping all the existing landslides and evaluating them.
PCGP RR6 App A.6 part 1, page 28	"Some of the Pipeline route adjustments intended to avoid identified hazards, as well as land acquisition issues, resulted in route alignments that extended outside the area of LiDAR coverage. Supplemental LiDAR and aerial photograph data were acquired for many of these localized reroute areas. Nevertheless, some of the later reroute alignments are currently outside the area of LiDAR and aerial photograph coverage."	DOGAMI recommends the Applicant obtain high resolution lidar for all areas that may impact the proposed facilities or pipeline along the proposed route. Lidar coverage should be collected with enough buffer distance to characterize potential seismic and landslide hazards. For example, for landslide hazards, the lidar should include from the valley bottom to the top of the ridge. Also, there is publicly available lidar data along most all of the pipeline route as well as statewide aerial photography. Please evaluate the potential large landslides keeping in mind that landslides may extend from the tops of ridges and may move downslope to block rivers. In addition, lidar should be used to evaluate seismic sources. The issue of inadequate

		landslide hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comment #35) and has still not been adequately addressed.
PCGP RR6-AppA.6-part 1, p28	"However, most landslides can be placed in two general categories: (1) shallow-rapid landslides (debris slides/flows); and (2) deep-seated landslides."	Provide a comprehensive, detailed landslide hazard analyses prepared by a qualified professional for the proposed facilities and its surroundings. Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Co-seismic lateral spreads are an important type of landslide which could affect the facility and pipeline.
PCGP RR6-AppA.6-part 1, p29	"generally greater than 50 percent"	Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner. Provide references for all numbers.
PCGP RR6-AppA.6-part 1, p29	"DOGAMI, in cooperation with other agencies, produced a map of Potential Rapidly Moving Landslide Hazards in Western Oregon (Hofmeister et al., 2002)."	This map is considered for preliminary screening and was created before lidar data became widely available. Site-specific evaluation of RML should be performed by the consultants using lidar data and modern methods. The issue of inadequate landslide hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comment #37) and has still not been adequately addressed.
PCGP RR6-	"The source, transport and depositional zones comprising	This map (DOGAMI IMS-

AppA.6-part 1, p30	the RML hazard areas were not differentiated on the maps/GIS data provided by DOGAMI."	22) is considered for preliminary screening and was created before lidar data became widely available. It is also not intended to make site-specific decisions. In this example, the IMS-22 data appears to be further misused to make non-site-specific evaluations. Site-specific evaluation of RML should be performed by the consultants using lidar data and modern methods. The issue of inadequate landslide hazard analysis was raised in the DOGAMI November 6, 2017 review memo (comment #36) and has still not been adequately addressed.
PCGP RR6-AppA.6-part 1, p31	"The initial relative risk to the Pipeline posed by the source, transport and depositional zones are considered to be high, moderate and low, respectively."	Provide a reference or documentation for this unsubstantiated conclusion. Debris flow depositional areas can be extremely dangerous and impactful depending on the size of the event. Concluding the risk is "low" for these areas needs substantial support from referenceable scientific studies.
PCGP RR6-AppA.6-part 1, p32	The greatest potential for reactivating large, deep-seated landslide movement is from human activity, seismic activity, stream erosion, and/or above-normal precipitation that extends over several months or years.	Provide a reference or documentation for this unsubstantiated conclusion.
PCGP RR6-AppA.6-part 1, p32	"The Pipeline is located within 1,000 feet and is upslope or downslope of the landslide"	Provide a reference or documentation for the unsubstantiated conclusion that 1,000 ft is far enough up or downslope to examine. Landslides should be

		evaluated to the extent for which they could impact the pipeline.
PCGP RR6-AppA.6-part 1, p33	"Surficial, geomorphic and vegetative features suggest that the landslide is active or dormant-historic (past movement less than 100 years ago) (Keaton and Degraff, 1996)."	Landslide age should not be used to determine hazard or risk.
PCGP RR6-AppA.6-part 1, p33	"Alignment is at a proximity that is sufficiently far from the landslide"	Provide a reference or documentation for the unsubstantiated conclusion that "sufficiently far" is far enough for the pipeline to be safe.
PCGP RR6-AppA.6-part 1, p34	During this phase, routing specialists were consulted to identify potential alternative routes around moderate to high risk landslides that appeared to be active or to have the potential to reactivate.	Analysis of risk should be quantitative using acceptable state-of-practice methods. For example, "landslides that appeared to be active or have potential to reactivate" is very vague and not conclusive.
PCGP RR6-AppA.6-part 1, p34	4.6. Landslide Hazard Avoidance and Minimization of Adverse Effects	If lidar and site-specific landslide hazard mapping was not performed to locate these areas, there are likely many areas missed and therefore not "all" are identified or avoided.
PCGP RR6-AppA.6-part 1, p35	"To ensure long term stability, it is important that fill slopes constructed at gradients of 30 percent or greater be engineered."	A simple slope gradient is not sufficient to identify where engineered cuts and fills should be performed. For example, many deep landslides have slopes much less than 30 percent.
PCGP RR6-AppA.6-part 1, p35	"Perforated drains should be surrounded by 12 inches of drain rock and all of which wrapped in a geotextile filter fabric."	If water is being collected at the surface or subsurface, a plan for where the water will be discharged is critical. Provide a water plan including collection and discharge. Discharging water in a non-designed

		method can cause slope instability. Using lidar to map all the existing landslides along the entire length of the pipeline route on both sides of the route all the way to the ridge top or all the way to the valley bottom is the only way to ensure discharging of water will not increase slope instability.
PCGP RR6-AppA.6-part 1, p35	4.6.2.1. SURFACE AND NEAR SURFACE WATER MANAGEMENT	If water is being collected at the surface or subsurface, a plan for where the water will be discharged is critical. Provide a water plan including collection and discharge. Discharging water in a non-designed method can cause slope instability. Using lidar to map all the existing landslides along the entire length of the pipeline route on both sides of the route all the way to the ridge top or all the way to the valley bottom is the acceptable way to help ensure discharging of water will not increase slope instability.
PCGP RR6-AppA.6-part 1, p37	"During Pipeline construction, qualified professionals with experience in slope stability will observe Pipeline construction within the identified landslides. If indications of instability are observed, necessary mitigative actions will be taken."	Pre-construction, construction, and post-construction stability analysis should be performed before the project is started so that potential adverse effects can be identified and mitigation prior to construction.
PCGP RR6-AppA.6-part 1,	The proposed PCGP Pipeline does not cross known active or recently active landslides that require installation of	If lidar and site-specific landslide hazard mapping

p37	instrumentation. The ancient landslides crossed by the proposed PCGP Pipeline alignment will be monitored as part of the system-wide monitoring conducted by PCGP.	was not performed to locate these areas, there are likely many areas missed and therefore not "all" hazards have been identified nor avoided. Provide a detailed landslide hazard analyses prepared by a qualified professional using current state of practice methods that include lidar as a base map for the proposed facilities and its surroundings. Document the analyses, data, assumptions, results, proposed mitigations, and any issues in a clear manner.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline.	Dependencies on existing infrastructure, such as roads and levees, which may fail during disasters causing safety concerns;	This issue was raised in the DOGAMI November 6, 2017 review memo (comment #7) and has still not been adequately addressed.
DOGAMI memo dated November 6, 2017. DOGAMI Comments Related to Geological Hazards and the Proposed Jordan Cove LNG Terminal and	On the basis of Oregon Administrative Rules per Division 21, OAR 345-021-0010(1)(h)(F)(i-ii), which states: "(i) An explanation of how the applicant will design, engineer, construct and operate the facility to integrate disaster resilience design to ensure recovery of operations after major disasters. (ii) An assessment of future climate conditions for the expected life span of the proposed facility and the potential impacts of those conditions on the proposed facility" (Accessed from: https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=234447), DOGAMI encourages designing and	This issue was raised in the DOGAMI November 6, 2017 review memo and has not been adequately addressed.

Pacific Connector Gas Pipeline.	building for ***disaster resilience*** and ***future climate*** using science, data and community wisdom to protect against and adapt to risks. This will allow people, communities and systems to be better prepared to withstand catastrophic events and future climate—both natural and human-caused—and be able to bounce back more quickly and emerge stronger from shocks and stresses. This includes: • Using best practices supporting public safety • Using a long-term view to protect citizens, property, environment, and our standard of living • Integrating resilience, where possible, by avoiding high risk areas or embracing higher performance standards than may be required by building codes and regulations. This will lessen damage and speed recovery after disasters and improve continuity of operations.	

Oregon Department of Land Conservation and Development

Contact: Patty Snow
Patty.snow@state.or.us
Ph: 503-934-0052

DLCD is Oregon's designated coastal management agency statutorily responsible for acting on the required certification of consistency with the Oregon Coastal Management Program (OCMP) pursuant to Section 307 (c)(3)(A) of the Coastal Zone Management Act (CZMA). An applicant for any federally-permitted project must obtain a CZMA consistency concurrence for the federal permit or license to be valid in Oregon's coastal zone.

These comments focus on the deficiencies of the Draft Environmental Impact Statement (DEIS) as guided by the implementing regulations for NEPA documents at 40 CFR Part 1502 and 18 CFR Part 380. DLCD submits these comments with the perspective that deficiencies in DEIS information, regarding the assessment (or lack thereof) of impacts and the resulting mitigation from the assessed impacts, affects the federal consistency review process. DLCD uses NEPA documents, like the Federal Energy Regulatory Commission's (FERCs) DEIS, to evaluate the coastal effects of a proposed project per the federal consistency regulations at 15 CFR Part 930. A CZMA coastal effects evaluation includes reasonably foreseeable effects to natural resources and cultural resources, as well as impacts to economics, aesthetics, and recreation reliant on coastal resources. Comments we submitted during the Notice of Intent (NOI) scoping period in 2017 emphasized the necessity of a robust and comprehensive DEIS in order to be able to conduct an adequate review to determine consistency of this federally-licensed and permitted project with the OCMP. Although other state agencies have identified issues that may apply to the entire project under their respective jurisdictions, for CZMA consistency review, DLCD focuses on our coastal partners' issues and concerns within Oregon's coastal zone. Detailed information for any coastal partner issue included below is provided in each state agency comment section. State agency comment sections may raise additional issues as well.

In the published NOI, FERC staff identified issues (pg 7-8) that merited attention and inclusion in the relevant sections of the DEIS (40 CFR § 1502.9). Additionally, Oregon state agencies identified additional issues, including those related to enforceable policies of Oregon's networked coastal program, in comments to the FERC on August 15, 2017. The DEIS should have thoroughly address those identified issues in order to provide an assessment of impacts and mitigation for impacts in Oregon's coastal zone. Table 1 lists the issues identified by FERC staff and state coastal partners of the OCMP, to what extent the issue was analyzed in the DEIS, what is missing from the FERC's analysis, and the relevance of the information and analysis to federal consistency review.

Table 1. Topics identified in Notice of Intent or in scoping period comments and remaining deficiencies in the DEIS with relationship to the CZMA federal consistency review process.

Issues	Source	Extent Analyzed in 2019 DEIS	Missing from 2019 DEIS	Relationship to CZMA Analysis
Reliability and safety of LNG carrier traffic and natural gas pipeline	Commission Staff in NOI	Section 4.10.1.1 Marine Traffic Section 4.13.1.3 Safety and Reliability focuses on collisions with LNG carriers. Conclusion Section 5.1.10: Increased marine traffic would be less than historic ship traffic and so no significant impact to other marine traffic.	--Safety of other commercial and recreation vessels, aside from collisions with LNG carriers (*i.e*. increased wait times to enter Coos Bay in changing weather conditions because of LNG carrier security zone) --Time of year 70 construction vessels or 120 LNG carriers will be present. If all year, how will vessels safely navigate winter weather conditions or location of anchorage if within Territorial Sea if not able to enter bay. --Locations where marine traffic can wait safely in bay while LNG carrier passes. See Figure 1 based on a carrier 50 yards wide. --No discussion regarding what maximum size carrier the bay can accommodate safely.	Coastal effects evaluation for local coastal economies.
Impacts to aquatic resources from dredging access channel and slip and pipeline crossings	Commission Staff in NOI	Section 4.3 Water Resources and Wetlands Section 4.6 T&E Species Appendix H: Lists temporary and permanent impacts Conclusion Section 5.1.3.1; 5.1.3.2; 5.1.3.3:	--Please see DEQ comments for detailed information for missing analysis regarding water quality. --Please see ODFW comments for detailed information on missing analysis regarding: --Fish, wildlife, and associated habitats; e.g. the deepwater draft slip; salinity intrusion from dredging; impacts to aquatic organisms; and other aquatic concerns. Lack of assessment of riparian and	Coastal effects evaluation for impacts to natural/cultural resources and related local coastal economies.

		No significant impacts	steep slope impacts of the pipeline project. --Mitigation for temporary impacts to aquatic resources is a concern. Applicant and DEIS have specified mitigation actions for permanent impacts, however, the DEIS does not identify the temporary impacts fully for both JCEP and PCGP or propose mitigation. (*i.e.* impacted wetlands on pipeline route may take 4+ years to recover ecological function from pipeline impacts). --Mitigation for temporally related habitat function impacts. --Without specified mitigation that is tailored to address fish and wildlife habitats/ecology, it is not possible to balance impacts with offsets and come to a conclusion regarding total environmental impacts for the project.	
Potential impacts on the LNG terminal resulting from an earthquake or tsunami	-Commission Staff in NOI -State of Oregon scoping period comments; DOGAMI comments August 15, 2017; pg 8	Section 4.1 Geological Resources Section 4.13 Reliability and Safety	-- Please see DOGAMI comments for detailed information regarding missing analyses including the following topics: -- Geologic hazards have not been comprehensively identified, addressed in the DEIS, nor mitigation proposed for impacts. -- Dependencies on existing infrastructure, such as roads and levees, which may fail during disasters causing public and environmental safety concerns have not been	Coastal effects evaluation for impacts to local coastal economies and natural/cultural resources.

			included. --Tsunami hazards analyses, including tsunami hazards with the proposed channel and estuarine modifications from related Port project, specifically how currents, debris and ballistics may negatively impact the surrounding areas and safety of people, have not been included. --An explanation of how the applicant will design, engineer, construct and operate the facility to integrate disaster resilience design to ensure recovery of operations after major disasters. --An assessment of future climate conditions for the expected life span of the proposed facility and the potential impacts of those conditions on the proposed facility -- ASCE 7-16 (issued 2016) design standards include tsunami requirements, while the older versions do not. No discussion regarding new tsunami requirements or why most recent standards were not used.	
Impacts of pipeline construction on federally listed threatened and endangered species including northern	Commission Staff in NOI State of Oregon scoping period comments; ODFW comments August 15,	Section 4.6 lists impacts to federally listed species throughout. May affect and likely to adversely affect 12 species. Section 4.7 lists	--Please see ODFW comments for detailed information regarding missing analyses. --The DEIS notes some mitigation (*i.e.* older stand management); however, without specific assessment of impacts in relation to mitigation it is difficult to balance effects and come to a	Coastal effects evaluation for impacts to natural/cultural resources and local coastal economies (salmon; recreational and commercial).

spotted owl, marbled murrelet, and salmon	2017; pg 15-34	total late successional (old) forest acres on BLM land. 159.19 acres, BLM Coos Bay District, Section 2.1.7 Non-federal land mitigation still in development. Section 5.1.6 states no mitigation has been proposed by applicant to date.	conclusion regarding total environmental impacts for the project.	
Impacts of pipeline construction to private landowners including the use of eminent domain	Commission Staff in NOI	Section 2.3.2 Statement of ability for Project to use the right of eminent domain	--Entire analysis of impacts of exercising eminent domain on landowners, livelihoods, land-associated businesses, and property values.	Coastal effects evaluation for impacts to coastal economies.
Cumulative effects from additional large-scale projects in Coos Bay; particularly related Channel Modification project.	State of Oregon scoping period comments; ODFW comments August 15, 2017; pg 15	Section 4.14: Statements acknowledge cumulative effects of the Port's Channel Modification throughout. Acknowledged project is likely to have the largest contribution to cumulative impacts on Coos Bay. (pg 4-794) Appendix N lists	--Please see ODFW comments for detailed information regarding missing analyses including: --Limited analysis of impacts and lack of quantification of mitigation to offset impacts including, but not limited to: cumulative cubic yards, cumulative duration of disturbance in the waterway, cumulative conversion of shallow to deep-water habitat, cumulative changes in water current, cumulative changes to natural and conservation estuary management units in	Coastal effects evaluation for impacts to natural/cultural resources and economics.

		total acres whether upland or aquatic) from all regional projects.	Bay, cumulative mitigation for permanent aquatic habitat changes including oyster, clam, shrimp, crab and other aquatic ecosystem-dependent economies. --Unable to locate Table 4.14.2.3-1 as reference in Section 5 (pg 5-11). Projects with largest estuarine impacts warrant deeper, quantifiable cumulative analysis.	
Impacts to non-listed species and upland habitats and associated mitigation for impacts.	State of Oregon scoping period comments; ODFW comments August 15, 2017; pg 28	Section 2.1.7 Non-federal land mitigation still in development. Section 4.6 briefly describes state listed species.	-- Please see ODFW comments for detailed information regarding missing analyses including the following: -- No analysis for state species of concern, habitats of concern, state protected wildlife, associated mitigation for species habitats via state's habitat mitigation policy.	Coastal effects evaluation for impacts to natural/cultural resources

Additional topics of concern that are not sufficiently addressed in the DEIS are in Table 2.

Table 2. Additional deficiencies of the DEIS identified by DLCD.

Topic	Sections/Pages	Missing from 2019 DEIS	Relationship to CZMA Analysis
Impacts of spatial restrictions of channel use to recreational and commercial fisheries. Please see Figure 1.	Section 4.8.1.1 JC Terminal Recreation and Visual Resources: Acknowledges impacts to crabbing/clamming, boating, and fishing because of LNG carrier security zone (pg 4-540-541) Section 4.9.1.7 Recreation/Tourism and 4.9.1.8 Commercial	Analysis regarding economic impacts from LNG carrier security zone requirements (*i.e*. missing preferred fishing times, tides, or other critical natural resource timing issues due to 2-3.5 hour delay (page 2-14) while LNG carrier is in navigation channel). The time estimation in Section 4.8 (pg 4-541) conflicts with information on pg 2-14 and also on pg 4-598 (20-30 minutes). Bar pilots guiding commercial ships report passing approx. 6 recreational boats (pg 4-541) and 2 commercial fisheries boats (pg 4-597) per trip. The width of carrier plus security zone (likely 500 yard radius around moving ship (pg	Coastal effects evaluation for impacts to local coastal economies from safety considerations and associated delays

	Fishing: Acknowledges impacts from LNG carrier security zone (4-596-598). Sections 5.1.8.1 and 5.1.9 Conclusion: No significant impacts commercial or recreational fisheries vessels or economies.	4-623)), is approximately ¾ of a mile (See Figure 1). No spatial analysis of security zone for LNG carrier including pinch points, safe waiting areas, vessel delays, and associated impacts to fisheries-dependent economies. The security requirements for LNG carriers are not similar to other deep-draft vessel use of the channel, warranting additional analysis.	
Impacts to regional resources and economy from global climate change due to additional atmospheric carbon inputs	Section 4.14: Cumulative Impacts Acknowledges broad impacts to nation from climate change. (pg 4-804-807).	Analysis does not include unique challenges to coastal region from: climate change and sea level rise, decreased income for natural resource-dependent economies, or increased wildfire. Analysis does not include alternative to require stricter emission mitigation, or mitigation to offset regional impacts.	Coastal effects evaluation for impacts to local coastal economies and natural resources.
Impacts to culturally-important resources in project area (Terminal and pipeline)	Section 4.11 Cultural Resources; Acknowledges the TCP nomination document as part of an impending ethnographic study (pg 4-637). Appendix L: Tables within list many sites in need of further survey and testing or that are currently unevaluated. L-13 mentions TCP and need to assess.	The DEIS does not include relevant information compiled in the traditional cultural property historic district nomination document or the impending ethnographic study from the applicant. Without the information, impacts cannot be assessed, or alternatives identified to avoid, minimize, or mitigate impacts to resources.	Coastal effects evaluation for impacts to cultural resources.

Of most concern to DLCD are the sweeping mitigation and inventory recommendations that rely on the applicant providing the FERC information after issuance of the certificate order for the proposed project. That approach denies other permitting processes at the federal and state level, including federal consistency review, necessary information. Oregon created a networked coastal program, which means

coastal partners and their state authorities are part of the federal consistency review currently under way. Relying on mitigation agreements after the certificate order, leaves partner state agencies without the information necessary to process permits and make decisions, including DLCD. A particular example is Recommendation #6 (pg. 5-13), which requires to the applicant to request and allows FERC to approve major alterations after order issuance ("minor field adjustments," as defined in the DEIS, do not require FERC approval). Such alterations would likely require permit modifications by various state agencies in the coastal zone, and depending upon the significance of the change, implicate an additional federal consistency review per 15 CFR § 930.66. Similar challenges exist for Recommendation #33 for cultural resource inventories and associated plans and comments. Many of these 'post-order' conditions circumvent the state's opportunity to analyze impacts and provide the FERC comments on the extent of impacts and adequacy of mitigation for a broad array of issues in order to inform the final EIS.

The deficiencies of the DEIS identified above and the lack of analysis for relevant topics identified by FERC staff and state coastal partners lead DLCD to recommend that FERC prepare a revised or supplemental DEIS document, as provided for in 40 CFR § 1502.9, that includes the missing environmental analysis with an additional opportunity for public comment before moving toward a final EIS. Without necessary data and information, and adequate analysis of the project impacts, DLCD will be challenged to use the EIS to come to a decision regarding the applicant's certification statement for consistency with the OCMP.

Additionally, FERC should consider detailed comments each coastal partner agency offers in this comment document, not only because they identify deficiencies in the DEIS, but also because the missing information is relevant to analysis of OCMP enforceable policies for the federal consistency review of this proposed project. Each partner agency has provided specific issues related to their mission and regulatory authority. Table 3, below, details information gaps and coastal zone impacts that remain of concern in the DEIS and that are explicitly related to enforceable policies of the OCMP. This list is not exhaustive, however marks major issues that have been ongoing for the duration of the proposed project. If the information remains outstanding and the state agency concern is not ameliorated, it will affect the ability of FERC to issue a license that is consistent with the OCMP. DLCD recommends that FERC resolve these issues before issuance of the final EIS, as well as include them in the final EIS, not only to fully address impacts and mitigation associated with impacts from the project, but also to help align the project more fully with the OCMP.

Table 3. Outstanding issues in the DEIS that are related to CZMA federal consistency review in the Coastal Zone portion of the proposed project. Table 3 is demonstrative; not exhaustive. Additional details for each issue, as well as additional issues, are in each coastal partner comment section. Additional enforceable policies may apply for issues listed.

Broad Issue/Concern	Coastal Partner	Applicable OCMP Enforceable Policy (not exhaustive)
Upland mitigation and temporal mitigation that directly addresses specific impacts for fish and wildlife for the pipeline route. Mitigation noted in DEIS is exclusively for federal lands (currently none on non-federal land; pg 2-36; Section 2.1.7). Mitigation actions address federal lands management goals and may not provide net benefit for fish	ODFW	ORS 496.012

and wildlife.		
Avoidance of Category 1 habitat.	ODFW	ORS 496.012; ORS 496.182
Mitigation for T&E species (no proposed mitigation; pg 5-5; Section 5.1.6)	ODFW, ODA	ORS 496.012; ORS 506.109; ORS 564.115; ORS 564.120
Salvage plans and permits (incidental take) for aquatic construction; protected wildlife have been acknowledged, but not completed by applicant.	ODFW	ORS 496.012; ORS 506.109
Fish passage requirements for crossings.	ODFW	ORS 509.585; ORS 509.610
Ability of project to meet water quality standards such as turbidity, biocriteria, and applicable statewide narrative criteria.	DEQ	Various provisions in ORS chapter 468B
Adequacy of plans for turbidity, sedimentation, dredge material management, construction and post construction stormwater.	DEQ	Various provisions in ORS chapter 468B
Analysis demonstrating avoidance/minimization of wetland impacts at individual wetland/waterway scale.	DSL	ORS 196.800; ORS 196.805; ORS 196.810; ORS 196.815; ORS 196.818; ORS 196.825; ORS 196.830; ORS 196.845; ORS 196.855; ORS 196.880; ORS 196.905
Alternatives to selected dredge material disposal sites and methods.	DSL	ORS 196.800; ORS 196.805; ORS 196.810; ORS 196.815; ORS 196.818; ORS 196.825; ORS 196.830; ORS 196.845; ORS 196.855; ORS 196.880; ORS 196.905
Alternative analysis for size and shape of slip and access channel.	DSL	ORS 196.800; ORS 196.805; ORS 196.810; ORS 196.815; ORS 196.818; ORS 196.825; ORS 196.830; ORS 196.845; ORS 196.855; ORS 196.880; ORS 196.905
Identification of sources and release sites of hydrostatic testing water to avoid out-of-basin diversions, impacts, and identify alternatives.	WRD	Various provisions in ORS chapters 536 and 537
Identification of water sources for project needs like dust control to understand impacts and identify alternatives.	WRD	Various provisions in chapters 536 and 537
Identification of water sources that may result in changes to established diversion locations.	WRD	Various provisions in chapter 537

Lastly, the DEIS provides a general discussion of the required CZMA consistency certification at section 1.5.1, and a brief analysis for the certification at section 1.5.1.8, section 4.7.1.2, and 4.7.2.3. Specifically, there is a recommended condition at 4.7.1.2 that states:

> "Jordan Cove and Pacific Connector should not begin construction of their respective Project facilities until the companies each file with the Secretary a copy of ODLCD's determination of consistency with the CZMA" (DLCD's emphasis added).

It is unclear whether, or in what manner, FERC could or would enforce this condition. In particular, the use of the word "should" in directing the applicants to not begin construction prior to filing the required consistency certification makes this condition advisory in nature.

The requirement of the CZMA is clear and unambiguous: any license provisionally granted by the FERC is not valid until Oregon has formally concurred with the applicant's certification of consistency. There is specific purpose for the requirement that concurrence with the state's consistency certification is issued before federal permits; that purpose is to ensure that state program requirements have been fully considered and incorporated into any final federal decision. The implementing regulations of the CZMA clearly anticipate and authorize state-imposed conditions to modify a project in order to achieve consistency. Specifically, the provisions of 15 CFR § 930.62(d), state:

> "During the period when the State agency is reviewing the consistency certification, the applicant and the State agency should attempt, if necessary, to agree upon conditions, which, if met by the applicant, would permit State agency concurrence. The parties shall also consult with the Federal agency responsible for approving the federal license or permit to ensure that the proposed conditions satisfy federal as well as management program requirements (see also § 930.4)."

15 CFR § 930.4 further states:

> "Federal agencies, applicants, persons and applicant agencies should cooperate with State agencies to develop conditions that, if agreed to during the State agency's consistency review period and included in a Federal agency's final decision under subpart C or in a Federal agency's approval under subparts D, E, F or I of this part, would allow the State agency to concur with the federal action."

Given that the federal consistency review could result in state-imposed conditions to modify the project, FERC must know the outcome of this review before issuing a decision. However, most importantly, if FERC does issue a license provisioned on obtaining a concurrence from Oregon, it is a matter of federal regulation that the applicant does not begin construction prior to a federal consistency decision. Based on these requirements of the CZMA, DLCD requests that the recommended condition at section 4.7.1.2 be changed to reflect Condition #30 (Section 5.2, pg 5-19) and language altered to be consistent throughout the EIS. The FERC should clarify that pursuant to CZMA § 307 (c)(3)(A), the FERC license is not effective until Oregon concurs with the applicant's consistency certification and that any conditions included with the concurrence will become conditions of the FERC license.

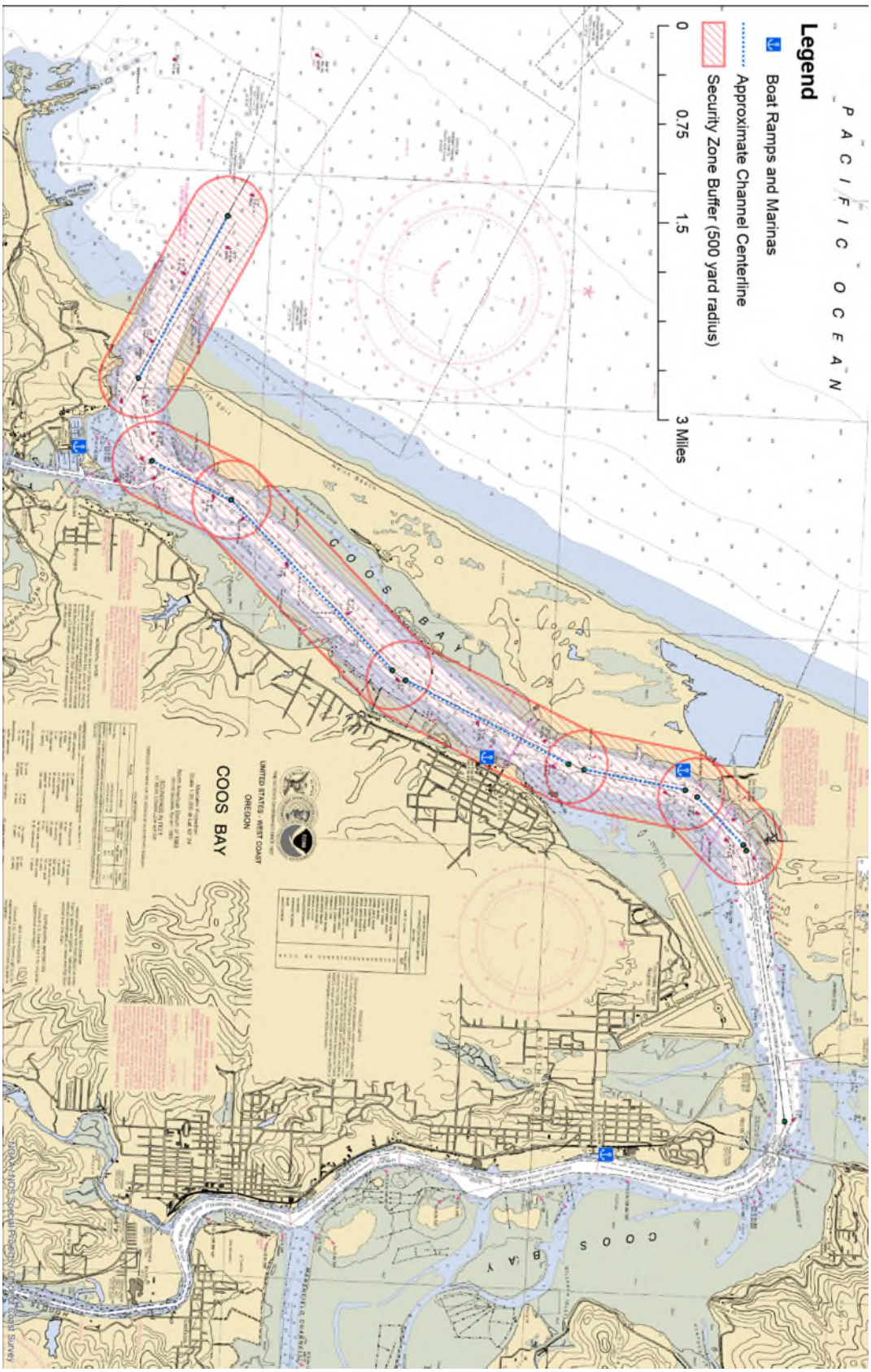

Legend
Boat Ramps and Marinas
Approximate Channel Centerline
Security Zone Buffer (500 yard radius)
0
0.75
1.5
3 Miles
PACIFIC OCEAN
COOS BAY
COOS BAY
UNITED STATES - WEST COAST
OREGON

Figure 1

Oregon Parks and Recreation Department, State Historic Preservation Office

Contact: John Pouley
John.pouley@oregon.gov
503-986-0675

As a federal undertaking, compliance with the National Historic Preservation Act (NHPA), specifically, Sections 101 and 106 is necessary for the Jordan Cove Energy Project. The SHPO, as well as other consulting parties, have defined roles in the Section 106 process, included in the implementing regulations (36 CFR 800). Many of our comments below relate directly to the 36 CFR 800 process, which is separate from, but can be coordinated with the National Environmental Policy Act (NEPA) review.

The NHPA review is addressed in the document, and summarized in the Conclusions and Recommendations (5.1) section of the DEIS. In that section FERC states that the cultural resources investigations are incomplete; that they have not yet completed the process of complying with Sections 101 and 106 of the NHPA; and that consultation with tribes, SHPO and applicable federal land-managing agencies have not been concluded. FERC additionally recommends that Jordan Cove and Pacific Connector "not construct or use any of their proposed facilities, including related ancillary areas for staging, storage, temporary work areas, and new or to-be-improved access roads, until all studies and consultation necessary to complete compliance with the NRHP have been completed. A memorandum of agreement (MOA) is recommended to address adverse effects and define treatment plans to mitigate impacts." Regarding these conclusions and recommendations, please consider the following:

Consultation with SHPO
As mentioned above, FERC acknowledges that consultation has not concluded. Consultation is addressed throughout the document, such as on Page 1-27 to 1-28, where it states: "The FERC is responsible under Section 106 and its implementing regulations, to consult with the Oregon State Historic Preservation Office (SHPO), identify historic properties within the APE, and make determinations of NRHP eligibility and project effects, on behalf of all the federal cooperating agencies." On page 4-633 it further states that consultations began with the issuance of the Notice of Intent (NOI) on June 9, 2017. On the following page, it states that previous versions of the projects between 2006 and 2015 informed FERC's current consultations.

While useful for understanding the long history of the undertaking, Oregon SHPO wishes to caution FERC that prior consultations from 2006 to 2015 are less applicable, because in many ways the undertaking is very different. The facility has changed, pipeline routes have changed, staffs have changed, and our understanding of effects to historic properties have become more informed. Due to these changes, meaningful, early and often consultation would provide a solid foundation for compliance with Section 101 and 106 of the NHPA. However, consultation with the lead federal agency has been sporadic, general, and consequently, not meaningful as would be hoped for such a large and complex undertaking.

For example, consultation for the current undertaking is primarily described as the mass- mailed scoping document NOI. Our office responded to the NOI, identifying it as a scoping document, and not consultation. That being said, there was a reference to the need for consultation (per 36CFR800.4) in the NOI, where FERC states: "The project-specific Area of Potential Effects (APE) will be defined in

consultation with the SHPO as the Project develops." Our office responded in a June 27, 2017 letter stating that we looked forward to consulting with FERC on the APE. Our response letter to the NOI is referenced in Appendix L, where under the column heading Purpose/Description it reads: "SHPO will assist FERC staff with the development of a definition for the area of potential effects (APE) for the new project". However, since that letter, our office has not been consulted with on the APE (per 36 CFR 800.4).

It is therefore surprising to see the APE defined in the DEIS on page 4-645, with the incorrect statement "as stated in our NOI, we define the APE as…". The statement is incorrect because the NOI did not define the APE. It merely indicated FERC would consult with SHPO to determine the APE. Since our June 2017 response to the NOI, consultation has not occurred, and the APE was developed without addressing the 36 CFR 800.4 process.

Page 4-633 states that consultation began with the NOI on June 9th, 2017. In the same paragraph, it states that the NOI "contained Section 106-specific text initiating consultations with the SHPO…". As stated above, the NOI is not a consultation document, but rather a public comment /scoping document. For one of the largest undertakings in Oregon, references to consultation mainly include NOI soliciting SHPO for its views on effects on historic properties in a single sentence, and a table in Appendix L that includes two letters from FERC to SHPO (one the NOI, and the second, an invitation to help produce the EIS), and three letters from SHPO to FERC. According to 36 CFR 800.3(c)(3), the agency official should consult with the SHPO in a manner appropriate to the nature of the undertaking. While we understand that the Section 106 process is still on-going, we are concerned at the level of consultation related to the nature of the undertaking, and the failure to include SHPO in consultation on the APE. Our office also feels strongly that consultation with appropriate consulting parties would be incredibly beneficial for this undertaking.

General Comments

As stated above, FERC recommends that Jordan Cove and Pacific Connector "not construct or use any of their proposed facilities, including related ancillary areas for staging, storage, temporary work areas, and new or to-be-improved access roads, until all studies and consultation necessary to complete compliance with the NRHP have been completed." With all the iterations of the project over the years, including the current version, there have been numerous permits and projects conducted that are outside the NHPA process, but should be included due to the potential to effect historic properties. As the lead federal agency, these are issues that could be discussed during meaningful, early and often consultation with consulting parties regarding the undertaking. It is also worth mentioning that communications between consulting parties and the project proponent are referenced in the DEIS as support for FERC consultation. However, when these groups convened to develop a draft Memorandum of Agreement for the undertaking, FERC is on record stating that they will not sign, but instead develop their own MOA and circulate among consulting parties for comment. On that topic, please note, much has been learned since the 2011 MOA, and a similar document would not be considered appropriate or adequate. Since the current group has been meeting for several months, it would be beneficial if FERC engaged the consulting parties in the development of an MOA as opposed to circulating something without their significant input.

Regarding the statement that surveys have identified archaeological sites that require monitoring during construction, and that further testing has been recommended for some sites that cannot be avoided, please note that there are also areas of high probability that would need monitoring, as opposed to only areas where sites have been identified. In addition, there are other types of historic properties that will

be affected by the undertaking. Part of that is addressed in the DEIS where FERC acknowledges that the Section 101 and 106 processes have not yet been concluded.

Oregon Department of Transportation

Contact: Susan White
Susan.white@odot.state.or.us
Ph: 503-986-3519

The Oregon Department of Transportation (ODOT) has the responsibility to preserve the operational safety, integrity, and function of the state's highway facilities. ODOT must also ensure that improvements to the highway system can be accomplished without undue impacts or damage to utilities within the highway right-of-way. It is ODOT's understanding that the proposed Jordan Cove Energy (natural gas terminal facilities) and Pacific Connector Natural Gas pipeline projects and associated activities could or will interface with state and/or interstate highways by crossing the highway, running parallel to the highway within the right-of-way, or running parallel to the highway just outside of the right-of-way. It is also ODOT's understanding that additional access may be needed to ODOT's facilities, and that traffic on ODOT's facilities may increase due to the projects (both during construction and upon project completion during regular operations and project maintenance).

General Requirements

Construction that may impact the state right-of-way (including interstate highways) is subject to Oregon Revised Statute (ORS) 374.305, under which no person, firm, or corporation may place, build, or construct on any state highway right-of-way, any approach road, structure, pipeline, ditch, cable or wire, or any other facility, thing, or appurtenance without first obtaining written permission from ODOT. The developers (Jordan Cove Energy Project, L.P. and Pacific Connector Gas Pipeline, L.P.), therefore, must obtain permits from each ODOT District Office where project work will occur *prior to commencing construction within the highway right-of-way or usage of access connections to the right-of-way*. The developer must also meet the requirements in Oregon Administrative Rule (OAR) Chapter 734 Division 51 for approach permitting and Division 55 for utility permitting through special provisions and should review rule requirements before completing plan sets and construction plans to understand stipulations related to the construction phase and future project operations and maintenance. ODOT Districts have some discretion in the issuance of a permit in order to address site specific situations such as weather/season, traffic volume, terrain, etc.

The following conditions must be fulfilled before a permit to work in the ODOT right-of -way will be issued:

- Developers must notify and work directly with ODOT where the proposed location of the terminal and pipeline facilities and associated activities are shown to be within the Potential Impact Radius (PIR) of any state highway. The PIR is based on minimum federal safety standards found in 49 CFR Part 192.
- Developers shall provide ODOT with a set of plans that include, but are not limited to, detailed construction staging plans for the terminal facility and associated LNG transfer facilities (e.g., Wharf, LNG storage tanks), expansion of upland industrial lands and access road improvements as well as pipeline route maps and construction staging plans. Developers will work with ODOT to develop

design standards for all pipes and related structures within the PIR of a state highway. Design requirements include the following:

- Minimum of 10 feet of cover from the top of the pipe will be the norm unless special acceptance of a lesser amount is authorized for a specific reason. A minimum of 10 feet of cover should be used as the standard within ODOT right-of-way.
- All pipe crossings of the highway shall be properly cased, or – for uncased pipeline crossings – a substantial increase in the pipeline design standards will be required.
- In no instance shall the pipeline be installed in an open trench across a state highway.
- In no instance shall the pipeline attach to or be suspended within state highway bridge structures.
- State highway access to all pipeline surface structures and assemblies, such as but not limited to gate valves and monitoring equipment, shall comply with OAR 734 Division 051 and all required conditions stated herein. A preferred location for pipeline surface structures and assemblies is outside of state highway right-of-way.
- Temporary state highway access locations, used for construction activities, shall also comply with OAR 734-051 and all required conditions stated herein. Modifications appropriate to provide safe operation shall be constructed at all temporary state highway access locations, prior to construction usage. Safety modifications must be removed and the state highway and access points be returned to their original condition upon completion of construction activities.
- Applicant must address specific site concerns associated with their terminal and pipeline route and associated project facilities. These concerns shall be addressed to the satisfaction of the appropriate Oregon Department of Transportation District offices prior to issuance of a permit to perform work within the state's highway right-of-way.
- Annually, or as changes dictate, updated emergency contact information (names and phone numbers) shall be delivered to each ODOT District Manager in which the terminal and pipeline and associated project facilities may affect state highway operations and maintenance activities.

The developers are responsible to secure all state, federal, and local permits and clearances as required under federal, state, and local statutes or codes for all areas within ODOT state highway right-of-way that are impacted by the development.

All impacts to the traveling public on state highways will be approved by the ODOT local District Office(s) prior to those impacts occurring. Utility coordination will be the responsibility of the developers. The terminal and pipeline projects will need to provide traffic mitigation for all state highways affected, and the mitigation approved by ODOT prior to and for the duration of the impact.

Highway Classification and Milepoints

It is unclear throughout the DEIS when a "state highway" is being referenced. A permit from ODOT would be required for any work on a highway that is part of the state highway system including Interstate highways and other highways on the National Highway System. It would be prudent to

specifically identify all highways and roads by their appropriate jurisdictional authority; as part of the National Highway System, State Highway System, County Highway System, and other local, private, and federal land management agency roads. Properly identifying the correct highway and road classification is necessary to submit permit requests to ODOT as well as the other agencies or owners.

Highway Classification

In DEIS Section 4.10.2.1 (Access Roads), not all of the highways listed on page 4-626 to be crossed by the pipeline "*Major state and federal highways that would be crossed by the pipeline include*" are part of the state highway system, as follows:

- Highway 227, and Butte Falls Highway, are both under Jackson County road authority and therefore are not part of the State Highway System. Crossings of those County highways should be coordinated with that County road authority.
- ODOT does not allow open cut crossings on the State Highway System, including Interstate Highways.

Highway Milepoints

Also in DEIS Section 4.10.2.1, and also in Appendix C: *Pipeline Route and Work Area Maps*, ODOT recommends clarifying that the Milepoints ("MP") depicted both in written text in Section 4.10.2.1 and as displayed on maps and other graphics in the DEIS and Appendix C are "Pipeline MPs". ODOT also recommends that on the Pipeline Location Maps in Appendix C that every location where the pipeline intends to cross a State or Interstate Highway, the approximate State Highway Milepoint (MP) should also be displayed and in a different color than the pipeline Milepoints. This will eliminate confusion for the reader and should add consistency with Section 4.10.2.1 with the [corrected] listing of **"***Major state and federal highways that would be crossed by the pipeline include*"**.**

Traffic Impacts

In DEIS Section 4.10.1.2 (Motor Vehicle Traffic), on page 4-625, the DEIS recommends, and ODOT agrees and further recommends to the FERC, that:

Prior to construction, Jordan Cove should file documentation that it has entered into development agreements with ODOT, Coos County, and the City of North Bend, as recommended in the *Traffic Impact Analysis* report.

Over-sized Loads

ODOT recommends that the DEIS clearly state and reference requirements for Over Dimensional (O-D) permitting for the operation of the pipe delivery trucks, and any other over-dimensional loads, that will operate on state and interstate highways. O-D permitting on ODOT highways requires District approval for specific length trucks. Routing, time-of-day, and pilot vehicle requirements will be enforced, as appropriate, for the "hauling routes" in all affected ODOT Districts. The developers should reference ODOT's Over-Dimension Operations website in the DEIS for permitting procedures and requirements: https://www.oregon.gov/ODOT/MCT/Pages/Over-Dimension.aspx

Pipeline Building/Trenching and Depth

The proposed pipeline burial methods and pipeline depth information provided in the DEIS do not fully conform to ODOT's standard requirements. All ODOT highways are required to be crossed via boring, directional drilling, or other tunneling techniques. Developers must work with ODOT District Permitting and receive approval prior to any digging activities on or along ODOT right-of-way.

ODOT requires the pipeline to be installed with a minimum of 10 feet of cover within the entire roadway right-of-way, measured at the lowest point within the right-of-way—for instance, below the lowest ditch bottom—for all Districts. *This includes all ODOT state highway and interstate highway crossings within those highways' right-of-way boundaries.*

Additionally, the pipeline design team will need to submit calculations that insure that the pipe wall thickness, at all highway crossings, is increased so that bursting pressure meets or exceeds the "49 CFR PART 192, Class 3" standards, for a Potential Impact Radius (PIR) > 900 feet. ODOT recommends that the DEIS reference this calculation consistent with all appropriate state and interstate highway crossings and that those highway crossings be indicated by approximate highway Milepoint (in text and in graphics as relevant).

Utility Coordination

Utility relocation requires approval and coordination with ODOT for any work in/across/under ODOT right-of-way if not otherwise included in permit requests. Specific utility relocation requests will be handled through the appropriate ODOT District Office. Any permit issued by ODOT would be issued to the utility company that owns the utility line or facility, not to their contractor. If Pacific Connector is the utility owner, then the permit would be issued to them.

Oregon Department of Water Resources

Contact: Mary F Bjork
Mary.F.Bjork@oregon.gov
503-986-0817

No.	Citation	Issue Identification	Recommended Resolution
1	Section 2 – Description of the Proposed Action. Pg.2-61 & 2-62 (PDF Pgs. 132-133)	**Diverted Open-Cut Crossing, with references to Flume, or Dam and Pump.** This section fails to account for interference with and/or damage to an existing water right holder, or diversion structures that might be located in an area that water would be diverted from during use of these methods.	This Department recommends that the applicant research any stretches of streams where these methods are contemplated, to determine if water rights exist. Water right holders that could be affected may need to be contacted to determine the best way to mitigate impacts.
2	Section 4.3 – Water Resources and Wetlands, In-Stream Flow sub-section. Pg.4-109 (PDF Pg. 297)	**Hydrostatic Testing.** This section speaks to the sources for obtaining water for hydrostatic testing, and that for any surface-water use, proper authorization would be obtained from OWRD. Existing water rights, other than municipal use, cannot be used because they are issued for a specific use in a specific location, possibly during a specific time.	Water from any source other than a municipality will require authorization from OWRD. A Limited License under ORS 537.143 is a typical method for obtaining water on a short term or fixed duration basis. The applicant is advised to contact the Department well in advance of water needs to determine best sources.
3	Section 4.3 – Water Resources and Wetlands, In-Stream Flow sub-section. Pg.4-111 (PDF Pg. 299)	**Out-of-basin diversions**. This section speaks to release of hydrostatic test water and the *Draft Hydrostatic Testing Plan* developed with input from several groups. OWRD was not consulted on this draft plan. The document states, "Where possible, test water would be released within the same basin from which it is withdrawn." ORS 537.801 et seq. addresses diversion of waters from basins of origin and defines "Basin" to mean "one of the	The applicant is advised to work closely with the Department to locate sources of water and to determine the appropriate mechanisms for appropriating water. Insofar as a significant amount of water may be transported outside the boundaries of the basin of origin, the applicant must work with the Department through the processes provided in ORS 537.803 – 870.

		river basins within this state" as defined by Department maps. ORS 537.801(3) states, "…the waters of the state may not be appropriated, stored or diverted for use outside the basin of origin except in compliance with ORS 537.801 to 537.860, including, if applicable, the prior approval of the Legislative Assembly under ORS 537.810."	
4	Section 4.3 – Water Resources and Wetlands, In-Stream Flow sub-section. Pg.4-112 (PDF Pg. 300)	**Dust Control.** This section speaks to the sources for obtaining water for dust control, and that for any surface-water use proper authorization would be obtained from OWRD. Existing water rights, other than municipal use, cannot be used because they are issued for a specific use in a specific location, possibly during a specific time.	Water from any source, other than a municipality, will require authorization from OWRD. A Limited License under ORS 537.143 is a typical method for obtaining water on a short term or fixed duration basis. The applicant is advised to contact the Department well in advance of water need to determine appropriate sources.
5	Section 4.3 – Water Resources and Wetlands, Point of Diversion Effects sub-section. Pg.4-118 (PDF Pg. 306)	**Alternate Point of Diversion Locations.** This section discusses consulting with the landowner if impacts on a water supply's point of diversion cannot be avoided, identifying an alternate location to establish the diversion.	Changing the location of a point of diversion under an existing water right requires state approval through a transfer application process, pursuant ORS 540 and OAR 690-380. The Draft EIS does not address or contemplate this requirement. The applicant is advised to work closely with the Department in regards to alternate points of diversion locations and apply for the required transfer well in advance of water needs.
6	Section 5 – Conclusions and Recommendations, #25. Pg.5-18 (PDF Pg. 1104)	**Instantaneous Flow Reduction.** This recommendation relates to the Hydrostatic Test Plan, requiring that any water withdrawal from a flowing stream does not exceed an instantaneous flow reduction of more than 10 percent of	Please be aware that withdrawal not exceeding an instantaneous flow reduction of more than 10 percent of stream flow may, in the absence of mitigation, cause an impact or injury to existing water rights, including but not limited to, instream water rights.

		stream flow.	

Oregon Department of Forestry

Contact: John Tokarczyk
John.a.Tokarczyk@oregon.gov
503-945-7414

The ODF's comments are primarily related to the clearing, grading, construction, operation, and maintenance of project components that would be located across state and privately owned forest lands. In these instances project operators are responsible for review and compliance with applicable requirements found in statute and code.

Depending on the location of project activities, operator requirements and considerations may include but are not limited to the following conditions:

State and Private Forest Lands - Project activities involving commercial forest activity on state and private forest lands are governed by the Oregon Forest Practices Act, Oregon Revised Statute (ORS) 527, and Oregon Administrative Rules (OAR) chapter 629 divisions 605 through 665. These apply even though the forest activity is a peripheral component of the project (DEIS Section 4.5.2 Timber). The forest practice rules are intended to provide resource protection and to set standards for planning forestry practices including harvesting, road construction and maintenance, protecting water quality in waters of the state, limiting effects on specified wildlife and other resource sites, chemical and petroleum product provisions, fish passage, peak flows, providing for public safety down slope of high landslide hazards, and determining reforestation or land conversion requirements.

Conversion of Forestlands – While nothing in the Forest Practices Act shall prevent the conversion of forestland to any other use (ORS 527.730), administrative rules address the conversion to non-forest use to ensure the conversion process is coordinated with other relevant federal, state, and local agencies.

Protection of forestlands from wildfire (Permit to Use Fire or Power Driven Machinery (PDM) The Oregon Department of Forestry is responsible for matters related to wildfire on forests within the state and project activities occurring on forest land may be subject to wildfire prevention and suppression requirements of Oregon Revised Statute chapter 477 and the associated administrative rules. In addition, every person conducting an operation inside or within 1/8 of a mile of an ODF forest protection district that uses fire or power driven machinery must first obtain a written permit (within the Notification), also known as a PDM. Fire prevention requirements must be adhered to. Some of these include but are not limited to: the need to limit or stop work during periods of elevated fire danger, the need to provide firefighting tools, the need to provide water supplies and pumping equipment, the need to provide fire watch personnel, the need to suppress wildfires originating from forest activities and construction, the need to dispose of debris in a specified manner, and the need to accept liability for the state's cost of suppressing wildfires originating from forest activities and construction. Following completion of the initial project activity, operation and maintenance activities will be subject to many of these same requirements. Additional information regarding these requirements is available at the Oregon Department of Forestry's website, http://www.oregon.gov/odf/Pages/fire/fire.aspx.

Additional comments are provided in the following table:

No.	Citation	Issue Identification	Recommended Resolution
1	Section 1.5.2.6, Oregon Department of Forestry, Page 1-32, Para 2	This section acknowledges the need for Notification for a forest operation but fails to address that need for a written plan for all ownerships where operations occur.	The DEIS discusses harvest and loss of forestland but fails to acknowledge the submission of a written plan in addition to notification. Written plans are part of the submission and such plans are an accompanying document to Notification. The Notification serves three purposes: notification of a forest operation (ORS 527.670), a request for a Permit to Use Fire or Power Driven Machinery (PDM, ORS Chapter 477), and notice to the Department of Revenue of timber harvest (ORS 321.550). Notifications are to be submitted via the online E-Notification system (www.ferns.odf.state.or.us/E-Notification). A separate notification should be filed for each county and timber owner affected by the project. All notifications require a 15 day waiting period before activity may begin unless a waiver is requested.
2	Section 4.7.2.2, Existing Land Use, Forestland, Page 4-417, Para 1	This section refers to regulatory requirements and route and clearing upland forest and land use change. This section fails to mention the need for an Alternate Practice where land use change results in a conversion of forestland.	The DEIS discusses harvest and loss of forestland, in which case conversion of forestland to other land uses (ORS 527.730) or practices not in statute or rule requires the submission of a Plan for Alternate Practice and written approval from the State Forester at the time of the operation.
3	Section 4.1.2.4 Landslide Hazards and Slope Stability Page 4-18 thru 4-25, Para 1	Section refers to Landslide and Slope Stability, but does not reference forest operations. Forest Practices Act landslide hazard assessment and standards may be applicable. Reference to forest operations is absent.	It is anticipated that most or all landslide public safety hazards associated with the project will fall under other jurisdictions due to land use conversion. Where clearings are not permanent and forest land use is maintained or proposed roads have a combined Pipeline and forest use, provisions for public safety under Forest Practices Act Rule Division 623 may be necessary. Reference to appropriate sections of the final EIS with equal or greater protection standards may also meet requirements.

4	Potentially Contaminated Soils and Groundwater, Accidental Spills Section 4.2.2.2, Pages 4-59 through 4-68.	Forest Practices Act and Chemical Rules standards may be applicable in the course of forest operations, reference to the FPA and forest operations is absent.	Provisions for spills of hazardous materials or applications of chemicals may have applicable standards under Forest Practices Act Rule Division 620 or reference to appropriate sections of the final EIS with equal or greater protection standards.
5	Surface Water, Pacific Connector Pipeline Project Section 4.3.2.2, Page 4-92 and other sections relevant to water quality	Forest Practices Act and water quality linkage, document does not identify relationship with FPA required written plan or alternate plan where water quality elements are	Through the Notification process, provisions for surface water quality under the Forest Practices Act (FPA) and rules will need to be addressed. Details would be submitted in either a Written Plan or Alternate Plan. Details may include specific provisions for meeting the FPA or reference appropriate sections of the final EIS with equal or greater protection standards or where land use conversion places water protection under other jurisdictions.
6	Wetlands Section 4.3.3, Pages 4-118 through 4-134	Forest Practices Act and wetland, lake linkage	Through the Notification process, provisions wetlands under the Forest Practices Act (FPA) and rules may need to be addressed (Divisions 645, 650, 655). Details would be submitted in either a Written Plan or Alternate Plan. Details may include specific provisions for meeting the FPA or reference appropriate sections of the final EIS with equal or greater protection standards or where land use conversion places water protection under other jurisdictions.
7	Other Special Status Species Section 4.6.3 page 4-368 Para 1	This section speaks about additional wildlife species that have special status or consideration by other federal or state agencies, beyond those listed as Threatened or Endangered under the federal ESA. The Oregon Forest Practices Act requires protections for certain wildlife species under Oregon Administrative Rule 629, Division 665. The FPA has specific rules for Northern Spotted Owl nest sites (OAR-629-	Forestry recommends that the applicant address protections afforded to wildlife under the Oregon Forest Practices Act in the EIS. Of particular note is the great-blue heron. Although this species is protected by law through the FPA, in association with forest operations, it is not addressed as a special status species in the EIS. Furthermore, these protection standards need to be addressed throughout the EIS. Activities such as timber harvest operations that occur near a known site of one of these species may require a written plan to address

		665-0210); Bald Eagle nest sites (OAR 629-665-0220), winter roost sites (OAR 629-665-0230), and foraging perch sites (OAR 629-665-0240); Osprey nest sites (OAR 629-665-0110), and Great Blue Heron rookeries (OAR 629-665-0120). Written plans which describe how forest operations will be conducted to avoid a conflict may also be required for operations near known sites of marbled murrelets under OAR-629-0170(5)(d) or OAR-629-0190(2). Similarly, written plans may be required for operations near certain band-tailed pigeon mineral springs or golden eagle nest sites under OAR-629-0170(5)(a) or OAR-629-0190(1).	how the operation will be conducted to avoid a conflict with the wildlife site. Exceptions to the FPA rules for spotted owls or marbled murrelets may apply if the applicant has a valid Incidental Take Permit from the USFWS. Other exceptions would need to be addressed through a Plan for Alternate Practice which must indicate how the operation will be conducted to result in a net equal or greater outcome for the species in question.
8	Other Special Status Species Section 4.6.3 page 4-368 Para 1	The proposed route indicates that the Pacific Connector pipeline project may go through or near known nest patches of spotted owls.	Forest operations on non-federal lands near a known nest site of a spotted owl may require a Written plan or Plan for Alternate Practice. This may include a requirement to designate a 70 acre core area of suitable spotted owl habitat, as described in rule in OAR 629-665-0210(1)(a). Exceptions to the FPA rules for spotted owls may apply if the applicant has a valid Incidental Take Permit from the USFWS. Other exceptions would need to be addressed through a Plan for Alternate Practice which must indicate how the operation will be conducted to result in a net equal or greater outcome for the species in question.
9	Section 4.6.3 page 4-368 Para 1	This section describes “special status species”. The FPA and species which receive protection under the FPA are not included in this section or Appendix I.	Recommend adding Oregon Department of Forestry and species protected under the Forest Practices Act to this section and Index referencing “special status species”.

Appendices

Appendix A: ODFW Recommended Mitigation Actions: Coos, Coquille, Umpqua, Rogue, and Klamath Watersheds

Table 1. Examples of projects with high to moderate ecological benefit for aquatic fish and wildlife resources.

Ecologically Beneficial Aquatic Related Projects Noted in DEIS	**Ecologically Beneficial Upland Related Projects Noted in DEIS**
Riparian planting; riparian enhancement; riparian easements; etc.	Relocation of matrix to LSR
Fish Passage Improvements	Noxious weed treatments
Large Wood instream	Road Closures
Relocation of matrix to LSR	Riparian planting; riparian enhancement; riparian easements; etc.
Road decommissioning	Snag creation
Stream crossing repair	Riparian Vegetation Management (thinning/Stack and burn)
Road storm-proofing	Pre-commercial thinning designed to improve mature forest conditions
Road Surfacing	Upland LWD placement
Road Closures	Pre-commercial thinning designed to improve mature forest conditions

Riparian Vegetation Management (thinning/Stack and burn)	Planting for Mardon Skipper

List 1. Potential projects to mitigate for aquatic resource impacts and sites in the Rogue River basin.

Streams crossed by pipeline

Little Butte Creek

1. Top RBFAT passage sites: Charlie; Bieberstad; Walcot; LBID site; Brown Ditch; Tucker Ditch; LBMD, others
2. Funding for water leases with willing landowners
3. Fund replacement of county culvert on Bitterlick Creek
4. Riparian project on Eagle Point urban tributaries, especially the golf course near the visitor center

NF Little Butte Creek

1. Top RBFAT passage sites: Hanley; MID NFLB, others
2. Funding for water leases with willing landowners
3. Find and implement riparian projects

SF Little Butte Creek

1. Top passage sites: MID SFLB; Hoeft Ditch; Klingle Meyers; Ragsdale; Tonn Ditch; Burrell Ditch; Omega, others
2. Funding for water leases with willing landowners
3. Find and implement riparian projects
4. Bank stabilization, fencing, planting on West/Hodgkin properties

Salt Creek

1. Passage at C2 Cattle Ranch diversion, coho found higher in the system
2. Culvert replacement on tributaries.

Indian Creek

1. Find and implement passage projects
2. Funding for water leases with willing landowners
3. Find and implement riparian projects
4. Implement large wood projects on BLM land
5. Implement outreach at Aunt Caroline's Park in Shady Cove

WF Trail Creek

1. Culvert replacement on West Fork and trib of West Fork at mill property
2. Culvert replacement on Buck Rock Creek (ODOT).
3. Culvert replacement on X trib near confluence of Trail Creek and Rogue.
4. Funding for water leases with willing landowners
5. Large wood projects on BLM land on West Fork Trail
6. Additional engineered wood structure on private land on West Fork Trail

<u>High priority summer steelhead steams (tribs of pipeline streams)</u>

Lost Creek

1. Riparian fencing and planting project on ranch property
2. Riparian projects on other private above ranch
3. Large wood project on ranch property

Lake Creek

1. Riparian fencing and planting project on ranch property
2. Find and implement passage projects where applicable

Antelope Creek

1. Restoration on ODOT property at confluence with Little Butte Creek???
2. Find and implement passage projects
3. Funding for water leases with willing landowners

4. Find and implement riparian projects

Other streams with high potential for restoration

Big Butte Creek

1. Funding for water leases with willing landowners

Table 2. Aquatic restoration/mitigation potential projects in the Rogue River basin.

Admin Unit	Fifth Field	Mitigation Group	Project Name	Quantity	Unit	Rationale
Medford BLM	Trail Creek	Aquatic and Riparian	Trail Creek Instream LWD	2.6	miles	Lack of large wood and recruitment of LWD into streams is a consistent factor limiting aquatic habitat quality in all watersheds crossed by Pacific Connector.
Medford BLM	Trail Creek	Road Surfacing	Road sediment reduction	16.3	miles	Road surfacing helps reduce sedimentation.
Medford BLM	Trail Creek	Road storm proofing	Road sediment reduction	4.3	miles	Storm-proofing restores hydraulic connectivity and reduces sediment.
Forest Service	Trail Creek	Road storm proofing	Road sediment reduction	0.6	miles	Storm-proofing restores hydraulic connectivity and reduces sediment.
Forest Service	Trail Creek	Rd decommissioning	Road sediment reduction	1.1	miles	Reduces sedimentation and restores hydraulic connectivity.
Medford BLM	Trail Creek	Rd decommissioning	Road sediment reduction	2.7	miles	Reduces sedimentation and restores hydraulic connectivity.
Medford BLM	Shady Cove-RR	Aquatic and Riparian	LWD	2.5	miles	Lack of large wood and recruitment of LWD into streams is a consistent factor limiting aquatic habitat quality in all watersheds crossed by Pacific Connector.
Medford BLM	Shady Cove-RR	Road sediment reduction	Road sediment reduction	1	miles	Improve existing roads.
Medford BLM	Shady Cove-RR	Road re surface	Road sediment reduction	1.5	miles	Improve existing roads.
Medford BLM	Big Butte	Road Surfacing	Road sediment reduction	6.4	miles	Reduces sedimentation and restores hydraulic connectivity.

Medford BLM	Little Butte	Road sediment reduction	Road sediment reduction	9	miles	Resurface roads in the Ashland RA
Medford BLM	Little Butte	Road sediment reduction	Road sediment reduction	9.4	miles	Resurface roads in the Butte Falls RA
Forest Service	Little Butte	Aquatic and Riparian	S Fk Little Butte LWD	1.5	miles	Placing 75 pieces of LWD into the South Fork by helicopter.
Forest Service	Little Butte	Aquatic and Riparian	Stream crossing decom.	32	sites	Restoring stream crossings reconnects aquatic habitats. Restoration includes riparian plantings to offset impact of shade removal at pipeline X's.

Table 2. Aquatic restoration/mitigation potential projects in the Rogue River basin continued.

Admin Unit	Fifth Field	Mitigation Group	Project Name	Quantity	Unit	Rationale
Forest Service	Little Butte	Road sediment reduction	Road decommissioning	53.2	miles	Remove roads and re plant.
Medford BLM	Little butte	Aquatic and Riparian	Little Butte Cr Fish Screen	1	site	Screen Lost Creek diversion and build permanent diversion structure.
Medford BLM	Little butte	Aquatic and Riparian	Lost Creek Instream LWD	8.6	miles	Lack of large wood and recruitment of LWD into streams is a consistent factor limiting aquatic habitat quality in all watersheds crossed by Pacific Connector.
Medford BLM	Little butte	Road sediment reduction	Little Butte Cr road imprv.	3.5	miles	Improve existing roads by restoring surface.
Medford BLM	Little butte	Road sediment reduction	Little Butte Cr rd decom.	10.6	miles	Remove roads to decrease sediment input in the Ashland RA.
Medford BLM	Little butte	Road sediment reduction	Little Butte Cr rd decom.	2.4	miles	Remove roads to decrease sediment input in the Butte Falls RA.

List does not include terrestrial habitat improvements, fire suppression, or stand density fuel break mitigation on federal land.

These actions are for off site mitigation only. On site mitigation includes placement of LWD at crossings etc.

List 2. Information for properties with potential for mitigation related to aquatic resources.

Dodes Cr Road Elk Creek subbasin

http://www.landandfarm.com/property/175.1_Acres_in_Jackson_County_Oregon-1473980/

Kane Cr

http://www.landandfarm.com/property/517.56_Acres_in_Jackson_County_Oregon-1473891/

Antelope Creek—**Antelope Creek Conservation Opportunity Area**

http://www.landandfarm.com/property/58_Acres_in_Jackson_County_Oregon-1471319/

Modoc Road with vernal pool:--**North Medford Conservation Opportunity Area**

http://www.landandfarm.com/property/212.67_Acres_in_Jackson_County_Oregon-1298398/

Evans Creek –1.5 miles of creek frontage

http://www.landandfarm.com/property/Rural_Residential_See_Remarks_Rogue_River_OR-1365916/

Indian Creek/Crowfoot Creek—**Shady Cove Foothills Conservation opportunity Area**

This isolated acreage is surrounded by Federal BLM land and is located in the heart of a well-known elk hunting area. The topography is graced with peaks and valleys that are permeated with logging roads and skid trails throughout. The headwaters of both Indian Creek and Crowfoot Creek originate on the parcel. The average elevation is 2500' MSL and the site index provides a mixture of merchantable timber, oak groves and open rock faces. Timber inventory data reveals a mixture of timber types and volumes. This property is uniquely located between Lost Creek Lake, the Rogue River, Big Butte Creek and the town of Shady Cove and is made up of three separate but contiguous tax lots

http://www.landandfarm.com/property/480_Acres_in_Jackson_County_Oregon-1674024/

Headwaters of Dead Indian Creek

This idyllic parcel is comprised of one square mile of gently undulating wilderness terrain and is endowed with over a mile of frontage of the headwaters of Dead Indian Creek, a major tributary of the South Fork of Little Butte Creek. The property lays just 1/2 mile from a paved county road and yet is completely surrounded by and easily accessed through BLM land on all sides. It's adjacent to the popular Buck Prairie recreational trail system, a winter haven for snowmobiling and cross country skiing enthusiasts, and a summer hiking and hunting mecca. It's just 5 miles to the boat launch at Howard Prairie Lake Recreation Area, a major local fishing, sailing and boating attraction.

There is plenty of merchantable and sub-merchantable timber growing on the property making this a legitimate and sustainable legacy investment opportunity. The property rests at about 5000' elevation.

http://www.landandfarm.com/property/648_Acres_in_Jackson_County_Oregon-1380787/

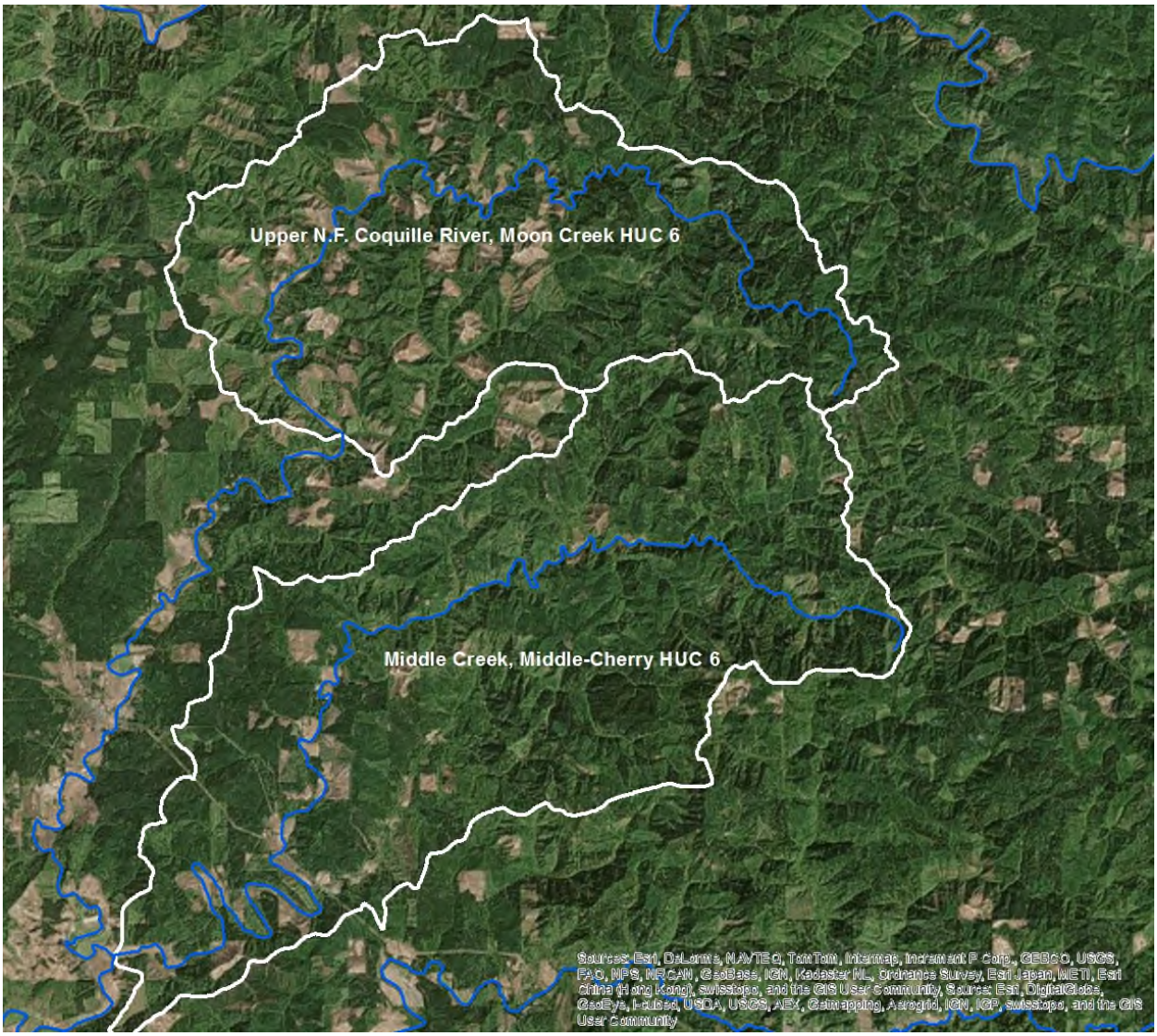


Figure 1. Subwatersheds in the Coquille River Basin with high potential for benefits to wildlife habitat, water quality and fisheries resources through: 1. older age timber management (80-120yrs.); 2. road decommissioning; 3. High Landslide Hazard Location stand easements establishment; 4. Riparian corridor easements/purchase.

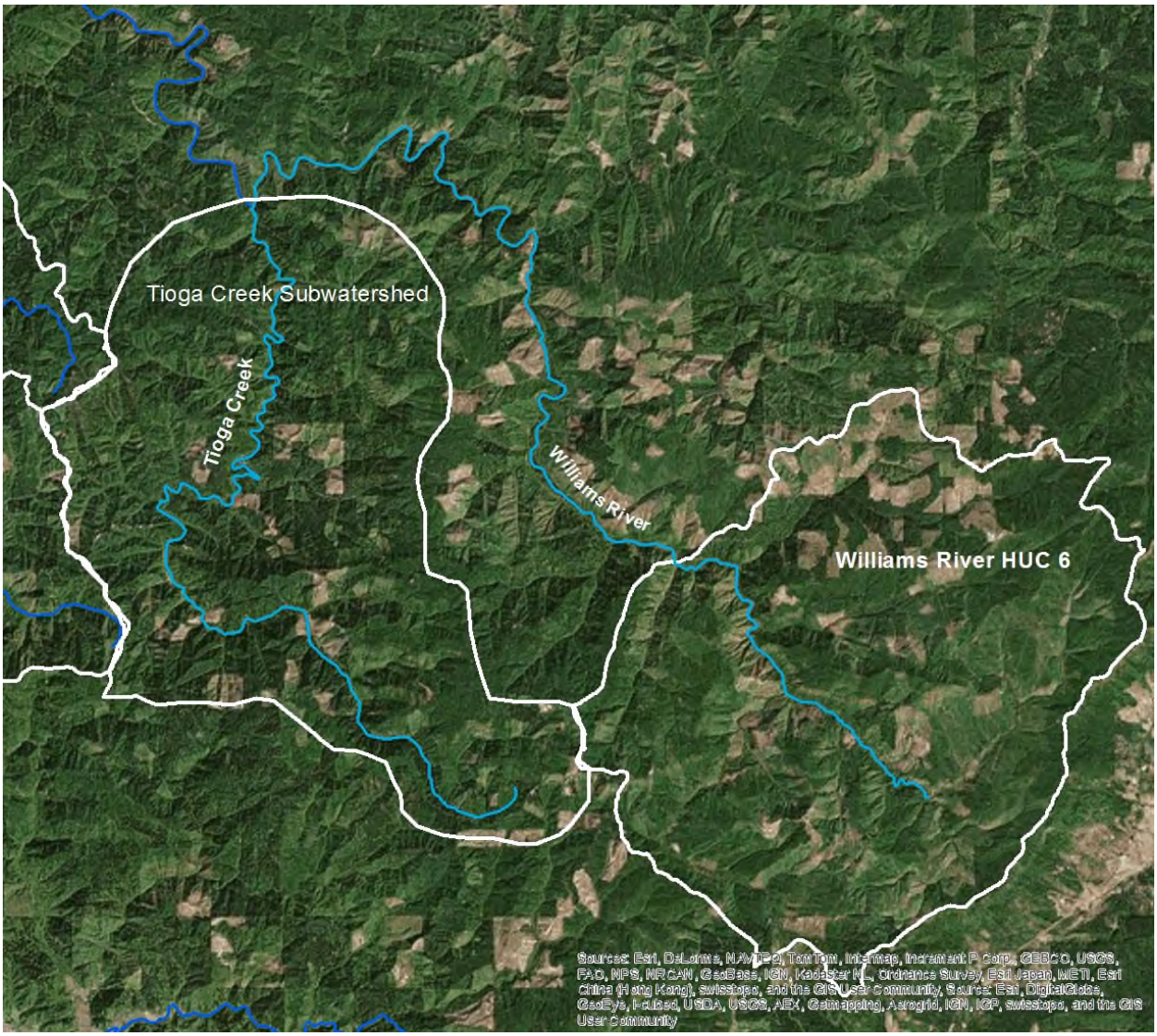


Figure 2. Subwatersheds in the Coos River Basin with high potential for benefits to wildlife habitat, water quality and fisheries resources through: 1. older age timber management (80-120yrs.); 2. road decommissioning; 3. High Landslide Hazard Location stand easements establishment; 4. Riparian corridor easements/purchase.

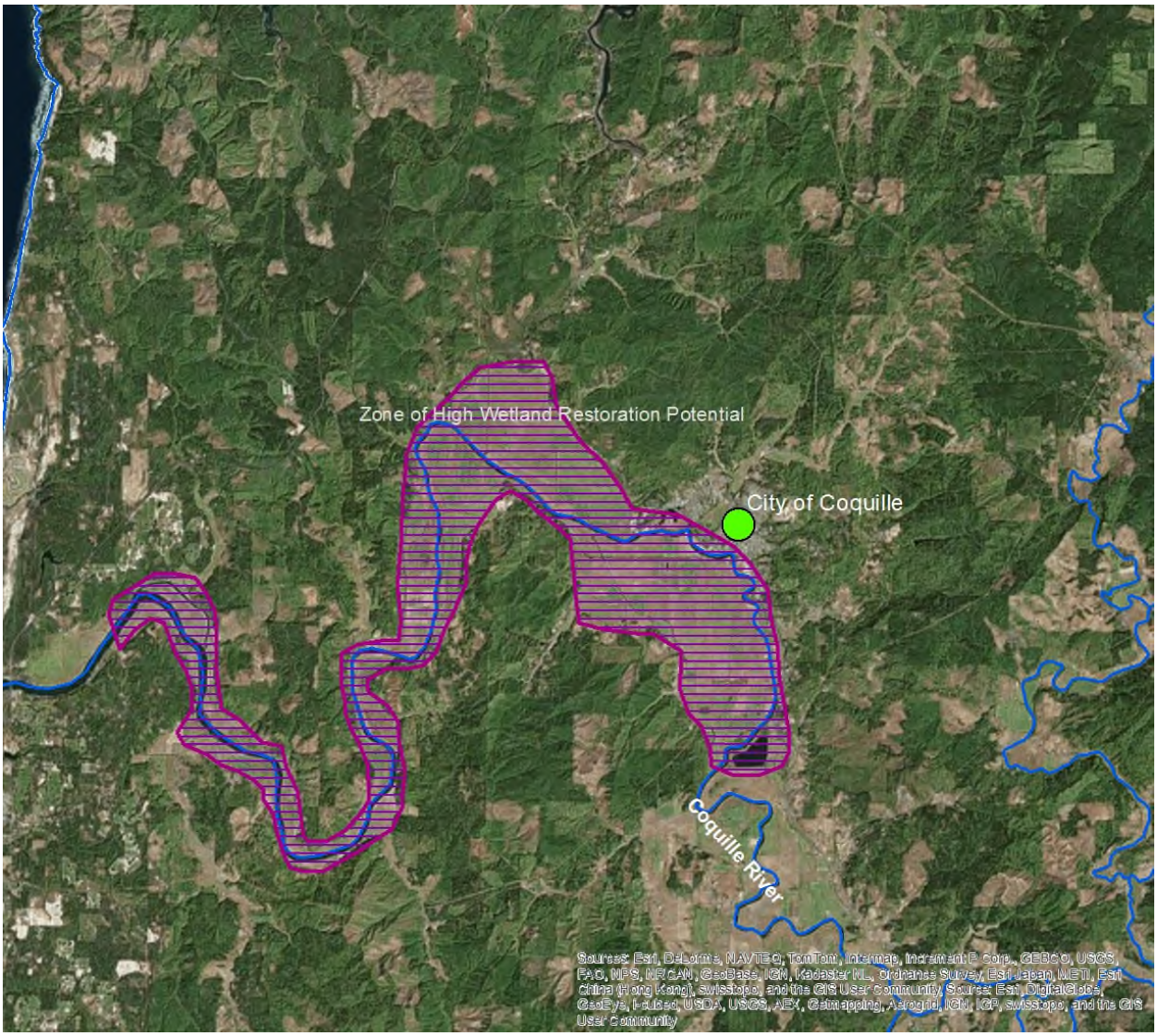


Figure 3. Subwatershed in the Coquille River basin with high potential for benefits to fish and wildlife resources through wetland restoration and protection.

Table 3. Types of mitigation projects that could be conducted on purchased mitigation lands in Jackson County

Wedgeleaf Ceanothus brush clearing
Oak stand thinning
Removal of small diameter conifers from oak stands
Controlled burns
Travel management patrols
Repair of ground degraded by
Restoration of hardwood component in stands with history of conifer management
Noxious weed control
Placement of LWD in upland areas

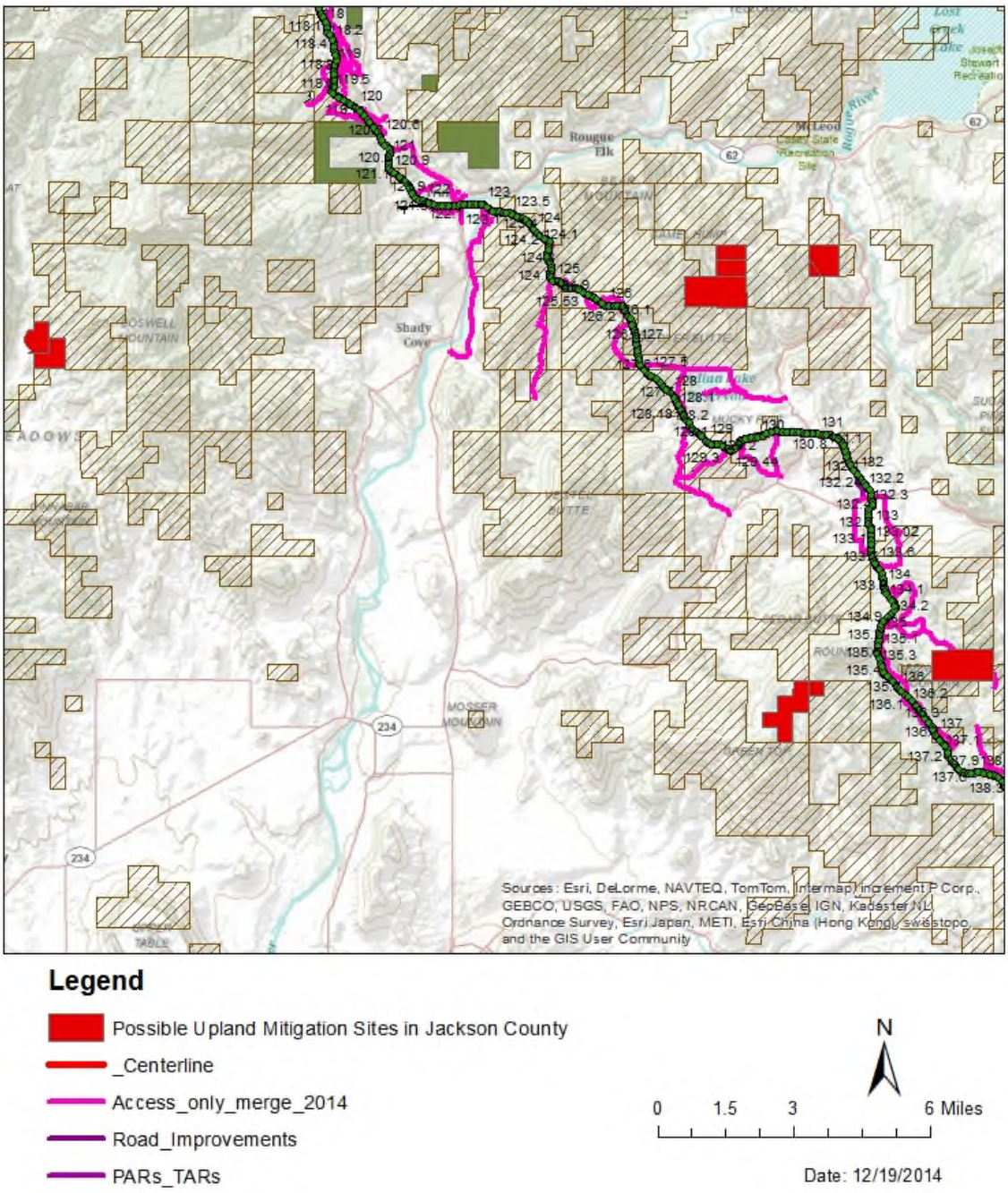


Figure 4. Mitigation sites in Jackson County in relation to the PCGP proposed route.

Table 4. Upland locations for proposed mitigation in Jackson County.

Property Block by TMA Unit	ROW D Priority	Map Nmbr.	FEEOWNER	INCAREOF	CITY	STATE	ACREAGE	TM_MAPLOT	SITEADD	VEG_NAME
Boswel Mtn.	1	8	MERIWETHER SOUTHERN OR	FOREST CAPITAL PARTNERS	INDEPENDENCE	OR	108.35	34-2W-16-500	EAST EVANS CR RD	Siskiyou-Sierra mixed conifer forest
Boswel Mtn.	2	1	MERIWETHER SOUTHERN OR	FOREST CAPITAL PARTNERS	INDEPENDENCE	OR	123.21	34-2W-16-900	EAST EVANS CR RD	Siskiyou-Sierra mixed conifer forest
Camel Hump B	3	4	MERIWETHER SOUTHERN OR	HANCOCK FOREST Mgmt.	VANCOUVER	WA	320	34-1E-1600	CROWFOOT RD	Siskiyou-Sierra mixed conifer forest
Camel Hump B	4	5	MERIWETHER SOUTHERN OR	HANCOCK FOREST Mgmt.	VANCOUVER	WA	80	34-1E-1500	CROWFOOT RD	Siskiyou-Sierra mixed conifer forest
Camel Hump B	5	3	MERIWETHER SOUTHERN OR	HANCOCK FOREST Mgmt.	VANCOUVER	WA	80	34-1E-1400	CROWFOOT RD	Siskiyou-Sierra mixed conifer forest
Camel Hump A	6	0	PLUM CREEK TIMBERLANDS LP		SEATTLE	WA	160.24	34-1E-10-900	CROWFOOT RD	Siskiyou-Sierra mixed conifer forest
Camel Hump A	6	0	PLUM CREEK TIMBERLAND		SEATTLE	WA	160.24	34-1E-10-900	CROWFOOT RD	Siskiyou mixed evergreen forest

			S LP							
Obench ain B	7	7	MERIWETHER SOUTHERN OR	HANCOCK FOREST Mgmt.	VANCOUVE R	WA	320	35-1E-5200	OBENCHAI N RD	Siskiyou-Sierra mixed conifer forest
Obench ain A	8	2	PLUM CREEK TIMBERLAND S LP		SEATTLE	WA	40	35-1E-6700	WORTHING TON RD	Siskiyou-Sierra mixed conifer forest
Obench ain A	9	6	PLUM CREEK TIMBERLAND S LP		SEATTLE	WA	240	35-1E-6800	WORTHING TON RD	Siskiyou-Sierra mixed conifer forest

List 4. Information from ODA Noxious Weed Program identifying noxious weed issue locations.

Potential Noxious Weed Sites for Mitigation

due to Proposed Pipeline Installation

Locations submitted by Oregon Department of Agriculture's Noxious Weed Program on December 22, 2014 (Carri Pirosko)

FUNDING FOR WEED ERADICATION ON LANDS OWNED BY ODA'S PRIVATE PARTNERS WOULD NEED TO BE COORDINATED THROUGH ODA TO PROTECT PRIVACY.

Potential Noxious Weed Sites for Mitigation due to Proposed Pipeline Installation (Jackson County)

Garlic Mustard on the banks of the Rogue River from Kelly Slough down through the Wild and Scenic Section of the Rogue River

Dyer's woad along the I-5 corridor from the California/Oregon border, up and over the Siskiyou Summit, and to Exits into Ashland

Skeletonweed control along the I-5 corridor from the California/Oregon border to the Jackson/Josephine County line and into Douglas County.

Japanese knotweed along the banks of tributaries feeding into the Rogue River throughout Jackson, Josephine Counties.

Perennial pepper weed on the banks of Emigrant Lake.

Eurasian watermilfoil in the marina and sections of

Leafy spurge in the cities of Ashland and Medford.

Potential Noxious Weed Sites for Mitigation due to Proposed Pipeline Installation (Douglas County)

<u>Paterson's Curse</u>

Douglas County

10599 Old Highway 99, Dillard

3845 Roberts Mountain Road, Myrtle Creek

Distaff thistle

Douglas County

Happy Valley Area

3203 Happy Valley Road, Roseburg

1200 Buell Lane, Roseburg

518 Buell Lane, Roseburg

520 Buell Lane, Roseburg

Metz Hill/Green Valley Area

331 Metz Hill Road, Oakland

1600 Metz Hill Road, Oakland

1601 Metz Hill Road, Oakland

2945 Metz Hill Road, Oakland

7888 Green Valley Road, Oakland

7275 Green Valley Road, Oakland

7279 Green Valley Road, Oakland

791 Scott Road, Oakland

Glide Area

16909 North Bank Road, Roseburg

16400 North Bank Road, Roseburg

16988 North Bank Road, Roseburg

297 Single Tree Lane, Roseburg

2589 Sunshine Road, Roseburg

LoneRock Timberland Co. Ranches, several properties in Glide area

Dixonville Area

17047 Dixonville Road, Roseburg

15241, Dixonville Road, Roseburg

2126 S. Deer Creek Road, Roseburg

974 Brumbach Road, Roseburg

Myrtle Creek Area

3842 Roberts Mountain Road, Myrtle Creek

3845 Roberts Mountain Road, Myrtle Creek

4993 Clarks Branch Road, Roseburg

Umpqua Highway

10850 N. Umpqua Highway, Roseburg

17271 N. Umpqua Highway, Roseburg

10190 N. Umpqua Highway, Roseburg

Spurge laurel

Douglas County

Project location: (directions to the site)
I-5 South to exit 138/Oakland; I-5 South to Exit 136 turn left onto Central follow central to Waite St turn right follow Wait St down to stop sign turn right onto Southside Rd.

Project GPS, from heart of infestation:
Latitude: 24'45.01"N Longitude: 19'37.10"W - Spurge laurel

Japanese knotweed

Douglas County

Project location: (directions to the site)
Deer Creek: I-5 South to exit 124 turn right onto Harvard at light follow Harvard to Stephens follow Stephens to Diamond Lake BLVD turn right follow Diamond Lake BLVD out to Buckhorn RD. (Myrtle Cr.)
I-5 South to exit 109 – N. Old Pacific HWY, turn left on N.W. 4th Ave turn right onto Division St. stay on Division St. until you come to the North Myrtle/ South Myrtle "Y" take a left –North Myrtle Rd.

Project GPS, from heart of infestation:
Latitude: 12'37.53"N Longitude: 15'41.58"W – Japanese knotweed

Portuguese broom

Douglas County

Project location: (directions to the site)
I-5 south Exit 159 on Anlauf Rd., to Cox Rd., then east to roads accessing the treatment area; or I-5 north exit 154, then west under freeway to Anlauf Rd., then north to Cox Rd.

Project GPS, from heart of infestation:
Latitude: 38’18.72”N Longitude: 11’25.89”W Portuguese broom

Gorse

Douglas County

Gorse- Scattered sites around Douglas County; Map available upon request.

Project GPS, from heart of one infestation:
Latitude: 23’48.94”N Longitude: 18’08.78”W Gorse

Appendix B: ODFW Comment Related Supportive Figures, Tables, and Information.

(Including expanded comments on riparian concerns and recommendations)

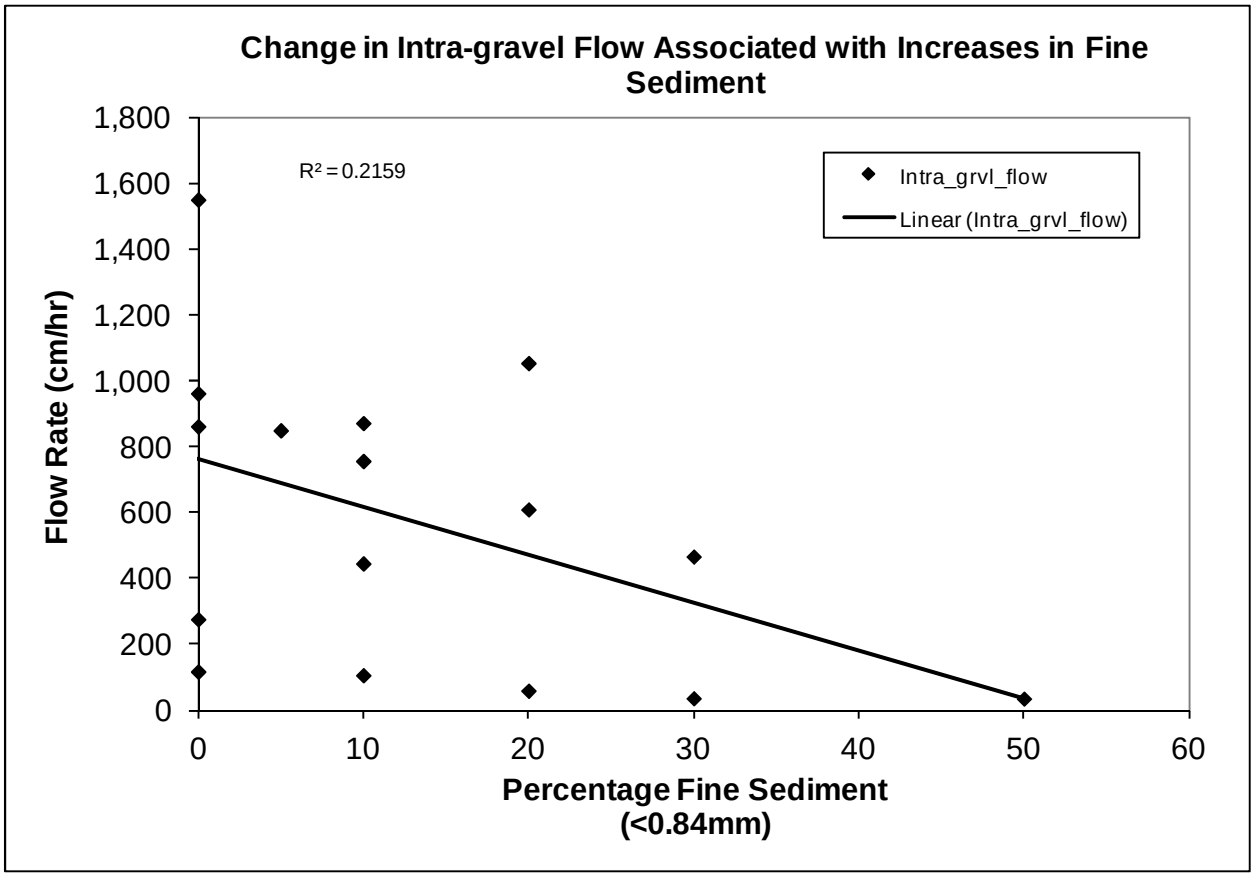


Figure 1. Change in intergravel flow of sediment Reiser and White 1988.

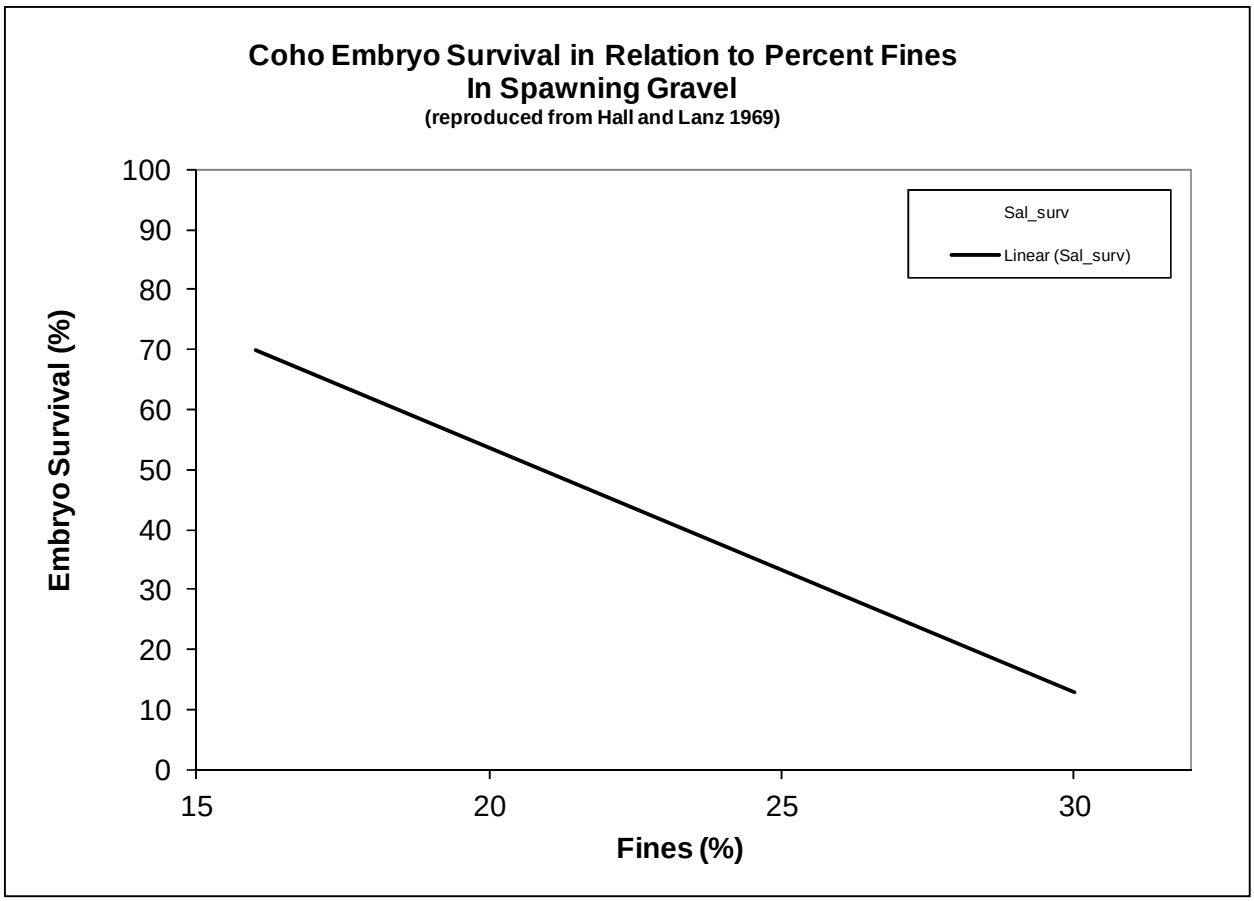


Figure 2. Coho embryo survival in relation to gravel embeddedness from Hall and Lanz 1969.

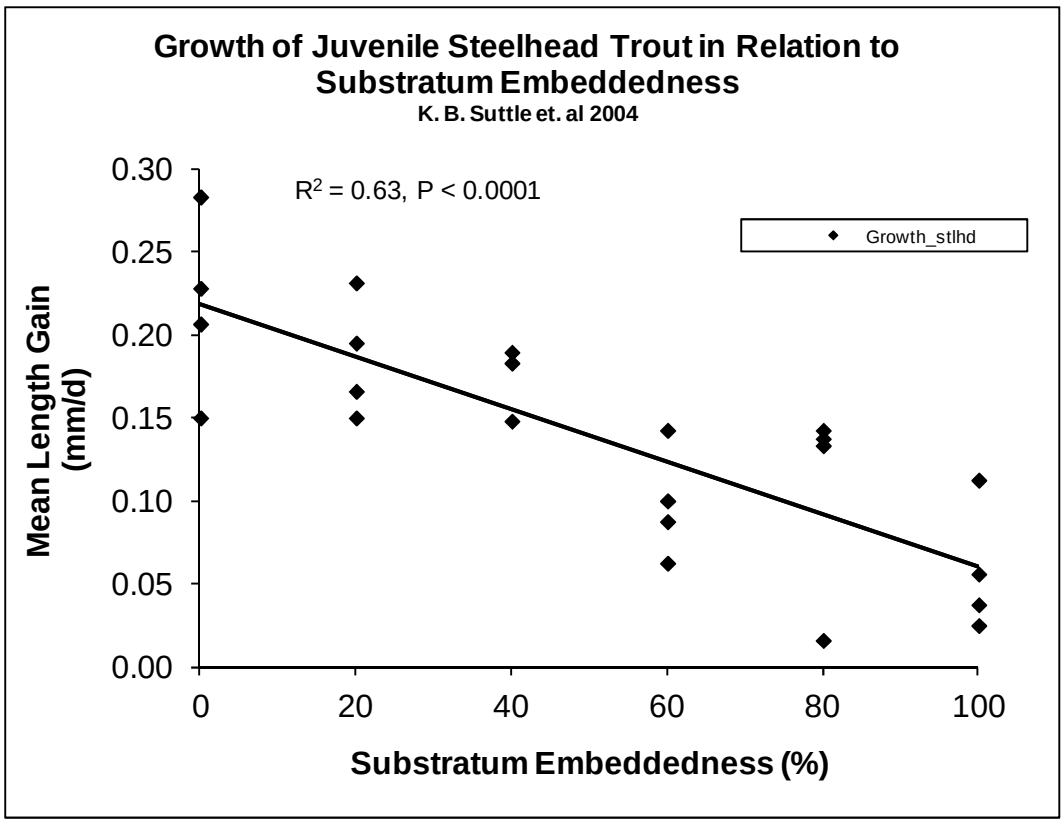


Figure 3. Growth of juvenile steelhead trout in relation to substrate embeddedness Suttle et. al 2004.

Table 2. Mean Monthly Flows 12/1/1905-9/30/2008 at Brockway Gauge (South Umpqua RM 138.7).

Mean, Minimum, and Maximum Flows in cfs, Sums in cfs·days

Month	# Values	Mean	Minimum	Maximum	Sum	Std Dev
1	77	6944	262	16000	534702.39	4215
2	77	6155	341	15400	473898.27	2953
3	77	4671	882	10900	359669.77	2354
4	77	3221	589	7380	247991.40	1491
5	77	1996	446	6910	153665.77	1184

6	77	881	142	3310	67859.37	546
7	76	265	53	576	20151.45	120
8	76	136	40	392	10359.90	65.0
9	76	149	50	587	11321.80	82.2
10	75	448	103	6040	33581.20	730
11	75	2569	190	13600	192643.17	2477
12	76	5680	184	20000	431669.90	4506

Source: Oregon Water Resources Department Flow Data

Table 3. Mean Monthly Flows 10/1/1910-9/30/2008 at Tiller (South Umpqua RM 187). Mean, Minimum and Maximum Flows in cfs, Sums in cfs·days

Month	# Values	Mean	Minimum	Maximum	Sum	Std Dev
10	71	188	35	1790	13340.18	245
11	71	1009	48	3980	71615.09	833
12	71	2038	67	7480	144698.56	1601
1	70	2116	90	4720	148085.14	1229
2	70	1968	95	4910	137726.09	937
3	70	1721	328	4780	120453.25	855
4	70	1422	433	2760	99527.30	492
5	70	1079	231	2090	75517.93	491
6	70	511	108	1640	35747.39	302
7	70	152	49	301	10636.06	58.4
8	70	75.9	30	206	5315.52	26.8
9	70	73.0	39	364	5107.95	44.6

Appendix B (Cont.): Expansion of riparian discussion from Department comments on the JCEP/PCGP DEIS**.**

Chapter 2.0 Table 2.1.5-1 Chapter 4.0; and Appendix F	**Riparian Habitat Impacts:** A. Riparian vegetation within the Riparian Management Area (RMA) zone near streams, wetlands, and waterways is critically important for the health of Oregon's native fish populations, especially in the drier parts of the pipeline corridor such as the Rogue and Klamath watersheds. Fish in the state are predominantly cold-water species that evolved in stream conditions that were generally in most cased related to climax or second growth hardwood and conifer forest, thus near maximum shade that the stand would produce. Oregon Dept. of Environmental Quality has identified 303d temperature listed streams including numerous streams through the pipeline route. These listings relate directly to removal of riparian	**Riparian Habitat Impacts:** A. The Department recommends for riparian vegetation: • RMA vegetation meet or exceed State and local government requirements be implemented on non-federal lands. All disturbed areas need to be replanted with native vegetation. The department recognizes that the proposed crossing locations may be on lands where private landowners may not allow the full setback to be replanted. In these situations, the Department does not object if mitigation for permanent riparian impacts occurs off-site provided that it occurs within proximity within the same HUC 6 watershed and on private lands. *(Note: The department recognizes recommendation in this section may not be possible).* Riparian ordinances in Coos and Douglas counties have been defined as a 50ft. minimum setback. Where the pipeline is adjacent to a stream corridor, the department recommends that riparian hardwood native vegetation be replanted and allowed to regenerate from the OHW mark to a distance of 50ft. minimum upslope in the pipeline corridor. The Department recommends: • Plants should include a minimum of at least 3 shrub species and 2 hardwood and 2 conifer tree species native to the location. • Plants should be installed from bare root or preferred 1 gallon or 2 gallon stock from a genetic source within 60 air miles and 1000ft. of elevation of the site. • Planting spacing should be 3ft. maximum and

	vegetation since the 1800's. The department notes that PCGP staff have developed a water temperature model to evaluate the impacts of the project at specific stream crossings. Chapter 4.3 identifies through modeling efforts that some streams impacted by the PCGP will be cooler following removal of the riparian corridor, which is not scientifically logical. • OC Coho salmon production across the pipeline route has been significantly deleteriously impacted by historical removal of vegetation from the RMA. Further impacts are considered as highly negative for this species as well as Fall Chinook Salmon, winter steelhead, and Coastal Cutthroat Trout. • The DEIS identifies extensive measures on federal lands where RMA's are currently considered in "Good" condition to further improve these stands. These measures are noted by the Department, but will fully fail to address damage to RMA's on private lands. • B. The Department has repeatedly raised concerns over inadequacy of	continue upslope. • *(Note: The Department recognizes the need for the pipeline to maintain a maintenance corridor. Accordingly, the above recommendations in A. are likely not feasible and in lieu of on site mitigation off-site mitigation is recommended such .* B. The Department recommends coordination with Department staff to develop Riparian Mitigation off-set mitigation (see comments below). *<u>Note:</u> In Jackson County, the riparian setback for all streams except the Rogue River is 50 feet from the ordinary high water level; the setback on the Rogue is 75 feet. As part of its review process for land use actions, Jackson County typically requires applicants to fill out a Riparian Landscape Plan showing how the proposed project will mitigate for unavoidable impacts to riparian areas. These plans must be reviewed and approved by the department before the County will accept them. Planting measures should be the same as section A.* <u>C. If the Applicant is unable to ensure the recommendations above in A and B</u>, The Department recommends the 30-foot wide area centered on the pipeline where the current proposal is to allow no trees taller than 15 feet be allowed to grow; as there will be a 30-foot wide area which will be maintained in an herbaceous state that provides very limited RMA function. The maintenance corridor will alter the vegetation in riparian areas for the life of the project and should require mitigation. Pacific Connector should calculate the amount of permanent impact from this loss of vegetation using the local riparian setback ordinances and be required to provide mitigation accordingly. Most riparian habitats will be considered Habitat Category 2 or 3 under the department Habitat Mitigation policy. In order to meet a "Net Benefit" through habitat restoration, the

	proposed riparian vegetation buffers for the PCGP on non-federal land. The proposed 25-foot replanting zones on private and state lands are not consistent with county or state requirements for riparian areas which may also vary depending on specific location within state and private forest lands. Agreed riparian buffers on federal land are 100 ft. minimum. For example, Douglas County Land Use and Development Ordinance (LUDO) requires the department to complete an inspection for any land use action that will affect the Riparian Vegetation Corridor. Other counties that the pipeline passes through have similar riparian vegetation-related ordinances. The Douglas County ordinance requires the Department to grant approval to reduce the setback or, if that is not possible, there is an appeals process through the county planners. C. Providing shade to streams is a critically important function of riparian areas, but there are many other functions. Healthy riparian areas contribute wood to streams which create habitat for	D. <u>Thinning as Mitigation:</u> The department recommends: • This treatment be used only on a very limited basis if at all. • This type of treatment only be used in subbasins where no stream or downstream reach of a connected stream is considered 303d listed. <u>Additional Riparian Recommendations:</u> The department recommends revisiting analysis and discussion of the following specific riparian impacts/mitigation components of the 2009 project FEIS: Revisit the sufficiency of the Compensatory Mitigation Plan (CMP) to fully mitigate project impacts. The CMP which was developed in close consultation with the USFS and other federal agencies and has been considered by the applicant to be sufficient to mitigate for impacts to federal and private lands. The department does not concur with the above conclusion. • The vast majority of proposed mitigation will occur on Federal lands whereas impacts to habitats will occur across Federal, State, and private ownerships creating an inequitable disparity between impact site and mitigation site location. According to the DEIS, a total of 90.7 acres of various types of riparian vegetation will be removed within riparian zones on federal property with additional acres on private ownership that are within watersheds that provide critical habitat for either Oregon Coast (OC) and Southern Oregon/Northern California Coast (SONCC) coho salmon. Most of this habitat (70%) is on private land. The CMP focuses on a late successional and mid-seral forest subset within the lost riparian

	fish and slow down stream flows during storms. Plant roots hold the soil in place which helps to prevent erosion. Riparian vegetation filters runoff reducing the amount of sediment and pollutants that enter the stream. Many terrestrial wildlife species rely on riparian vegetation for food, shelter, and migration corridors. D. <u>Thinning as Mitigation:</u> The DEIS notes in TABLE Table 2.1.5-1 and other locations thinning of the riparian forest as mitigation. The department recognizes that this treatment will produce harvest revenue, however, assuming that this treatment is aimed at producing greater growth through reducing stock densities, the department considers this treatment experimental and unlikely to yield benefits for fishery resources on medium and small streams as: • Due to existing stream protection buffers on federal lands most stands timber near streams are >60yrs. in age. Individual trees in these stands largely have attributes (sufficient size and	vegetation habitat. Most of this habitat (63%) is on private land. Yet, nearly the entire menu of mitigation for these impacts occurs on public land. Throughout project reviews, the department has recommended that mitigation occur on private lands where it may not occur otherwise. • The Department recommends further consideration of mitigation options on non-federal lands in order to achieve mitigation site locations commensurate to impact site locations. • The Department recommends that mitigation proposals should be expanded for impacts to fish species in addition to late successional and mid-seral forest riparian habitat across the pipeline route including the range of both OC and SONCC coho salmon. The proposed project would result in a loss of function of other riparian habitat types due to a lack of adequate proposed mitigation. The Department recommends other priorities for mitigation in addition to large wood. These include, but are not limited to: • Purchase of in-stream water rights from willing sellers • Protection of riparian habitat on private land (purchases or easements from willing sellers), • Restoration of fish passage, and • Restoration of riparian habitat such as fencing and planting, non-native vegetation control, etc. (multi-year projects) See Appendix B in this document. FERC's staff has previously recommended that PCGP develop a stream mitigation plan. The department has previously requested this as well. • The Department recommends that the applicant complete a stream, riparian, wetland, and upland mitigation plan for all

	height) to provide good-excellent LWD for small streams and fair-good for smaller medium sized streams. • A number of small tributaries where treatments are proposed feed into larger tributaries that are 303d listed for temperature. If a particular stand is providing maximum shading overstocked and thinning will reduce shading there becomes a need for discussion to determine "Limiting Factors" for salmonids by individual watershed prior to thinning treatment. Increasing water temperature at time zero in the context of increasing LWD 100-200yrs. in the future fails to meet ecological objectives. • Thinning of overstocked stands decreases tree mortality, improves growth rates, and theoretically extends the life expectancy of trees. Overstocked stands have more disease issues and greater mortality, thus contributing more snag habitat and large wood to streams in upcoming years, while allowing	impacts (on federal and non-federal lands), which is acceptable to state and federal natural resource agencies and approved by the department prior to FERC authorization of this project. The Department notes that proposed mitigation measures in the CMP are likely not adequate. Each of these stream crossings will need to be assessed during a site visit with a department biologist to assess project-related impacts. These site visits will be used to determine: • The Department anticipates that the applicant will use all measures available to determine fish distribution, however, in the rare instance that there remains uncertainty concerning fish use of a stream department staff will need to assist with historic and present fish presence/absence if unknown and species expected to be present. • Individual Habitat Categorization under the department Habitat Mitigation Policy and to assist the project proponents in determining suitable mitigation to offset those • The Department strongly objects to the Environmental Investigator (EI) determining mitigation needs during implementation as described in the FERC Wetland and Waterbody Construction and Mitigation Procedures. Site specific impacts will need to be assessed at each stream or river crossing to determine mitigation needs for each unique site based on the department Fish and Wildlife Habitat Mitigation Policy.

	remaining trees to continue to grow. • There is no existing dataset documenting from time zero through to 200-300yrs. when it could be determined if the original treatment produced greater quantity of large wood for stream complexity.	