APPENDIX H

Late Successional Reserves Crossed by the PCGP Project

Jordan Cove Natural Gas Liquefaction and Pacific Connector Gas Pipeline Project

Final EIS

Appendix H

Late Successional Reserves Crossed by PCGP Project

Pacific Connector Gas Pipeline

Coos Bay, Roseburg, and Medford Districts and Klamath Falls Resource Area, Lakeview District, BLM Oregon; Umpqua, Rogue River, and Winema National Forests

Prepared for:

USDI Bureau of Land Management

USDA Forest Service

Prepared by:

North State Resources

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1.0 INTRODUCTION

The 1994 Northwest Forest Plan (NWFP) Record of Decision (ROD) created a new land use allocation called the Late-Successional Reserve (LSR). LSRs were designed to maintain late-successional (mature or old-growth) forests in a well-distributed pattern across federal lands within the range of the NSO (Mouer et al. 2011). The NWFP contained standards and guidelines for LSRs. As defined in the NWFP ROD, these standards and guidelines constitute the "rules and limits governing actions, and the principles specifying the environmental conditions or levels to be achieved" in each LSR (USDA and USDI 1994, page F-4).

The proposed Pacific Connector Gas Pipeline (PCGP) project would cross four Bureau of Land Management (BLM) districts and three U.S. Forest Service (Forest Service) national forests. The Resource Management Plans (RMPs) for the BLM districts that would be crossed by the PCGP project—Coos Bay, Roseburg, Medford, and Klamath Falls Resource Area of the Lakeview District—were approved in 1995 after the ROD for the NWFP was signed and, therefore, explicitly incorporated the LSR designation and related standards and guidelines. The land and resource management plans (LRMPs) of the three national forests that would be crossed by the PCGP project—Rogue River, Umpqua, and Winema—were amended by the NWFP to include LSR designations and standards and guidelines.

In crossing these federal lands, the PCGP project would traverse portions of three large (mapped) LSRs, RO-223 (223), RO-227 (227), and RO-261 (261), located in the Coos Bay and Roseburg Districts of the BLM and the Umpqua and Rogue River National Forests. Specifically, a portion of LSR 261 is in the Coos Bay District, portions of LSRs 261 and 223 are in the Roseburg District, portions of LSR 223 are in the Umpqua National Forest, and portions of LSR 227 are in the Rogue River National Forest. The proposed project would also cross several smaller (unmapped) LSRs in the Coos Bay and Roseburg Districts of the BLM, based on presence of marbled murrelet (MAMU) habitat and/or known owl activity centers (KOACs) outside mapped LSRs. For development proposals like the PCGP project, the LSR standards and guidelines state that pipelines should be planned to have the least possible adverse impacts on LSRs (USDA and USDI 1994, page C-17). The standards and guidelines also state that these types of proposals will be reviewed on a case-by-case basis and may be approved when adverse effects can be minimized and mitigated.

To meet this direction, the federal agencies (BLM and the Forest Service) have provided input to the project proponent regarding project design. First, in routing the proposed PCGP project, LSRs have been avoided where possible. Second, where impacts to LSRs are unavoidable, onsite "Design Features" or "Project Requirements"[1] have been developed to minimize the impacts. Third, in order to ensure that the objectives would continue to be achievable in these LSRs, land reallocations are being proposed as part of a substantial off-site mitigation package. These proposed land reallocations would take non-LSR (i.e., matrix) lands and designate them as LSRs. The reallocations will require amendments to the RMPs for the Coos Bay and Roseburg

[1] The BLM, Forest Service, and Reclamation use the term "Design Features" or "Project Requirements" rather than "mitigation" to describe elements of a plan that occur within a project area and are standard requirements of a project. The BLM and Forest Service reserve the term "mitigation" to describe measures taken to reduce or compensate for otherwise unavoidable impacts. The term "mitigation" as used elsewhere in this report refers to the full range of activities designed to reduce adverse effects of the Project.

Districts of the BLM and the LRMPs for the Umpqua and Rogue River National Forests. These proposed mitigation actions and related plan amendments for LSRs are a primary focus of this report.

1.1 REPORT FORMAT

1.1.1 Purpose

The purpose of this technical report is to provide the information necessary to support findings by agency decision-makers regarding impacts of the proposed PCGP project to the LSRs that the pipeline would cross. The Federal Land Policy and Management Act (FLPMA) of 1976 and the National Forest Management Act (NFMA) of 1976 require projects or other management activities on BLM- and Forest Service-managed lands to be consistent with the relevant land management plans. This means that decision makers must determine whether BLM and Forest Service actions to amend the relevant land management plans to reallocate non-LSR lands to LSR lands and the BLM decision (with Forest Service concurrence) to issue a right-of-way grant for the project are consistent with the standard and guidelines for new developments in LSRs.

1.1.2 Approach

Section 1 of this report provides background on the NWFP and the development of the LSR designation as part of the overall strategy to maintain healthy forest ecosystems that will support populations of native species associated with late-successional and old-growth (LSOG) forests. Included are overviews of the LSR components and standards and guidelines, as well as a summary of the content and role of Late-Successional Reserve Assessments (LSRAs).

Section 2 provides an evaluation, organized by BLM and Forest Service unit, of PCGP project impacts and related mitigation actions in individual LSRs. Each LSR evaluation includes a summary of relevant information from the associated LSRA, updated, as appropriate, with any significant new information. This section also includes an evaluation of proposed off-site mitigation actions and related plan amendments for each affected LSR and their impacts, if any, on attainment of LSR objectives. Finally, Section 2 describes the effects of the proposed mitigation actions and plan amendments on projected outputs of the land management plans, and, for LRMPs, the significance of any changes to the delivery of goods or services.

Section 3 of this report lists the experience and association of the report preparers, and Section 4 provides the references cited in this report.

1.1.3 Agency Use

As cooperating agencies, the BLM and Forest Service will use information in this report to prepare the portions of the PCGP Project Environmental Impact Statement (EIS) that are relevant to proposed agency actions.

The BLM will use the information in this report in considering whether or not to approve LSR-related amendments to the relevant RMPs. The BLM will also use this information in considering whether or not to grant a right-of-way for the project.

The Forest Service will use the information in this report in making its decision to approve or not approve LSR-related amendments to the relevant LRMPs, in its finding of whether or not those

amendments would constitute significant changes under the NFMA, and in its decision regarding concurrence in BLM's granting of a right-of-way for the project.

1.2 LATE SUCCESSIONAL RESERVES

1.2.1 Background

In the 1980s, public controversy intensified over timber harvesting of LSOG forests; declining populations of LSOG-related species such as the northern spotted owl (NSO) and marbled murrelet (MAMU), which are both listed as threatened under the Endangered Species Act (ESA); and the role of federal forests in regional and local economies. Litigation and court injunctions on harvesting of LSOG forests on federal land resulted in gridlock for federal timber sales and economic impacts to communities dependent on the timber resource. Congress, seeking a permanent solution to the gridlock, commissioned a group of scientists to develop and evaluate different strategies for protecting LSOG forests on federal lands within the range of the NSO. This scientific team mapped areas of significant LSOG forests and developed several strategies for protecting them (Scientific Panel on Late-Successional Forest Ecosystems 1991). The turmoil ultimately led to President Clinton's convening a Forest Conference in Portland, Oregon, on April 2, 1993, to address the human and environmental needs served by federally managed forests in Washington, Oregon, and northern California (Mouer et al. 2011). Following the conference, an interagency team of scientists, economists, sociologists, and others—the Forest Ecosystem Management Assessment Team or FEMAT—was assembled to develop proposals for the management of over 24 million acres of public land within the range of the NSO.

On July 1, 1993, President Clinton announced his forest plan for a sustainable economy and a sustainable environment (Clinton and Gore 1993). During the same month, FEMAT issued its report, "Forest Ecosystem Management: An Ecological, Economic and Social Assessment" (FEMAT 1993), which provided the framework for subsequent National Environmental Policy Act (NEPA) decision-making. Over the next year, NEPA analyses were completed, and an EIS was developed. The ROD associated with this EIS was signed in 1994, implementing new management direction for the public lands within the range of the NSO (USDA and USDI 1994). The ROD amended existing management plans for 19 national forests and seven BLM districts in California, Oregon, and Washington. The ROD and accompanying standards and guidelines are commonly referred to as the Northwest Forest Plan. The ROD for the Final EIS is available at http://www.reo.gov/library/reports/newroda.pdf, and the standards and guidelines are available at http://www.reo.gov/library/reports/newsandga.pdf.

The NWFP established the following objectives for the land use allocations and standards and guidelines (USDA and USDI 1994, page 3):

- Comply with the requirements of federal law.
- Be based on the best available science and be ecologically sound.
- Protect the long-term health of federal forests.
- Provide for a steady supply of timber and non-timber resources that can be sustained over the long term without degrading forest health or other environmental resources.

The NWFP standards and guidelines created new land use allocations that overlay existing management directions in the relevant land management plans (USDA and USDI 1994). These plans, as amended, are consistent with all management directions in the NWFP regarding the

proposed PCGP project. The standards and guidelines in the current BLM and FS management plans apply where they are more restrictive or provide greater benefits to late-successional forest related species than other provisions of the standards and guidelines in the NWFP (USDA and USDI 1994, page C-2).

The NWFP allocated a network of LSR reserves to conserve species of concern within the existing configuration of land ownership and the location of remaining LSOG forests within the range of the NSO. The reserve network is embedded in a matrix of "working" forests and was designed to maintain LSOG forests in a well-distributed pattern across these federal lands (Mouer et al. 2011).

The LSR network is composed primarily of areas of large (mapped) reserves, but also includes smaller areas of "unmapped" reserves that are composed of sites occupied by MAMUs or are known NSO activity centers. The LSR standards and guidelines are designed to guide management activities occurring within these LSRs to protect and enhance the conditions of the LSOG forest ecosystems contained therein (USDA and USDI 1994). The proposed PCGP project would cross three mapped LSRs (223, 227, and 261).

1.2.2 LSR Objectives/Goals

The overall objective of the LSR network is to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG-related species, including the listed NSO and marbled murrelet. The reserves are designed to help achieve the following goals (USDA and USDI 1994, page B-4):

- Promote a distribution, quantity, and quality of LSOG forest habitat sufficient to avoid foreclosure of future management options.
- Provide habitat for populations of species associated with LSOG forests.
- Help ensure that LSOG species diversity will be conserved.

The LSR land allocations and standards and guidelines have been specifically designed to help achieve the goals listed above.

1.2.3 LSR Elements

In 1994, the standards and guidelines for the NWFP described five elements that were used to designate LSRs.

> Late-Successional Reserves have been designated based on five elements: (1) areas mapped as part of an interacting reserve system; (2) LS/OG 1 and 2 areas within Marbled Murrelet Zone 1, and certain owl additions, mapped by the Scientific Panel on Late-Successional Forest Ecosystems (1991); (3) sites occupied by marbled murrelets; (4) known owl activity centers; and (5) Protection Buffers for specific endemic species identified by the Scientific Analysis Team (SAT) (1993). (USDA and USDI 1994b, page C-9)

Today, elements (1) and (2) are commonly referred to as "mapped" LSRs, and elements (3) and (4) are commonly referred to as "unmapped" LSRs. Although element (5), protection buffers, was originally part of the LSR network, it was later removed by the 2001 ROD for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and

Guidelines (USDA and USDI 2001b). The 2001 ROD retained the direction to manage known sites of protection buffer species but removed their designation as small, species-specific LSRs.

1.2.4 Mapped LSRs

Most LSR areas are mapped. The LSR network includes approximately 7.4 million acres or about 30 percent of the area covered by the NWFP. Several factors were considered in designating these reserves, including key watersheds and significant areas of old-growth forest that had previously been identified (USDA and USDI 1994b). These included LS/OG 1 and 2 areas (most ecologically significant, and ecologically significant late-successional and old-growth forests, respectively) identified by the Scientific Panel on Late-Successional Forest Ecosystems (Johnson et al. 1991). Maps of the LSR network are available at the following website: http://www.reo.gov/gis/data/gisdata/index.htm. Maps of the LSRs that would be crossed by the PCGP project are included in Section 2 of this report.

1.2.5 Unmapped LSRs

Unmapped LSRs include sites occupied by MAMUs and known NSO activity centers. For MAMUs, surveys are required for projects that occur within MAMU habitat to determine if there is occupation within the project area. If occupation is documented, all contiguous existing and recruitment habitat within a 0.5-mile radius is to be protected and managed by the standards and guidelines for LSRs. The standards and guidelines for LSRs also apply to known spotted owl activity centers (as of January 1, 1994) located in matrix or Adaptive Management Areas of the NWFP. Activity centers are defined as an area of concentrated activity of either a pair of spotted owls or a territorial single owl. Each KOAC has a 100-acre area identified around or near the activity center, where the standards and guidelines for LSRs apply (USDA and USDI 1994b). Areas of unmapped LSRs affected by the PCGP project are discussed in Section 2 of this report.

It should be noted that the term “unmapped” LSR is being used to distinguish the LSR areas represented by occupied MAMU stands and KOACs from the larger “designated” or “mapped” LSRs in the NWFP. However, with implementation of the NWFP these areas are mapped and are managed under the standards and guidelines for LSR. It should also recognized that other terms are used by the agencies to refer to these areas including the terms LSOG 3 and 4 areas as well as LSR 3 and 4 areas. The term “unmapped” LSR is used in this report because it was the term used in the NWFP and is a consistent way to identify and discuss these LSR areas.

1.2.6 LSR Standards and Guidelines

The standards and guidelines for LSRs are contained in Attachment C (pages C-9 through C-21) of the NWFP ROD. They are designed to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG species. They are written to apply to specific management actions such as silviculture, range management, mining, new developments, etc., and should be interpreted in that context.

The standards and guidelines that apply to new developments such as pipelines are addressed on page C-17 of the NWFP standards and guidelines.

> “Developments of new facilities that may adversely affect Late-Successional Reserves should not be permitted. New development proposals that address public needs or provide significant public benefits, such as powerlines, pipelines,

> reservoirs, recreation sites, or other public works projects will be reviewed on a case-by-case basis and may be approved when adverse effects can be minimized and mitigated. These will be planned to have the least possible adverse impacts on Late-Successional Reserves. Developments will be located to avoid degradation of habitat and adverse effects on identified late-successional species."

The LSR standards and guidelines provide the framework upon which the proposed LSR mitigation actions and related plan amendments for the PCGP project are evaluated.

1.2.7 LSRAs

The LSR standards and guidelines specify that management assessments be prepared for each large LSR (or groups of smaller LSRs) before habitat-disturbing projects are allowed to occur in these areas. The standards and guidelines (page C-11 of the NWFP ROD, USDA and USDI 1994) directed that these LSRAs include:

> "(1) a history and inventory of overall vegetative conditions within the reserve, (2) a list of identified late-successional associated species within the reserve, (3) a history and description of current land uses within the reserve, (4) a fire management plan, (5) criteria for developing appropriate treatments, (6) identification of specific areas that could be treated under those criteria, (7) a proposed implementation schedule tiered to higher order (i.e., larger scale) plans, and (8) proposed monitoring and evaluation components to help evaluate if future activities are carried out as intended and achieve desired results."

The BLM and the Forest Service use LSRAs to better understand the existing conditions in the LSRs, develop criteria for appropriate treatments, and identify and prioritize actions that would further LSR objectives. The NWFP directed that LSRAs would be subject to review by the Regional Ecosystem Office (REO). The REO provides staff work, support, and recommendations to the Regional Interagency Executives concerning the implementation of the NWFP (USDA and USDI 1994, page E-16). The standards and guidelines for LSRs also require REO review of projects in LSRs, such as thinning of trees, prescribed fire, salvage of dead trees, and others (USDA and USDI 1994, page C-12 through C-19). Once an LSRA has been reviewed by the REO, projects that are determined to be in conformance with relevant project criteria in the LSRA are exempt from further REO review. It is also intended that LSRAs be treated as 'living' assessments that should be updated over time as new data become available, conditions change (e.g., due to fires), and projects are implemented and monitored.

The three LSRAs relevant to the LSRs that would be affected by the PCGP project include the South Coast – Northern Klamath LSRA for LSR 261 (May 1998), the South Cascades LSRA for LSR 227 (April 1998), and the South Umpqua River/Galesville LSRA for LSR 223 (July 1999). These assessments are discussed in further detail in Section 2 of this report and are available at the following website: http://www.reo.gov/lsr/assessments/

2.0 LATE SUCCESSIONAL RESERVES CROSSED BY THE PCGP PROJECT

2.1 OVERVIEW

2.1.1 Energy Transmission on Federal Lands

By law, energy transmission can be a legitimate use of public land. The U.S. Congress has determined that public lands, including BLM and Forest Service lands, play a significant role in energy development and transmission. This intent has been expressed in legislation that dates back to the Mineral Leasing Act of 1920. Because federal lands are so extensive in the Pacific Northwest, it would be practically impossible to avoid them and still construct interstate power transmission lines or natural gas pipelines that connect to distribution hubs. If utility corridors could not cross public lands, the impacts on private lands from easements would increase, and overall costs resulting from longer, more indirect routes would also increase. These costs would be ultimately carried by the public.

While the BLM and Forest Service have a mission to manage public lands, the Federal Energy Regulatory Commission (FERC) determines where and when new energy sources and transmission facilities can be developed. FERC is also the federal agency responsible for authorization of natural gas pipelines and certain other types of energy projects. Construction and operation of public utilities like the PCGP project are regulated by FERC to ensure that public interests are protected. If FERC has accepted an application from a utility company to cross public land, Congress, through the 2005 Energy Policy Act (EPAct), has directed the responsible agencies to coordinate with FERC to process applicaitons required to construct the project. The 2005 EPAct reinforced Executive Order (EO) 13212 issued May 18, 2001, which directed federal agencies to take appropriate actions, consistent with applicable law, to expedite reviews of applications for energy-related projects and to take other action necessary to accelerate the completion of such projects while maintaining safety, public health and environmental protections. To facilitate EO 13212, the Secretaries of Agriculture, Interior, and Energy and other federal agencies have agreed, through a formal Memorandum of Understanding (Interagency MOU, 2002), to coordinate their efforts and to cooperate in the expeditious processing of applications for construction of natural gas pipelines.

The underlying need for action of the PCGP project is for FERC to respond to the June 6, 2013, application to authorize the Jordan Cove export terminal (and PCGP), and for the BLM to respond to a right-of-way grant application originally filed by Pacific Connector on April 17, 2006. The right-of-way grant would allow Pacific Connector to construct, operate, maintain and eventually decommission a natural gas pipeline that would cross lands and facilities administered by the BLM, BOR, and the Forest Service. In addition there is a need for the BLM and Forest Service to consider amending affected district and forest land management plans to make provision for the PCGP right-of-way.

FERC will analyze the environmental consequences of the construction and operation of the proposed PCGP project in its EIS. The BLM and Forest Service have identified the specific sections of their RMPs and LRMPs that would need to be amended to make provision for the proposed project. The BLM and Forest Service will independently evaluate the proposed RMP and LRMP amendments, considering the overall balance of the goals and objectives and goods and services in each RMP/LRMP using the NEPA process as required by the planning regulations of each agency. The BLM and Forest Service will use FERC's consolidated public

record for description and analysis of environmental consequences associated with construction and operation of the PCGP project. The proposed RMP/LRMP amendments will be included and evaluated as part of FERC EIS. With the exception of land allocation changes that would reallocate acres of Matrix to LSR, the amendments are site-specific, and would apply only to this proposed project. This report evaluates the proposed RMP/LRMP amendments that are related to LSRs.

2.1.2 The Proposed PCGP Project on BLM and Forest Service Lands

The proposed project would cross about 71 miles of land managed by the BLM or Forest Service. The pipeline would cross four BLM districts (Coos Bay, Roseburg, Medford, and the Klamath Falls Resource Area of the Lakeview District) for a total of approximately 40 miles. The proposed pipeline would also cross three national forests (Rogue River, Umpqua, and Winema) for a total of approximately 31 miles.

The mapped LSRs that would be crossed are depicted on figure 2.1-1. The proposed project would affect mapped LSRs on four of the seven BLM and Forest Service units: the Coos Bay and Roseburg Districts for the BLM, and the Rogue River and Umpqua National Forests for the Forest Service. Several unmapped LSR areas would also be affected in the Coos Bay and Roseburg Districts of the BLM. These unmapped LSRs are depicted in figures 2.1-2 and 2.1-3. Table 2.1.2-1 and figure 2.1-4 provide an overview of the number of acres that would be directly affected by the PCGP project within LSRs on each affected unit of the BLM and Forest Service. Direct effects would occur in the areas that would be cleared (i.e., forest vegetation would be cleared) for the pipeline right-of-way and the temporary extra work areas (TEWAs). Direct effects would also occur in acres that would be "modified" by the PCGP project. These acres include uncleared storage areas (UCSAs) that would not be cleared of trees during construction. These areas would be used to store forest slash, stumps, and dead and downed log materials that would be scattered across the right-of-way after construction, which would be considered temporary habitat modifications.

Indirect effects from construction of the pipeline are also expected within LSRs that have interior forest that the MAMU and NSO rely on for nesting habitat. The conversion of large tracts of LSOG forest to small, isolated forest patches with large edge areas can create changes in microclimate, vegetation species, and predator-prey dynamics. Such edge effects – magnitude of changes over distance from the edge to forest interior – will depend on the general orientation to the sun. Two main physical factors affecting and creating an edge microclimate are sun and wind (Forman 1995; Chen et al. 1995, Harper et al. 2005). Together, sun and wind: 1) desiccate leaves by increasing evapotranspiration; 2) influence which plant species survive and thrive along the edge, usually favoring shade intolerant species; and 3) impact the soil, insects, and other animals along the edge. Compared to the forest interior, areas near edges receive more direct solar radiation during the day, lose more long-wave radiation at night, have lower humidity, and receive less short-wave radiation. However, such effects are dependent on such local conditions as orientation of an edge: the magnitudes of change in humidity with distance from an edge are most extreme with south-facing edges, compared to east- and west-facing edges (Chen et al. 1995). These effects would vary along the pipeline route as a function of route orientation and the facing direction of each edge. Because the Pacific Connector pipeline generally trends from northwest to southeast, edge effects would be most pronounced on the southwest-facing edges and weakest along the northeast-facing edges. Fundamental changes in the microclimate

(moisture, temperature, solar radiation) of a stand have been recorded greater than 700 feet from the forest edge (Chen et al. 1995).

Using recommendations from the ESA Sub-Task Group and Habitat Quality Subtask Group[2], indirect effects are considered to extend for 100 meters from the created edge in LSOG forest. In making their recommendation the sub-task groups considered the study done by Karen A. Harper et al, which looked at edge influence on forest structure in fragmented landscapes (Harper et al 2005). The study reviewed the effects caused by forest edges on multiple response variables including: 1) forest processes of tree mortality/damage, recruitment, growth rate, canopy foliage, understory foliage, and seedling mortality, 2) forest structure by canopy trees, canopy cover, snags and logs, understory tree density, herbaceous cover, and shrub cover, and 3) stand composition by species, exotics, individual species and species diversity. The study found that the mean distance of edge influence on any single response variable did not exceed 300 feet (100 meters). Therefore, indirect effects for the project are estimated to extend for 100 meters beyond the cleared area on each side of the corridor in LSOG forest habitat. There is no corresponding research for edge effects in younger forest stands (less than 80 yrs. old). There is however research that indicates indirect effects extend out approximately two times the average tree height (Morrison et al 2002). Based on this an estimate of 30 meters is used in non-LSOG forest habitat. In non-forested areas, no indirect effects are estimated since no new edge would be created. Table 2.1.2-2 and figure 2.1-5 provide a summary of the total number of LSR acres that would be directly and indirectly affected on BLM and Forest Service lands by the PCGP project.

The construction, operation, and maintenance of the proposed PCGP project would affect LSRs on federal lands in several ways. It would remove and fragment LSOG forest habitat that some vertebrate and invertebrate species are dependent on. It would directly affect individuals of species listed as threatened under the ESA (NSO and MAMU) through removal of suitable nesting, roosting, and foraging habitat for the NSO and the removal of suitable or potential nesting habitat for the MAMU. The indirect effects discussed above would result in the loss of interior LSOG forest habitat and increased predation. These impacts and others from the proposed construction, operation, and maintenance of the PCGP project on LSRs are discussed in sections 4.3, 4.4, 4.5, 4.6, and 4.7 of the FERC Final EIS and in FERC-prepared biological assessments (BAs). In addition to the direct and indirect effects of the project the FERC FEIS also addresses the cumulative impacts in section 4.14. This analysis includes other actions proposed on federal lands. The analysis in this report focuses on how the proposed amendments and mitigation actions would affect the LSR land allocation in terms of the distribution, quantity and quality of LSOG habitat, and how the reallocation of matrix lands to LSR may impact expected timber outputs in the land use plans.

[2] These sub-task groups were part of an Interagency Task Force, which included representatives of the FWS and NMFS, as well as USFS, BLM, ODLCD, ODE, ODSL, COE, ODFW, EPA, and ODEQ, to obtain specific input, guidance, and technical approach reviews. Agencies participating in the Interagency Task Force reviewed information provided by Jordan Cove Energy and Pacific Connector Gas Pipeline.

Figure 2.1-1. Overview Map of the PCGP Project and LSRs on BLM and USFS Lands

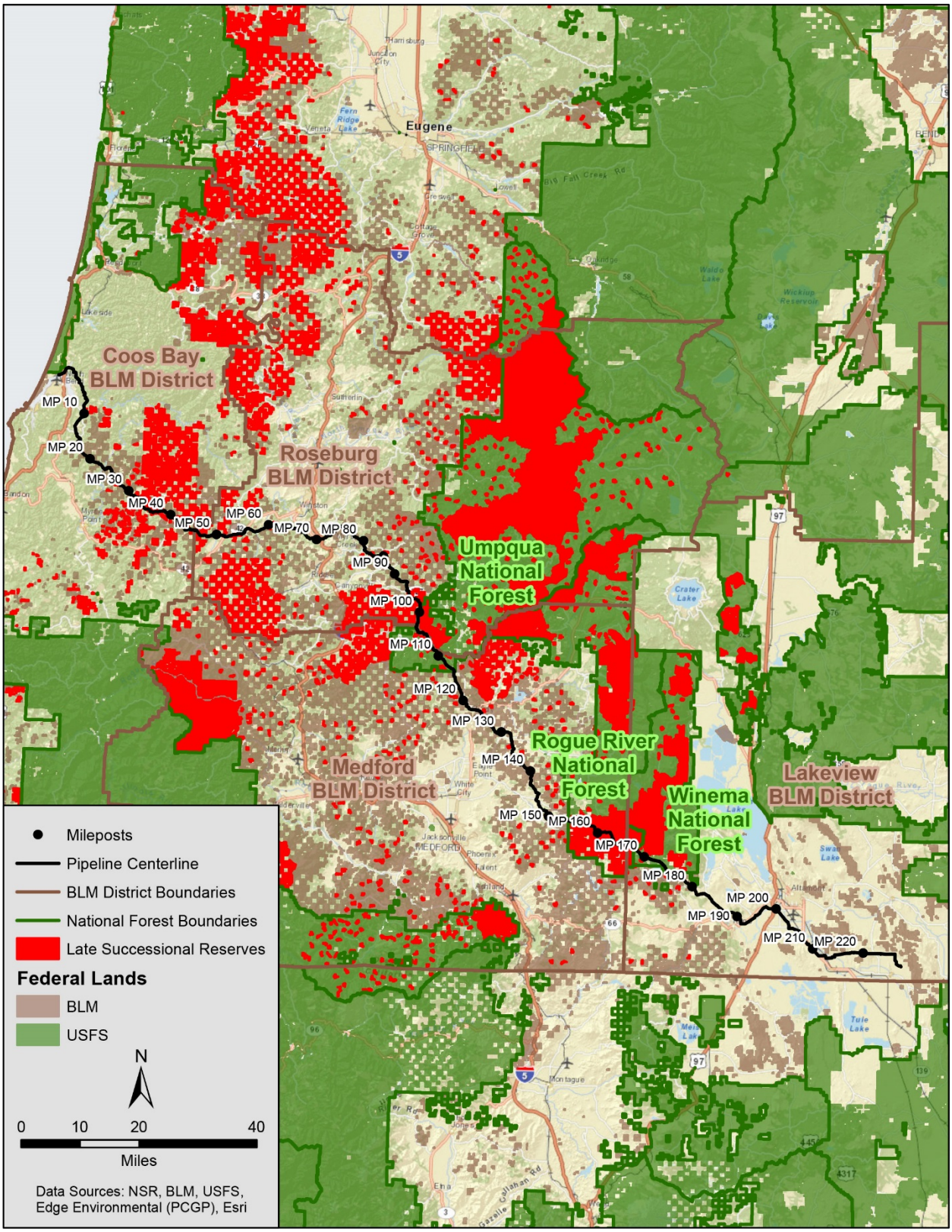


Figure 2.1-2. Occupied MAMU Stands Crossed by the Proposed PCGP Project

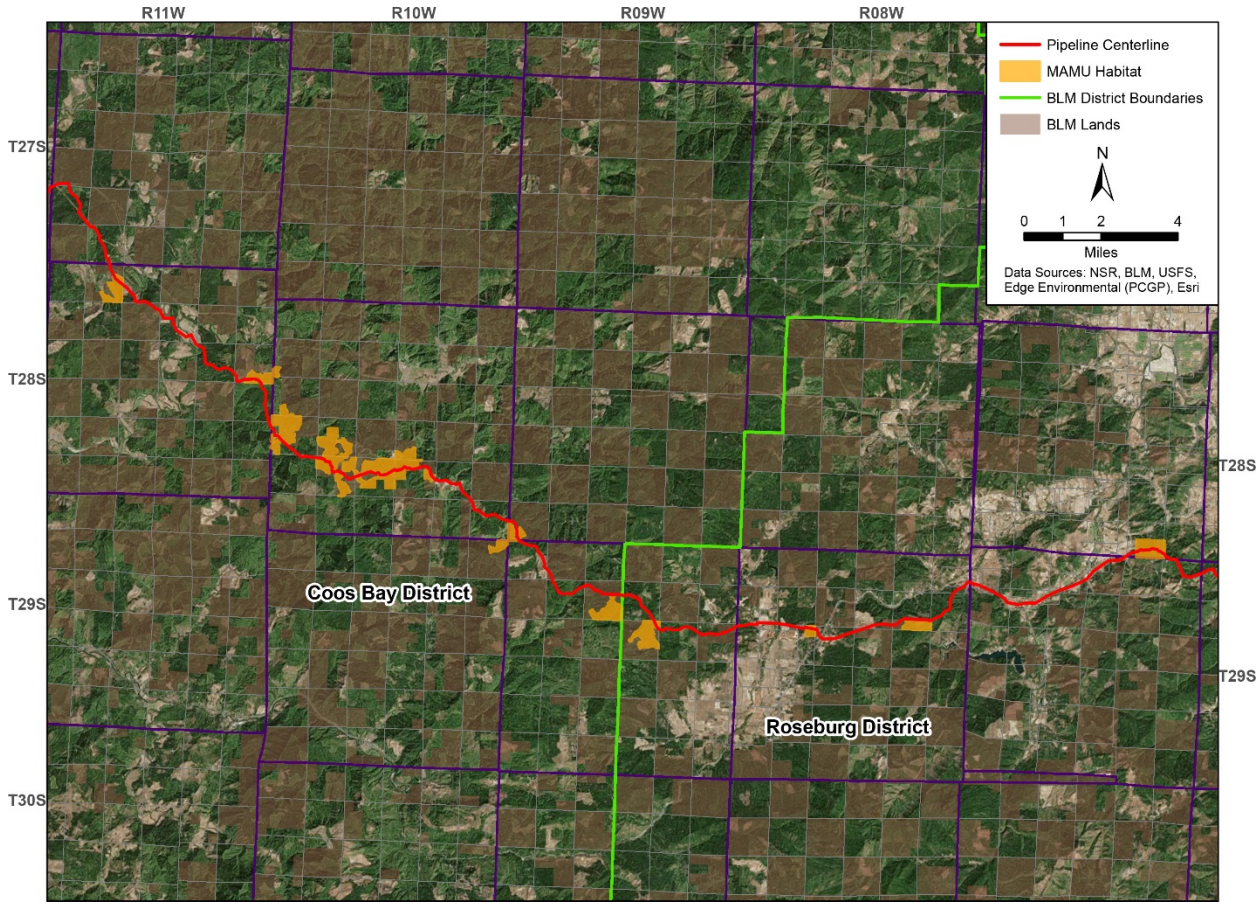


Figure 2.1-3. Known Owl Activity Centers Crossed by the PCGP Project

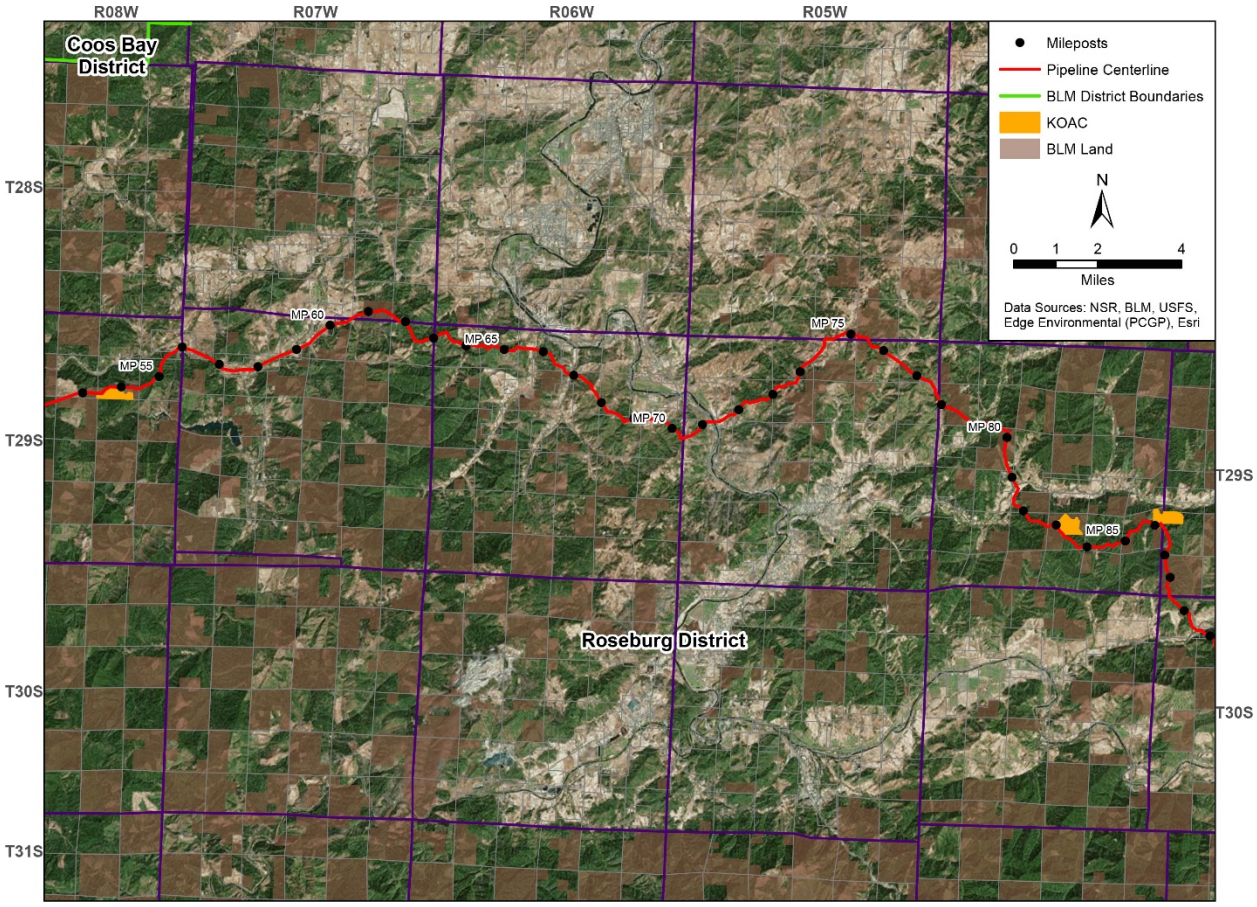


TABLE 2.1.2-1

Direct Effects a/ of the Proposed PCGP Project on Mapped and Unmapped b/ LSRs (acres)

District/Forest	Direct Effects on Mapped LSRs	Direct Effects on Unmapped LSRs	Total Direct Effects
Coos Bay District	34.8	39.7	74.5
Roseburg District	79.8	36.6	116.4
Umpqua National Forest	84.5	0.0	84.5
Rogue River National Forest	276.1	0.0	276.1
Total	**475.2**	**76.3**	**551.5**

a/ Direct effects include PCGP corridor clearing, TEWAs, and UCSAs
b/ Unmapped LSRs include MAMU stands and known owl activity centers
Data source: USFS, BLM GIS layers

Figure 2.1-4. Direct Effects of the Proposed PCGP Project on Mapped and Unmapped LSRs (acres)

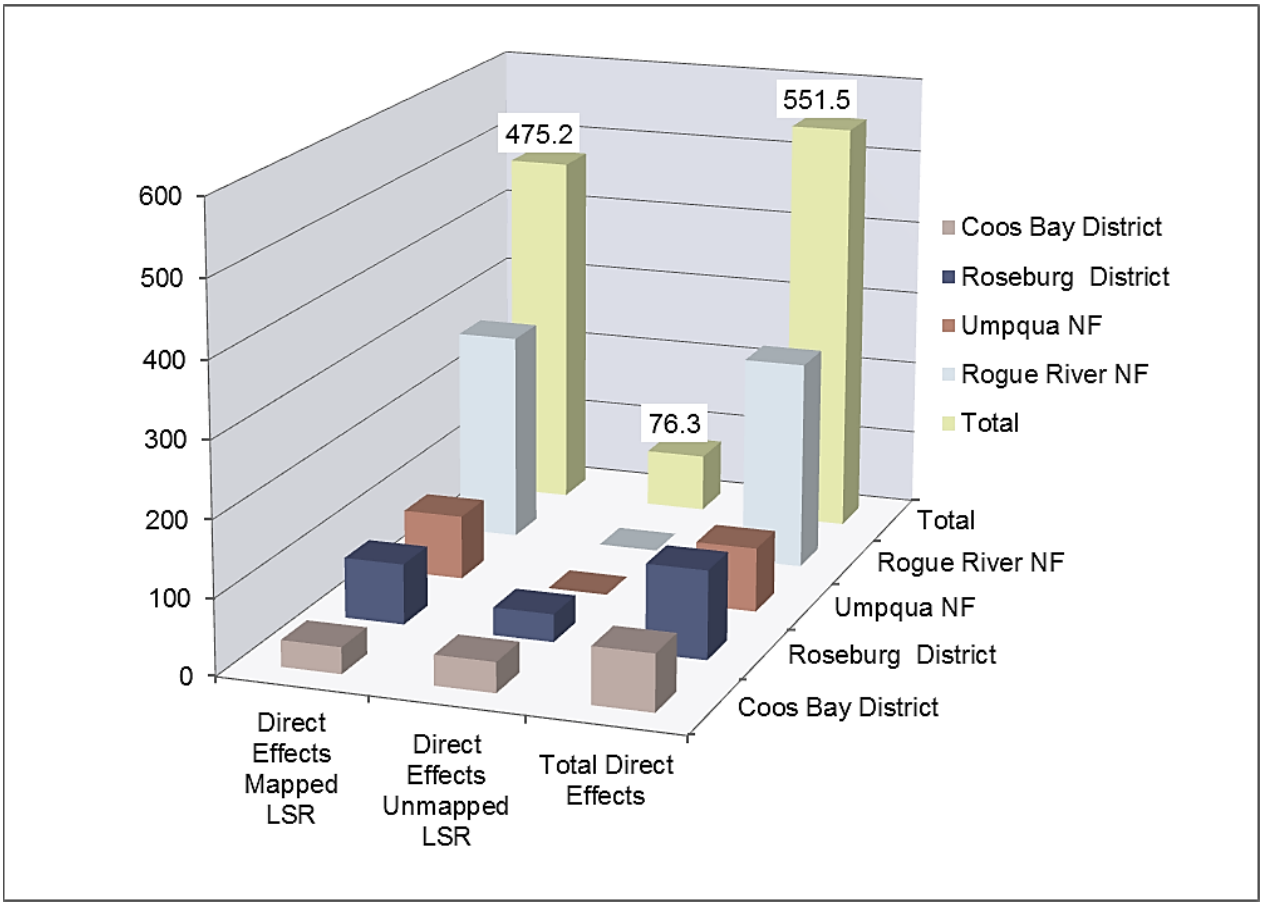


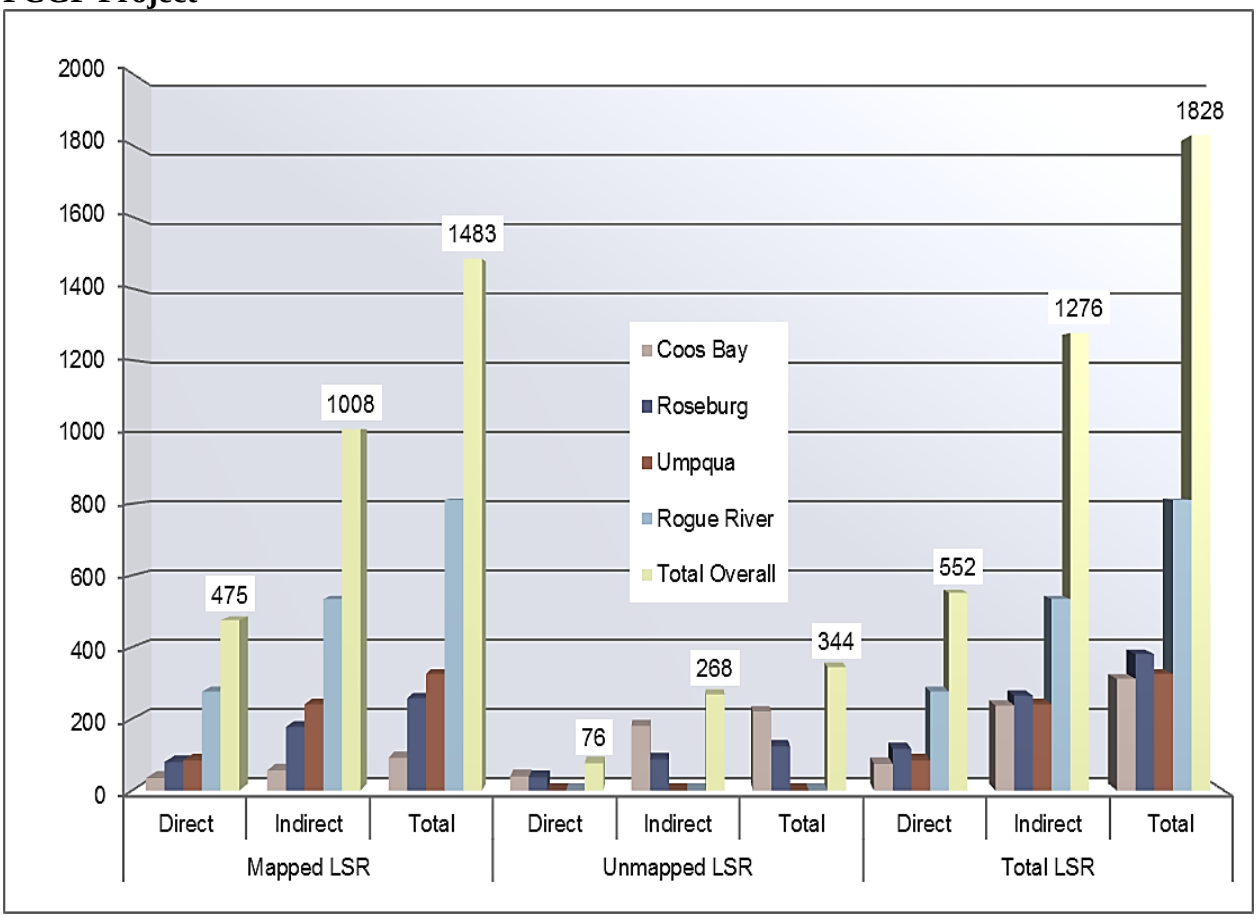
TABLE 2.1.2-2

Summary of Total LSR Acres Directly and Indirectly a/ Affected by the Proposed PCGP Project

District/National Forest	Mapped LSR			Unmapped LSR			Total LSR		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
BLM District									
Coos Bay	35b/	56	91	40	181	220	75b/	237	312
Roseburg	80	177	257	37	87	124	116	265	381
Total BLM	**115**	**234**	**348**	**76**	**268**	**344**	**191**	**502**	**692**
Forest Service National Forest									
Umpqua	85	241	325	0	0	0	85	241	325
Rogue River	276	534	810	0	0	0	276	534	810
Total Forest Service	**361**	**775**	**1135**	**0**	**0**	**0**	**361**	**775**	**1135**
Total Overall	**475**	**1008**	**1483**	**76**	**268**	**344**	**552**	**1276**	**1828**

Data source: BLM, USFS GIS data layers
a/ Total impacts include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).

Figure 2.1-5. Summary of Total LSR Acres Directly and Indirectly Affected by the PCGP Project



2.1.3 The Need for Plan Amendments and Off-Site Mitigation in LSRs

Under the Federal Land Policy and Management Act (FLPMA), and the National Forest Management Act (NFMA), the proposed PCGP project would have to conform to BLM and Forest Service land use plans. Those plans incorporate the NWFP standards and guidelines, which allow new developments in LSRs, provided several steps are taken. The standard and guideline for new developments in LSRs state;

> "Developments of new facilities that may adversely affect Late-Successional Reserves should not be permitted. New development proposals that address public needs or provide significant public benefits, such as powerlines, pipelines, reservoirs, recreation sites, or other public works projects will be reviewed on a case-by-case basis and may be approved when adverse effects can be minimized and mitigated. These will be planned to have the least possible adverse impacts on Late-Successional Reserves. Developments will be located to avoid degradation of habitat and adverse effects on identified late-successional species." (USDA and USDI 1994, page C-17)

To be consistent with this standard and guideline, the first step is to avoid affecting LSRs altogether. When that is not feasible, the second step is to address the public need for the project. The third step is locating the project to minimize adverse impacts, and the fourth step is to mitigate or compensate for unavoidable adverse impacts. In order to be consistent with the standard above, steps three and four would need to result in impacts that are either neutral or beneficial to the creation and maintenance of late-successional habitat in LSRs (USDA and USDI Memorandum 2001).

2.1.3.1 Step One: Avoidance

Alternative routes that would avoid all LSRs were investigated by the applicant, BLM, Forest Service, and FERC. These alternatives would require lengthy rerouting both in terms of the overall length of the pipeline and in the amount of private land affected. These alternatives and the reasons why they were not carried further are discussed in section 3.4 of FERC Draft EIS. The steps taken to avoid LSRs and how they were incorporated into the proposed route where feasible are also discussed in section 10.6 of Resource Report 10.

In summary, because the proposed project is a linear, large-diameter, high-pressure natural gas pipeline that must be routed to ensure safety, stability, and integrity, it is unreasonable, impractical, and infeasible to entirely avoid all designated LSRs within the project area for the following reasons:

1) The overall extent of the designated LSR land allocation in the project area makes it impractical to completely avoid LSRs;

2) The length of the proposed project, which extends approximately 230 miles from Coos Bay to Malin, Oregon, crosses Coos, Douglas, Jackson, and Klamath counties, and traverses public lands managed by four BLM districts as well as three national forests makes it impractical to avoid all designated LSRs;

3) The checkerboard landownership pattern of BLM lands within the project area makes it unreasonable to avoid LSRs;

4) Large contiguous areas of federal lands (see figure 2.1-1) in the project area make it impractical and infeasible to entirely route around these lands to avoid LSRs; and

5) Where LSRs are encountered along the alignment, the routing requirements of the proposed pipeline to ensure a safe, stable, and constructible alignment to ensure long-term integrity make it infeasible/unreasonable to avoid LSRs by aligning the pipeline on steep side slopes or other potentially unstable areas.

2.1.3.2 Step Two: Public Need:

The Commission will consider the need and public benefit of this project when making its decision on whether or not to authorize it, as documented in the Project Order. The cooperating agencies will consider need and public benefit within the context of each agency's respective authorities. Each Cooperating Agency will document its decision in the applicable permit, approval, concurrence or determination.

2.1.3.3 Step Three: Minimize

During the project route selection and construction footprint design process, interdisciplinary teams from the BLM and Forest Service worked with FERC and the applicant to develop steps that would minimize impacts to LSRs where avoidance was not feasible. In August 2006, the Forest Service requested that the FERC study an alternative route over portions of the Rogue River and Fremont-Winema National Forests. This suggested route variation, mostly followed existing Forest Service roads. In late September 2006, Pacific Connector met with the Forest Service to discuss the variation, as well as to explain project construction requirements. As a result of consultations with the Forest Service, Pacific Connector modified its original May 2006 route to adopt segments of the USFS suggested variation, and incorporated the modified route into its proposed route as filed with the Commission on September 4, 2007. The following features have been incorporated into the proposed route and construction design:

- Performing routing and geotechnical evaluations to ensure the most stable pipeline alignment for long-term stability. These efforts would minimize the potential need to conduct future maintenance activities, which could require additional impacts to LSRs.

- Where feasible, the proposed alignment was co-located with existing roads and early seral, conifer plantations to reduce impacts to LSOG habitat and to minimize disturbance impacts.

- Areas of side slopes were avoided to minimize the need for additional TEWAs to accommodate the necessary cuts and fill to safely construct the pipeline.

- The number and size of the planned TEWAs in LSRs were minimized to those critical for safe pipeline construction.

- Additional TEWAs were located in previously disturbed areas (i.e., areas that were recently logged) or in young regenerating forest stands.

- Existing roads would be used to access the construction right-of-way during construction and the right-of-way would be used as the primary travel-way to move equipment and materials up and down the right-of-way to remove the need for additional roads within LSRs. The existing roads would also be used during operations and maintenance to avoid the need for new access routes.

- Pacific Connector would replant or allow trees to naturally regenerate to within 15 feet of the pipeline centerline within the permanent pipeline easement to minimize potential long-term effects of the pipeline easement.

Detailed descriptions of all the conservation measures proposed by the applicant are included in table 1 of Resource Report 3 in the FERC Draft EIS.

2.1.3.4 Step Four: Mitigate

In addition to avoidance and minimization, off-site mitigation would also be necessary to ensure that unavoidable adverse impacts are mitigated to meet the requirement that the overall impact would be either neutral or beneficial to the creation and maintenance of late-successional habitat in LSRs. A Compensatory Mitigation Plan (CMP) on BLM and Forest Service lands has been recommended by the agencies for the PCGP project. A portion of the CMP was developed specifically to compensate for the unavoidable adverse impacts of the project on LSRs to achieve a neutral or beneficial condition within affected LSRs, and to maintain the long-term integrity of the BLM and Forest Service land use plans for LSRs. Under the CMP, unavoidable impacts to LSOG forest habitats within LSRs on BLM and Forest Service lands would be compensated for by a combination of reallocation of matrix lands to LSR and implementing off-site mitigation projects. The off-site mitigations for stand treatments and fuel breaks are intended to implement the recommendations contained in the LSRAs for LSR 223, 227 and 261. Stand treatments would enhance or accelerate the development of LSOG habitat elements to further offset the effects of the PCGP project on LSRs in the long term (long term is longer than the expected life of the project or greater than 50 yrs.). Fuel breaks would help reduce the risks of LSOG forest loss to catastrophic wildfires. The off-site mitigation actions would also increase the effectiveness of the LSOG forest habitat added to LSRs by improving the quantity, quality, and distribution of high-quality habitat. On BLM lands, the proposed mitigation actions also include having the applicant acquire approximately 796 acres of non-federal forest lands to replace the matrix lands that are being reallocated to LSR. The proposed CMP is described in Appendix J of the 2013 FERC Draft EIS.

The primary mitigation action for the effects of the proposed pipeline on LSRs would add acres to the LSRs. The BLM and Forest Service are proposing to accomplish this through reallocation of matrix lands to LSR. Reallocating these acres will require amendments to the Coos Bay and Roseburg District RMPs and the Umpqua and Rogue River National Forest LRMPs. The analysis in the following sections will look at the acres of habitat (by habitat type of LSOG, non-LSOG and non-forest) that would be cleared by the project with the amount of habitat that would be reallocated since this would the most direct comparison of acres affected in the LSR system. Table 2.1.3-1 and figure 2.1-6 display a summary comparison between the LSR acres that would be cleared by the construction of the PCGP project and the proposed reallocation of matrix lands to LSR. Amendments concerning LSRs associated with the PCGP project would be coordinated with the Regional Ecosystem Office as required by the Northwest Forest Plan.

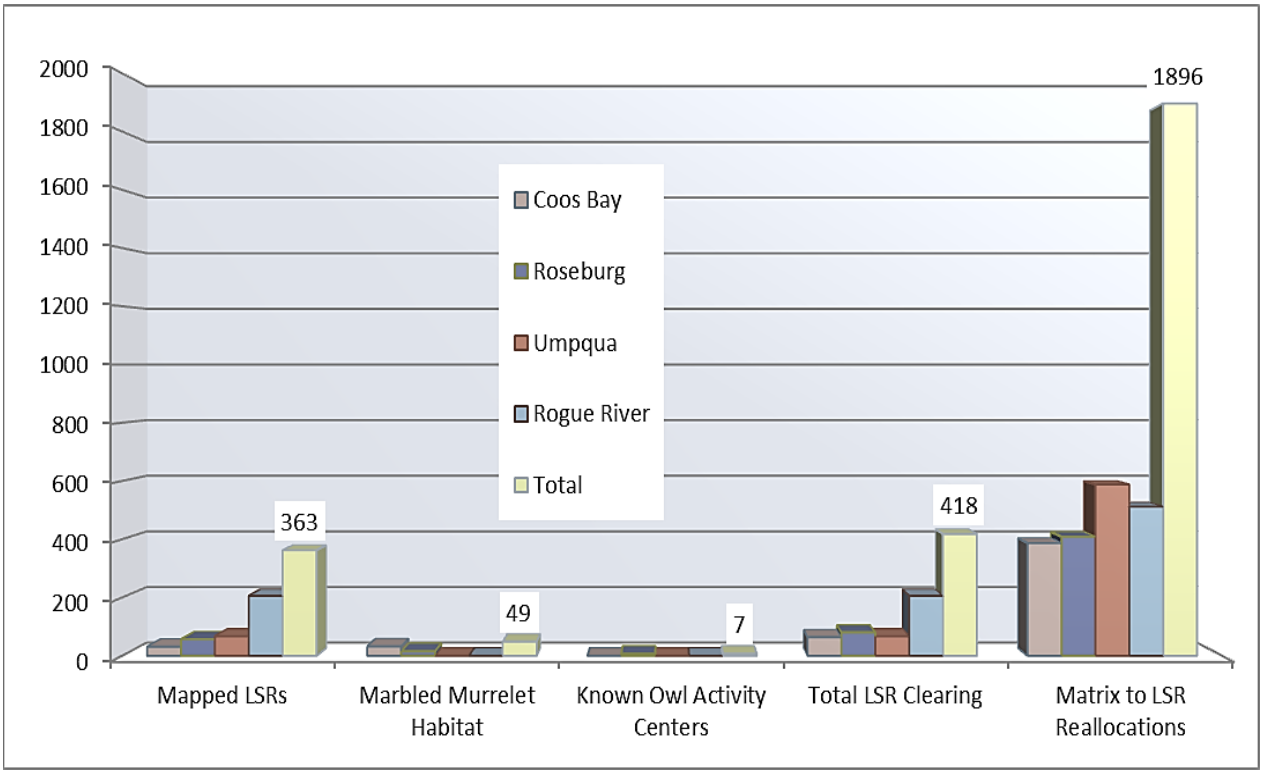
TABLE 2.1.3-1

Comparison of Total LSR Acres Cleared a/ by the PCGP Project and the Acres of Matrix Reallocated to LSR

District/National Forest	LSR Components b/ Affected by PCGP Right-of-Way Clearing				LSR Mitigation: Matrix to LSR Reallocations
	Mapped LSRs	MAMU Stands	Known Owl Activity Centers	Total LSR Clearing	
BLM District					
Coos Bay	32	33	0	64	387
Roseburg	57	16	7	81	409
Forest Service National Forest					
Umpqua	67	0	0	67	588
Rogue River	206	0	0	206	512
BLM and Forest Service Combined					
Total	**363**	**49**	**7**	**418**	**1896**

Data source: BLM, USFS GIS data layers
a/ Clearing includes acres in the PCGP corridor and the TEWAs
b/ MAMU stands and known owl activity centers outside of mapped LSRs

Figure 2.1-6. Comparison of Total LSR Acres Cleared by the PCGP Project and Total Acres of Matrix Reallocated to LSR



The following section evaluates the proposed amendments and mitigation actions in relation to LSRs on BLM lands.

2.2 RMP AMENDMENTS ON BLM LANDS

The proposed PCGP project would cross four BLM Districts (Coos Bay, Roseburg, Medford and the Lakeview Resource Area of the Klamath Falls District) for a total of approximately 40 miles. Figure 2.1-1 (above) provides an overview of the proposed project and the management units of

the BLM. Table 2.1.2-1 (above) displays the total acres that would be directly affected for each BLM District.

The BLM in western Oregon developed six RMPs concurrently, including the RMPs for the Coos Bay, Roseburg, Medford, and Klamath Falls Districts. The six RMPs together cover all BLM-administered lands in western Oregon. The RMPs were developed under the requirements of the FLPMA through the use of an interdisciplinary planning process. Lands administered by the BLM are managed to maintain healthy, functioning ecosystems from which a sustainable production of natural resources can be provided.

Oregon and California Railroad Grant Lands (O&C Lands) and Coos Bay Wagon Road Lands (CBWR Lands) are a unique category of federal lands that would be crossed by the PCGP project. These lands are managed by BLM districts in western Oregon.

The O&C Lands were designated by Congress in 1866 to support the construction of a railroad in the State of Oregon. The O&C Lands were to be sold by the Oregon and California Railroad Company to aid in offsetting the cost of building the railroad between Portland and the California border. The railroad ended its sales of O&C Lands to private citizens in 1903 before all of the O&C Lands were sold. In 1916, Congress passed the O&C Revestment Act, which returned over 2.4 million acres of Oregon's O&C Lands to federal ownership and management.

The CBWR Lands were established by a land grant in 1869 to the Southern Oregon Company a decade after Oregon entered the United States. These lands were also subsequently reconveyed to the United States. The O&C Lands Act of 1937 requires the Secretary of the Interior to manage O&C and CBWR Lands for permanent forest production in conformity with the principle of sustained yield. Further, the Act requires that management of O&C Lands protect watersheds, regulate stream-flow, provide for recreational facilities, and contribute to the economic stability of local communities and industries. O&C Lands must also be managed in accordance with other environmental laws such as ESA and the Clean Water Act. Some provisions of these laws take precedence over the O&C Lands Act. For instance, ESA requires the Secretary of the Interior to ensure that management of O&C lands would not result in jeopardy to listed species or destruction or adverse modification of their critical habitat.

The Responsible Official for the proposed LSR-related amendments to the RMPs is the BLM Oregon/Washington State Director. The decision to be made is whether the RMPs would be amended if FERC approves the PCGP project. If FERC does not authorize the project, the amendments would not be implemented.

The implementing regulations for FLPMA (43 CFR 1600) describe the process for amending RMPs as follows:

> §1610.5-5 Amendment.
>
> A resource management plan may be changed through amendment. An amendment shall be initiated by the need to consider monitoring and evaluation findings, new data, new or revised policy, a change in circumstances or a proposed action that may result in a change in the scope of resource uses or a change in the terms, conditions and decisions of the approved plan. An amendment shall be made through an environmental assessment of the proposed

change, or an environmental impact statement, if necessary, public involvement as prescribed in § 1610.2 of this title, interagency coordination and consistency determination as prescribed in § 1610.3 of this title and any other data or analysis that may be appropriate. In all cases, the effect of the amendment on the plan shall be evaluated. If the amendment is being considered in response to a specific proposal, the analysis required for the proposal and for the amendment may occur simultaneously.

(a) If the environmental assessment does not disclose significant impact, a finding of no significant impact may be made by the Field Manager. The Field Manager shall then make a recommendation on the amendment to the State Director for approval, and upon approval, the Field Manager shall issue a public notice of the action taken on the amendment. If the amendment is approved, it may be implemented 30 days after such notice.

(b) If a decision is made to prepare an environmental impact statement, the amending process shall follow the same procedure required for the preparation and approval of the plan, but consideration shall be limited to that portion of the plan being considered for amendment. If several plans are being amended simultaneously, a single environmental impact statement may be prepared to cover all amendments.

In addition, the BLM Land Use Planning Handbook (H-1601-1) provides the following guidance for amending RMPs.

B. Determining When it is Necessary to Amend Plans and How It Is Accomplished

Plan amendments (see 43 CFR 1610.5-5) change one or more of the terms, conditions, [or] decisions of an approved land use plan. These decisions may include those relating to desired outcomes; measures to achieve desired outcomes, including resource restrictions; or land tenure decisions. Plan amendments are most often prompted by the need to:

1. consider a proposal or action that does not conform to the plan;
2. implement new or revised policy that changes land use plan decisions, such as an approved conservation agreement between the BLM and the USFWS;
3. respond to new, intensified, or changed uses on public land; and
4. consider significant new information from resource assessments, monitoring, or scientific studies that change land use plan decisions.

The BLM regulations in 43 CFR 1600 and the NEPA process detailed in the CEQ [Council on Environmental Quality] regulations in 40 CFR 1500 guide preparation of plan amendments. Plans needing amendment may be grouped geographically or by type of decision in the same amendment process. Similarly, one amendment process may amend the same or related decisions in more than one land use plan.

The planning criteria that will be used to evaluate the proposed amendments include the amount and quality of MAMU habitat that would be affected, the quantity and quality of habitat in KOACs that would be affected, and the functionality of LSRs in terms of the distribution, quantity and quality of LSOG habitat that would be affected by the construction and operation of the PCGP project. The remainder of this section of the report evaluates the proposed amendments and mitigation actions related to LSRs on each of the BLM Districts that the proposed pipeline would cross.

2.2.1 Coos Bay District

The Coos Bay District RMP as amended guides all resource management activities in the District. The RMP provides the vision and strategy for the land allocations and resource programs as well as the management actions/directions for each of the land allocations and resource programs (USDI 1995a). The Coos Bay District RMP is available at http://www.blm.gov/or/districts/coosbay/plans/coosbayrmp.php. A map of the proposed PCGP project and LSRs in the Coos Bay District is displayed as figure 2.2-1.

In the Coos Bay District, the construction of the PCGP project would directly affect approximately 35 acres of LSR 261. The construction of the project would also directly affect approximately 41 acres of MAMU stands within both mapped and unmapped LSRs.

2.2.1.1 Existing Conditions of Mapped LSR 261

Summary from LSRA

The South Coast-North Klamath LSRA (USDA and USDI 1998b) covers 10 mapped LSRs: 251, 255 (not included in the Siskiyou National Forest), 257, 259, 260, 261, 263, 264, 265, and 267, and the unmapped LSRs on lands administered by the BLM in the Coos Bay, Roseburg, and Medford Districts, and the Forest Service Siuslaw National Forest in the Mapleton Ranger District (see figure 2.2-2). The assessment area ranges from about the Smith River drainage in the north to the California border in the south, west to the Pacific Ocean, and east approximately to Interstate 5. This grouping of LSRs into one assessment occurred due to their proximity to each other and their interdependence. Approximately 80 percent of the assessment area is within the Oregon Coast Range Province, 19.7 percent is within the Klamath Province, and 0.3 percent is within the Oregon Western Cascade Province.

Figure 2.2-1. Map of Proposed PCGP Project and LSRs in the Coos Bay District

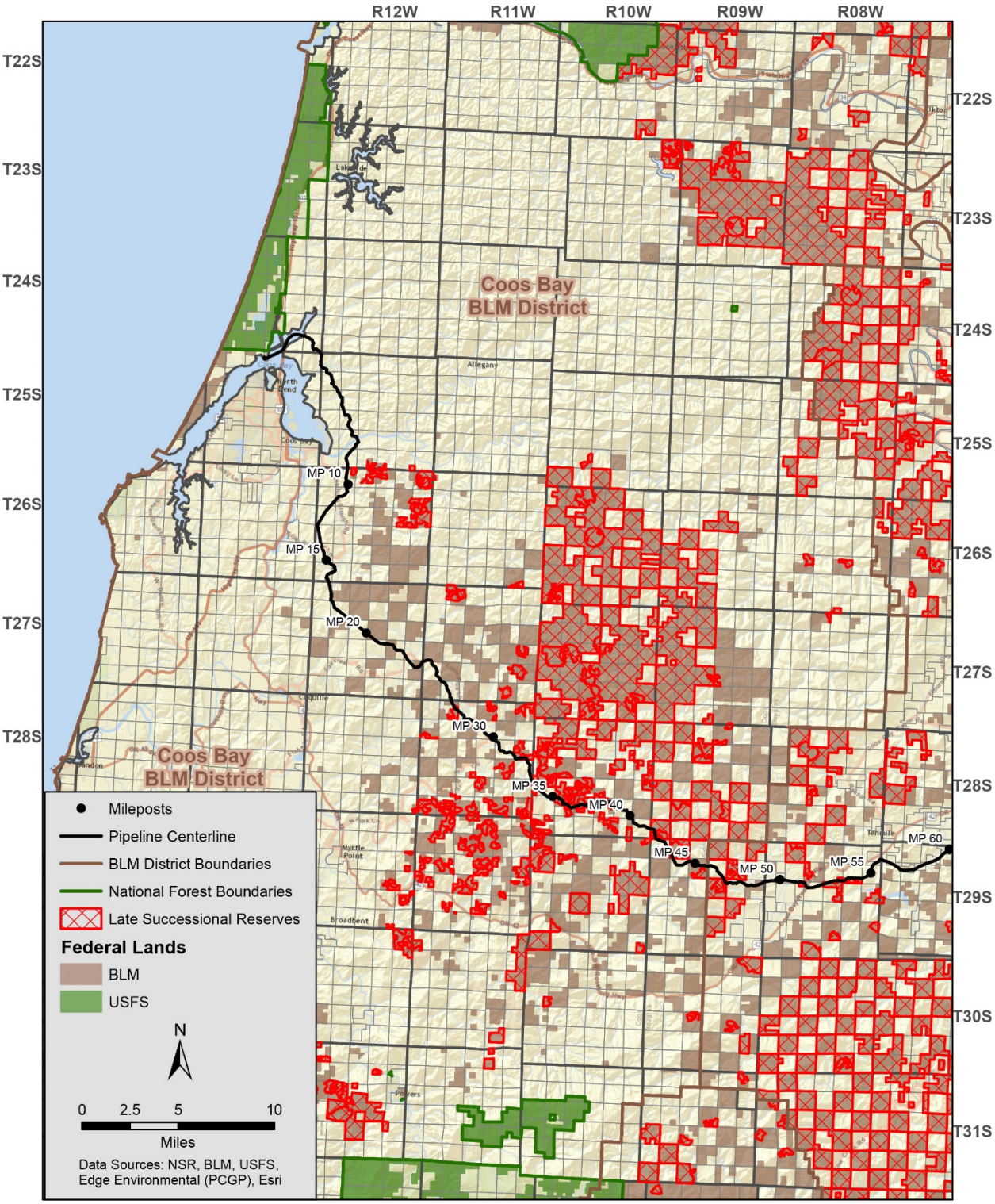
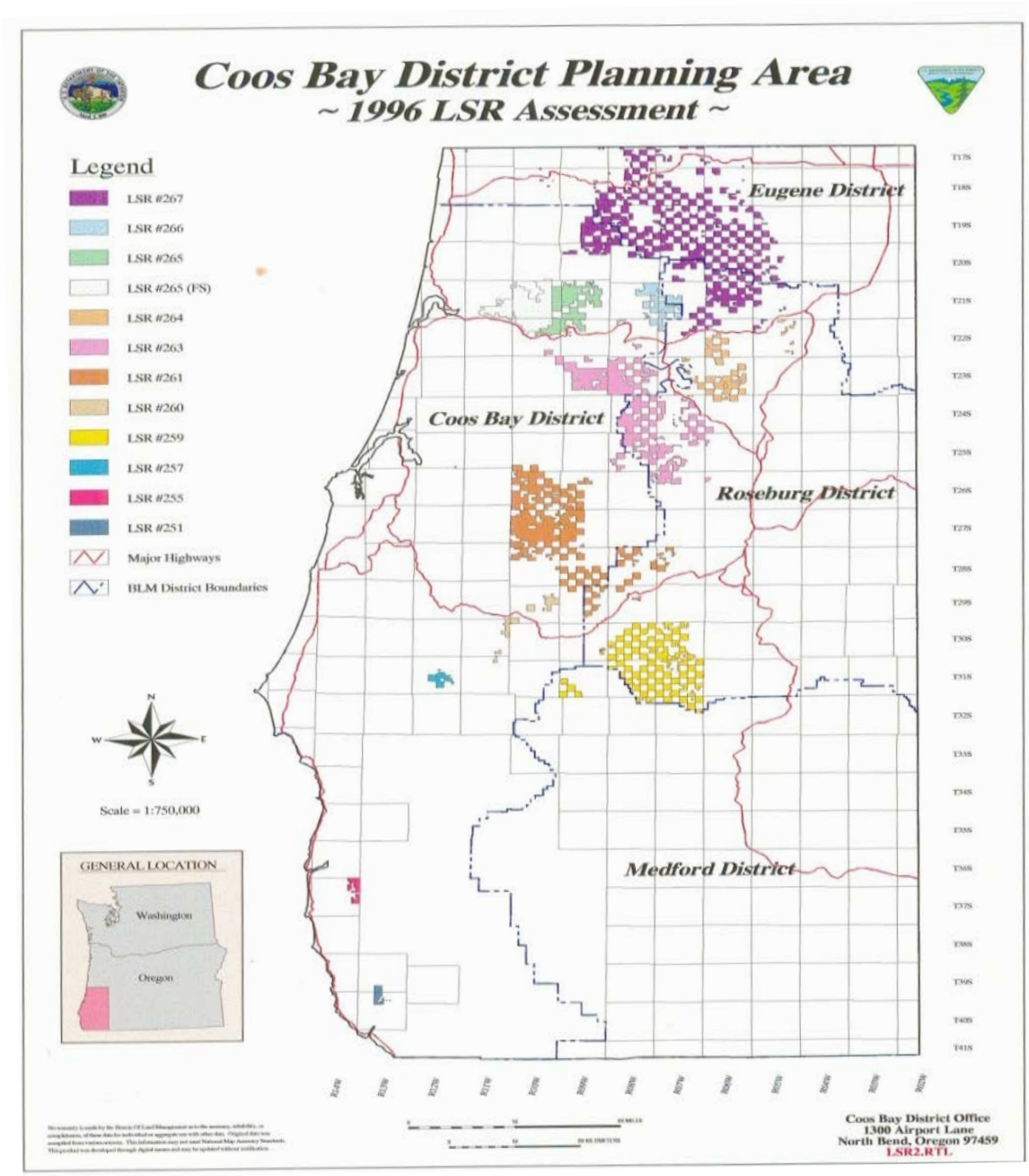


Figure 2.2-2. Map of South Coast–North Klamath LSRA



LSR 261 is approximately 70,611 acres and lies within the Oregon Coast Range Province. This LSR is located within two BLM districts totaling approximately 59,656 acres in the Coos Bay District and 10,955 acres in the Roseburg District.

One indicator of the current habitat condition of the LSRs is the amount and percentage that is late-successional forest. Overall, the percentages of late-successional forest habitat in the 10 LSRs ranged from 41 percent for LSR 266 to 72 percent for LSRs 260 and 265, with a mean of

57.4 percent for all the LSRs. The amount for LSR 261 is 50 percent. Although these percentages give an overall indication of how much late-successional forest habitat remains in the LSRs, an analysis of the number of acres of interior forest habitat may be a better indicator of the ability of these reserves to support and maintain populations of late-successional species. Interior forest habitat is defined as that part of late-successional habitat that is beyond [not subject to] the edge effect. Estimates of the number of acres of interior forest habitat in the LSRs were derived using a buffer approximating edge effects for the provinces in this LSRA. The buffer used for the Oregon Coast Range Province (including LSR 261) was 500 feet.

The acres of interior forest habitat are substantially lower than the corresponding numbers for late-successional forest habitat. Percentages of interior forest habitat range from 4 percent for LSR 251 to 32 percent for LSR 265. The amount for LSR 261 is 14 percent. Some differences among LSRs in the percentage of interior habitat are due simply to LSR size, since smaller LSRs have a higher ratio of perimeter (edge) to total area. Another key factor accounting for differences among the LSRs is the degree to which the reserves are fragmented due to public versus private ownership. The more fragmented the ownership pattern, the less interior habitat will be provided. Generally, these estimates indicate that many of the LSRs in the study area are presently in poor condition for maintaining populations of many late-successional forest species, especially those associated with interior forest habitat. The amount of LSOG and interior forest habitat for LSR 261 is shown in table 2.2.1.1-1.

TABLE 2.2.1.1-1

Acres and Percentages of LSOG and Interior Forest Habitat in LSR 261

LSR	Total Acres	LSOG Acres	Percent of Total LSR	Interior Forest Habitat Acres	Percent of Total LSR
261	70,611	35,583	50%	9,646	14%

Desired Future Conditions

Goals for the LSRs in the assessment area are to protect and enhance conditions of LSOG forest ecosystems and to create and maintain biological diversity associated with native species and ecosystems. Some of the important attributes that can be influenced by management actions include stand composition (species, density, and size), legacy wood (snags and coarse woody debris (CWD)), and disturbance processes (fire, wind, and disease).

The LSRs in the LSRA area were ranked for management actions using the following priorities: high, medium, and low. Although it is expected that most emphasis will be focused on the high-priority LSRs, the ranking system does not imply that there will not be management activities in the medium- and low-priority LSRs. LSR 261 was ranked in the high-priority category.

High Priority LSRs

Of the LSRs in the LSRA, 261, 263, and 259 have the highest priority for management actions because they are large and are key links in the LSR network. Also LSRs 261 and 263 provide greater opportunities to either increase or develop large (greater than 640 acres) contiguous stands of interior late-successional habitat. In addition, most of the acres of young, intensively cultured forest plantations that could benefit the most from treatments occur in the three LSRs.

Since LSRs 261 and 263 are the largest LSRs in the LSRA (70,611 and 60,599 acres), developing large contiguous stands of late-successional habitat would have greater value.

The quantity and quality of late-successional habitat is changed through disturbance events such as wildfire, windstorms, disease, insects, and soil movement. Large-scale disturbance events can change or eliminate late-successional habitat on hundreds to thousands of acres, while small-scale disturbance events cause habitat loss at the stand level. While the risk of habitat loss cannot be eliminated, risk management activities may reduce the probability that a major stand-replacing event or events that degrade habitat quality will occur. The primary purpose of risk reduction activities in these LSRs is to reduce the probability of large-scale loss of late-successional habitat. Another purpose of risk reduction activities is to reduce the probability of late-successional habitat loss in stands with important features such as nest stands for NSOs, stands containing other key species, or stands containing larger blocks of interior habitat or providing meaningful localized connectivity.

Wildfire presents the greatest risk of late-successional habitat loss within the LSRA area. The majority of risk-reducing activities would be aimed at managing fuels and sources of ignition. Fuels and ignition sources may be actively managed by reducing existing fuels; by reducing fuels created by stand management operations through prescribed burning; indirectly through treatments designed to maintain stand vigor; or pruning to reduce fuel ladders into the canopy. Access may be restricted during periods of high fire danger.

Recent Changes

There have been no notable changes in the transportation system or fire history in LSR 261 in the Coos Bay District since the LSRA was written in 1998. Numerous density management treatments designed to accelerate LSOG forest habitat conditions have occurred since 1999 on approximately 6,396 acres. These density management treatments included tree topping/snag creation to increase CWD levels throughout the 6,396 acres. An additional 566 acres of tree topping/snag creation was also accomplished. Vegetation management has also included hardwood conversions on approximately 215 acres, pre-commercial thinning on approximately 6,074 acres, and invasive plant treatments on approximately 211 acres. In addition to these past activities, approximately 3,018 acres are planned for density management and another 38 acres are planned for hardwood conversion.[3]

Using the most recent GIS data from the latest Northwest Forest Plan Monitoring Report on LSOG forest (Mouer et. al. 2011), the current estimate of LSOG forest in LSR 261 is 31,793 acres. This is less than the 35,583 acres estimated when the LSRA was written. However, because the two estimates were derived using different data bases a direct comparison cannot be made.

Agency Recommendations

The recommendations and priority for treatments in the LSRA have not changed. Although the extensive vegetation treatments are designed to accelerate the development of LSOG forest

[3] Information provided by Steven Fowler, District Planning and Environmental Coordinator, Coos Bay District BLM.

habitat conditions in the future, the need to develop contiguous LSOG habitat and prevent loss due to intensive fires remain high priorities.

2.2.1.2 Unmapped LSRs in the Coos Bay District Affected by the PCGP Project

Known Owl Activity Centers

The proposed PCGP project corridor would not clear or modify any of the KOACs in the Coos Bay District. Therefore, the proposed project would not alter any unmapped KOAC LSR areas in the Coos Bay District.

Occupied MAMU Stands

Existing known MAMU occupied sites were inventoried using BLM geographic information system (GIS) layer data in 2006, and three occupied sites were identified that were in the proposed PCGP project corridor. Additional MAMU surveys were conducted in 2007, 2008, and 2012 - 2014 within the project area. Nine additional occupied sites were identified from these surveys for a total of 12 occupied MAMU stands within the project area on the Coos Bay District. BLM delineated the extent of the occupied stands identified during the surveys and incorporated the newly identified stands into the GIS layer. All but one of the occupied stands within the PCGP project area on the Coos Bay District occur outside of mapped LSRs in lands currently allocated as matrix in the NWFP. Stand C3070 lies entirely within mapped LSR 261. Approximately 34 acres of occupied MAMU stands would be cleared by the PCGP project on the Coos Bay District (see table 2.2.1.2-1). The map in figure 2.2-3 displays the known MAMU occupied stands in relation to the project.

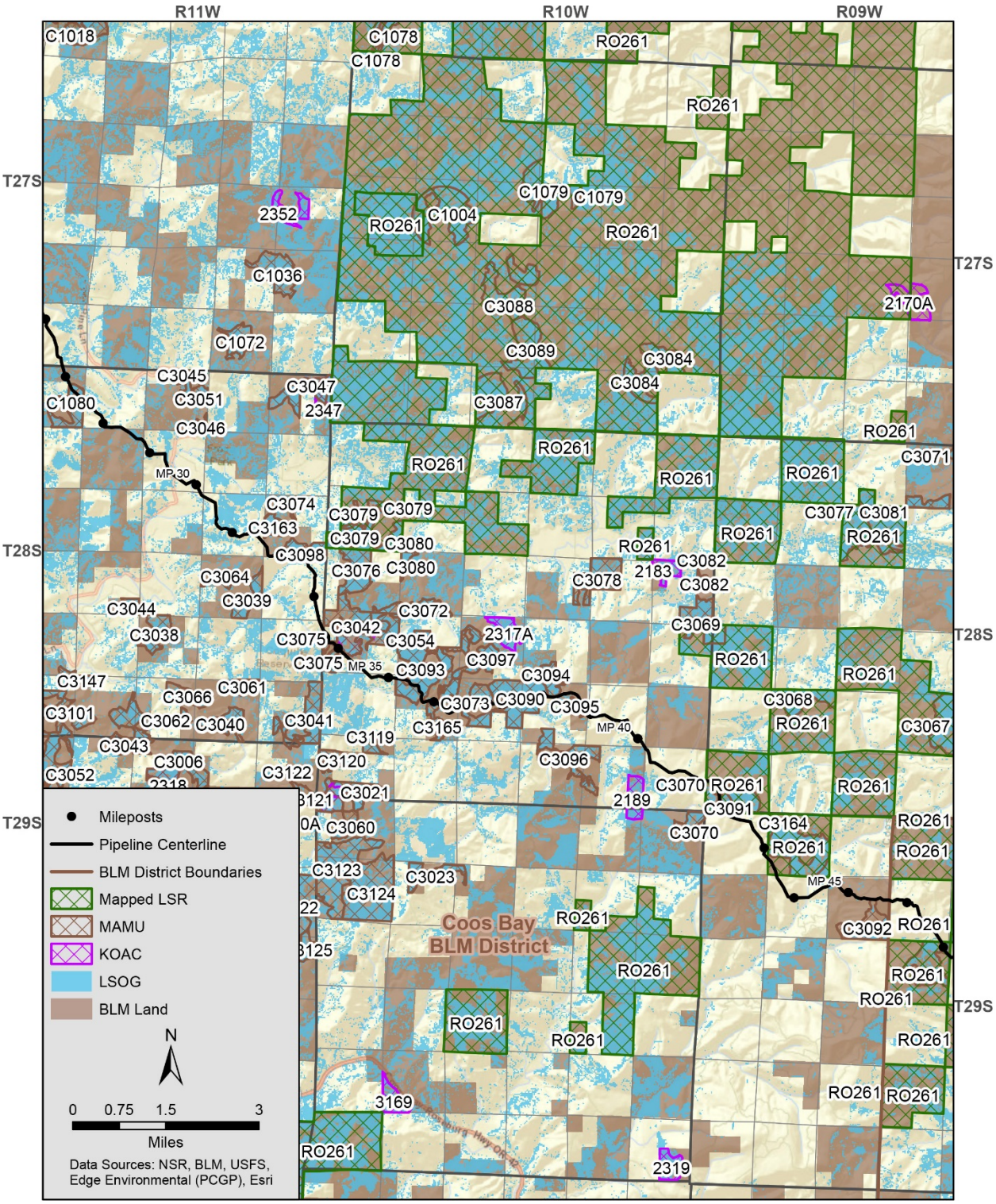
TABLE 2.2.1.2-1

Known Occupied MAMU Stands within the PCGP Project Area in the Coos Bay District

Occupied Stand	Location	Acres cleared by PCGPa/
C1080	MP 27.14-27.47	4
C3098	MP 32.03-32.48	5
C3075	MP 33.77-33.99	2
C3042	MP 33.86-33.90	1
C3093	MP 35.12-35.79	4
C3165	MP 35.89-36.11	<1
C3073	MP 36.49-37.14	5
C3090	MP 37.14-38.00	9
C3094	MP 38.09-38.20	1
C3095	MP 38.83-38.91	<1
C3070b/	MP 41.89-41.97	1
C3092	MP 45.40-45.47	1
Total		**34**

a/ Cleared acres include the PCGP project construction corridor and TEWAs
b/ Occupied Stand C3070 lies entirely within LSR 261
Data Source: BLM GIS data layers

Figure 2.2-3. Map of Occupied MAMU Stands in PCGP Project Area



2.2.1.3 Proposed RMP Amendments and Mitigation Actions Relevant to LSRs in the Coos Bay District

There are two RMP amendments and one set of mitigation measures proposed.

RMP Amendments

The BLM proposes to amend the Coos Bay District RMP as follows:

BLM-4, Reallocation of Matrix Lands to Late Successional Reserves

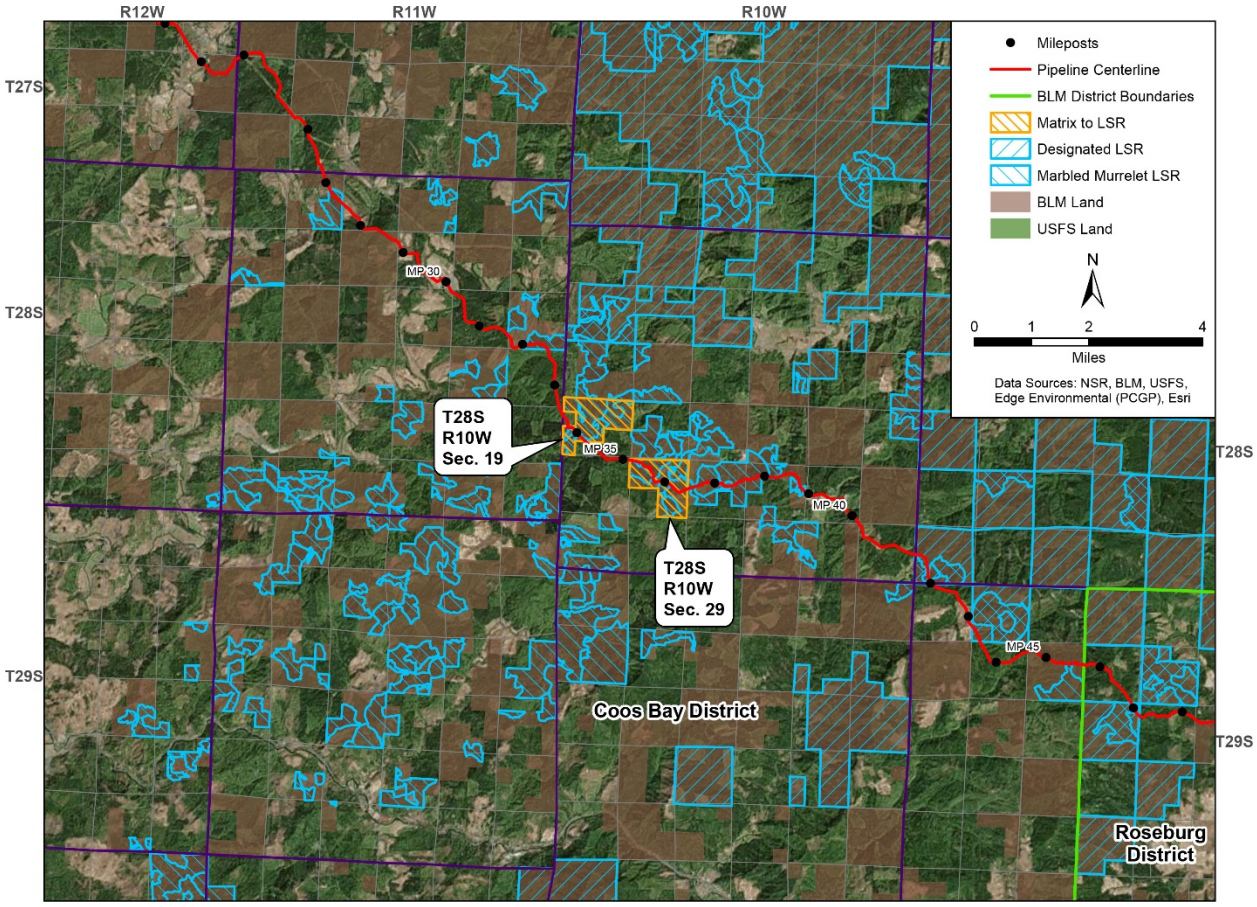
The Coos Bay District RMP would be amended to change the designation of approximately 387 acres from the matrix land allocation to the LSR land allocation in Sections 19 and 29, of T. 28 S., R. 10 W., W. M., Oregon.

This change in land allocation is proposed to provide partial mitigation for the potential adverse impact of the PCGP project on LSRs in the Coos Bay District. This amendment would change future management direction for the lands reallocated from matrix to LSR. A map of the proposed reallocation is displayed as figure 2.2-4.

BLM–1, Site-Specific Exemption from Requirement to Protect MAMU Habitat in the BLM Coos Bay District

The Coos Bay District RMP would be amended to waive the requirements to protect contiguous existing and recruitment habitat for MAMUs within parts of the PCGP right-of-way that is within 0.5 mile of occupied MAMU sites, as mapped by the BLM. This is a site-specific amendment applicable only to the PCGP right-of-way and would not change future management direction at any other location. The RMP for the Coos Bay District requires protection of occupied MAMU sites whether they are inside or outside of a mapped LSR. Most of the occupied sites in the Coos Bay District that would be affected by the PCGP project are outside of mapped LSRs.

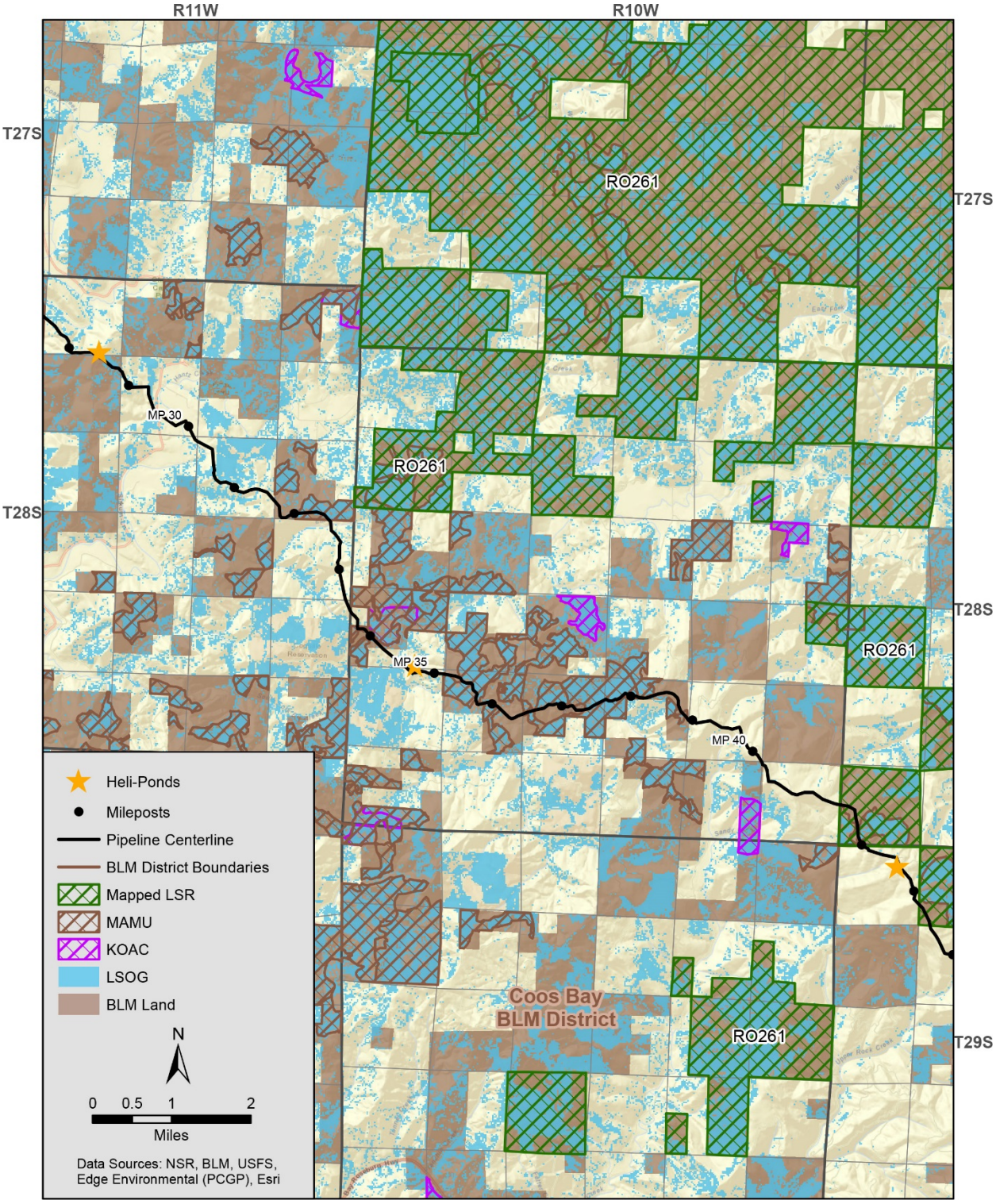
Figure 2.2-4. Map of Matrix Reallocated to LSR in the Coos Bay District



Mitigation Actions

A Mitigation Plan has been recommended by the BLM to ensure that the objectives of the RMP related to LSRs would be achieved (see figure 2.2-5). In addition to reallocating matrix to LSR, the mitigation actions include creating three heli-ponds at strategic locations in the East Fork and Middle Fork of the Coquille River. These heli-ponds would help protect LSRs in this area from high-intensity fires by reducing initial response times.

Figure 2.2-5. Map of Off-site LSR Mitigation Proposals in the Coos Bay District



2.2.1.4 Impacts Related to the Proposed Amendments and Mitigation Actions in the Coos Bay District

RMP Amendments

BLM-4, Reallocation of Matrix Lands to Late Successional Reserves

The primary management objective of the LSR land allocation is to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth–related species. Currently, based on the most recent BLM GIS data there are approximately 31,793 acres of LSOG forest which comprises approximately 45 percent of LSR 261. The PCGP project would remove approximately 31.6 acres of forest vegetation in LSR 261 in the Coos Bay District (see figure 2.2-4). This would include the removal of forest vegetation from both the pipeline corridor and the temporary extra work areas (TEWAs). Approximately 2.0 of the 31.6 acres would be LSOG forest habitat. The area proposed to be allocated to LSR 261 is approximately 998 acres. There are, however, approximately 611 acres of occupied MAMU stands within this proposed area. The occupied MAMU stands are protected under the Coos Bay RMP and managed by the standards and guidelines for LSRs as an area of unmapped LSR. Therefore, the net reallocation equals approximately 387 acres (998 minus 611), of which approximately 101 acres are LSOG forest. The 31.6 acres of clearing in LSR 261 described above includes the clearing that would occur within the reallocated Matrix acres (see figure 2.2-6 for a depiction of the acres proposed for reallocation and the area of occupied MAMU stands).

This change in land allocation is proposed to partially mitigate for the potential adverse impact of the proposed PCGP project on LSR 261 in the Coos Bay District. When acres reallocated from matrix to LSR are compared to the acres of LSR that would be cleared by construction, the proposed amendment reallocates approximately 12 times more acres to LSR than would be cleared by the PCGP project (see table 2.2.1.4-1 and figure 2.2-7).

In addition to the impacts from the removal of forest vegetation in LSR 261, there would be additional impacts from the acres modified by UCSAs and from the acres indirectly affected through the creation of new edges and fragmentation of older forest. A comparison of the total acres affected in LSR 261 and the acres of reallocation are displayed in table 2.2.1.4-2 and figure 2.2-8.

Figure 2.2-6. Map of Reallocation from Matrix to LSR and MAMU Stands

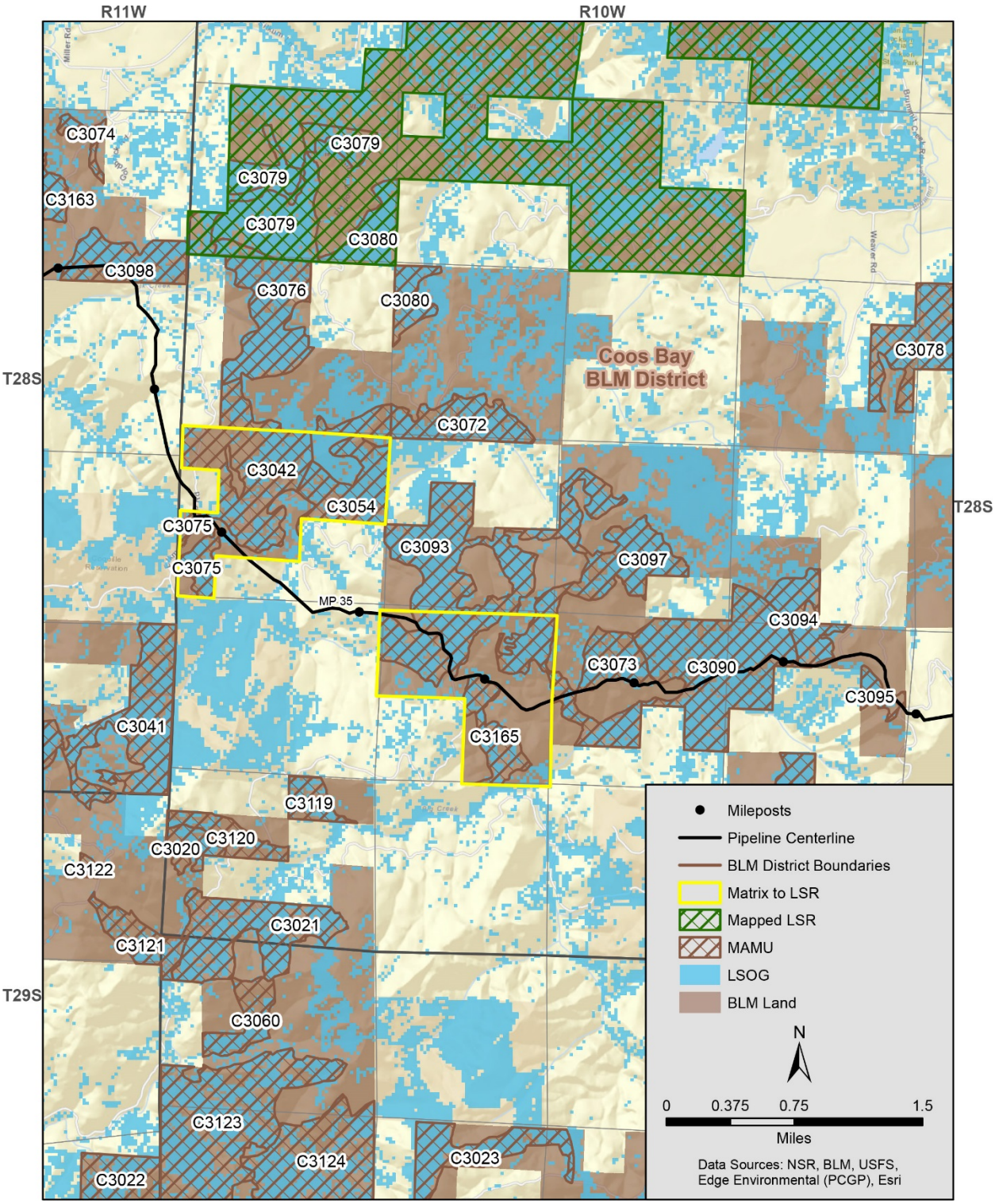


TABLE 2.2.1.4-1

Comparison of LSR Acres Cleared a/ by Proposed PCGP Project and Acres Reallocated from Matrix to LSR

Coos Bay District LSR 261	LSOG	Non-LSOG	Non-Forest	Total All Classes
Matrix to LSR Reallocation	101	284	2	387
LSR Cleared by PCGP Corridor	2.0	29.6	0	31.6

Data source: USFS, BLM GIS Layers
a/ Acres cleared includes the PCGP corridor and TEWAs

Figure 2.2-7. Comparison of LSR Acres Cleared by PCGP Project and Acres Reallocated from Matrix to LSR

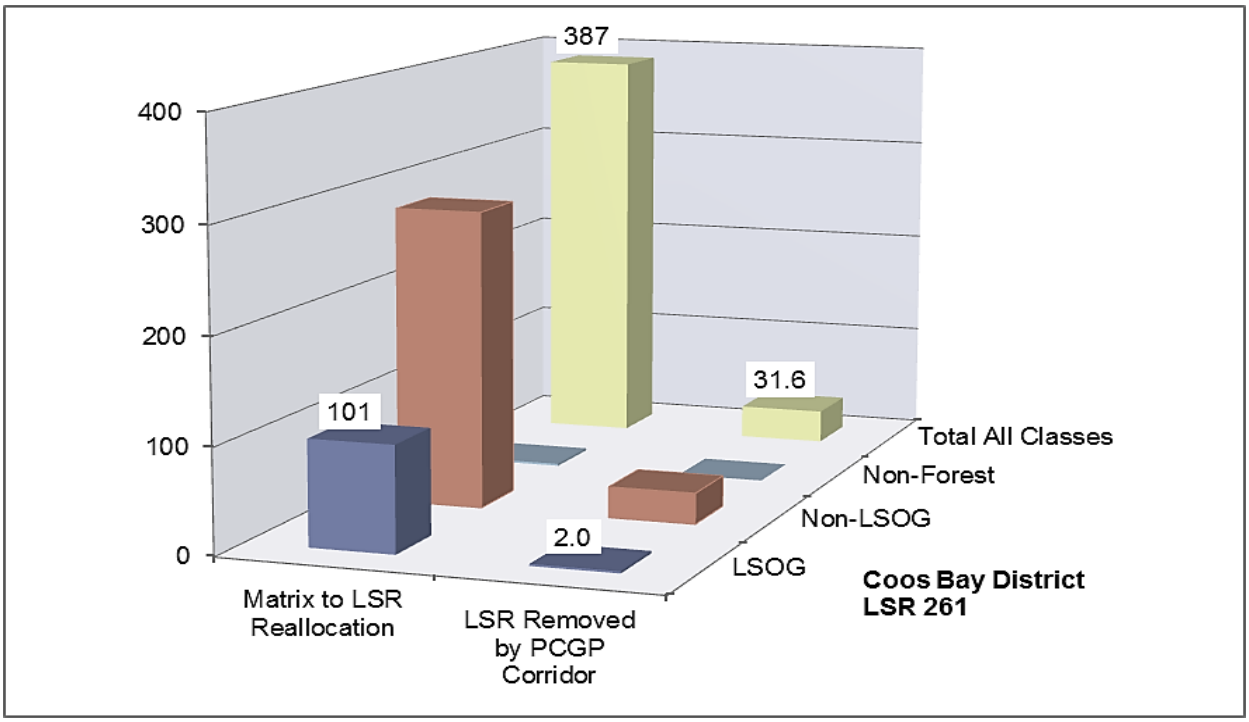


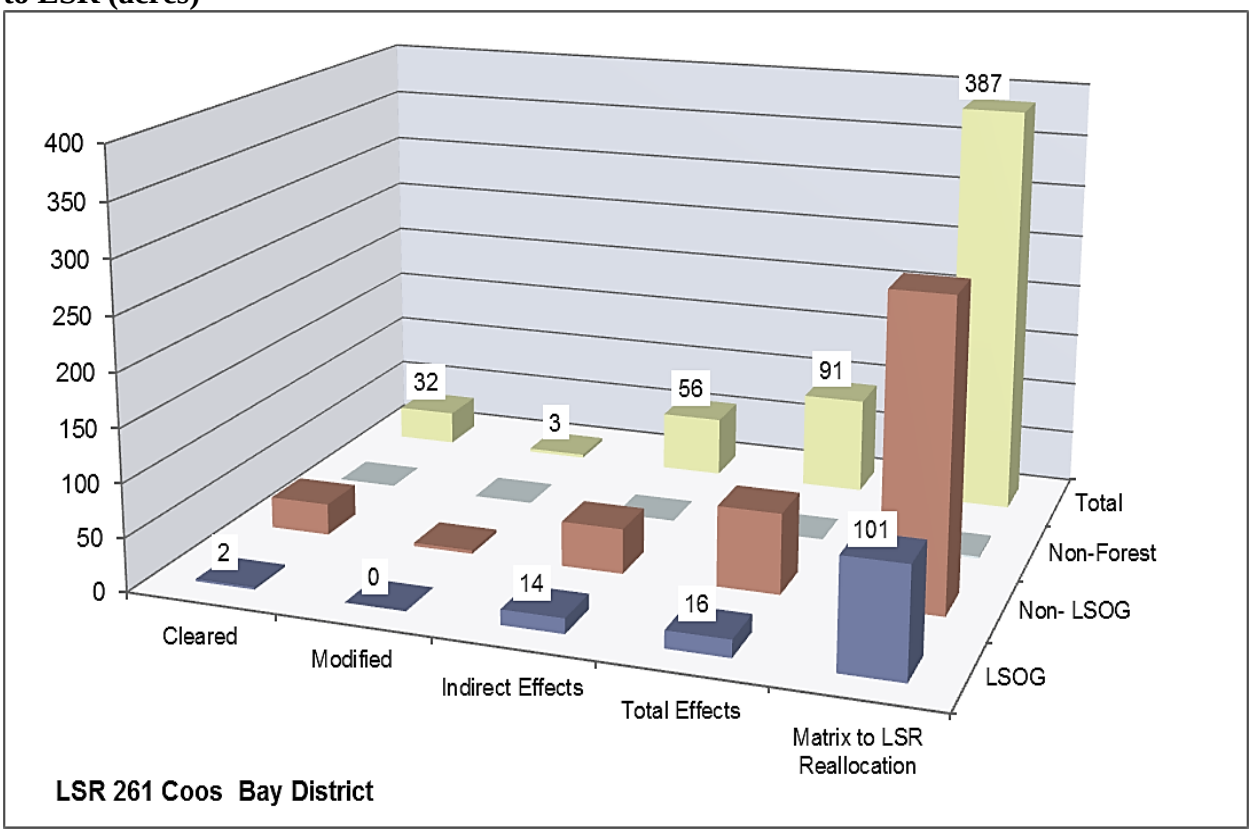
TABLE 2.2.1.4-2

Comparison of Total PCGP Project LSR Effects a/ and Acres of Matrix Reallocated to LSR

Coos Bay Dist. LSR 261	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	2	0	14	16	101
Non- LSOG	30	3	42	75	284
Non-Forest	0	0	0	0	2
Total	**32**	**3**	**56**	**91**	**387**

Data source: BLM, USFS GIS data layers
a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).

Figure 2.2-8. Comparison of Total PCGP Project LSR Effects and Matrix Reallocated to LSR (acres)



Impact on the Functionality of LSR 261 on the Coos Bay District

The functionality of LSR 261 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat within LSR 261 on the Coos Bay District would increase with the proposed RMP amendment. There are approximately 998 acres that would be redesignated as LSR 261, approximately 611 of those acres are currently unmapped LSR MAMU stands and the other 387 acres are matrix. The PCGP

project would remove approximately 2 acres of LSOG habitat but the reallocation from Matrix lands would add 101 acres of LSOG habitat for a net increase of 99 acres of LSOG habitat in LSR. There is also approximately 364 acres of LSOG within the 611 acres of unmapped LSR that would be included within mapped LSR 261. The management direction for these 611 acres would not change. Overall this would increase the current level of LSOG habitat within mapped LSR 261 from 31,793 acres to 32,256 acres or by about one percent.

- Quality: The area of LSR 261 that would be affected by the PCGP project is highly fragmented due to both the land ownership pattern and past management activities. In routing the pipeline, existing developments such as roads were used where feasible and impacts to LSOG habitat was avoided or minimized. The area proposed for reallocation to LSR 261 contains some large blocks of LSOG habitat as well as occupied MAMU stands (see figure 2.2-6). This reallocation would consolidate habitat in an area that is highly fragmented. LSR 261, like most LSRs on BLM land, is comprised of checkerboard sections or even smaller parcels of land. The intent of the reallocations is to better connect these pieces by decreasing distances between individual LSR parcels and reduce the amount of 'edge' adjacent to existing occupied murrelet stands. Consolidating habitat is one of the main objectives in the LSRA for this area. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSOG habitat within LSR 261 would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 261 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR RMP amendment. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur within a current gap between the northern and southeastern portions of LSR 261 and would provide some additional connectivity within LSR 261 in this area.

- The off-site mitigation action would provide added protection to the quantity, quality and distribution of LSOG habitat by improving the potential to decrease initial fire suppression response times and thereby increase the potential to control fires before they become high-intensity fires that threaten LSOG forests. Protecting LSOG forest from loss due to high-intensity fire is also one of the objectives in the LSRA for this area.

The RMP amendment and off-site mitigation actions for LSR 261 in the Coos Bay District have been designed with the goal that the overall impact would be either neutral or beneficial to the creation and maintenance of late-successional habitat.

RMP Amendment: BLM–1, Site-Specific Exemption from Requirement to Protect MAMU Habitat in the BLM Coos Bay District

Amount and quality of MAMU habitat affected by the construction and operation of the PCGP project.

Minimization Efforts: The following measures were taken in routing the proposed PCGP project to minimize adverse effects to habitat within each of the identified MAMU occupied stands.

- C1080: This stand was identified by surveys conducted in 2013 after the proposed route was filed with FERC. Presently there is only one small TEWA located within the stand (see figure 2.2-9).

- 3098: The MAMU surveys performed in 2008 identified this stand. Minor alignment adjustments reduced habitat removal within this stand. The adjustments shortened the route and minimized an acute alignment angle (PI), which allowed a TEWA to be eliminated (see figure 2.2-10).

- C3075: The proposed route would be partially within an existing road (BLM 28-10-25.0; Elk Mountain Loop) through this stand. The alignment was adjusted slightly to stay within the existing road as much as possible before shifting 90 degrees to continue along the ridgeline to ensure the safety and integrity of the pipeline and to minimize grading/disturbance requirements (see figure 2.2-11).

- C3042: The route was realigned to avoid multiple deep-seated landslides, which would minimize affects to this stand (see figure 2.2-11).

- C3093: The MAMU surveys performed in 2008 identified this stand. The proposed right-of-way would be generally located within an existing road (BLM 28-11-29.0; Elk Creek), which would minimize impacts to this stand. The sizes of the TEWAs in the northern and southern portion of the stand were reduced to further minimize impacts (see figure 2.2-12).

- C3165: This stand was identified from surveys performed in 2013 after the proposed route was filed with FERC. The proposed route is on the north edge of the stand and follows an existing road (BLM 28-11-29.0; Elk Creek). Only a small portion (about 0.6 acres) of this stand would be impacted (see figure 2.2-13).

- C3073: The proposed alignment within stand C3073 would follow an existing road (BLM 28-11-29.0; Elk Creek) except in the western part of the stand, where the alignment crosses a narrow strip of the stand within a Riparian Reserve before intersecting with and following the road. In-road construction would minimize impacts to this stand (see figure 2.2-14).

- C3090: The MAMU surveys performed in 2007 identified this stand. Stand C3090 is bisected by the pipeline right-of-way, which follows a ridgeline. Due to steep topography and the size of this stand, no additional routing avoidance was identified. There is one TEWA on this portion of the route that would be required because of a sharp angle PI and because it is the only topographic break suitable for staging along this steep narrow ridgeline (see figure 2.2-15).

- C3094: The MAMU surveys performed in 2008 identified this stand. The proposed right-of-way follows a ridgeline and just clips the southern edge of this stand. Use of UCSAs areas instead of TEWAs would minimize removal of habitat within stand C3094 (see figure 2.2-16).

- C3095: The MAMU surveys performed in 2008 identified this stand. The proposed right-of-way would be located within an existing access road (BLM 28-10-9.4; Weaver-

Sitkum Tie Road). In-road construction techniques and the use of uncleared storage areas would minimize habitat removal within this stand (see figure 2.2-17).

- C3070: This stand is within mapped LSR 261. Only a small portion (about one acre) of this stand would be cleared for the project (see figure 2.2-18).
- C3092: The MAMU surveys performed in 2007 identified this stand. Micro-adjustments moved the right-of-way further to the edge of the stand to minimize habitat removal. A small portion (less than one acre) of the northern most edge of this stand would be cleared (see figure 2.2-19).

Figure 2.2-9. Map of MAMU Occupied Stand C1080

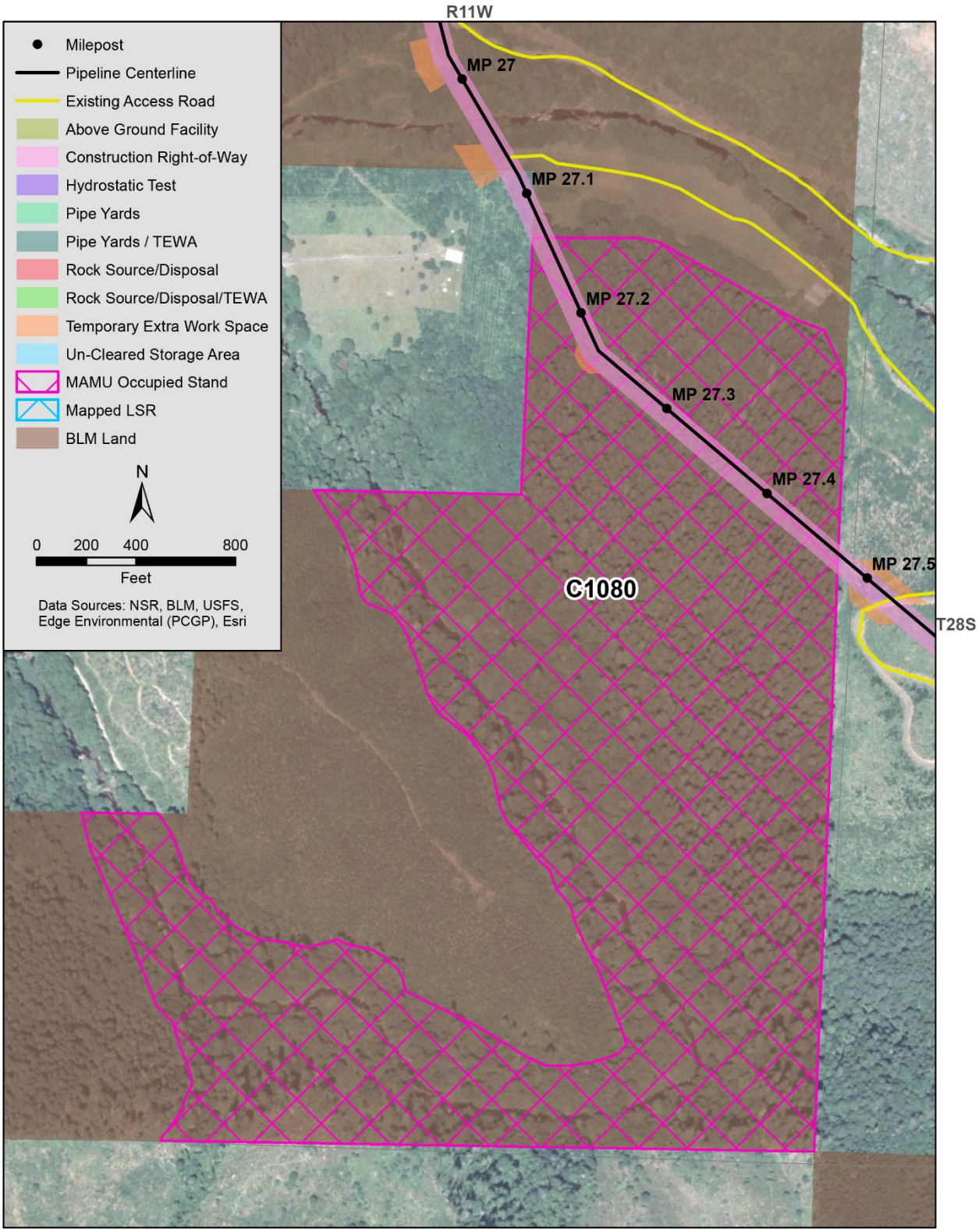


Figure 2.2-10. Map of MAMU Occupied Stand C3098

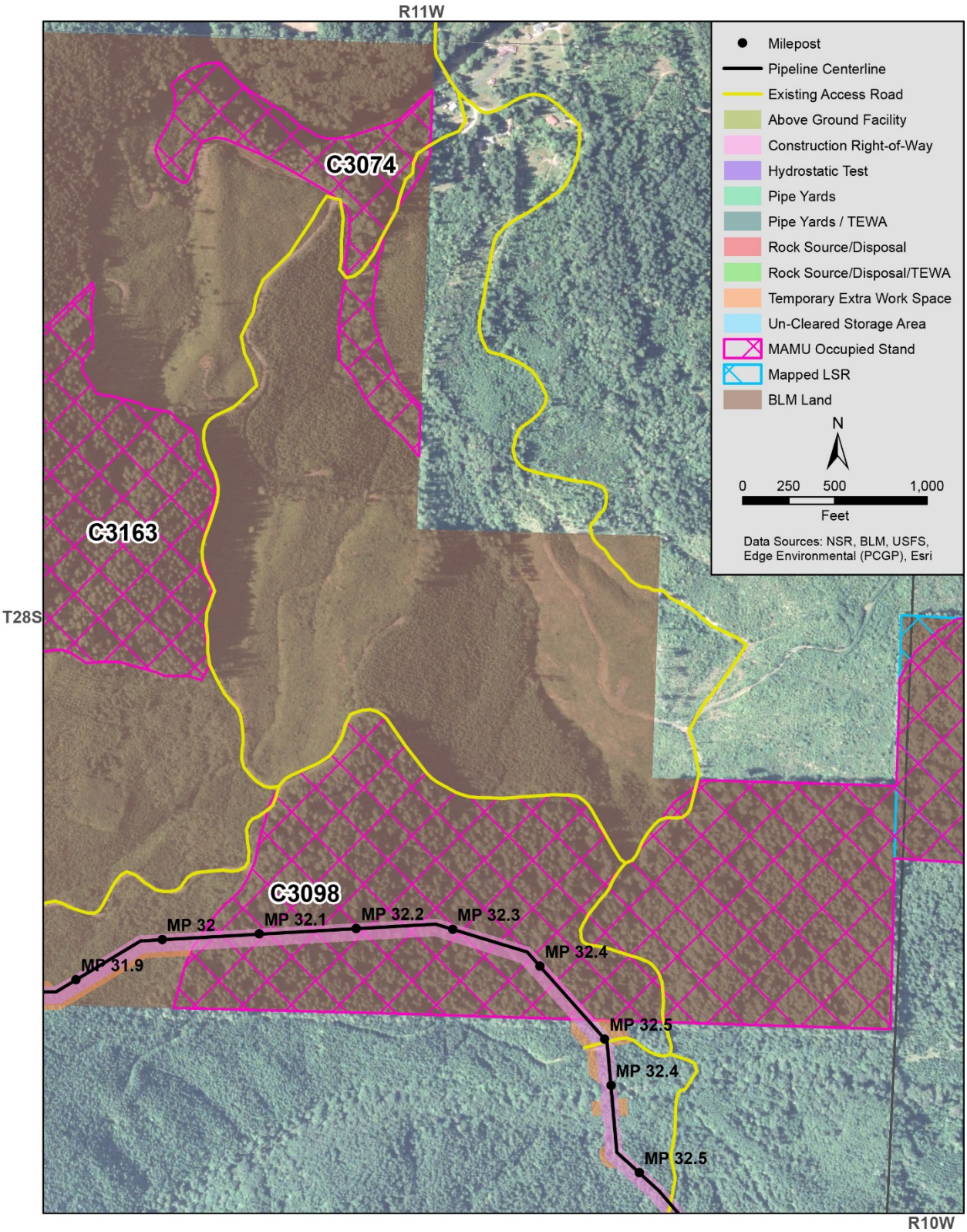


Figure 2.2-11. Map of MAMU Occupied Stand C3075 and C3042

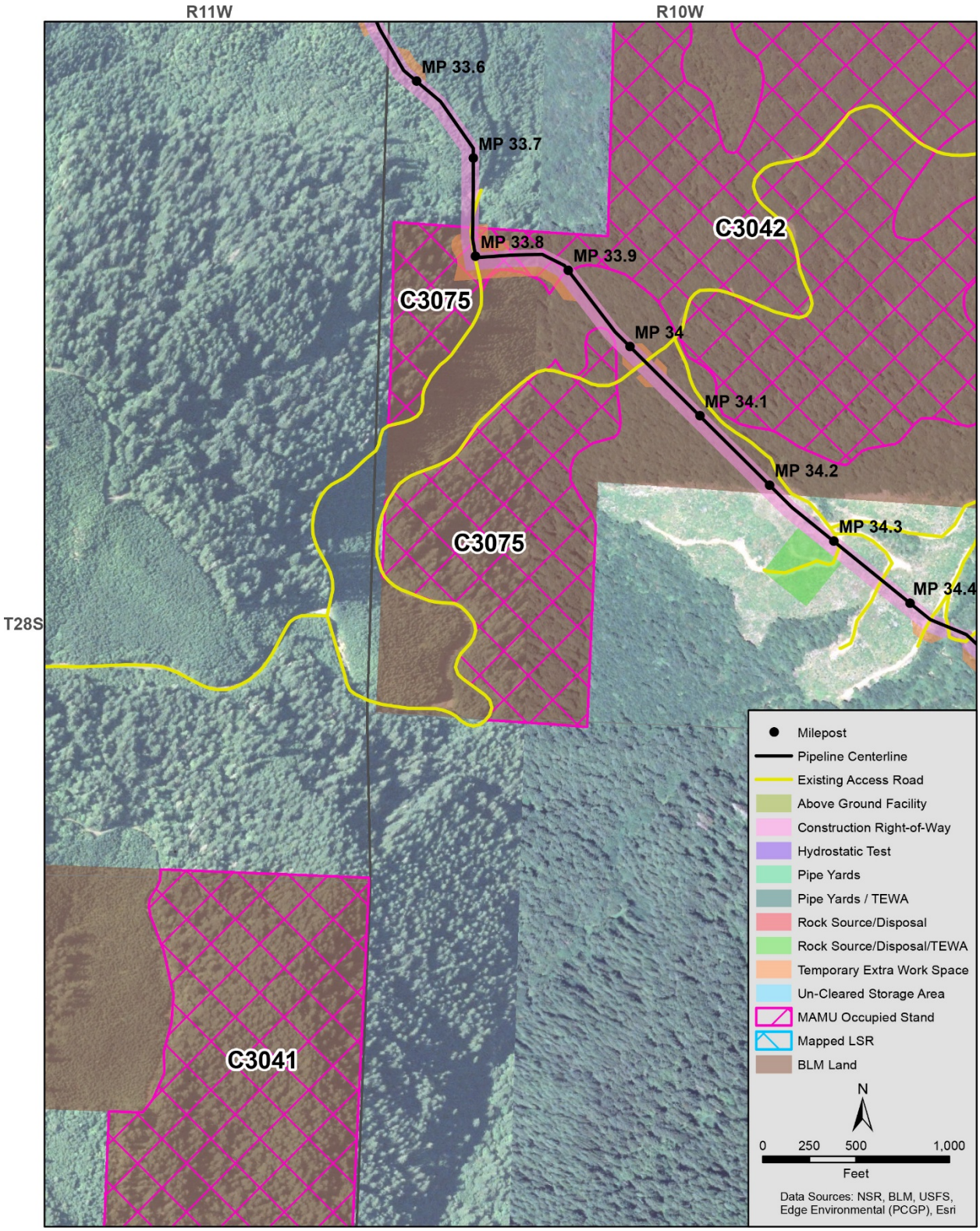


Figure 2.2-12. Map of MAMU Occupied Stand C3093

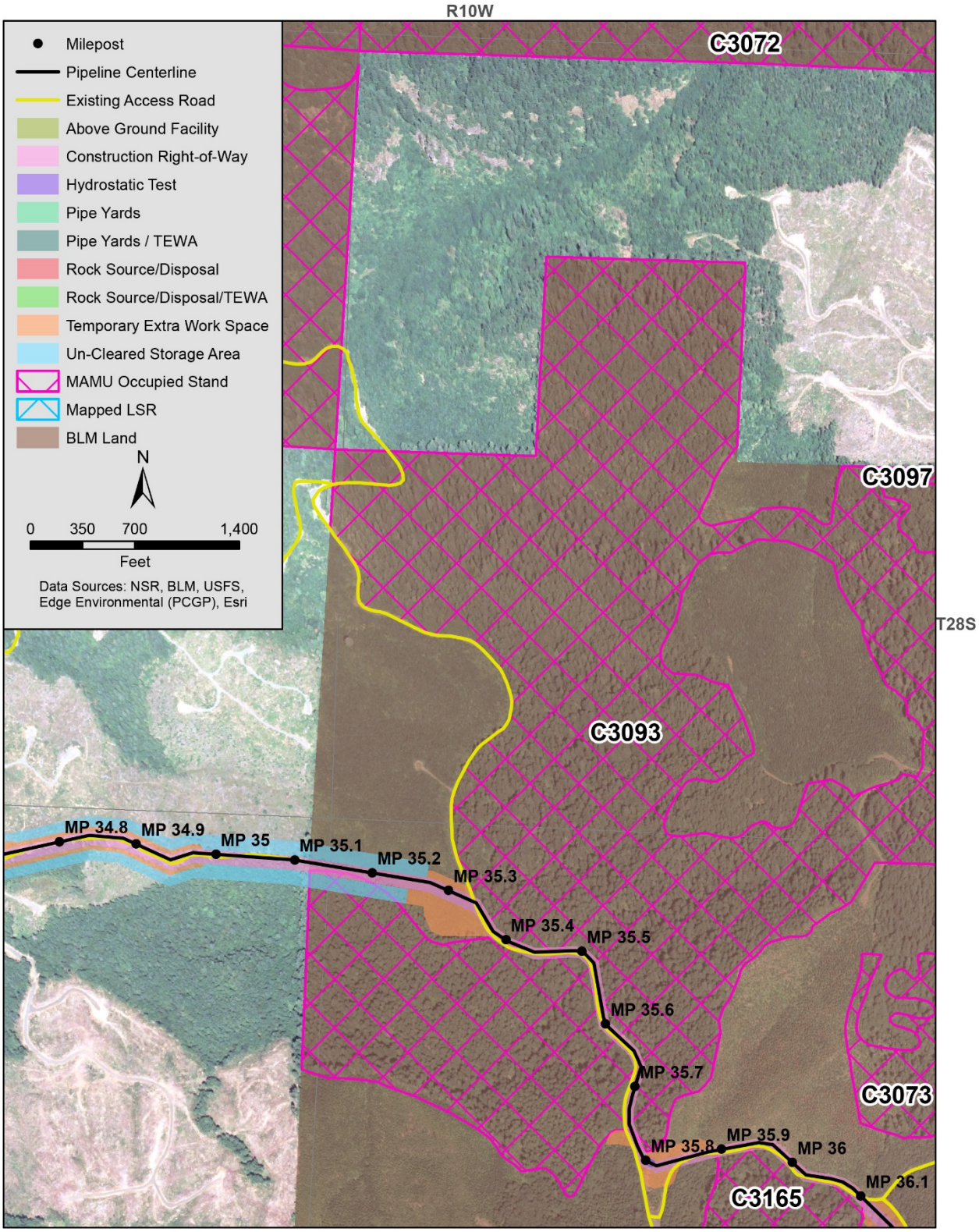


Figure 2.2-13. Map of MAMU Occupied Stand C3165

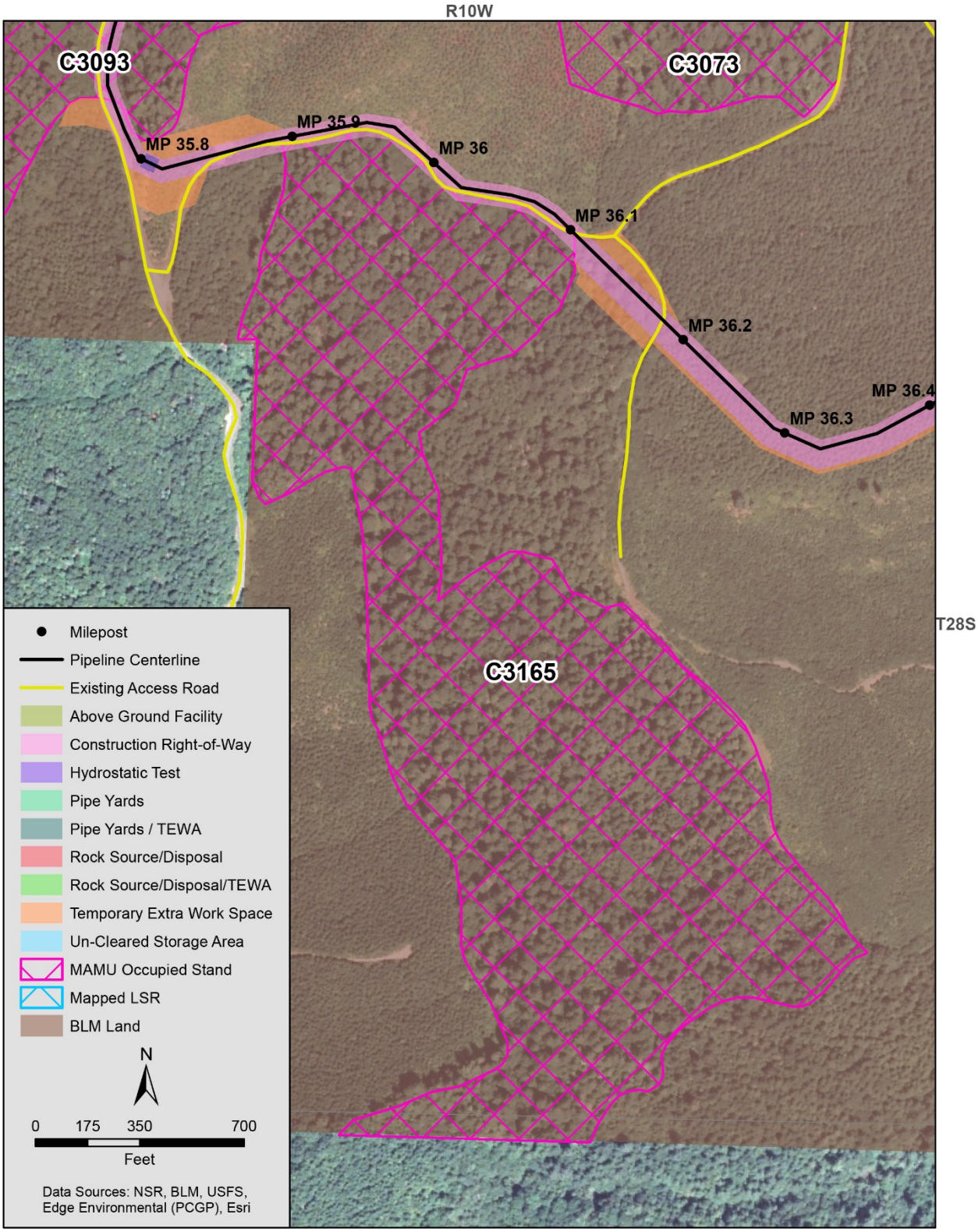


Figure 2.2-14. Map of MAMU Occupied Stand C3073

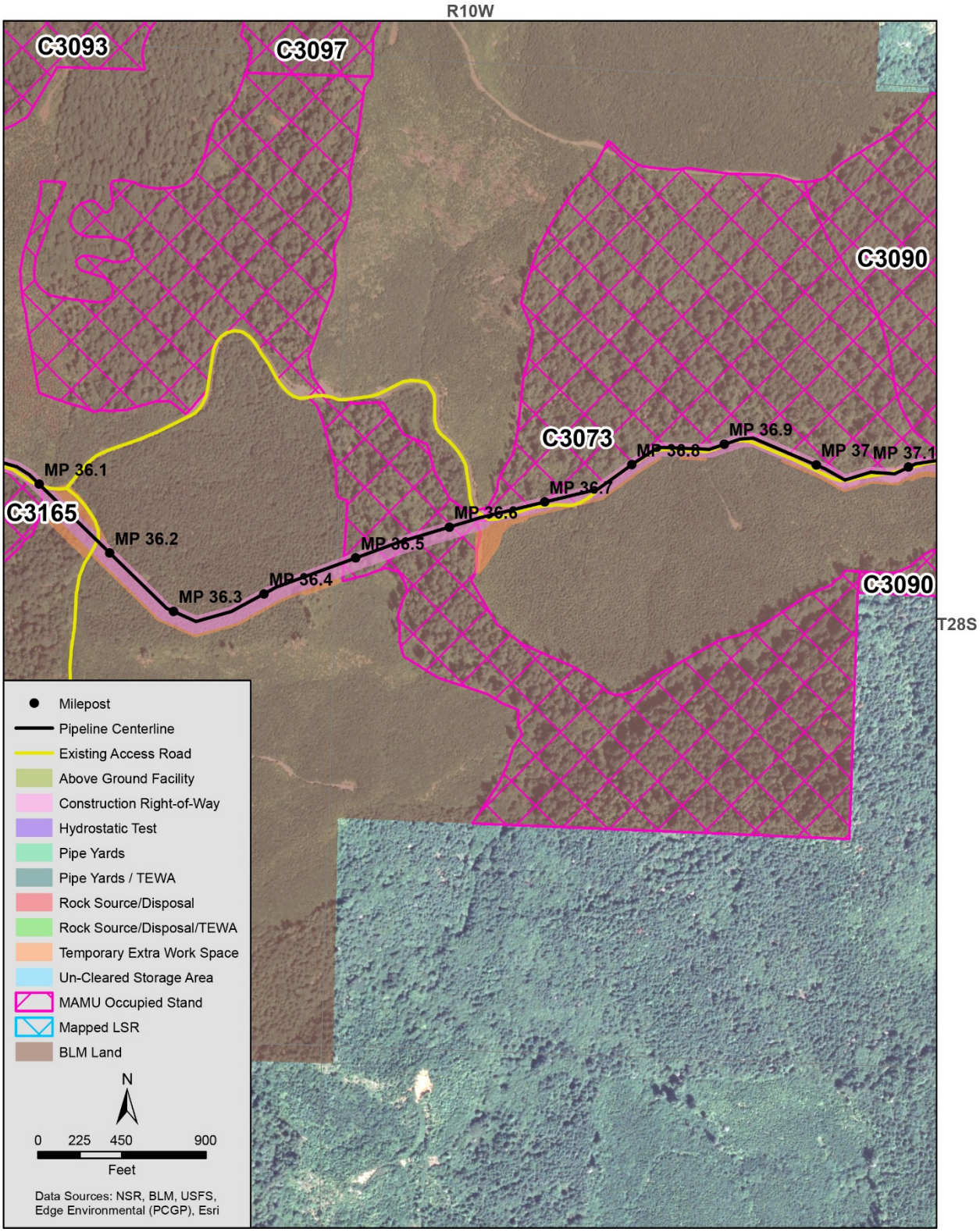


Figure 2.2-15. Map of MAMU Occupied Stand C3090

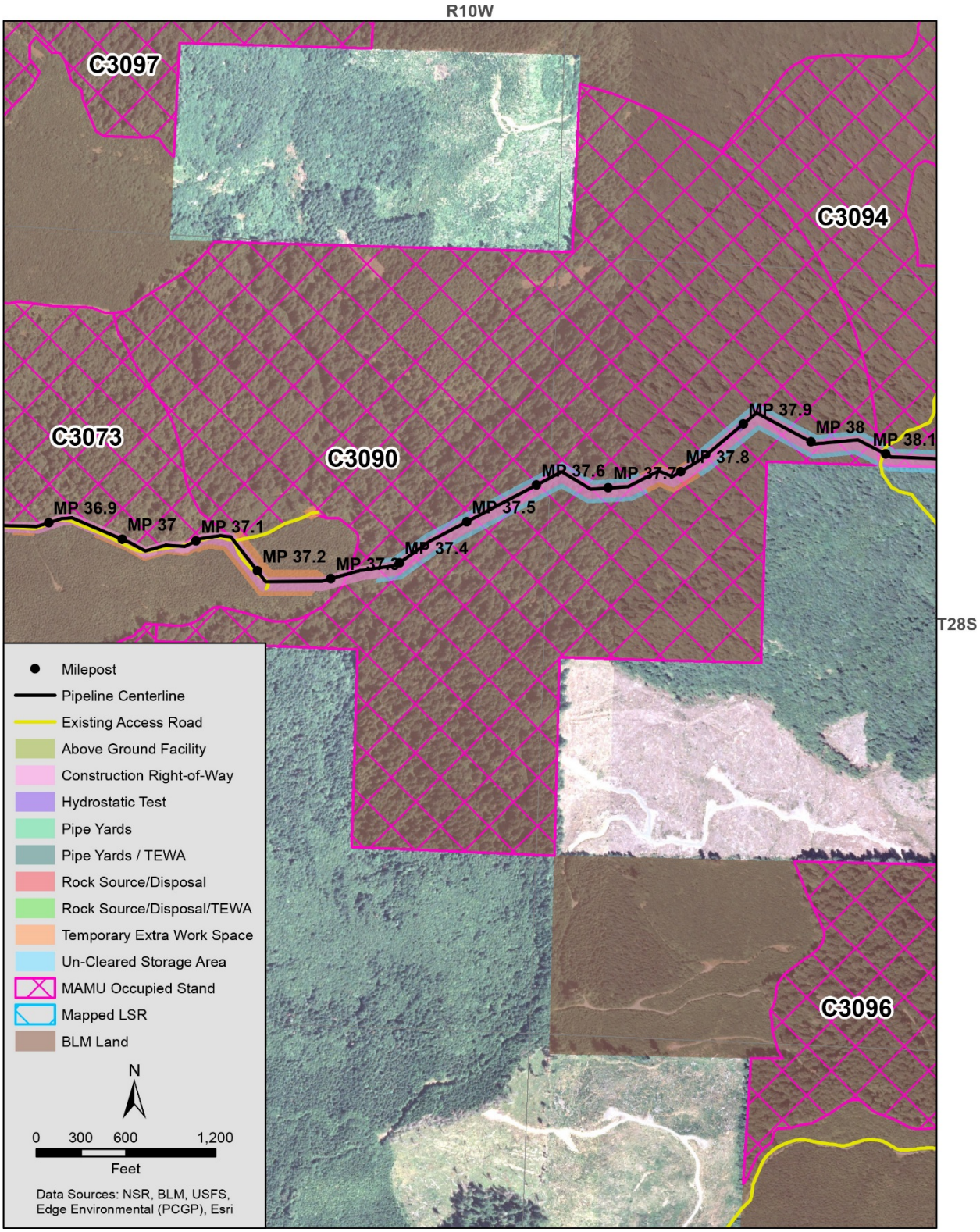


Figure 2.2-16. Map of MAMU Occupied Stand C3094

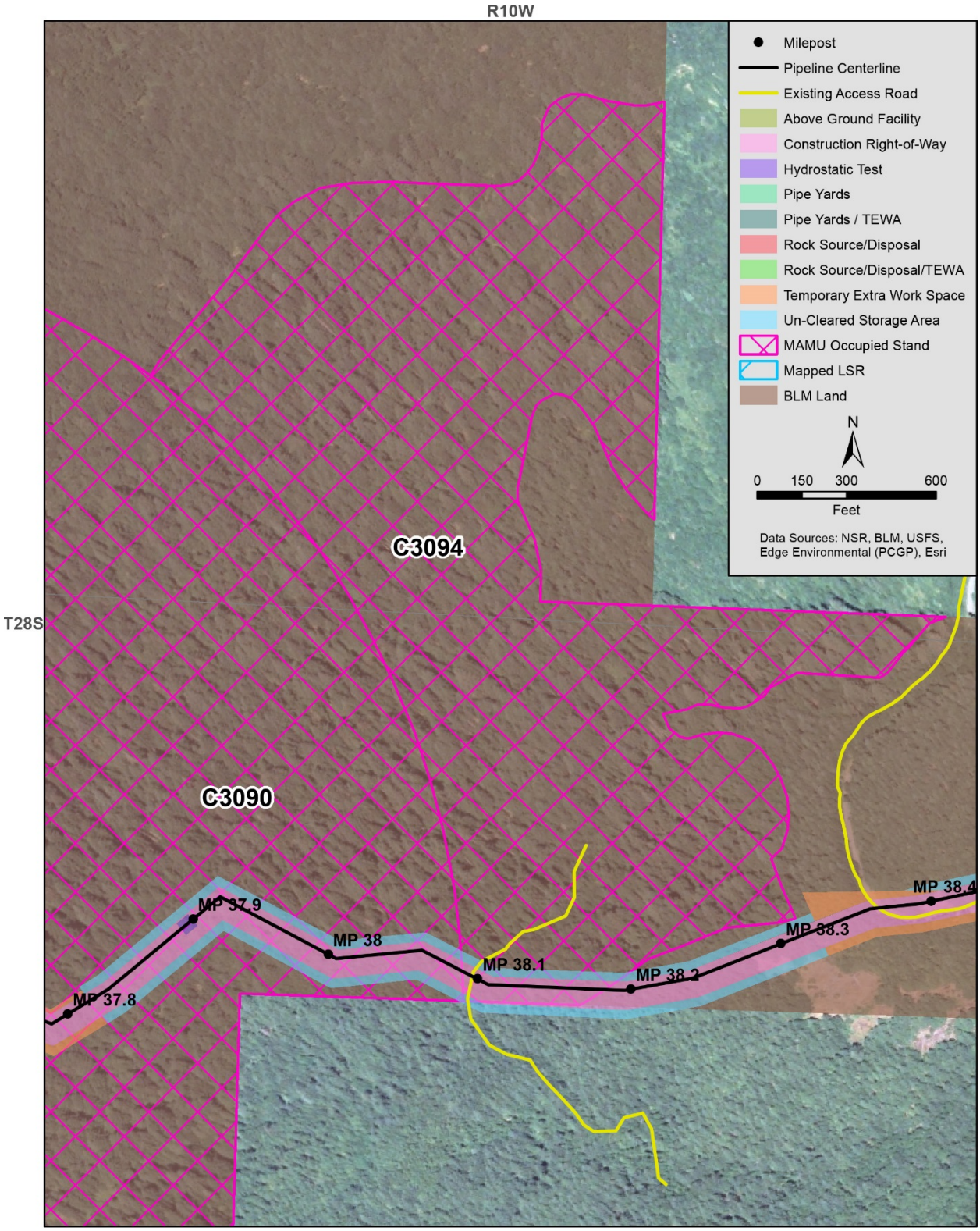


Figure 2.2-17. Map of MAMU Occupied Stand C3095

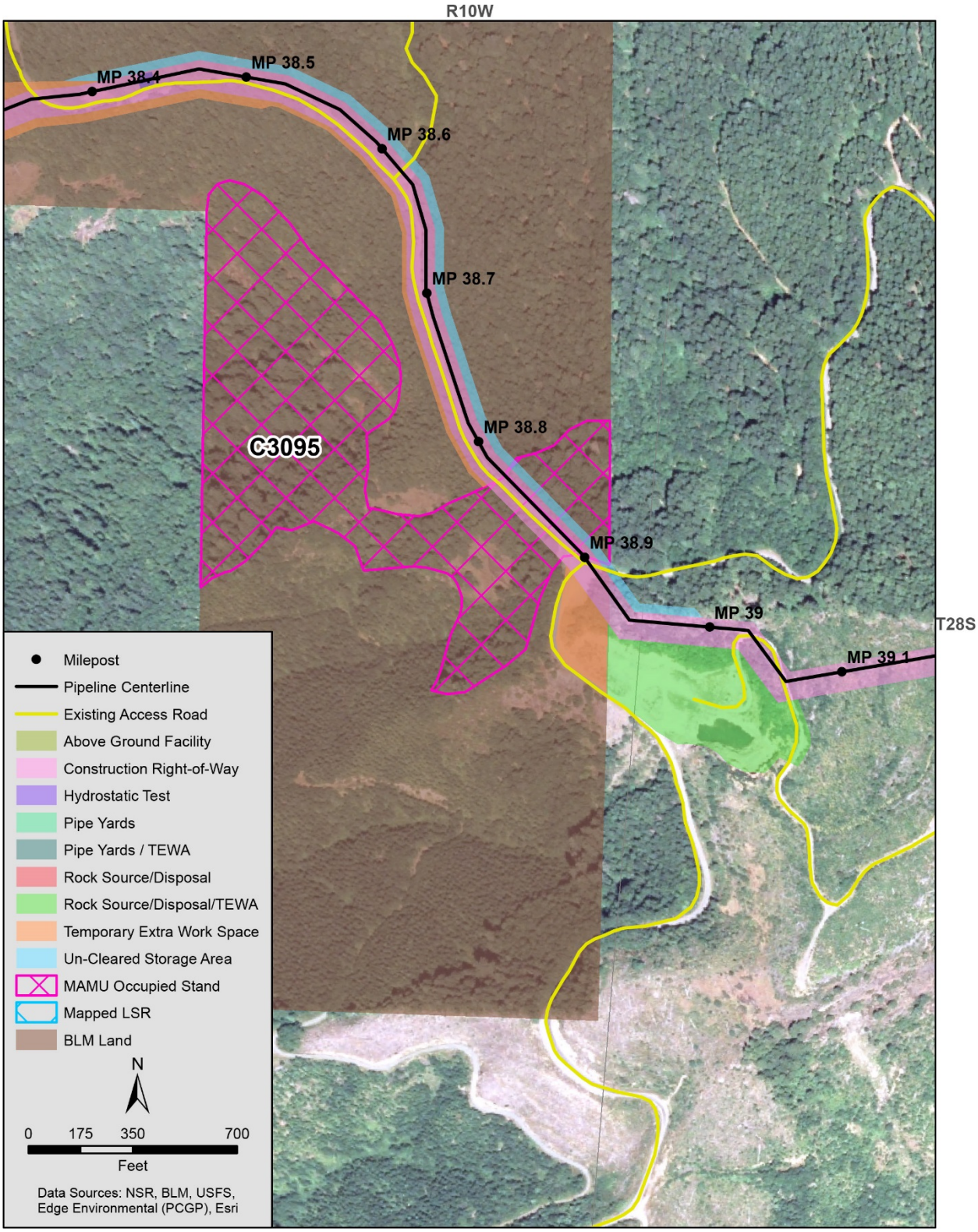


Figure 2.2-18. Map of MAMU Occupied Stand C3070

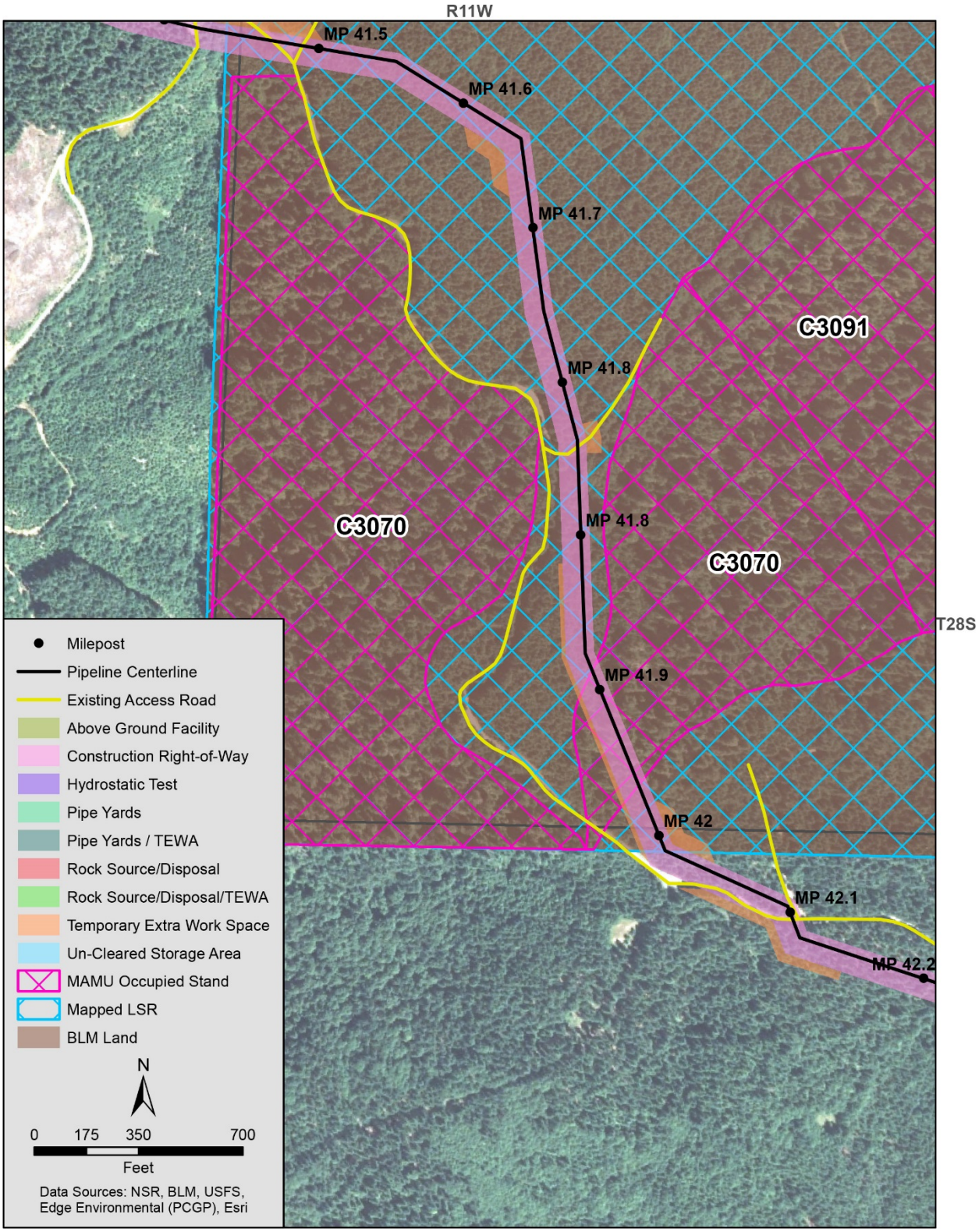
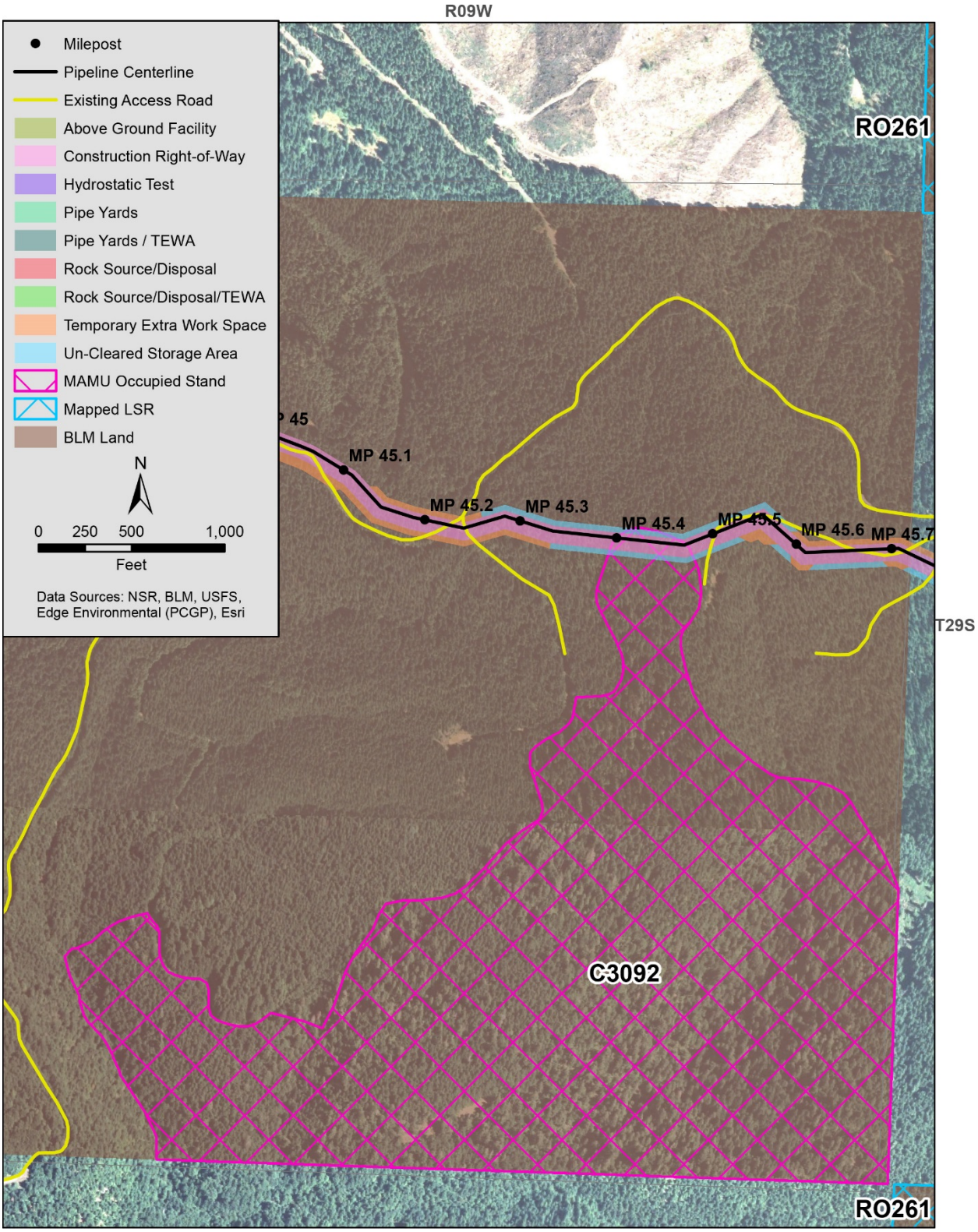


Figure 2.2-19. Map of MAMU Occupied Stand C3092



Currently, based on the latest BLM GIS data layers there are approximately 1,225 acres of LSOG forest habitat within the twelve occupied MAMU stands impacted by the PCGP project on the Coos Bay District. The PCGP project would require removing approximately 34 acres of forest vegetation in occupied MAMU stands from both the pipeline corridor and the TEWAs. Approximately 15 of these acres would be LSOG forest habitat. This would result in an approximate one percent reduction of the existing LSOG habitat within these twelve occupied MAMU stands.

The area proposed to be reallocated to LSR 261 is in the immediate vicinity of the occupied MAMU stands that would be affected (see figure 2.2-6 above). A large portion of this area (approximately 611 acres) contains occupied MAMU habitat (see discussion for RMP Amendment BLM-4 above). Although this habitat is currently protected by the management direction in the Coos Bay RMP, reallocating it to become part of a designated LSR would provide additional protections and benefits for MAMU habitat. The additional protection would result from the area being protected not just because of the existing habitat condition but as a land allocation dedicated to the management of late successional habitat. The additional benefits would result from the surrounding non-habitat areas being managed in the future to become LSOG forest, thereby consolidating larger contiguous blocks of habitat. A summary of the acres that would be affected both directly and indirectly from the construction of the PCGP project is displayed in table 2.2.1.4-3 and figure 2.2-20.

TABLE 2.2.1.4-3

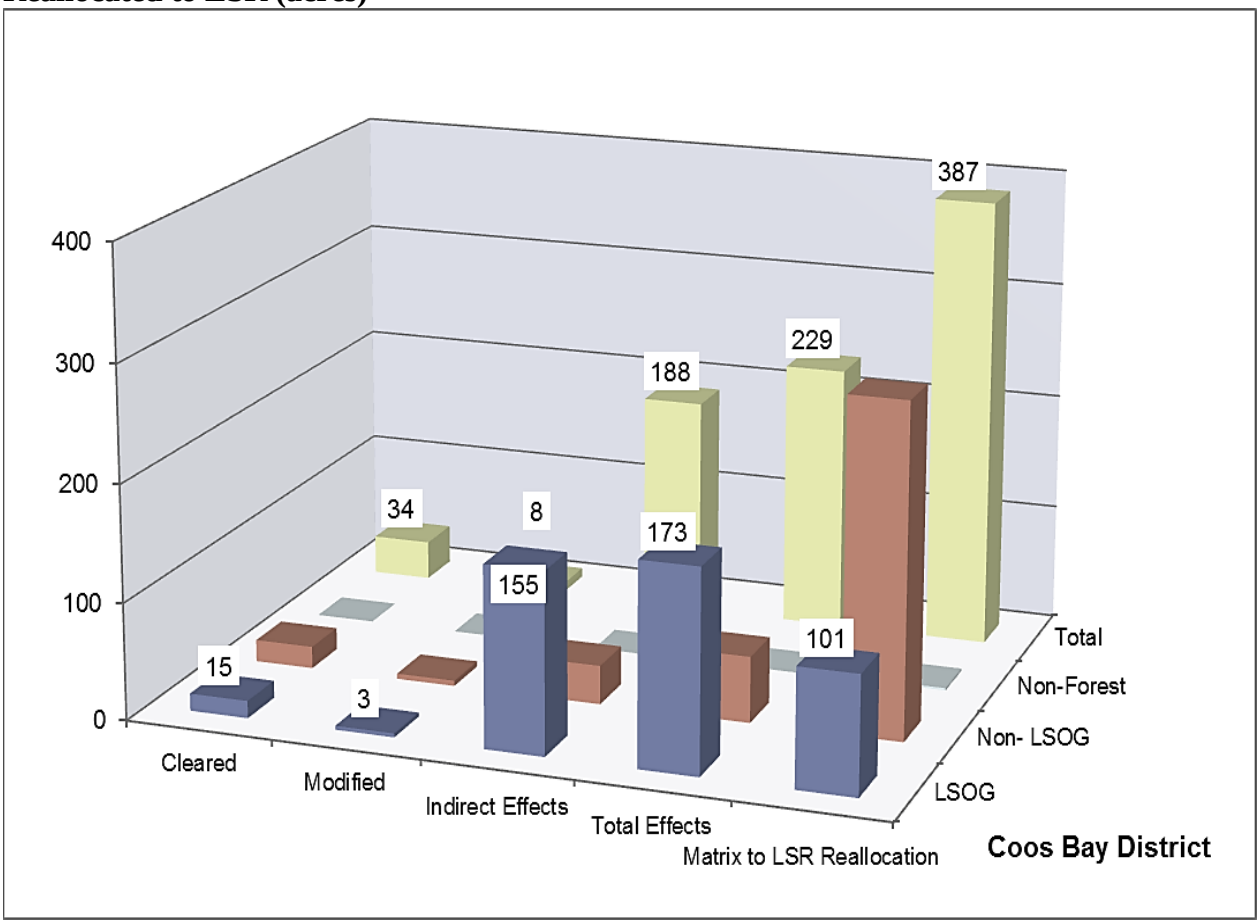
Comparison of Total PCGP Project Effects a/ on MAMU Stands and Matrix Reallocated to LSR (acres)

Coos Bay District	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	15	3	155	173	101
Non- LSOG	19	5	33	57	284
Non-Forest	0	0	0	0	2
Total	**34**	**8**	**188**	**229**	**387**

Data source: BLM, USFS GIS Data Layers

a/ PCGP project total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).

Figure 2.2-20. Comparison of Total PCGP Project Effects on MAMU Stands and Matrix Reallocated to LSR (acres)



Aggregated Impact of the Proposed PCGP Project on Mapped and Unmapped LSRs in the Coos Bay District

Approximately 101 acres of the 387 acres of matrix lands being reallocated to LSR contain LSOG forest habitat. A comparison of the total LSR acres that would be affected by the proposed PCGP project in the Coos Bay District (in both mapped and unmapped LSRs) and the matrix acres reallocated to LSR is in table 2.2.1.4-4 and figure 2.2-21.

TABLE 2.2.1.4-4

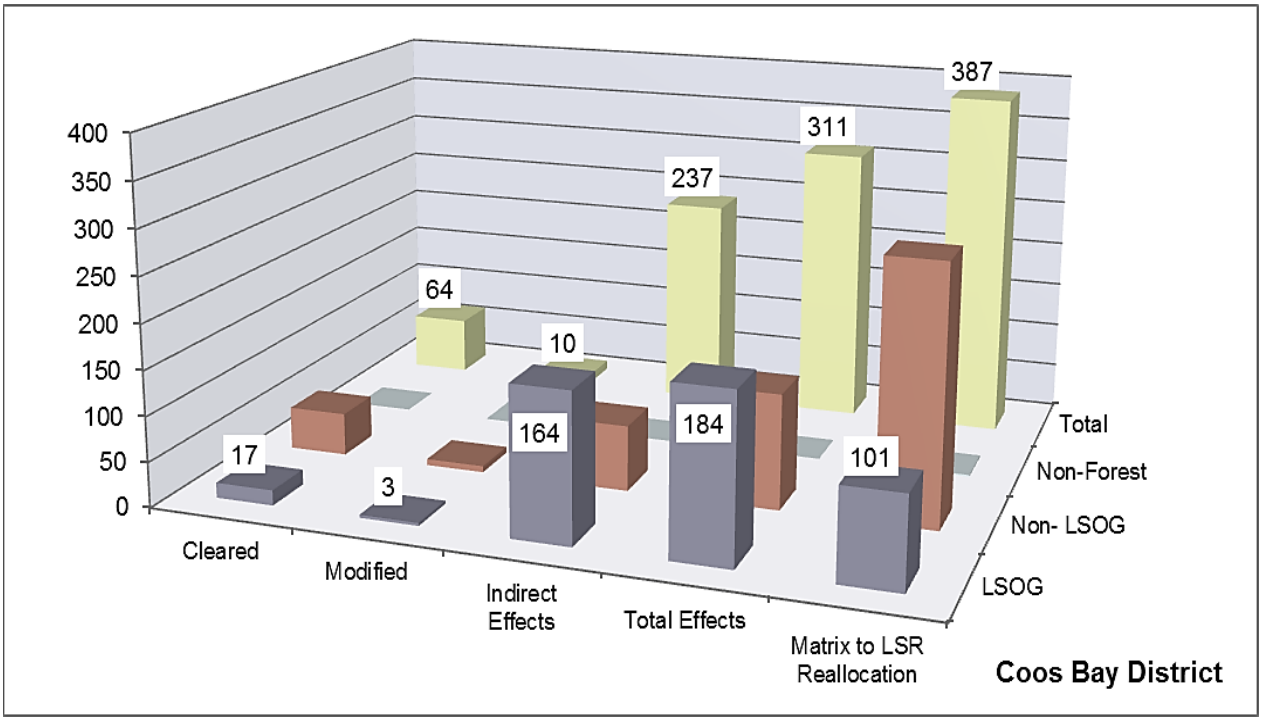
Comparison of the Total PCGP Project Effects a/ on LSRs and Matrix Reallocated to LSR (acres)

Coos Bay District	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	17	3	164	184	101
Non- LSOG	47	7	73	127	284
Non-Forest	0	0	0	0	2
Total	**64**	**10**	**237**	**311**	**387**

Data source: BLM, USFS GIS Data Layers

a/ PCGP project total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG) in both mapped and unmapped LSR.

Figure 2.2-21. Comparison of Total LSR Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



A total of approximately 64 acres of LSR lands would be cleared by the construction of the PCGP project in the Coos Bay District. Approximately 17 of these acres would be LSOG forest habitat. The proposed amendment would reallocate more than six times the amount of LSOG forest that would be cleared for the construction of the project.

Mitigation Actions

In addition to the reallocation of matrix land to LSR, the Coos Bay District is also proposing to construct three heli-ponds. Two of them would be in the East Fork Coquille watershed and the other in the Middle Fork Coquille watershed (see figure 2.2-5 above). High-intensity fire has been identified as the single factor most affecting LSOG forest habitats on federal lands in the area of the NWFP (Mouer et al. 2011). Construction of the pipeline and associated activities would remove both mature and developing stands and would increase fire suppression complexity; however, the corridor would also provide a fuel break that could aid in suppression efforts. Within the East/Middle Fork watersheds, there is an 18-plus mile gap between helicopter accessible waterholes. Quick response time is imperative for successful control in wildfire situations during the initial attack. Most water sources in this area are low in the drainage and accessible only by truck. Heli-ponds at these locations would reduce the 18 mile gap to approximately 6 miles and would enable a 2 to 3 mile radius for aerial application. Fire control is necessary to protect LSRs and endangered species habitat should a wildfire occur. These heli-ponds would reduce initial attack response times in both the mapped and unmapped LSRs that would be affected by the PCGP project and increase the potential to control fires before they become high-intensity fires that threaten LSOG forests.

Aggregated Amendments to LSR 261

There are no other proposed amendments related to LSR 261 in the Coos Bay District. There is, however, another amendment being proposed for LSR 261 in the Roseburg District of the BLM. The combined amendments to LSR 261 are evaluated and discussed in Section 2.2.2.5.

2.2.1.5 Evaluation of the Proposed Amendments and Mitigations Relevant to the Coos Bay District RMP Objectives

Two LRMP amendments and one mitigation measure are associated with LSRs in the Coos Bay District. Proposed amendment BLM-1 would waive the requirement to protect all MAMU habitat within occupied stands. A total of 34 acres would be cleared within twelve occupied MAMU stands. The proposed waiver is project specific, meaning that it would apply only to the PCGP project. Proposed amendment BLM-4 would reduce the matrix land allocation in the Coos Bay District by 387 acres from 55,300 acres to 54,913 acres, or by about 0.7 percent. This amendment would increase LSR 261 by 998 acres from 70,357 acres to 71,355, or by 1.4 percent. This proposed change would affect the 988 acres as shown in figure 2.2-6 for the life of the current RMP. The proposed mitigation would create three heli-ponds, one in the Middle Fork Coquille watershed and two in the East Fork Coquille watershed.

The objective for the LSR land allocation in the Coos Bay District RMP states, "Protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth forest-related species including the NSO and MAMU. Maintain a functional, interacting, late-successional and old-growth forest ecosystem" (USDI May 1995, page 18).

The objective in the Coos Bay District RMP for managing MAMU habitat states, "Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and bureau special status species policies" (USDI May 1995, page 32).

The proposed amendments and mitigation would not alter the objectives of the Coos Bay District RMP for LSRs for the following reasons:

- The quantity, quality, and distribution of LSOG habitat within LSR 261 would be either maintained or improved with the proposed reallocation of matrix to LSR RMP amendment (see discussion in section 2.2.1.4 *Impact on the Functionality of LSR 261 on the Coos Bay District* above)

- The quantity and quality of LSOG habitat within and adjacent to occupied MAMU stands would be either maintained or improved with the proposed reallocation of matrix to LSR (see discussion in section 2.2.1.4 *Amount and quality of MAMU habitat affected by the construction and operation of the PCGP project* above).

- The construction of the heli-ponds would provide increased protection of the existing LSOG forest habitat in both the mapped and unmapped LSRs from loss due to intensive fire through reduced initial response times. These measures along with the reallocation of matrix lands to LSR have been designed so that the overall effect on LSRs would be neutral or beneficial, thereby maintaining the goals for LSRs in the Coos Bay District.

Both the reallocation of matrix lands to LSR and the proposed mitigation would be consistent with the goals of the LSR land allocation to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG-related species. They would also be consistent with the management recommendations in the LSRA for LSR 261 by consolidating blocks of LSOG forest habitat and providing increased protection of existing LSOG forest habitat from intensive fire.

An objective in the Coos Bay District RMP for matrix land is to produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability. Moving a net of 387 acres from matrix to LSR 261 would not prevent attainment of objectives for matrix in the Coos Bay District RMP because:

- Allowable Sale Quantity (ASQ) would be minimally affected between now and the time that the Coos Bay District RMP is revised. The CMP includes a provision that approximately 387 acres of non-federal forest lands would be acquired by the applicant to replace matrix lands lost to reallocation. As a practical matter, if a linear relationship between acres and outputs is assumed, the potential effect would be less than 1 percent of the District's ASQ since the amendments affect less than 1 percent of the general forest management land base. With the acquisition of 387 acres of forest land to be added to the matrix land base, the potential timber output would not be reduced. The amendments would not prevent future vegetation management activities such as commercial thinning in LSR 261, which would also contribute to the local forest products industry. Also, the off-site mitigation measures would provide increased protection for forested stands in the matrix in this area by reducing initial response times and increasing the potential to prevent loss of commercial timber from intensive fire.

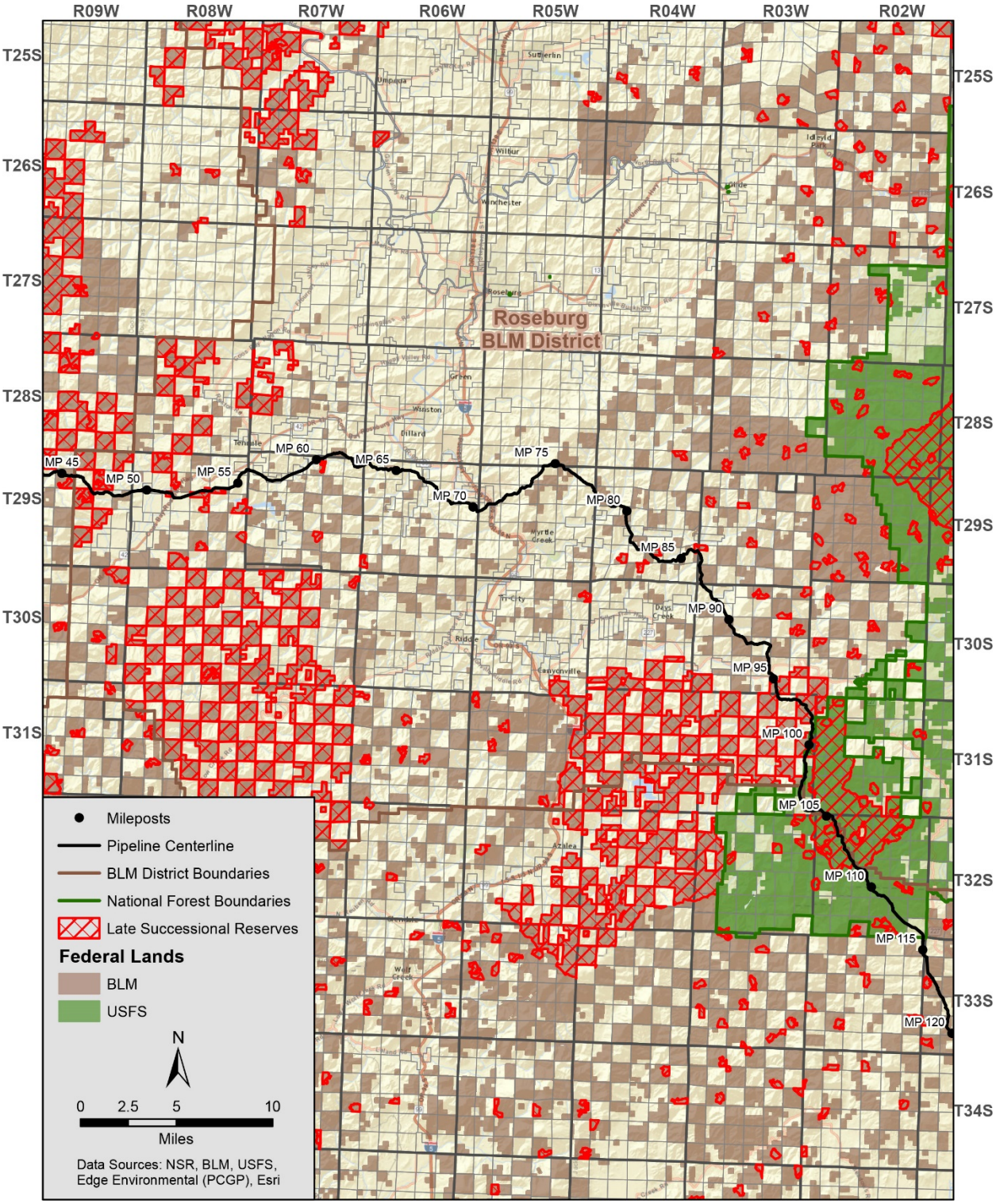
These changes would not have an important effect on the objectives identified in the RMP or affect land resources throughout a large portion of LSR land allocation in the Coos Bay District.

2.2.2 Roseburg District

The Roseburg District RMP as amended guides all resource management activities in the District. The RMP provides the vision and strategy for the land allocations and resource programs as well as the management actions/directions for each of the land use allocations and resource programs (USDI 1995b). The Roseburg District RMP is available at http://www.blm.gov/or/districts/roseburg/plans/roseburgrmp.php. A map of the proposed PCGP project and LSRs in the Roseburg District is displayed in figure 2.2-22.

In the Roseburg District, the construction of the PCGP project would directly affect approximately 12 acres of LSR 261 and 67 acres of LSR 223. The construction would also directly affect approximately 37 acres of occupied MAMU stands within both mapped and unmapped LSR and approximately 16 acres within three KOACs.

Figure 2.2-22. Map of Proposed PCGP Project and LSRs in the Roseburg District



2.2.2.1 Existing Conditions of Mapped LSR 261

Summary from LSRA

This information is provided in section 2.2.1.1.

Recent Changes

There have been no notable changes in the transportation system or fire history in LSR 261 in the Roseburg District since the LSRA was written in 1998. Several density-management treatments designed to accelerate LSOG forest habitat conditions have occurred since 1999 on approximately 544 acres. Vegetation management has also included pre-commercial thinning on approximately 5,622 acres and some treatments for invasive plants.[4]

Agency Recommendations

Since there have been no significant changes in the conditions of this LSR in the Roseburg District, there would be no changes to the recommendations or priorities for management activities in the LSRA.

2.2.2.2 Existing Conditions of Mapped LSR 223 in the Roseburg District

Summary from LSRA

The South Umpqua River/Galesville Late-Successional Reserve Assessment (USDA and USDI 1999) addresses one LSR in the Roseburg and Medford Districts of the BLM and the Umpqua National Forest totaling about 66,900 acres. This LSR is a major habitat link between the Coast Range and Cascade Provinces. The LSR is addressed in the context of a 104,140-acre assessment area.

This LSR lies in a critical east-west connectivity area between two large valley systems. To the south is the Rogue River valley and to the north is the Umpqua valley. North and south of this LSR, there are essentially no neighboring LSRs. The LSR is located at the south end of the Umpqua valley in a landscape dominated by intermingled BLM and private lands. To the east and southeast of the LSR, there is a block of Forest Service lands. The lack of federal ownership across the I-5 corridor in most of western Oregon makes this area a vital link between major physiographic provinces.

Vegetative conditions, past and present, have been influenced by environmental and human factors. Late-successional stands are estimated to have historically covered from 40 to 75 percent of southwestern Oregon (USDA 1993). For this LSR, approximately 43 percent (28,767 acres) of the federal lands are in late-successional stands. The objective for management in this LSR is to attain and maintain 60 percent to 75 percent of the federal lands in late-successional stands.

Three general landscape criteria were identified for setting priorities for the location of future treatment areas. These included maintaining or enhancing connectivity across the landscape, establishing large blocks of late-successional habitat, and enhancing suitable spotted owl habitat conditions around centers of activity.

[4] Information provided by Paul Ausbeck, District Planner and Environmental Coordinator, Roseburg District BLM.

The risk of large-scale habitat loss from a wildfire occurring within this LSR is relatively high. The historic fire-return level for the LSR is on the order of 30 to 80 years. The primary objective of fire and fuels management in the LSR is to minimize the loss of late-successional habitat by reducing the risks of high-intensity, stand-replacing wildfires.

The objective of silvicultural systems proposed for this LSR would be to develop old-growth characteristics, including snags, downed logs, large trees, canopy gaps, multiple layers, and diverse species composition. Silviculture treatments, such as reforestation, release, density management, pruning, fertilization, and tree culturing to accelerate the development of desired characteristics, could occur within the LSR

Fire has been a significant if not the dominant factor in maintaining the compositional and structural diversity of the area, as well as fragmenting the late-successional forests. The intensity of fires has varied based on elevation, aspect, and vegetation zones. Forests of all vegetation zones have burned, though the return intervals have been different. The zones in the lower elevations probably had more frequent fires than the Douglas-fir and other conifer-dominated types at higher elevations. Not only were the fuel characteristics more conducive to frequent fires, but the lower elevations probably experienced more frequent human-caused fires as Native Americans burned the valleys and foothills for their own uses. Fire exclusion and the continued suppression of fires became effective around the 1940s. Fire exclusion has resulted in the development of stands that would not have occurred naturally. In some stands, shade-tolerant understories have seeded in that would have otherwise been kept out by frequent low-intensity fires. This is particularly so at the higher elevation zones where white fir has become a more common understory species.

Risk of large-scale habitat loss from a wildfire event occurring within this LSR is relatively high. Fuels and ignition sources are present. The NWFP recognizes that the Oregon Klamath Physiographic Province has an increased fire risk due to lower moisture conditions and rapid accumulation of fuels after insect outbreaks and drought. Fire suppression and exclusion have caused fuels to accumulate to a point that they are outside the range of “historic” variability. Many stands are currently overstocked with conifers, hardwoods, and shrubs.

Changes Since the LSR Was Written

Little fire activity has occurred in LSR 223 in the Roseburg District since the LSRA was written in 1999. The Bland Mountain II Fire burned approximately 36 acres of forest 50 years or older in 2004. There has also been little change in the transportation system, with approximately 2 miles of road being decommissioned and a current road system of about 151 miles on BLM-administered lands. Several density management treatments designed to accelerate LSOG forest habitat conditions have occurred since 1999 on approximately 345 acres. Vegetation management has also included approximately 63 acres of girdling of noncommercial-sized conifers, pre-commercial thinning on approximately 5,137 acres, and some treatments for invasive plants on approximately 159 acres.[5]

Using the most recent GIS data from the latest Northwest Forest Plan Monitoring Report on LSOG forest (Mouer et. al. 2011), the current estimate of LSOG forest in LSR 223 is 20,557

[5] Information provided by Paul Ausbeck, District Planner and Environmental Coordinator, Roseburg District BLM.

acres. This is less than the 28,767 acres estimated when the LSRA was written. However, because the two estimates were derived using different data bases a direct comparison cannot be made.

Agency Recommendations

Since there has been no significant change in the conditions of this LSR in the Roseburg District, there would be no changes in the recommendations or priorities for management activities in the LSRA.

2.2.2.3 Unmapped LSR in the Roseburg District

KOACs

A known spotted owl activity center as described by the NWFP is approximately 100 acres of the best NSO habitat adjacent to a nest site or activity center for all spotted owl sites known prior to January 1, 1994, on federal matrix and Adaptive Management Area lands (USDA and USDI 1994, page C-10). In 2006, BLM provided to Pacific Connector GIS data layers of known spotted owl activity centers within its jurisdictional boundaries. Three KOACs located on matrix lands (unmapped LSRs) within the Roseburg District occur within the PCGP project area (P2199, P0361, and P2294); see table 2.2.2.3-1 and figure 2.2-23.

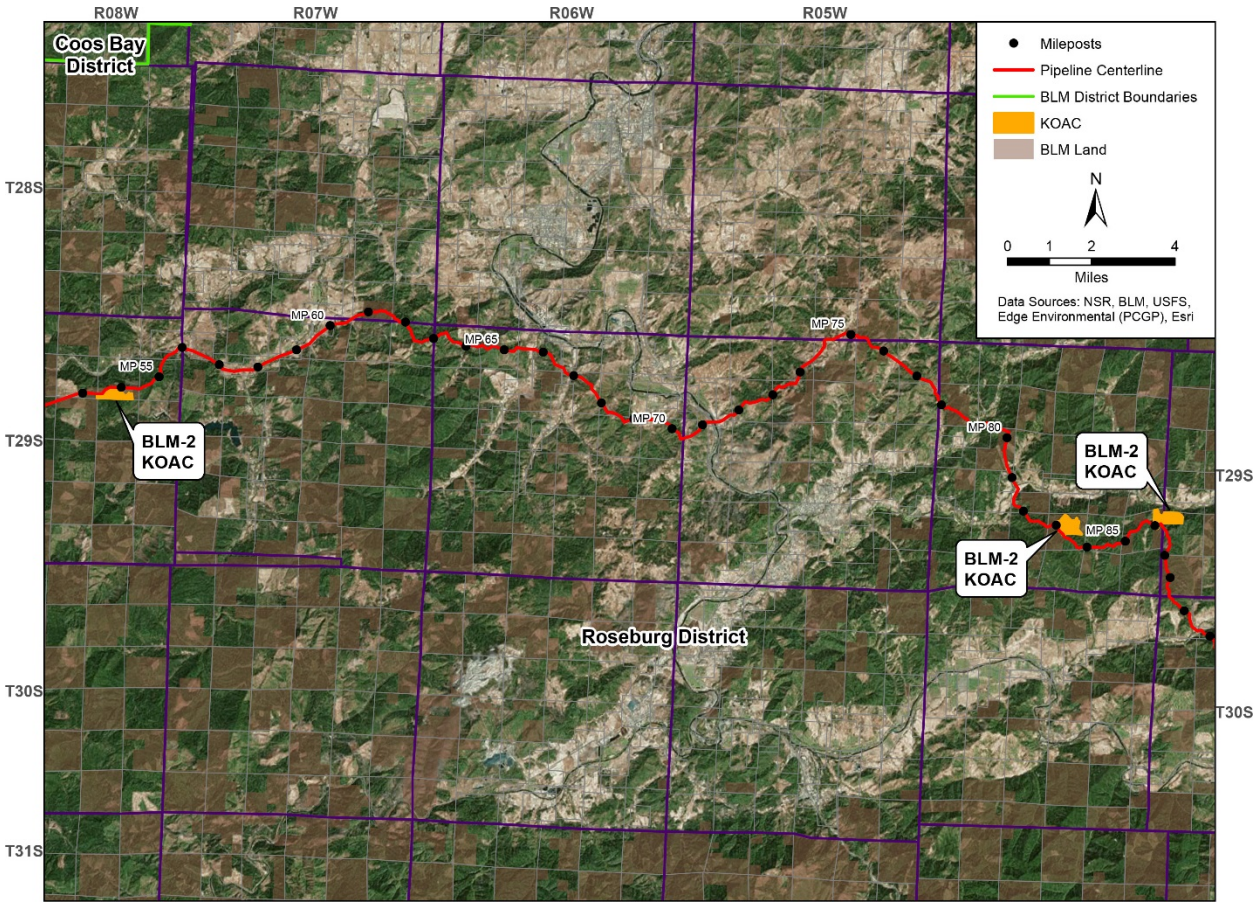
TABLE 2.2.2.3-1

KOAC Sites within the PCGP Project Area in the Roseburg District

Site Identification	Approximate Mile Post Range	Acres Cleared by the PCGP[1]
P2199	MP 53.36–53.76	1.2
P0361	MP 82.95–83.28	4.1
P2294	MP 85.95-86.16	1.9

1. Cleared acres include the PCGP project construction corridor and TEWAs.
Data source: BLM GIS layers

Figure 2.2-23. Map of KOAC Sites Crossed by PCGP Project in the Roseburg District



MAMU

Existing known MAMU occupied sites were inventoried using BLM geographic information system (GIS) layer data in 2006, and one occupied sites was in the proposed PCGP project corridor on the Roseburg District. Additional MAMU surveys were conducted in 2007-2008 and 2012-2013 within the project area, and one additional occupied site was identified on the Roseburg District. BLM delineated the extent of the stand identified during the surveys and incorporated the newly identified stand into the GIS layer. One of the two occupied stands within the PCGP project area on the Roseburg District occurs outside of mapped LSRs on lands that are currently allocated as matrix and the other stand lies within in LSR 261. Approximately 5.4 acres of occupied MAMU stands would be cleared by the PCGP project (see table 2.2.2.3-2). The map in figures 2.2-24 and 2.2-25 displays the known MAMU occupied stands in relation to the project on the BLM Roseburg District.

TABLE 2.2.2.3-2

Known Occupied MAMU Stands in the Roseburg District within the PCGP Project Area

MAMU Occupied Stand	Milepost Location	Acres Cleared a/
R3035 b/	MP 46.90-47.10	3
R3036	MP 51.04-51.29	3
R3051	MP 54.18-54.44	12
R3052 c/	MP 60.85-61.66	1
Total		**19**

a/ Acres cleared equals the clearing in the PCGP corridor and the TEWAs
b/ Occupied MAMU Stand R3035 lies entirely within LSR 261
c/ Occupied MAMU Stand R3052 overlaps with KOAC P2199

Figure 2.2-24. Map of Occupied MAMU Stand R3035

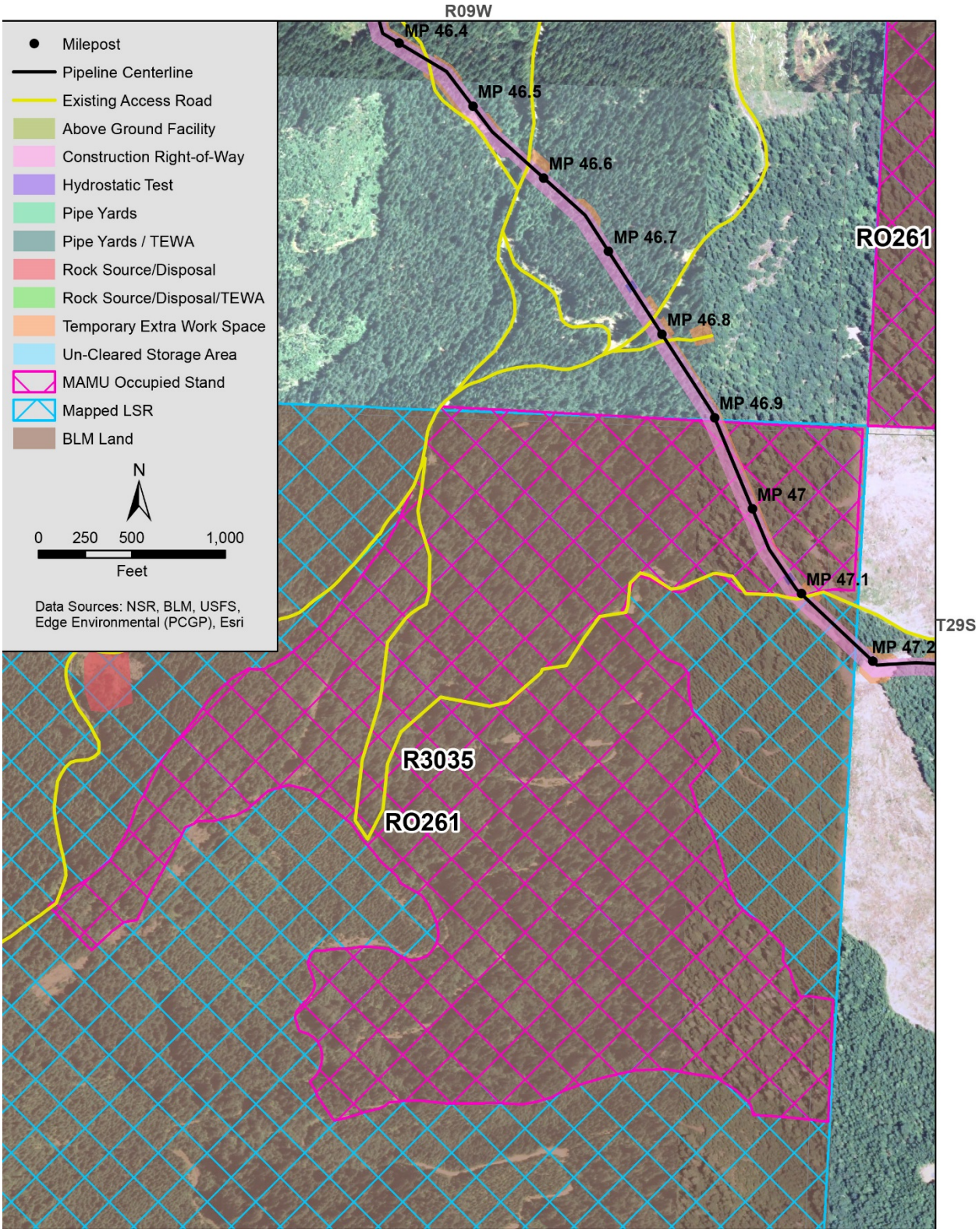


Figure 2.2-25. Map of Occupied MAMU Stand R3036

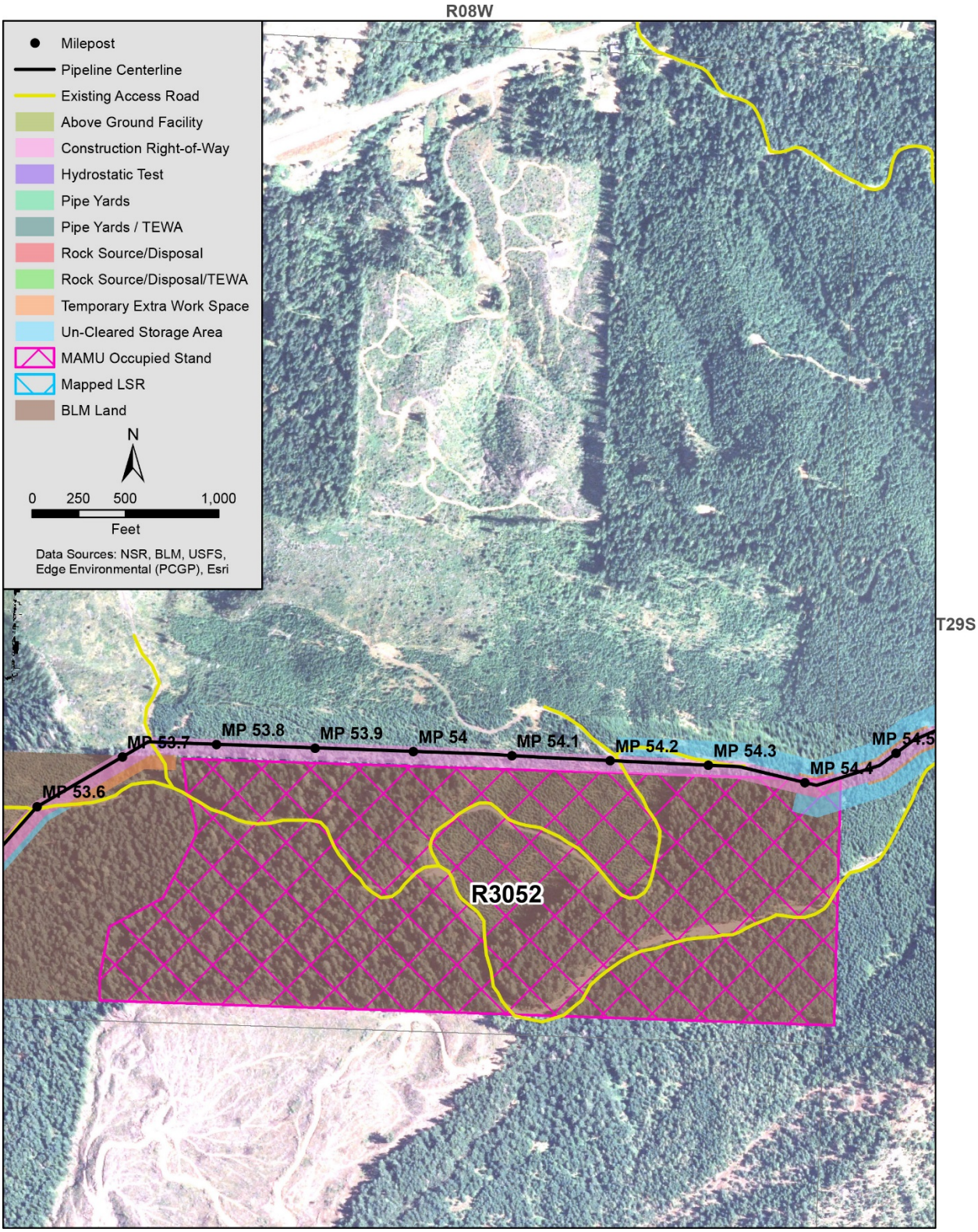


Figure 2.2-25a. Map of Occupied MAMU Stand R3051

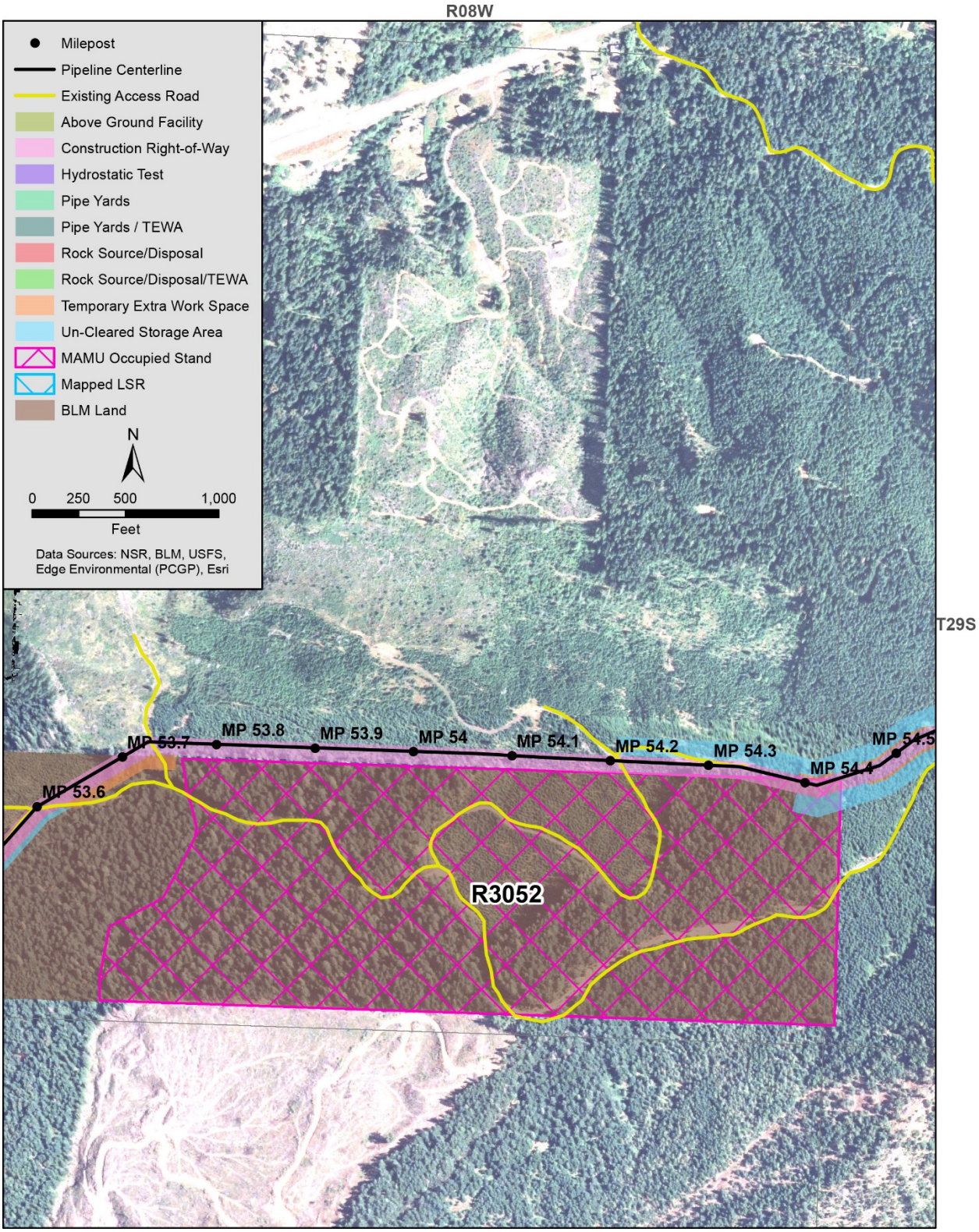
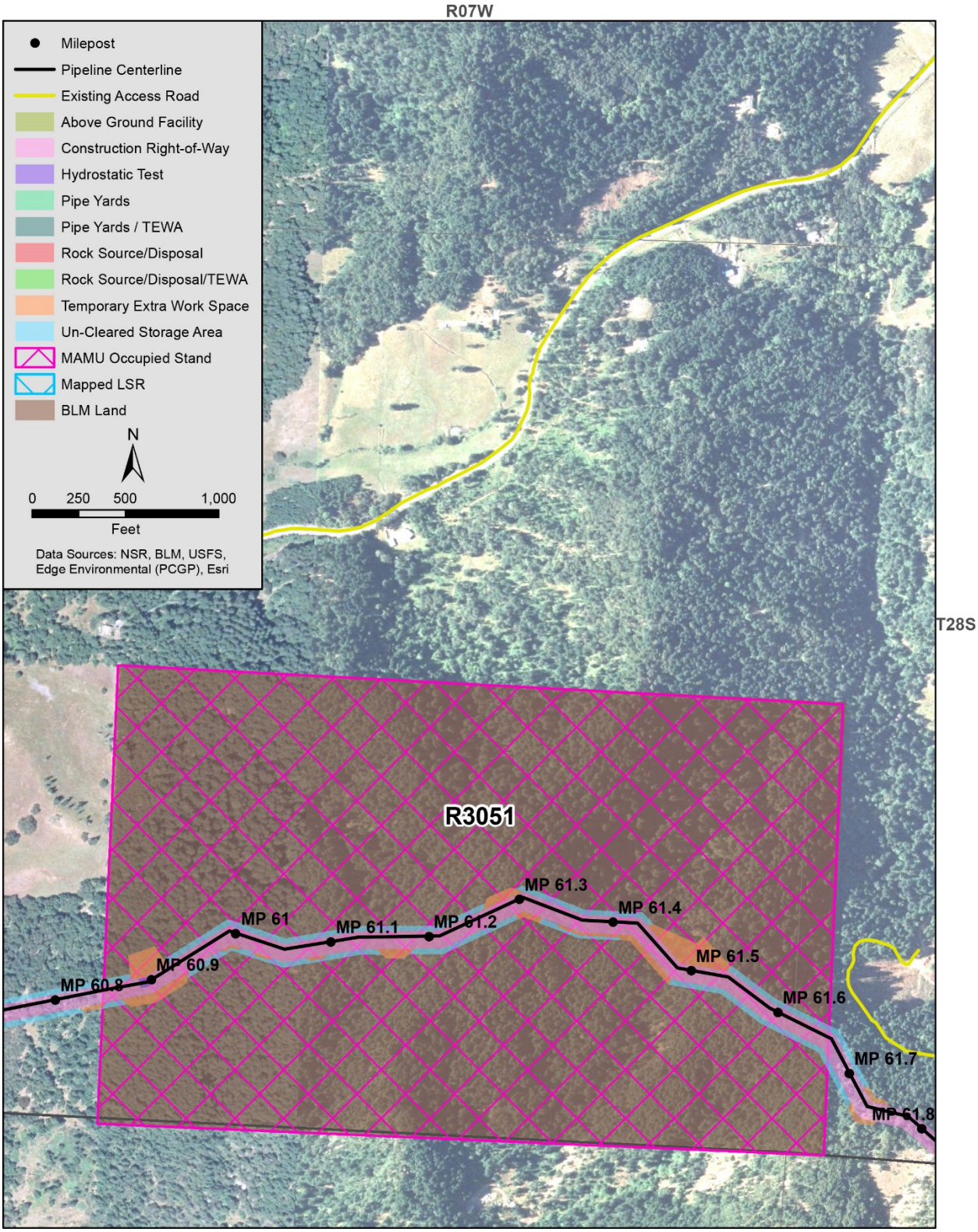


Figure 2.2-25b. Map of Occupied MAMU Stand R3052



2.2.2.4 Proposed RMP Amendments and Mitigation Actions Relevant to LSRs in the Roseburg District

There are two RMP amendments and two sets of mitigation actions proposed.

RMP Amendments

BLM proposes to amend the Roseburg District RMP as follows:

BLM-3, Reallocation of Matrix Lands to Late Successional Reserves

The Roseburg District RMP would be amended to change the designation of approximately 409 acres from the matrix land allocation to the LSR land allocation in Sections 32 and 34, of T. 29 1/2 S., R. 7 W., and section 1 T. 30 S. R. 7 W., W. M., Oregon.

This change in land allocation is proposed to partially mitigate for the potential adverse impact of the proposed PCGP project on LSRs in the Roseburg District. This amendment would change future management direction for the lands reallocated from matrix to LSR. A map of the proposed reallocation is displayed in figure 2.2-26.

BLM–1, Site-Specific Exemption for Requirement to Protect MAMU Habitat in the BLM Roseburg District

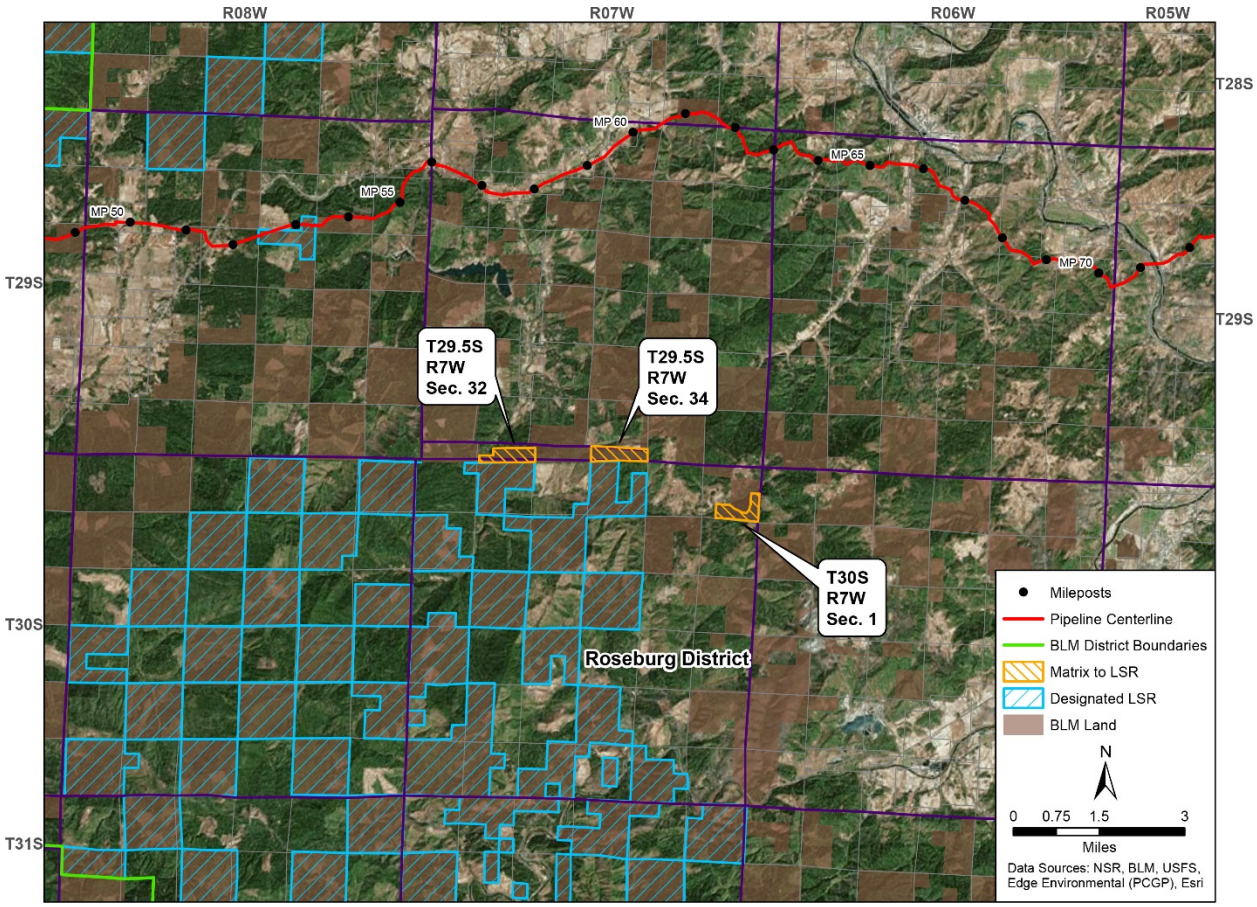
The Roseburg District RMP would be amended to waive the requirements to protect contiguous existing and recruitment habitat for MAMUs within the PCGP right-of-way that is within 0.5 mile of occupied MAMU sites, as mapped by the BLM. This is a site-specific amendment applicable only to the PCGP right-of-way and would not change future management direction at any other location.

The RMP for the Roseburg District requires protection of occupied MAMU sites whether they are inside or outside of a mapped LSR. The occupied sites in the Roseburg District that would be affected by the PCGP project are within mapped and unmapped LSR (see figures 2.2-24, 2.2-25, 2.2-25a, and 2.2-25b).

BLM-2, Site-Specific Exemption from Requirement to Retain Habitat in Known Owl Activity Centers in the BLM Roseburg District

The Roseburg District RMP would be amended to waive the requirements to retain habitat in KOACs at three locations (see figure 2.2-23). This is a site-specific amendment applicable only to the PCGP right-of-way and would not change future management direction at any other location. The RMP for the Roseburg District requires retaining habitat within KOACs. By definition, KOACs are within matrix lands and therefore will be addressed as unmapped LSRs.

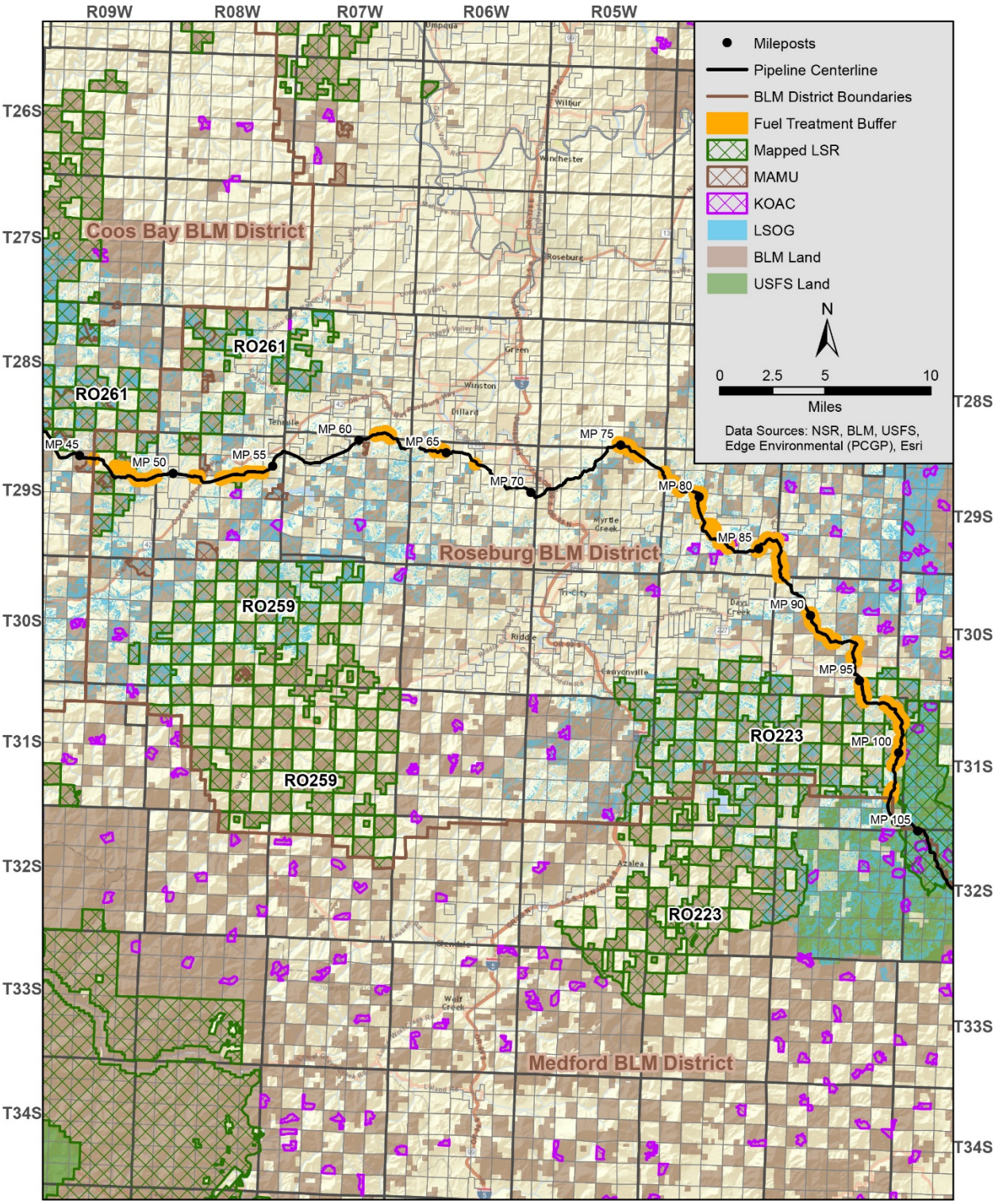
Figure 2.2-26. Map of Proposed Matrix to LSR Reallocation in the Roseburg District



Mitigation Actions

A Mitigation Plan was developed by the BLM and adopted by the PCGP project applicant to ensure that the objectives of the Roseburg District RMP related to LSRs would be achieved (see Figure 2.2-27). In addition to the reallocation of matrix lands to LSR, the mitigation actions include hazardous fuels reduction through creating a 1,000-acre fuel break adjacent to the proposed corridor in the South Umpqua River watershed and aiding fire suppression efforts through the creation of six dry hydrants in the South Umpqua River, Myrtle Creek, and Middle South Umpqua River watersheds. These off-site mitigation actions are designed to help protect LSOG forest habitat by reducing the risk of high-intensity fires.

Figure 2.2-27. Map of Proposed Off-site LSR Mitigation Actions in the Roseburg District



2.2.2.5 Impacts Related to Proposed Amendments and Mitigation Actions Relevant to LSRs in the Roseburg District

RMP Amendments

BLM-3, Reallocation of Matrix Lands to Late Successional Reserves

The primary management objective of the LSR land allocation is to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth related species. Currently, based on the latest BLM GIS data there are approximately 31,793 acres of LSOG forest habitat in LSR 261. If constructed, the portion of the PCGP project in the Roseburg District would remove approximately 11 acres of forest vegetation in LSR 261. This includes the removal of forest from both the pipeline corridor and the TEWAs. Approximately 1 of these acres is LSOG forest habitat (see figures 2.2-28 and 29). The area proposed to be reallocated to LSR is approximately 409 acres of matrix lands, of which approximately 286 acres are LSOG forest. The proposed reallocation is shown in figure 2.2-30 and displayed in table 2.2.2.5-1 and figure 2.2-31.

The acres that would be reallocated would become part of mapped LSR 259. This LSR is adjacent to LSR 261 and is also near the area of the proposed PCGP project (see figure 2.2-30). LSR 259 is also included in the South Coast-North Klamath LSRA and has the same priorities and recommendations as LSR 261 see section 2.2.1.1. Of the LSRs in the LSRA, 261, 263, and 259 have the highest priority for management actions because they are large and are key links in the LSR network. One of the key objectives for these LSRs is to increase the stand sizes of contiguous LSOG habitat. In addition, most of the acres of young, intensively cultured forest plantations that could benefit the most from treatments occur in the three LSRs. A key recommendation for these LSRs is risk management activities to reduce the probability that a major stand-replacing event or events that degrade habitat quality would occur. The primary purpose of risk reduction activities in these LSRs is to reduce the probability of large-scale loss of late-successional habitat. Another purpose of risk reduction activities is to reduce the probability of late-successional habitat loss in stands with important features such as nest stands for NSOs, stands containing other key species, or stands containing larger blocks of interior habitat or providing meaningful localized connectivity.

Also, the area around LSR 259 provides a better opportunity to consolidate LSOG habitat as evidenced by the high percentage of LSOG forest in the acres proposed for reallocation. The reallocation would increase the quantity of LSOG habitat in LSR 259 by 286 acres. It would also improve the quality of LSOG habitat due to the larger LSOG patch size and the consolidation of habitat in this area. Reallocation in this area would also improve the distribution of LSOG habitat between LSR 259 and LSR 261, which is important in this area due to the highly fragmented land ownership patterns (see figures 2.2-26 and 2.2-30). For these reasons, reallocating acres to LSR 259 is being considered for mitigation to the impacts in LSR 261.

Figure 2.2-28. Map of LSR 261 Crossed by PCGP Project (east portion)

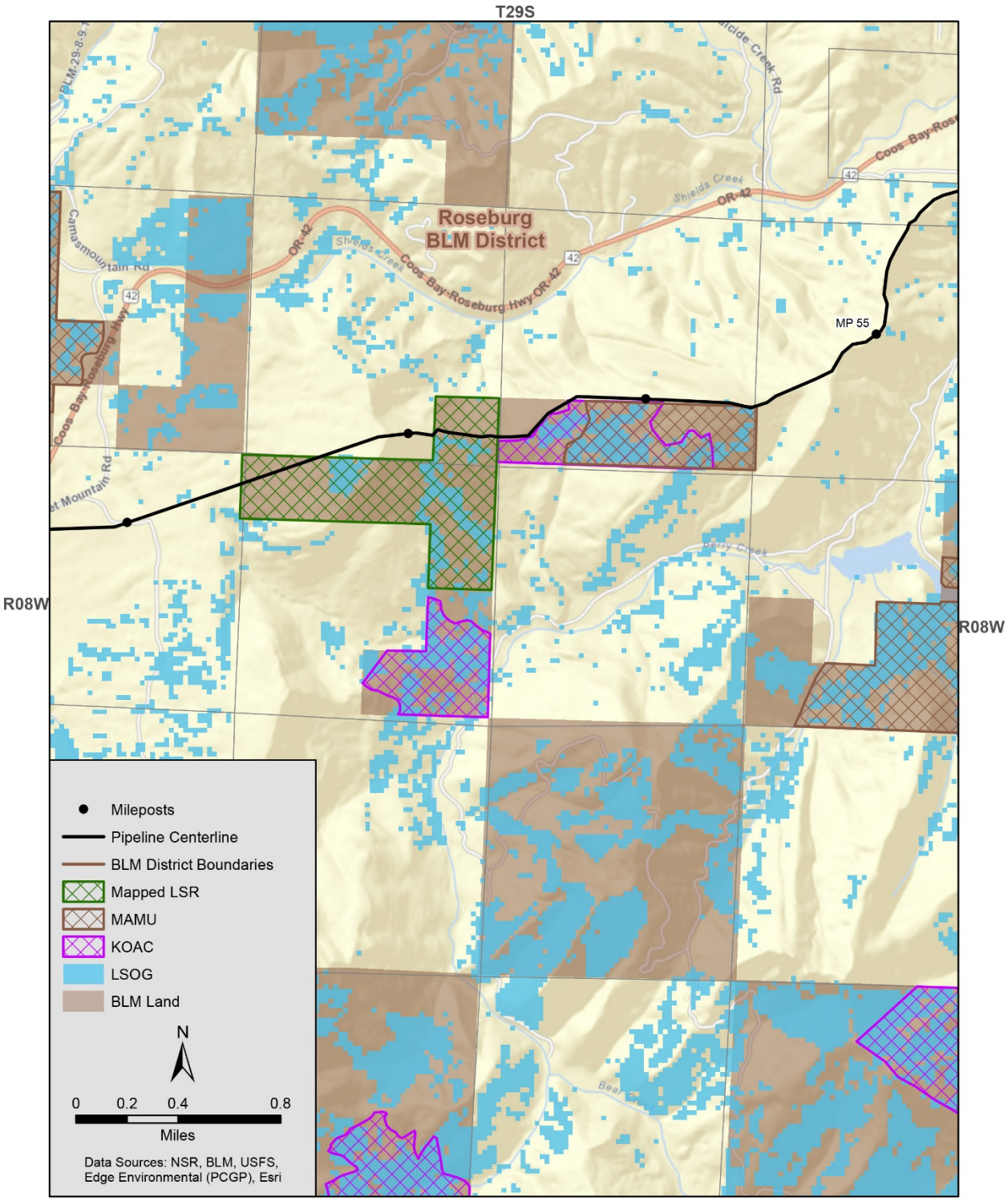


Figure 2.2-29. Map of LSR 261 Crossed by PCGP Project (west portion)

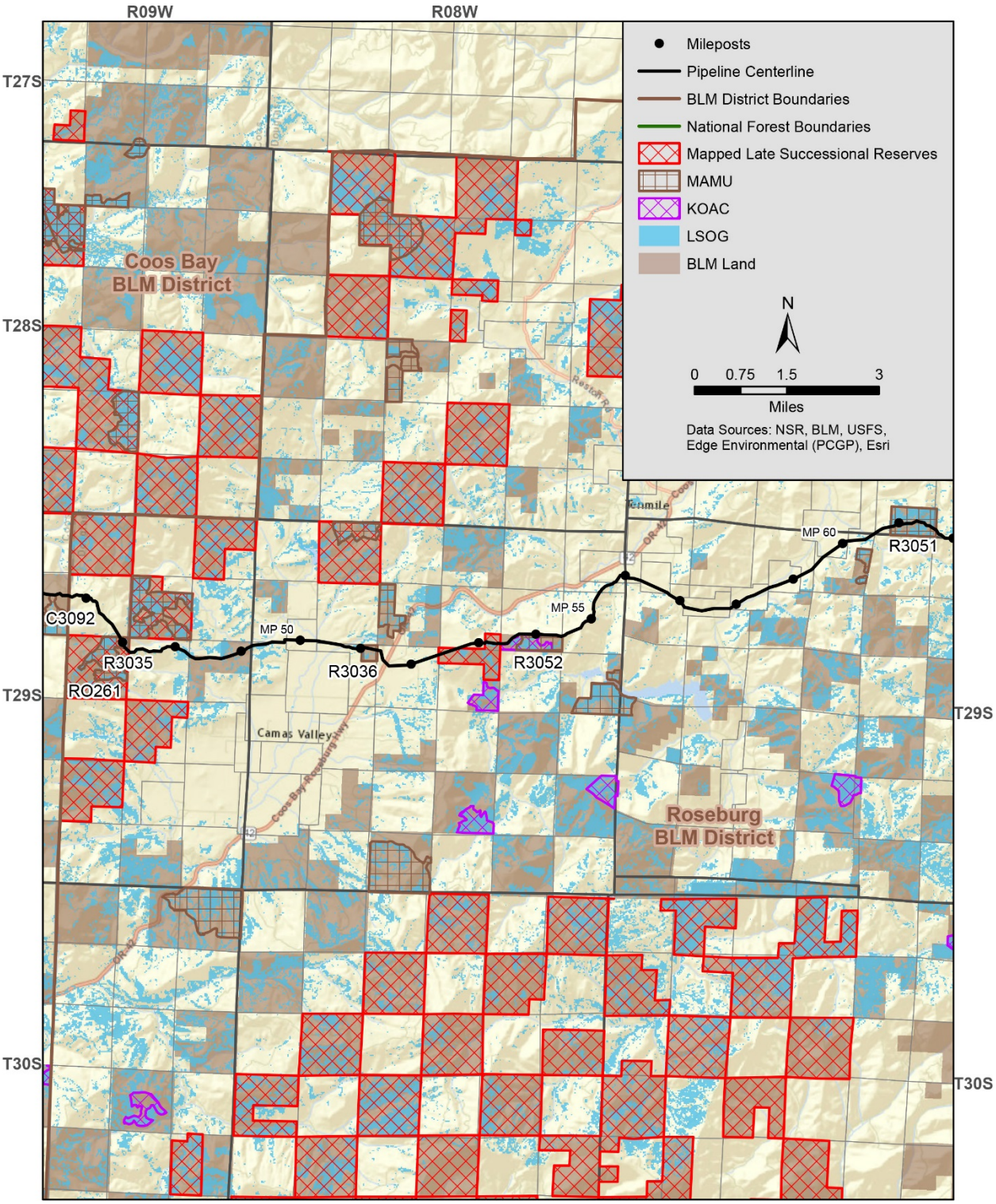


Figure 2.2-30. Map of Proposed Matrix to LSR Reallocation and LSOG Habitat in the Roseburg District

TABLE 2.2.2.5-1

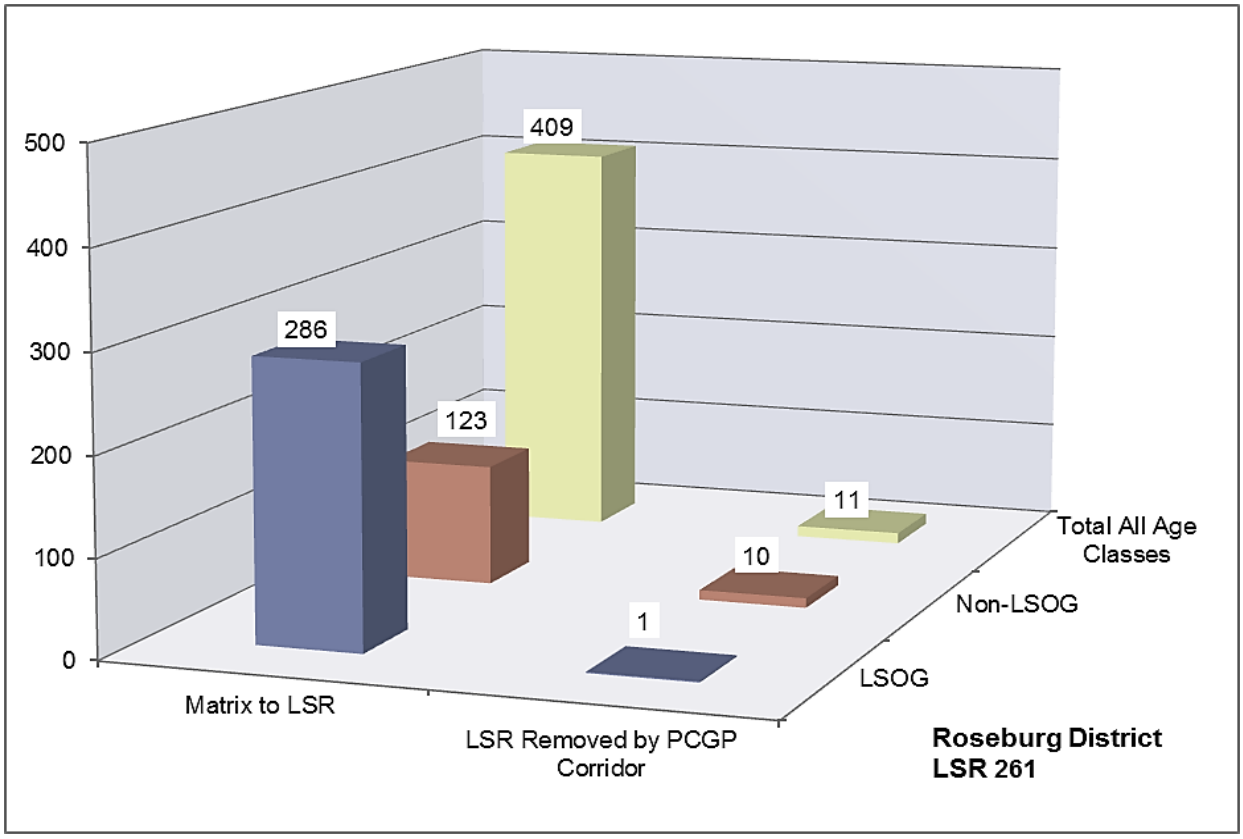
Comparison of LSR Acres Cleared a/ by PCGP Project and Acres of Matrix Reallocated to LSR

Roseburg District LSR 261	LSOG	Non-LSOG	Non-forest	Total All Age Classes
Matrix to LSR	286	123	0	**409**
LSR cleared by PCGP Corridor	1	10	0	**11**

a/ Acres cleared includes the PCGP Corridor and TEWAs

Data source: USFS, BLM GIS Layers

Figure 2.2-31. Comparison of LSR Acres Cleared by the PCGP Project and the Acres of Matrix to LSR Reallocation



In addition to the impacts from the removal of forest vegetation in LSR 261, there would be additional impacts from the acres modified by UCSAs and the acres indirectly affected through the creation of new edges and fragmentation of older forest. A comparison of the total acres affected in LSR 261 and the acres of reallocation are displayed in table 2.2.2.5-2 and figure 2.2-32 below.

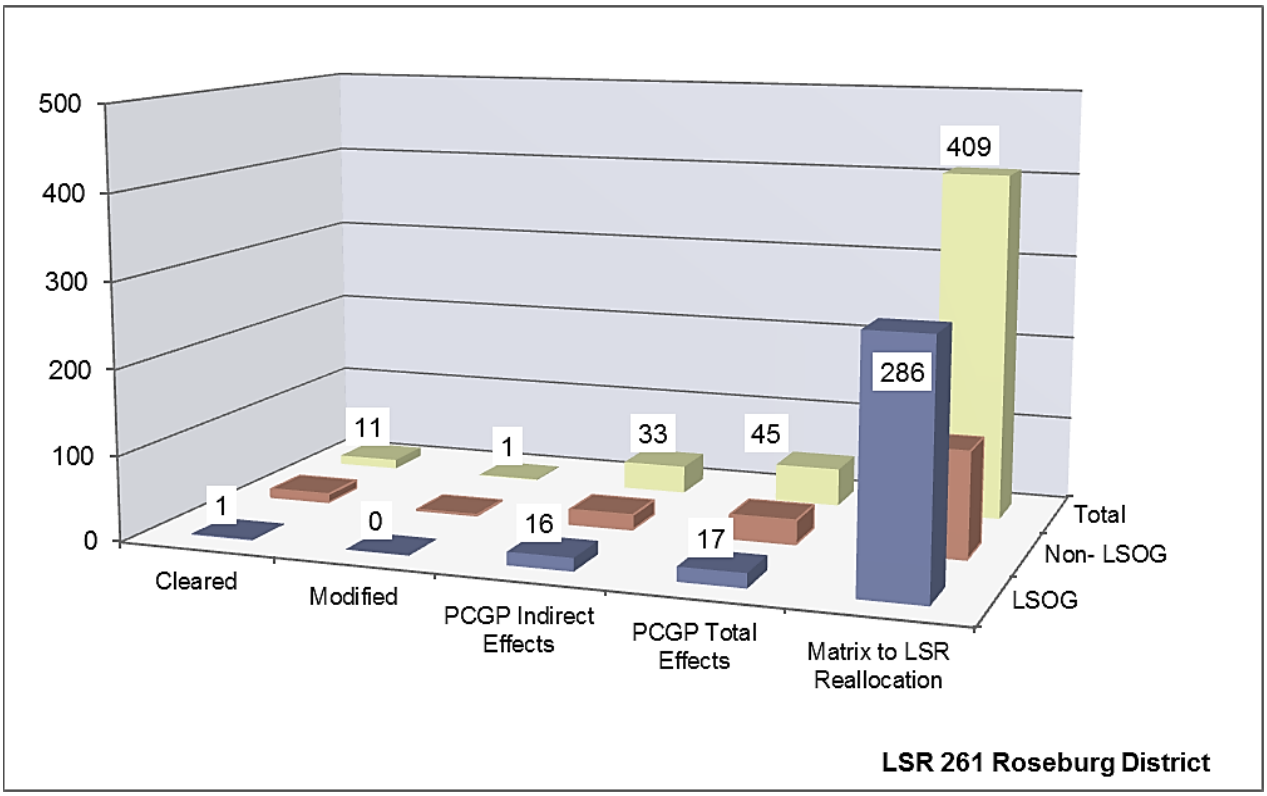
TABLE 2.2.2.5-2

Comparison of the Total LSR Acres Affected a/ by the PCGP Project and Matrix Reallocated to LSR

Roseburg Dist. LSR 261	Cleared	Modified	PCGP Indirect Effects	PCGP Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	1	<1	16	17	286
Non- LSOG	10	1	17	28	123
Non-Forest	0	0	0	0	0
Total	**11**	**1**	**33**	**45**	**409**

a/ PCGP total impacts include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in Non-LSOG)
Data source: BLM, USFS GIS Data Layers

Figure 2.2-32. Comparison of Total LSR Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



Impact on the Functionality of LSR 261 on the Roseburg District

The functionality of LSR 261 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat in LSRs on the Roseburg District would increase slightly with the construction of the PCGP project and RMP amendment. The PCGP project would remove approximately 1 acre of LSOG habitat, but would reallocate approximately 286 acres of LSOG habitat with the RMP amendment. This would represent a net increase of approximately 285 acres of LSOG habitat within LSR on the Roseburg District[6].

- Quality: The area of LSR 261 that would be affected by the PCGP project is highly fragmented due to both the land ownership pattern and past management activities. The area contains a high degree of edge with little or no interior forest habitat (see figures 2.2-28 and 2.2-29 above). In routing the pipeline, existing developments such as roads were used where feasible and impacts to LSOG habitat was avoided or minimized. The area proposed for reallocation contains some large blocks of LSOG habitat as well as an adjacent KOAC (see figure 2.2-30). This reallocation would consolidate habitat in an area that is highly fragmented. LSRs on BLM land are comprised of checkerboard sections or even smaller parcels of land. The intent of the reallocations is to better connect these pieces by decreasing distances between individual LSR parcels and reduce the amount of 'edge' adjacent to existing occupied murrelet stands. Consolidating habitat is one of the main objectives in the LSRA for this area. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSR habitat would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 261 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR RMP amendment. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur between the southern edge of LSR 261 and the northern edge of LSR 259 and would provide some additional connectivity within LSR in this area.

- The off-site mitigation action would provide added protection to the quantity, quality and distribution of LSOG habitat by improving the potential to decrease initial fire suppression response times and thereby increase the potential to control fires before they become high-intensity fires that threaten LSOG forests. Protecting LSOG forest from loss due to high-intensity fire is also one of the objectives in the LSRA for this area.

The RMP amendments and off-site mitigation actions for LSR 261 in the Roseburg District have been designed with the goal that the overall impact would be either neutral or beneficial to the creation and maintenance of late-successional habitat.

BLM-1, Site-Specific Exemption from Requirement to Protect MAMU Habitat in the BLM Roseburg District

[6] The acres would be reallocated to LSR 259 which is next to LSR 261, see discussion in section 2.2.2.5 BLM-3, Reallocation of Matrix Lands to Late Successional Reserves above for the reasons reallocation in LSR 259 is being considered as mitigation for LSR 261.

Amount and Quality of MAMU Habitat Affected by the Construction and Operation of the PCGP Project

The occupied MAMU stands that would be affected by the proposed PCGP project in the Roseburg District lie within mapped and unmapped LSR (see figure 2.2-24 and 2.2-25). The amount of MAMU habitat that would be affected both directly and indirectly is displayed in table 2.2.2.5-3 and figure 2.2-33

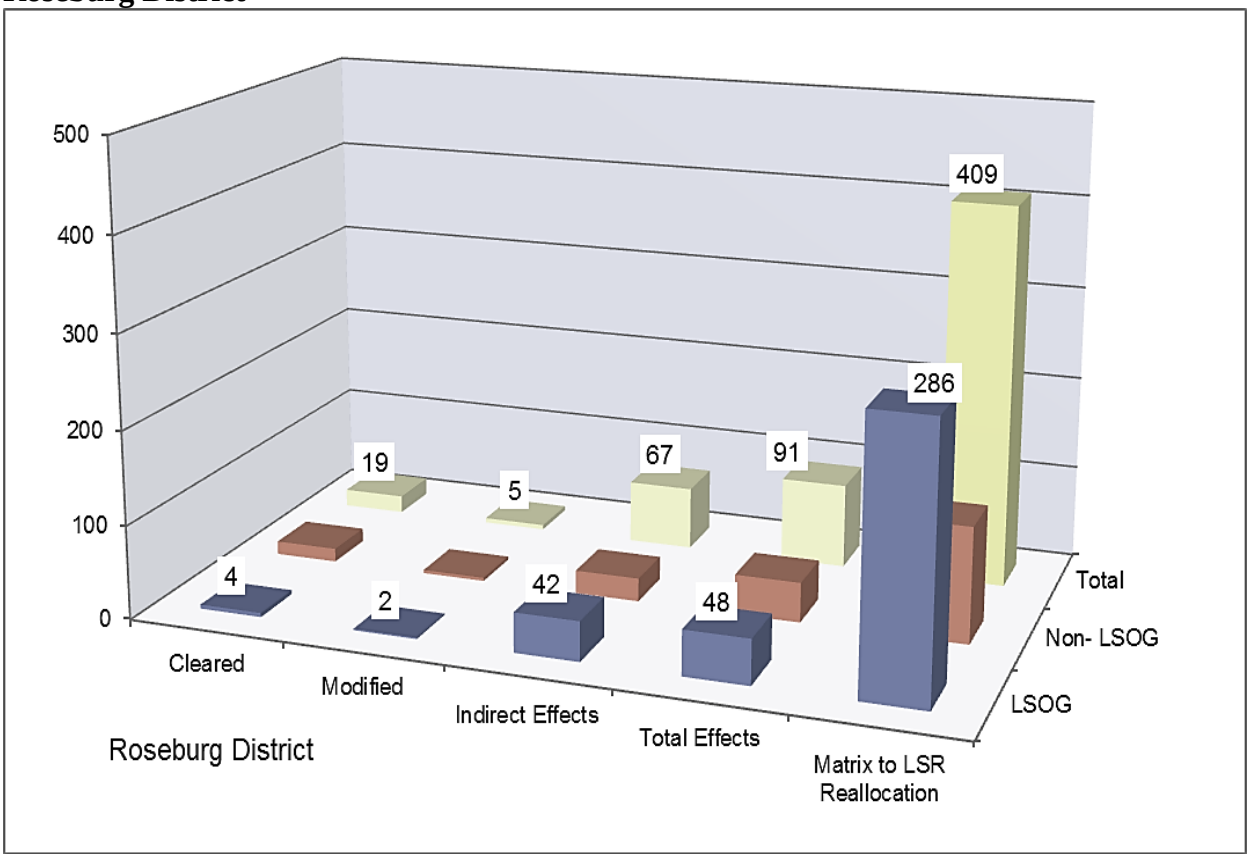
TABLE 2.2.2.5-3

Comparison of Total Acres of Occupied Marbled Stands Impacted[a] by the PCGP Project and acres of Matrix to LSR Reallocation

Roseburg District	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	4	2	42	48	286
Non- LSOG	14	3	25	43	123
Non-Forest	0	0	0	0	0
Total	**19**	**5**	**67**	**91**	**409**

a/ PCGP project total impacts include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in Non-LSOG).
Data Source: BLM, USFS GIS Data Layers

Figure 2.2-33. Total Acres of Occupied MAMU Stands Affected by PCGP Project on the Roseburg District



The proposed PCGP project would remove approximately 19 acres within occupied MAMU stands. Approximately 4 of those acres would be LSOG habitat. The proposed matrix to LSR reallocation for LSRs in the Roseburg District is outside of MAMU Zone 1 but is within MAMU Zone 2 and contains suitable habitat for MAMUs (see figure 2.2-34). The affected MAMU stands on the Roseburg District are adjacent to the MAMU occupied stands affected by the project in the Coos Bay District. The proposed matrix to LSR reallocation in the Coos Bay District also contains MAMU nesting habitat and would compensate for habitat loss in LSR, see section 2.4.4 for further discussion of the total impacts to MAMU stands on the Coos Bay and Roseburg Districts.

Figure 2.2-34. MAMU Zone Map

BLM 2, Site-Specific Exemption from Requirement to Retain Habitat in Known Owl Activity Centers in the BLM Roseburg District

Amount and Quality of KOACs Affected by the Construction and Operation of the PCGP Project

Minimization Efforts: The following measures were taken in routing the proposed PCGP project to minimize adverse effects to habitat within each of the identified KOACs. A map of each of the KOACs that would be affected by the proposed PCGP project is shown in figures 2.2-35 and 36.

- P2199. The right-of-way would generally be within an existing road (BLM 28-8-2.2) along the edge of the KOAC. TEWAs would be placed in existing clear-cut and regenerating coniferous forest stands. Recent activity of the spotted owl pair (MSNO 2199B) is more than 1.25 miles southeast of this site, near KOAC R3024 (see figure 2.2-35).

- P0361. The alignment of the pipeline would follow a narrow ridgeline along an existing road (BLM 29-4-35; Wood Creek Road) that forms the western boundary of this KOAC. The alignment along the ridgeline ensures the safety and integrity of the pipeline and would minimize disturbance by reducing grading requirements. An effort was made to place a required TEWA for a PI in early seral habitat. Recent activity of this spotted owl pair (MSNO 0361A) is more than 0.75 mile northwest of this KOAC (see figure 2.2-36).

- P2294. The pipeline alignment along the ridgeline would ensure pipeline safety and integrity and minimize disturbance by reducing grading requirements. Only a small lobe on the southern edge and on the upper ridgeline of the KOAC would be crossed by the alignment. The KOAC is located within the Klamath demographic study area and has been monitored for more than 20 years. The most recent activity at this site was last documented in 1994 (see figure 2.2-36).

Currently, based on the latest BLM GIS data layers there are approximately 197 acres of LSOG forest habitat within the three KOACs that would be impacted by the PCGP project on the Roseburg District. Even though measures were taken to minimize impacts, habitat would still be affected by the PCGP project. While removal of LSOG forest habitat would be kept to 2 acres, there would also be impacts from the UCSAs and the indirect effects of new edge and

fragmentation of forest habitat. The total impacts from the proposed pipeline on KOACs are displayed below in table 2.2.2.5-4 and figure 2.2-37.

Figure 2.2-35. Map of KOAC P2199 and the PCGP Project

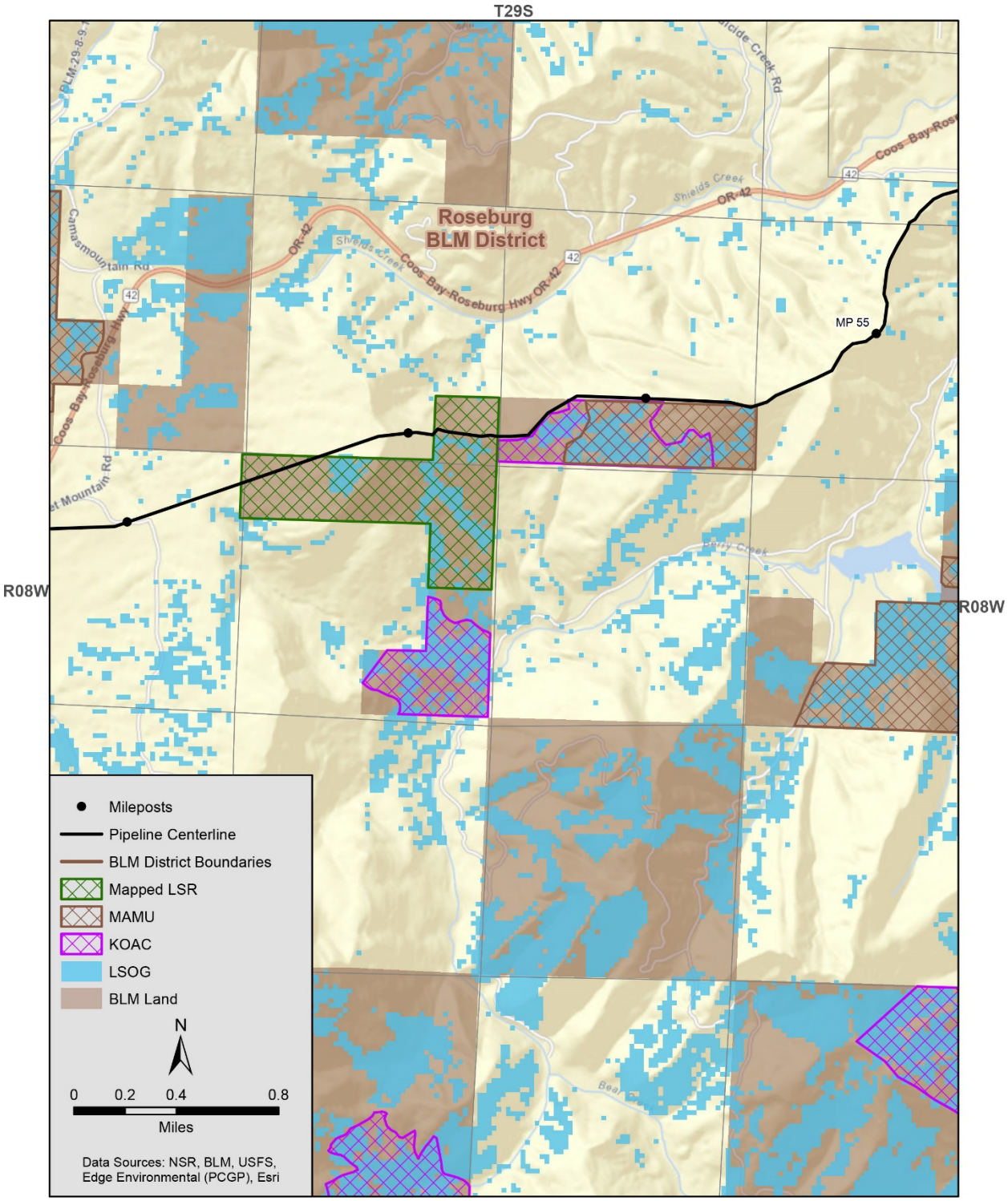


Figure 2.2-36. Map of KOAC P0361 and P2294 and the PCGP Project

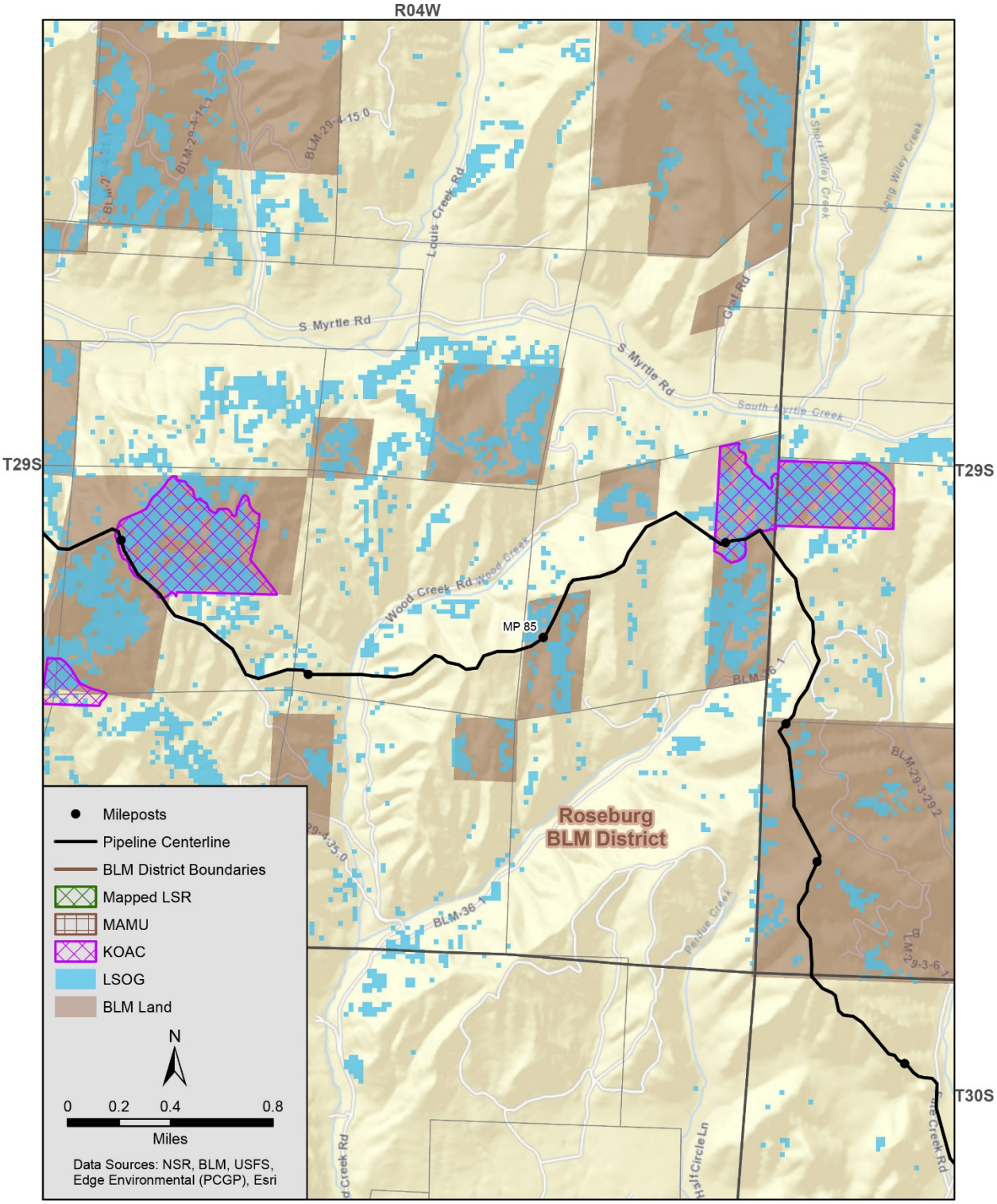


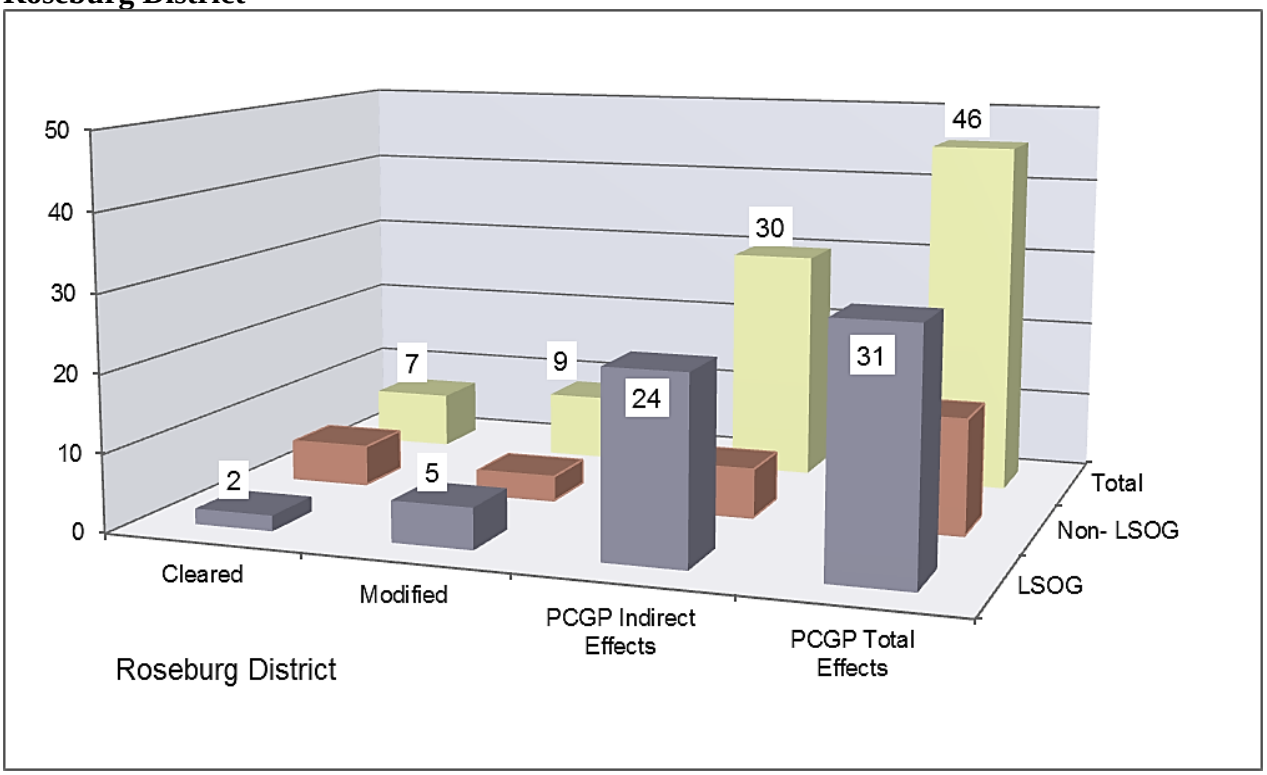
TABLE 2.2.2.5-4

Summary of Total KOAC Acres Affected a/ by PCGP Project in the Roseburg District

Roseburg Dist. KOACs	Cleared	Modified	PCGP Indirect Effects	PCGP Total Effects
	PCGP Direct Effects			
LSOG	2	5	24	31
Non- LSOG	5	3	6	15
Non-Forest	0	0	0	0
Total	**7**	**9**	**30**	**46**

a/ PCGP total impacts include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS Data Layers

Figure 2.2-37. Summary of Total KOAC Acres Affected by the PCGP Project in the Roseburg District



Aggregated Impact of the Proposed PCGP Project on Mapped and Unmapped LSRs in the Roseburg District

The construction of the PCGP project in the Roseburg District would also affect LSR 223 (see figure 2.2-38). Currently, based on the latest BLM and Forest Service GIS data there are approximately 20,557 acres of LSOG forest habitat which comprises approximately 31 percent of LSR 223. The proposed pipeline would remove approximately 46 acres of forest from LSR 223, of which approximately 13 acres would be LSOG forest. In addition to the acres cleared, there would be effects from acres modified by UCSAs and indirect effects from the creation of

new edge and the fragmentation of forest habitat. The total impacts to LSR 223 in the Roseburg District are displayed in table 2.2.2.5-5 and figure 2.2-39 below.

Figure 2.2-38. Map of LSR 223 Crossed by the PCGP Project in the Roseburg District

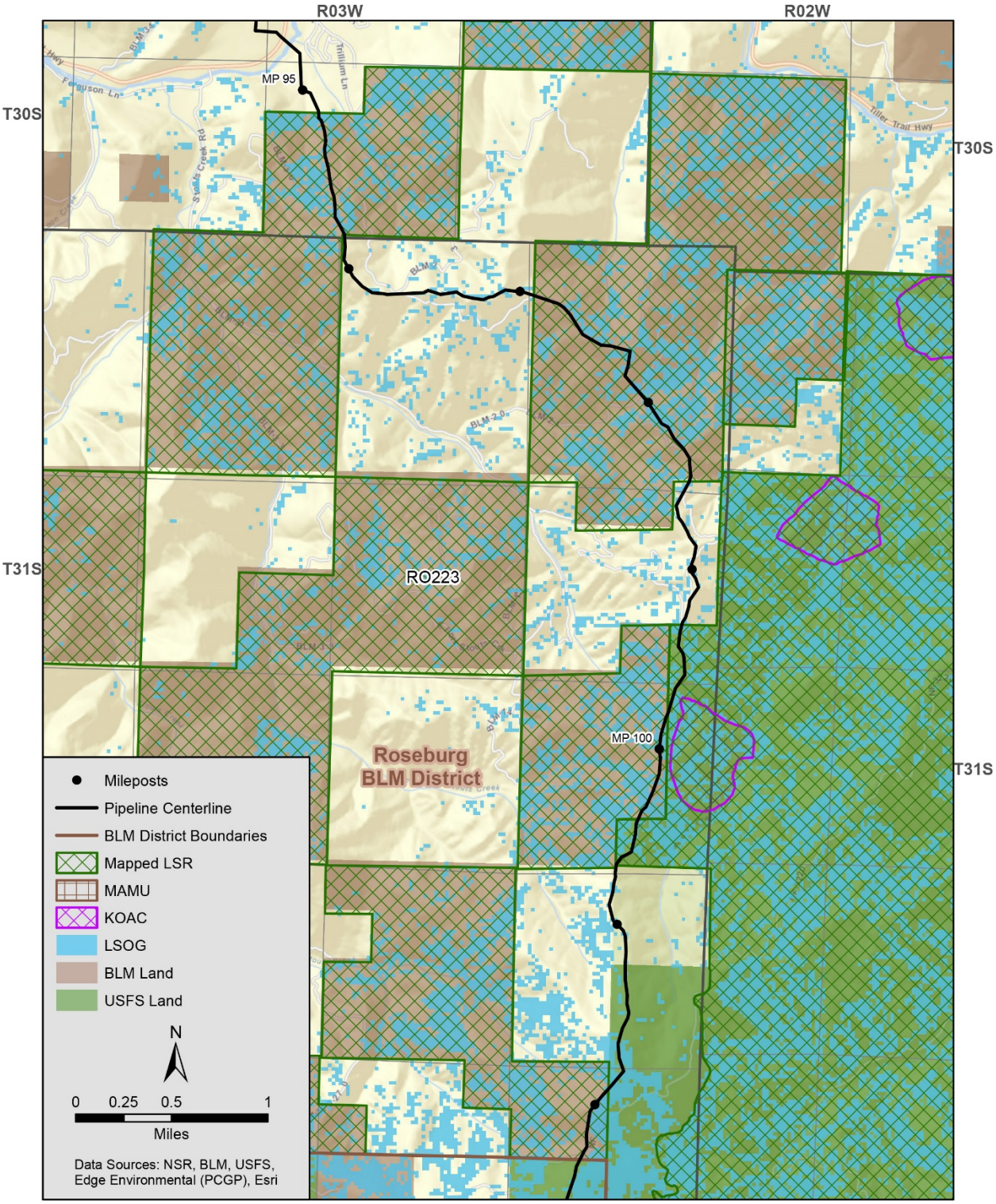


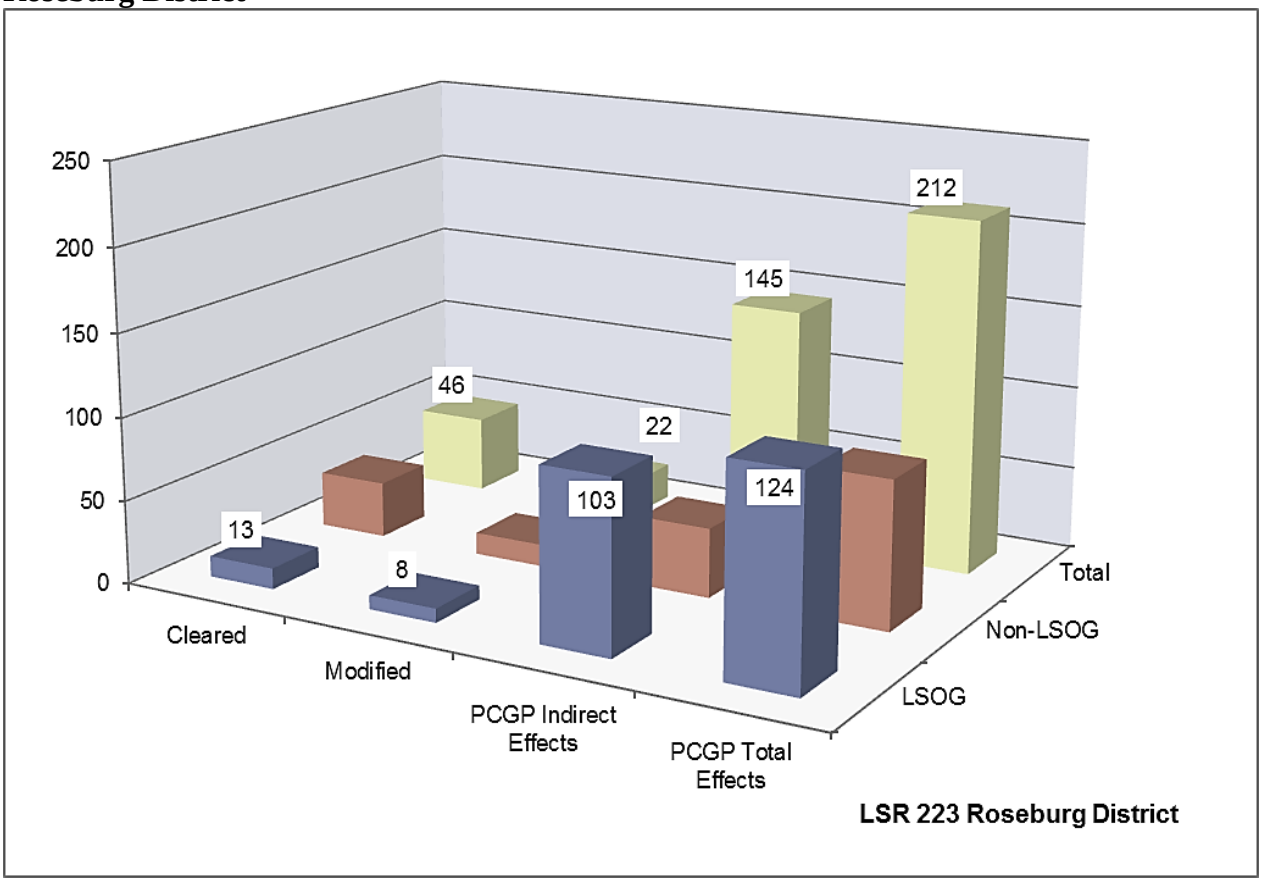
TABLE 2.2.2.5-5

Summary of Total LSR 223 Acres Affected a/ by the PCGP Project in the Roseburg District and Acres of Matrix Reallocated to LSR

Roseburg Dist. LSR 223	Cleared	Modified	PCGP Indirect Effects	PCGP Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	13	8	103	124	13
Non-LSOG	34	13	42	88	34
Non-Forest	0	0	0	0	0
Total	**46**	**22**	**145**	**212**	**46**

a/PCGP total impacts include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS Data Layers

Figure 2.2-39. Summary of Total LSR 223 Acres Affected by the PCGP Project on the Roseburg District



In addition to the impacts of the PCGP corridor on LSR 223 in the Roseburg District there are also potential off-site impacts to LSR 223 from road reconstruction that would be necessary to accommodate the trucks that would be hauling the sections of pipe. These trucks are longer than typical trucks that use forest roads and some road widening and curve realignment may be necessary to safely allow for this truck traffic. In LSR 223 on the Roseburg District it is estimated that approximately two acres of road widening would occur within LSR. Although this road widening would occur to the extent possible within the existing clearing limits it is

probable that some additional clearing of forest vegetation would be necessary to accommodate the road reconstruction. It is estimated that this would be a maximum of two acres and would occur along an existing road opening.

There are no proposed amendments to reallocate matrix lands to LSR 223 in the Roseburg District. This is due primarily to the lack of suitable LSOG forest habitat in the matrix near the LSR and the proposed pipeline. There is, however, a proposed amendment to reallocate matrix lands to LSR 223 in the Umpqua National Forest, which borders the east side of the Roseburg District. The proposed PCGP project would also affect LSR 223 in the Umpqua National Forest. The combined impacts of the project on LSR 223 in the Roseburg District and Umpqua National Forest, the matrix to LSR reallocation, and the proposed mitigation actions are evaluated in section 2.3.1.3.

Approximately 286 acres of the 409 acres of matrix lands that would be reallocated in the Roseburg District contain LSOG forest habitat. A comparison of the total LSR acres that would be affected by the proposed PCGP project in the Roseburg District in both mapped LSRs (261 and 223) and unmapped LSRs (KOACs and MAMU), with the matrix acres reallocated to LSR, is in table 2.2.2.5-6 and figure 2.2-40. A total of approximately 81 acres of LSR lands would be cleared by the construction of the PCGP project in the Roseburg District. Approximately 19 of these acres would be LSOG forest habitat. The proposed amendment would reallocate approximately 15 times the amount of LSOG forest that would be cleared with the construction of the PCGP project.

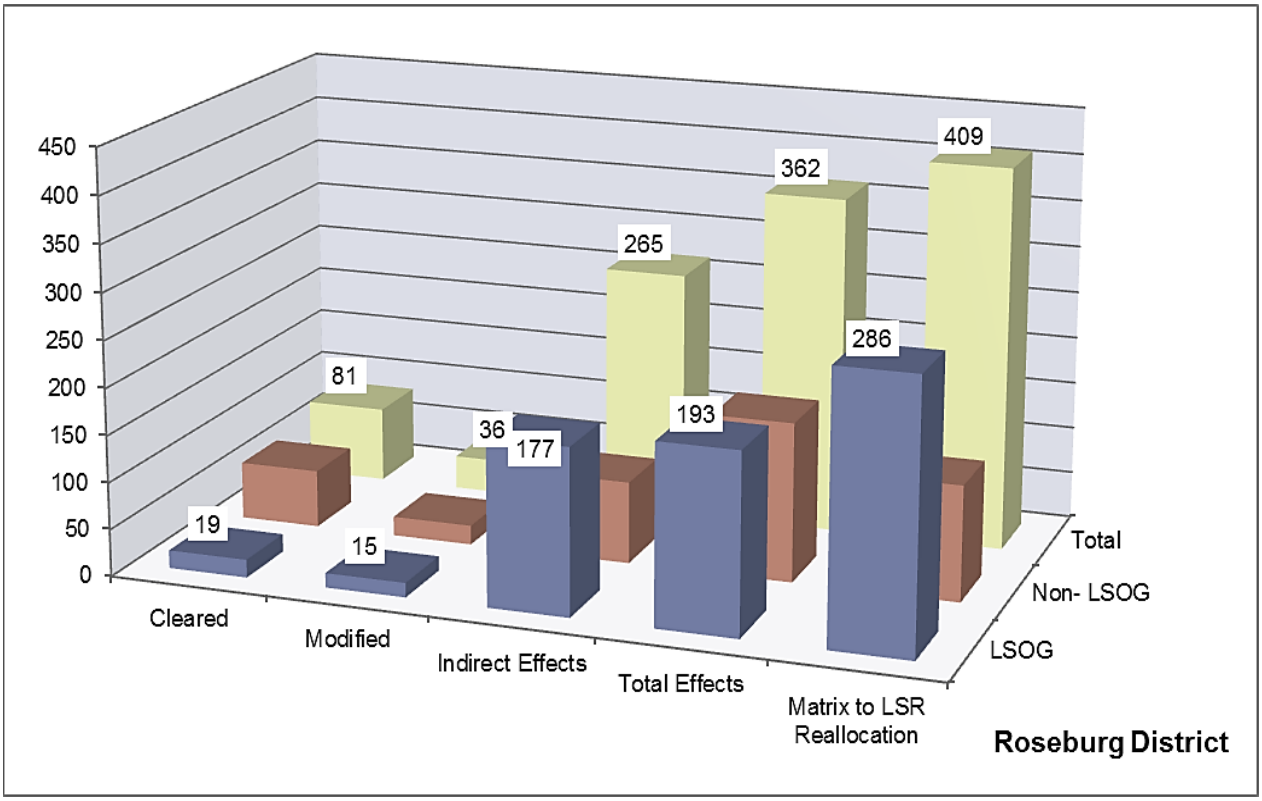
TABLE 2.2.2.5-6

Comparison of Total LSR Acres Affected a/ by PCGP Project and Acres of Matrix Reallocated to LSR

Roseburg District	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	19	15	177	193	286
Non- LSOG	61	21	87	169	123
Non-Forest	0	0	0	0	0
Total	**81**	**36**	**265**	**362**	**409**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG) in both mapped and unmapped LSR Data source: BLM, USFS GIS data layers

Figure 2.2-40. Comparison of Total LSR Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



Mitigation Actions

In addition to the reallocation of matrix lands to LSR, the off-site mitigation actions include hazardous fuels reduction through creating a 1,000-acre fuel break adjacent to the PCGP project corridor in the South Umpqua River watershed and aiding fire suppression efforts through the creation of six dry hydrants in the South Umpqua River, Myrtle Creek, and Middle South Umpqua River watersheds (see figure 2.2-27). These mitigation actions have been designed to complement the mitigation actions being considered in the Umpqua National Forest to benefit LSR 223 (see section 2.3.1.4).

<u>1,000-Acre Fuel Break</u>

High-intensity fire has been identified as the single factor most affecting late successional and old growth forest habitats on federal lands in the area of the NWFP (Mouer et al. 2011). Construction of the pipeline and associated activities would remove both mature and developing stands and increase fire suppression complexity. However the corridor also provides a fuel break. Fuels reduction adjacent to the corridor would increase the effectiveness of the corridor as a fuel break. Fuels reduction would lower the risk of loss of developing and existing mature stands and other valuable habitats to high-intensity fire. This segment is part of the Days Creek to Shady Cove fuel break and ties in with similar projects in the Umpqua National Forest.

Six Dry Hydrants

By installing dry hydrants, the water source is disturbed only once, and there are several other advantages. Fire vehicles will not need to be really close to the water to fill up, decreasing the risk of contamination, and they can fill from some water sources that would otherwise need to be modified for use. Areas that have had restoration work for fish populations could still be safely accessed for fire suppression. Over all, better water sources would improve suppression success and therefore help protect natural resources.

Aggregated Amendments to LSR 261

There are no other proposed amendments related to LSR 261 in the Roseburg District. There is, however, another amendment being proposed for LSR 261 in the Coos Bay District of the BLM. The amendment to LSR 261 in the Coos Bay District is discussed in section 2.2.1 above. The following discussion relates to the overall impacts of the PCGP project on LSR 261 and the overall acres being reallocated to LSR in the vicinity of LSR 261.

The total impacts to LSR 261 from the proposed PCGP project on both the Coos Bay and Roseburg Districts are displayed in table 2.2.2.5-7 and figure 2.2-41 below. The impacts include the direct impacts that would occur from construction (the acres cleared plus the acres modified by UCSAs) as well as the indirect impacts that would occur from the creation of new edge and the fragmentation of existing LSOG forest habitat. The indirect effects are measured as extending for 100 meters from the cleared edge on each side of the corridor in LSOG forest and 30 meters on each side of non-LSOG forest.

In considering the total impacts to LSOG forest habitat in LSR 261, there would be approximately 33 acres affected (including both direct and indirect impacts) compared to the approximately 387 acres of LSOG forest habitat being reallocated. The amendments would reallocate slightly more than 13 times the amount of LSOG forest habitat than would be affected. In considering the total impacts to forest habitat in LSR 261, there would be approximately 136 acres affected (including both direct and indirect impacts) compared to the 796 acres of matrix lands being reallocated. The amendments would reallocate almost 6 times more forest habitat than would be affected.

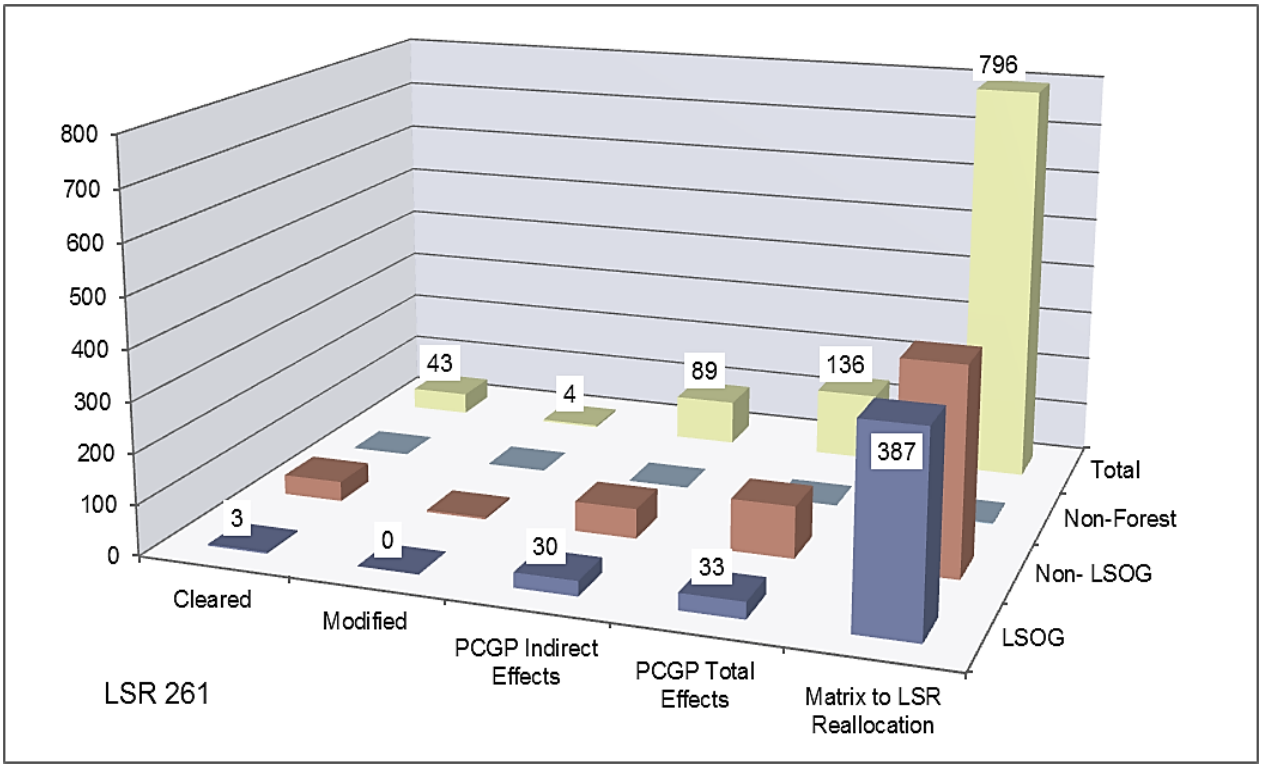
TABLE 2.2.2.5-7

Comparison of Total LSR 261 Acres Affected a/ by PCGP Project and Acres of Matrix Reallocated to LSR

LSR 261	Cleared	Modified	PCGP Indirect Effects	PCGP Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	3	0	30	33	387
Non- LSOG	40	4	59	103	407
Non-Forest	0	0	0	0	2
Total	**43**	**4**	**89**	136	**796**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG) on Coos Bay and Roseburg Districts.
Data source: BLM, USFS GIS Data Layers

Figure 2.2-41. Comparison of Total LSR 261 Acres Impacted by the PCGP Project and Acres of Matrix to LSR Reallocation



Impact on the Functionality of LSR 261 on the Roseburg and Coos Bay Districts

The functionality of LSR 261 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat within LSR 261 on the Roseburg and Coos Bay Districts would increase with the proposed RMP amendments. The PCGP project would remove approximately 3 acres of LSOG habitat in LSR 261 but the reallocation would add 387 acres of LSOG habitat for a net increase of 385 acres[7]. This would increase the current level of LSOG habitat in LSR 261 from 31,793 acres to 32,178 acres or by approximately 1.2 percent.

- Quality: The area of LSR 261 that would be affected by the PCGP project on both the Roseburg and Coos Bay Districts is highly fragmented due to both the land ownership pattern and past management activities. In routing the pipeline, existing developments such as roads were used where feasible and impacts to LSOG habitat was avoided or minimized. The area proposed for reallocation to LSR 261 contains some large blocks of LSOG habitat as well as occupied MAMU stands and an adjacent KOAC (see figures 2.2-6 and 2.2-30). This reallocation would consolidate habitat in an area that is highly

[7] 286 of these acres would be reallocated to LSR 259 which is next to LSR 261, see discussion in section 2.2.2.5 BLM-3, Reallocation of Matrix Lands to Late Successional Reserves above for the reasons reallocation in LSR 259 is being considered as mitigation for LSR 261.

fragmented. LSR 261, like most LSRs on BLM land, is comprised of checkerboard sections or even smaller parcels of land. The intent of the reallocations is to better connect these pieces by decreasing distances between individual LSR parcels and reduce the amount of 'edge' adjacent to existing occupied murrelet stands and KOACs. Consolidating habitat is one of the main objectives in the LSRA. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSOG habitat within LSR 261 would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 261 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR RMP amendments. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur within a current gap between the northern and southeastern portions of LSR 261 and between LSR 261 and LSR 259 which would provide some additional connectivity within LSR in these areas.

- The off-site mitigation actions on the Roseburg and Coos Bay Districts would provide added protection to the quantity, quality and distribution of LSOG habitat by improving the potential to decrease initial fire suppression response times and thereby increase the potential to control fires before they become high-intensity fires that threaten LSOG forests. Protecting LSOG forest from loss due to high-intensity fire is also one of the objectives in the LSRA for this LSR.

The matrix to LSR reallocations and the off-site mitigation actions on both the Coos Bay and Roseburg Districts have been designed with the goal that, overall, the impact of the PCGP project on LSR 261 would be either neutral or beneficial to the creation and maintenance of late-successional habitat. With the increase in the acres of protected LSOG habitat and the formation of larger habitat blocks in areas where fragmentation was a major concern in the LSRA, the overall functionality of LSR 261 would be maintained or improved.

2.2.2.6 Evaluation of the Proposed Amendments and Mitigation Actions Relevant to the Roseburg District RMP Goals and Objectives

Three LRMP amendments and two off-site mitigation measures are associated with LSRs in the Roseburg District. The proposed amendment BLM-1 would waive the requirement to protect all MAMU habitat within occupied stands. Approximately 19 acres of occupied MAMU stands would be cleared within the Roseburg District. The proposed waiver is project-specific and would apply only to the PCGP project. Proposed amendment BLM-3 would reduce the matrix land allocation in the Roseburg District by 409 acres from 54,900 acres to 54,491 acres or by 0.74 percent. It would increase the total LSR land allocation in the Roseburg District by 409 acres from 186,423 acres to 186,832 acres, or by 0.33 percent. This proposed change would affect the 409 acres for the life of the current planning cycle (see figure 2.2-30). Proposed amendment BLM-2 would waive the requirement to retain KOAC habitat in the Roseburg District. A total of approximately 7 acres of habitat within three KOACs would be cleared with the construction of the PCGP project. The proposed mitigation actions would create a 1,000 acre fuel break and six dry hydrants.

The objective for the LSR land allocation in the Roseburg District RMP states, “Protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat

for late-successional and old-growth forest-related species including the NSO and MAMU. Maintain a functional, interacting, late-successional and old-growth forest ecosystem" (USDI June 1995, page 29).

The objective in the Roseburg District RMP for managing MAMU habitat states, "Protect, manage, and conserve federal listed and proposed species and their habitats to achieve their recovery in compliance with the Endangered Species Act, approved recovery plans, and bureau special status species policies" (USDI June 1995, page 41).

The proposed amendments and mitigation actions would not alter the objectives of the Roseburg District RMP for LSR for the following reasons:

- The quantity, quality, and distribution of LSOG habitat in LSRs on the Roseburg District would be either maintained or improved with the proposed reallocation of matrix to LSR RMP amendment (see discussion in section 2.2.2.5 BLM-3, Reallocation of Matrix Lands to Late Successional Reserves and *Impact on the Functionality of LSR 261 on the Roseburg District* above)

- The quantity and quality of LSOG habitat within KOACs on the Roseburg District would be minimally altered. Approximately 2 acres of LSOG habitat would be cleared with the PCGP project within an area that is already highly fragmented (see discussion in section 2.2.2.5 *Amount and quality of KOACs affected by the construction and operation of the PCGP project* above).

- The construction of the 1,000-acre fuel break and the construction of six dry hydrants would provide increased protection of the quantity, quality, and distribution of LSOG forest habitat in both mapped and unmapped LSRs on the Roseburg District from loss due to intensive fire through the ability to use fuel breaks in fire suppression strategies and reduced initial response times. These measures along with the reallocation of matrix lands to LSR have been designed so that the overall effect on LSRs would be neutral or beneficial, thereby maintaining the goals for LSRs in the Roseburg District.

Both the reallocation of matrix lands to LSR and the proposed mitigation actions would be consistent with the goals of the LSR land allocation to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG-related species. They would also be consistent with the management recommendations in the LSRAs for LSR 261, 259 and 223 by consolidating blocks of LSOG forest habitat and/or providing increased protection of existing LSOG forest habitat from intensive fire.

One of the objectives in the Roseburg District RMP for matrix land is to produce a sustainable supply of timber and other forest commodities. Moving 409 acres from the matrix to LSR would not prevent attainment of the objectives for matrix in the Roseburg District RMP because:

- Allowable Sale Quantity (ASQ) would not be affected between now and the time the Roseburg District RMP is revised. The CMP includes a provision that approximately 409 acres of non-federal forest lands would be acquired by the applicant to replace matrix lands lost to reallocation. As a practical matter, if a linear relationship between acres and outputs is assumed, the potential effect would be less than 1 percent of the District's ASQ since these amendments affect less than 1 percent of the General Forest Management

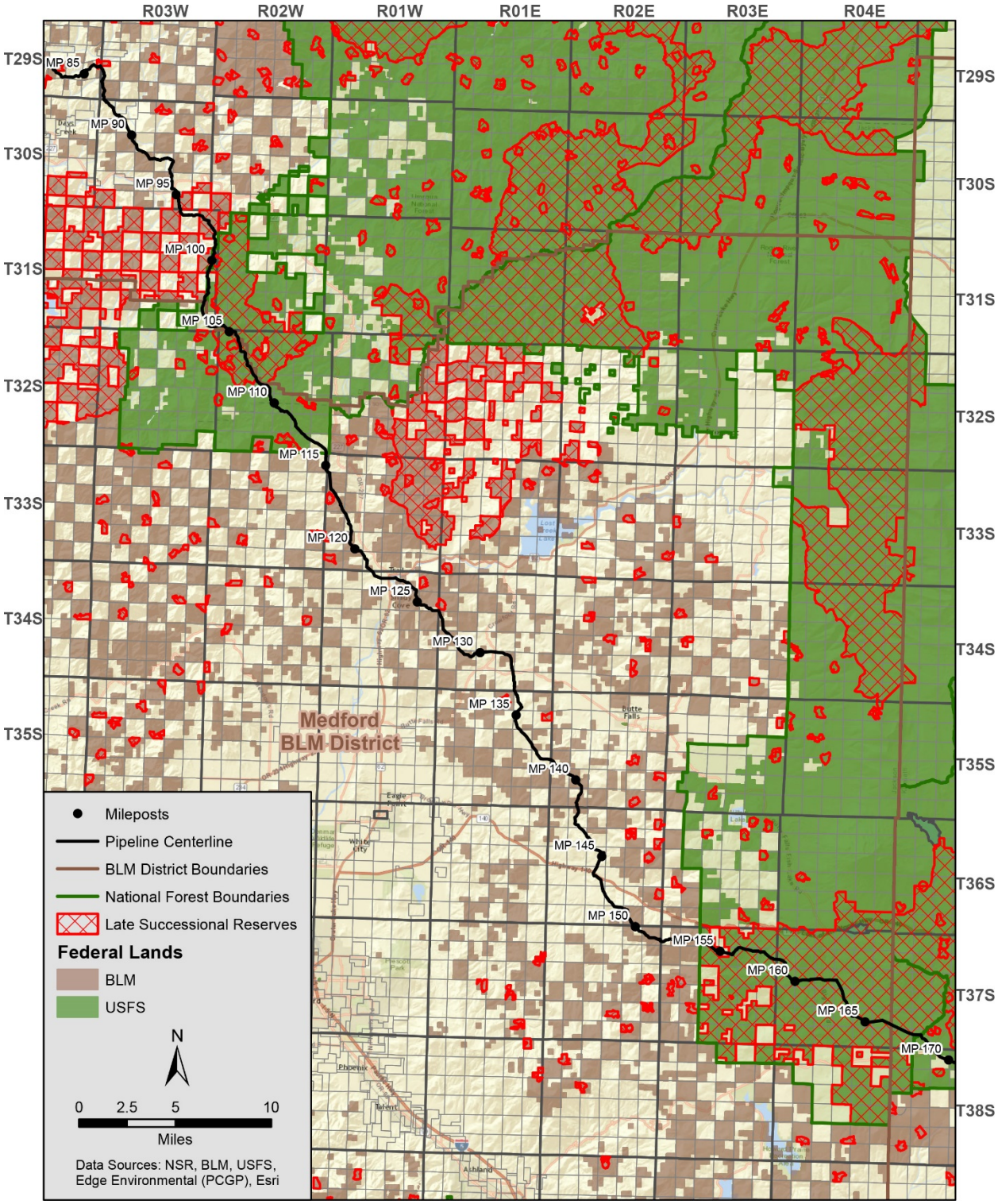
land base. With the acquisition of 409 acres of forest land to be added to the matrix land base, the timber output potential would not be altered. This amendment would not prevent future vegetation management activities such as commercial thinning in LSRs that would also contribute to the local forest products industry. The mitigation actions would also provide increased protection for forested stands in the matrix in this area by reducing initial response times and increasing the potential to prevent loss of commercial timber from intensive fire.

These changes would not have an important effect on the objectives in the Roseburg District RMP or affect land resources throughout a large portion of the LSR land allocation in the Roseburg District.

2.2.3 Medford District

There is no MAMU habitat in the Medford District where the proposed PCGP project would be located due to its distance from the ocean. The map in figure 2.2-42 demonstrates that all of the mapped LSR as well as all KOACs have been avoided with the proposed PCGP project corridor. Therefore, the proposed project would not alter any mapped or unmapped LSR in the Medford District.

Figure 2.2-42. Map of the Proposed PCGP Project and LSRs on the Medford District.



2.2.4 Klamath Falls Resource Area of the Lakeview District

There is no MAMU habitat in the Klamath Falls Resource Area of the Lakeview District due to its distance from the ocean. The map in figure 2.2-43 demonstrates that all of the mapped LSR as well as all KOACs have been avoided with the proposed PCGP project corridor. Therefore, the proposed project would not alter any mapped or unmapped LSR in the Klamath Falls Resource Area of the Lakeview District.

Figure 2.2-43. Map of the Proposed PCGP Project and LSRs in the Klamath Falls Resource Area of the Lakeview District

2.3 LRMP AMENDMENTS ON NATIONAL FOREST SYSTEM LANDS

The proposed PCGP project would cross three national forests—Umpqua, Rogue River, and Winema—for a total of approximately 31 miles. Figure 2.1-1 provides an overview of the proposed project and the management units of the Forest Service. Table 2.1.2-1 displays the total acres of LSR that would be affected in each management unit of the Forest Service.

National forests are managed for many purposes. The concept of a broad mission for the public lands dates to the Organic Act of 1897, when Congress directed that federal timber reserves be managed for a supply of timber and protection of watersheds. Later, the Multiple Use Sustained Yield Act of 1960 again expressed Congressional intent to provide goods and services that people need while providing for long-term sustainability. The dual mission of providing resources people need and sustaining the environment of the national forests is the job of the Forest Service.

Generally, LRMPs do not provide project-level analysis or authorize individual projects. Every project or activity that occurs on a national forest is evaluated by the Forest Service for consistency with the LRMP of the national forest where the project is located. Forest Service personnel evaluated the proposed PCGP project and found that the linear nature of the proposed pipeline was not consistent with certain parts of the existing LRMPs for the Rogue River, Umpqua, and Winema National Forests.

In order to address these inconsistencies, the Forest Service is evaluating LRMP amendments to make provision for construction and operation of the PCGP project. With the exception of boundary changes that add acres to LSRs in the Umpqua and Rogue River National Forests, the amendments are project-specific and would apply only to this project. In considering these amendments, the Forest Service is guided by maintaining the overall balance of goods and services provided by each national forest.

The Forest Service is now under the 2012 planning rule (36 CFR 219, 2012). The 2012 planning rule allows a three year transition period for the procedures of the previous planning rule to be used to amend LRMPs (36 CFR 219.17(b)(2), 2012). The proposed amendments are using the procedures of the 1982 planning rule.[8] The 1982 planning rule and the 2000 planning rule as amended and clarified are available online at http://www.fs.fed.us/emc/nfma/2000_planning_rule.html.

[8] 36 CFR 219, (1982)

The Responsible Official for the proposed LRMP amendments is the Forest Supervisor of the Umpqua National Forest (as designated by the Regional Forester). The decision to be made is whether the LRMPs would be amended if FERC approves the PCGP project. The Forest Supervisor will also determine if the proposed amendments are significant for the purposes of the planning process.[9] If FERC does not authorize the PCGP project, the LRMP amendments would not be implemented.

"Significance" as used in the discussion of LRMP amendments relates to the impact of an amendment on the delivery of goods and services from the Forest Plan that it amends.[10] The determination of whether a plan amendment is significant is guided by several factors.

Changes to a LRMP that are not significant can result from:

- Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.
- Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.
- Minor changes in standards and guidelines.
- Opportunities for additional projects or activities that will contribute to achievement of the management prescription.

The following examples indicate circumstances that may cause significant changes to a LRMP:

- Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000)
- Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

The planning criteria used to evaluate the significance of amendments includes the timing and duration of the proposed change, the location and size of the proposed change, and how the proposed change could alter multiple-use goals and objectives. The remainder of this section will address amendments on the Umpqua, Rogue River, and Winema National Forest related to LSRs.

2.3.1 Umpqua National Forest

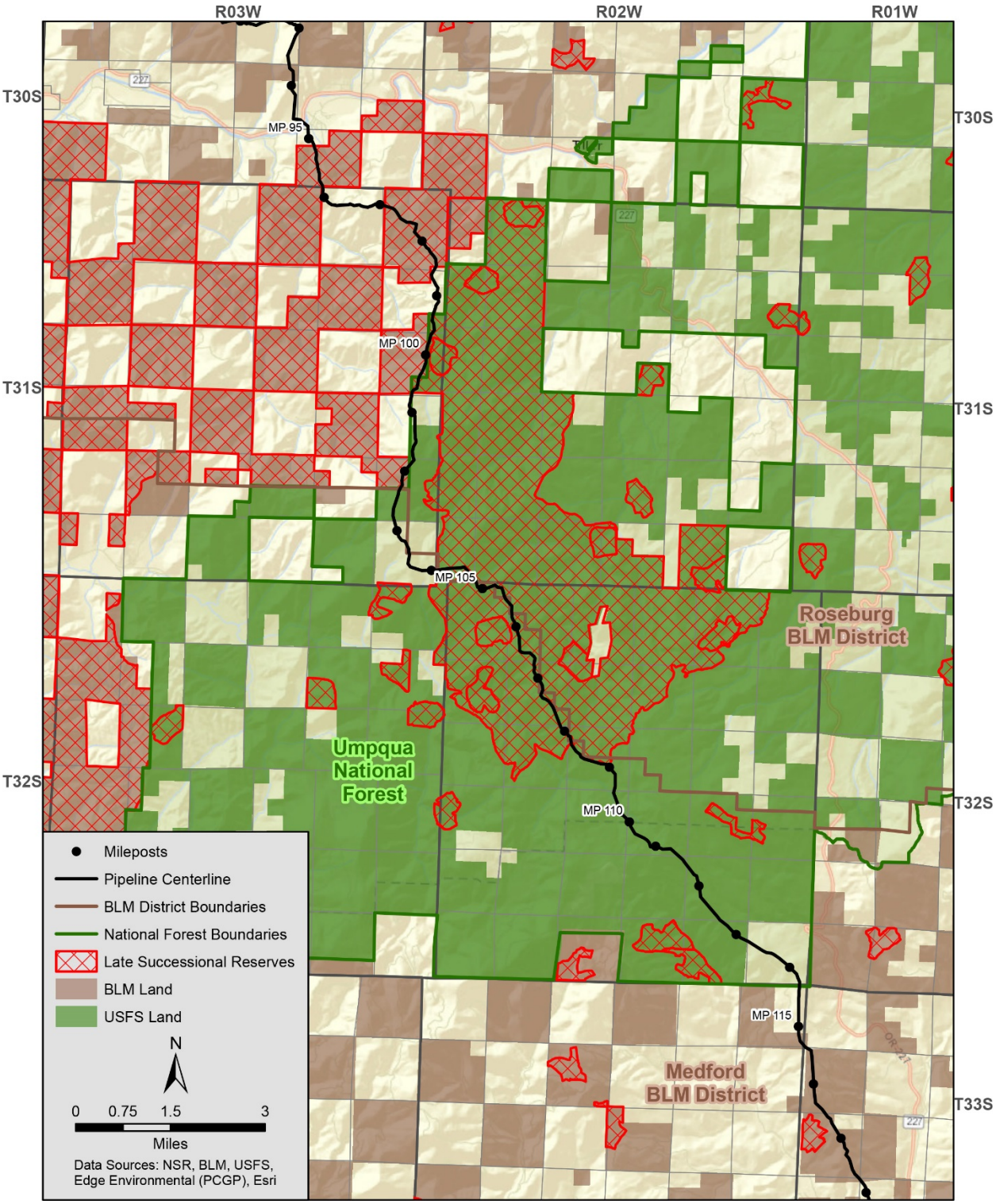
The Umpqua National Forest LRMP as amended guides all resource management activities, establishes management standards and guidelines, and serves as the primary land management plan for the Umpqua National Forest. The amendments to the Umpqua National Forest LRMP

[9] 36 CFR 219.10(f) (1982)

[10] FSM 1926.51 The context of "significance" as it relates to Forest Plans is different than "significance" for environmental impacts as defined by the CEQ regulations at 40 CFR 1508.27. A project may have a "significant" impact on the human environment, but not "significantly" change a forest plan because the context of the effects is different in each determination.

include the NWFP and the inclusion of LSRs (see section 1.2.3 above). Goals and Objectives, Standards and Guidelines, and Management Prescriptions are found in Chapter Four: Forest Management Direction. Management direction in Chapter Four may be changed by amending the Forest Plan. The Umpqua NF LRMP is available at http://www.fs.usda.gov/detailfull/umpqua/landmanagement/?cid=fsbdev3_056190&width=full. In the Umpqua National Forest, the construction of the project would directly affect (acres cleared plus acres modified) approximately 85 acres of LSR 223. A map of the proposed PCGP project and LSRs in the Umpqua National Forest is displayed in figure 2.3-1.

Figure 2.3-1. Map of Proposed PCGP Project and LSRs in the Umpqua National Forest



2.3.1.1 Mapped LSR 223 in the Umpqua National Forest

Summary from LSRA

This information is provided in section 2.2.2.2.

Recent Changes since LSRA was Written

Little activity has occurred in LSR 223 in the Umpqua National Forest since the LSRA was written in 1999. Approximately four wildfires have occurred but each was less than 10 acres. There have been several fuel treatments (thinning and pile-burning) for a total of approximately 136 acres. There has also been some pre-commercial thinning of young stands of timber on approximately 93 acres[11].

Agency Recommendations

Since little has changed in the conditions of this LSR, there would be no changes in the recommendations or priorities for management activities in the LSRA[12].

2.3.1.2 Relationship of Unmapped LSR and the PCGP Project in the Umpqua National Forest

There is no MAMU habitat in the Umpqua National Forest due to its distance from the ocean. The map in figure 2.3-1 demonstrates the PCGP project would not affect KOACs in the Umpqua National Forest. Therefore the proposed PCGP project does not alter any unmapped LSR areas in the Umpqua National Forest.

2.3.1.3 Proposed LRMP Amendments and Mitigation Actions Relevant to LSR 223

LRMP Amendments

The Forest Service proposes to amend the Umpqua National Forest LRMP as follows:

<u>UNF-4, Reallocation of Matrix Lands to Late Successional Reserves</u>

The Umpqua National Forest LRMP would be amended to change the designation of approximately 588 acres from the matrix land allocation to the LSR land allocation in Sections 7, 18, and 19, T.32 S., R. 2 W., Oregon; and Sections 13 and 24, T. 32 S., R. 3 W., W. M., Oregon.

This change in land allocation is proposed to partially mitigate for the potential adverse impact of the PCGP project on LSR 223 in the Umpqua National Forest. This amendment would change future management direction for the lands reallocated from matrix to LSR. A map of the proposed reallocation is displayed in figure 2.3-2.

[11] Personal communications with Wes Yamamoto, Forest Service PCGP project coordinator
[12] Personal communications with Wes Yamamoto, Forest Service PCGP project coordinator

Mitigation Actions

A Mitigation Plan was developed by the Forest Service and adopted by the PCGP project applicant to ensure that the goals and objectives of the LRMP related to LSR would be achieved. Mitigation actions include:

- Creation of snags on 175 acres that are below desired snag densities for LSRs.
- Placing CWD on 350 acres in units that are currently below desired levels for CWD.
- Closing and decommissioning 7.6 miles of roads to reduce fragmentation and develop interior stand habitat over time.
- Thinning approximately 2,081 acres of overstocked stands, and under-burning approximately 1,128 acres in LSRs to reduce fire risk and accelerate development of LSR characteristics.
- Integrated stand density and fuel break treatments on 2285 acres in LSR 233 to restore stand density, species diversity, structural diversity, and control the spread and intensity of wildfire within forested stands prone to fire activity.

While the primary mitigation action for the effects of the proposed pipeline on LSR 223 would be to replace affected acres with additional acres of LSOG forest habitat that are currently outside of the LSR, the additional off-site mitigation actions proposed are consistent with the recommendations in the LSRA for LSR 223. These off-site mitigation actions would accelerate the development of LSOG forest habitat elements to further offset the effects of the PCGP project on LSR 223 in the long term. The additional off-site mitigation actions would also increase the effectiveness of the additional LSOG forest habitat added to LSR 223 by improving the quantity, quality, and distribution of high-quality habitat. The fuels treatment is part of the approximate 10 mile-long fuel break extending form Stouts Creek on the Roseburg District to Trail Creek on the Medford District that represents a landscape-scale action to reduce the risk of damage to LSR from catastrophic wildfire. Figure 2.3-3 displays where the proposed mitigation actions would occur.

Figure 2.3-2. Proposed Matrix to LSR Reallocation, Umpqua National Forest

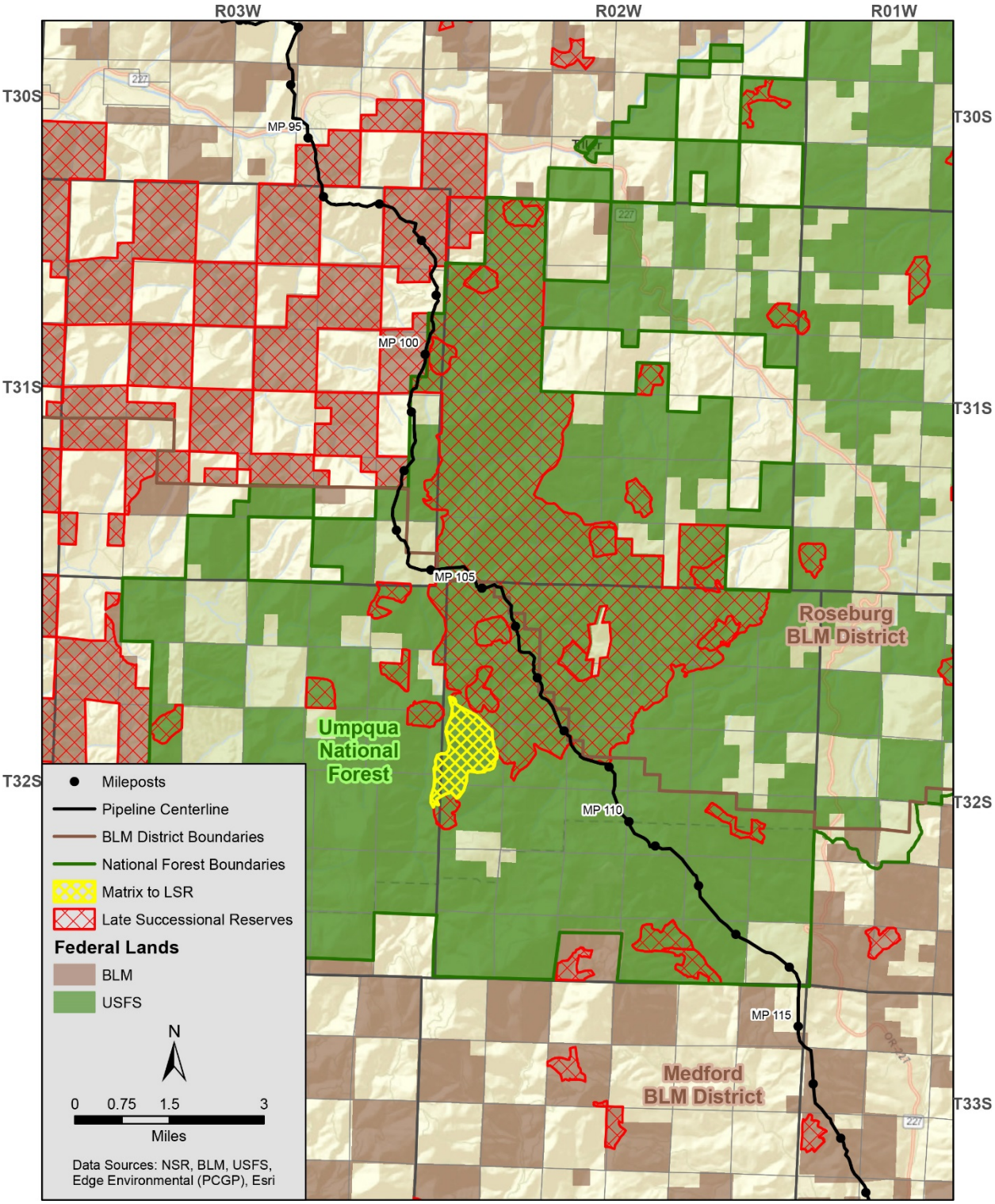
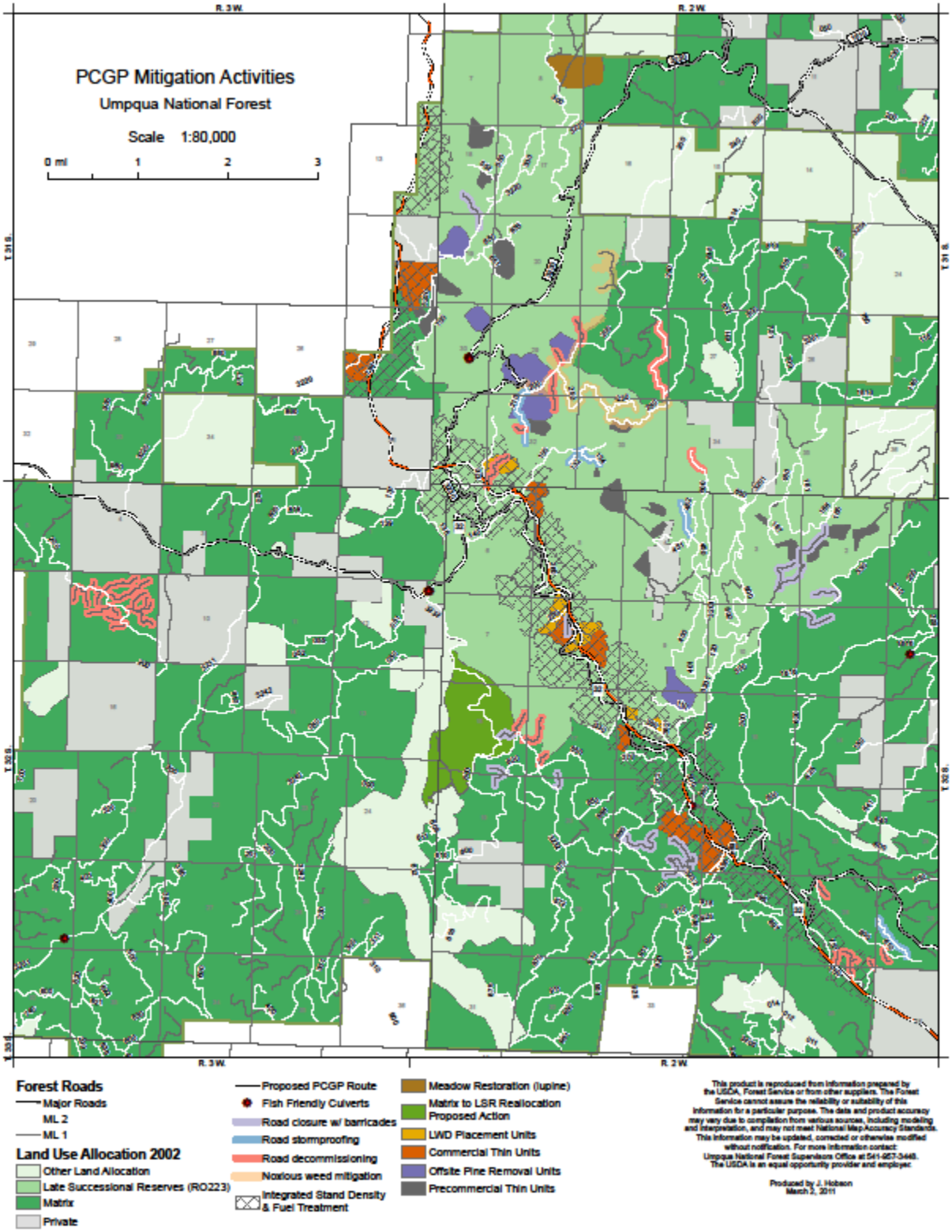


Figure 2.3-3. Proposed Off-site Mitigation Actions in the Umpqua National Forest



2.3.1.4 Impacts Related to the Proposed Amendments and Mitigation Actions Relevant to LSR 223

LRMP Amendment

One LRMP amendment is proposed for the Umpqua National Forest.

UNF-4, Reallocation of Matrix Lands to LSR

The primary management objective of the LSR land allocation is to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old growth–related species. Currently, based on latest BLM and Forest Service GIS data there are approximately 20,557 acres of LSOG forest habitat which comprises approximately 31 percent of LSR 223.

If constructed, the portion of the PCGP project in the Umpqua National Forest would be about 10.9 miles long, of which about 5.0 miles would traverse through LSR 223. The PCGP project would clear approximately 67 acres, of which approximately 23 acres are LSOG forest. The area proposed to be reallocated to LSR 223 is approximately 588 acres of matrix lands, of which approximately 431 acres are LSOG forest. This change in land allocation is proposed to partially mitigate for the potential adverse impact of the PCGP project on LSR 223 in the Umpqua National Forest. The proposed reallocation is shown in figure 2.3-2. When acres reallocated from matrix lands to LSR are compared to the acres of LSR that would be cleared by the PCGP project, the proposed amendment would reallocate over eight times more acres to LSR than would be cleared for the project corridor (see table 2.3.1.4-1 and figure 2.3-4, below).

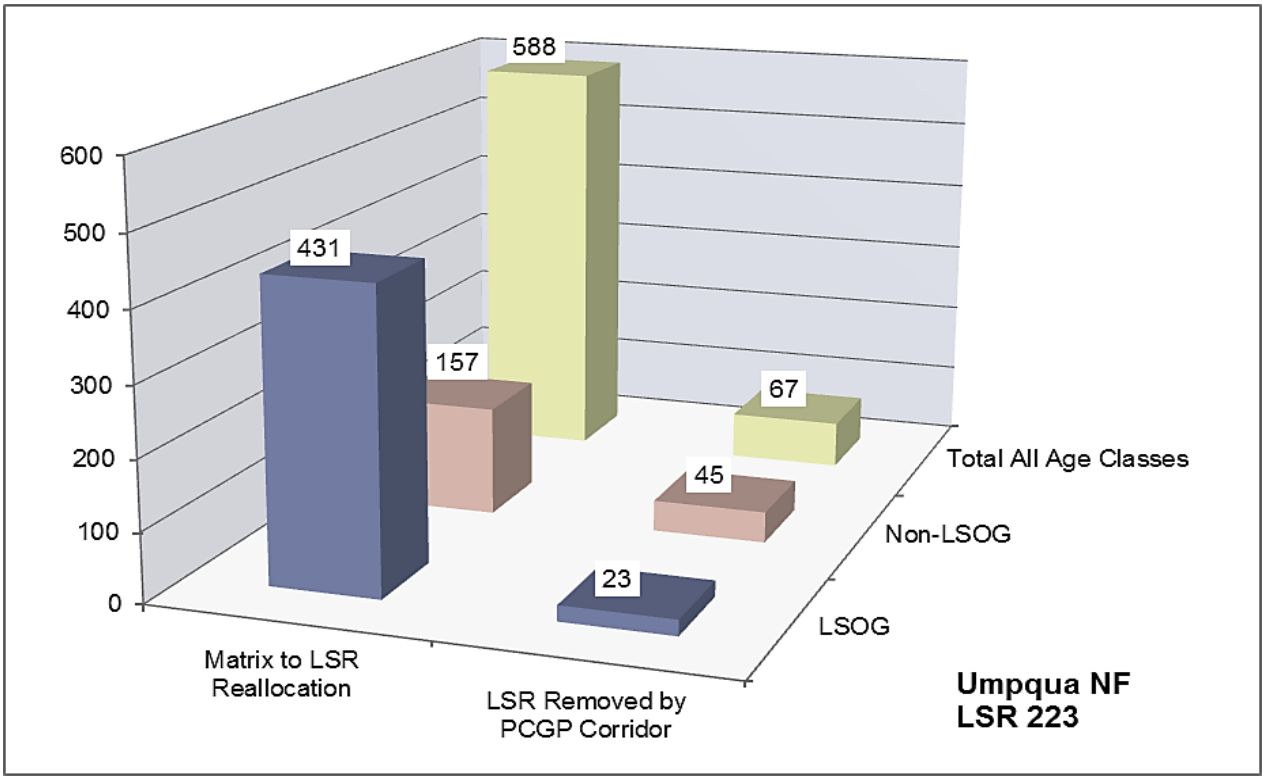
TABLE 2.3.1.4-1

Comparison of LSR Acres Cleared a/ by the PCGP Project and Acres of Matrix Reallocated to LSR

Umpqua National Forest LSR 223	LSOG	Non-LSOG	Non-Forest	Total All Age Classes
Matrix to LSR Reallocation	431	157	0	**588**
LSR Cleared by PCGP Corridor	23	45	0	**67**

a/ Acres cleared include corridor clearing and TEWAs.
Data source: BLM, USFS GIS data layers, Cox 2010

Figure 2.3-4. Comparison of Acres of LSR Cleared by the PCGP Project and Acres of Matrix to LSR Reallocation



In addition to the impacts from the removal of forest vegetation in LSR 223, there would be additional impacts from the acres modified by UCSAs and the acres indirectly affected through the creation of new edges and fragmentation of older forest. A comparison of the total acres affected in LSR 223 and the acres of reallocation are displayed in table 2.3.1.4-2 and figure 2.3-5 below.

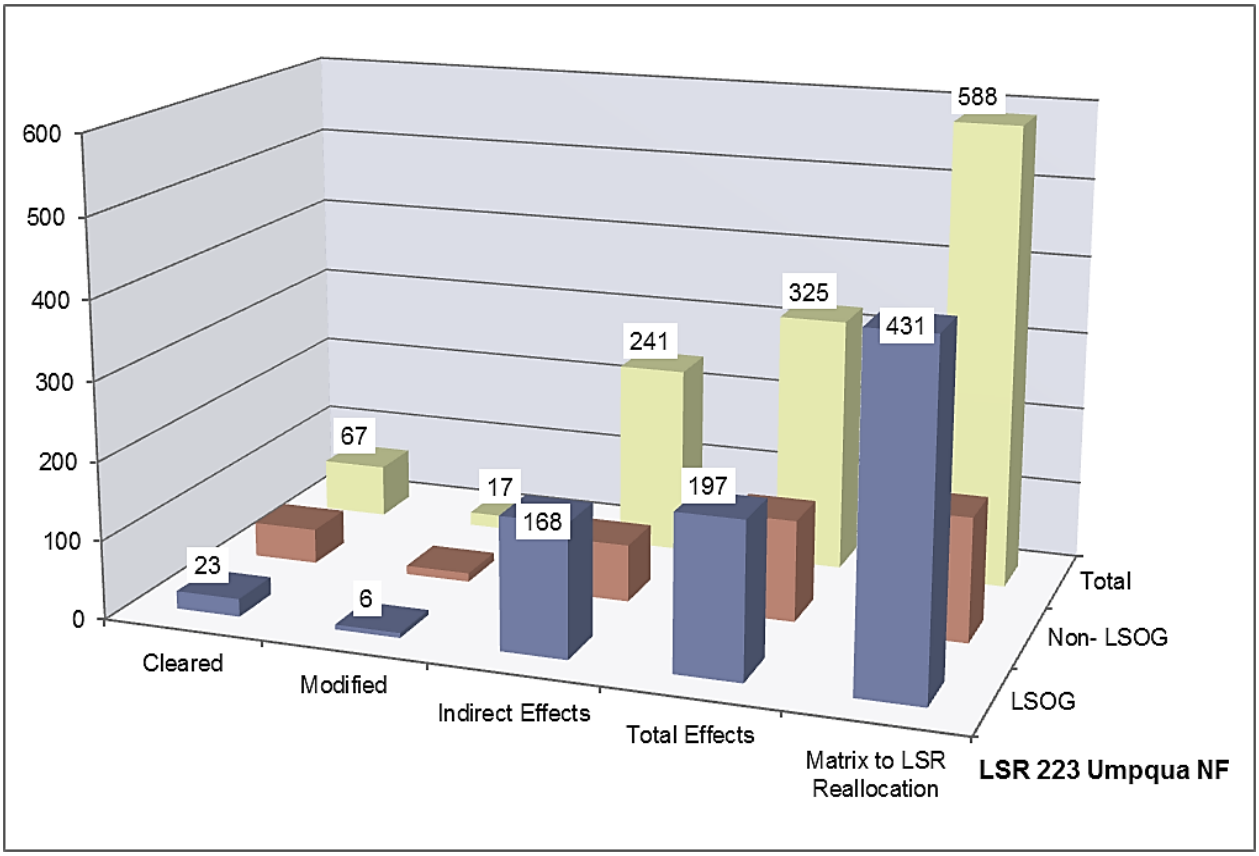
TABLE 2.3.1.4-2

Comparison of LSR 223 Acres Affected a/ by PCGP Project and Acres of Matrix Reallocated to LSR

Umpqua National Forest LSR 223	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	23	6	168	197	431
Non- LSOG	45	11	73	129	157
Non-Forest	0	0	0	0	0
Total	**67**	**17**	**241**	**325**	**588**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS Data Layers, Cox 2010

Figure 2.3-5. Comparison of Total LSR 223 Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



In addition to the impacts of the PCGP corridor on LSR 223 in the Umpqua National Forest there are also potential off-site impacts to LSR 223 from road reconstruction that would be necessary to accommodate the trucks that would be hauling the sections of pipe. These trucks are longer than typical trucks that use forest roads and some road widening and curve realignment may be necessary to safely allow for this truck traffic. In LSR 223 on the Umpqua National Forest it is estimated that approximately 2.5 acres of road widening would occur. Although this road widening would occur to the extent possible within the existing clearing limits it is probable that some additional clearing of forest vegetation would be necessary to accommodate the road reconstruction. It is estimated that this would be a maximum of 2.5 acres and would occur along an existing road opening.

Impact on the Functionality of LSR 223 on the Umpqua National Forest

The functionality of LSR 223 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat within LSR 223 on the Umpqua National Forest would increase with the proposed LRMP amendment. The PCGP project would remove approximately 23 acres of LSOG habitat but the reallocation would add 431 acres of LSOG habitat for a net increase of 408 acres. This would increase the

current level of LSOG habitat in LSR 223 from 20,557 acres to 20,965 acres or by approximately two percent.

- Quality: The area proposed for reallocation to LSR 223 contains some large blocks of LSOG habitat and would also be located immediately adjacent to two KOACs, providing further consolidation of LSOG habitat and increased protection of NSO habitat. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSOG habitat within LSR 223 would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 223 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR LRMP amendment. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur on the southwest edge of the LSR providing for some additional connectivity with the nearest LSRs to the south and west.

- The off-site mitigation would improve the quantity, quality and distribution of LSOG habitat in LSR 223 by accelerating the development of constituent elements of late-successional habitat, reducing the risk of stand-replacement fire and reducing fragmentation through road decommissioning and stand-density management.

The mitigation actions for LSR 223 in the Umpqua National Forest have been designed with the goal that the overall impact would be either neutral or beneficial to the creation and maintenance of late-successional habitat. These actions combined would maintain or improve the functionality of LSR 223.

Mitigation Actions

To compensate for the direct and indirect effects associated with the PCGP project in the LSR land allocation, off-site mitigation actions have also been developed by the Forest Service (see figure 2.3-3). Direct and indirect effects of the PCGP project corridor are described in the FERC Draft EIS and BA. For the purposes of this discussion, indirect effects of the corridor are modeled by age class of vegetation and an associated estimate of edge effects. Indirect effects on LSOG forest are estimated to extend 100 meters on each side of the corridor. Indirect effects for non-LSOG forest are estimated to extend 30 meters on each side of the corridor. No indirect effects are estimated to non-forested areas. These proposed off-site mitigation actions include:

- Accelerating development of larger trees by pre-commercial thinning young stands.
- Replacing constituent elements of habitat by placing LWD in units, creating snags, controlling noxious weeds, and restoring meadows.
- Reducing the risk of stand-replacing fire by stand-density management, commercial thinning, and fuels reduction treatments.
- Reducing habitat fragmentation by decommissioning roads and accelerating the development of interior stand conditions by stand-density management

The additional off-site mitigation actions would increase the effectiveness of the LSOG forest habitat added to LSR 223 by improving the quantity, quality, and distribution of LSOG forest habitat. These off-site mitigation actions are consistent with the LSRA for LSR 223.

Road Decommissioning (7.6 miles)

Although the PCGP project has been routed to avoid LSOG habitat as much as possible, the project would create edge effects that would affect interior stand microclimates and cause habitat fragmentation within LSR 223 that cannot be avoided. Edge is the effect of an opening on microclimate in adjacent stands (Chen, Franklin et al. 1993). Edge effects introduced by roads (or corridors) are highly variable and depend on aspect, road width, vegetation crossed, and other variables. Edge effects are greatest when there is a high contrast in structure and composition between a newly created opening and the adjacent landscape (Harper, Macdonald et al. 2005). Thus, edge effects are greatest when they affect interior stand habitats of older forests and lowest when the new opening is similar to the surrounding landscape, such as adjacent to an existing road or in a recent clearcut.

Decommissioning roads with appropriate restoration measures would presumably reverse edge effects and habitat fragmentation caused by existing roads and create habitat for a variety of animals (Switalski, Bissonette et al. 2004). The effect of edge reduction by road decommissioning is highly variable for the same reasons described for the edge effects created by constructing a road. Agency field experience has shown that road decommissioning reduces the edge effects over time by revegetating road surfaces and eliminating road corridors. Revegetating selected roads in conjunction with the density management proposed for adjacent plantations would block up forested habitat and reduce edge effects and fragmentation in a period of about 40 years as planted trees became pole sized (5 to 9 inches diameter at breast height (dbh) and 20 to 40 feet tall).

Published data on rate and pattern of edge reduction associated with decommissioning roads is not available (Baker 2011), but a comparison of the predicted beneficial effect of road decommissioning to edge effects that would be associated with the PCGP project is useful, even if based on assumptions[13]. Using an assumed edge reduction over time of 50 feet on each side of the road, decommissioning 7.6 miles of road would reduce existing road-related edge effects on an estimated 92 acres (7.6*5280*100/43560)

Linear edge provides another measurement of the edge effect. Approximately 5.9 miles of the proposed PCGP project would be located within LSR 223, creating 11.8 miles of new edge within LSR 223. Proposed road decommissioning would revegetate 7.6 miles of roads, removing approximately 15.2 miles of existing edge over time.

Stand-Density Management

Stand-density management is proposed in early and mid seral Douglas-fir or ponderosa pine plantations that were planted. The purpose of this mitigation action is to restore stand density, species diversity, and structural diversity to those considered characteristic under a natural disturbance regime by enhancing and accelerating the physical and biological services for

[13] This approach is consistent with CEQ Regulations for NEPA, 40 CFR 1508.22

associated flora and fauna within LSR 223. Table 2.3.1.4-3 below displays the acres of density management activities occurring in LSR 223 and matrix.

TABLE 2.3.1.4-3

Stand-Density Management Activities in LSR 223 and Matrix

Treatment Type	LSR 223 Acres	Matrix Acres	Riparian Reserve Acres
Pre-commercial Thinning	377	40	42
Off-Site Pine Restoration	398		15
Commercial Thinning	138	406	35
Total	**913**	**446**	**92**

Source: USFS GIS, Hobson 2010

Pre-commercial thinning is proposed for overstocked plantations to accelerate the development of late-successional and old-growth forest characteristics in LSR 223. Managing stand density would increase growth rates, decrease susceptibility to stand-replacing fire, and diversify stand structure in otherwise relatively homogenous stands. This accelerated development would also reduce fragmentation and edge effects and would help maintain the ability of these stands to respond to changed environmental conditions from either natural or human-caused disturbances. A majority of the pre-commercial thinning acres are within 1 mile of the pipeline right-of-way. Placing the off-site mitigation activities close to the actual pipeline corridor increases their effectiveness by affecting lands within, or near, the home ranges of individual species affected by the pipeline habitat changes. Because the mitigation actions address ecological processes like the edge effect, placing the mitigation action near the edge impacts would increase the effectiveness of the mitigation action by restoring ecosystem structures near the acres that would be affected by the pipeline. The stand-density management activities in matrix lands would improve timber productivity by increasing growth rates, which would partially offset some of the lost timber management potential in the matrix acres reallocated to LSR.

Integrated Stand Density and Fuel Break Treatments (2,285 acres LSR 223)

This prescription is intended accomplish two outcomes. First, it is intended to enhance LSOG habitat by increasing the growth, health, and vigor of the trees remaining in the stands; restoring stand density, species diversity, and structural diversity to those considered characteristic under a natural disturbance regime. Secondly, it is intended to reduce the probability of large-scale loss of LSOG from wildfires as part of a 10 mile long and 0.5-mile wide shaded fuel break extending form Stouts Creek on the Roseburg District to Trail Creek on the Medford District that represents a landscape-scale action to reduce the risk of damage to LSR from catastrophic wildfire. Fuels treatments are decided on a case-by-case basis and rely on fuel loading information as well as proximity to roads and other factors. Slash treatments may be as simple as lop and scatter to get the fuels in contact with the ground for more rapid decomposition, or they may involve piling, burning, or removal of fuel from the site for biomass energy or other uses.

Stand-density management over time would reduce existing edge effects. There is no precise way to estimate the reduction in edge effects with available data since stands have many different age classes, perimeters, and canopy closures. The estimated perimeter of the units proposed for integrated stand-density management and fuels treatment adjacent to the pipeline in LSR 223 is approximately 10 miles. Assuming some edge effect reduction within 100 feet of the

perimeter of these units, density management would reduce edge effects over time by an estimated 121 acres (10*5280*100/43560).

Snag Creation (175 acres LSR 223)

Snag creation is proposed as a mitigation action to replace snags lost in the pipeline right-of-way for habitat for cavity-nesting birds and denning sites for mammals (bats, bears, fishers, etc.). Snags would be lost from the pipeline corridor to facilitate pipeline construction and mitigate safety hazards for construction workers and from the removal of live trees that would have contributed to future snag habitat.

Approximately 4,200 snags within LSR 223 would be created by blasting tops from live trees (preferably trees with existing decay that makes them more suitable for cavity-nesting birds and/or as denning sites) or by inoculating living trees with heart rot decay fungi or other methods. Sites selected for snag creation would be within ½ mile of the pipeline right-of-way to develop snag habitat within (or near) the home ranges of cavity excavators being displaced by the pipeline corridor. Sites would be in mid and late seral stands.

The current direction is to manage CWD levels on a landscape perspective and use land allocation as a consideration for where levels of CWD may occur overtime. DecAID (a tool for managing snags, partially dead trees, and downed wood for biodiversity in forests in Washington and Oregon) is a summary of the best available data on dead wood in Pacific Northwest ecosystems (Marcot et al. 2002). To use DecAID, planning areas should be large enough to encompass the range of variation in wildlife habitat types and structural conditions; it is suggested that planning areas be at least 20 square miles in size (12,800 acres). A reasonable objective is to manage for a range of conditions within the area, balancing areas with high densities of dead wood with moderate- and low-density areas (Marcot et al. 2002).

Wildlife and inventory data summarized in the DecAID Advisor can be applied to management and planning decisions at a range of spatial scales and geographic extents. The calculated tolerance levels (80, 50, and 30 percent) for wildlife data can be applied to stand-level management. However, it is not advised that a particular tolerance level be applied to all stands across a landscape. The LSRA for LSR 223 indicates that snags are below historic conditions (USDA and USDI 1999). The objectives of the LSR land allocation and the location and size of the project make it appropriate to manage for high and moderate snag densities for this project. Snags should be managed at the 80 percent tolerance level in LSRs. However, most of the proposed pipeline would be located along ridge tops that are prone to fire disturbance. Considering fuels, it would be appropriate to manage at a lower density of small snags and downed wood in both tolerance levels. The LSRA for this area recommended a desired future condition of at least 4 snags per acre > 20 inches dbh and 15 feet tall (USDA and USDI 1999, table 8). The target within the LSR treatment areas would be to manage snags densities at 16 per acre > 10.0 inches dbh, of which 8 per acre are > 20 inches dbh.

Large Woody Debris Placement (350 acres LSR 223)

One of the components of CWD is large woody debris (LWD), which consists of trees or portions of trees lying on the forest floor. LWD placement is proposed to accelerate the

development of LSOG forest characteristics by restoring this habitat component to areas where LWD is lacking.

Large wood would be placed in or near areas that are also receiving stand-density management treatment. The large wood would be from trees cut from the pipeline corridor. Sites selected for LWD placement are within 1/2 mile of the proposed pipeline right-of-way. As with the other off-site mitigation actions, placement of the mitigation activities close to the pipeline corridor can benefit species that would be affected by the vegetation changes within the corridor and would make these mitigation actions more effective. Sites for placement of LWD would be in early successional stands that are currently deficient in downed wood. The LWD placement is expected to vary to account for some of the range in variability found across the landscape. For 11 to 20 inch diameter logs, densities would vary from 8 to 33 logs/acre. For 20 inch plus diameter logs, densities would vary from 3 to 12 logs per acre. Logs would be approximately 40 feet in length, and the specified diameter (11 to 20 inches, and 20 inches plus) refers to the stem diameter at the midpoint of the 40-foot log.

Noxious Weed Treatment (6.7 miles)

Soils disturbed during pipeline construction and proposed mitigation activities would have the potential to disperse and generate potential seedbeds for noxious weeds. The proposed noxious weed treatment along 6.7 miles roads within LSR 223 would assist in mitigating potential adverse habitat impacts.

Meadow Restoration (80 acres)

There would be a loss of forest habitat buffering unique habitats and disruption to soil horizons within those habitats from the construction of the PCGP project. These actions would result in adverse impacts to native flora and fauna and increase the opportunities for invasion by non-native plant species. These impacts cannot be fully mitigated on site; therefore, restoration activities such burning, removal of encroaching conifers, and noxious weed control would be applied to an 80-acre meadow located in LSR 223.

Comparison of Total Adverse Direct and Indirect Effects of the PCGP Project on Edge and Total Beneficial Direct and Indirect Effects of Mitigation Actions on Edge in LSR 223

The acres of direct and indirect effects of the PCGP project and the acres of direct and indirect effects of various mitigation actions as related to the edge effect are shown in table 2.3.1.4-4 and figure 2.3-6. For the purposes of this comparison, indirect effects of the corridor are modeled by the age class of vegetation and an associated estimate of edge effects. Since there is no precise method for predicting indirect effects, the following assumptions were used.

- Adverse indirect effects of the PCGP project on LSOG habitat are estimated to extend 100 meters from the cleared edge on each side of the corridor.
- Adverse indirect effects of the PCGP project for non-LSOG habitat are estimated to extend 30 meters from the cleared edge on each side of the corridor.
- No indirect effects are estimated for non-forested areas since there would be no new edge created.

- Direct effects of road decommissioning are estimated from the revegetation of an average road prism of 20 feet.
- The beneficial indirect effects of road decommissioning are estimated to extend 50 feet on each side of the decommissioned road in all vegetation classes.
- The beneficial indirect effect of integrated stand-density fuels management treatments is estimated to extend 100 feet from the perimeter of the unit in all vegetation classes.
- Indirect effects of other mitigation actions are not considered to reduce edge in this comparison.

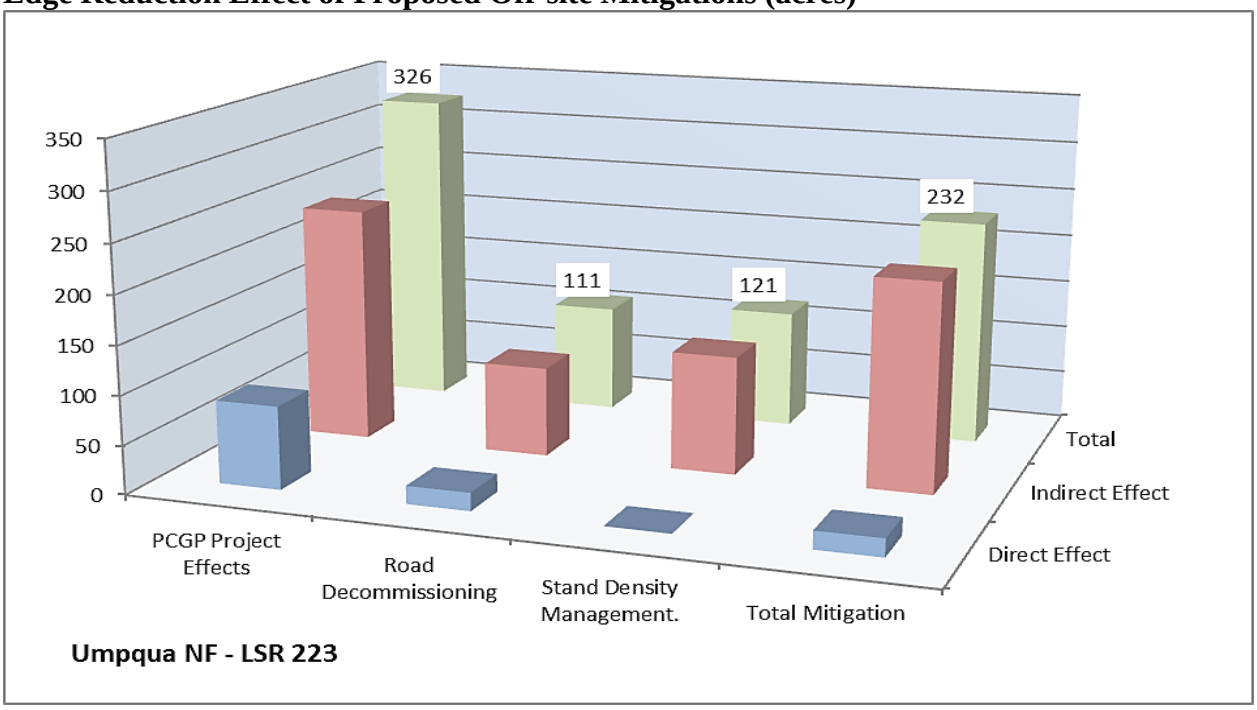
TABLE 2.3.1.4-4

Comparison of Total PCGP Project Impacts a/ on LSR 223 and Estimated Edge Reduction Effect b/ of Proposed Off-site Mitigation Actions (Acres)

Umpqua National Forest (LSR 223)	Direct Effect	Indirect Effect	Total
		Total PCGP Project Impacts on LSR 223	
PCGP Effects	85	241	326
		Proposed Off-site Mitigation	
Road Decommissioning	18	92	111
Stand-Density Management.	0	121	121
Total Mitigation	**18**	**213**	**232**

a/ PCGP project direct effects include corridor clearing, TEWAs, and UCSAs. Indirect effects include 100 meters on each side of corridor edge in LSOG and 30 meters on each side of corridor edge in non-LSOG
b/ Direct edge reduction effects include acres of decommissioned road revegetated (7.6*5280*20/43560) and indirect effects include 50 feet on each side of decommissioned road and 100 feet along perimeter of stand-density treatments.
Data source: BLM, USFS GIS data layers, Hobson 2010

Figure 2.3-6. Comparison of Total PCGP Project Impacts on LSR 223 and Estimated Edge Reduction Effect of Proposed Off-site Mitigations (acres)



The comparisons displayed are not one-to-one correlations, since the adverse impacts on edge would occur immediately with the construction of the pipeline and the reduction of edge effect from the off-site mitigation would occur over time. The comparison also does not take into consideration that the edge created by the construction of the pipeline would also reduce over time as the majority of the corridor (about 70 percent) would be re-forested. The comparison does display that some of the mitigation actions proposed would help reduce the amount of fragmentation in LSR 223 by reducing the amount of existing edge. Over time, this would allow for the formation of larger blocks of interior forest habitat.

Aggregated Impacts to LSR 223

There are no other proposed amendments related to LSR 223 in the Umpqua National Forest. There would be, however, additional impacts to LSR 223 from the proposed PCGP project in the Roseburg District of the BLM. The impacts to LSR 223 in the Roseburg District are discussed in section 2.2.2.5. The following discussion relates to the overall impacts of the proposed project on LSR 223 and the overall acres being reallocated to LSR 223.

The total impacts to LSR 223 from the proposed PCGP project on both the Umpqua National Forest and Roseburg Districts are displayed in table 2.3.1.4-5 and figure 2.3-7 below. The impacts include the direct impacts that would occur from the construction of the project (the acres cleared plus the acres modified by UCSAs) as well as the indirect impacts that would occur from the creation of new edge and the fragmentation of existing LSOG forest habitat. The indirect effects are measured as extending for 100 meters from the cleared edge on each side of the corridor in LSOG forest and 30 meters on each side of non-LSOG forest.

In considering the total impacts to LSOG forest habitat in LSR 223, there would be approximately 321 acres affected (including both direct and indirect impacts) compared to the approximately 431 acres of LSOG forest habitat being reallocated. The amendments would reallocate slightly more than 1.3 times the amount of LSOG forest habitat that would be affected. The off-site mitigation proposed in the Roseburg District would add another 1,000 acres of fuel treatment in addition to the 2,284 acres proposed in the Umpqua National Forest. This in addition to the six dry hydrants proposed in the Roseburg District that would provide for increased prevention of LSOG forest habitat loss due to intensive fire.

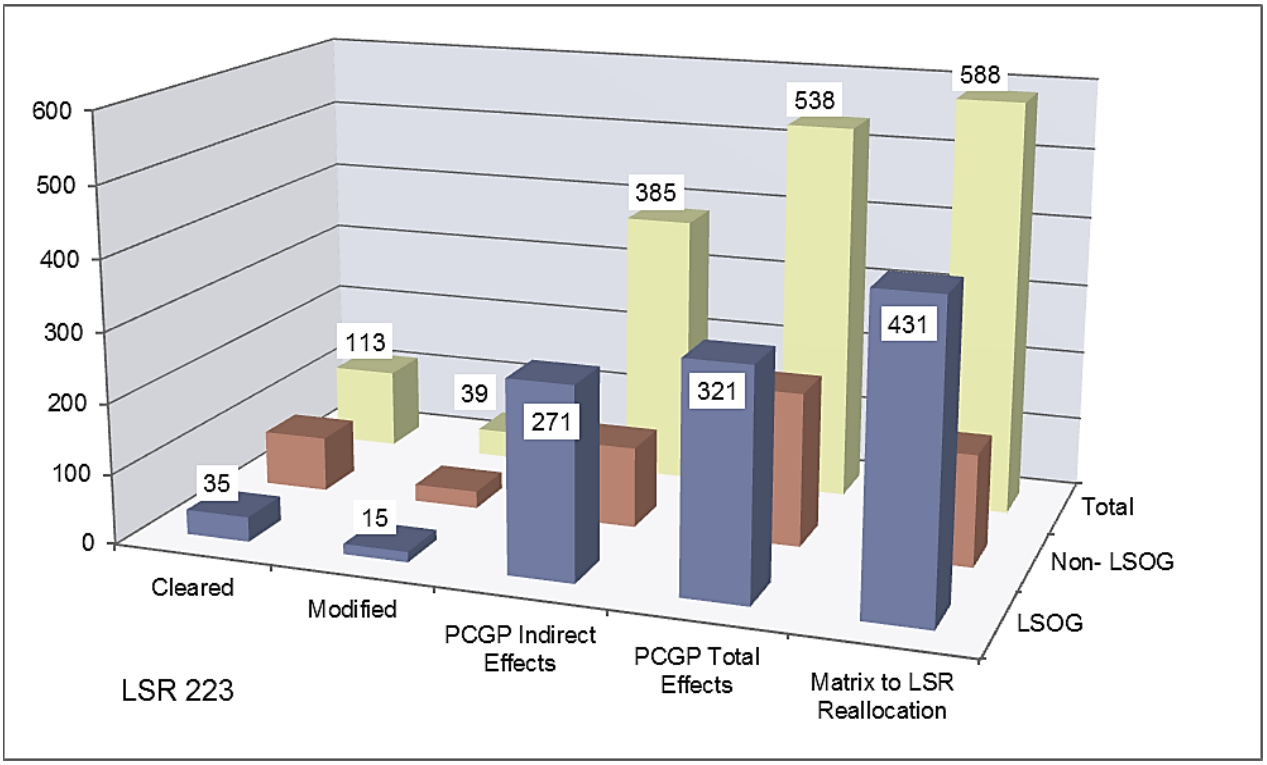
TABLE 2.3.1.4-5

Comparison of Total LSR 223 Acres Affected a/ by PCGP Project and Acres of Matrix Reallocated to LSR

LSR 223	Cleared	Modified	PCGP Indirect Effects	PCGP Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	35	15	271	321	431
Non- LSOG	78	24	115	217	157
Non-Forest	0	0	0	0	0
Total	**113**	**39**	**385**	**538**	**588**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG) in the BLM Roseburg District and Umpqua National Forest.
Data source: BLM, USFS GIS Data Layers, Cox 2010

Figure 2.3-7. Comparison of Total LSR 223 Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



In considering the total impacts to forest habitat in LSR 223, there would be approximately 528 acres affected (including both direct and indirect impacts) compared to the 588 acres of matrix lands being reallocated. The amendment would reallocate approximately 1.1 times the amount of forest habitat that would be affected in LSR 223. However when comparing the amount of LSOG habitat that would be cleared with the PCGP project with the amount of LSOG habitat that would be reallocated there would be over 11 acres reallocated for each acre cleared in LSR 223.

Impact on the Functionality of LSR 223 on the Umpqua National Forest and BLM Roseburg District

The functionality of LSR 223 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat within LSR 223 on the Umpqua National Forest and Roseburg District would increase with the proposed LRMP amendment. The PCGP project would remove approximately 35 acres of LSOG habitat but the reallocation would add 431 acres of LSOG habitat for a net increase of 396 acres. This would increase the current level of LSOG habitat in LSR 223 from 20,557 acres to 20,953 acres or by approximately 1.9 percent.

- Quality: The area proposed for reallocation to LSR 223 contains some large blocks of LSOG habitat and would also be located immediately adjacent to two KOACs, providing

further consolidation of LSOG habitat and increased protection of NSO habitat within LSR 223. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSOG habitat in LSR 223 would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 223 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR LRMP amendment. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur on the southwest edge of the LSR providing for some additional connectivity with the nearest LSRs to the south and west.

- The off-site mitigation would improve the quantity, quality and distribution of LSOG habitat in LSR 223 by accelerating the development of constituent elements of late-successional habitat, reducing the risk of stand-replacement fire and reducing fragmentation through road decommissioning and stand-density management.

The matrix to LSR reallocation and the off-site mitigation actions on both the Roseburg District and the Umpqua National Forest have been designed with the goal that the overall impact of the PCGP project on LSR 223 would be either neutral or beneficial to the creation and maintenance of late-successional habitat. With the increase in the acres of protected LSOG habitat and the inclusion of large LSOG habitat blocks, the overall functionality of LSR 223 would be maintained or improved.

2.3.1.5 Evaluation of the Proposed Amendment and Mitigation Actions in Relation to the Goals and Objectives and Outputs of the Umpqua LRMP

One LRMP amendment and multiple off-site mitigation actions are associated with LSR 223 in the Umpqua National Forest. The proposed amendment would reduce the matrix lands in the Umpqua National Forest by 588 acres from 412,300 acres to 411,712 acres, or by 0.14 percent. It would increase the total LSR land allocation in the Umpqua National Forest by 588 acres from 375,160 acres to 375,748 acres, or by 0.16 percent. This amendment would increase the Umpqua NF portion of LSR 223 by 588 acres from 14,386 acres to 14,973, or by 3.9 percent. This proposed change would affect 588 acres as shown in figure 2.3-2 for the life of the current planning cycle.

This amendment would not alter the long term multiple use goals and objectives of the Umpqua LRMP as amended for LSRs for the following reasons:

- The quantity, quality, and distribution of LSOG habitat in LSR 223 would be either maintained or improved with the proposed reallocation of matrix to LSR LRMP amendment (see discussion in section 2.3.1.4 *Impact on the Functionality of LSR 223 on the Umpqua National Forest* above).

- An extensive off-site mitigation plan was developed by the Forest Service and adopted by the PCGP project applicant to ensure that the Goals and Objectives of the LRMP related to LSR habitat would still be achievable. The off-site mitigation actions were designed to compensate for the impacts of the proposed PCGP project. Mitigation actions include (1) creation of snags on 175 acres that are below desired snag densities adjacent to the project corridor within the LSR, (2) placing LWD on 350 acres in units that are currently

below desired levels for LWD within the LSR and close to the project corridor, (3) closing and decommissioning 7.6 miles of roads to reduce fragmentation and develop interior stand habitat over time within the LSR, and (4) thinning approximately 2,080 acres of overstocked stands to accelerate development of LSR characteristics, and (5) under-burning approximately 1,128 acres in the LSR to reduce fire risk.

All of these actions would be consistent with the goals of the LSR land allocation to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG-related species and with the recommendations in the LSRA for LSR 223.

The proposed amendment would not alter any existing standards and guidelines. Lands that are transferred from the matrix land allocation to LSR would be managed under the LSR standards and guidelines in the future. Moving 588 acres from the matrix to the LSR would not prevent attainment of the long-term balance of goods and services for the Umpqua National Forest because:

- Approximately 23 acres of LSOG forest would be cleared from the LSR by the construction of the PCGP project on the Umpqua NF; 431 acres of LSOG forest would be added back to the LSR in the land allocation change. Additionally, several elements of the off-site mitigation plan would accelerate the development of late-successional stand characteristics on several hundred acres within the LSR where the potential loss of habitat occurs. Acres of LSOG habitat replaced in the LSR by the proposed amendment would exceed the acres of LSOG habitat cleared by construction of the project, thus increasing the acres that are managed for late-successional habitats. As a general principle, populations and individuals within a population of LSOG-dependent species respond favorably to increased protection of LSOG forest, so it can be inferred that LSOG-dependent species would benefit somewhat by this increase in LSOG habitat over time. This is consistent with the goals for LSR.

- The proposed amendment would not affect outputs from the LRMP because it would not stop any existing or planned project. If it would not stop or affect any management activity designed to benefit LSRs or meet other management objectives, then it is not likely that the amendment would affect the multiple use balance of the LRMP.

- An evaluation of the proposed change to matrix land was conducted by staff of the Umpqua NF (USDA Forest Service 2009a). The evaluation concluded that the small change in matrix would not warrant a change in the Forests' Probable Sale Quantity (PSQ). The evaluation noted the PSQ would not be affected between now and the time that the Umpqua National Forest LRMP is revised because the Forest has the capacity to maintain PSQ without the acres of matrix lands that are being reallocated to LSR. As a practical matter, if a linear relationship between acres and outputs is assumed, the potential effect would be approximately 0.1 percent of the Forest's PSQ, since this amendment would affect approximately 1/10th of 1 percent of the Forest matrix land base. This amendment would not prevent future vegetation management activities such as thinning that would benefit LSR and also contribute to the local forest products industry.

2.3.1.6 Evaluation of the effect of the proposed amendment on the entire land management plan or land resources throughout a large portion of the planning area:

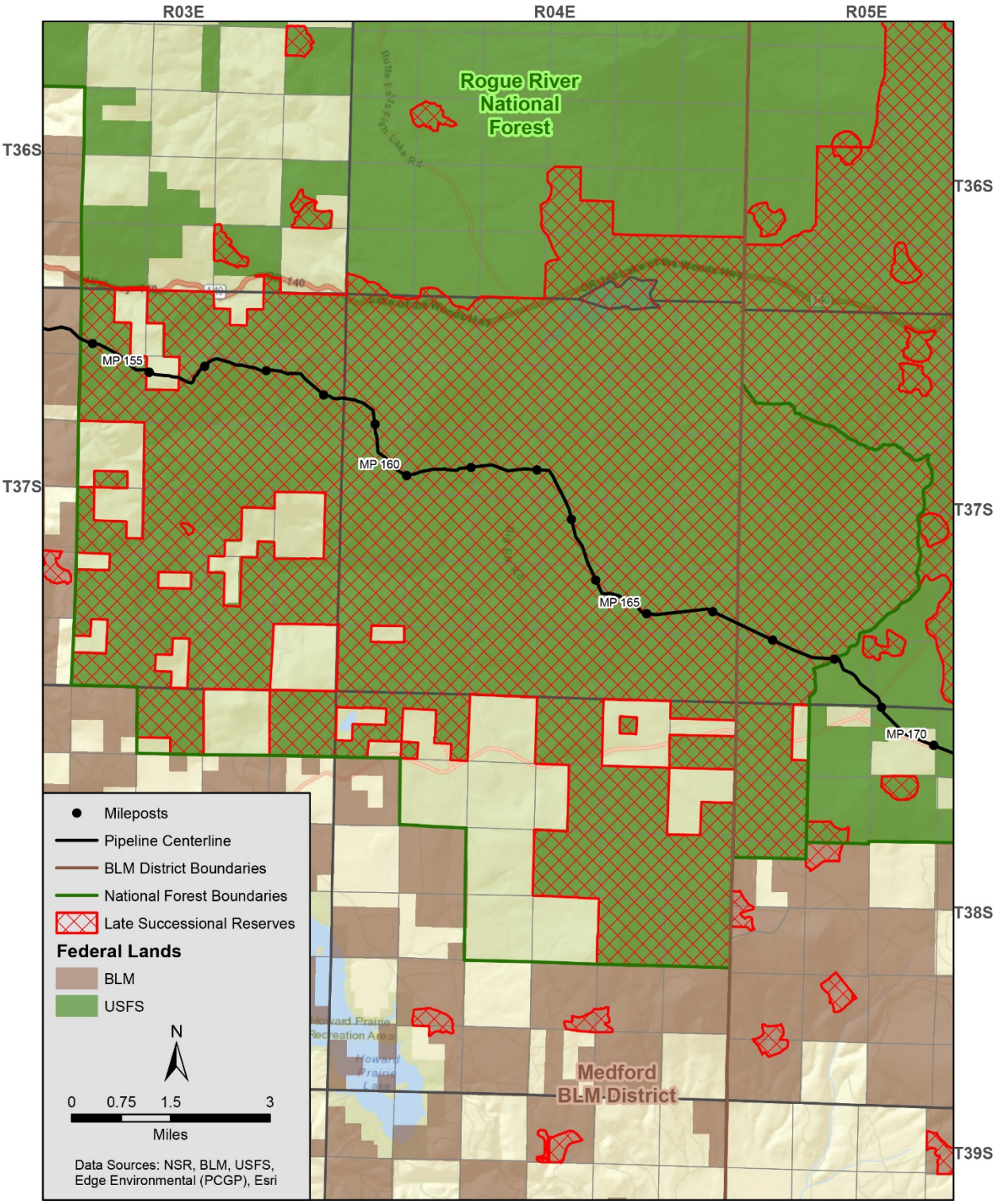
- Reducing the matrix land allocation of 412,300 acres by 588 acres or 0.1 percent would not be an important change because it would not alter the outputs of goods and services from the matrix lands during this planning period.
- The PCGP project would affect a very small portion of LSR 223 in the Umpqua National Forest. The clearing for the construction right-of-way where most impacts would occur is approximately 67 acres of the more than 375,000 acres of LSR in the Umpqua National Forest, or about 0.02 percent of the LSR land allocation in the Umpqua National Forest.

For these reasons, the proposed amendment would not have an important effect on the entire land management plan or affect land resources throughout a large portion of the planning area.

2.3.2 Rogue River National Forest

The Rogue River National Forest LRMP, as amended, serves as the single land management plan for the Rogue River National Forest (USDA Forest Service, Rogue River National Forest LRMP 1990). The amendments to the Rogue River National Forest LRMP include the NWFP and the inclusion of LSRs (see section 1.2.3 above). The Rogue River NF LRMP is available at http://www.fs.usda.gov/detail/rogue-siskiyou/landmanagement/?cid=stelprdb5315100. The proposed PCGP project would cross approximately 13.7 miles of the Rogue River National Forest and, if constructed, would directly affect (corridor plus TEWAs and UCSAs) approximately 276 acres of LSR 227. A map of the proposed project and LSR 227 in the Rogue River National Forest is displayed in figure 2.3-8.

Figure 2.3-8. Map of Proposed PCGP Project and LSR in the Rogue River National Forest



2.3.2.1 Mapped LSR 227 in the Rogue River National Forest

Summary from LSRA

The South Cascades LSRA (USDA and USDI 1998a) area is located in a network of southwest Oregon LSRs. The LSRA includes lands administered by the following jurisdictions: the Rogue River, Winema, Umpqua, and Willamette National Forests and the Butte Falls, Mt. Scott, and South Valley Resource Areas of the Medford, Roseburg, and Eugene Districts of the BLM. The assessment area includes about 721,000 acres in the following LSRs: 222, 224, 225, 226, and 227.

The South Cascades LSRs are part of a regional network designed in association with other land allocations (riparian reserves, National Parks, Wildernesses, botanical areas, etc.) to provide functional late seral habitat, including long-term dispersal and migratory pathways. From a regional perspective, the south Cascades provide a link and are a north-south transition area between the Sierra Nevada of northern California and the northern Cascade Range of Oregon and Washington. The Siskiyou Mountains run generally east-west and provide connectivity between the coastal and inland south Cascade areas. The Columbia and Klamath Rivers, the only major rivers that significantly breach the Cascade and Coast ranges, allow mixing of inland and coastal species and genetic varieties. These links allow movement of species and genetic material north and south and east and west in response to changes in climate such as occurred during the ice ages and the xerothermic period. These links are still important in the evolutionary process and health of the Pacific Northwest flora and fauna.

The habitat within the South Cascades LSRs serves as source areas for spotted owls and other late-successional and old growth–dependent species. Since species depend on habitat, a variety of habitats present over time and space provides for a broad range of species, including rare and sensitive species and those associated with late-seral stages. Successional and disturbance processes have provided a varied seral-stage mix and a functional landscape pattern. However, the effects of fire, the most influential process, have been altered and will likely continue to be modified well into the future.

The eastern portion of LSR 227 contains many acres of relatively recent volcanic flows in which the soils are not developed well enough to support late seral forests. The amount of interior late seral habitat also decreases as one moves south and east through the LSR network (i.e., fragmentation is greater). LSR 227 contains approximately 101,600 acres, of which approximately 16,250 acres (16 percent) is in late seral, 39 percent is in mid seral, 32 percent is in early seral, and approximately 13 percent is in areas not capable of supporting late seral forests. Previous work on the Regional Ecological Assessment Program (REAP) suggests that the historical functional range is between 45 and 75 percent late seral conditions.

Changes Since LSRA Was Written

Two wildfires totaling approximately 294 acres—the Little Butte and the Fish Lake fires—have occurred in LSR 227 in the Rogue River National Forest since the LSRA was written in 1998. Existing roads total approximately 238 miles, with 70 miles of road being decommissioned. Vegetation management has included approximately 540 acres of pre-commercial thinning, 27

acres of meadow restoration, aspen restoration, invasive plant treatments, and a 207-acre commercial thinning timber sale (Big Bad Elk).[14]

Using the most recent GIS data from the latest Northwest Forest Plan Monitoring Report on LSOG forest (Mouer et. al. 2011), the current estimate of LSOG forest in LSR 227 is 30,404 acres. This is more than the 16,250 acres of late-seral forest estimated when the LSRA was written. However, because the two estimates were derived using definitions and different data bases a direct comparison cannot be made.

Agency Recommendations

Because little has changed in the conditions of the LSR, there would be no changes in the recommendations or priorities for management activities in the LSRA[15].

2.3.2.2 Relationship of Unmapped LSR and the PCGP Project in the Rogue River National Forest

There is no MAMU habitat in the Rogue River National Forest due to its distance from the ocean. The map in figure 2.3-8 demonstrates the lands that would be affected by the proposed project are all within mapped LSR 227. Therefore, the proposed project would not alter any unmapped LSR in the Rogue River National Forest.

2.3.2.3 Proposed LRMP Amendments and Mitigation Actions Relevant to LSR 227

LRMP Amendment

The Forest Service proposes to amend the Rogue River National Forest LRMP as follows:

<u>RRNF-7, Reallocation of Matrix Lands to Late Successional Reserves</u>

The Rogue River National Forest LRMP would be amended to change the designation of approximately 512 acres from the matrix land allocation to the LSR land allocation in Section 32, T.36 S., R. 4 E., W. M., Oregon.

This change in land allocation is proposed to partially mitigate for the potential adverse impact of the PCGP project on LSR 227 in the Rogue River National Forest. The amendment would change future management direction for the lands reallocated from matrix to LSR. A map of the proposed reallocation is displayed in figure 2.3-9.

Mitigation Actions

The lands in the Rogue River National Forest that would be affected by the proposed project are all within LSR 227. The primary objectives for the off-site mitigation actions are to accelerate the development of LSOG forest habitat in LSR 227 through snag creation, woody debris placement, and density management, and to reduce LSOG forest habitat fragmentation through road decommissioning.

[14] Personal communications with Wes Yamamoto, Forest Service PCGP project coordinator, and Jeff Von Kienast
[15] Personal communications with Wes Yamamoto, Forest Service PCGP project coordinator

The primary mitigation action for the effects of the proposed pipeline on LSR 227 would be to replace the acres in LSR 227 that would be affected by the pipeline with additional acres of LSOG forest habitat that are currently outside of the LSR. The additional off-site mitigation actions proposed are consistent with the recommendations in the LSRA for LSR 227. These off-site mitigation actions would accelerate the development of LSOG forest habitat elements to further offset the effects of the PCGP project on LSR 227 in the long run. The additional off-site mitigation actions would also increase the effectiveness of the additional LSOG forest habitat added to LSR 227 by improving the quantity, quality, and distribution of high-quality habitat. Figure 2.3-10 displays where the proposed off-site mitigation actions would occur.

Figure 2.3-9. Map of Proposed Matrix Reallocated to LSR in the Rogue River National Forest

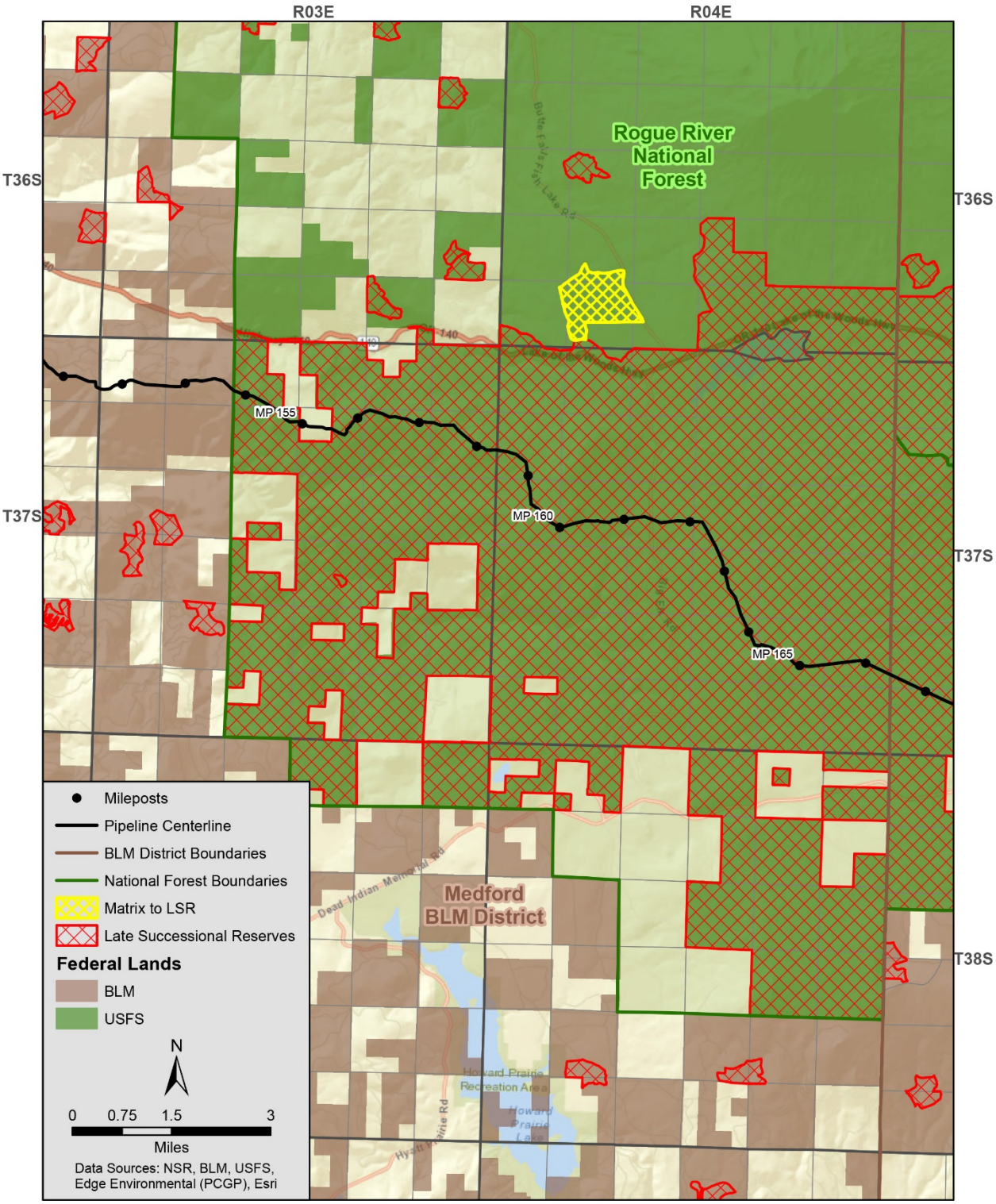
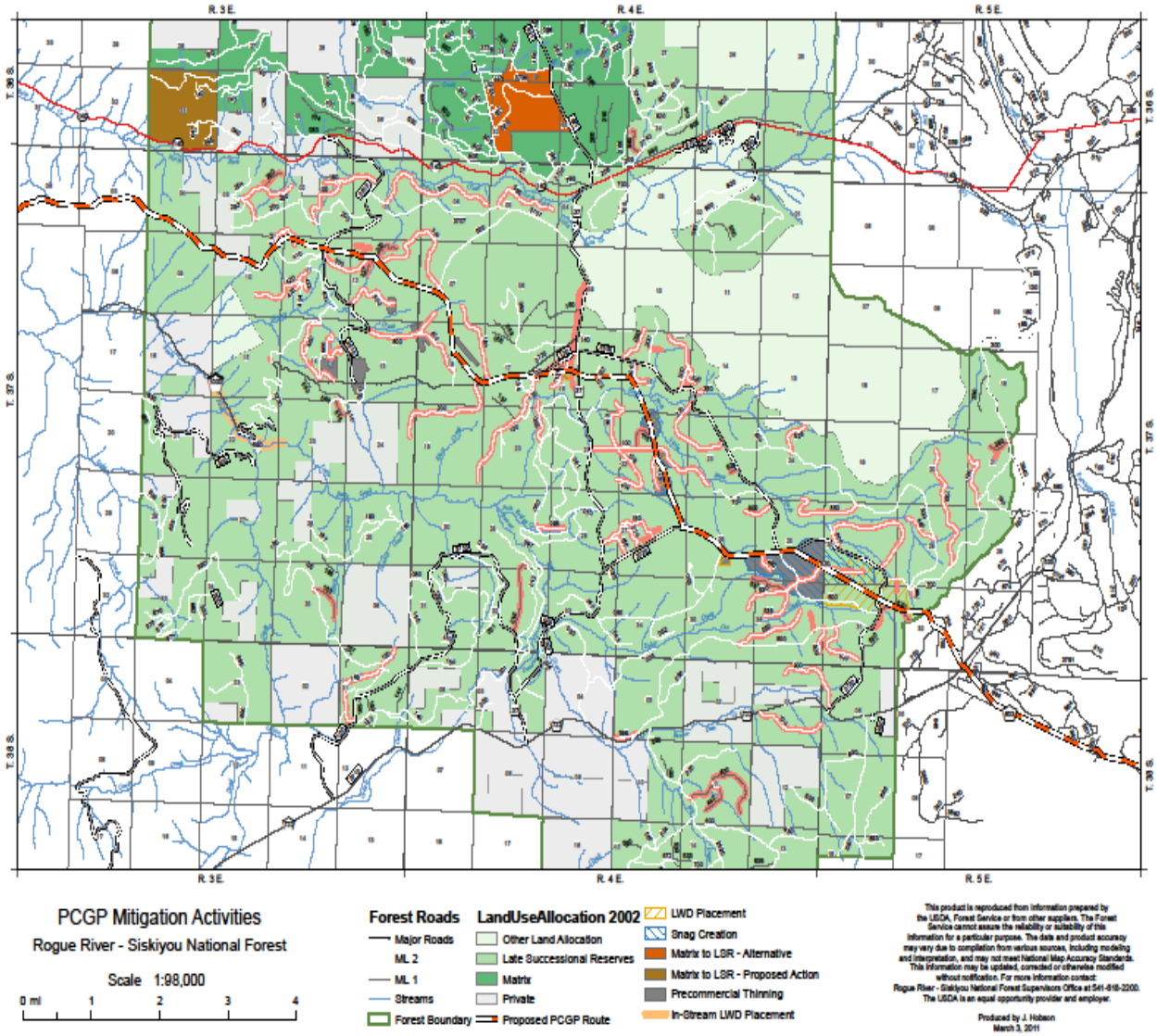


Figure 2.3-10. Proposed Off-site Mitigation Actions in the Rogue River National Forest



2.3.2.4 Impacts Related to Proposed Amendments and Mitigation Actions Relevant to LSR 227

LRMP Amendment

<u>RRNF 7, Reallocation of Matrix Lands to LSR 227</u>

In the Rogue River National Forest, the proposed project would lie entirely within LSR 227. Currently, based on the latest Forest Service GIS data there are approximately 30,404 acres of LSOG forest habitat which comprises approximately 30 percent of LSR 227. If constructed, the portion of the project on the Rogue River National Forest would be about 13.7 miles long and would clear approximately 206 acres of forest vegetation in LSR 227, of which approximately 55 acres are LSOG forest. The matrix area proposed for reallocation to LSR is approximately 512

acres, of which approximately 333 acres are LSOG forest (see figure 2.3-9). This change in land allocation is proposed to partially mitigate for the potential adverse impact of the PCGP project on LSR 227 in the Rogue River National Forest. When acres reallocated from matrix to LSR are compared to the acres of LSR that would be cleared by the PCGP project, the proposed amendment would reallocate about 2-1/2 more acres to LSR than would be cleared in the project corridor. When comparing acres of LSOG habitat, the proposed amendment would reallocate about 6 times more acres of LSOG habitat than would be cleared by the project (see table 2.3.2.4-1 and figure 2.3-11 below).

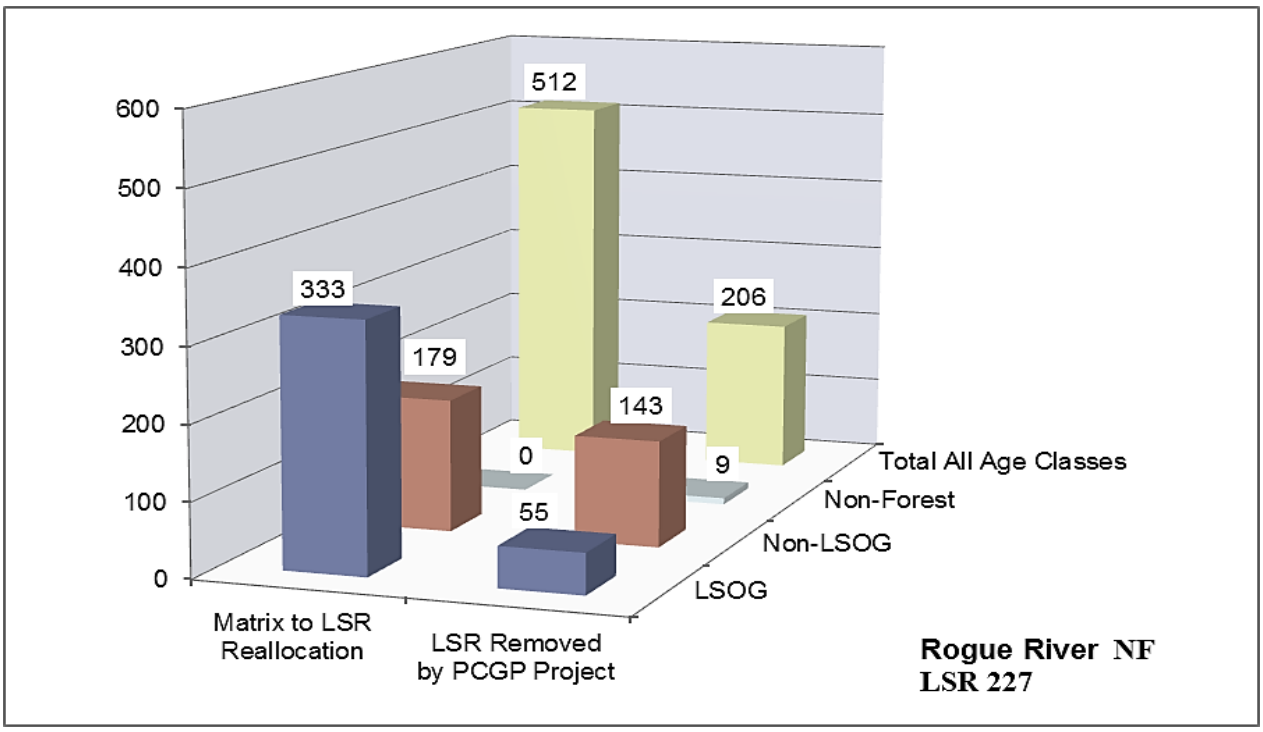
TABLE 2.3.2.4-1

Comparison of LSR Acres Cleared a/ by PCGP Project and Acres of Matrix Reallocated to LSR

Rogue River National Forest LSR 227	LSOG	Non-LSOG	Non-Forest	Total All Age Classes
Matrix to LSR Reallocation	333	179	0	**512**
LSR Cleared by PCGP Project	55	143	9	**206**

a/ Acres cleared include corridor clearing and TEWAs.
Data source: BLM, USFS GIS data layers, Cox 2010

Figure 2.3-11. Comparison of LSR Acres Cleared by the PCGP Project and Acres of Matrix Reallocated to LSR



In addition to the impacts from the removal of forest vegetation in LSR 227, there would be additional impacts from the acres modified by UCSAs and the acres indirectly affected through the creation of new edges and fragmentation of older forest. A comparison of the total acres affected in LSR 227 and the acres that would be reallocated are displayed in table 2.3.2.4-2 and figure 2.3-12 below.

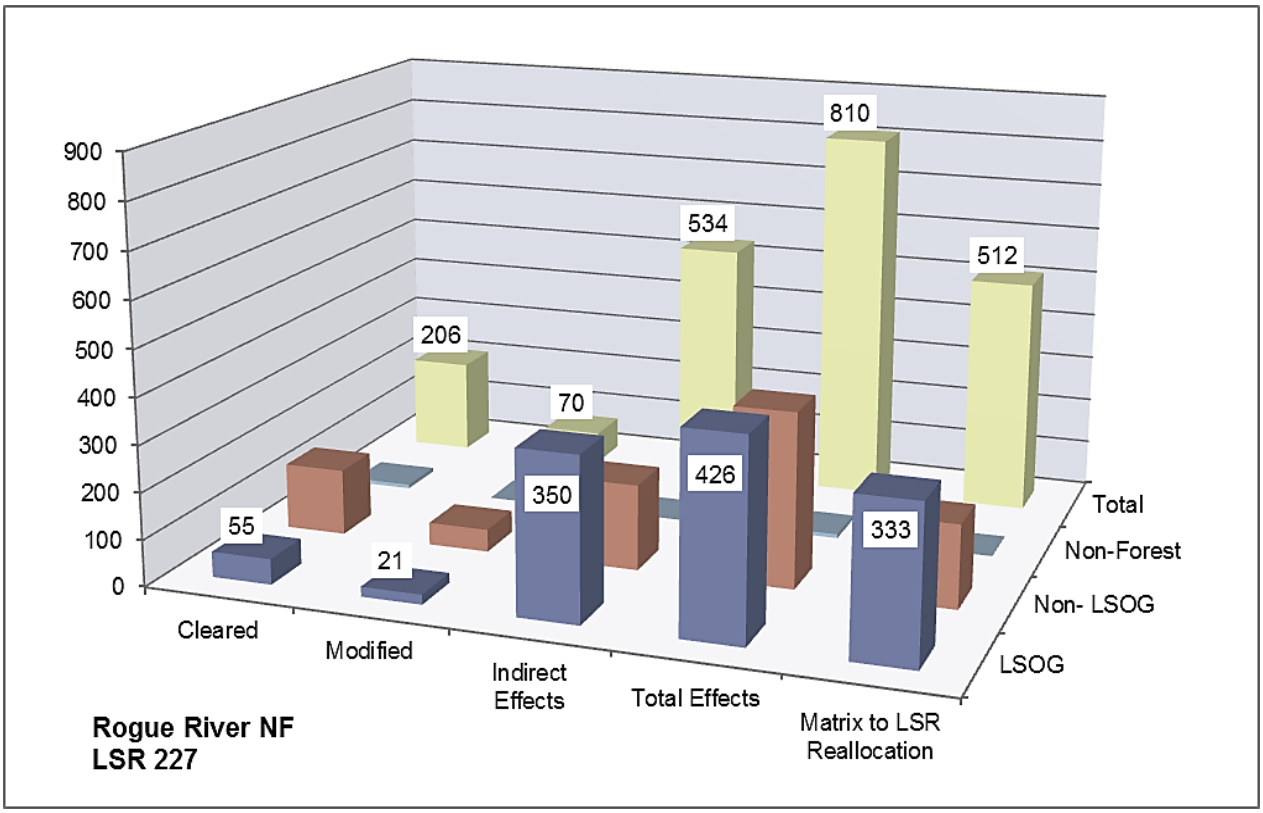
TABLE 2.3.2.4-2

Comparison of Total LSR Acres Affected a/ by PCGP Project and Acres of Matrix Reallocated to LSR

Rogue River National Forest LSR 227	Cleared	Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
	Direct Effects				
LSOG	55	21	350	426	333
Non- LSOG	143	48	184	375	179
Non-Forest	9	0	0	9	0
Total	**206**	**70**	**534**	**810**	**512**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS Data Layers, Cox 2010

Figure 2.3-12. Comparison of Total LSR Acres Affected by PCGP Project and Acres of Matrix Reallocated to LSR



In addition to the impacts of the PCGP corridor there are also potential off-site impacts to LSR 227 from road reconstruction that would be necessary to accommodate the trucks that would be hauling the sections of pipe. These trucks are longer than typical trucks that use forest roads and some road widening and curve realignment may be necessary to safely allow for this truck traffic. It is estimated that approximately four acres of road widening would occur within LSR 227. Although this road widening would occur to the extent possible within the existing clearing limits it is probable that some additional clearing of forest vegetation would be necessary to accommodate the road reconstruction. It is estimated that this would be a maximum of four acres and would occur along an existing road opening.

Impact on the Functionality of LSR 227 on the Rogue River National Forest

The functionality of LSR 227 relates directly to the goals and objectives for LSRs (see section 1.2.2) and can be measured by the quantity, quality and distribution of LSOG forest habitat in the LSR and how the proposed PCGP project would impact these characteristics.

- Quantity: The overall quantity of LSOG habitat within LSR 227 on the Rogue River National Forest would increase with the proposed LRMP amendment. The PCGP project would remove approximately 55 acres of LSOG habitat but the reallocation would add 333 acres of LSOG habitat for a net increase of 278 acres. This would increase the current level of LSOG habitat in LSR 227 from 30,404 acres to 30,682 acres or by approximately 0.9 percent.

- Quality: The area proposed for reallocation to LSR 227 contains some large blocks of LSOG habitat. With the reallocation of matrix to LSR and the consolidating of larger blocks of LSOG habitat the quality of the LSOG habitat within LSR 227 would be slightly improved.

- Distribution: The distribution of LSOG habitat within LSR 227 would remain largely unchanged with the proposed PCGP project and the reallocation of matrix to LSR LRMP amendment. To the extent there are minor changes they would be beneficial due to the location of the proposed reallocation. The reallocation would occur on the north end of the LSR providing for some additional connectivity with the nearest LSRs to the north.

- The off-site mitigation would improve the quantity, quality and distribution of LSOG habitat in LSR 227 by accelerating the development of constituent elements of late-successional habitat, reducing the risk of stand-replacing fire, and reducing fragmentation through road decommissioning and stand-density management.

The mitigation actions for LSR 227 in the Rogue River National Forest have been designed with the goal that the overall impact would be either neutral or beneficial to the creation and maintenance of late-successional habitat. These actions combined would maintain or improve the functionality of LSR 227.

Mitigation Actions

Road Decommissioning (53.2 miles)

Although the proposed PCGP project has been routed to avoid LSOG forest as much as possible, it would create edge effects that may affect interior stand microclimates and cause habitat fragmentation within LSR 227 that cannot be avoided. Edge is the effect of an opening on microclimate in adjacent stands (Chen, Franklin et al. 1993). Edge effects introduced by roads are highly variable and depend on aspect, road width, vegetation crossed, and other variables. Edge effects are greatest when there is a high contrast in structure and composition between a newly created opening and the adjacent landscape (Harper, Macdonald et al. 2005. p. 768). Thus, edge effects are greatest when they affect interior stand habitats of older trees and least when the new opening is similar to the surrounding landscape, such as when it is adjacent to an existing road or in a recent clearcut.

Decommissioning roads with appropriate restoration measures would presumably reverse edge effects and habitat fragmentation caused by existing roads and create habitat for a variety of animals (Switalski, Bissonette et al. 2004). By discouraging vehicular access, road decommissioning also eliminates disturbance (noise, presence, etc.) caused by human intrusion. This potentially benefits nesting behavior in particular for the NSO. The effect of edge reduction by road decommissioning is highly variable for the same reasons described for the edge effects created by constructing a road. Agency field experience has shown that road decommissioning reduces edge effects over time by revegetating road surfaces and eliminating road corridors. Revegetating selected roads in conjunction with the density management proposed for adjacent plantations would block up forested habitat and reduce edge effects and fragmentation in a period of about 40 years as planted trees became pole sized (5 to 9 inches dbh and 20 to 40 feet tall). Published data on the rate and pattern of edge reduction associated with decommissioning roads are not available (Baker 2011), but a comparison of the predicted beneficial effect of road decommissioning on edge effects associated with the PCGP project is useful, even if it is based on assumptions.[16] Using an assumed edge reduction over time of 50 feet on each side of the road, decommissioning roads would reduce existing road-related edge effects on an estimated 645 acres (53.2*5280*100/43560).

Linear edge provides another measurement of edge effect. Approximately 13.6 miles of the proposed PCGP project would be located within LSR 227, creating 27.2 miles of new edge within LSR 227. Proposed road decommissioning would revegetate 53.2 miles of roads, removing approximately 106.4 miles of existing edge over time. Fragmentation in the context of impacts on the LSR land allocation is the process of reducing the size and connectivity of stands that compose a forest. The conversion of large tracts of old-growth forest to small, isolated forest patches with large edge areas can create changes in microclimate, vegetation species, and predator-prey dynamics.

To provide an indication of the effects of the proposed PCPG corridor and proposed road decommissioning on fragmentation, the Forest Service conducted a stand-level analysis, considering stands that fall within 100 meters of the proposed pipeline corridor (USDA Forest Service, Rogue River National Forest 2010). All stands that overlapped the 100-meter buffer were included in the analysis out to the stand edges beyond the buffer. The only changes examined in this analysis were natural growth and development of trees and the off-site mitigation activities. Natural events, such as wildfire and storms, were not modeled because of their stochastic nature and the relatively limited size of the analysis area. Within the modeled stands, it was assumed that there would be no forest management harvest activities during the 60 years modeled beyond activities already planned. Future management activities would need to be consistent with the LRMP in effect at the time the project is implemented.

Construction of the pipeline would result in the fragmentation of LSOG forest in LSR 227 and would increase the fragmentation index (ratio of edge to acres) in modeled stands (those within 100 meters of the pipeline) by about 1 percent.[17] After 60 years, normal stand growth would reduce this ratio by about 3 percent. With implementation of proposed road decommissioning, the ratio of edge acres would decrease by about 34 percent. A decrease in the ratio of edge to

[16] This approach is consistent with CEQ Regulations for NEPA, 40 CFR 1508.22

[17] Changes in edge:area ratios are more meaningful as relative numbers rather than absolute values, so percentages are used to express changes in values.

opening means that patch sizes of forested areas have increased. LSR 227 currently has 1,445 patches of mature forest greater than 1 acre in size that lie within 100 meters of the edge of the proposed PCGP project corridor. Project construction would increase fragmentation by passing through and dividing some of these patches, with a net increase of five patches. The current average patch size throughout the LSR is about 7 acres, which is not projected to change within the next 60 years. With the proposed road decommissioning and road closures, the size of patches within 100 meters of the proposed pipeline would increase to an average of 14.5 acres within 60 years. This would be consistent with a reduction in the edge to opening ratio discussed above.

In terms of interior patches (LSOG areas that are at least one acre in size and at least 300 feet from a hard edge), there are currently 779 interior patches in LSR 227. Eight of these (about 1 percent of the interior patches) would be fragmented by the pipeline corridor. In 60 years, interior patches are projected to increase to 856 interior patches, a 9 percent increase from the current condition. With the proposed road decommissioning, the number of interior patches would increase by about 16 percent to 927, and the average size of the patches would increase from about 6.5 acres to 13.9 acres, an increase in size of over 100 percent.

There are approximately 233 miles of road in LSR 227. The proposed road decommissioning would create a 23 percent reduction in road mileage in this LSR. Current road density in LSR 227 is about 3.3 miles per square mile. With the proposed road decommissioning, it would be reduced to about 2.5 miles per square mile. Reductions in road density that would occur within ¼, ½, and 1 mile of the pipeline corridor are shown in the table 2.3.2.4-3 below.

TABLE 2.3.2.4-3

Reductions in Road Density within 1/4 and 1/2 and 1 mile of PCGP Corridor

Road Density	Existing Road Density (miles/square mile)	With Road Decommissioning (miles/square mile)
LSR 227	3.3	2.5
Within ¼ mile of pipeline	3.9	1.7
Within ½ mile of pipeline	4.1	1.7
Within 1 mile of pipeline	4.2	2.5

Stand-Density Management (600 Acres)

Pre-commercial thinning is proposed for overstocked plantations to accelerate the development of late-successional and old-growth forest characteristics in LSR 227. Managing stand density would increase growth rates, decrease susceptibility to stand-replacing fire, and diversify stand structure in otherwise relatively homogenous stands. This accelerated development would also reduce fragmentation and edge effects and would help maintain the ability of these stands to respond to changed environmental conditions from either natural or human-caused disturbances. All 600 acres are within 0.5 mile of the pipeline right-of-way. Placing the off-site mitigation activities close to the actual pipeline corridor would increase their effectiveness by affecting lands within, or near, the home ranges of individual animals and species affected by the pipeline habitat changes. As the mitigation actions address ecological processes like edge effects, placing the mitigation within or near the edge impacts increases the effectiveness of the mitigation by restoring ecosystem structures and processes on some of the acres also affected by the pipeline. Thinning young stands would, over time, reduce existing edge effects. There is no precise way

to estimate the edge effect reduction with available data since stands have many different age classes, perimeters, and canopy closures. The estimated perimeter of the units proposed for thinning is approximately 3.0 miles. Assuming some edge reduction within 100 feet of the edge of these units, density management would reduce edge effects over time by an estimated 36 acres (3*5280*100/43560).

Fuels treatments for the slash generated by stand-density management are decided on a case-by-case basis and rely on slash loading information as well as proximity to roads and other factors. Slash treatments may be as simple as "lop and scatter" (cutting slash into smaller pieces and scattering) to get the fuels in contact with the ground for more rapid decomposition, or they may involve piling and burning, jackpot or underburning, or removal of slash from the site for biomass energy or other uses.

Snag Creation (600 acres)

Snag creation is proposed as a mitigation action to replace snags lost in the pipeline right-of-way for habitat for cavity-nesting birds and denning sites for mammals (bats, bears, fishers, etc.). Snags would be lost from the pipeline corridor to facilitate pipeline construction or to mitigate safety hazards for construction workers.

Approximately 1,200 snags would be created by blasting tops from live trees (preferably trees with existing decay, which makes them more suitable for cavity-nesting birds and/or as denning sites),by inoculating living trees with heart rot decay fungi, or by other methods. Sites selected for snag creation would be within ½ mile of the pipeline right-of-way to develop snag habitat within (or near) the home ranges of cavity excavators being displaced by the pipeline corridor. Sites would be in mid-successional stands or around the edges of early successional stands that are currently deficient in snags as defined by the LRSA (USDA and USDI 1998a). Stand data for the plant associations in this area (which is an indication of undisturbed forest snag levels) shows these stands have an average of about four snags per acre in the 11- to 20-inch-diameter range, and an additional four snags per acre greater than 20 inches in diameter.

If the tree diameters in the stands prevent snag creation in the > 20-inch-diameter size class, additional snags in the smaller size class (11- to 20-inch-diameter) would be created to make up for the deficit. For sites bordering early successional stands, snags would be created within 100 yards of the stand boundary at the same trees per acre levels described above.

Large Woody Debris (LWD) Placement in Plantations

Large wood placement in plantations is proposed to accelerate the development of LSOG forest characteristics by restoring this habitat component to plantations where LWD is lacking. Any wood used in this mitigation would come from the PCGP project corridor. No additional trees outside the corridor would be harvested to provide large woody debris, so this mitigation is necessarily limited by the amount of LWD that can be provided from the corridor. LWD used in this mitigation would be staged at appropriate locations and placed with a helicopter.

The first priority in restoration with respect to LWD would be to ensure that that the PCGP project itself meets LRMP standards after construction is completed. After LWD standards within the corridor have been met, any additional LWD would be available for placement in the adjacent units identified below.

Large wood would be placed in plantations that are also receiving stand-density management treatment. The large wood would be from trees cut from the pipeline corridor. Sites selected for downed woody material placement would be within ½ mile of the pipeline right-of-way. As with the other off-site mitigation actions, placement of the mitigation activities close to the pipeline corridor can benefit species that are affected by the vegetation changes within the corridor and would make these mitigation actions more effective. Sites would be in early successional stands that are currently deficient in downed wood.

The large wood placement piece count per acre is expected to vary to account for some of the range in variability found across the landscape. For 11- to 20-inch-diameter logs, treatments would average about 10 pieces on each treated acre but densities would vary from 8 to 33 logs per acre. For 20-inch plus-diameter logs, an average of 5 pieces would be placed on each treated acre, but densities would vary from 3 to 12 logs per acre. Logs would be approximately 40 feet in length, and the specified diameter (11- to 20-inch and 20-inch plus) refers to the stem diameter at the midpoint of a 40-foot log.

Comparison of Total Direct and Indirect Effects of the PCGP Project and the Beneficial Effects of Off-site Mitigation Actions on Edge

Acres of direct and indirect effects of the PCGP project and the acres of direct and indirect effects of various mitigation actions as related to a reduction in edge effects are shown in table 2.3.2.4-4. For the purposes of this comparison, indirect effects of the PCGP project are modeled by the age class of vegetation and an associated estimate of edge effects. Since there is no precise method for predicting indirect effects, the following assumptions were used.

- Indirect effects for LSOG habitat are estimated to extend 100 meters from the cleared edge on each side of the corridor.
- Indirect effects for non-LSOG habitat are estimated to extend 30 meters from the cleared edge on each side of the corridor.
- No indirect effects are estimated for non-forested areas since there would be no new edge created.
- Direct effects of road decommissioning are estimated from the revegetation of an average road prism of 20 feet.
- Indirect effects of road decommissioning are estimated to extend 50 feet on each side of the decommissioned road in all vegetation classes.
- The indirect effect of stand-density management is estimated to extend 100 feet from the perimeter of the unit in all vegetation classes.
- Indirect effects of other mitigation actions are not considered to reduce edge in this comparison.

Using these assumptions, combined direct and indirect effects of the project and proposed mitigation actions are shown in table 2.3.2.4-4 and figure 2.3-13 below.

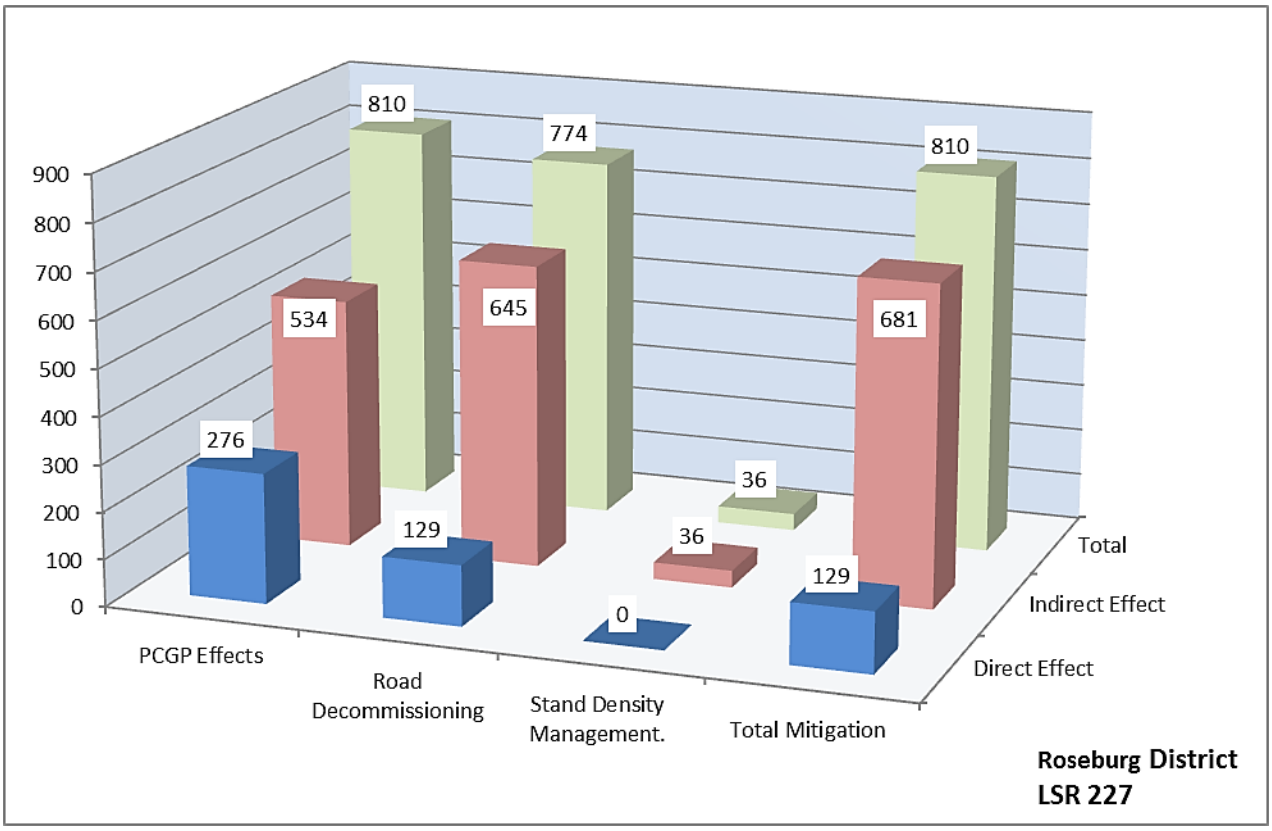
TABLE 2.3.2.4-4

Comparison of Total PCGP Project Impacts a/ on LSR 227 and Estimated Edge Reduction Effect b/ of Proposed Off-site Mitigation Actions (acres)

Rogue River National Forest (LSR 227)	Direct Effect	Indirect Effect	Total
		Total PCGP Project Impacts on LSR 227	
PCGP Effects	276	534	810
		Proposed Off-site Mitigation	
Road Decommissioning	129	645	774
Stand-Density Management.	0	36	36
Total Mitigation	129	681	810

a/ PCGP project direct effects include corridor clearing, TEWAs, and UCSAs. Indirect effects include 100 meters on each side of corridor edge in LSOG and 30 meters on each side of corridor edge in non-LSOG
b/ Direct edge reduction effects include acres of decommissioned road revegetated (53.2*5280*20/43560) and indirect effects include 50 feet on each side of decommissioned roads and 100 feet along the perimeter of stand-density treatments.
Data source: BLM, USFS GIS data layers, Hobson 2010

Figure 2.3-13. Comparison of Total PCGP Project Impacts on LSR 227 and Estimated Edge Reduction Effect of Proposed Off-site Mitigation Actions (acres)



2.3.2.5 Evaluation of the Proposed Amendment and Mitigation Actions in Relation to the Goals and Objectives of the LRMP for the Rogue River National Forest

The proposed amendment would reduce the matrix land allocation in the Rogue River National Forest by 512 acres, from 191,839 acres to 191,244 acres or by 0.27 percent. It would increase the total LSR land allocation in the Rogue River National Forest by 512 acres, from 187,745

acres to 188,257 acres or by 0.27 percent. This amendment would increase LSR 227 by 512 acres, from 54,300 acres to 54,812 acres or by 0.94 percent.

This proposed change would affect 512 acres for the life of the current planning cycle. Peripheral habitat connectivity with adjacent habitats would be improved on the perimeter of the addition.

This amendment would not alter the long term multiple use goals and objectives of the Rogue River National Forest LRMP as amended for LSRs for the following reasons:

- The quantity, quality, and distribution of LSOG habitat in LSR 227 would be either maintained or improved with the proposed reallocation of matrix to LSR LRMP amendment (see discussion in section 2.4.1.4 *Impact on the Functionality of LSR 227 on the Rogue River National Forest* above).

- An extensive off-site mitigation plan was developed by the Forest Service and adopted by the PCGP project applicant for the construction of the pipeline to ensure that the goals and objectives of the LRMP related to LSRs would still be achievable. The off-site mitigation actions have been specifically designed to offset the adverse impacts of the PCGP project. Mitigation actions include (1) closing and decommissioning 53 miles of roads, which would help consolidate interior stand habitat and reduce fragmentation to achieve long-term objectives for LSR 227; (2) 600 acres of pre-commercial thinning of young stands, which would reduce fragmentation and accelerate the development of LSOG forest habitat conditions; (3) placing LWD on approximately 600 acres in existing harvest units that are low in LWD to provide this constituent element of LSOG forest habitat; and (4) creating snags on approximately 600 acres that are currently below desired snag levels for LSRs.

All of these actions would be consistent with the goals of the LSR land allocation to protect and enhance conditions of LSOG forest ecosystems that serve as habitat for LSOG-related species and with the recommendations in the LSRA for LSR 227.

This amendment would not change any existing standards and guidelines in the LRMP. If the LRMP is amended, these 512 acres would be administered as LSR in the future. Moving 512 acres from matrix to LSR would not alter attainment of the long-term balance of goods and services for the Rogue River National Forest for the following reasons:

- The proposed amendment would not affect LSR outputs because it would not stop any existing or planned project. If it would not stop or affect any management activity designed to benefit the LSR or meet other management direction, then it is not likely that the proposed amendment would affect the multiple use balance of the LRMP.

- An evaluation of the proposed change to matrix land was conducted by staff of the Rogue River NF (USDA Forest Service 2009). The evaluation concluded that the small change in matrix would not warrant a change in the Forests' Probable Sale Quantity (PSQ). The evaluation noted the Forests' PSQ would not be affected between now and the time that the Rogue River National Forest LRMP is revised because the forest has the capacity to maintain PSQ without the acres of matrix lands that are being reallocated to LSR. As a practical matter, if a linear relationship between acres and outputs is assumed, the

potential effect would be approximately three tenths of one percent of the Forest's PSQ since this amendment would affect approximately three tenths of one percent of the Forest matrix land base. This amendment would not prevent future vegetation management activities such as thinning that would benefit LSRs and also contribute to the local forest products industry.

The following evaluates the effects of the proposed amendment on the entire land management plan or land resources throughout a large portion of the planning area:

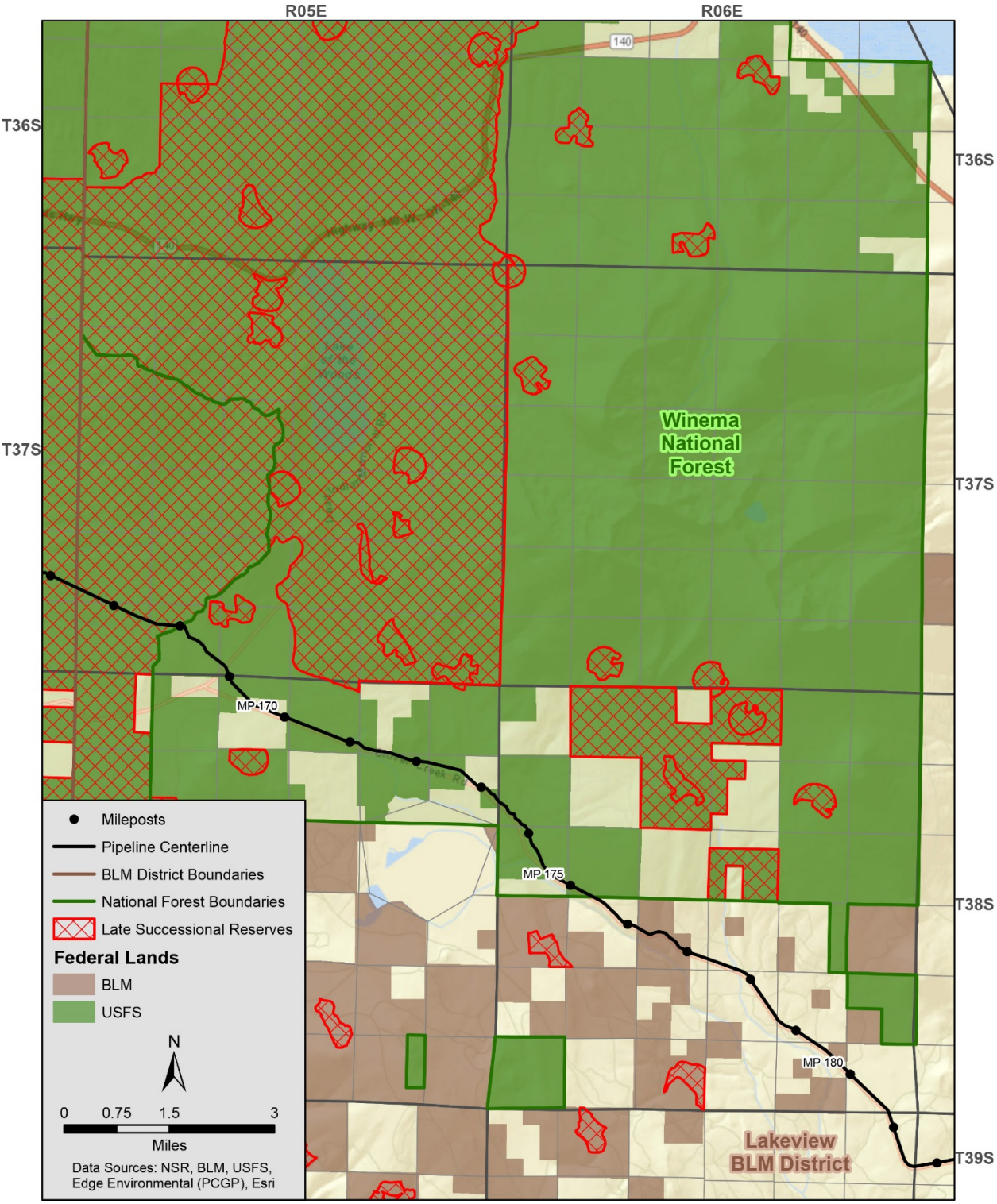
- Reducing the matrix land allocation of 191,839 acres by 512 acres or 0.3 percent would not be an important change because it would not alter the outputs of goods and services from the matrix lands during this planning period.
- The PCGP project would affect a very small portion of LSRs in the Rogue River National Forest. The construction right-of-way where most impacts would occur is approximately 206 acres of the 187,000 plus acres of LSR on the Rogue River National Forest. This is about 0.1 percent of the LSRs in the Rogue River National Forest.

For these reasons, the proposed amendment would not have an important effect on the entire land management plan or affect land resources throughout a large portion of the planning area.

2.3.3 Winema National Forest

There is no MAMU habitat in the Winema National Forest due to its distance from the ocean. The map in figure 2.3-14 demonstrates that all of the mapped LSRs as well as all KOACs would not be affected by the proposed PCGP project. Therefore, the proposed project does not alter any mapped or unmapped LSR in the Winema River National Forest.

Figure 2.3-14. Map of Proposed PCGP in the Winema National Forest



2.4 AGGREGATED LSR AMENDMENTS AND OFF-SITE MITIGATION

All combined, there is a total of seven proposed management plan amendments that would affect LSRs across two BLM districts and two Forest Service national forests to accommodate construction of the PCGP project. Table 2.4-1 summarizes the proposed amendments.

TABLE 2.4-1

Summary of Proposed BLM RMP and Forest Service LRMP Amendments

BLM/Forest Service Management Unit	Reallocate Matrix Land to LSR a/	Exemption from Requirement to Protect MAMU Habitat b/	Exemption from Requirement to Retain Habitat in KOACs c/
BLM Coos Bay District	Proposal to reallocate 387 acres of matrix Land to LSR 261	Proposal to waive requirement on twelve occupied MAMU stands	None
BLM Roseburg District	Proposal to reallocate 409 acres of matrix Land to LSR 259	Proposal to waive requirement on four occupied MAMU stands	Proposal to waive requirement on three KOACs
Forest Service Umpqua National Forest	Proposal to reallocate 588 acres of matrix land to LSR 223	None	None
Forest Service Rogue River National Forest	Proposal to reallocate 512 acres of matrix land to LSR 227	None	None

a/ Reallocated acres would become part of mapped LSRs.
b/ Occupied MAMU stands outside of mapped LSRs are designated as un-mapped LSRs.
c/ All KOACs are outside of mapped LSRs and are designated as un-mapped LSRs.

The total amount of LSR acres affected by the PCGP project directly and indirectly across all BLM and Forest Service lands is displayed in table 2.4-2 and figure 2.4-1.

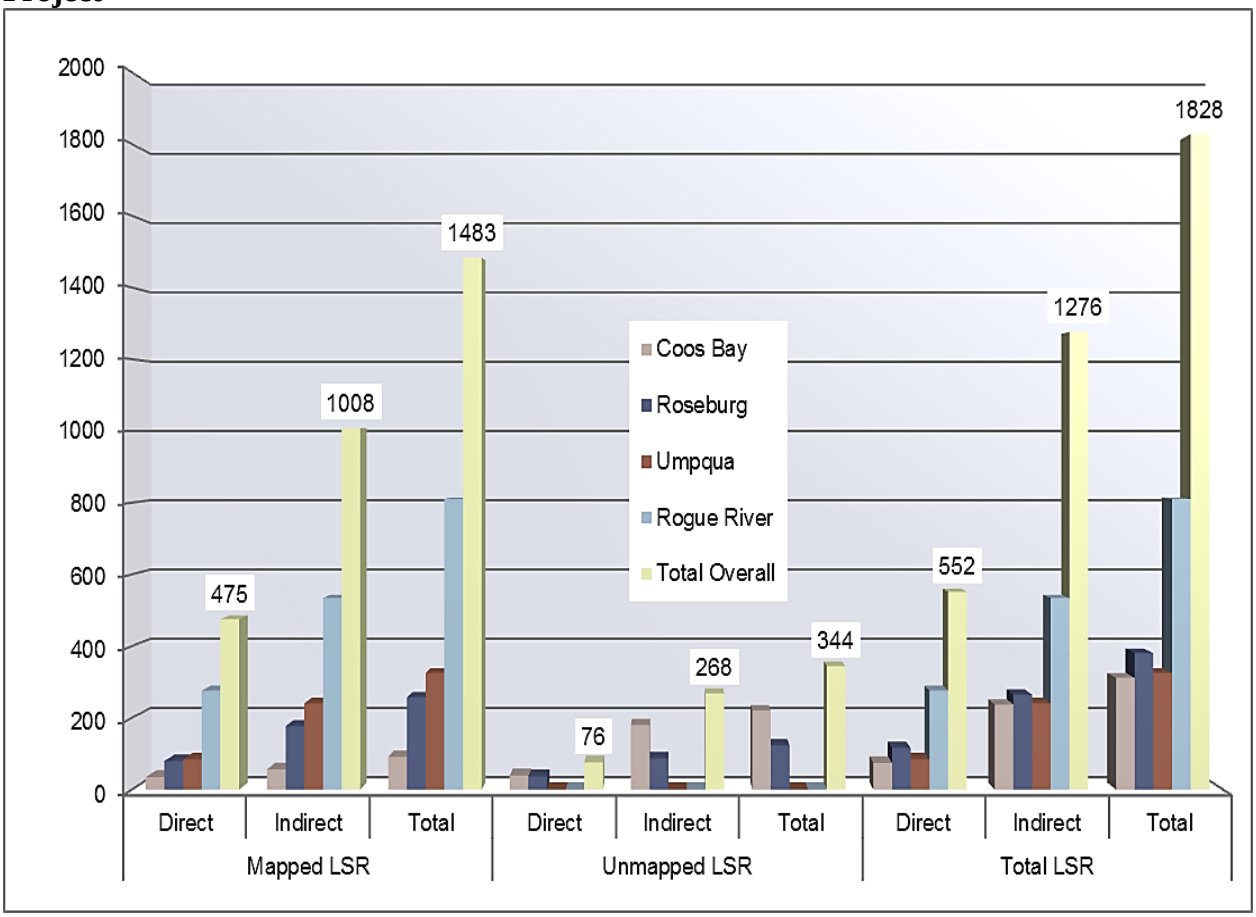
TABLE 2.4-2

Summary of Total LSR Acres Directly and Indirectly Affected a/ by PCGP Project

	Mapped LSR			Unmapped LSR		
Management Unit	**Direct**	**Indirect**	**Total**	**Direct**	**Indirect**	**Total**
BLM Districts						
Coos Bay	35	56	91	40	181	220
Roseburg	80	177	257	37	87	124
Total BLM	115	234	348	76	268	344
Forest Service National Forests						
Umpqua	85	241	325	0	0	0
Rogue River	276	534	810	0	0	0
Total USFS	361	775	1135	0	0	0
Total Overall	**475**	**1008**	**1483**	**76**	**268**	**344**

a/ PCGP total impacts include direct impacts (acres cleared in corridor and TEWAs, and UCSAs), and acres indirectly affected (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS data layers

Figure 2.4-1. Summary of Total LSR Acres Directly and Indirectly Affected the PCGP Project



Un-mapped LSRs for the most part were avoided with the routing of the proposed PCGP project due to their smaller size and greater dispersal except for BLM Coos Bay District, where numerous occupied MAMU stands are concentrated in the area of the proposed route (see figure 2.2-3). Mapped LSRs would be affected the most on Forest Service lands where the proposed route is in the general vicinity of large LSR areas, especially in the Rogue River National Forest (see figures 2.3-1 and 2.3-8).

In addition to the proposed amendments that reallocate matrix lands to LSR, numerous off-site mitigation actions have been proposed and designed with the goal that the overall impacts to LSRs on both BLM and Forest Service lands would be neutral or beneficial to the creation and maintenance of late-successional habitat. The off-site mitigation actions help create or maintain LSOG habitat within LSR by enhancing or accelerating development of late-successional habitat (thinning, placing large wood, creating snags, etc.), and by reallocating LSOG habitat within matrix lands to LSR. Off-site mitigation actions include fire hazard reduction, road decommissioning, stand-density management, coarse woody debris enhancement, and other treatments. Table 2.4-3 summarizes the proposed off-site mitigation actions for LSRs on BLM and Forest Service lands. Maps of the proposed off-site mitigation actions are displayed in figures 2.2-5, 2.2-27, 2.3-3, and 2.3-10.

TABLE 2.4-3

Summary of Proposed Off-site Mitigation Actions for LSR Impacts on BLM and Forest Service Lands

BLM/Forest Service Management Unit	Fire Hazard Reduction	Road Decommissioning	Stand-Density Management	Coarse Woody Debris Enhancement	Other Treatments
BLM Coos Bay District	Development of three heli-ponds				
BLM Roseburg District	Development of six dry hydrants		Fuel hazard reduction on 1000 acres		
Forest Service Umpqua National Forest		7.6 miles of road decommissioning	913 acres of stand-density management Fuel break treatments on 2,285 acres	Snag creation on 175 acres and LWD placement on 350 acres	80 acres of meadow restoration and 81 acres[a] of invasive plant treatment
Rogue River National Forest		53.2 miles of road decommissioning	Pre-commercial thinning of 600 acres	Snag creation and LWD placement on 600 acres	
Totals	**9 Sites**	**60.8 Miles**	**4,798 Acres**	**1,125 Acres**	**161 Acres**

a). Estimated acres based on 50 feet of treatment on each side of 6.7 miles of road (6.7*5280*100/43560)
Data source: BLM, Forest Service GIS Layers

2.4.1 Comparison of Total PCGP Project Impacts and Proposed Plan Amendments

Table 2.4.1-1 and figure 2.4-2 compare the total amount of LSR acres affected by the PCGP project with the total acres proposed for reallocation from matrix to LSR. In comparing the acres proposed for reallocation with the acres of LSR directly affected by the project (the acres cleared plus the acres modified by UCSAs), the ratio is approximately 3.4 to 1.

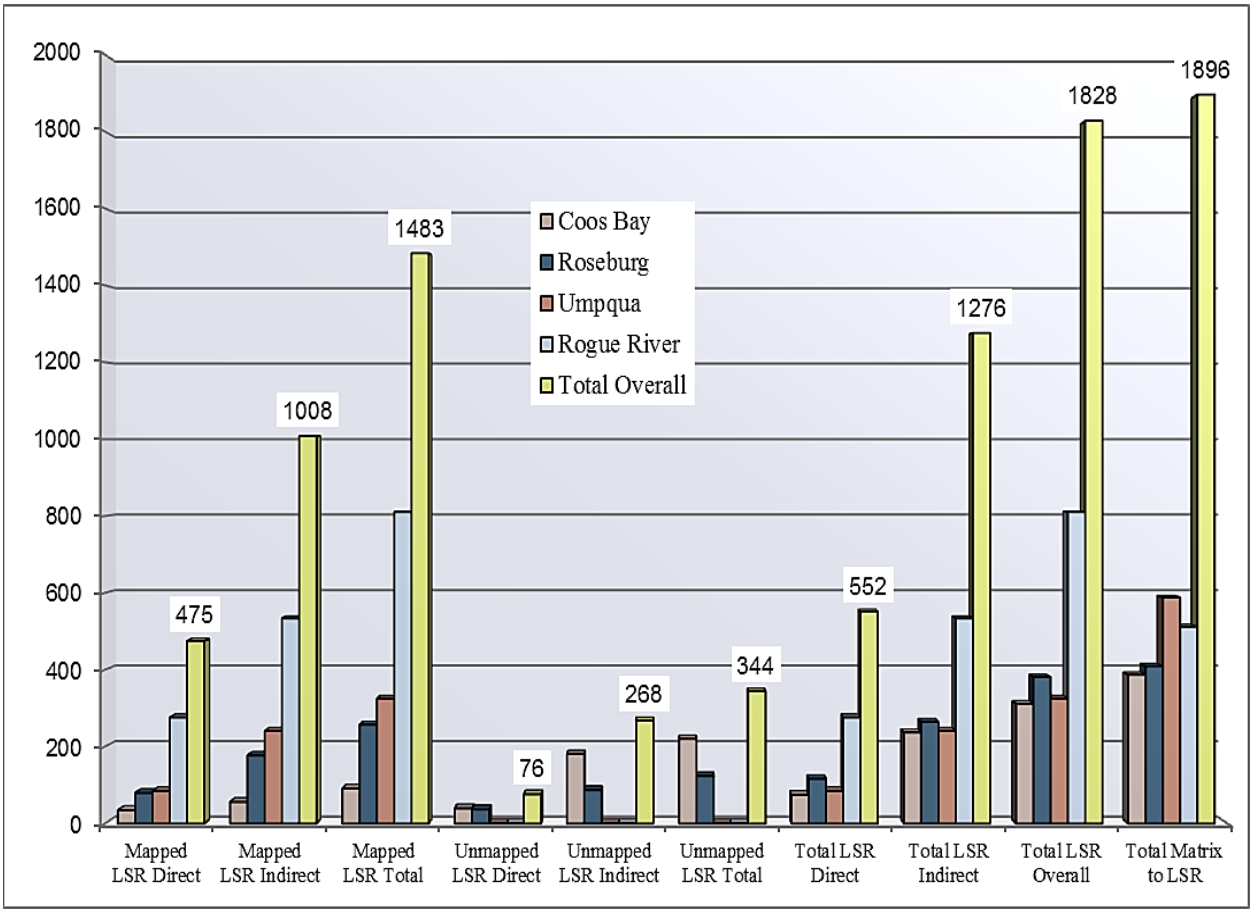
TABLE 2.4.1-1

Summary of the Total LSR Acres Affected Directly and Indirectly a/ by PCGP Project and Total Acres of Matrix Reallocated to LSR

	Mapped LSR			Unmapped LSR			Total LSR			Total
Unit	**Direct Effect**	**Indirect Effect**	**Total Effect**	**Direct Effect**	**Indirect Effect**	**Total Effect**	**Direct Effect**	**Indirect Effect**	**Overall Effect**	**Matrix to LSR**
BLM Districts										
Coos Bay	35	56	91	40	181	220	75	237	312	387
Roseburg	80	177	257	37	87	124	116	265	381	409
Total BLM	**115**	**234**	**348**	**76**	**268**	**344**	**191**	**502**	**692**	**796**
USFS National Forests										
Umpqua	85	241	325	0	0	0	85	241	325	588
Rogue River	276	534	810	0	0	0	276	534	810	512
Total Forest Service	**361**	**775**	**1135**	**0**	**0**	**0**	**361**	**775**	**1135**	**1100**
Total Overall	**475**	**1008**	**1483**	**76**	**268**	**344**	**552**	**1276**	**1828**	**1896**

a/ PCGP total effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG).
Data source: BLM, USFS GIS data layers, Cox 2010

Figure 2.4-2. Comparison of Total LSR Acres Affected by the PCGP Project and Total Acres of Matrix Reallocated to LSR



Comparing the matrix acres proposed for reallocation to LSR with the total LSR acres that would be directly and indirectly affected by the PCGP project, the ratio is slightly more than one to one. It should be noted however that a high percentage of the overall impact (slightly more than two-thirds) would be from the indirect effects of the project that would result from the creation of new edge and fragmentation of forested habitat. There is no precise way to measure the indirect impacts or compare them to the impacts of removing forest vegetation for the project. In considering the objectives of LSRs, a more important comparison is the overall impact the project would have on LSOG habitat with the amount of LSOG habitat that would be reallocated to LSRs (see table 2.4.1-2 and figure 2.4-3).

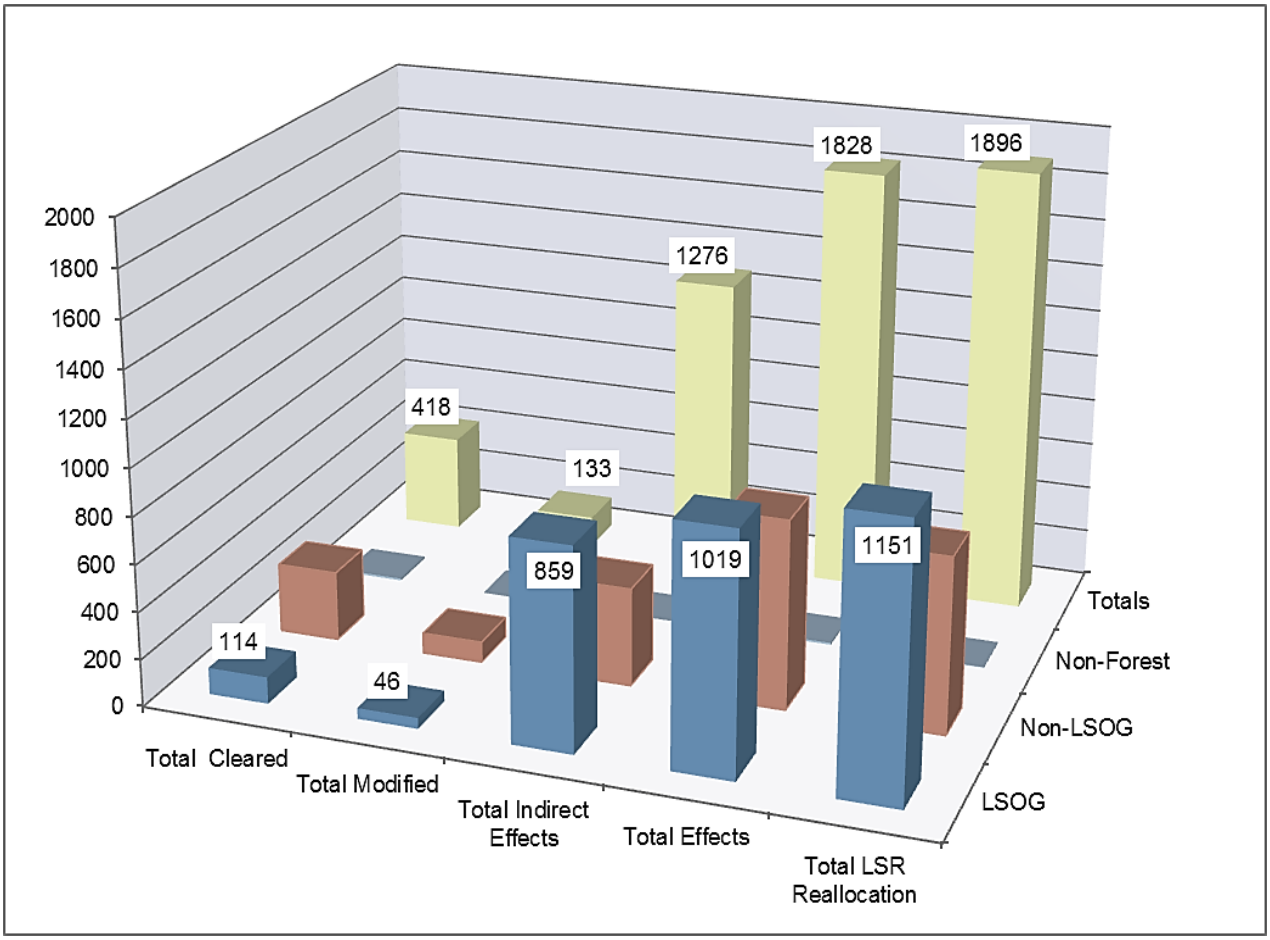
TABLE 2.4.1-2

Comparison of Total LSR Acres by Habitat Type Affected a/ by the PCGP Project and Total Acres of Matrix Reallocated to LSR

Habitat Type	Total Cleared	Total Modified	Total Indirect Effects	Total Effects	Total LSR Reallocation
LSOG	114	46	859	1019	1151
Non-LSOG	296	87	417	800	743
Non-Forest	9	0	0	9	2
Totals	**418**	**133**	**1276**	**1828**	**1896**

a/ PCGP project impacts include (direct effects) cleared acres (corridor and TEWAs) and modified acres (UCSAs), and (indirect effects) 100 meters on each side of the cleared corridor edge in LSOG and 30 meters on each side of the cleared corridor edge in non-LSOG.
Data source: BLM, Forest Service, GIS Layers, Cox 2010

Figure 2.4-3. Comparison of Total LSR Acres Affected by PCGP Project and Total Acres of Matrix Reallocated to LSR



In comparing the acres of LSOG habitat that would be reallocated to LSR with total amount of acres of LSOG habitat in LSRs that would be cleared by the PCGP project, the ratio would be approximately 10 to 1. This is due in part to the efforts to avoid LSOG habitat in the routing of the PCGP project and the efforts to identify larger blocks of LSOG habitat in the matrix areas proposed for reallocation.

Comparing the acres of LSOG habitat proposed for reallocation to LSR with the total LSR acres of LSOG habitat that would be directly and indirectly affected by the PCGP project, the ratio is approximately 1.1 to 1. It should be noted, however, that a high percentage (about 84 percent) of the overall impact on LSOG habitat would be from the indirect effects of the project on LSOG habitat that would result from the creation of new edge and fragmentation. There is no precise way to measure the indirect impacts on LSOG habitat or compare them to the impacts of removing LSOG habitat for the project. There are, however, measures that can be taken to reduce the impacts of edge and fragmentation over time. The proposed off-site mitigation actions include measures to reduce edge effects and fragmentation in the affected LSRs over time.

2.4.2 Comparison of Total PCGP Project Impacts and Off-site Mitigation Actions

A summary of the proposed off-site mitigation actions for LSRs on BLM and Forest Service lands is described in table 2.4-3 above. The mitigation actions are designed to accomplish two main objectives. The first objective is to enhance the development of LSOG habitat and its constituent elements. The second objective is to reduce the risk of losing LSOG habitat to high intensity fires.

For the BLM lands, the focus of the mitigation actions would be to reduce the risk of LSOG habitat loss from high intensity fire. This focus is due primarily to the highly fragmented ownership pattern in the area of the proposed PCGP project and the few remaining large blocks of LSOG habitat. Because of these factors, protecting the remaining LSOG habitat in the LSRs is the highest priority. The proposed development of the three heli-ponds, the six dry hydrants, and the 1,000 acres of fuel hazard reduction are spread across the Coos Bay and Roseburg Districts in the area of the proposed PCGP project and would provide added protection and reduced fire response times for both the mapped and un-mapped LSRs in this area (see figures 2.2-5 and 2.2-27).

For the Forest Service lands, the focus of the off-site mitigation actions would be on both reducing the risk of LSOG habitat loss from high intensity fire and enhancing the development of LSOG habitat in LSRs. The Forest Service lands in the vicinity of the proposed PCGP project provide greater opportunities for LSOG habitat enhancement due to the large LSR areas and the larger blocks of LSOG habitat. The proposed treatments include more than 60 miles of road decommissioning, more than 1,500 acres of stand-density management, approximately 2,285 acres of integrated fuel hazard reduction/stand-density management, and approximately 1,125 acres of CWD enhancement. The integrated fuel hazard reduction treatments in the Umpqua National Forest are designed to tie into the treatments in the BLM Roseburg District so that it would provide for continuous fuel hazard reduction along the pipeline on both BLM and Forest Service lands in this area.

A portion of the Forest Service off-site mitigation actions have been designed to partially compensate for the fragmentation of LSOG habitat that would occur with the construction of the PCGP project in LSR 223 and 227. These off-site mitigation actions include the road decommissioning and the stand-density management proposals. Table 2.4.2-1 and figure 2.4-5 below compare the impacts that would occur from the construction of the project and the estimated amount of edge effect reduction that would occur over time with the off-site mitigation actions.

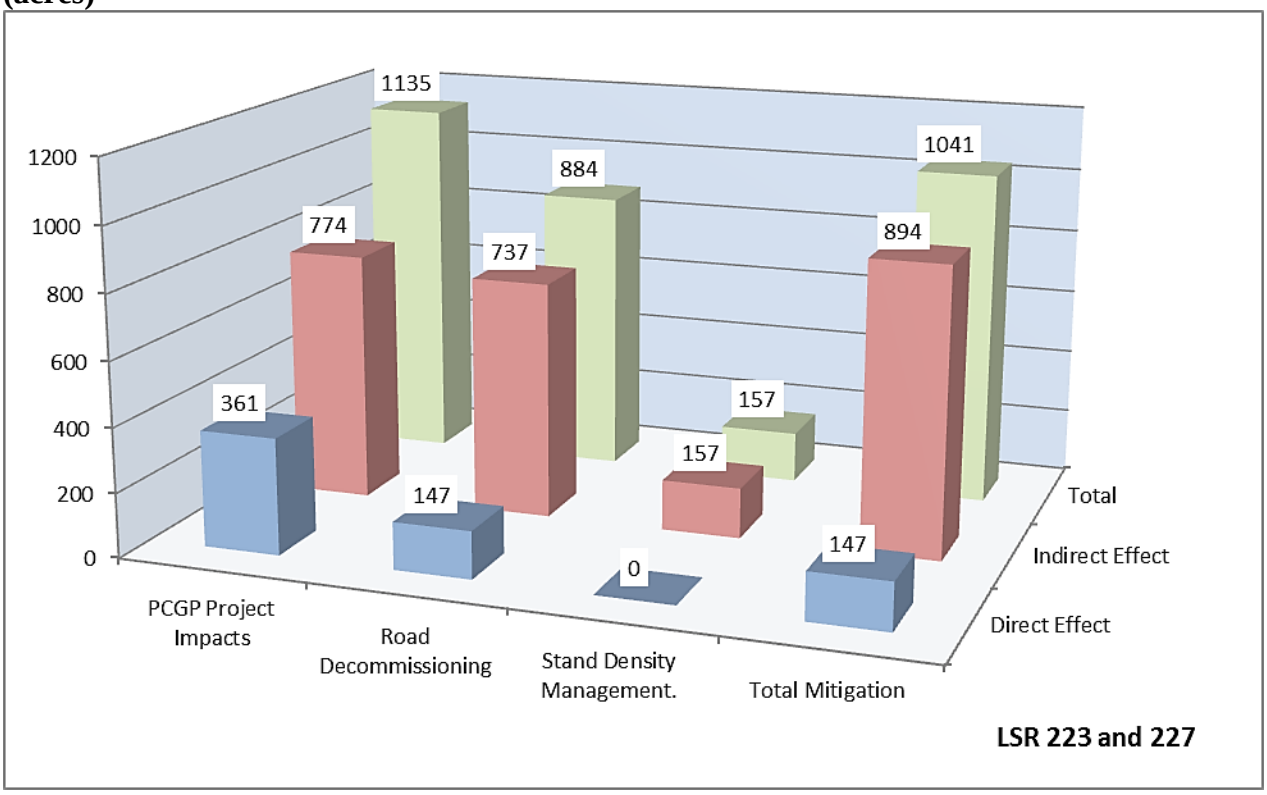
TABLE 2.4.2-1

Comparison of Total PCGP Project Impacts a/ on LSRs 223 and 227 and Estimated Edge Reduction Effect a/ of Proposed Off-site Mitigation Actions on Forest Service Lands (Acres)

LSR 223 and 227	Direct Effect	Indirect Effect	Total
	Total LSR Acres Affected on Forest Service Lands		
PCGP Project Impacts	361	774	1135
	Proposed Off-site Mitigation Actions on Forest Service Lands		
Road Decommissioning	147	737	884
Stand-Density Management.	0	157	157
Total	**147**	**894**	**1041**

a/ PCGP project direct effects include corridor clearing, TEWAs, and UCSAs. Indirect effects include 100 meters on each side of the corridor edge in LSOG and 30 meters on each side of corridor edge in non-LSOG.
b/ Direct edge reduction effects include acres of decommissioned roads revegetated (60.8*5280*20/43560) and indirect effects include 50 feet on each side of decommissioned roads and 100 feet along perimeter of stand-density treatments.
Data source: BLM, USFS GIS data layers, Hobson 2010

Figure 2.4-4. Comparison of Total PCGP Project Impacts on LSRs 223 and 227 and Estimated Edge Reduction Effect of Proposed Off-site Mitigations on Forest Service Lands (acres)



A more detailed discussion of these off-site mitigation actions and the assumptions used in estimating edge reduction effects is included in sections 2.3.1.4 and 2.3.2.4. The purpose of the comparison here is to show the total amount of off-site mitigation on Forest Service lands that has been designed to compensate for the indirect effects of edge fragmentation. In comparing the indirect beneficial effects of the off-site mitigation with the indirect effects of the PCGP project on LSRs (which is an estimate of the edge and fragmentation impacts), the ratio is slightly more than one to one. This is not a one to one comparison, however, since the adverse

impacts would occur at the time of construction, but the beneficial effects of edge reduction would occur over several decades. This comparison, however, does not consider the beneficial effects of the on-site mitigation in edge reduction that would also occur over time from the reforestation of the project corridor except for a 30-foot area over the center of the pipeline.

2.4.3 Summary of PCGP Project Impacts on LSRs and Proposed Plan Amendments and Off-site Mitigation Actions at the Province Level

The NWFP included a comprehensive monitoring program to evaluate progress toward meeting the plan's desired outcomes (USDA and USDI 1994, page E-1 to E-12). In 1995, a scientifically based interagency monitoring program was developed (Mulder et al. 1999). The monitoring program is composed of six modules designed to answer key questions. The modules include tracking the status and trends of watershed conditions, LSOG forests, social and economic conditions, tribal relationships, and the populations and habitats of MAMUs and NSOs. The module for LSOG habitat monitoring characterizes the status and trend of older forests to answer the key question: "Is the NWFP maintaining or restoring late-successional and old-growth forest ecosystems to desired conditions on federal lands in the NWFP area?" Monitoring results are evaluated and reported in 1- and 5-year intervals. Monitoring results for the first 10 and 15 years are documented in a series of general technical reports that are available online at http://www.fs.fed.us/pnw/publications/gtrs.shtml. The 15-year LSOG forest monitoring report was completed in 2011 (Mouer et al. 2011).

The monitoring program for LSOG habitat is based on physiographic provinces. The use of provinces allows differentiation between areas of common biological and physical processes. The provinces are useful for stratifying monitoring findings according to the climatic, topographic, and social gradients across the NWFP area that create significant differences in potential natural vegetation, current vegetation, natural disturbance regime, historical land use, and land ownership (Moeur et al. 2005). The twelve provinces used in the NWFP are shown in figure 2.4-5.

The proposed PCGP project would affect LSRs in three of the twelve provinces: the Oregon Coast Range, Oregon Klamath, and Oregon Western Cascades provinces. A map of the provinces crossed by the proposed PCGP project route is in figure 2.4-6.

Figure 2.4-5. Physiographic Provinces of the Northwest Forest Plan

The Northwest Forest Plan Area

An image of the area covered by the Northwest Forest Plan, provided by NASA's Moderate Resolution Imaging Spectroradiometer (MODIS), from over 400 mi above the Earth onboard the Terra satellite.

This image comes from a composite of images, from June through September 2001, combined to produce one single cloud-free portrait of the Earth, known as the NASA Blue Marble image.

Interstate highways

Urban areas

Physiographic provinces

1. Washington Olympic Peninsula
2. Washington Western Lowlands
3. Washington Western Cascades
4. Washington Eastern Cascades
5. Oregon Western Cascades
6. Oregon Eastern Cascades
7. Oregon Coast Range
8. Oregon Willamette Valley
9. Oregon Klamath
10. California Klamath
11. California Coast Range
12. California Cascades

N

0 50 100 150 200 Miles

0 80 160 240 320 Kilometers

Figure 2.4-6. Map of Physiographic Provinces Crossed by PCGP Project

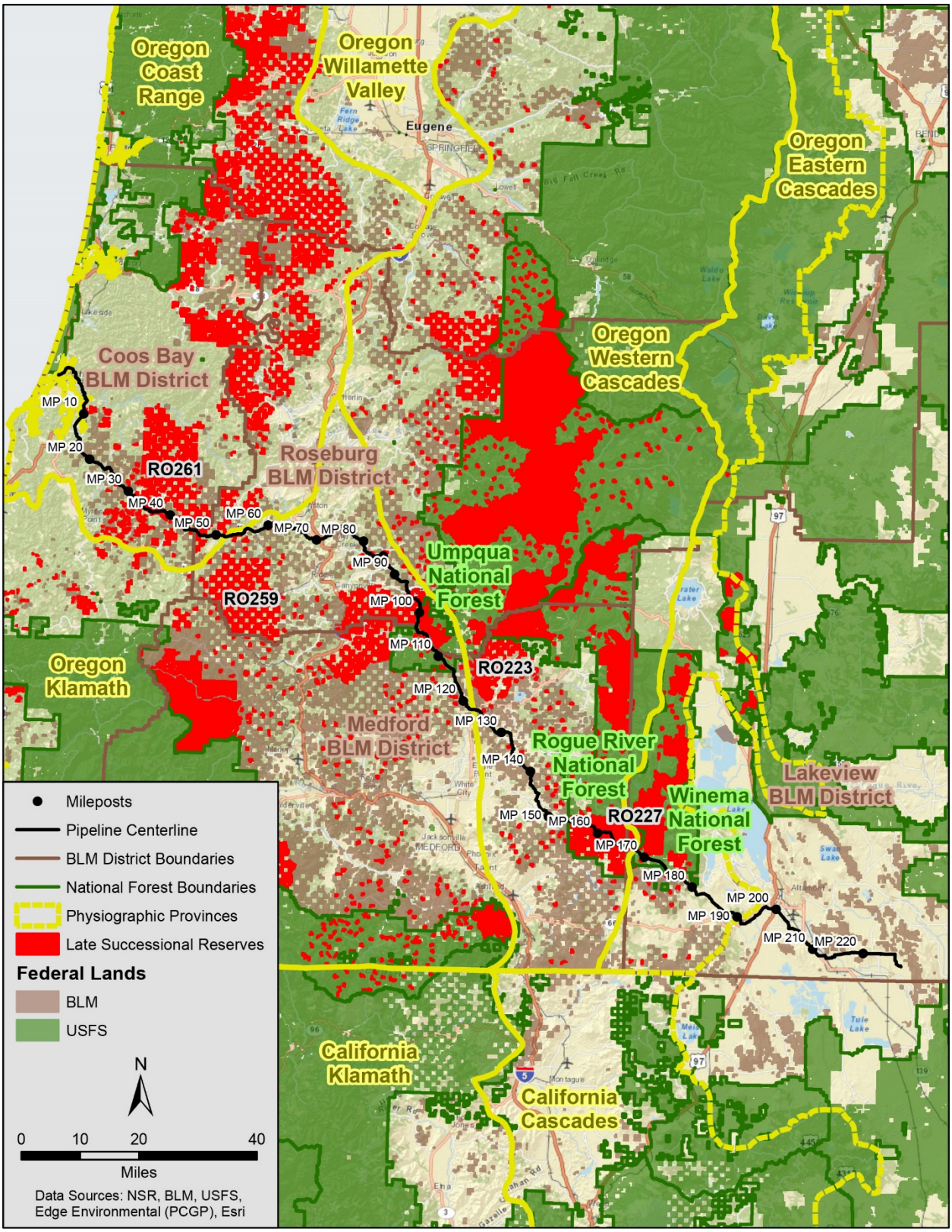


Table 2.4.3-1 and figure 2.4-7 provide a summary of the total LSOG acres in LSRs that would be affected directly and indirectly by the PCGP project and the total acres of LSOG habitat reallocated to LSR by province.

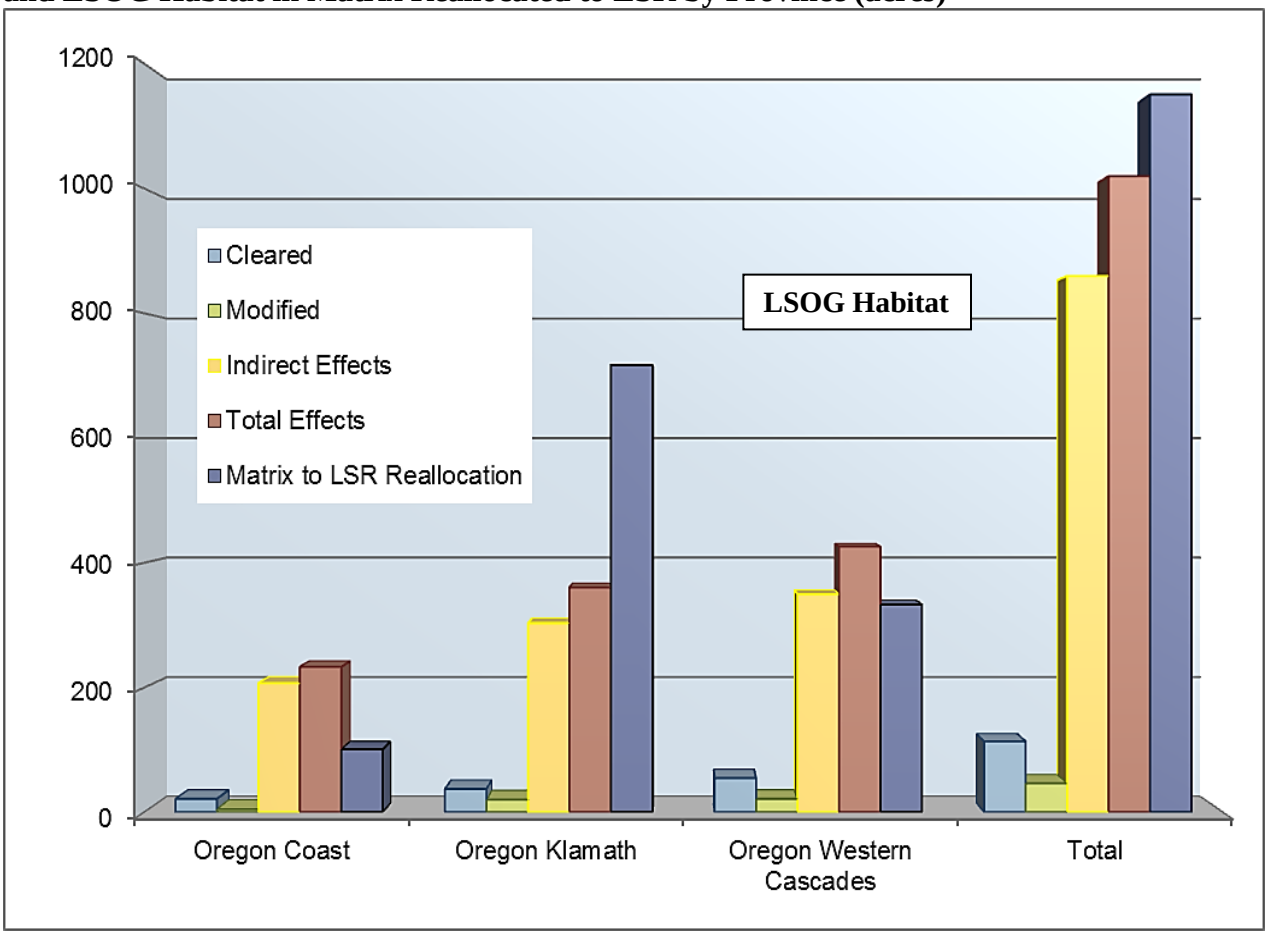
TABLE 2.4.3-1

Comparison of Total PCGP Project Effects a/ on LSOG Habitat in LSRs and LSOG Habitat in Matrix Reallocated to LSR by Province (Acres)

Province	Direct Effects: Cleared	Direct Effects: Modified	Indirect Effects	Total Effects	Matrix to LSR Reallocation
Oregon Coast Range	21	5	207	233	101
Oregon Klamath	37	20	303	361	717
Oregon Western Cascades	55	21	350	426	333
Total	**114**	**46**	**860**	**1020**	**1151**

a/ PCGP project effects include cleared acres (corridor and TEWAs), modified acres (UCSAs), and indirect effect acres (100 meters on each side of the cleared corridor edge in LSOG).
Data source: BLM, USFS GIS data layers

Figure 2.4-7. Comparison of Total PCGP Project Impacts on LSOG Habitat in LSRs and LSOG Habitat in Matrix Reallocated to LSR by Province (acres)



As illustrated by table 2.4.3-1 and figure 2.4-7, the impacts on LSOG habitat in LSRs from the PCGP project would be spread across three provinces, with the majority of the impacts occurring

in the Oregon Klamath and Oregon Western Cascade Provinces, including the majority of the LSOG forest acres reallocated to LSR. Although a small portion of the proposed pipeline would also cross the Oregon Eastern Cascades Province in the Winema National Forest, it would not affect any LSRs in that province.

Table 2.4.3-2 summarizes the proposed off-site mitigation actions for LSRs on BLM and Forest Service lands by province. Maps of the proposed off-site mitigation actions are displayed in figures 2.2-5, 2.2-27, 2.3-3, and 2.3-10.

TABLE 2.4.3-2

Summary of Proposed Off-site Mitigation Actions for LSR Impacts on BLM and Forest Service Lands by Province

Physiographic Province	Fire Hazard Reduction	Road Decommissioning	Stand-Density Management	Coarse Woody Debris Enhancement	Other Treatments
Oregon Coast Range	Development of three heli-ponds				
Oregon Klamath	Development of six dry hydrants	7.6 mile of road decommissioning	Fuel hazard reduction on 1000 acres a/ 913 acres of stand-density management Fuel break treatments on 2,285 acres	Snag creation on 175 acres and LWD placement on 350 acres	80 acres of meadow restoration and 81 acres b/ of invasive plant treatment
Oregon Western Cascades		53.2 miles of road decommissioning	Pre-commercial thinning of 600 acres	Snag creation and LWD placement on 600 acres	
Totals	**9 Sites**	**60.8 Miles**	**4,798 Acres**	**1,125 Acres**	**161 Acres**

a/ A small portion of these acres would be within the Oregon Coast Province.
b/ Estimated acres based on 50 feet of treatment on each side of 6.7 miles of road (6.7*5280*100/43560)
Data source: BLM, Forest Service GIS Layers

The monitoring data from the 2011 LSOG forest monitoring report suggests a slight net loss of LSOG forest over the NWFP area, from 33.2 percent of federal forest in 1994/1996 to 32.6 percent in 2006/2007. The federal LSOG forest area decreased by an estimated 1.9 percent in the NWFP area during the monitoring period. This estimate includes loss from natural disturbances and timber harvesting, as well as the estimated gains from LSOG forest recruitment. The net change was positive in some provinces and negative in others. For the Oregon Coast, Oregon Klamath, and Oregon Western Cascades Provinces, the estimated net loss was 3.0, 1.1, and 7.9 percent, respectively (Mouer et al. 2011).

Similar to the findings of previous monitoring reports, wildfire was the most significant cause of LSOG habitat loss over the NWFP area. Most of the LSOG forest losses on federal lands (approximately 184,000 acres) were associated with wildfire, including several large fire events in the Oregon Klamath and Oregon Western Cascades Provinces. Most of the LSOG forest loss on federal land was from reserves and almost 90 percent of those losses were associated with wildfire. Less than 0.5 percent of the LSOG habitat loss on federal lands was associated with timber harvesting. The 2011 monitoring report concluded that the risk of loss of LSOG habitat to wildfire will continue to be a critical consideration for policies affecting LSOG forests (Mouer et al. 2011).

The proposed plan amendments and off-site mitigation actions proposed by the BLM and Forest Service are consistent with the findings in the 2011 LSOG forest monitoring report. The plan amendments have been designed to increase the overall acres of LSOG habitat within LSRs in each of the provinces affected (see table 4.3.1 and figure 2.4-7). The off-site mitigation measures (see table 2.4.3-2) have been designed to both reduce the risk of loss of LSOG forest to wildfire and enhance the creation and maintenance of LSOG habitat in LSRs (see section 2.4.2). The proposed plan amendments and off-site mitigation actions have been designed with the goal that the overall impact of the PCGP project would be neutral or beneficial to the creation and maintenance of LSOG habitat within LSRs.

2.4.4 Summary of PCGP Project Impacts on Occupied MAMU Stands and Proposed Plan Amendments and Off-site Mitigation Actions at the Province Level

In addition to the NWFP monitoring module for LSOG forests (see section 2.4.3), the monitoring program also includes a module that assesses status and trends in MAMU populations and nesting habitat to answer the key questions: "Are the MAMU populations associated with the NWFP Plan area stable, increasing, or decreasing?" and "Is the NWFP maintaining and restoring MAMU nesting habitat?" (Mulder et al. 1999)

The monitoring for MAMUs is also based on the same provinces as the LSOG forest monitoring as well as MAMU Zones. There are two zones based on distance from the coast. In Oregon, Zone 1 extends approximately 35 miles inland. Zone 2, which extends approximately 12 miles further, is defined for survey purposes and was not included in the monitoring report for Oregon and California (Raphael et al. 2011). A map of the provinces and zones for MAMUs is in figure 2.4-8.

All of the occupied MAMU stands that would be affected by the PCGP project are located on BLM lands (twelve stands in the Coos Bay District and four stands in the Roseburg District). Most of the stands (14 of the 16) are within Zone 1 and the Oregon Coast Range Province. Two of the stands in the Roseburg District fall within MAMU Zone 2 and the Oregon Klamath Province. Table 2.2.4-1 and figure 2.4-9 summarize the total amount of LSOG habitat that would be affected by the PCGP project in occupied MAMU stands and the amount of LSOG habitat that would be reallocated from Matrix to LSR.

Figure 2.4-8. Map of Physiographic Provinces and MAMU Zones

Northwest Forest Plan—the First 15 Years (1994–2008): Status and Trend of Nesting Habitat for the Marbled Murrelet

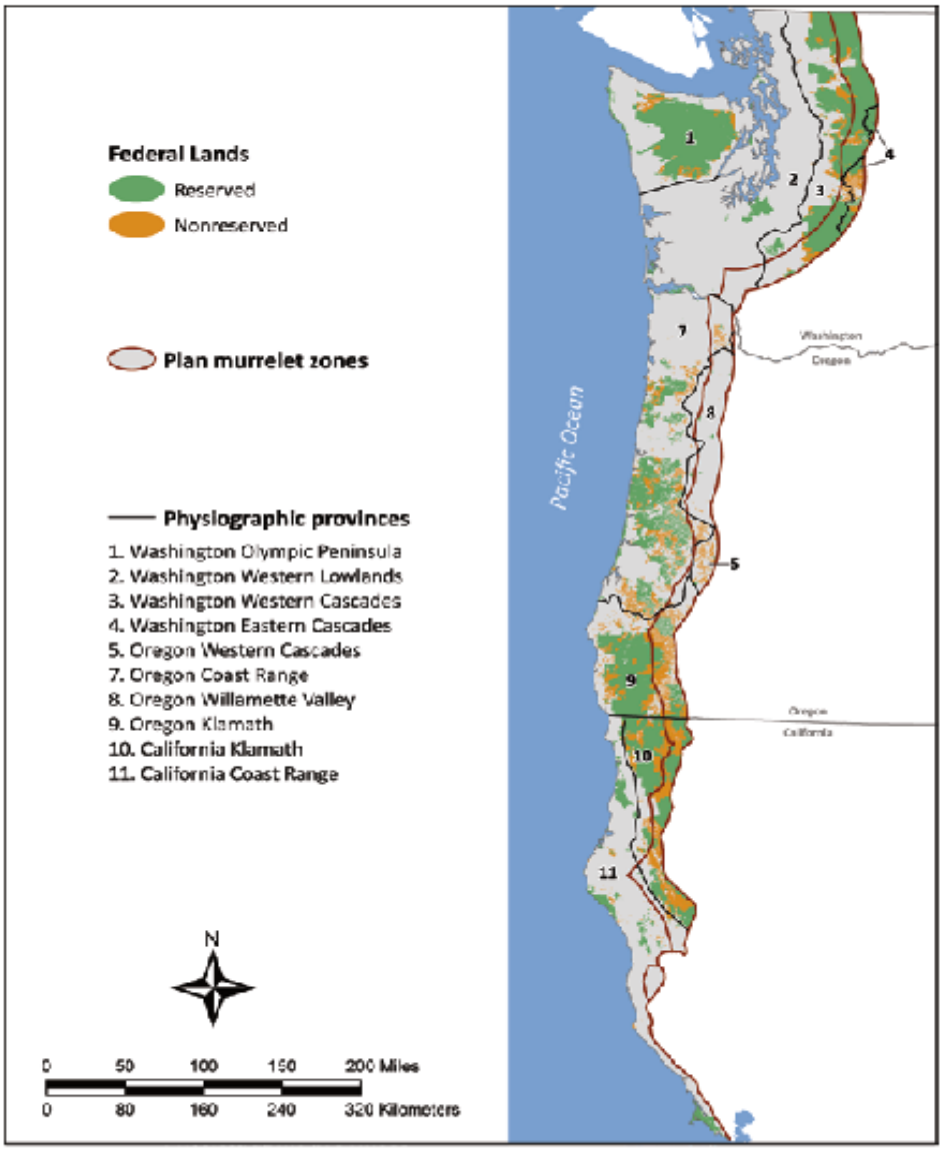


Figure 3—Locations of Northwest Forest Plan reserved and nonreserved land use allocations on federal lands within the range of the marbled murrelet (2009). Reserves include congressionally reserved lands (National Parks and wilderness), late-successional reserves, and other lands withdrawn from timber harvest. Nonfederal lands are depicted in gray. Plan murrelet zones are denoted as Zone 1 closer to the west coast and Zone 2 farther away from the coast.

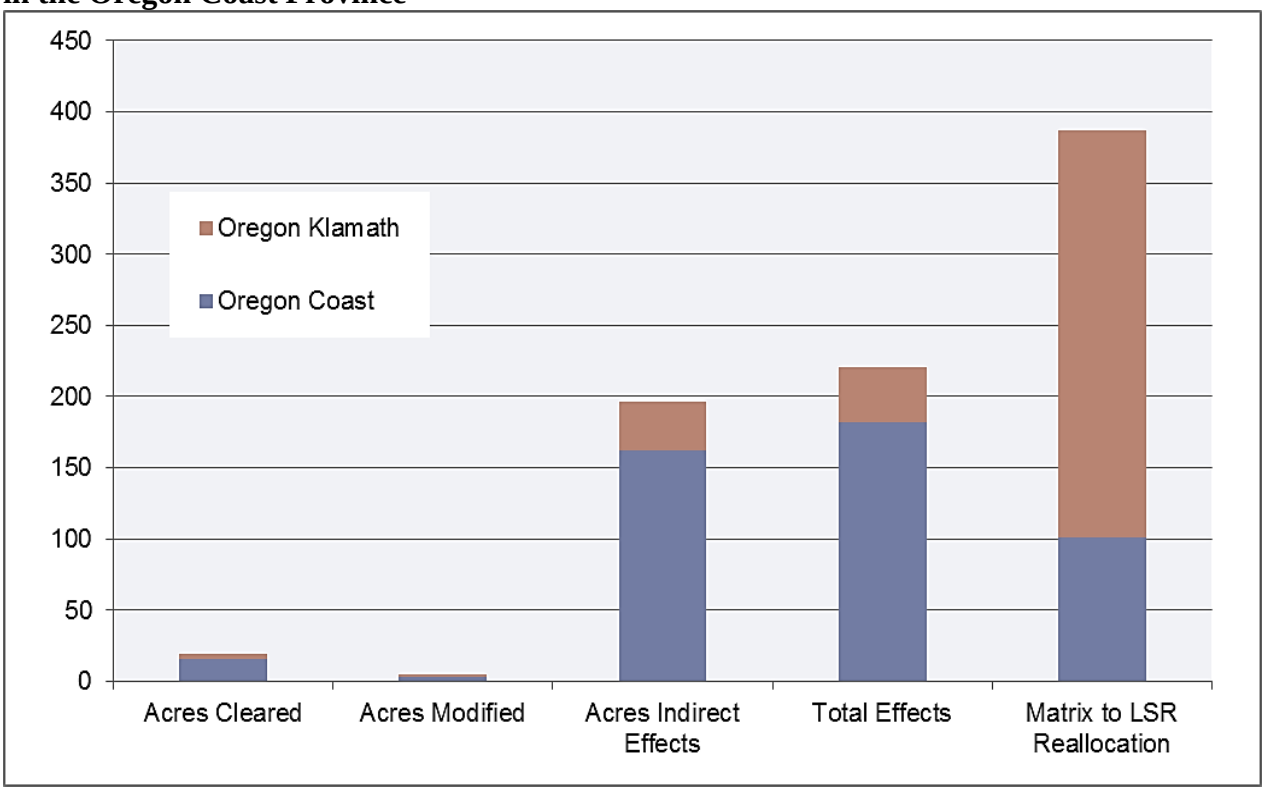
TABLE 2.4.4-1

Comparison of Total LSOG Habitat Acres in Occupied MAMU Stands Affected a/ by PCGP Project and Acres of LSOG Habitat in the Matrix Reallocated to LSR in the Oregon Coast Province

Habitat Type	Total Cleared	Total Modified	Total Indirect Effects	Total Effects	Matrix to LSR Reallocation
LSOG	19	5	197	**221**	**387**

a/PCGP project impacts include (direct effects) cleared acres (corridor and TEWAs) and modified acres (UCSAs), and (indirect effects) 100 meters on each side of the cleared corridor edge in LSOG.
Data source: BLM, Forest Service, GIS Layers,

Figure 2.4-9. Comparison of Total LSOG Habitat Acres in Occupied MAMU Stands Affected by PCGP Project and Acres of LSOG Habitat in the Matrix to LSR Reallocation in the Oregon Coast Province



Approximately two-thirds of the higher suitability nesting habitat for MAMUs within the NWFP area occurs on federal lands. Almost 90 percent of that habitat on federal land is protected under various reserve allocations. Based on monitoring data, the rate of loss of higher suitability habitat on reserved lands has been about 3.0 percent over the 10-year period from 1996 to 2006, with most of the loss due to wildfire, especially in Oregon. In the Oregon Coast Range Province, the loss of higher suitability habitat in federal reserves over the same period was approximately 2.4 percent (Raphael et al. 2011). The 2011 MAMU monitoring report found that fire was the major cause of loss of nesting habitat on federal lands since the plan was implemented and that MAMU population size is strongly and positively correlated with the amount of nesting habitat, suggesting that conservation of remaining nesting habitat and restoration of currently unsuitable habitat is key to MAMU recovery (Raphael et al. 2011).

The proposed plan amendments and off-site mitigation actions proposed by the BLM are consistent with the findings in the 2011 MAMU monitoring report. The plan amendments have been designed to increase the overall acres of LSOG habitat within LSRs and a portion of the Matrix to LSR reallocation is in an area that contains a high concentration of occupied MAMU stands (see figure 2.2-6). The 101 acres of LSOG proposed for reallocation to LSR 261 on the Coos Bay District is in the immediate vicinity of the occupied MAMU stands that would be affected by the PCGP project (see figure 2.2-6 above). The total amount of acres proposed for designation to mapped LSR 261 on the Coos Bay District is about 998 acres, with a large portion of this area (approximately 611 acres) containing occupied MAMU stands. Although this MAMU habitat is currently protected by the management direction in the Coos Bay RMP, designating it as part of LSR 261 would provide additional protections and benefits for MAMUs. The additional protection would result from the area being protected, not just because of the existing MAMU occupation but as a land allocation dedicated to the management of late-successional habitat. The additional benefits would result from the surrounding non-habitat areas being managed in the future to become LSOG habitat, thereby consolidating larger contiguous blocks of nesting habitat over time. This is consistent with the findings in the 2011 MAMU monitoring report of the need to protect existing nesting habitat and restore currently non-suitable habitat.[18] The off-site mitigation actions (see table 2.4.3-2) have been designed to reduce the risk of loss of LSOG forest in occupied MAMU stands from wildfires. This is also consistent with the findings in the 2011 monitoring report that wildfire has been the major cause of the loss of nesting habitat since the NWFP was implemented.

[18] In addition to the Coos Bay reallocation of Matrix to LSR, the BLM Roseburg District is also proposing to reallocate 409 acres of which about 286 acres is LSOG Forest. Although these acres are within MAMU Zone 2 and the Oregon Klamath Province they are in the general vicinity of the MAMU habitat affected by the PCGP Project and would also compensate for loss of MAMU habitat in LSR (see FEIS section 4.1.3.6).

3.0 LIST OF REPORT PREPARERS AND CONTRIBUTORS

Name	Employer	Position	Experience	Contribution
Paul Uncapher	North State Resources, Inc.	Program Manager	33 years	Project Manager
Mike Redmond	North State Resources, Inc.	Senior Scientist	38 years	Primary Author
Kathryn McDonald	North State Resources, Inc.	Senior Writer/Editor	35 years	Technical Editor
Mike Hupp	North State Resources, Inc.	Senior Scientist	38 years	Contributor
Charles Comiskey, Ph.D.	Quantus LLC	Biologist/Economist	40 years	Contributor
Sylvia Cantu	North State Resources, Inc.	Desktop Publisher	34 years	Word Processing/Formatting

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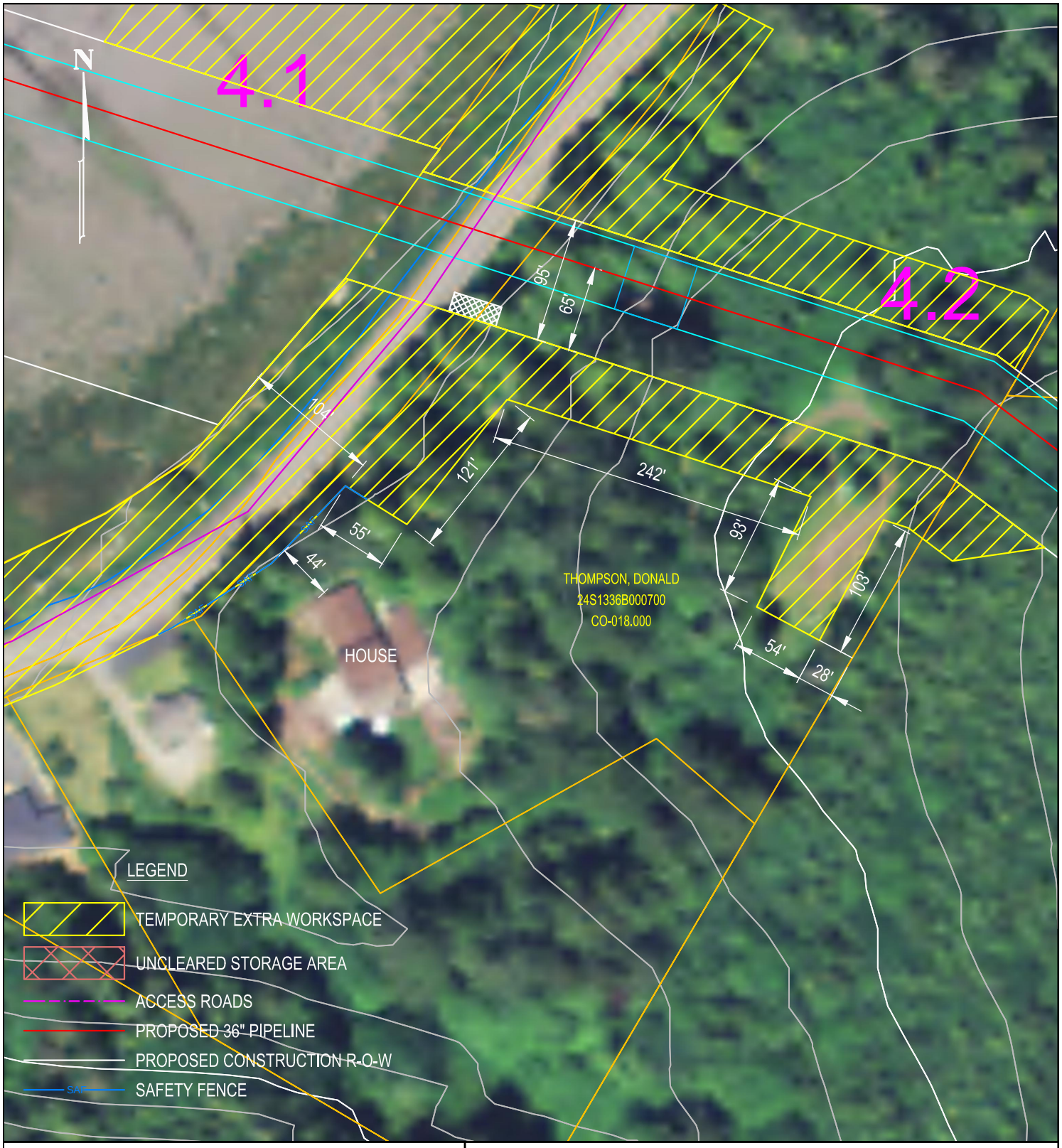
APPENDIX I

Site-Specific Residential Mitigation Plans



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

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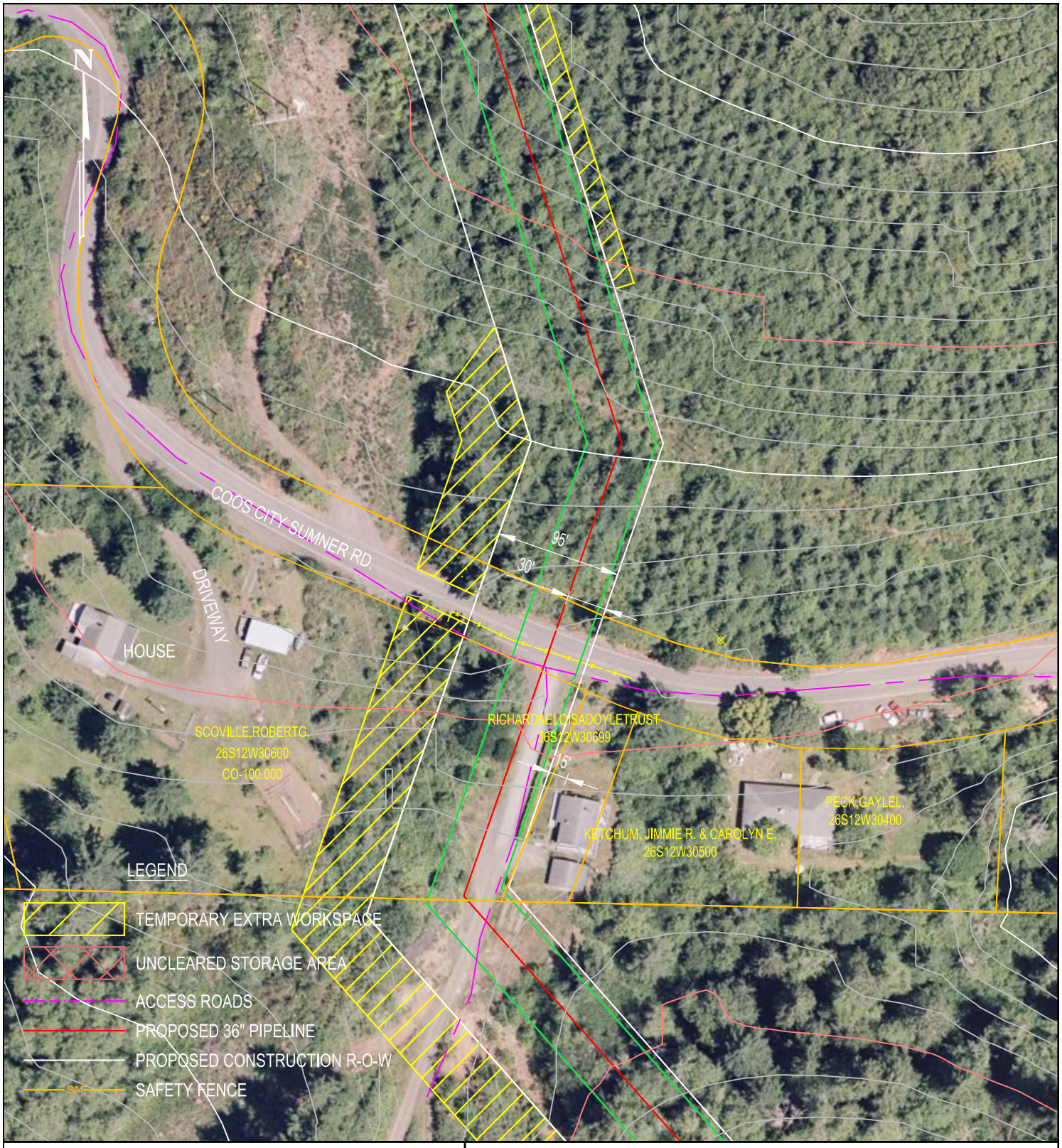
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 4.2
36" PACIFIC CONNECTOR GAS PIPELINE
S-36, T-24-S, R-13-W
COOS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAR 2015	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAR 2015	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0016	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 14.25
36" PACIFIC CONNECTOR GAS PIPELINE
S-30, T-26-S, R-12-W
COOS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
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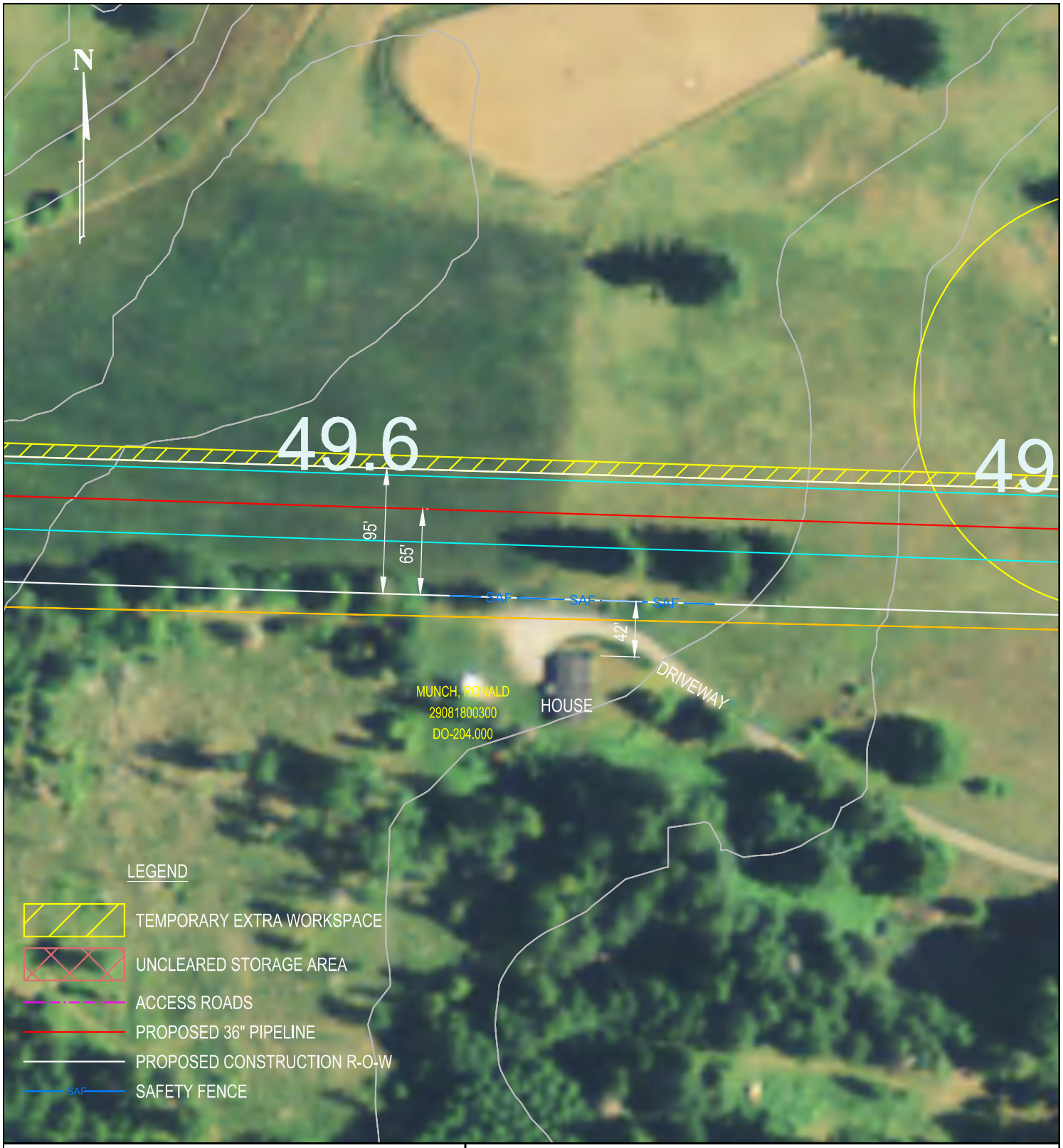
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0013	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

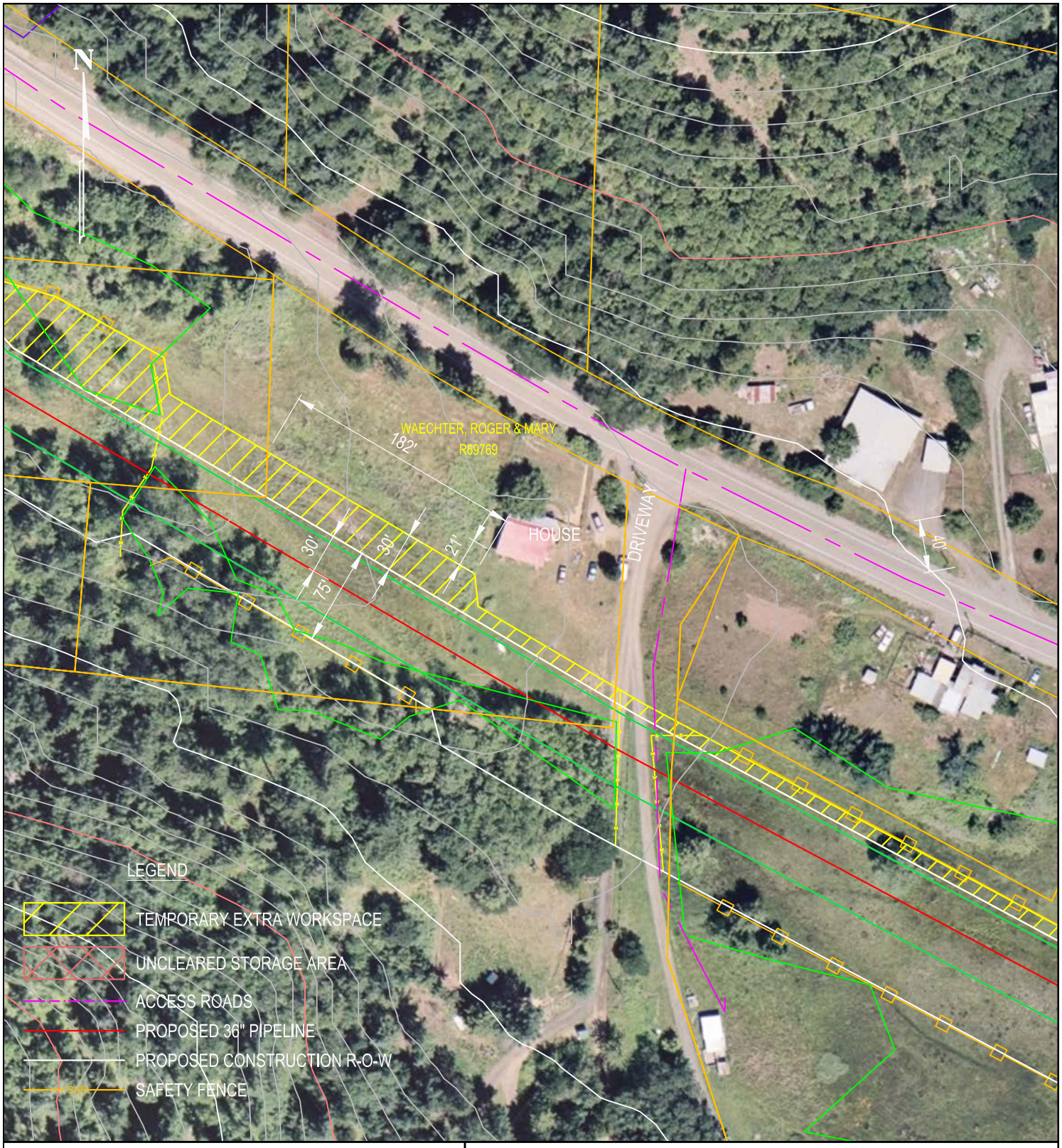
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 49.60
36" PACIFIC CONNECTOR GAS PIPELINE
S-18, T-29-S, R-8-W
DOUGLAS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAR 2015	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAR 2015	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0019	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

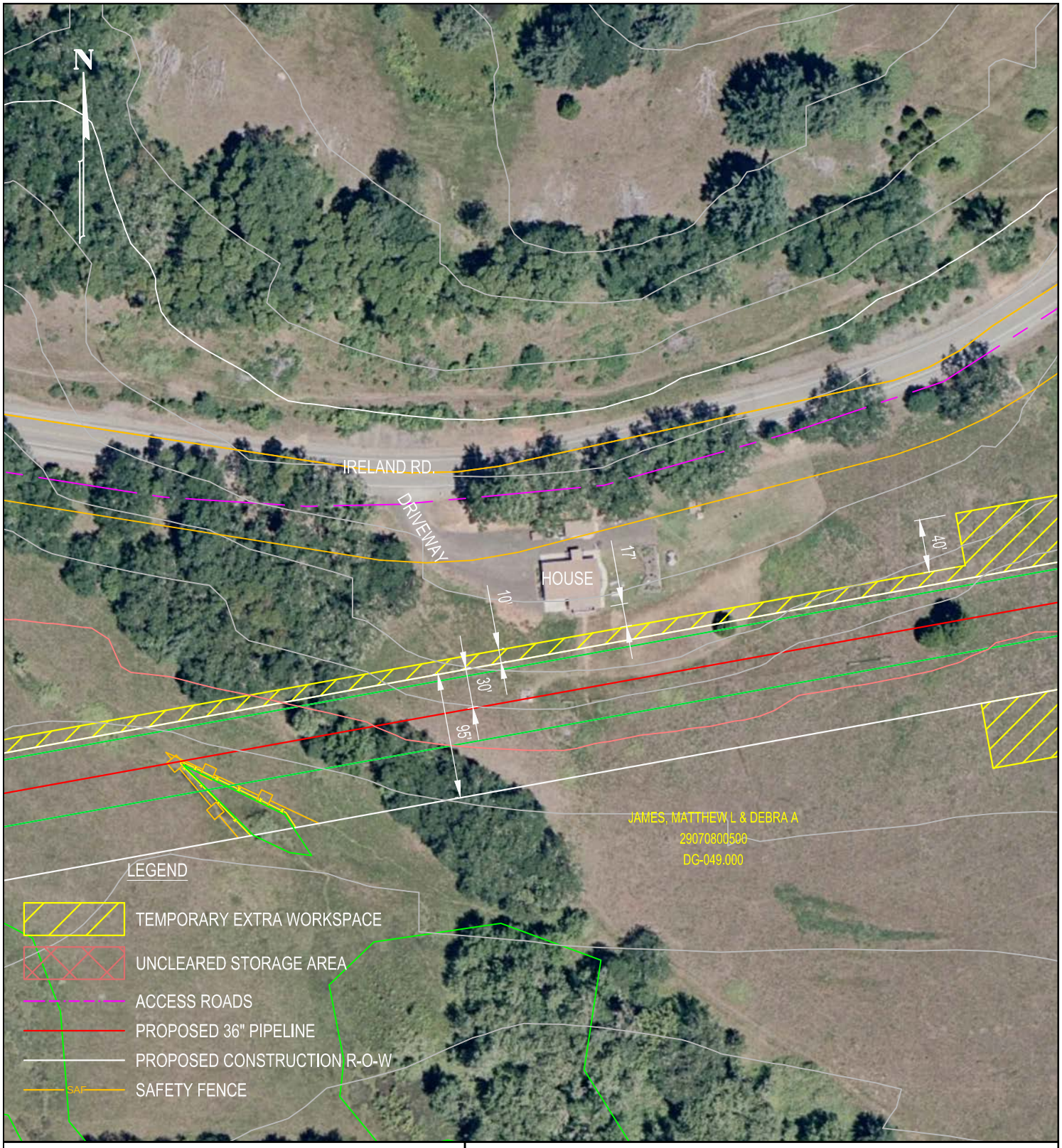
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 56.88
36" PACIFIC CONNECTOR GAS PIPELINE
S-7, T-29-S, R-7-W
DOUGLAS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0014	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 57.51
36" PACIFIC CONNECTOR GAS PIPELINE
S-8, T-29-S, R-7-W
DOUGLAS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
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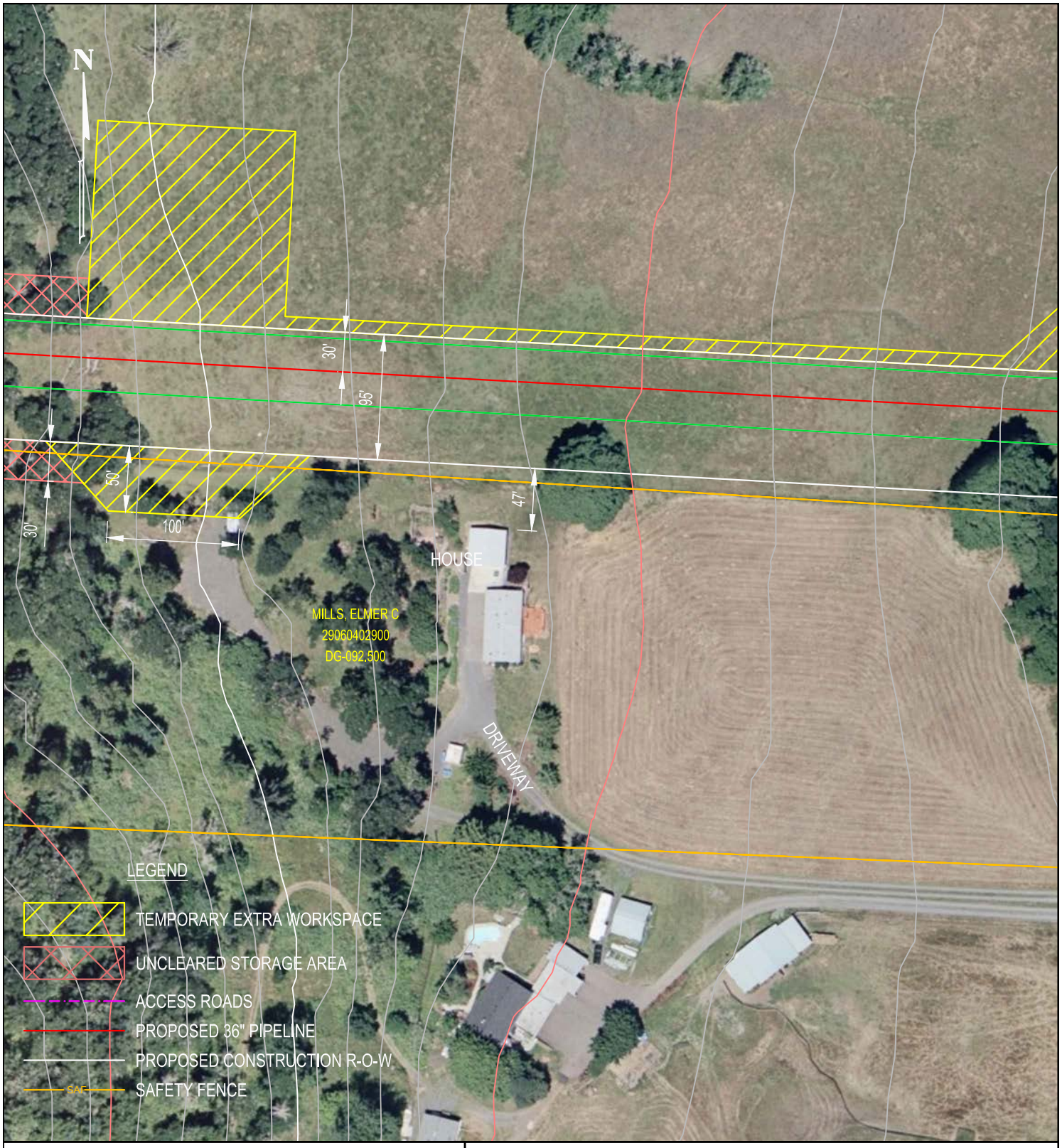
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0012	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

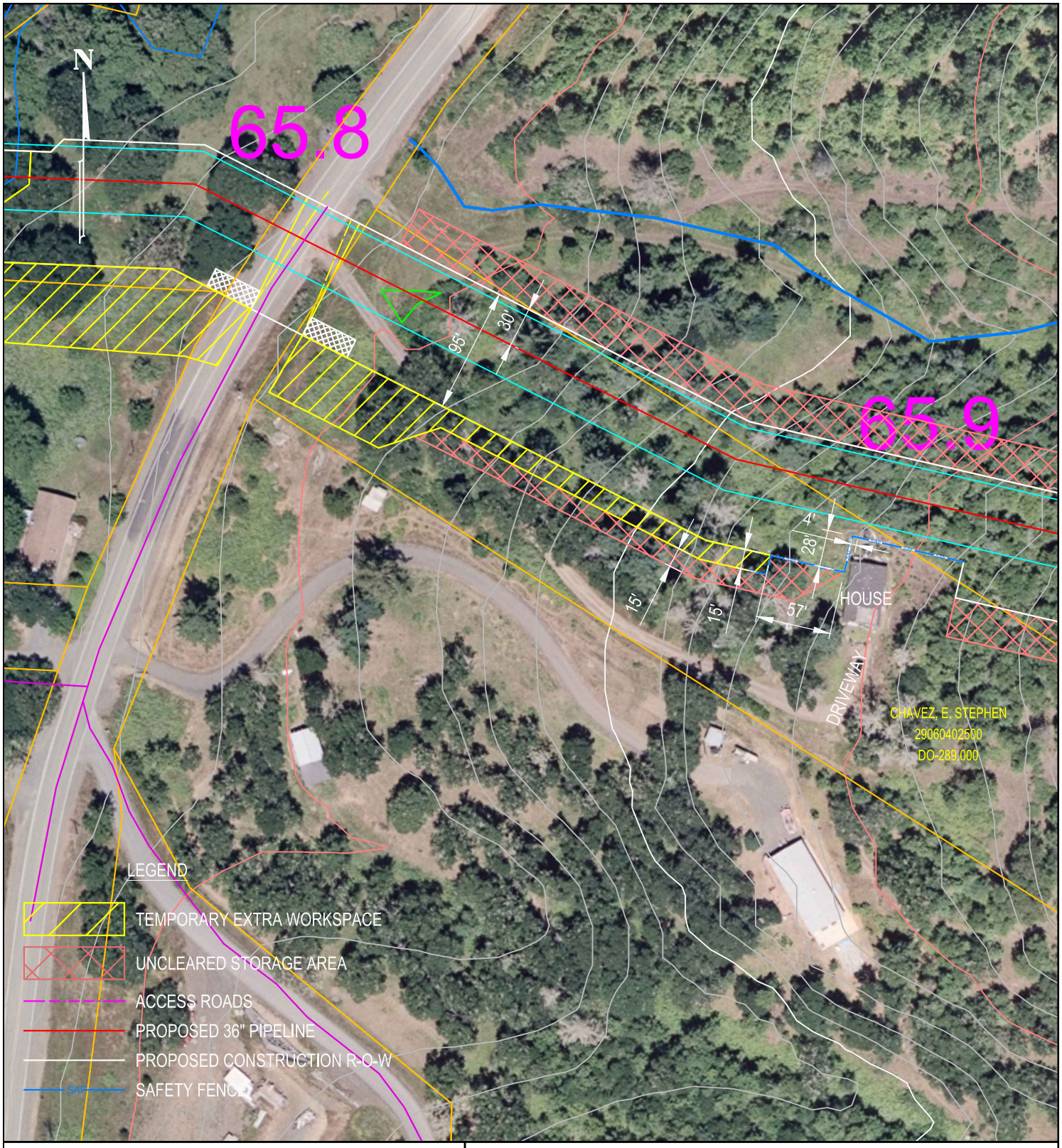
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 65.64
36" PACIFIC CONNECTOR GAS PIPELINE
S-4, T-29-S, R-6-W
DOUGLAS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0011	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

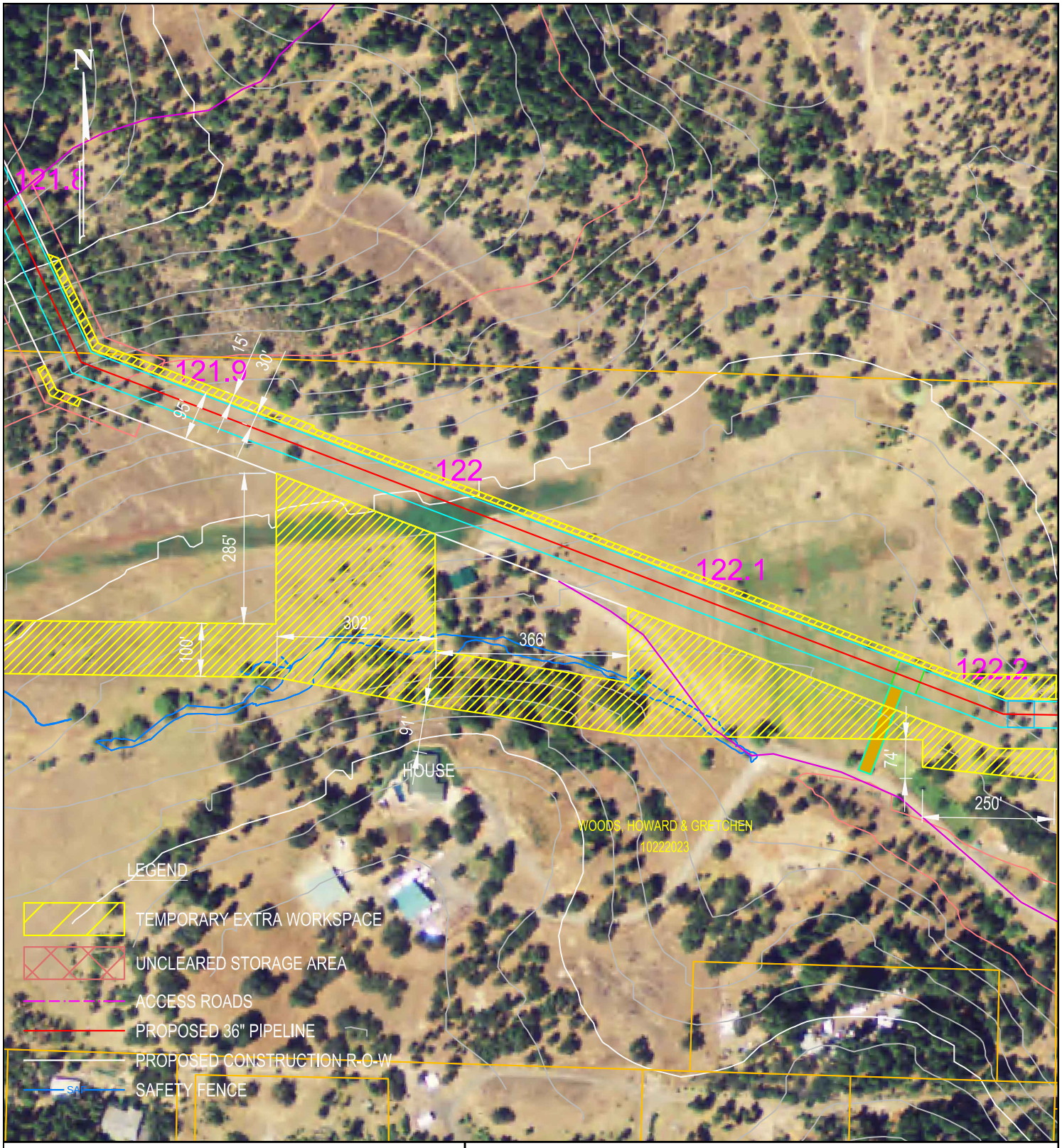
PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 65.90
36" PACIFIC CONNECTOR GAS PIPELINE
S-4, T-29-S, R-6-W
DOUGLAS COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAR 2015	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAR 2015	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0017	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 122.00
36" PACIFIC CONNECTOR GAS PIPELINE
S-35, T-34-S, R-1-E
JACKSON COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAR 2015	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAR 2015	ISSUED FOR BID:	SCALE: 1" = 250'
CHECKED BY:	DATE:	ISSUED FOR CONSTRUCTION:	
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0015	SHEET 1 OF 1

REFERENCE DRAWINGS	
DRAWING NO.	TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 199.71
36" PACIFIC CONNECTOR GAS PIPELINE
S-17, T-39-S, R-9-E
KLAMATH COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
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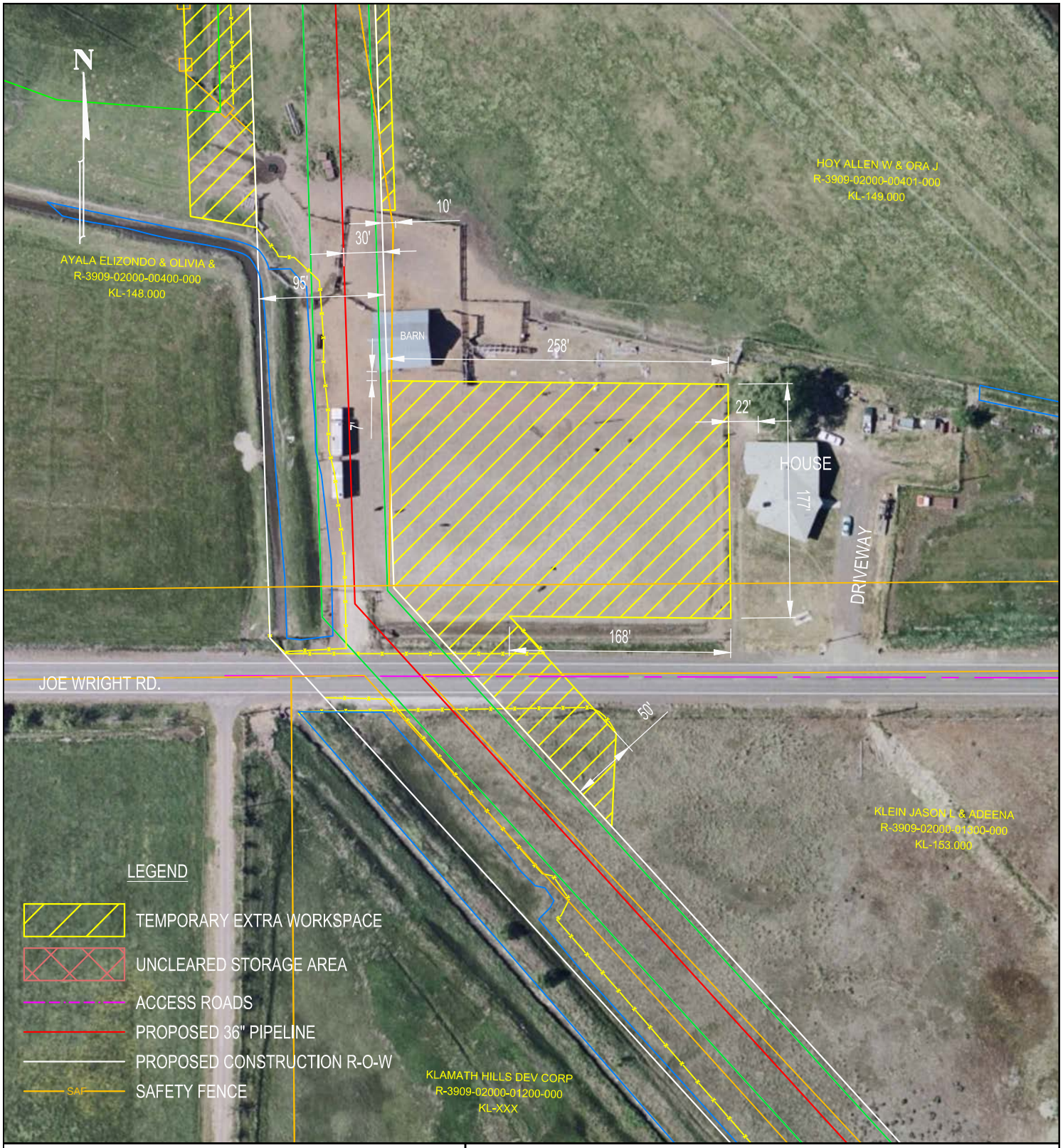
APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0002	SHEET 1 OF 1



REFERENCE DRAWINGS	
DRAWING NO.	TITLE

PACIFIC CONNECTOR GAS PIPELINE PROJECT
PACIFIC CONNECTOR GAS PIPELINE, LP
RESIDENTIAL SITE SPECIFIC MAP - M.P. 203.32
36" PACIFIC CONNECTOR GAS PIPELINE
S-20, T-39-S, R-9-E
KLAMATH COUNTY, OREGON

Pacific Connector GAS PIPELINE

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
A	MAY 2013	JCP	PRELIMINARY			

DRAWN BY: JCP	DATE: MAY 2013	ISSUED FOR BID:	SCALE: 1" = 100'
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APPROVED BY:	DATE:	DRAWING NUMBER: 3430.33-X-0001	SHEET 1 OF 1