*Protest of the*

UNITED STATES FOREST SERVICE'S PROPOSED FOREST PLAN AMENDMENTS (#28132)) TO THE UMPQUA, ROGUE RIVER-SISKIYOU, and FREMONT-WINEMA NATIONAL FORESTS

**JORDAN COVE NATURAL GAS LIQUEFACTION TERMINAL AND PACIFIC CONNECTOR GAS PIPELINE PROJECTS**

**January 6, 2020**

**Responsible Official**: Alice B. Carlton, Supervisor, Umpqua National Forest

**Submitted on half of Oregon Department of Fish and Wildlife by the Oregon Department of Justice**

Lead Objector: Jesse Ratcliffe
Assistant Attorney General
Oregon Department of Justice
1162 Court St NE
Salem, OR 97301
(503) 947-4549
jesse.d.ratcliffe@state.or.us

Oregon Department of Fish and Wildlife Contact: Sarah Reif
Energy Coordinator
4034 Fairview Industrial Drive SE
Salem, OR 97302
sarah.j.reif@state.or.us
503-947-6082
*Comments authored by Sarah Reif and Christopher Claire, Habitat Protection Biologist, ODFW Charleston Field Office.*

*Statement of Interest*: The Oregon Department of Fish and Wildlife (ODFW) is statutorily charged with the management of the State of Oregon's fish and wildlife resources. *See*, *e.g.*, ORS 496.012. ODFW has an interest in federal actions affecting these resources. The manner in which the State of Oregon's fish and wildlife resources would be affected by the Plan Amendments is described in detail below.

*Statement of Error*: As described in detail below, the Plan Amendments err in two ways:

(1) The Plan Amendments are inconsistent with the State's fish and wildlife habitat mitigation policy (496.012; OAR 635-415-0000 through -0025), and insufficient for offsetting the proposed pipeline's impacts to fish, wildlife, and their habitats. The Plan Amendments are therefore inconsistent with 36 CFR 219.4(b)(2), 36 CFR 219.8(a)(1), and 36 CFR 219.9(a) and (b).

` (2) The Plan Amendments are inconsistent with the United States Fish and Wildlife Service's (USFWS) and National Oceanographic and Atmospheric Administration's (NOAA) Endangered Species Act (ESA) Section 7 Consultations and Biological Assessment, which are based on the

Applicant's preferred route, instead of the Blue Ridge Variation selected by FERC in the FEIS and adopted by the USFS for the purpose of the Plan Amendments.

*Parts of Plan Protested*: The Plan Amendments would involve plan-level and project-specific amendments to the LRMPs for the three National Forests. The plan level amendments would be to re-allocate lands currently designated as Matrix lands to Late Successional Reserve as mitigation for the LSR impacted by the PCGP project. The project-specific amendments are described in more detail in the Discussion section, below. ODFW does not find the compensatory mitigation that is proposed for this reallocation and the project-specific amendments to be consistent with the State's Habitat Mitigation Policy, or sufficient for offsetting the proposed pipeline's impacts to fish, wildlife, and their habitats. The Plan Amendments are therefore inconsistent with 36 CFR 219.4(b)(2), 36 CFR 219.8(a)(1), and 36 CFR 219.9(a) and (b). For these reasons, ODFW protests the entirety of the Plan Amendments.

In addition, the USFS proposes to adopt the FERC-recommended Blue Ridge Variation. The USFS has not obtained the required ESA Biological Assessment or Section 7 Consultation from the USFWS or NOAA with respect to the Blue Ridge Variation. For these reasons, ODFW protests the part of the Plan Amendments pertinent to the Blue Ridge Variation.

*Issues Being Protested*: The Statement of Error, above, describes the general categories of issues raised in the protest. These issues are fully described in the Discussion section, below.

*Attachments*: ODFW attaches a copy of the State of Oregon's comment letter on the DEIS, which address the issues raised herein. ODFW's comments may be found at pages 63-155 of the attachment. Because the Plan Amendments are proposed to accommodate the proposed Pacific Connector Gas Pipeline, comments on the effects of the Pipeline equate to comments on the effects of the Plan Amendments.

*Note*: ODFW also objects to and has protested the United States Bureau of Land Management's proposed Resource Management Plan Amendments in connection with the Pacific Connector Gas Pipeline. Because of the similarity of the issues raised by both the USFS amendments and the BLM amendments, the Discussion section at some points addresses both. The Discussion section is clear, however, as to which issues apply specifically to the USFS amendments.

**DISCUSSION**

The Oregon Department of Fish and Wildlife (ODFW) provides the following comments on the Bureau of Land Management's (BLM) 2019 Proposed Resource Management Plan (RMP) Amendments (DOI-BLM-ORWA-M000-2017-0007-EIS) *and the* US Forest Service (USFS) Draft Record of Decision for the Land and Resource Management Plan (LRMP) Amendments for the Umpqua, Rogue River, and Winema National Forests, for the Jordan Cove Liquified Natural Gas (LNG) Terminal (JCEP) and Pacific Connector Gas Pipeline (PCGP) Projects. ODFW is submitting one letter to address both the BLM and USFS, and will be referring to both federal land management agencies' sections of the Federal Regulatory Commission's (FERC) 2019 Final Environmental Impact Statement (FEIS) for the JCEP and PCGP Projects in the State of Oregon (FERC Docket No. CP17-494-000 and CP17-495-000). The FEIS was published in November 2019

by FERC (Federal Register Notice 84 FR 64315) and its Cooperating Agencies (BLM, 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).

The primary purpose of these comments is to assess the consistency of the BLM RMP Amendments and the USFS LRMP Amendments with State of Oregon wildlife management policies.

**USFS Proposed Land Resource Management Plan Amendments**

It is ODFW's understanding that the USFS, whose lands would also be crossed by the PCGP project, would need to issue concurrence with the BLM for the Right of Way grant. The FEIS Section 2.1.3 reports the PCGP pipeline would cross approximately 30 miles of USFS lands administered by the Umpqua, Rogue River, and Winema National Forests (under the Blue Ridge Variation). Authorization of the pipeline would involve plan-level and project-specific amendments to the LRMPs for the three National Forests. The plan level amendments would be to re-allocate lands currently designated as Matrix lands to Late Successional Reserve as mitigation for the LSR impacted by the PCGP project, as follows:

| National Forest | LSR Number | Acres of LSR Impacted by ROW | Acres of Matrix Re-Allocated as LSR |
|---|---|---|---|
| Umpqua NF | 223 | 68 | 585 |
| Rogue River NF | 227 | 281 | 522 |
| Winema NF | -- | -- | -- |

Project-specific amendments address a number of actions as follows:

- FS-1. Exempts PCGP from the Management Recommendations for Survey and Manage Species on the 3 forests. The USFS would still be responsible for species persistence, but the PCGP project would be exempt.
- UNF-1. Exempts PCGP from the Standards and Guidelines for Fisheries (Umpqua NF LRMP page IV-33, Forest-Wide) to allow the removal of effective shading vegetation where perennial streams in the East Fork of Cow Creek would be crossed by the ROW.
- UNF-3. Exempts the PCGP project from displacement and compaction limitations on soil conditions within ROW in all management areas.
- UNF-4 re-allocation of Matrix Lands to LSR [plan level amendment]
- RRNF-5. Allows PCGP to cross 2.5 acres of the Restricted Riparian land allocation (Management Strategy 26) in the South Fork of Little Butte Creek.
- RRNF-6 allows displacement and compaction of soils
- WNF-1 allows a pipeline in Management Area 3 which is currently an avoidance area for new utility corridors.
- WNF-4 exempts restrictions from displacement and compaction of soil
- WNF-5 exempts 9.6 acres in Management Area 8 from restrictions on displacement and compaction of soil.

Each of these plan-level and project-level amendments has proposed on-site and off-site mitigation actions proposed to address the impacts to USFS LRMP resources. Those mitigation packages are discussed more fully below.

**Relevant ODFW Authorities**

ODFW recommendations on the JCEP/PCGP project are guided by the following statutes and rules:

- 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.
- ODFW Fish and Wildlife Habitat Mitigation Policy (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. This rule is the framework ODFW uses to implement ORS 496.012, 506.109, 496.182, 509.140, and 509.180, among other statutes. Discussed in greater detail below.
- 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.

**ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000 through -0025)**

ODFW reviewed the proposed RMP and LRMP amendments, and the impacts of the JCEP/PCGP projects, using the framework of the ODFW Fish and Wildlife Habitat Mitigation Policy (hereafter, ODFW mitigation policy). It is the State of Oregon's Wildlife Policy (ORS 496.012) that wildlife shall be managed

to prevent serious depletion of any indigenous species and to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of this state. It is also the State of Oregon's Food Fish Management Policy (ORS 506.109) that food fish shall be managed to provide the optimum economic, commercial, recreational and aesthetic benefits for present and future generations. The Oregon Fish and Wildlife Commission has directed ODFW to use its mitigation policy rules to further the State of Oregon's Wildlife- and Food Fish Management Policy.

ODFW applies this mitigation policy when reviewing development actions on all land ownerships, including federal lands managed by the BLM and USFS. *See* 43 CFR 24.3; *California Coastal Comm'n v. Granite Rock Co.*, 480 US 572 (1987).

The ODFW mitigation policy is based on the premise that habitats can have varying levels of relative importance or influence on the survival of fish and wildlife species. This variability will depend on the ecological condition and physical setting of habitat at a specific site, and the needs and sensitivity of fish and wildlife species using the habitats. The ODFW mitigation policy also recognizes that opportunities and approaches for habitat mitigation can also vary accordingly. This recognition resulted in the mitigation policy's hierarchy of habitat categories. For example, Category 1 represents habitats that have the highest relative importance to the survival and production of fish and wildlife, and that are difficult to replicate. Reflecting this importance, habitats in this category require the highest level of conservation with limited opportunities for mitigation (mitigation is limited to avoidance of impacts). At the other end of the hierarchy, category 6 contains habitats that provide relatively minimal values for fish and wildlife with low potential for becoming significant; accordingly, the mitigation goal for these habitats is relatively low.

> Habitat Category 1: Irreplaceable, essential habitat for a fish and wildlife species, population, or unique assemblage of species that is limited on either a province or site-specific basis. To be Category 1, the habitat must be essential for the species of concern, and irreplaceable, and limited. The mitigation goal of Habitat Category 1 is no loss of either habitat quantity or quality. In the case of potential impact to Category 1, ODFW will recommend avoidance.
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> Habitat Category 2: Essential habitat for a fish and wildlife species, population, or unique assemblage of species that is limited on either a province or site-specific basis. To be Category 2, the habitat must be essential for the species of concern, and limited. These habitats are not irreplaceable (the distinguishing factor from Category 1 habitats). The mitigation goal of Habitat Category 2, if impacts are unavoidable, is no net loss of either habitat quantity or quality and to provide a net benefit in habitat quantity or quality.
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> Habitat Category 3: Essential habitat for species, or important habitat for a species that is limited on either a province or site-specific basis. Essential habitats that are not limited are Category 3. To be Category 3, important habitats must be limited. The mitigation goal of Habitat Category 3, if impacts are unavoidable, is no net loss of either habitat quantity or quality.
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> Habitat Category 4: Important habitat for fish and wildlife species. Habitats important for species but that are not limited are Category 4. The mitigation goal of Habitat Category 4, if impacts are unavoidable, is no net loss in either existing habitat quantity or quality.
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> Habitat Category 5: Habitat for fish and wildlife having high potential to become either essential or important habitat. Category 5 includes habitats that currently may not provide significant support

for the needs of fish and wildlife species, but that have high potential to be restored to a condition that contributes to sustaining these species. The mitigation goal of Habitat Category 5

Habitat Category 6: Habitat for fish and wildlife that has a low potential to become either essential or important habitat. Category 6 includes habitats that currently do not provide significant support for the needs of fish and wildlife species, and that are not expected to have the opportunity or capability to be restored to a condition that contributes to sustaining these species.

There are a number of key terms contained within the category descriptions that must be interpreted and applied consistently for the successful application of this policy. The following discussion provides general guidance on the key components of these habitat category definitions.

*Essential Habitat*
"Essential habitat" refers to habitats that contain the physical and biological conditions necessary to support the most critical life history functions of the fish and wildlife species being considered. These habitats are those that species are dependent upon for long-term population maintenance, and are often termed as preferred or optimal for the species. To be essential, it must be reasonable to conclude that a reduction in the quality or quantity of the habitat would likely result in a decline of the species or population being evaluated. Generally, essential habitats will be those that provide critical support to the population or species for reproduction, rearing, forage and dispersal (migration) necessary for the completion of one or more life history functions.

*Limited Habitat*
"Limited habitat" refers to the lack of an adequate amount of habitat necessary to sustain, over time, the fish and wildlife species or populations being considered. This concept requires that the relative availability of suitable habitats to support important life history functions be considered at variable scales that may go beyond the project site. In the case of relatively mobile species, the presence and abundance of suitable habitats may need to be assessed at the watershed or regional scale. For species with small home ranges and limited mobility, the assessment may only consider the project site or area immediately surrounding the site.

*Important Habitat*
"Important habitat" refers to habitats with the physical and biological conditions that contribute to sustaining fish and wildlife populations over time, but that may not be necessary to support the most critical life history functions of the species being considered. These habitats may be commonly used by the species, but the species are less dependent on the conditions for the long-term maintenance of the species or population.

*Irreplaceable*
"Irreplaceable" means that it is unlikely that the habitat being considered could be replaced or recreated through mitigation actions within a reasonable time frame. To be replaceable, both the quantity and functional quality of the habitat to fish and wildlife species would be restored. It is reasonable to conclude that a habitat is likely to be "irreplaceable" if no method or technique has been shown to be successful at recreating the habitat being considered. While the policy does not preclude the use of any new or untested mitigation techniques, there must be some certainty that the project will be successful at restoring habitat quantity and quality before concluding that the habitat is replaceable. Where uncertainty is high, or the level of risk

that the mitigation project will fail is unacceptable the habitat should be classified as "irreplaceable."

In-kind and in-proximity mitigation are the standards set by the ODFW mitigation policy for Habitat Categories 2 and 3, and is recommended for Category 4. The reasons are:

1). Habitat mitigation that does not produce or benefit like resource/habitat features and thus is not highly similar or identical to the attribute damaged does not address the ecological loss of the attribute damaged and lost function (in-kind).

2). Habitat mitigation that is not in-proximity will fail to address resource concerns in the watershed where impact occurred.

3). Through time, repeated out-of-kind or out-of-proximity mitigation can result in unbalanced ecological benefits of habitat mitigation on the landscape and depletion of resources in the area where impacts occurred.

**Inconsistency of the BLM and USFS Proposed Mitigation and the ODFW Mitigation Policy**

ODFW does not find the proposed compensatory mitigation for either the USFS or BLM lands sufficient for offsetting the proposed pipeline's impacts to fish, wildlife, and their habitats. The compensatory mitigation actions are proposed for USFS lands in Section 2.1.5 of the FEIS, and for BLM lands in Section 2.1.4 of the FEIS. Since the project's inception, ODFW has recommended FERC and the federal land management agencies crosswalk the federal land compensatory mitigation plans with the standards in the ODFW mitigation policy to ultimately ensure that fish and wildlife impacts are avoided, minimized, and mitigated (see ODFW's comments on page 80 of Oregon State Agency Comments on FERC's Draft Environmental Impact Statement for Docket Nos. CP-17-494-000 and CP17-495-000 dated July 3, 2019). As of the date of this letter, this crosswalk has not been included in the FEIS, and therefore ODFW does not have the information it needs to ensure the project's impacts will be offset to State of Oregon standards.

To the extent ODFW has found the information necessary to evaluate consistency of the BLM and USFS mitigation with its mitigation policy standards, it is ODFW's conclusion that those standards would not be met. This inconsistency is based on the following issues, which appear repeatedly throughout the remainder of ODFW's comments in this letter:

1) Incomplete information and analyses quantifying and describing the impacts of the proposed action and/or the Blue Ridge Variation,
2) Proposed impacts to Category 1 habitats for both marbled murrelets (*Brachyramphus marmoratus*) and northern spotted owls (*Strix occidentalis caurina*), and
3) Mitigation proposed is often out-of-kind, out-of-proximity, or lacking ecological benefit to the species and habitat impacted by the proposed project with particular emphasis on listed fish, marbled murrelet, northern spotted owls, coastal marten, and fisher.

**Incomplete Analysis of Blue Ridge Variation**

In order to assess the impacts of this project on fish and wildlife, a number of sections within the FEIS and associated appendices required review on a very short timeline. To the extent ODFW was able within the 30-day review period provided by the BLM and the 45-day review period provided by the

USFS, ODFW reviewed FEIS Sections 2.1.3, 2.1.4, 2.1.5, 2.6.3, 4.6, FEIS Appendices F.1 through F.12, and the Comprehensive Mitigation Plan provided by the Applicant to FERC and Cooperating Agencies in September 2019. ODFW also reviewed the FERC Biological Assessment (filed July 29, 2019, and included as part of Appendix I of the FEIS).

The FEIS Section 2.1.3 discusses impacts of the PCGP pipeline on LSR and wildlife habitat in terms of acres, miles, and extent. However, it is not clear in every case that the numerical estimates represent the original proposed action in the Draft EIS or the newly-recommend Blue Ridge Variation. In some cases, for example in the BLM's summary of impacts (Section 2.1.4 and Section 4.6), the impact of the Blue Ridge Variation on total acres of impact for marbled murrelet suitable habitat and total acres of impact for the northern spotted owl are not provided. An acreage summary is only provided for those portions of the LSR crossed by the PCGP project where NSO and marbled murrelet habitats overlap. In this case, ODFW is unable to accurately assess habitat loss and address that loss in its recommendations.

ODFW also observed that the Biological Assessment in the FEIS, which is currently being analyzed by the USFWS and NOAA as per Section 7 Endangered Species Act Consultation (see Initiation Letters from USFWS and NOAA to FERC and Cooperating Agencies, dated August 23, 2019) does not include the Blue Ridge Variation.

ODFW recommends more complete information quantifying the wildlife impacts of the Blue Ridge Variation, and an associated impact analysis in the Biological Assessment. Without complete information ODFW does not have the necessary information to assess the impacts and compare the consistency of the proposed mitigation with the ODFW mitigation policy.

**Impacts to Terrestrial Wildlife Habitat**

The comments in this section address the following impacts of the proposed pipeline to terrestrial wildlife that would be authorized by the BLM and USFS decisions:

- Marbled murrelet habitat removal and degradation
    - Category 1 habitat issues
- Northern spotted owl habitat removal and degradation
    - Category 1 habitat issues
- Sufficiency of proposed BLM and USFS mitigation in offsetting habitat loss for marbled murrelet, northern spotted owl, and other wildlife

*Marbled murrelet habitat removal and degradation*

The PCGP pipeline that would be authorized by the BLM and USFS granting of the ROW and associated plan amendments is proposed to cross known-occupied and presumed-occupied suitable habitat for the marbled murrelet. Marbled murrelet known/presumed-occupied suitable habitat would be impacted by both route variations under consideration, including the originally-proposed route analyzed in the DEIS and the new Blue Ridge Variation.

Marbled murrelets in Washington, Oregon, and California were listed as threatened under the federal Endangered Species Act in 1992, and were subsequently listed as state-threatened in Oregon under the Oregon Endangered Species Act in 1995. The species is listed as state-endangered in both Washington and California.

Nesting habitat loss and degradation is one of the primary threats to sustaining populations of the marbled murrelet. There is strong evidence of large-scale loss of older forests since European settlement within the marbled murrelet range in the Pacific Northwest and northwestern California (e.g., Booth 1991, Teensma et al. 1991, Bolsinger and Waddell 1993, Ripple 1994, Perry 1995, USFWS 1997, Wimberly et al. 2000, McShane et al. 2004, Strittholt et al. 2006, Ohmann et al. 2007, Davis et al. 2015). In the Oregon Coast Range, Wimberly and Ohmann (2004) estimated that large-conifer forests declined by 58% between 1936 and 1996, with corresponding increases in small-conifer forests during this period. Habitat loss and degradation were primary factors in the initial federal and state listings of the marbled murrelet in the 1990s (CDFG 1994, ODFW 1995, Desimone 2016, USFWS 1997, 57 FR 45328). Since the 1990s, further habitat losses have occurred, mainly due to timber harvest on nonfederal lands and wildfire on federal lands (Raphael et al. 2016a).

Past habitat removal has created large gaps that fragment population distribution within the core of the marbled murrelet range (Ralph et al. 1995a, USFWS 1997, RIT 2012). In Oregon, large habitat gaps occur in the northwest portion of the state as well as the coastal strip between Reedsport and the Siskiyou Mountains (RIT 2012; Fig. 2 in ODFW 2018). Most remaining nesting habitat persists on federal lands in Oregon, including the Siuslaw and Rogue River-Siskiyou National Forests, forests owned by the Bureau of Land Management, and the state-owned and managed Tillamook, Clatsop, and Elliott State Forests (Raphael et al. 2016a; Fig. 2 in ODFW 2018). The full extent of occupied habitat on private lands is unknown since state regulations for forest practices do not require pre-project wildlife surveys by private landowners (Tucker and Weikel 2017a); it is generally assumed to be low given available forest stand inventory and harvest data (Greber et al. 1990, Ohmann et al. 2007) and ODFW's examination of the 2012 habitat suitability data produced by Raphael et al. (2016a) for Oregon (see ODFW 2018 for details).

Other environmental impacts such as adverse oceanic conditions, climate change, effects of oil spills, and other large-scale disturbances such as catastrophic fire, are also serious additive threats to the species' survival and recovery (ODFW 2018).

The Northwest Forest Plan, created in 1994, established a system of late-successional reserves (LSR) across the range of the marbled murrelet on both USFS and BLM alnds. LSRs provide suitable nesting habitat over the long term for both murrlets, NSO, and other late successional dependent species (USDA FS and USDI BLM 1994).

<u>Category 1 Habitat Issues for Marbled Murrelet</u>

ODFW considers known/presumed-occupied suitable habitat for the marbled murrelet to be Category 1, meaning it is essential, limited, and irreplaceable within a reasonable time frame. The components of this determination are detailed below:

- "Occupied suitable habitat" (USFWS 2014) is defined the following manner:

  > Suitable Habitat: generally, includes old-growth forests within 50 miles of the coast and characterized by large trees, multi-storied stands, and moderate-to-high canopy coverage. Nest trees can be remnant old-growth trees in a stand of younger forest, but nest trees must have large branches or deformities such as high, moss-covered branches or branches with growths of dwarf mistletoe, which serve as nest platforms.
  >
  > Occupied Suitable Habitat: Habitat in the vicinity of the proposed project that meets any of the following criteria:
  > i. Occupied Stand: is a stand that has been surveyed by the applicant, landowner, or manager, or others following the Pacific Seabird Group (PSG) protocol (Mack et al. 2003) and that encompasses an "occupied site"
  > ii. Historically Occupied Stand: is a stand that was at any time known to be occupied by marbled murrelet. This includes stands where more recent surveys may have indicated that the status is not currently "occupied"
  > iii. Unsurveyed Suitable Habitat (=Presumed Occupied): is an area or forested stand identified as potential nesting habitat that has not been ground-truthed for suitable nesting structures or surveyed following the PSG protocol, including areas with incomplete survey data (*e.g.*, where only one year of marbled murrelet surveys have been completed).

- The occupied suitable habitat in Oregon is "Essential" for the marbled murrelet because it supports reproduction for the species, which is a critical life history function. It is well-established that the decline in nesting habitat quantity and quality is the primary threat to marbled murrelet populations, and any further reduction would have significant impact to the population (see sources cited within ODFW 2018).

- The occupied suitable habitat in Oregon is also "Limited" for the marbled murrelet because they are tied to mature, late successional, old growth forest. As described above, an estimated 58% decline in late successional forests occurred between 1936 and 1996, and an estimated 9.2% further decline was documented between 1993 and 2012. What remains is highly fragmented, and at risk to fire, insect infestation, and disease.

- And finally, the occupied suitable habitat in Oregon is "Irreplaceable" because of the unreasonable time frame necessary to re-create late successional, old growth forests. While trees can be replanted and forests can be managed toward old growth condition, the time it takes to create the functions and values selected for by nesting murrelets (80-year old trees, multi-storied canopy, wide platform branches) interrupts nesting opportunity for at least 5 generations. This is not a reasonable mitigation time frame to allow for mitigation to replace the lost functions and values.

The extent of occupied suitable habitat follows the 'continuous habitat' descriptions in Mack et al. (2003), meaning the delineation of Category 1 habitat should include all of the sub-canopy detection area plus all of the area extending out from the sub-canopy detection until natural breaks in habitat 100

meters or larger are encountered. Therefore, a project that proposes to impact the edge of occupied suitable habitat is still impacting Category 1 habitat.

As per the ODFW mitigation policy, the mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality. The Oregon Fish and Wildlife Commission directs ODFW to protect Category 1 habitats by recommending or requiring (a) avoidance of impacts through alternatives to the proposed development action, or (b) no authorization of the proposed development action if impacts cannot be avoided.

Recognizing the limited time for review of the FEIS, Table 1 below provides a summary of ODFW's understanding of the PCGP pipeline's impacts to Category 1 habitat for the marbled murrelet. Sources used to generate these numbers include the FEIS Section 4.6 and the Effects Determination Section of the Biological Assessment (Appendix I of the FEIS). Given the volume and complexity and sometimes discrepancies among the information provided in the various planning documents for this project, ODFW seeks confirmation from the federal agencies that these estimates are in fact correct. Of note, these acreages are for the originally-proposed route as described in the current Biological Assessment. Similar summaries were not readily available for the Blue Ridge Variation.

**Table 1. Summary of PCGP Pipeline Impacts to Marbled Murrelet Category 1 Habitat as Defined by the ODFW Fish and Wildlife Habitat Mitigation Policy (OAR 635 Division 415). Source for the acreages is the Jordan Cove/PCGP Biological Assessment dated July 2019.**

| **Marbled Murrelet Known/Presumed-Occupied Suitable habitat that will potentially be….** | **Acres** |
|---|---|
| Removed by the Right-of-Way or Temporary Work Areas (TEWAs) | 78 (Approximately 71 federal, 7 private land) |
| Disrupted indirectly from construction noise and road noise (extending 0.25 mi from ROW) | 7,145 |
| Degraded from the indirect effects of increased edge, fragmentation, and increased predation | 656 |

ODFW acknowledges the condition recommended by FERC, BLM, and USFS to avoid tree removal during the marbled murrelet breeding season. This is an important avoidance strategy; however, it does not offset the habitat loss associated with the permanent ROW and the TEWAs or the indirect effects of increasing forest that may degrade habitat quality over time.

Therefore, ODFW does not find this level of impact to marbled murrelet Category 1 habitat consistent with the ODFW mitigation policy and therefore it is also not consistent with the State of Oregon's Wildlife Policy. ODFW recommends the BLM and USFS consider alternative siting of the ROW that avoids impacts to Category 1 habitat for marbled murrelet.

**Northern spotted owl habitat removal and degradation**

The PCGP pipeline that would be authorized by the BLM and USFS granting of the ROW and associated plan amendments is proposed to cross northern spotted owl nesting, roosting, and foraging habitat.

Northern spotted owl nest patches would be impacted by both route variations under consideration, including the originally-proposed route analyzed in the DEIS and the new Blue Ridge Variation.

Northern spotted owls are protected in Oregon by the state (listed in 1987) and federal (listed in 1990) Endangered Species Acts, where they are listed as threatened. The species also receives protections through the Oregon Forest Practices Act (FPA; OAR 629-665-0210).

The NSO population is under severe biological stress in much of western Oregon. NSO numbers appear to have declined annually since 1985 when many studies began, and are currently declining at an average rate of 3.8 percent range-wide each year (Dugger et al. 2015). Loss and adverse modification of nesting, roosting, and foraging habitat due to timber harvesting and natural disturbances such as fire and windstorms, and competition with encroaching barred owls (*Strix varia*) have led to a decline of NSOs throughout much of their historic range (Davis et al. 2011, Dugger et al. 2015, Davis et. 2016). Wildfire has been the major cause of habitat loss on federal lands (e.g., National Forests and National Parks), where most NSO habitat is protected from timber harvesting by protective land management plans (Davis et. 2016). Timber harvest continues to be the primary cause of habitat loss on non-federal lands. Over the past decade it has become apparent that competition from the barred owl now poses a significant threat to the NSO (Dugger et al. 2015). Barred owls compete directly with NSOs for habitat and resources for nesting, roosting, and foraging.

Recovery efforts for the NSO are helping to reduce habitat loss on federal lands. Although the need for timber necessitates continued harvesting, current forest management practices stress more limited harvesting in older-age forests and suggest alternate areas for harvest which are less preferred by spotted owls. Careful planning of timber sales and forest conservation are necessary to halt the decline of the NSO. Large, continuous blocks of late-successional forest have been an element of NSO conservation strategies for over two decades.

Current management of federal forest lands in Oregon includes established network of lands reserved from logging. The Northwest Forest Plan, created in 1994, established a system of late-successional reserves (LSR) across the range of the spotted owl on U.S. Forest Service and Bureau of Land Management lands to provide suitable nesting habitat over the long term (USDA FS and USDI BLM 1994). The federal forest lands outside these reserves are managed to allow dispersal between the LSRs through riparian reserves and other land allocations. In 2011, the U.S. Fish and Wildlife Service (USFWS) issued a Revised Recovery Plan for the NSO that contains a wide array of recommendations, including protecting high-quality and occupied spotted owl habitat, actively managing forests to restore their health, and managing competition from the encroaching barred owl (USDI FWS. 2011). The USFWS is currently conducting an experimental removal of barred owls from spotted owl habitat to assess the effect on NSOs. A new final rule designating critical habitat was published by the USFWS in December 2012. In 2016, the BLM replaced the Northwest Forest Plan for the management of BLM-administered lands in western Oregon with an updated conservation strategy to maintain large, continuous blocks of late-successional forest because of new scientific information and policies related to the NSO (USDI BLM 2016a, USDI BLM 2016b).

Forest management operations on State and private lands in Oregon are governed by rules promulgated under the Oregon Forest Practices Act. The Act, amended in 1987, requires the Board of Forestry to adopt rules to protect Federal- and State-listed wildlife species. The Board of Forestry created NSO protection rules in 1991. The Oregon Forest Practices Act provides for protection of 70-acre owl core area around known nest sites on State and private lands. This rule is intended to protect the size of areas used by juvenile NSO prior to dispersal, which is about 70 acres (Miller 1989).

The existing science clearly establishes the importance of older more structurally-complex multi-layered conifer forests as NSO (Thomas et al. 1990, Courtney et. 2004); the NSO recovery plan recommends the maintenance of older and more structurally-complex multi-layered conifer forests (USDI FWS 2011); and the results of previous analyses demonstrate that maintaining older and more structurally-complex multi-layered conifer forests would contribute to meeting the needs of the NSO (Davis et al. 2011, Dugger et al. 2015, Davis et. 2016). Therefore, maintaining older and more structurally-complex multi-layered conifer forest is a necessary part of the purpose of contributing to the conservation and recovery of the NSO.

Category 1 Habitat Issues for Northern Spotted Owl

While protection and enhancement of all northern spotted owl nesting, roosting, and foraging habitat (as defined in the USFWS 2014 Conservation Framework) is important for recovery of the northern spotted owl, ODFW is particularly concerned about impacts to habitat in the immediate vicinity of known nests and/or activity centers (referred to as a 'resource site' in the Forest Practices Act).

Consistent with the definitions in the Oregon Forest Practices Act (OAR 629-665-0210), ODFW uses the following definitions for terms used herein:

- 'Resource sites' consist of a 70-acre "core area" surrounding a northern spotted owl nest site or activity center of a pair of owls. The shape of the 70-acre core area depends on the characteristics of the forest, it must encompass the activity center or nest tree and consist of forest stands with structural characteristics known to represent nesting habitat for northern spotted owls.
- On federal lands, ODFW considers known-occupied (surveyed according to protocol), historical, and presumed-occupied (unsurveyed but with relevant structural characteristics and/or designated by the federal land management agency) as northern spotted owl resource sites.

ODFW considers known/presumed-occupied resources sites for the northern spotted owl to be Category 1, meaning it is essential, limited, and irreplaceable within a reasonable time frame. The components of this determination are detailed below:

- The nesting resource site is "Essential" for the northern spotted owl because it supports reproduction for the species, which is a critical life history function. It is well-established that the decline in nesting habitat quantity and quality is one of the primary threats to northern spotted owl populations, and any further reduction would have significant impact to the population (as described and cited above).

- Northern spotted owl nesting resource sites in Oregon are also “Limited” because they are tied to mature, late successional, old growth forest. As described above, an estimated 58% decline in late successional forests occurred between 1936 and 1996, and an estimated 9.2% further decline was documented between 1993 and 2012. What remains is highly fragmented, and at risk to fire, infestation, and disease.

- And finally, the northern spotted owl nesting resource sites in Oregon are “Irreplaceable” because of the extended time frame necessary to re-create late successional, old growth forests. While trees can be replanted and forests can be managed toward old growth condition, the time it takes to create the functions and values selected for by nesting northern spotted owls (mature forest stands with multi-layered and multi-species canopy, dense canopy closure [>60%], forest with large standing and fallen dead trees, and many trees with cavities and broken tops) interrupts nesting opportunity for multiple generations. This is not a reasonable mitigation time frame to allow for mitigation to replace the lost functions and values.

As per the ODFW mitigation policy, the mitigation goal for Category 1 habitat is no loss of either habitat quantity or quality. The Oregon Fish and Wildlife Commission directs ODFW to protect Category 1 habitats by recommending or requiring (a) avoidance of impacts through alternatives to the proposed development action, or (b) no authorization of the proposed development action if impacts cannot be avoided.

Based on information in the Biological Assessment (Appendix I), and the BLM and USFS Supporting Documentation (Appendix F), it does appear that some amount of Category 1 habitat for northern spotted owls will be impacted by the project. ODFW has met on a number of occasions with the project applicant to review maps of northern spotted owl resource nest sites relative to the proposed ROW and surrounding area. However, final acreages of impact to Category 1 have not been settled and would require additional time beyond what was provided by this public notice.

ODFW acknowledges the condition recommended by FERC, BLM, and USFS to avoid tree removal during the northern spotted owl breeding season. This is an important avoidance strategy. However, it does not offset the habitat loss associated with the permanent ROW and the TEWAs or the indirect effects of increasing forest that may degrade habitat quality over time.

It is clear, however, that some northern spotted owl Category 1 habitat will be impacted. ODFW does not find any level of impact to northern spotted owl Category 1 habitat consistent with the ODFW mitigation policy, and therefore, it is not consistent with the State of Oregon’s Wildlife Policy. Construction of the project would remove and modify high value nesting, roosting, foraging habitat, dispersal, and capable habitat within the home range of 97 northern spotted owls, 58 of which are currently below sustainable threshold levels of suitable habitat for continued persistence in their home range and/or core area. As such, ODFW recommends the BLM and USFS consider alternative siting design of the ROW to avoid impacts to northern spotted owl Category 1 habitat.

The FEIS and supporting documents do report that at least 517 acres of northern spotted owl nesting, roosting, and foraging habitat will be directly impacted by the project. Some amount of that is likely

Category 1 habitat. However, ODFW would consider the remainder to fall within definitions of Category 2 according to its mitigation policy. As such, those impacts beyond the nesting resource site would likely be mitigatable and subject to the discussion provided in the section below.

**Mitigation Sufficiency for Marbled Murrelet, Northern Spotted Owl, and Other Wildlife Beyond Category 1 Habitats**

Without a cross-comparison of habitat impacts to habitat mitigation offsets according to the ODFW mitigation policy, it is difficult for ODFW to assess the sufficiency of the proposed BLM and USFS mitigation actions designed to address impacts to marbled murrelet habitat. ODFW assumes that unoccupied (surveyed according to protocol) suitable habitat is Category 2. ODFW also assumes that marbled murrelet recruitment and capable habitat, as defined in the Biological Assessment as well as by USFWS (2014 Conservation Framework), can meet the definitions of Category 3 or lower but that determination would need to be made on a site-specific basis given patterns of forest alteration and the existing forested stand structure.

Outside of Category 1 habitats for the marbled murrelet and northern spotted owl, ODFW assumes that impacts to wildlife habitat could be offset depending on the ecological benefit of the proposed mitigation. To that end, ODFW evaluated the relative merits of the proposed BLM and USFS mitigation actions (Table 2, below). In Table 2, ODFW field staff used on-the-ground knowledge of habitat conditions within the basins where project impacts will occur, and a determination of whether and how the proposed mitigation action meets the definitions and standards of the ODFW mitigation policy (although limited by the lack of detailed information). To facilitate rapid review given the short time frame for ODFW comment, ODFW field staff assigned an ecological value of high-, medium-, or low depending on how well the mitigation projects met the definitions in the ODFW mitigation policy. Mitigation designated high ecological value would generate a direct net benefit and replace lost functions and values for the species and habitats impacted by the project. Mitigation actions designated medium ecological value would convey moderate benefit or replacement for the species and habitats impacted by the project, but are somewhat limited by either being out-of-proximity or having some level of failure risk that would require significant design to overcome. Mitigation actions designated as low ecological value are those unlikely to replace or benefit the species and habitats impacted by the project, are often out-of-kind, or involve some unacceptable level of failure risk.

ODFW recognizes and supports the concerted efforts of the USFS and the Applicant (for BLM lands) in finding mitigation projects with features that seek to address impacts across a large and diverse landscape. Of particular note is that on the Umpqua and Rogue River National Forests, more late-successional old growth (LSOG) would be re-allocated from Matrix to LSR than would be impacted by the PCGP ROW and temporary work areas (TEWAs) within current LSR. However the FEIS does not include sufficient descriptions of whether and how the LSOG contained within the re-allocated Matrix lands matches or exceeds the quality of the LSOG being impacted by the project. Some of the mitigation actions proposed not only offset impacts but could generate a net benefit in both quantity and quality. For example, the road decommissioning activities would reduce human disturbance impacts not only to marbled murrelet but to other sensitive wildlife as well.

There are substantial acreages proposed for fuels reduction and stand density management on both USFS and BLM lands, which are designed to reduce the risk of catastrophic wildfire but also to potentially accelerate development of LSOG forest conditions. If properly designed with wildlife habitat goals helping to drive silvicultural plans, these projects could serve to offset the loss and degradation of habitat associated with the pipeline's construction activities. ODFW noted in the FEIS that these potential fuels reduction projects have not yet been scoped or approved nor described in any great detail. For this reason, fuels reduction projects carry uncertainty as mitigation and do not rank high in Table 2. In addition, planning and approvals for these fuel reduction projects would likely take considerable time and public process, so there likely would be a time lag between the PCGP project's impacts to wildlife habitat and the implementation of a fuels reduction mitigation offset. This time lag would also be inconsistent with the ODFW mitigation policy, which recommends that mitigation actions occur prior-to or concurrent with the development action.

At this time, proposed compensatory mitigation for coastal marten, fisher, and big game winter range is not fully described in the FEIS or the Comprehensive Mitigation Plan. ODFW recommends these plans be more fully developed to the in-kind, and in-proximity standards of the ODFW mitigation policy so as to achieve no net loss and net benefit (Category 2 impacts.

**Table 2. ODFW ranking of potential Ecological Benefit effectiveness of BLM and USFS Upland/Wildlife PCGP mitigation Projects.**

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| BLM, CB | EF Coquille | Fire Suppressi on | Fire Suppression | Heli Pond Constructi on | Each | 2.0 | NSO/ MAMU | Low |
| BLM, CB | MF Coquille | Fire Suppressi on | Fire Suppression | Heli Pond Constructi on | Each | 1.0 | NSO/ MAMU | Low |
| BLM, MD | Big Butte Crk | Habitat Improvem ent | Terrestrial Hab Improv | Big Butte Crk Fritillaria Habitat | Acres | 600 | Upland/ Listed Plant | No score |
| BLM, MD | Shady Cove RR | Fuels Reduction | Stand Density Break | Shady Cove Fuel Hazard Reduction | Acres | 866 | NSO/ MAMU | Med |
| BLM, RD | Shady Cove RR | Fuels Reduction | Stand Density Break | Shady Cove Fuel Hazard Reduction | Acres | 866 | NSO/ MAMU | Med |
| BLM, RD | Trail Crk | Fuels Reduction | Stand Density Break | Trail Crk Fuel Hazard Reduction | Acres | 687 | NSO/ MAMU | Med |
| BLM, RD | Trail Crk | Fuels Reduction | Stand Density Break | Trail Crk Fuel Hazard Reduction | Acres | 687 | NSO/ MAMU | Med |
| BLM, RD | South Umpqua River | Fuels Reduction | Stand Density Fuel Break | Hazardous Fuel Reduction | Acres | 1000 | NSO/ MAMU | Med |
| BLM, RD | Myrtle Crk | Habitat Improvem ent | Special Status Plant | Habitat Improvem ent Mariposa Lily | Acres | 50 | Upland/ Listed Plant | No score |
| BLM, RD | Myrtle Crk | Fire Suppressi on | Fire Suppression | Bilger Crk Pump Chance | Sites | 1 | NSO/ MAMU | Low |
| BLM, RD | South Umpqua River, Myrtle Crk, and Middle S. Umpqua River | Fire Suppressi on | Fire Suppression | Dry Hydrants | Sites | 6 | NSO/ MAMU | Low |

Table 2. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Umpqua NF | Days Creek-South Umpqua | Fuels Reduction | Stand Density Fuel Break | Days Crk_South Umpqua Matrix Integrated Fuels Reduction | Acres | 194 | NSO/ MAMU | Med |
| USFS Umpqua NF | Days Creek-South Umpqua | Fuels Reduction | Stand Density Fuel Break | Days Crk-South Umpqua LSR Integrated Fuels Reduction | Acres | 254 | NSO/ MAMU | Med |
| USFS Umpqua NF | Days Creek-South Umpqua | Snag Creation | Terrestrial Habitat Improvement | Days Crk-South Umpa LSR Snag Creation | Acres | 34 | NSO/ MAMU | Med |
| USFS Umpqua NF | Days Creek-South Umpqua | Snag Creation | Terrestrial Habitat Improvement | Days Crk-South Umpqua Matrix Snag Creation | Acres | 14 | NSO/ MAMU | Med |
| USFS Umpqua NF | Days Creek-South Umpqua | Lupine Meadow Restoration | Terrestrial Habitat Improvement | Upper Cow Crk Lupine Meadow Restoration | Acres | 23 | Upland Habitat | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Road Decommissioning | Road Sediment Reduction | Elk Crk Road Decommissioning | Miles | 5.9 | NSO/ MAMU | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Fuels Reduction | Stand Density Fuel Break | Elk Crk Matrix Integrated Fuels Reduction | Acres | 176 | NSO/ MAMU | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Commercial Thinning | Stand Density Mngmnt | Elk Crk LSR Enhancement | Acres | 91 | NSO/ MAMU | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Off-Site Pine Removal | Stand Density Mngmnt | Elk Crk LSR Off-Site Pine Removal | Acres | 300 | NSO/ MAMU | Med |

Table 2. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Umpqua NF | Elk Crk-South Umpqua | LWD Upland Placement | Terrestrial Habitat Improvement | Elk Crk LSR LWD Placement | Acres | 99 | NSO/ MAMU | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Lupine Meadow Restoration | Terrestrial Habitat Improvement | Elk Crk LSR Lupine Meadow Restoration | Acres | 101 | Upland/ Habitat | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Noxious Weed Treatment | Terrestrial Habitat Improvement | Elk Crk Roasdside Noxious Weeds | Miles | 6.7 | Upland/ Habitat | High |
| USFS Umpqua NF | Elk Crk-South Umpqua | Snag Creation | Terrestrial Habitat Improvement | Elk Crk LSR Snag Creation | Acres | 68 | NSO/ MAMU | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Water Source Improvement | Fire Suppression | Elk Crk Pump Chance | Sites | 2 | NSO/ MAMU | Med |
| USFS Umpqua NF | Evans Crk | Road Shaded Fuel Break | Stand Density Fuel Break | Evans Crk LSR Road Shaded Fuel Break | Acres | 63 | NSO/ MAMU | Med |
| USFS Umpqua NF | Trail Crk | Fuels Reduction | Stand Density Break | Trail Crk Matrix Integrated Fuels Reduction | Acres | 500 | NSO/ MAMU | Med |
| USFS Umpqua NF | Trail Crk | Road Shaded Fuel Break | Stand Density Break | Trail Crk LSR Road Shaded Fuel Break | Acres | 175 | NSO/ MAMU | Med |
| USFS Umpqua NF | Trail Crk | Snag Creation | Terrestrial Habitat Improvement | Trail Crk Matrix Snag Creation | Acres | 109 | NSO/ MAMU | Med |
| USFS Umpqua NF | Trail Crk | Pre-commercial Thinning | Stand Density Mngmnt | Trail Crk LSR PCT Enhancement | Acres | 112 | NSO/ MAMU | Med |

Table 2. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Umpqua NF | Upper Cow Crk | Water Source Improvement | Fire Suppression | Upper Cow Crk Pump Chance | Sites | 1 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Fuels Reduction | Stand Density Break | Upper Cow Crk LSR Integrated Fuels Reduction | Acres | 635 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Fuels Reduction | Stand Density Break | Upper Cow Crk Matrix Integrated Fuels Reduction | Acres | 730 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Road Shaded Fuel Break | Stand Density Fuel Break | Upper Cow Crk LSR Road Shaded Fuel Break | Acres | 378 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Commercial Thinning | Stand Density Mngmt | Upper Cow Crk LSR Enhancement | Acres | 197 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Pre-commercial Thinning | Stand Density Mngmt | Elk Crk LSR PCT Enhancement | Acres | 116 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | LWD Upland Placement | Terrestrial Habitat Improvement | Upper Cow Crk LSR LWD Placement | Acres | 65 | Amphib/ Other | Med |
| USFS Umpqua NF | Upper Cow Crk | Snag Creation | Terrestrial Habitat Improvement | Upper Cow Crk LSR Snag Creation | Acres | 90 | NSO/ MAMU | Med |
| USFS Umpqua NF | Upper Cow Crk | Snag Creation | Terrestrial Habitat Improvement | Upper Cow Crk Matrix Snag Creation | Acres | 11 | NSO/ MAMU | Med |

Table 2. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Umpqua NF | Upper Cow Crk | Land Re-allocation from Matrix to LSR | Reallocation of Matrix Lands to LSR | LRMP Amendment UNF 4 LSR 223 Reallocation | Acres | 585 | NSO/ MAMU | Low |
| USFS Rogue River NF | Little Butte Crk | Pre-commercial thinning | Stand Density Fuel Break | Little Butte Crek LSR Pre-Commercial Thin | Acres | 618 | NSO/ MAMU | Med |
| USFS Rogue River NF | Little Butte Crk | Habitat Planting | Terrestrial Habitat Improvement | Little Butte Creek Mardon Skipper butterfly | Acres | 20 | Upland Habitat | No score |
| USFS Rogue River NF | Little Butte Crk | LWD Upland Placment | Terrestrial Habitat Improvement | LWD Upland Placement | Acres | 511 | Upland Habitat | Med |
| USFS Rogue River NF | Little Butte Crk | Snag Creation | Terrestrial Habitat Improvement | Little Butte Crek LSR Snag Creation | Acres | 622 | NSO/ MAMU | Med |
| USFS Rogue River NF | Little Butte Crk | Land Reallocation to Matrix LSR | Land Reallocation to Matrix LSR | LRMP Amendment RRNF 7, LSR 227 Reallocation | Acres | 25 | NSO/ MAMU | Med |
| USFS Rogue River NF | Big Butte Crk | Land Reallocation to Matrix LSR | Land Reallocation to Matrix LSR | LRMP Amendment RRNF 7, LSR 227 Reallocation | Acres | 497 | NSO/ MAMU | Med |
| USFS Winema NF | Spencer Crk | Stand Density Reduction | Visuals | Clover Crk Visual Mngmnt | Acres | 114 | Social | Low |

**Impacts to Aquatic Habitats**

*Riparian Impacts and Fish-bearing Stream Impacts*

The Pacific Connector Pipeline Project (PCGP) will remove a 75-foot wide swath of riparian forest at 155 fish-bearing stream crossings (PCGP Comprehensive Mitigation Plan pg ES-9) in the 229 miles of the

pipeline route from Coos Bay to Malin. Impacts of the pipeline construction to aquatic resources are directly and indirectly linked to a number of factors including, but not limited to:

- Soil disturbance of the pipeline corridor and associated Temporary Work Areas (TEWAs) that induce potential for sediment delivery to streams due to both surface erosion and increased slope failure/landslide. Pipeline corridor erosion sediments and trench landslides have a significant negative impact to stream ecological function.
- Loss of riparian canopy where the PCGP pipeline crosses streams.

  1) This removal of tree canopy opens the channel and surrounding stream adjacent habitats to greater solar input. The removal of tree canopy from the pipeline corridor results in an open pathway with greater solar input where warmer air is able to move laterally along the pipeline corridor from substantial distances upslope into the open stream. It is ODFW's understanding that while thermal effects of removal of riparian forest were directly modeled for the stream segment where canopy will be removed; that up-slope timber removal effects on temperature regimes was not modeled.
  2) Additionally, loss of trees in the riparian zone removes nutrient inputs in the reach that would have been generated by canopy foliage.
  3) Tree canopy removal and subsequent stump removal (pipeline trench zone) destabilizes soils along the pipeline corridor on slopes and at stream crossings.

- Loss of riparian forest at crossings and immediate upslope areas results in long-term inability of the stream segment to recruit Large Woody Debris (LWD), which is necessary to provide stream complexity for ecological function in the reach and to a degree downstream, including fish hiding cover and macroinvertebrate production.
- Permanent loss of upslope timber in steep chutes (where the pipeline traverses headwall areas) that would have potential to eventually reach the stream through debris torrent delivery and deliver that LWD.

The PCGP route traverses through a number of ecoregions and stream habitats that are highly important for production of fish and wildlife linked to aquatic habitats including: Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*) (ESA threatened), fall and spring Chinook salmon (*O. tshawytscha*), Pacific lamprey *(Entosphenus tridentata),* Lost River sucker *(Catostomus luxatus/Deltistes luxatus)*, winter steelhead *(O. mykiss irrideus),* coastal cutthroat trout (*O. clarki clarki*), river otter *(Lutra canadensis*), mink *(Neovison vison),* American beaver (*Castor canadensis*), common merganser *(Mergus merganser*), and numerous others.

The potential negative effects to aquatic/stream habitats through implementation of the PCGP project will reduce the productive value of the habitats of native fish and amphibians that use these streams and waterways. ODFW has evaluated both the direct and indirect impacts the proposed PCGP project would have in relation to stream, river, and wetland habitats and the subsequent effects to productive capacity of these habitats for native fish and wildlife. ODFW recommends further development of avoidance and mitigation measures to address these concerns.

Although a large number of the proposed pipeline stream crossings are on private land, a notable smaller number are on BLM lands in the Coos Bay, Roseburg, Medford, and Klamath Falls districts.

Additionally, there are proposed pipeline stream crossings on the USFS Winema and Rogue National Forests. Table 2 notes examples (not an exhaustive list) of streams that will be impacted on federal lands owned by the BLM and USFS. There are locations where LSR will be removed with pipeline stream crossings or the pipeline will be within <200ft of the stream and LSR will be removed (Table 1) and Figure 1. There are also a number of locations where riparian forest removal will be predominantly of younger age, and stream segments that are upstream of the end of fish use due to the small size of the watershed or other factors. Primary concerns with loss of riparian forest at the PCGP stream crossings is threefold:

1) The removal of riparian canopy where the pipeline crosses streams eliminates tree canopy shading within the permanent Right of Way (ROW). Additionally, the loss of leaf and needle input to streams may reduce carbon energy and nutrients for primary and macroinvertebrate production however the cost/benefit of decreased would be best assessed on a site-specific basis.
2) The removal of trees, stump removal (in the zone of the trench) and general soil disturbance will lead to soil instability.
3) Loss of riparian forest at pipeline stream crossings and immediate upslope areas results in long-term inability of the segment to recruit Large Woody Debris (LWD), which is necessary to provide stream complexity for ecological function of the reach for fish hiding cover and macroinvertebrate production.

The Comprehensive Mitigation Plan (CMP) developed by the applicant included modeling of the effects of shading on stream temperatures in the zone where trees will be removed at pipeline crossings of streams, however, did not model upslope impacts of thermal regimes. The modeling provided indicated that worst case scenario would result in 0.3˚F increase at some stream crossings. The resultant thought from the modeling was that this is sufficiently minimus so that the pipeline crossing removal of riparian forest would have negligible effects on aquatic resources. However, this analysis was performed without consideration of the cumulative impacts that watersheds can have through time in other segments (will be discussed later). ODFW recommends furthering the analysis by considering this cumulative impact, and incorporating the outcomes of this analysis in avoidance, minimization, and mitigation measures.

*Upland Steep Slope and Pipeline Corridor Sediment Concerns*

There are numerous critical concerns with placement of the PCGP pipeline on steep slopes and direct routing at 90˚ to slopes. Coastal sandstone soils are highly susceptible to mass-wasting when undercut, deconsolidated, devegetated, and generally disturbed. The excavation of the pipeline trench and associated soil disturbance will unconsolidate soils removing the ionic bonds of the colloids resulting in a highly erosive condition. A secondary factor, the extensive access road network that will be created to access the pipeline installation and facilitate pipeline maintenance, will further create potential for mass-wasting slope failures and general sediment production over the current condition. Stream productive capacity for numerous anadromous fish streams in the Coos and Coquille River basins has been assessed as “Poor” (Scale: “Very Poor”; “Poor; Fair”; “Good”; “Excellent”) with similar stream health conditions in the South Umpqua River basin, and varying health of streams in the Rogue and Klamath basins. This “Poor” condition rating is in many cases related to upland disturbance factors that have increased sediment loading and the loss of riparian forest and LWD since 1900. Sediment transport to streams is considered a substantial factor currently suppressing recovery of OC coho salmon.

Extensive research has documented the impacts of sediments to salmonids. The BMP's proposed in the CMP for the PCGP corridor are considered reasonable by ODFW. However, the CMP fails to acknowledge that the BMPs are considered unable to fully control erosion and sediment production. The proposed access road networks will likely have long-term chronic effects to fish and wildlife unless seeded, mulched, and closed. The pipeline corridor will have elevated sediment delivery for a number of years post-project despite BMP's.

ODFW continues to recommend interagency coordination to design measures of avoiding, minimizing, and mitigating the impacts of erosion and sediment transport of sediments into Oregon's stream networks. Management of erosion and transport of sediments to stream networks is foundationally critical for enhancing spawning and rearing habitat for fall Chinook salmon, OC coho salmon, Pacific lamprey, winter steelhead and coastal cutthroat trout 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 has repeatedly made recommendations to FERC and the Cooperating Agencies that there be interagency coordination in order to fully address these resource concerns.

Table 2. Examples of streams within the PCGP corridor route on federal land with anticipated riparian forest removals (as mapped by ODFW). ***Note: Information include locations for stream crossings where LSR are proposed to be removed and where Riparian forest was not composed of LSR.***

| | | # LSR | # Non-LSR | # LSR | # Non-LSR |
|---|---|---|---|---|---|
| | | Coho Stream | Coho Stream | Non-Coho Fish | Non-Coho |
| Land Owner | Jurisdiction | Crossings | Crossings | Stream Crossings | Stream Crossings |
| BLM | Coos Bay | Bear Pen Crk | | Elk Creek | Upper MF Coq Trib |
| | | S.F. Elk Crk | | Brownson Creek | |
| | | Cherry Crk | | Steinan Creek | |
| | | | Big Creek | | |
| BLM | Roseburg | | | | |
| BLM | Medford | Canyon Creek | | | |
| | | Trail Creek trib | | | |
| USFS | Umpqua NF | | | | |
| USFS | Rogue NF | | | | Daly Creek |
| | | | | | S.F. Little Butte Creek |
| USFS | Winema | | | | Spencer Creek |

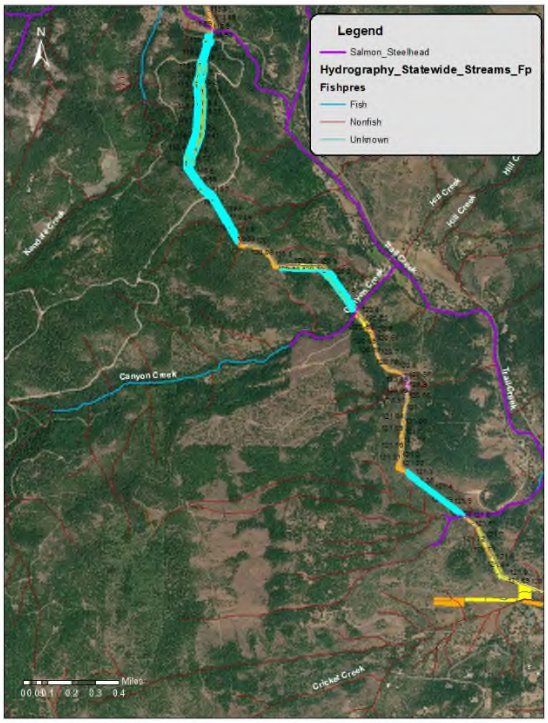


Figure 1. Map noting stream crossing in Trail Creek watershed where LSR will be removed immediately adjacent to a coho bearing stream (LSR highlighted in light blue).

**Aquatic Mitigation Sufficiency Review**

Nearly all aquatic habitats that will be affected within the 229-mile PCGP corridor have a habitat categorization of 4 or higher, however this categorization was not included in the FEIS and is based on draft maps ODFW received from the project applicant. Table 3 denotes categorization for the types of habitats that will be impacted by the PCGP project. The distribution (proximity) of the mitigation projects in the CMP is relatively within the zone of impact for much of the PCGP project despite them being nearly all on BLM and USFS lands and thus are relatively "In-Proximity" at the HUC 4 level (Figure 2). The ODFW mitigation policy includes in-proximity mitigation standards for habitats that are classified as Category 4 or higher. The 4$^{th}$ code HUC watershed drainage area is the basin size that ODFW uses to determine if a project is in-proximity for aquatic species. However, some of the proposed mitigation for aquatic impacts is not in-proximity. For example in the Coos basin where over 20 miles of pipeline impacts occur to stream/aquatic habitats, no mitigation projects proposed in that HUC 4 watershed noted (Figure 2). A number of these stream and upland impacts will directly or indirectly impact estuarine wetlands and coho habitat that are considered Habitat Category 2 under the ODFW Mitigation Policy Table 3.

*Stream Crossing/Riparian Mitigation*

The BLM and USFS have been asked to develop a large number of mitigation projects to address PCGP impacts including stream crossing riparian forest removal.

- ***Temperature:*** a) The applicant modeling fails to address cumulative impacts that can occur within watersheds over a relatively short stream distance and temporal period. Although modeling suggested that 0.3˚F is likely to be the largest thermal impact to a stream segment through installation of the PCGP for an individual stream, this can be largely increased if other landscape projects (e. g. timber harvest, road building, home construction, fire, etc.) within a watershed are within the time period prior to recovery of the shade component at a particular impact location. b) The CMP identifies 44 projects on BLM lands (CMP pdf pg 30) designed to mitigate directly for aquatic impacts, and another 13 projects on USFS lands. These projects range from fish passage and sediment management to placement of LWD. However, the mitigation does not identify any projects that directly produce "In-Kind" canopy mitigation for harvest of trees adjacent to the PCGP 155 stream crossings. The PCGP project has denoted a single project designed to specifically develop riparian canopy on Spencer Creek in the Winema National Forest. However, local ODFW staff believe the likelihood this project would produce substantive ecological benefit is low because degraded stream conditions downstream will nullify benefits. In order to address riparian forest impacts associated with the PCGP, ODFW's DEIS comments included recommendations for projects to align with the ODFW Habitat Mitigation Policy mitigative actions that are "In-Kind." For example, projects that enhance stream buffers on private forest lands through long-term or in perpetuity easements would serve as direct ecological benefit for impacts. ODFW recommends that FERC revisit and adopt ODFW's DEIS comment recommendations to sufficiently mitigate for these impacts.

- ***Loss of future LWD potential:*** The removal of the riparian forest from stream crossings to facilitate the PCGP will result in mostly permanent impacts. ODFW does recognize that over a long-term period there will be some encroachment into the access corridor by riparian forest up to the boundaries of the allowable ROW, which will provide limited recovery. However, there will be a habitat function gap in these segments through time. Large Woody Debris from the stream adjacent slopes and upslope to Stand Potential Tree height will not be allowed to grow and recruit to streams within the PCGP corridor. This zone will be managed for low stature ground cover vegetative species that will not replace lost function of the timber overstory. ODFW has calculated that the PCGP project has potential to remove up to 8,073+ trees (based on standard observed stocking rates in riparian habitats) in the PCGP stream crossing zones (Table 4). If conservatively one-half of these trees through time are likely to fall towards and into the stream, then a total of 3,836 trees would be removed that would have potentially been available for creation of LWD instream complexity. The review of proposed mitigation on federal lands to offset impacts of the PCGP collectively identifies placement of 1,257 individual LWD pieces. This results in a in a direct mitigation inequality of 2,597 (Table 4). ODFW recommends that the federal cooperating agencies and applicant develop a coordination plan with ODFW for the overall goal of evaluating the lost functions of the PCGP impacts within the ODFW mitigation policy framework and corresponding mitigation actions.

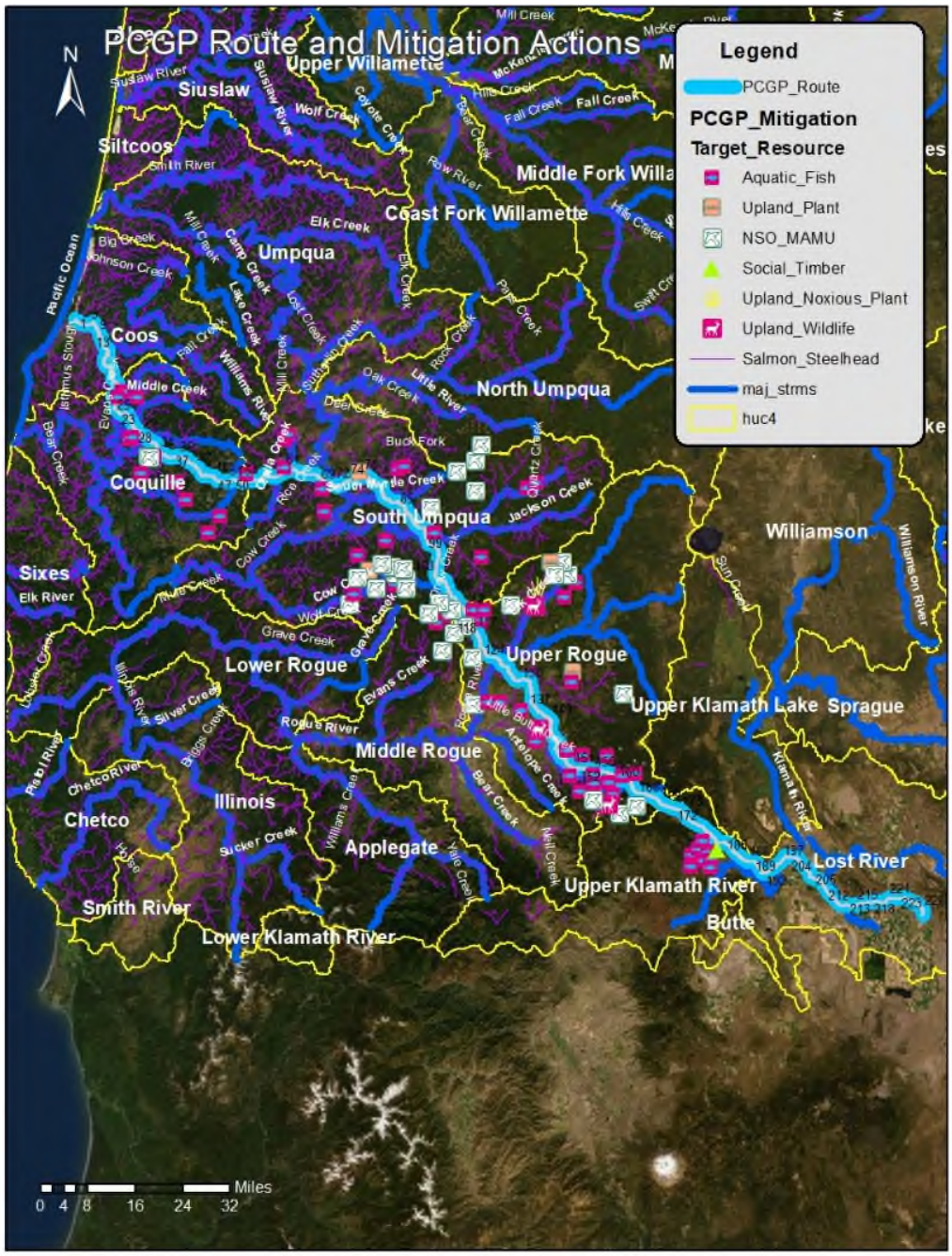


Figure 2. Pacific Connector Gas Pipeline route, HUC 4 delineations and proposed BLM and USFS mitigation projects.

Table 3. Categorizations for habitats/species impacted by the PCGP project; developed within the guidelines of the ODFW Habitat Mitigation Policy (from DRAFT Pacific Connector Gas Pipeline Project Wildlife Habitat Mitigation Plan in Accordance with Oregon Department of Fish and Wildlife OAR 635-415-0000 through 0025; February 13, 2015; Table 3.3.1 pdf pgs 19-20)

| Habitat Type | | Habitat Category | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| **General Habitat Type** | **Habitat sub-type** | **Essential AND Limited AND Irreplaceable** | **Essential AND Limited BUT NOT Irreplaceable** | **Essential BUT NOT Limited OR Important AND Limited** | **Important BUT NOT Limited** | **NOT Important BUT High Restoration Potential** | **NOT Important AND NOT High Restoration Potential** |
| **Estuarine** | | | Coos Bay Estuary/Haynes Inlet<br>• EFH Species<br>• Green Sturgeon (southern DPS)<br>• Oregon Coast Coho (CHU)<br>• Eelgrass<br>• Special Status Species<br>• Species-At-Risk<br>• Native Oysters | | | | |
| **Waterbody / Open Water** | | | Fish-Bearing<br>SONCC Coho CHU<br>Lost River Sucker (CHU)<br>Shortnose Sucker (CHU)<br>Oregon Coast Coho (CHU)<br>Special Status Species Presence<br>Species-At-Risk Presence | Nonfish-Bearing | | | |
| **Wetland** | | Vernal Pool | Non-Forested Wetlands<br>Forested Wetlands<br>Seep- or Spring-fed Wetlands<br>Special Status Species Presence | | | Non-forested Wetlands (Agriculture) | |
| **Coniferous/Mixed Forest** | **Old Growth (175+ years)** | NSO Nest Patch<br>MAMU Occupied Stand<br>MAMU Presumed Occupied Stand | Old-growth Forest<br>NSO CHU - unoccupied<br>MAMU CHU - unoccupied<br>Riparian Management Zone<br>Critical Big Game Winter Range<br>NWFP LSRs<br>NSO Core Area<br>NSO Home Range<br>MAMU Stand (300-foot Buffer)<br>Special Status Species Presence | | | | |
| | **Late Successional (80-175 years)** | NSO Nest Patch<br>MAMU Occupied Stand<br>MAMU Presumed Occupied Stand | Late Successional Forest<br>Riparian Management Zone<br>Critical Big Game Winter Range<br>NWFP LSRs<br>NSO Core Area<br>NSO Home Range<br>MAMU Stand (300-foot Buffer)<br>Special Status Species Presence | | | | |
| | **Mid-Seral (40-80 years)** | NSO Nest Patch<br>MAMU Occupied Stand<br>MAMU Presumed Occupied Stand | NSO CHU<br>MAMU CHU<br>NSO Core Area<br>MAMU Stand (300-foot Buffer)<br>Riparian Management Zone<br>NWFP LSRs<br>Critical Big game Winter Range<br>Special Status Species Presence | Mid-Seral Forest<br>NSO Home Range | | | |
| | **Clear-Cut/Regenerating (0-40 years)** | MAMU Occupied Stand<br>MAMU Presumed Occupied Stand<br>NSO Nest Patch | NSO CHU<br>MAMU CHU<br>Riparian Management Zone<br>NWFP LSRs<br>Critical Big Game Winter Range<br>Special Status Species Presence | NSO Core Area<br>NSO Home Range<br>MAMU Stand (300-foot Buffer) | Regenerating/Clearcut Forest<br>Utility Corridor | | |
| **Deciduous Forest** | | | Mature Oak/Old-Growth Forest | Mid-Seral Forest | Regenerating Forest | | |

Table 3. Continued

| Habitat Type | | Habitat Category | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| General Habitat Type | Habitat sub-type | Essential AND Limited AND Irreplaceable | Essential AND Limited BUT NOT Irreplaceable | Essential BUT NOT Limited OR Important AND Limited | Important BUT NOT Limited | NOT Important BUT High Restoration Potential | NOT Important AND NOT High Restoration Potential |
| | | | Late Successional Forest<br>Riparian Management Zone<br>NSO Core Area – dispersal<br>Critical Big Game Winter Range<br>Special Status Species Presence | NSO Home Range - dispersal | | | |
| **Grasslands** | | | Critical Big Game Winter Range<br>Special Status Species Presence | Grasslands<br>Riparian Management Zone | Utility Corridors<br>Transitional Areas<br>Pasture | | |
| **Shrublands** | | | Critical Big Game Winter Range<br>Special Status Species Presence | Sagebrush Shrublands<br>Riparian Management Zone | Utility Corridors | | |
| **Agriculture** | | | Critical Big Game Winter Range<br>Special Status Species Presence | Riparian Management Zone | | Cultivated Field<br>Tree Farm | |
| **Barren Lands / Unvegetated** | | | Beaches – margins of waterbodies and open water | | | | |
| **Developed** | | | Ditches – fish-bearing<br>Ditches – special status species<br>Special Status Species Presence | | | Roads – to be decommissioned<br>Ditches – dirt or gravel bottom<br>Vegetated land surrounding<br>Urban/Residential structures | Roads – permanent<br>Industrial<br>Quarry<br>Residential/Urban structures<br>Ditch – concrete lined |

Table 4. ODFW evaluation of the PCGP Riparian Forest stream corridor loss associated with the pipeline corridor and proposed BLM and USFS proposed mitigation projects.

| | PCGP Corridor Width Time Zero (ft) | Permanent Width Corridor (ft)[1] | Upslope Perm. Untimbered Strm Aproaches 75ft x2[2] | Total Riparian Timber Loss[3] | Number of Loss of Potential LWD Contribute[4] |
|---|---|---|---|---|---|
| **Stream Riparian Forest Removed # Crossings = 155** | 75 | 50 | 150 | 8073 | 4036 |

***Total Distance of Stream Corridor Removed (ft)*** **14,725**

***Miles*** ***2.79***

***Total tree removal 1/2 distance site potential Tree height*** **8,073**

**Winema NF Riparian Mitigation: 0.5 miles x 12ft corridor x 1 tree every 12 ft = 220 trees producing shade 20yrs post project**

***Mitigation Inequality (Shade)***

***Total tree removal in perpetuity within 1/2 site potential height of stream minus PCGP total Mitigation*** ***6,616***

***50% of trees removed 1/2 distance site potential Tree height[5]*** **3,836**

| | LWD Placed @ time of Contruction # |
|---|---|
| **LWD BMPs OC Coho@ Pipeline Crossings (frm CMP)** | 351 |
| **LWD BMPs SONCC Coho @ Pipeline Crossings (frm CMP)** | 173 |
| **LWD Placed BLM and SFS Mitigation Projects (frm CMP)** | 733 |
| ***Total Mitigation LWD*** | **1,257** |

***Mitigation Inequality (LWD)***

***Tree removal in perpetuity for 50% total trees 1/2 site potential height of stream*** ***2,579***

[1] The PCGP project has indicated a 30ft long-term corridor in Riparian stream crossings. Regrowth of trees to shading height is considered >20yrs; and LWD recruitement 100+yrs on average across zones of the 229 mi pipeline; accordingly ODFW assessed the temporal impacts with an average corridor of 50ft rather than the maximum time zero removal width of 75ft or the long-term recovery to 30ft.

[2] Timbered area lost in pipeline permanent corridor uplslope on both sides of stream crossing Distance is slightly <1/2 the potential tree height, thus trees able to reach stream for LWD contribution and within distance to provide shading

[3] Uses stocking density of riparian area timber on 12ft spacing or a tree every 144ft$^2$

[4] Assumes that 50% of trees removed would potentially fall into or across stream channel at windthrow or senescence age

[5] Trees removed that would potentially contribute LWD through time to stream

*Upland Steep Slope and Pipeline Corridor Sediment Mitigation*

A number of miles of the pipeline will be constructed on slopes that are adjacent to slopes that exceed 50% or on slopes that are over 30%. 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. Klamath basin streams are also vulnerable to impacts from erosion and sediment delivery. Chronic turbidity is a substantive force currently suppressing ecological productivity for salmonids in these watersheds. Mass wasting debris torrents and general erosion are considered a substantial threat to the function of stream habitats for ESA listed and non-ESA listed salmonids, and the wildlife that depend on these fish.

The PCGP will result in timber removal initially that is 95 feet in width. Within the logged corridor of the pipeline, the trenched area will include full excavation of the soil profile and adjacent ground disturbance from heavy equipment. In addition to the PCGP and the associated ROW, numerous access roads will be built to harvest timber and for pipeline construction. These activities will likely create conditions that produce new sources of both acute and chronic sedimentation.

ODFW recognizes that a notable quantity of soil stabilization projects will be implemented during construction of the PCGP. These BMP's are applaudable, but recovery of permanent ground cover vegetation to reach maximum effectiveness will likely take 5-8 years at some locations. After that time the pipeline corridor will be vulnerable long-term to greater soil erosion due to lack of overhead canopy that softens rainfall patterns (Table 5). Additionally, there will be a greater potential for landslides to occur within the corridor due to the lack of timber following construction that currently provides hydrograph buffering through evapotranspiration processes that reduce overall water yield resulting in more modest forces on soils and stream morphology.

Table 5. Debris avalanche erosion in forested, clear-cut, and roaded areas. (Table 5.6 in Swanston and Swanson 1976).

| Site | Period of Record (Years) | Area ($km^2$) | Slides (Number) | Annual debris Avalanche Erosion ($m^3/km^2$) | Rate of debris avalanche erosion relative to forested areas |
|---|---|---|---|---|---|
| **Stequaleho Creek, Olympic Peninsula, Washington (Fiksdal 1974)** | | | | | |
| Forest | 84 | 19.3 | 25 | 71.8 | 1.0 |
| Clearcut | 6 | 4.4 | | | |
| Road | 6 | 0.7 | 83 | 11,825.0 | 165.0 |
| **Alder Creek, western Cascade Range, Oregon (Morrison 1975)** | | | | | |
| Forest | 25 | 12.3 | 7 | 45.3 | 1.0 |
| Clearcut | 15 | 4.5 | 18 | 117.1 | 2.6 |
| Road | 15 | 0.6 | 75 | 15,565.0 | 344.0 |
| **Selected drainages, Coast Mountains, southwest British Columbia** | | | | | |
| Forest | 32 | 246.1 | 29 | 11.2 | 1.0 |
| Clear-cut | 32 | 26.4 | 18 | 24.5 | 2.2 |
| Road | 32 | 4.2 | 11 | 282.5[a] | 25.2 |
| **H.J. Andrews Experimental Forest, western Cascade Range, Oregon (Swanson and Dyrness 1975)** | | | | | |
| Forest | 25 | 49.8 | 31 | 35.9 | 1.0 |
| Clear-cut | 25 | 12.4 | 30 | 132.2 | 3.7 |
| Road | 25 | 2.0 | 69 | 1772.0 | 49.0 |

[a]Calculated from O'Loughlin (1972) with the assumption that the area of road construction inside and outside clear-cuttings was 16% of the area clear-cut.

*Comparison of Proposed BLM and USFS Mitigation and ODFW Mitigation Policy*

Following review of the proposed PCGP mitigation projects (Table 6), ODFW is unable to confirm that mitigation actions will meet the definitions and standards of the ODFW mitigation policy because of:

1) Very limited location information
2) Little or no current condition and or degradative issue information
3) A lack of information on the exact treatment that will provide offset/ecological uplift.

ODFW recommends further development of the mitigation proposals through interagency coordination. Some of the proposed BLM and USFS mitigation projects would be considered by ODFW to meet the threshold of in-kind because they would help to reduce sediment production/delivery to streams and waterways. However, not all projects would meet this threshold. The array of projects includes: road sediment abatement, road drainage, and replacement of failing culverts, which have potential to provide correlative benefit to offset the potential turbidity impacts of the PCGP project corridor and road construction ground disturbance (Table 6). Given the limited information available to ODFW at this time, it is not entirely clear how the proposed projects will achieve the mitigation goals of no net loss and net benefit in habitat quantity and quality.

In Table 6, ODFW field staff used on-the-ground knowledge of habitat conditions within the basins where project impacts will occur, hydrological and upland habitat function for production of fish and wildlife, and a determination of whether and how the proposed mitigation action meets the definitions and standards of the ODFW mitigation policy (although limited by the lack of detailed information). To facilitate rapid review given the short time frame for ODFW comment, ODFW field staff assigned an ecological value of high-, medium-, or low depending on how well the mitigation projects met the definitions in the ODFW mitigation policy. Mitigation designated high ecological value would generate a direct net benefit and replace lost functions and values for the species and habitats impacted by the project. Mitigation actions designated medium ecological value would convey moderate benefit or replacement for the species and habitats impacted by the project, but are somewhat limited by either being out-of-proximity or having some level of failure risk that would require significant design to overcome. Mitigation actions designated as low ecological value are those unlikely to replace or benefit the species and habitats impacted by the project, are often out-of-kind, or involve some unacceptable level of failure risk.

In order to properly assess whether the sediment abatement projects meet the rigor of fully mitigating for impacts, ODFW recommends complete information on the proposed project actions including at a minimum:

1) GPS location and detailed current condition of habitat function(s) or lack thereof
2) Previous land management actions within the HUC 6 of the proposed project that are relevant to the proposed uplift
3) Fish passage status of upstream/downstream reaches from the project area
4) Future land management strategies proposed at the HUC 6 level that may affect performance of the project in the future

Table 6. ODFW ranking of potential effectiveness for BLM and USFS PCGP mitigation Projects.

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| BLM, CB | EF Coquille | Road Resurface | Road Sediment Reduction | S.F. Elk Crk Road Surfacing | Miles | 2.6 | Aquatic/ Fish | Med |
| BLM, CB | EF Coquille | Road Resurface | Road Sediment Reduction | Yankee Run Mainline Road Surfacing | Miles | 2.0 | Aquatic/ Fish | Med |
| BLM, CB | EF Coquille | Road Resurface | Road Sediment Reduction | Yankee Run Spurs Road Surfacing | Miles | 0.9 | Aquatic/ Fish | High |
| BLM, CB | MF Coquille | LWD Instream | Aquatic Habitat | Upper Rock Crk Instream LWD placement | Miles | 2.1 | Aquatic/ Fish | Med |
| BLM, CB | MF Coquille | Road Surfacing | Road Sediment Reduction | Road Surfacing Fall Creek System | Miles | 0.9 | Aquatic/ Fish | Med |
| BLM, CB | MF Coquille | Road Surfacing | Road Sediment Reduction | Bridge Approach paving-Sandy & Jones Creek Rds | Each | 2.0 | Aquatic/ Fish | Med |
| BLM, CB | NF Coquille | LWD Instream | Aquatic Habitat | Woodward and Steinnon Creek Instream Large Wood Placement | Miles | 1.5 | Aquatic/ Fish | Med |
| BLM, CB | NF Coquille | LWD Instream | Aquatic Habitat | Upper NF. Coquille In-Stream LWD | Miles | 2.2 | Aquatic/ Fish | Med |
| BLM, CB | NF Coquille | Road Surfacing | Road Sediment Reduction | Approach paving-Woodward & Alder Creek | Each | 2.0 | Aquatic/ Fish | High |
| BLM, KF | Spencer Crk | Road Closure | Road Sediment Reduction | Spencer Crk Repair Existing Road Closure | Sites | 12.0 | Aquatic/ Fish | Med |
| BLM, KF | Spencer Crk | Road Drainage | Road Sediment Reduction | Spencer Crk Drainage Improvements and Sediment Trap Removal | Sites | 15.0 | Aquatic/ Fish | Med |
| BLM, KF | Spencer Crk | Road Drainage | Road Sediment Reduction | Keno Access Road Repair and Culvert Replacement | Site | 1.0 | Aquatic/ Fish | Med |

Table 6. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| BLM, MD | Big Butte Crk | Road Resurfacing | Road Sediment Reduction | Big Butte Crk Road | Miles | 6.4 | Aquatic/ Fish | Med |
| BLM, MD | Little Butte Crk | Fish Passage | Fish Passage | Little Butte Crk Fish Screen | Site | 1.0 | Aquatic/ Fish | Med |
| BLM, MD | Little Butte Crk | LWD Instream | Aquatic Habitat | Little Butte Crk LWD | Miles | 8.6 | Aquatic/ Fish | Med |
| BLM, MD | Little Butte Crk | Road Decommissio ning | Road Sediment Reduction | Little Butte Crk Rd Decom; Butte Falls RA | Miles | 2.4 | Aquatic/ Fish | High |
| BLM, MD | Little Butte Crk | Road Surface Drainage Enhancement | Road Sediment Reduction | Little Butte Crk Rd Improvement | Miles | 3.5 | Aquatic/ Fish | Med |
| BLM, MD | Little Butte Crk | Road Surfacing | Road Sediment Reduction | Road Resurfacing (Butte Falls | Miles | 9.4 | Aquatic/ Fish | Med |
| BLM, MD | Little Butte Crk | Road Surfacing | Road Sediment Reduction | Road Resurface (Ashland RA) | Miles | 9.0 | Aquatic/ Fish | Med |
| BLM, MD | Shady Cove RR | LWD Instream | Aquatic Habitat | Shady Cove LWD | Miles | 2.5 | Aquatic/ Fish | Med |
| BLM, MD | Shady Cove RR | Road Drainage and Surface Enhancement | Road Sediment Reduction | Shady Cove Road Improvement | Miles | 1.3 | Aquatic/ Fish | Med |
| BLM, MD | Shady Cove RR | Road Surfacing | Road Sediment Reduction | Shady Cove Road Resurface | Miles | 1.5 | Aquatic/ Fish | Med |
| BLM, MD | Trail Crk | LWD Instream | Aquatic Habitat | Trail Crk LWD | Miles | 2.6 | Aquatic/ Fish | Med |
| BLM, MD | Trail Crk | Road Decommissio ning | Road Sediment Reduction | Trail Crk Road Decom | Miles | 2.7 | Aquatic/ Fish | Med |
| BLM, MD | Trail Crk | Road Stormproofing | Road Sediment Reduction | Trail Crk Road Stormproofing | Miles | 4.3 | Aquatic/ Fish | Med |
| BLM, MD | Trail Crk | Road Surfacing | Road Sediment Reduction | Trail Crk Rd Resurfacing | Miles | 16.3 | Aquatic/ Fish | Med |
| BLM, RD | MF Coquille | Road Surfacing and Cross Drain Replacement | Road Sediment Reduction | Dice, Boulder, and Twelvemile Crk Rds | Miles | 8.0 | Aquatic/ Fish | Med |

Table 6. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| BLM, RD | MF Coquille | Fish Passage | Fish Passage | Boulder Crk and Battle Crk clvrt replacement | Miles | 2.0 | Aquatic/ Fish | Med |
| BLM, RD | MF Coquille | LWD Instream | Aquatic Habitat | Middle Fk Coquille LWD | Miles | 0.6 | Aquatic/ Fish | High |
| BLM, RD | MF Coquille | Road Drainage and Surface Enhancement | Road Sediment Reduction | Camas Mtn Road Drainage and Surface Enhancement | Miles | 3.5 | Aquatic/ Fish | Med |
| BLM, RD | MS Umpqua | Road Drainage | Road Sediment Reduction | E.F. Willis Crk Tributary Clvrt Replacement | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | MS Umpqua | Fish Passage | Fish Passage | McNabb Crk Box Clvrt (Fish Passage) | Site | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | MS Umpqua | Road Drainage | Road Sediment Reduction | Judd Crk Clvrt Replacement | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | Myrtle Crk | Fish Passage | Fish Passage | Slide Crk Clvrt Replacment | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | Myrtle Crk | Road Stabilization | Road Sediment Reduction | South Myrtle Hill Slide Repair | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | Myrtle Crk | Road Drainage and Surface Enhancement | Road Sediment Reduction | Slide Crk Rd Drainage and Surface Enhancement | Miles | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | Ollala_Looki ng-glass | Culvert Replacement | Aquatic Habitat and Road Sediment | Unnamed Tributary to Lower Ollala Crk | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | Ollala_Looki ng-glass | Road Stabilization | Road Sediment Reduction | Ollala Tide Road Renovation | Project | 1.0 | Aquatic/ Fish | Med |
| BLM, RD | South Umpqua River | Fish Passage | Fish Passage | Beal Creek Culvert Replacement | Sites | 2.0 | Aquatic/ Fish | Med |
| BLM, RD | South Umpqua River | LWD Instream | Aquatic Habitat | West Fork Canyon Crk LWD and Boulder Placement | Miles | 0.8 | Aquatic/ Fish | High |
| BLM, RD | South Umpqua River | Culvert Replacement | Road Sediment Reduction | Corn Creek | Project | 1 | Aquatic/ Fish | Med |
| BLM, RD | South Umpqua River | Road Drainage and Surface Enhancement | Road Sediment Reduction | South Umpqua Road Draianage and Surface Enhancement | Miles | 10 | Aquatic/ Fish | Med |

Table 6. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Umpqua NF | South Umpqua River | Road Stormproofing | Road Sediment Reduction | 31-4-3.2 Road Storm proofing | Project | 1 | Aquatic/ Fish | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Fish Passage | Aquatic and Riparian Habitat | Elk Crk Fish Passage Culverts | Sites | 5 | Aquatic/ Fish | Med |
| USFS Umpqua NF | Elk Crk-South Umpqua | Road Storm Proofing | Road Sediment Reduction | Elk Crk Road Storm-proofing | Miles | 9.2 | Aquatic/ Fish | Med |
| USFS Umpqua NF | Trail Crk | Road Decommissioni ng | Road Sediment Reduction | Trail Crk Road Decomissioning | Miles | 0.3 | Aquatic/ Fish | Med |
| USFS Umpqua NF | Trail Crk | Road Storm proofing | Road Sediment Reduction | Trail Crk Road Stormproofing | Miles | 2.2 | Aquatic/ Fish | Med |
| USFS Umpqua NF | Upper Cow Crk | Fish Passage | Aquatic and Riparian Habitat | Upper Cow Crk Fish Passage Culverts | Sites | 6 | Aquatic/ Fish | Med |
| USFS Umpqu a NF | Upper Cow Crk | Fish Passage | and Riparian Habitat | Upper Cow Crk Fish Passage Culverts | Sites | 6 | Aquatic/ Fish | Med |
| USFS Rogue River NF | Little Butte Crk | LWD Instream | Aquatic and Riparian Habitat | South Fork Little Butte Crk LWD | Mile | 1.5 | Aquatic/ Fish | Med |
| USFS Rogue River NF | Little Butte Crk | Stream Crossing Repair | Aquatic and Riparian Habitat | Road Decommissionin g | Sites | 32 | Aquatic/ Fish | Med |
| USFS Rogue River NF | Little Butte Crk | Road Decommissiong | Road Sediment Reduction | Little Butte Crk Road Decommissionin g | Miles | 57.5 | Aquatic/ Fish | High |
| USFS Winema NF | Spencer Crk | Riparian Planting | Aquatic and Riparian Habitat | Spencer Crk Riparian Planting | Miles | 0.5 | Aquatic/ Fish | Low |
| USFS Winema NF | Spencer Crk | Riparian Fencing | Aquatic and Riparian Habitat | Spencer Crk Fencing | Miles | 0.5 | Aquatic/ Fish | Med |

Table 6. Continued

| Admin Unit | Watershe | Proj Type | Mitgation Group | Project Name | Unit | Qty | Targeted Resource | Ecological Score High-Med-Low |
|---|---|---|---|---|---|---|---|---|
| USFS Winema NF | Spencer Crk | LWD Instream | Aquatic and Riparian Habitat | Spencer Creek Ford Hardening | Sites | 1 | Aquatic/ Fish | High |
| USFS Winema NF | Spencer Crk | Stream Crossing Repair | Aquatic and Riparian Habitat | Stream Crossing Repair | Sites | 25 | Aquatic/ Fish | Med |
| USFS Winema NF | Spencer Crk | Road Decomissioning | Road Sediment Reduction | Spencer Crk Road Decomissioning | Miles | 29.2 | Aquatic/ Fish | Med |
| USFS Winema NF | Spencer Crk | Stand Density Reduction | Visuals | Clover Crk Visual Mngmnt | Acres | 114 | Social | Med |

**Literature Cited**


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**Protest Submitted on behalf of the Oregon Department of Fish and Wildlife by:**

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Jesse D. Ratcliffe
Assistant Attorney General, OSB # 043944
Natural Resources Section | General Counsel Division
Oregon Department of Justice
1162 Court St. NE
Salem, OR 97301
t. (503) 947-4549