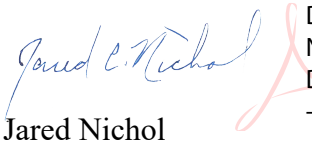
Dear Reader:

The Butte Falls Resource Area, Medford District Bureau of Land Management (BLM) has completed the environmental analysis for the proposed South Clark Forest Management Project. The South Clark Forest Management Project Environmental Assessment (EA) provides a description of the Project Area, background information, four Action Alternatives for implementing the Project, and the anticipated effects of the alternatives. In addition, an unsigned Finding of No Significant Impact (FONSI) is being released for public review at the same time. The comment period for this EA and unsigned FONSI will begin when it is posted on ePlanning on the Project page at https://eplanning.blm.gov/eplanning-ui/project/2021843. Any comments you may have regarding this Project, the EA, or the FONSI must be received by the close of the comment period to be considered for this proposal.

The environmental assessment reflects a substantial change to the Project's Purpose and Need and project elements that the BLM made after initial public scoping on the Project. Previously, a purpose of the Project was to provide non-motorized recreational opportunities (walking, hiking, and mountain bike optimized trails) near and in collaboration with the town of Butte Falls. After reviewing scoping comments from private individuals and Oregon Department of Wildlife related to the proposed recreational opportunities, the BLM determined planning for the recreation project would substantially benefit from additional time for public and other government agency involvement, and collaboration with the town of Butte Falls. The BLM has separated the recreation portion of the Forest Management Project into a distinct project with a separate environmental assessment, now called the Fredenburg Butte Recreation Project. Additional information on the status, public involvement opportunities, and development of the Fredenburg Butte Recreation Project are available on the ePlanning project page at: https://eplanning.blm.gov/eplanning-ui/project/2027101.

The current public comment period is for the vegetation management and related elements of the South Clark Forest Management Project only. To comment on the Forest Management Project, please send your comments to Bureau of Land Management, Attention: South Clark Project, 3040 Biddle Road, Medford, OR 97504, e-mail your comments to BLM_Butte_Falls_Planning@blm.gov (Subject: South Clark Project), or submit comments online at the South Clark Forest Management ePlanning project page at https://eplanning.blm.gov/eplanning-ui/project/2021843.

Thank you for your interest in public lands and involvement with projects proposed by BLM.



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Butte Falls Field Office

U.S. Department of the Interior
Bureau of Land Management

Medford District, Butte Falls Field Office

South Clark Forest Management Project Environmental Assessment

DOI-BLM-ORWA-M050-2023-0001-EA

This document and supporting information are available online on the project website in the BLM's National ePlanning register:

https://eplanning.blm.gov/eplanning-ui/project/2014299/510

The Adobe Acrobat version of this document may include maps and tables that cannot be made compliant with Section 508 of the Rehabilitation Act of 1973. For help with data or information, please contact the Butte Falls Field Office Planning and Environmental Specialist at 541-618-2261.

OR/WA Bureau of Land Management
Medford District, Butte Falls Field Office
3040 Biddle Road
Medford, Oregon 97504
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Chapter 1 Purpose and Need for Action

1.1 Introduction

This environmental assessment (EA) analyzes a set of potential forest management actions and associated roadwork on Bureau of Land Management (BLM)-administered lands managed by the Butte Falls Field Office (see Section 1.2 for further description of the Planning Area).

The BLM is preparing this EA in accordance with National Environmental Policy Act (NEPA) requirements, the Council on Environmental Quality (CEQ) regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Parts 1500-1508), and the Department of the Interior's regulations on implementing the NEPA (43 CFR Part 46). As more fully described in Chapter 2, proposed forest management actions include activities (known as "treatments") such as timber harvest, post-harvest activity fuels reduction, and reforestation, that would be used to manage the forest environment to achieve a variety of objectives. Other management activities to support timber harvest and upgrade the road system are proposed, such as road renovation, improvement, construction; roadside vegetation treatments; helicopter yarding/landings; and timber haul.

1.2 Location of the Proposed Actions

The 52,385-acre Planning Area for this EA encompasses a selection of drainage areas within the Lower Big Butte Creek [1], Upper Big Butte Creek [2], North Fork Big Butte Creek [3], Lower South Fork Big Butte Creek [4], and McNeil Creek [5] watersheds, in Jackson County north of Medford, Oregon. See sub-watersheds within the Planning Area on Map 1.

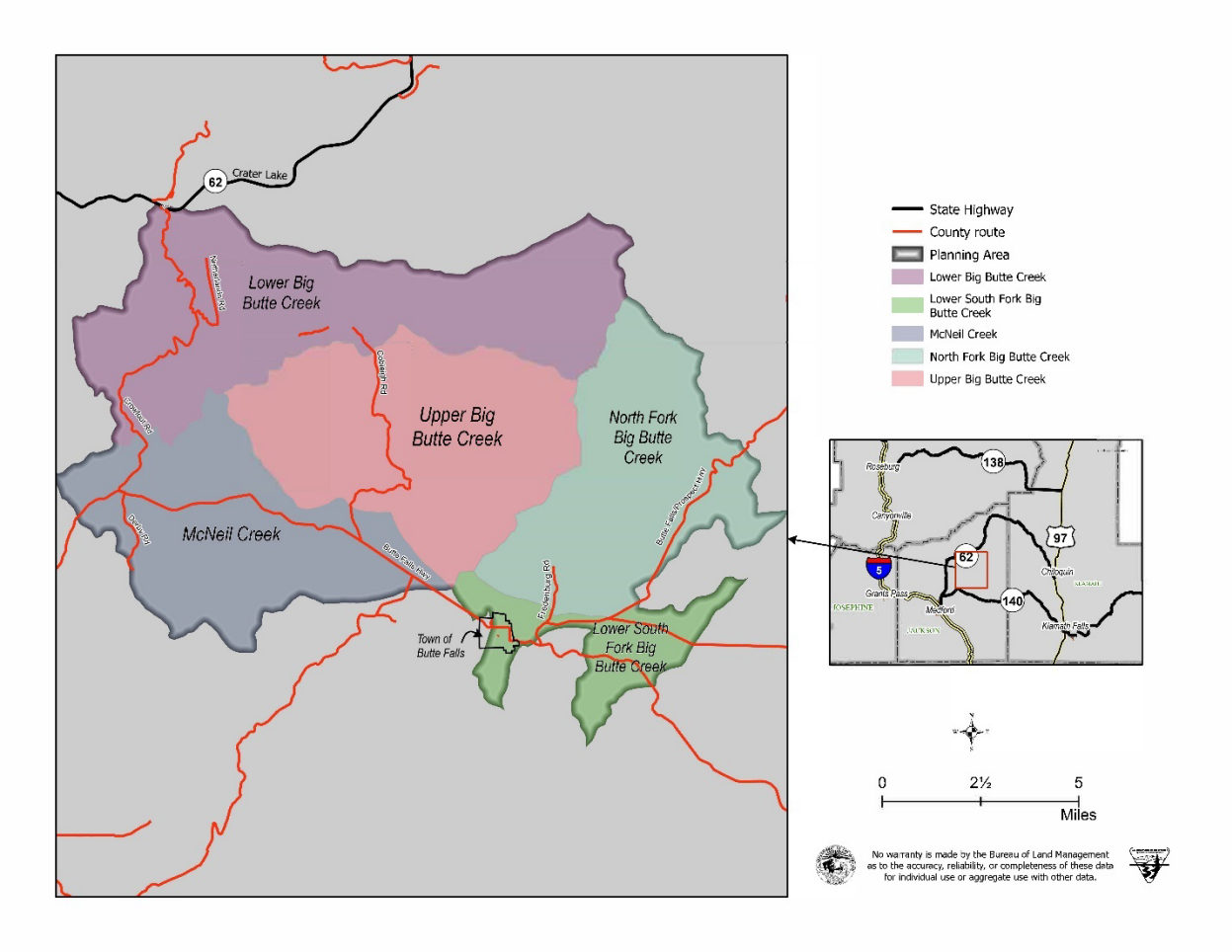
All proposed actions in this EA would occur in the Planning Area. The BLM refers to the sub-set of locations in the Planning Area where actions are proposed as the "Treatment Area[6]" throughout this EA. The BLM is proposing timber harvest through commercial timber sales, activity fuels treatments, forest stand reforestation, and landing construction in the Harvest Land Base (HLB) land use allocation (LUA). The HLB is comprised of Low Intensity Timber Area (LITA), Moderate Intensity Timber Area (MITA), and Uneven-Aged Timber Area (UTA) sub-allocations. The BLM designated the LUAs in the 2016 Southwestern Oregon Record of Decision and Resource Management Plan (SWO ROD/RMP) (BLM 2016b). See Chapter 2 and Appendix 2 for more information on proposed activities.

The BLM is proposing logging truck haul and roadside vegetation management (RVM) within existing road corridors, primarily in District-Designated Reserve (DDR) LUA (BLM 2016b, p. 54, footnote 15). The remainder of the proposed work (i.e., new road and landing construction and haul) is primarily in the HLB, DDR-Timber Productivity Capability Classification (TPCC)

[1] The Planning Area includes 15,157 acres (100%) of the 15,157 acres Lower Big Butte Creek watershed.
[2] The Planning Area includes 12,364 acres (100%) of the 12,364 acres Upper Big Butte Creek watershed.
[3] The Planning Area includes 10,361 acres (47%) of the 21,990 acres North Fork Big Butte Creek watershed.
[4] The Planning Area includes 3,832 acres (24%) of the 15,799 acres Lower South Fork Big Butte Creek watershed.
[5] The Planning Area includes 10,670 acres (65%) of the 16,294 acres McNeil Creek watershed.
[6] The "Treatment Area" represents the area evaluated for potential treatments. Not all acres within the Treatment Area will be treated.

and Late Successional Reserve-Dry (LSR-Dry) LUAs.

Map 1. South Clark Planning Area Sub-Watersheds



The Planning Area encompasses a total of approximately 18,458-acres of BLM-administered land (Tables 1 and 2[7]), while the Treatment Area varies from approximately 2,053 to 2,238 acres (timber harvest unit acres), depending upon the alternative. The remaining lands in the Planning Area are mixed ownership; about 64 percent are privately owned (mostly private timber industry lands), about 0.02 percent is managed by the U.S. Forest Service, about 0.4 percent is managed by the U.S. Army Corps of Engineers, and less than 0.1 percent is managed by state government (Table 1).

[7] These are GIS acres, are estimates based on current data, and have been rounded to the nearest whole acre. In Table 2 Waterbody, Area, or Wetland = WAW.

Table 1. Land Ownership in the Planning Area

Ownership	Acres	Percent
Private Lands	**33,701**	**64.3%**
Bureau of Land Management Ownership	**18,458**	**35.2%**
Bureau of Land Management O&C Lands	17,648	33.7%
Bureau of Land Management Public Domain	176	0.3%
Bureau of Land Management Acquired Lands	633	1.2%
U.S. Forest Service (USFS)	**9**	**0.02%**
U.S. Army Corps of Engineers	**184**	**0.4%**
State Government	**33**	**0.1%**
Total	**52,385**	**100%**

Table 2. Land Use Allocations in the Planning Area (BLM-Administered Lands)

Land Use Allocation	Acres	Percent
Harvest Land Base	**8,557**	**46.4%**
Harvest Land Base – UTA	4,596	24.9%
Harvest Land Base – LITA	3,444	18.7%
Harvest Land Base – MITA	520	2.8%
Riparian Reserve	**2,217**	**12.0%**
Riparian Reserve – Dry	2,000	10.8%
Riparian Reserve - Moist	217	1.2%
District Designated Reserve- Road & WAW	**470**	**2.6 %**
District Designated Reserve-ACEC	**1,126**	**6.1%**
District Designated Reserve-TPCC	**4,243**	**23.0%**
Late-Successional Reserve	**1842**	**10%**
Late-Successional Reserve – Dry	1,785	9.7%
Late-Successional Reserve – Older Forest	57	0.3%
Total	**18,455**	**100%**

1.3 Decisions to be Made

The BLM Butte Falls Field Office will decide whether to implement the actions outlined in one or more of the alternatives described in Chapter 2. The Authorized Officer will decide whether to offer timber for sale, and if timber is offered for sale, how many commercial sales to offer, and with which project design features, and whether to implement related actions, including planting (reforestation) of harvested areas, road construction and other related roadwork, helicopter use, landings, and hauling of timber during the wet season. These decisions will be documented through Decision Record documents that will identify specific approved actions and will be made available to the public.

1.4 Purpose and Need

Harvest Land Base (HLB): Those lands on which the determination and declaration of the ASQ is based. A defined land use allocation under the 2016 ROD/RMP.

Allowable Sale Quantity (ASQ): The timber volume that a forest can produce continuously under the intensity of management described in the RMP for those lands allocated for permanent timber production. The ASQ is set by the ROD/RMP for each sustained yield unit.

Sustained Yield Unit (SYU): An administrative unit for which an ASQ is calculated.

The need for the South Clark Forest Management Project (Project) is to conduct commercial timber sales to contribute timber volume to meeting ASQ for the Medford Sustained Yield Unit (SYU) (BLM 2016, p. 5). Accordingly, the purpose of this forest management project is to harvest timber in HLB lands in a manner that provides ASQ volume in fiscal year 2024 in accordance with management direction in the 2016 SWO ROD/RMP (RMP).

Of the BLM-administered lands within the Planning Area, the majority is comprised of revested Oregon and California Railroad (O&C) lands (17,648 acres or approximately 96 percent of the BLM-administered lands). The BLM manages these lands under the statutory requirements of the O&C Act (43 U.S.C. 2601 et seq.) and the Federal Land Policy and Management Act (FLPMA) (FLPMA, 43 U.S.C. 1701 et seq.). The O&C Act requires the BLM to sell, cut, and remove timber on O&C lands in conformity with the principle of sustained yield (BLM 2016b, p. 5). The FLPMA requires the BLM to create RMPs to guide and control future management actions on BLM-administered lands. The BLM developed the RMP pursuant to FLPMA, while in compliance with other laws and statutes, including the O&C Act. The RMP provides the objectives, LUAs, and management direction for managing BLM-administered lands in southwestern Oregon, including the Medford District and the Butte Falls Field Office.

The RMP management direction reflects the need to produce the declared ASQ and requires action by the Medford District. Specifically, the following management direction establishes the need for this project:

- In the HLB, “Conduct silvicultural treatments to contribute timber to the ASQ” (BLM 2016b, p. 62).
- In the HLB-LITA, MITA, and UTA, “produce timber to contribute to the attainment of the declared ASQ” (BLM 2016b, pp. 64-68).

The Butte Falls Field Office is one of three field offices within the Medford District SYU, as defined in the RMP (BLM 2016b, p. 5). The BLM has declared an allowable sale quantity (ASQ) of 37 MMbf (million board feet) for the Medford sustained yield unit (SYU), in which the Butte Falls Field Office is located, consistent with the O&C Act. An allowable range of variation in the volume of timber that the Medford District BLM will offer for sale on an annual basis is 22-52 MMbf (BLM 2016b, pp. 5-6).

The BLM would plan to offer the timber analyzed in this EA in one or more fiscal years, currently planned for FY 2024. The projected volume from the Project along with other planned projects in the Medford SYU would contribute to the Medford District’s declared ASQ of 37 MMbf for FY 2024.

This ASQ volume represents the sustained-yield volume of timber that the BLM would offer for sale from the Harvest Land Base, which has specific management direction for sustained-yield timber production (BLM 2016b, p. 6). The Medford District identifies the most preferable next watershed for commercial HLB sales by evaluating existing forest stand data (LiDAR and other data) with the greatest potential standing tree volume with the least likelihood of resulting in potential take of Northern Spotted Owl. Potential take of NSO is a consideration due to RMP management direction to not authorize timber sales that would cause the incidental take of northern spotted owl territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP has begun (BLM 2016b, pp. 19, 23, 30, 121, 127-128).

Medford District identified the Big Butte Creek watershed as the next location for harvesting ASQ volume in the Butte Falls Field Office based on these factors. The selection of forest stands included for consideration in this Project was based on stand composition and stocking of conifers, logging feasibility, and location in relation to existing road infrastructure that could support an economically viable and operationally feasible timber sale. Desirable stand composition and stocking is dependent on aspect, elevation, average annual precipitation, and other factors. For example, a moist high elevation site could support a higher relative density before self-thinning occurs as compared to a low elevation, drier, south facing slope. Therefore, there is no hard threshold for a stand to meet to be considered desirable, it varies based on the position on the landscape.

The Field Office selected a preliminary set of forest stands (i.e., treatment units) located primarily within the HLB, and some in the LSR-Dry, RR-Dry, and DDR-TPCC land use allocations. The Forest Operations Inventory (FOI) dataset, LIDAR, and aerial photography were used to identify stands with the majority of timber in merchantable size classes (> 8” DBH) for possible harvest treatment. Refinement of the preliminary set of treatment units was done by the authorized decision maker and timber sale planner by making decisions to exclude stands from the Project for specific reasons, such as: 1) stands with known inadequate stocking; 2) stands in active timber sales; and 3) recently harvested stands (<10 years). Through the interdisciplinary team (IDT) process, further refinement of the preliminary set of forest stands occurred that eliminated from consideration LUAs other than HLB, based on a variety of factors.

The refined set of treatment units were carried forward through the field survey, habitat assessment, and stand exam processes to gather more information on the current conditions of the stands. The stands were then evaluated by the field office silviculturist, engineer, and logging -systems specialists for economic and operational feasibility. For example, a potential treatment unit may have been deemed uneconomical when the harvest volume per acre would be too low to be economically feasible or stands would not be accessible based on terrain. Other resource specialists—such as the soil scientist, hydrologist, botanist, and archaeologist—reviewed stands for potential issues related to their resource. Preliminary cost analyses were completed during this stage of the planning process to inform the decision maker of the economic feasibility of the options considered.

1.5 Land Use Plan Conformance

The actions in this EA are in conformance with the RMP (BLM 2016b). The RMP directs

management of all BLM-administered lands in the Planning Area and addresses how the BLM will comply with applicable laws, regulations, and policies in western Oregon including, but not limited to the: O&C Act, FLPMA, Endangered Species Act (ESA), National Environmental Policy Act (NEPA), Archaeological Resources Protection Act, Clean Air Act, and Clean Water Act. The Butte Falls Field Office designed this project to conform to the RMP. This EA tiers to the 2016 PRMP/FEIS (FEIS) where appropriate (BLM 2016a), in the subsequent analyses provided in Chapter 3 and in Appendix 1 of this document.

1.6 Public Involvement for this EA

On November 10, 2022, the BLM sent by mail and email a public scoping notice to 500 individuals, businesses, organizations, and government entities, and posted the notice on the project ePlanning website. Public scoping notices were in addition to consultation with Tribal governments (see Chapter 4). The BLM requested comments by December 15, 2022. The BLM received 20 comment letters, emails, and ePlanning submissions from state agencies, non-government organizations (NGOs), and adjacent landowners along with seven interest response forms from a state agency, NGO, and adjacent landowners who wished to be kept informed but did not have specific comments at the time. All scoping comment letters, emails, and ePlanning submissions received are in the project record.

Comment letters included numerous citations to various scientific literature. Where literature citations were provided with a clear linkage to a substantive comment, the BLM reviewed and considered the literature before fully developing the proposed actions and alternatives. A list of the literature submitted[8] can be found in Appendix 4, References. The BLM strives to apply the most current, geographically relevant science to its analysis and management considerations that represent actions similar in scope and scale to the BLM project. The BLM considered relevant, appropriate, and available information for the project development and potential effects.

Section 2.9 includes responses to comments submitted to request actions beyond the framework of the proposed alternatives.

1.7 Issues Selected for Detailed Analysis

Issues are points of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect. An issue is more than a position statement; rather, it has a cause-and-effect relationship with the proposed actions or alternatives, and points to environmental effects (BLM NEPA Handbook H-1790-1, Section 6.4).

The BLM generated a list of issues based on internal scoping discussions and from substantive public comments submitted during scoping. From that list, the BLM identified the following issue to analyze in detail in this EA.

- Issue 1- What would the estimated volume of timber be from the HLB in this project? How would this timber volume contribute to the achievement of the declared ASQ for the Medford District SYU in upcoming fiscal years?

[8] Includes literature referenced in scoping comments that is readily available on the internet or already in BLM's reference database.

1.8 Issues Considered but Not Analyzed in Detail

Issues raised by the public or BLM during scoping that did not relate to how an alternative responded to the Purpose and Need or did not point to a potentially significant environmental effect beyond what was anticipated and accounted for in the FEIS (BLM 2016a), were considered but are not analyzed in further detail in Chapter 3. Requests for information that would not further contribute to making a reasoned and fully informed decision were also not included in the EA. A detailed list and rationale for the issues that were considered but were not analyzed in detail is available in Appendix 1.

Chapter 2 Alternatives

In developing alternatives, the BLM considered numerous ways to meet the Purpose and Need, including alternatives proposed or suggested by the public. The BLM analyzed four alternatives in detail for the Purpose and Need.

This chapter provides a brief, largely qualitative and comparative summary of the key points and differences among the alternatives analyzed in detail. More specific, quantitative details of each of the action alternatives is contained in Table 3, Summary Comparison of the Action Alternatives (Section 2.8). This chapter also briefly describes the alternatives the BLM considered but did not analyze in detail (Section 2.9).

2.1 Alternative 1 - No Action Alternative

Under the No Action Alternative, the BLM would not implement silvicultural treatments within the Planning Area at this time, nor any of the associated roadwork or timber haul. Existing activities in the Planning Area would continue and the present environmental conditions and trends in the Treatment Area would continue. Because the BLM would not implement Action Alternatives, vegetation growth rates, stand stocking densities, fuel loads, etc. would continue to change based on current existing forces and disturbance on BLM-administered lands in the area would remain the same.

Since the proposed Treatment Areas for timber harvest consist of lands designated as HLB by the RMP, the No Action Alternative does not preclude future timber harvest. If no action were selected at this time, it is reasonably foreseeable that the BLM would implement a forest management project in this area within the next five to 10 years to contribute to the Medford District ASQ. It is reasonably foreseeable that the proposed harvest area and harvest treatments would be the same or very similar to the current project. In the future, the BLM would prepare an EA for that project, prior to making any implementation decisions.

The reasonably foreseeable cumulative actions identified in this EA (see Section 3.2) would still apply to the analysis of the environmental effects of the No Action Alternative. In addition, the No Action Alternative does not suggest that the BLM would stop implementing the 2016 RMP. The No Action Alternative serves as a baseline that represents current (past and present) conditions and trends, and a reference point from which to compare the environmental effects of the action alternatives. Inclusion of this alternative is without regard to meeting the Purpose and Need identified in Chapter 1.

2.2 Project Elements Common to All Action Alternatives

In all Action Alternatives, timber harvest, treatment of activity fuels, and various types of roadwork and timber haul are proposed. Below is a summary of the actions that are common to all Action Alternatives; however, the type and amount of each treatment/activity may vary by alternative (see Section 2.8, Table 3).

2.2.1 Timber Harvest

There are no treatments in nest patches of owl sites that have been active in the past two years and owl habitat would be maintained in the core of these active sites. While the type of treatment (i.e., commercial thinning, selection harvest, and regeneration harvest) and the retention levels prescribed vary by alternative (see Section 2.8, Table 3), the BLM would incorporate the following timber harvest practices and project design features under all the action alternatives.

- During commercial harvest, except for safety, operational, or fuels reduction reasons, retain existing snags > 20 inches diameter at breast height (DBH); snags 6–20 inches DBH in decay classes III, IV, and V (see BLM 2010a); down woody material > 20 inches in diameter at the large end and > 20 feet in length; and down woody material 6–20 inches in diameter at the large end and > 20 feet in length in decay classes III, IV, and V (see BLM 2010a) (BLM 2016b, pp. 62-63).

- For treatments within HLB-LITA and MITA, include among retained trees all trees that are ≥ 40 inches DBH and that the BLM identifies were established prior to 1850, except where falling is necessary for safety or operational reasons and no alternative harvesting method is economically viable or practically feasible. If such trees need to be cut for safety or operational reasons, retain cut trees in the stand (BLM 2016b, pp. 64-67).

- For treatments within HLB-UTA, retain dominant Douglas-fir (*Pseudotsuga menziesii*) and pine (*Pinus* spp.) trees that are both ≥ 36 inches DBH, and that the BLM identifies were established prior to 1850 and madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), and oak (*Quercus* spp.) trees > 24 inches DBH, except where falling is necessary for safety or operational reasons and no alternative harvesting method is economically viable or practically feasible. If such trees need to be cut for safety or operational reasons, retain cut trees in the stand (BLM 2016b, p. 68).

2.2.2 Yarding Methods

The BLM would select helicopter, ground-based, or cable (skyline) yarding methods depending on the slope of the terrain or other environmental conditions in the harvest unit.

In ground-based yarding, a moving vehicle travels to the logs and pulls or lifts them (depending on equipment used) to the landing. The machines used for skidding, forwarding, and swinging are diverse and would be wheeled or tracked. Trees and logs are removed from the woods and yarded to the landing via lead end suspension or fully suspended on the ground-based equipment. Most ground-based equipment travels on skid trails that are approved by the BLM. Equipment

with mechanized cutting capabilities travels off approved skid trails to cut trees (e.g., feller bunchers) under conditions (See Appendix 3, PDF No. 38) where detrimental soil disturbance would be minimal. Ground-based yarding is generally limited to slopes of 35 percent or less and limited to when soils are relatively dry and resistant to compaction and displacement (see Appendix 3, PDF No. 35). In some cases, ground- based yarding using specialized ground-based mechanized equipment would be allowed on slopes up to 50 percent (see Appendix 3, PDF No. 36). In certain cases, tethered logging equipment maybe used on slope over 50 percent (See Appendix 3, PDF No. 36).

The BLM generally allows the loggers to select the skid trail pattern which the BLM approves and may modify before use is allowed. In certain instances, the BLM will require pre-designated skid trails along with soil management PDFs to facilitate yarding operations in sensitive areas and where skid trails go outside of the harvest unit boundary. The routes would be located on existing skid trails when feasible, or when newly located would generally be 12 to 15 feet wide and would vary in length.

Endline/bull-lining is a ground-based yarding method where a cable is dragged from the skidder to the log and the log is dragged along the ground to a skid trail. Lining of logs is generally used for yarding short, steep pitches generally over 35 percent slope.

Cable (skyline) yarding is a cable system that pulls the logs to the landing using steel cables. A stationary machine, or yarder, would be located on the road and would pull logs up to the landing with one end of the log suspended.

Skyline-cable yarding is generally used when the ground is too steep for ground-based yarding (generally >35 percent slope). In certain instances, due to soils, topography, road location or other environmental conditions slopes less than 35 percent may be logged using skyline-cable systems. Skyline-cable yarding may also be used to log units during the winter due to soil moisture limitations that affect the use of ground-based equipment if the roads leading to the units have sufficient rock depths.

Helicopter yarding is an aerial logging system that transports logs to a landing using a cable attached to a helicopter. Logs are lifted vertically and fully suspended during the yarding process. Helicopter yarding is used in environmentally sensitive areas and where new road construction is not feasible due to topography, economics, or other access issues.

Proposed yarding systems may differ from those in the final timber sale contract based on site-specific factors discovered during contract development or necessary operational adjustments; however, yarding systems impacts would stay within the parameters of the EA analysis (for example, a ground-based yarding system might change to a helicopter system if more operationally efficient).

2.2.3 Landings

Landings would be dispersed throughout the treatment area and be up to 0.5-acre for cable or ground-based units, up to one acre for helicopter units and up to three acres for helicopter service landings. Many proposed landings in this EA are designated as alternate locations and may or may not be used in the final timber sale. Where feasible, landings would be located on stable

locations, such as gentle side slopes, ridgetops, stable benches, or flat areas. Landings would only be constructed in riparian reserves where there is not an operationally feasible and economically viable alternative (BLM 2016b, p. 75). See Appendix 3 for a list of applicable PDFs that would be required for landing construction and use.

2.2.4 Treatment of Activity Fuels

The BLM proposes to treat activity fuels post-treatment using lop-and-scatter, hand piling and burning, mechanical piling and burning, and/or biomass removal. Activity fuels are defined as the twigs, limbs, branches, and small tree bole segments that are broken off and left behind during the harvesting off merchantable logs. In some cases, harvested stands would be underburned as a treatment to reduce surface activity fuels. The BLM would conduct a fuels assessment within each treatment unit following activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit.

Burning of piles would occur within two years or less of pile creation. Prescribed burning operations would comply with the guidelines established by the Oregon Smoke Management Plan (OAR 629-048-0010).

In all timber sale units the BLM proposes to lop-and-scatter slash (live and dead material nine inches or less) if less than 11 tons per acre is present in the treatment unit. Material seven inches in diameter or less would be cut to three-foot lengths and left on the ground. The depth of the slash would not exceed 18 inches. The BLM proposes to hand pile and burn slash if more than 11 tons per acre is present in the treatment unit. Material between one and seven inches in diameter and longer than two feet would be piled by hand. The piles would be a minimum of four feet high and six feet in diameter. Piles would be burned in the fall, winter, or spring. All piles would be covered with four mil polyethylene plastic sheeting to facilitate rapid and efficient ignition and consumption of fuels to minimize residual smoke.

The BLM proposes to allow mechanical piling and pile burning when the slash remaining in the treatment units is greater than 11 tons per acre and the slope is generally less than 35 percent. Mechanical equipment would pick up material and walk it to the pile. Material would not be pushed into a pile. Equipment would only travel on previously used skid trails. If machine piled, material between two and 12 inches in diameter and greater than two feet long would be piled. The piles would be a minimum of eight feet high and 10 feet in diameter. Piles would be burned in the fall to winter and would occur within two years or less of being piled.

Whole trees or treetops would be yarded to log landings, the treetops and limbs removed and piled at the landings, and the resulting slash piles hauled away from the landings as biomass or sold as firewood. Whole tree yarding and tree top yarding would not be required but are options for treating activity slash.

2.2.5 Other Activities

Other activities proposed in the LSR, RR, HLB, and DDR include yarding corridors and the use of tailholds and guylines (see Glossary for definitions).

2.2.6 Roadwork and Timber Haul

The BLM proposes to improve roads that would be used for timber haul by either renovating or improving existing roads as described below. Timber haul would be allowed during the wet season on paved roads or roads with adequately rocked surfacing to prevent rutting or conveyance of the sediment to ditchlines and the stream network.

Core activities, such as road maintenance, on BLM-administered lands have defined Best Management Practices (BMPs). The BLM would apply BMPs from Table C-1 in the RMP (BLM 2016b, pp.167-182) to provide stable, well-draining roads that protect water quality and accommodate harvest operations during all stages of the project.

Road Renovation/Maintenance

Before roads are used for forest management activities, existing roads to be renovated would be restored to the original design standard as described in the BLM Road Manual, Road Standards. Road renovation may include spot rocking or surfacing if needed; cleaning ditches where needed; cleaning or enlarging catch basins; replacing culverts that are undersized or have met or exceeded their lifespan; installing new cross drain culverts; removing vegetation and trees growing within six feet of culvert inlets or outlets; and removing brush and trees along roadways (roadside vegetation management).

Renovation may also include grubbing and excavation operations. Roadside vegetation management (RVM) is focused on timber haul routes and extends beyond the running surface to include the entire road prism. Under the original design of a BLM roadway, the road prism is generally 22.5-feet on both sides of the center line of the road. The BLM would implement RVM treatments in the area between the bottom of the fill slope and the top of the cut slope of the original prism of the roadway which may extend beyond 22.5-feet on steep side slopes and turnouts and log landings. In the South Clark Project Area RVM would occur along the Project haul routes, except in riparian reserves (RR). Vegetation and trees that would interfere with road grading and renovation operations would be removed and stumps ground down to a depth of six inches below the road surface, shoulders, or ditch lines. Debris, brush, and trees that are not merchantable would be hand piled and burned, chipped, or lopped and scattered depending on the location. Merchantable trees defined as trees that are greater than 8” in diameter at breast height (DBH), or a tree with a 5” merchantable top at 16’ from the butt of the log will be removed from site.

Road surfacing is placing crushed rock the full width and desired length of the road. Surfacing is done by grading and reshaping the road subgrade, then hauling, placing, and compacting the new surfacing material on the prepared subgrade.

Spot rocking involves placing crushed rock on the road in areas as needed to help control erosion and maintain the road surface. This restores the road surface and road condition making it suitable for driving and hauling. Crushed aggregate material would be placed on sections of inadequately surfaced roads that would be used for hauling timber.

Road Improvements

Road improvements would occur on existing road prisms that need to be upgraded to a higher design standard than the original road was designed for. In addition to potential actions associated

with road renovation, road improvement may also include repairing and/or widening narrow sections, improving drainage patterns, upgrading from natural surface to aggregate surface, and installing new draw culverts. Improvement may include grubbing and excavation operations.

Road Decommissioning
Roads identified by BLM for decommissioning may have alignment and design issues that would require substantial and costly road improvements and potential hazard mitigation during timber haul, or they are no longer needed for access due to new construction or alternative access or are in undesirable locations such as RR or are not needed in the near future but needed for forest management at a later date. Roads that access permittee lands within a reciprocal right-of-way agreement area shall not be decommissioned without concurrence by permittees. The Butte Falls Field Office can employ any of the following methods of decommissioning:

- **Decommission or long-term storage**: the road or segment would be closed to vehicles on a long-term basis but may be used again in the future. Actions may include installing water bars, blocking (with root wads, boulders, tank traps, etc.), or placing slash on the roadbed. This would put them in a condition that will be storm proofed to reduce risk of failure but keep them in the database as an existing road.

- **Full decommission**: road or segment determined to have no future need. The natural hydrologic flow would be restored by the removal of hardware (culverts), if necessary. The road or segment would be physically blocked, water bars may be added, the roadbed would be decompacted, fillslopes and cutslopes stabilized, and slash may be placed on the roadbed.

- **Obliteration**: road or segment determined to have no future need. Obliteration is a full site restoration and is permanent. All drainage structures would be removed, the roadbed would be decompacted, fill material used in the original road construction would be excavated and placed in the subgrade in order to reestablish the original ground line and recontour, and slash would be placed on the newly contoured surface.

Eight road segments were determined to qualify for decommissioning (See Appendix 2, Table 28; Appendix 5, Map 46). The BLM is proposing full decommission on these segments and will require concurrence of the reciprocal right-of-way permittees before a final decision can be made. If full decommissioning is not possible, one of the other methods of decommissioning may be chosen.

2.3 Common to Alternatives 2, 3, and 5

All project elements identified in 2.2 sections plus the following:

Road Construction
The BLM also proposes to construct new roads to provide access to select timber harvest units (under Alternatives 2, 3, and 5). Road construction would be either temporary or permanent, as

described below.

Temporary Road Construction
The BLM proposes to construct temporary roads to allow operators temporary access to treatment units where no previous roads exist. Where topography allows, roads would be located on stable areas such as ridges, stable benches, or flats, and gentle to moderate slopes. Road construction would be minimized on steep slopes (>60 percent) (BLM 2016b, p. 167). An access route would be constructed to at least minimum standards that would facilitate safe and efficient operations. Construction would include clearing, grubbing, removing, and disposing of vegetation and debris from within established clearing limits. Work also includes the construction of a minimum-width subgrade by excavating, leveling, grading, and out sloping.

After harvest, roads identified as temporary would be fully decommissioned using one or more of the following: ripped, water barred, mulched, blocked, and seeded with native grass where needed.

Permanent Road Construction
The BLM proposes to construct permanent roads to allow access to Treatment Areas under the Project as well as for future forest management. New permanent roads would be added to the road system. Where topography allows, roads would be located on stable areas such as ridges, stable benches, and gentle to moderate slopes. On slopes greater than 60 percent, end hauling of excavated material would occur and would be disposed of on stable areas outside of riparian areas that would minimize risk of sediment delivery to streams and other waterways.

After timber harvest, roads identified as permanent and surfaced with aggregate rock will be left open and roads identified as permanent and not surfaced with aggregate rock will be placed into long term storage using one or more of the following: water barred, mulched, blocked, camouflaged, and seeded with native grass where needed.

2.4 Alternative 2
Alternative 2 applies regeneration harvest prescriptions in all LITA and MITA Treatment Areas and minimizes residual relative densities in selection harvest prescriptions in the UTA in order to maximize the amount of harvest volume. Compared to the other action alternatives, Alternative 2 proposes the most amount of regeneration harvest and the most intense selection harvest.

Alternative 2 prescribes selection harvest at the lower end of the post-harvest relative density (RD) range allowed in the RMP for stands in the UTA (20-30 percent stand average RD) (see Table 3). Group selection openings (gaps) would be created on up to 30 percent of the stand area and would be up to four acres in size. No treatment areas (skips) would occur on 10 percent of the stand area. See Appendix 2, Table 26 for more information by harvest unit.

2.5 Alternative 3
Alternative 3 includes selection harvest in the UTA LUA and both regeneration harvest and commercial thinning in the LITA and MITA LUAs. The RMP identified that the BLM would conduct regeneration harvest for any of nine reasons, which include resetting stand development in overly dense stands that would not respond well to commercial thinning and producing

complex early-successional ecosystems. For this alternative, the BLM identified LITA and MITA stands with high (more than 50 percent) relative density (RD) and trees with low crown ratios (less than 25 percent) that would not respond well to commercial thinning. As relative density increases above 50 percent, competition for light, nutrients, and water begins to reduce growth rates and increase stresses on individual trees and on the stand as a whole. In forest stands where the live crown ratios decline to less than 25 percent, individual trees are less likely to respond to thinning designed to encourage tree growth and stand structural development (Tappeiner et. al. 2007, p. 212). The BLM would reset stand development in these stands to a complex early-successional ecosystem through regeneration harvest. Regenerated stands would retain 15-30 percent of pre-harvest basal area in green trees in LITA, and 5-15 percent in MITA stands. Stands with higher crown ratios and the potential for vigorous growth after release would be proposed for commercial thinning.

Where commercial thinning and selection harvest are prescribed, the BLM would thin stands to achieve a post-harvest RD of between 20-30 percent in the UTA and 25-35 percent in the LITA and MITA. In LITA and MITA group selection openings (gaps) would be created on up to 10 percent of the stand area and would be up to four acres in size. In UTA group selection openings (gaps) would be created on up to 30 percent of the stand area and up to four acres in size. No treatment areas (skips) would occur on at least five percent of the stand in LITA and MITA and on at least ten percent of UTA stands greater than 10 acres. First, Alternative 3 emphasizes the use of prescriptions to address current site-specific conditions and desired future conditions, and second, prescriptions that would maximize the amount of volume to contribute to the ASQ for the Medford SYU. See Appendix 2, Table 26 for more information by harvest unit.

2.6 Alternative 4

Alternative 4 is almost the same as Alternative 3 except that there is no new road building and approximately 24 fewer acres of harvest. Helicopter logging would be used in units where access would otherwise require a new road. Some areas within the proposed stands, totaling 23.9 acres, would be deferred under Alternative 4 due to access limitations.

Alternative 4 would apply the same set of prescriptions as Alternative 3 within the remaining Treatment Areas (see Section 2.5). Alternative 4 presents alternative methods for accessing proposed treatments areas instead of new temporary or permanent road construction. For example, this alternative evaluates the use of longer skidding distances in lieu of building new roads. See Appendix 2, Table 26 for more information by harvest unit.

2.7Alternative 5

Alternative 5 differs from the other Alternatives in that no regeneration harvest or group selection openings (gaps) are proposed and overall would retain the highest amount of RD post-treatment in harvested stands. Within the HLB (MITA, LITA, and UTA), commercial thinning and selection harvest would be prescribed to retain stand-level relative densities at the higher end of the range allowed in the RMP, 35-45 percent RD post-harvest (BLM 2016b, pp. 65, 67, 68).

No treatment areas (skips) would occur on at least five percent of the stand area in LITA and MITA, and on 10 percent of the stand area in UTA. See Appendix 2, Table 26 for more information by harvest unit.

Alternative 5 also differs from Alternatives 2, 3, and 4 in that harvest is designed to modify but maintain the function of foraging and dispersal habitat, and downgrade nesting-roosting habitat, rather than removing spotted owl habitat (see Wildlife Issue NAID #1 and Table 18). Also, in owl sites known to have been occupied within the past five to 10 years (no sites in the Project Area have had known occupancy in the past five years) the BLM would either defer treatment or alter prescriptions as compared to Alternatives 2, 3, and 4, consistent with guidance in RMP Appendix A regarding management of northern spotted owl (NSO) sites associated with the harvest land base (Appendix A, BLM 2016b, pp. 129-130). For sites known to have been occupied by a territorial pair or resident single within the past 10 years, RMP Appendix A guides managers to give priority to maintaining existing habitat conditions in the nest patch and maintaining existing nesting-roosting habitat in the 500-acre core use area, or promoting the protection and development of nesting-roosting habitat in the nest patch and 500-acre core use area, to the extent consistent with the management objectives and management direction for the Harvest Land Base (Appendix A, BLM 2016b, p. 130).

The Project Area includes the following sites within the HLB that are known to have been occupied within the past five to 10 years: Dog Creek (2008O and 2008A), Santiam Peak (22530O), Fredenburg (0060O), McNeil Camp (4566O), and Clark Creek Falls (1161O). Within the nest patch of these recently occupied owl sites, the BLM would defer treatment to future forest management projects, which would delay treatment of 46 acres as compared to Alternative 3. Within the core-use areas (outside of the nest patch) of these sites, there are 127 acres of proposed harvest units. In these units, the BLM would implement treatment prescriptions designed to promote structural complexity and heterogeneity, promote development of nesting-roosting habitat, and restore habitat for Bureau Special Status Species. This would be achieved through treatments focused on the development of large open grown trees, increasing vertical and horizontal structural complexity and heterogeneity, and increasing vegetative species diversity. These treatments would consist of harvest prescriptions that would:

- Treat in stands where canopy structure is generally single layered;
- Retain post-treatment residual canopy cover of 60 percent within roosting/foraging stands and 40 percent within dispersal stands;
- Retain decadent woody material, such as large snags and down wood, post-treatment;
- Retain multiple canopy, uneven-aged tree structure that was present prior to treatment;
- Promote heterogeneity in tree structure in selection harvest units.

2.8 Summary Comparison of Action Alternatives

Tables 3 and 4 below highlight, in a side-by-side fashion, the key elements of each Alternative, particularly those elements that vary by Alternative. Tables 3 and 4 do not include all details of each Alternative. Additional details are contained in Section 2.2 and Appendix 2, Proposed Treatments by Action Alternative.

Table 3. Summary Comparison of the Action Alternatives

MANAGEMENT ACTION*		FOREST MANAGEMENT ACTION ALTERNATIVES			
		2	3	4	5
Timber	Common to All	• Retain existing snags and down woody material to the level set forth in the SWO ROD/RMP (see Section 2.2.1 for more information) • In HLB-LITA, retain trees ≥ 40 inches DBH and that the BLM identified were established prior to 1850, and madrone, bigleaf maple, and oak trees >24"… (see Section 2.2.1 for more information) • In HLB-UTA, retain dominant Douglas-fir and pine trees that are both ≥ 36 inches DBH, and that the BLM identifies were established prior to 1850 (see Section 2.2.1 for more information). • No treatment in nest patches of owl sites that have been active in the past two years. • Maintain owl habitat in the core of active NSO sites.			
	Total Treatment Acres by Federal Status	• 2,239 acres (1,978-O&C acres, 261-PD acres)	• 2,239 acres (1,978-O&C acres, 261-PD acres)	• 2,215 acres (1,963-O&C acres, 252-PD acres)	• 2,054 acres (1,802-O&C acres, 252-PD acres)
	Acres by Treatment Type	• In HLB-LITA and MITA: o Commercial thinning –0 acres o Regeneration harvest –1,088 acres • In HLB-UTA: o Selection harvest – 1,142 acres	• In HLB-LITA and MITA: o Commercial thinning –812 acres o Regeneration harvest –276 acres • In HLB-UTA: o Selection harvest – 1,142 acres	• In HLB-LITA and MITA: o Commercial thinning – 788 acres o Regeneration harvest – 276 acres • In HLB-UTA: o Selection harvest – 1,142 acres	• In HLB-LITA and MITA: o Commercial thinning –1,054 acres o Regeneration harvest – 0 acres • In HLB-UTA: o Selection harvest – 992 acres
	Yarding Method	• Ground-based –1,658 acres • Cable-ground – 19 acres • Cable – 90 acres • Helicopter- 472 acres	• Ground-based –1,658 acres • Cable-ground – 19 acres • Cable – 90 acres • Helicopter- 472 acres	• Ground-based –1,623 acres • Cable-ground – 16 acres • Cable – 75 acres • Helicopter- 501 acres	• Ground-based –1,572 acres • Cable-ground – 19 acres • Cable – 68 acres • Helicopter- 395 acres
	Reforestation	If needed, planting of tree species appropriate to the site, would occur in regeneration harvest treatment areas and in group selection openings of thinned and selection harvested stands as follows: • In HLB-LITA and MITA Treatment Areas - trees would be planted to achieve a stand-level average density of at least 130 trees per acre within five years of harvest. • In HLB-UTA (group selection openings) Treatment Areas - trees would be planted to achieve an average density across the openings of at least 150 trees per acre within five years of harvest.	• Same as Alternative 2.	• Same as Alternative 2.	• Same as Alternative 2.

* The acres and mileage reported in this table are based on Geographic Information System (GIS) data and are rounded up to the nearest acre or tenth of a mile; acres may differ from those reported in individual timber sale contracts/prospectuses due to differences in electronic mapping software versus data collected from GPS units. GIS calculates from horizontal distances and GPS accounts for slope distance. Total acres may vary slightly from other tables displayed throughout this document and the analysis file due to methods used for rounding data outputs. The acreage and distance rounding would not contribute to any differences in effects reported.

Table 4. Summary Comparison of Action Alternatives Harvest Support Activities

MANAGEMENT ACTION*		FOREST MANAGEMENT ACTION ALTERNATIVES			
		2	3	4	5
Access	New Road Construction	• Temporary road construction: 1.6 miles • Permanent road construction: 3.0 miles	• Temporary road construction: 1.6 miles • Permanent road construction: 3.0 miles	• No new roads, temporary or permanent.	• Temporary road construction: 1.6 miles • Permanent road construction: 2.5 miles
	Roadside Vegetation Management	• Brush and commercially harvest trees: 15.7 miles	• Brush and commercially harvest trees: 15.7 miles	• Brush and commercially harvest trees: 12.2 miles	• Brush and commercially harvest trees: 12.1 miles
	Landings & Yarding Wedges	• Existing landings: up to 47 acres • New landings in HLB-LITA, MITA, and UTA, RR-Dry, LSR-Dry, DDR-TPCC: up to 120 acres • New landings would be constructed up to 0.5- acre for cable and ground-based units, up to one acre in size for helicopter landings and up to three acres for service landings in size and located in stable areas (see Section 2.2.3 for more information). • Yarding wedges – 9 acres	• Existing landings: up to 47 acres • New landings in HLB-LITA, MITA, and UTA, RR-Dry, LSR-Dry, DDR-TPCC: up to 120 acres • New landings would be constructed up to 0.5- acre for cable and ground-based units, up to one acre in size for helicopter landings and up to three acres for service landings in size and located in stable areas (see Section 2.2.3 for more information). • Yarding wedges – 9 acres	• Existing landings: up to 50 acres • New landings in HLB-LITA, MITA and UTA, RR-Dry, LSR-Dry, DDR-TPCC: up to 97 acres • New landings would be constructed up to 0.5- acre for cable and ground-based units, up to one acre in size for helicopter landings and up to three acres for service landings in size and located in stable areas (see Section 2.2.3 for more information). • Yarding wedges – 9 acres	• Existing landings: up to 45 acres • New landings in HLB-LITA, MITA, and UTA, RR-Dry, LSR-Dry, DDR-TPCC: up to 115 acres • New landings would be constructed up to 0.5- acre for cable and ground-based units, up to one acre in size for helicopter landings and up to three acres for service landings in size and located in stable areas (see Section 2.2.3 for more information). • Yarding wedges – 9 acres
	Pre-designated Skid Trails	• 1.6 miles	• 1.6 miles	• 2.7 miles	• 1.3 miles
	Road Improvement	• 4.0 miles	• 4.0 miles	• 3.6 miles	• 3.3 miles
	Road Renovation	• 69.0 miles	• 69.0 miles	• 67.8 miles	• 67.9 miles
	Road Decommissioning	• 2.0	• 2.0	• 2.0	• 2.0
	Total Timber Haul	• 77.5 miles	• 77.5 miles	• 72 miles	• 75.2 miles
	Dry Season Haul	• 33.1 miles	• 33.1 miles	• 29.1 miles	• 32.2 miles
	Wet Season Haul	• 24.9 miles	• 24.9 miles	• 24.2 miles	• 24.5 miles
	Wet Season Haul (with added rock)	• 19.6 miles	• 19.6 miles	• 18.1 miles	• 18.7 miles

* The acres and mileage reported in this table are based on Geographic Information System (GIS) data and are **rounded up** to the nearest acre or tenth of a mile; acres may differ from those reported in individual timber sale contracts/prospectuses due to differences in electronic mapping software versus data collected from GPS units. GIS calculates from horizontal distances and GPS accounts for slope distance. Total acres may vary slightly from other tables displayed throughout this document and the analysis file due to methods used for rounding data outputs. The acreage and distance rounding would not contribute to any differences in effects reported.

2.9 Alternatives Considered but Not Analyzed in Detail

The BLM considered the alternatives below but did not analyze them in detail because they met one of the criteria listed below (See BLM NEPA Handbook H-1790-1 (2008), Section 6.6.3).

- It is ineffective (it would not respond to the purpose and need).
- It is technically or economically infeasible.
- It is inconsistent with the basic policy objectives for the management of the area (such as not in conformance with the RMP).
- Its implementation is remote or speculative.
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to an alternative that is analyzed.

Consider an Alternative Where all the Lands that can be Treated within the Planning Area are Proposed for Commercial Timber Harvest to the Maximum Extent Permissible within the Scope of Sustained Yield.

One aspect of this proposed alternative was not considered because it would not meet the purpose and need. This project does not contain a purpose and need to commercially treat stands in RR or LSR because a sustained-yield volume of timber can only come from the Harvest Land Base. Reserve allocations (RR and LSR) do not have objectives for sustained-yield timber production (BLM 2016b, p.6). The other aspect of this proposed alternative, to harvest to the maximum extent permissible within the scope of sustained yield, is substantially similar to Alternative 2 which is analyzed in detail.

Stands in Late-Successional Reserve.
Treating stands in LSR would not meet the purpose and need. The purpose of the proposed project is to conduct timber harvest in the HLB to contribute to the attainment of the ASQ for the Medford District's SYU. The BLM offers this sustained-yield volume of timber only from the Harvest Land Base, which has specific objectives for sustained-yield timber production (BLM 2016b, p.6). Harvesting in LSR stands would provide timber volume, identified as non-ASQ volume in the Proposed RMP/Final EIS, and would not count towards the ASQ volume (BLM 2016b, p.6).

Stands in Riparian Reserve.
Treating stands in RR would not meet the purpose and need. The purpose of the proposed project is to conduct timber harvest in the HLB to contribute to the attainment of the ASQ for the Medford District's SYU. The BLM offers this sustained-yield volume of timber only from the Harvest Land Base, which has specific objectives for sustained-yield timber production (BLM 2016b, p.6). Although harvest in the middle and outer zone of riparian reserves is allowed to attain certain management objectives-e.g., thinning to ensure stands are able to provide a long-term source of large wood for streams- any volume harvested in RR stands would be considered non-ASQ volume in the Proposed RMP/Final EIS, and would not count towards the ASQ volume (BLM 2016b, p.6).

Retain Mature Forests and all Large Diameter Trees (>20 inches DBH).
This alternative is not consistent with management direction for the HLB, nor would it respond to the purpose and need, and therefore was not analyzed in detail. In the 2016 PRMP/FEIS, to which this EA is tiered, an alternative that would only harvest small diameter trees as a one-time entry was considered but not analyzed in detail as it would not be a reasonable alternative because it would not meet the RMPs purpose and need to provide a sustained yield of timber (BLM 2016a, p. 103). Additionally, there is no management direction in the RMP that requires the retention of mature forests or trees >20 inches DBH. The RMP (p. 127) does not authorize additional restrictions on HLB timber harvest as proposed in this alternative because it states that "the BLM will not defer or forego timber harvest of stands in the HLB for reasons not described in the management direction and this appendix [Appendix A, Guidance for Use of the RMP]." For example, retaining all trees >20 inches DBH in LITA proposed for commercial thinning harvest would most likely result in post-harvest basal areas that exceed the maximum retention allowed in the management direction (25 percent or 45 percent after harvest stand basal area, depending on LUA) (BLM 2016c, p. 65). This suggested alternative to retain mature forests and all large diameter Trees (>20 inches DBH) is inconsistent with the basic policy objectives for the management of the area (i.e., the RMP); therefore, this alternative was not considered in detail.

Do Not Downgrade or Remove Suitable, or NSO Critical Habitat.
This alternative was partially included in Alternative 5 within nest patch and core-use nesting-roosting habitat acre sites not currently occupied but known to have been occupied by a territorial pair or resident single within the past 10 years. Having an alternative to not downgrade or remove suitable, or NSO critical habitat would not meet the purpose and need. The purpose of the proposed project is to conduct timber harvest in the HLB to contribute to the attainment of the ASQ for the Medford District's SYU. The BLM offers this sustained-yield volume of timber only from the Harvest Land Base, which has specific objectives for sustained-yield timber production (BLM 2016b, p.6). The alternatives are consistent with the RMP, owl recovery plan, and the designation of critical habitat for the northern spotted owl. The RMP (p. 127) states that "the BLM will not defer or forego timber harvest of stands in the HLB for reasons not described in the management direction and this appendix [Appendix A, Guidance for Use of the RMP]." There is no management direction in the RMP that prohibits the downgrade or removal of suitable or NSO critical habitat in the HLB. This suggested alternative to not downgrade or remove suitable or critical NSO habitat is inconsistent with the basic policy objectives for the management of the area (i.e., the RMP); therefore, this alternative was not considered in detail.

Reduce fuels and small trees in dense stands.
During public scoping, a commenter requested that the BLM thin a portion of stands that are dense and young and leave older stands unlogged. The BLM interpreted this comment to mean the Project should only conduct thinning treatments in young stands and no regeneration harvest. This alternative is not consistent with management direction for the HLB, nor would it respond to the purpose and need, and therefore was not analyzed in detail.

Reduce Road Density.
The BLM interpreted this comment to mean that there would be an alternative where the BLM would take actions to reduce road density within the Planning Area that are unrelated to timber harvest. This alternative was not considered in detail as it would not meet the purpose and need of the Project. The purpose of the proposed project is to conduct timber harvest in the HLB to contribute to the attainment of the ASQ for the Medford District's SYU. While this was not considered in detail, the BLM looked for opportunities to reduce road density, while still providing a transportation system that can support harvest that would produce timber to contribute towards the Medford District's ASQ.

Conserve, Create, and Restore Habitat for Migratory Birds and Bureau Sensitive Species.
This alternative by the public was not analyzed in detail because it would not respond to the purpose and need, and the Bureau Sensitive Species and Migratory Bird issues were considered but not analyzed in further detail because there is no potential for significant effects or significant effects beyond what was analyzed in the FEIS (pp. 825-852, 890-894) (see Wildlife Issues NAID #5 and NAID #7) This project does not contain a purpose and need to conserve, create, or restore migratory bird and/or Bureau sensitive species or their habitat. The purpose of the proposed project is to conduct timber harvest in the HLB to contribute to the attainment of the ASQ for the Medford District's SYU.

Chapter 3 Affected Environment & Environmental Consequences

This chapter describes the affected environment (existing conditions) and the direct and indirect environmental consequences (potential changes to those conditions) as a result of implementing the project alternatives discussed in Section 2, as they relate to the issue identified for detailed analysis. The BLM describes the methodologies and assumptions of the analysis, the Affected Environment, and then answers the question captured in the issue statement by describing the environmental consequence of the alternatives analyzed in detail, including the No Action Alternative. The cumulative effects of ongoing and reasonably foreseeable actions combined with the alternatives are also discussed in this chapter.

The reasonably foreseeable cumulative actions identified in this EA (see Section 3.2) would still apply to the analysis of the environmental effects of the No Action Alternative. In addition, the No Action Alternative does not suggest that the BLM would stop implementing the RMP. However, the No Action Alternative does not attempt to speculate exactly which actions the BLM would use in place of the actions this EA proposes, thus allowing the No Action Alternative to serve as a baseline to represent current (past and present) conditions and trends, and a reference point from which to compare the environmental effects of the action alternatives. Inclusion of this alternative is without regard to meeting the Purpose and Need identified in section 1.4.

3.1 Types of Effects

The BLM has considered the potential effects of the alternatives consistent with the CEQ implementing regulations (40 CFR 1500-1508) (CEQ 2020), as modified by the 2022 final Phase I changes (CEQ 2022).

3.2 Ongoing and Reasonably Foreseeable Actions

The list of ongoing and reasonably foreseeable actions below is an overview of land management actions that have occurred in the recent past, are ongoing, or are reasonably foreseeable within or adjacent to the South Clark Planning Area. Only those ongoing and future foreseeable actions that are potentially implemented in each issue being analyzed are included in the issue's effects analysis.

Integrated Vegetation Management for Resilient Lands (IVM-RL) - The Medford District in March 2022 issued a decision on a program of work for a range of integrated vegetation management activities, focused on fuels reduction, restoration, forest health, and threatened and endangered species recovery using a suite of non-commercial (such as mechanical treatment or prescribed fire) and commercial vegetation treatments. Activities may occur in all LUAs and would be consistent with the RMP. Acres of treatment may vary from year to year depending on funding availability. Nothing under the IVM-RL is proposed in the Planning Area at this time, and timing of actions potentially proposed under the IVM-RL would be speculative.

Future Harvest of the Same Units if the No Action Alternative is Chosen - If the No Action Alternative is selected or the Project is cancelled, the units selected for commercial treatment would be placed back into outyear planning as potential units for harvest. The units may be selected as part of the same treatment units as South Clark Project or be grouped with other units to create a new planning area. The analysis of the units as part of a future timber harvest may be as soon as five years.

Lost Lewis Forest Management Project (BLM) – Currently the Lost Lewis Forest Management Project is in the pre-planning stage and is primarily in adjacent sub-watersheds to the north of the South Clark Planning Area. Currently, the number of acres to be harvested is unknown, but BLM anticipates a total of two to four timber sales to occur in 2025. The project will likely consist of timber harvest in HLB, associated transportation management work, and follow-up activity fuels treatments.

Obenchain Reoffer (BLM) – The Butte Falls Field Office recently completed the Updated Obenchain Forest Management Project EA, of which the project area is located to the south, primarily outside of the South Clark Planning Area. There are 32 acres of Obenchain units within the South Clark Planning Area. The updated EA was completed in 2021, after the South Obenchain Fire burned 14,792 acres of BLM-administered lands, including 149 acres of timber sale units from the Obenchain project. The updated EA included timber sale harvest, salvage harvest, activity fuels treatments, and associated transportation management work. A Decision Record was signed in June of 2021 and authorized implementation of 290.5 acres of salvage harvest with follow-up activity fuels treatments, 22.4 miles of timber haul, and 0.85 miles of temporary route construction and subsequent decommissioning. It is anticipated that the BLM will offer for sale approximately 139 acres of the Obenchain project harvest units, associated timber haul, follow-up activity fuels, and road construction. Approximately 10 out of the 139 acres are within the South Clark Planning Area.

Timber Harvests on Private Lands - Throughout the checkerboard ownership within the BLM Medford District, the BLM assumes that late-seral forest stands on private land have been or will be converted to early-seral conditions and large industrial landowners will continue to manage those lands primarily for timber production on a 40-to-60-year basis (BLM 2016a, p. 173). The BLM assumes intensive timber management on private lands will include the use of herbicides to control competing vegetation, resulting in highly simplified vegetative communities. The BLM assumes that industrial harvesting will follow the Oregon Forest Practices Act and other such requirements. The actual timing of any timber harvest on private lands is dependent on many factors, including valuations based on supply/demand and ownership. Recent salvage operations on private lands have occurred since the South Obenchain Fire.

Fredenburg Recreation Project: The BLM has been collaborating with the town of Butte Falls to propose development of a non-motorized multi-use system of trails in the Fredenburg Butte area north of Butte Falls. The trail system includes up to 30 miles of mountain biking and hiking trails and provide a potential connection to the town of Butte

Falls recently acquired community forest lands. The project includes up to three trailhead parking areas in previously disturbed harvest landing areas and one parking area, and up to two campgrounds. The project is in the early planning stages and may change from what is currently being considered. The project would be built out in phases depending on funding and work priorities.

Town of Butte Falls Trail System: The town of Butte Falls recently acquired 430 acres of private timber lands surrounding the town. They are currently in a planning process to develop a recreation plan for the community forest. The town has expressed interest in developing a wide variety of recreational opportunities including, but not limited to non-motorized trails, day-use areas, camping, archery target range, a bike park, and educational opportunities.

Medford District Routine Road and Water Source Maintenance: There is ongoing maintenance on the district other than what has been proposed under this project of BLM-administered roads within the road right-of-way, including emergency maintenance and hazard tree removal as authorized under the Medford District Road and Pump Chance Routine Maintenance Categorical Exclusion and Decision Record (DOI-BLM-ORWA-M000-2022-0002-CX).

Medford District Invasive Plant Annual Treatment Plan (ATP): This work includes inventory of infestations, assessment of risk for spread, and application of control measures including the release of biological control agents, mowing, hand-pulling, and the use of approved herbicides as authorized under the Decision Record for the Integrated Invasive Plant Management for the Medford District Environmental Assessment (DOI-BLM-ORWA-M000-2017-0002-EA) on BLM-administered lands. Approximately 100 acres of known invasive plant infestations in the Planning Area are included in the 2023 Butte Falls Invasive Plant ATP. An additional 2000 acres along Project haul routes will be surveyed for targeted invasive plant infestations and treated as funding and staffing allows.

Summit Prairie Grazing Allotment- Approximately 37,136 acres (14,561 acres BLM) of the 91,216-acre (30,579 acres BLM; 60,637 acres private/other) Summit Prairie grazing allotment is within the Planning Area (T33S-R01E, T33S-R02E, T33S-R03E, T34S-R01E, T34S-R02E, T34SR03E, T35S-R02E, T35S-R03E). The season of use (across entire grazing allotment on BLM land) is 669 pair from 4/16-9/30.

Big Butte Grazing Allotment- Approximately 2,929 acres (1,236 acres BLM) of the 44,239-acre (21,802 acres BLM; 22,437 acres private/other) Big Butte grazing allotment is within the Planning Area (T34S-R01E, T34S-R02E, T34S-R03E, T35S-R01E, T35S-R03E). The season of use (across entire grazing allotment on BLM land) is 666 pair from 4/16-10/13.

Neil Tarbell Grazing Allotment- Approximately 547 acres (503 acres BLM) of the 562-acre (518 acres BLM; 44 acres private/other) Neil Tarbell grazing allotment is within the Planning Area (T34S-R01E). The season of use (across entire grazing allotment on BLM land) is 37 pair from 4/16-5/30.

Derby Road Sawmill Grazing Allotment- Approximately 100 acres (100 acres BLM) of the 524-acre (524 acres BLM; 0 acres private/other) Derby Road Sawmill grazing allotment is within the Planning Area (T34S-R01E). The season of use (across entire grazing allotment on BLM land) is 10 pair from 4/16-7/15.

Bear Mountain Grazing Allotment- Approximately 62 acres (20 acres BLM) of the 1,329-acre (1,006 acres BLM; 323 acres private/other) Bear Mountain grazing allotment is within the Planning Area (T34S-R01E). The season of use (across entire grazing allotment on BLM land) is 54 pair from 4/16-6/15.

Crowfoot Grazing Allotment- Approximately 715 acres (613 acres BLM) of the 9,365-acre (7,400 acres BLM; 1,965 acres private/other) Crowfoot grazing allotment is within the Planning Area (T34S-R01E). The season of use (across entire grazing allotment on BLM land) is 0 pair from 5/1-7/15.

Crowfoot Creek Grazing Allotment- All of the approximately 516 acre (516 acres BLM) Crowfoot Creek grazing allotment is within the Planning Area (T34S-R01E). The season of use (across entire grazing allotment on BLM land) is 28 pair from 4/16-6/30.

Cobleigh Road Grazing Allotment- All of the approximately 89-acre (89 acres BLM) Cobleigh Road grazing allotment is within the Planning Area (T34S-R02E). The season of use is 0 pair from 6/1-7/15.

Derby Station- All of the approximately 517-acre (517 acres BLM) Derby Station grazing allotment is within the Planning Area.

West Derby- Approximately 131 acres of the 1,127-acre West Derby grazing allotment is within the Planning Area.

BLM Fuels Treatments – Fuels treatments can include broadcast burns, underburns, and handpile and burn. Mechanical hazardous fuels treatments can include cutting, piling, lop and scatter, and mastication. These treatments have occurred previously, are ongoing, and would continue to occur in the Planning Area.

Wildfires – The perimeter of the 2020 South Obenchain fire partially overlaps the South Clark Planning Area. There are approximately 2,109 acres with the Planning Area that were also within the South Obenchain Fire perimeter. The fire burned approximately 32,671 acres, of which 14,792 acres were on BLM-administered lands.

Mining- There are currently no active mining claims in the South Clark Planning Area.

3.3 Issues Analyzed in Detail

Issue 1- What would the estimated volume of timber be from the HLB in this project? How would this timber volume contribute to the achievement of the declared ASQ for the Medford SYU in fiscal year 24?

Methodology

This analysis focuses on answering how well the alternatives meet the purpose and need for conducting timber harvest within the selected stands in the Harvest Land Base (HLB) to produce timber to contribute to the attainment of the declared ASQ for the Medford SYU for fiscal year (FY) 2024. The unit of measure used in this analysis is volume of timber in board feet. In the RMP, the BLM declared the annual ASQ for the Medford SYU to be 37 million board feet (MMbf) (RMP, pp. 5-6). Per the RMP, the BLM can offer for sale in each SYU as much as 40 percent variation on an annual basis[9], which equates to between 22 MMbf and 52 MMbf annually (RMP, p. 6). For the purposes of this analysis, the BLM used 37 MMbf, the midpoint value of the allowable annual ASQ range, to calculate the percentage of volume each alternative would contribute. The BLM also notes whether each alternative would produce timber volume within the allowable annual range.

Harvest levels are derived from recent survey data, including stand exams, which identify current stocking and volume levels. Stand stocking levels are variable in the proposed harvest units. Therefore, assumed harvest levels range from 18 thousand board feet (Mbf) per acre for some Regeneration Harvest prescriptions, down to five Mbf per acre for some lower volume harvest areas, such as thinning treatments that would retain higher relative density (RD).

Assumptions

Timber volumes analyzed are preliminary estimates and actual harvest volume may vary by a range of up to 30 percent. Median values are used to facilitate comparison of alternatives.
The BLM would plan to offer the timber analyzed in this EA in up to four separate timber sales in fiscal year 2024.

Other planned projects with proposed timber harvest in the Harvest Land Base for fiscal year 2024 in the Medford SYU include: the Ashland Salvage Project for the Ashland Field Office, and the Last Chance Project for the Grants Pass Field Office. The BLM estimates the projected volume from these other projects to be 14.2 MMbf or 38 percent of the total contribution to the Medford District's declared ASQ for FY 2024 (approximately 37 MMbf). These projected volume contributions would remain the same for all alternatives.

Measurement Indicators

The measurement indicator for evaluating this project's contribution to the declared ASQ for the stated fiscal years is the anticipated percent of the SYU's ASQ harvest volume expected to be produced during implementation of the South Clark Project. The estimated volumes are based on

[9] The RMP also requires the BLM to offer up to 30% of the declared ASQ over the entire decade (RMP, p. 6), which equates to between 260 MMbf and 480 MMbf per decade. Since this is beyond the temporal scope of this analysis, it is not discussed in this EA.

proposed harvest in the HLB. In this Project the BLM does not propose timber harvest in other land use allocations other than for yarding corridors, landings, and road maintenance; therefore, a limited amount of non-ASQ volume would result from this project. Since non-ASQ volume would not contribute to ASQ attainment, this volume is not considered in this analysis.

Affected Environment

The Butte Falls Field Office is one of three field offices on the Medford District that produces timber to contribute volume towards meeting the declared ASQ for the Medford SYU.

Environmental Effects

The table below shows the estimated volume of timber that would be harvested in the South Clark Project for each alternative, in million board feet (MMbf), the percent it would contribute to the declared ASQ for fiscal year 2024, as well as combined with other projects on the Medford SYU (cumulatively).

Table 5. Estimated timber volume available, representative percentage of ASQ, and percentage of ASQ when combined with other planned Medford SYU projects for each South Clark Alternative

Measurement Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Volume (MMbf)[10]	0	20.2	16.7	16.5	8.8
Percent of ASQ[11]	0%	55%	45%	45%	24%
Combined SYU Volume (MMbf)	14.2	34.4	30.9	30.7	23.0
Combined SYU Percent of ASQ[12]	38%	93%	83%	83%	62%

Alternative 1

Under Alternative 1, timber harvest would not be implemented at this time. This alternative would not provide timber to contribute volume to the SYU and therefore would not contribute ASQ for fiscal years during which sales are anticipated to be sold (currently expected to be FY 2024).

While the other planned timber sales on BLM-administered lands in the Medford SYU would contribute to the 2024 Medford District ASQ, they would not contribute to the need to conduct timber harvest within the South Clark Project to produce timber to contribute to the attainment of the declared ASQ for the Medford SYU. Without the volume contributed by the South Clark Project, the Medford District would not attain the target midpoint ASQ and would fall short of the allowable annual 40% ASQ variation with 14.2 MMbf total estimated ASQ attainment in FY 2024.

Due to the three-year lead time required to plan and analyze a new commercial timber harvest project and the full workloads for BLM staff assigned to outyear projects, the BLM would not meet the ASQ targets for the SYU for fiscal year 2024, for which the South Clark Project ASQ volumes were anticipated.

[10] Timber volumes analyzed are estimates and actual volumes may vary by a range of approximately 30% (see *Section 3.3, Assumptions*).
[11] Percentage of midpoint ASQ of 37 MMbf annually.
[12] Percentage of midpoint ASQ of 37 MMbf when combined with other projects on the Medford SYU.

Alternative 2

Direct and Indirect Effects

Alternative 2 would contribute approximately 20.2 MMbf of timber volume. At the scale of the SYU for fiscal year 2024, this Alternatives would contribute approximately 93 percent of the Medford SYU's ASQ requirement based on the mid-point of the annual variation range of the declared ASQ range.

Cumulative Effects

In 2024, assuming that the offered timber sales take place on the currently planned schedule, the BLM would implement timber sales from the South Clark Project and other planned projects in the Medford SYU, and these projects would all contribute to the cumulative ASQ volume.

The approximately 20.2 MMbf estimated to be produced in Alternative 2, combined with the approximately 14.2 MMbf from other planned projects in the Medford SYU, would contribute a total of approximately 34.4 MMbf, or 93 percent, of the cumulative annual target of 37 MMbf for the SYU.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 2, would be 93 percent attainment of the Medford SYU declared ASQ for fiscal year 2024, consistent with the 40 percent annual variation for ASQ in the RMP.

Alternative 3

Direct and Indirect Effects

Alternative 3 would contribute approximately 16.7 MMbf of timber volume. At the scale of the SYU for fiscal year 2024, this Alternative would contribute approximately 45 percent of the Medford SYU's ASQ requirement based on the mid-point of the annual variation of the declared ASQ range.

Cumulative Effects

In 2024, assuming that the offered timber sales take place on the currently planned schedule, the BLM would implement timber sales from the South Clark Project and other planned projects in the Medford SYU, and these projects would all contribute to the cumulative ASQ volume.

The approximately 16.7 MMbf estimated to be produced in Alternative 3, combined with the approximately 14.2 MMbf from other planned projects in the Medford SYU, would contribute a total of approximately 30.9 MMbf, or 83 percent, of the cumulative annual target of 37 MMbf for the SYU.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 3, would be 83 percent attainment of the Medford SYU declared ASQ for fiscal year 2024, consistent with the 40 percent annual variation for ASQ in the RMP.

Alternative 4

Direct and Indirect Effects

Alternative 4 would contribute approximately 16.5 MMbf of timber volume. At the scale of the

SYU for fiscal year 2024, this Alternative would contribute approximately 45 percent of the Medford SYU's ASQ requirement based on the mid-point of the annual variation range of the declared ASQ range.

Cumulative Effects

In 2024, assuming that the offered timber sales take place on the currently planned schedule, the BLM would implement timber sales from the South Clark Project and other planned projects in the Medford SYU, and these projects would all contribute to the cumulative ASQ volume.

The approximately 16.5 MMbf estimated to be produced in Alternative 4, combined with the approximately 14.2 MMbf from other planned projects in the Medford SYU, would contribute a total of approximately 30.7 MMbf, or 83 percent, of the cumulative annual target of 37 MMbf for the SYU.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 4, would be 83 percent attainment of the Medford SYU declared ASQ for fiscal year 2024, consistent with the 40 percent annual variation for ASQ in the RMP.

Alternative 5

Direct and Indirect Effects

Alternative 5 would contribute approximately 8.8 MMbf of timber volume. At the scale of the SYU for fiscal year 2024, this Alternative would contribute approximately 24 percent of the Medford SYU's ASQ requirement based on the mid-point of the annual variation range of the declared ASQ range.

Cumulative Effects

In 2024, assuming that the offered timber sales take place on the currently planned schedule, the BLM would implement timber sales from the South Clark Project and other planned projects in the Medford SYU, and these projects would all contribute to the cumulative ASQ volume.

The approximately 8.8 MMbf estimated to be produced in Alternative 5, combined with the approximately 14.2 MMbf from other planned projects in the Medford SYU, would contribute a total of approximately 23.0 MMbf, or 62 percent, of the cumulative annual target of 37 MMbf for the SYU.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 5, would be 62 percent attainment of the Medford SYU declared ASQ for fiscal year 2024, consistent with the 40 percent annual variation for ASQ in the RMP.

Chapter 4 Consultation and Coordination

4.1 Endangered Species Act (ESA) Consultation

ESA Wildlife

There are three federally listed wildlife species under the ESA either known to occur (NSO and gray wolf) within the South Clark Forest Management Planning Area or their range overlaps the Planning Area (Franklin's bumble bee). The Butte Falls Field Office has determined the proposed actions in the EA may affect these species and has completed or is completing consultation for these three species. The Butte Falls Field Office has initiated consultation with the USFWS for the South Clark Forest Management project for NSOs and Franklin's bumble bee and met with the Level 1 consultation team on May 9, 2023, for a field trip to proposed treatment sites to provide an overview of the project and discuss potential effects from the proposed actions. Consultation with the USFWS for NSOs and Franklin's bumble bee will be completed before the first Decision Record is signed for the South Clark Forest Management Project. Consultation for the gray wolf on the Medford District was completed in 2020 and is covered in the Biological Assessment and Letter of Concurrence for Medford Bureau of Land Management and Rogue River-Siskiyou National Forest activities affecting the Gray Wolf (USDA Forest Service /USDI BLM 2016 and USDI FWS 2017, and amendment).

ESA Fish

The South Clark Forest Management Project is within the range of the federally listed Southern Oregon Northern California Coast Coho (SONCC) Salmon. The anticipated effects of the South Clark Forest Management Project are within those consulted on with the National Marine Fisheries Service (NMFS) in the Programmatic Biological Assessment/Opinion for the BLM's Forest Management Program for Western Oregon (WCR 2017-7574). Notification of this Project was initiated on Month Day Year[13], with the submittal of the required pre-project notification form that was developed under the Programmatic Forest Management Biological Opinion (BO). A verification letter confirming that the proposed actions are consistent with the effects analysis and conclusions of the NMFS BO was received on Month Day Year.

ESA Plant

The South Clark Forest Management Project is within the range of one threatened and endangered plant, the federally endangered Gentner's fritillary (*Fritillaria gentneri*). Suitable habitat for this species includes oak woodlands, chaparral shrublands, meadows, mixed hardwood-conifer woodlands, and the transition zones between these plant communities. The Biological Assessment (BLM 2020) and associated Letter of Concurrence from the USFWS (USDI USFWS 2014, #01EOFW00-2021-I-0017) prescribe measures, called Project Design Criteria, to ensure management actions would not be likely to adversely affect populations or habitat. One of the project design criteria for Gentner's fritillary for large-scale forest

[13] Dates for initiation and concurrence with NMFS will be updated before final release of EA.

management projects is to conduct two years of surveys if the project is within the range of the species, contains suitable habitat, and the action would negatively impact the population. Required surveys were completed between 2013 and 2021. There are thirty Gentner's fritillary sites in the project boundary, five in project activity areas and three within 100' of project activities. Sites in and within 100' of project activities will be protected and project disturbances will be revegetated with native species to prevent indirect impacts, according to PDC's prescribed in the 2020 Biological Assessment. The BLM and USFWS concurred that the actions proposed under all action alternatives are "not likely to adversely affect" federally listed threatened and endangered (T&E) plants because all relevant PDC's would be implemented (BLM 2020).

4.2 Tribal Consultation

On November 15, 2022, the BLM sent letters and emails to the Confederated Tribes of the Siletz Indians, the Confederated Tribes of Grand Ronde, and the Cow Creek Band of Umpqua Tribe of Indians. The letters and emails notified the Tribes of the South Clark Project and invited them to provide input or formally consult with the BLM. The Tribes did not request consultation.

4.3 State Historic Preservation Office

Consultation with the State Historic Preservation Office (SHPO) was not needed as the BLM determined that the project would have no effect on historic properties. See Appendix 1, Cultural Issue NAID #1 PDF numbers 9 and 10 for a description of how the BLM will avoid impacts to historic properties.

4.4 List of Preparers

The following BLM employees participated in the development and/or review of the content contained in these documents:

Name	Expertise
Steve Goodson	Forestry
Jon Lamb	Silviculture
Kyle Drennen	Layout Forester
Jennifer Sigler	Archeology
Alan Mason	Fire/Fuels
Jena Volpe	Fire Ecologist
Matt Bonsi	Engineer
Grant Martin	Engineer
John Mcneel	Engineer
Amy Meredith	Soils
Sasha Joachims	Botany (T&E, Rare)
Thomas Hender	Botany (Invasive)
Michael Webber	Hydrology
Rose Hanrahan	Fish

Name	Expertise
Dave Roelofs	Wildlife
Nicholas McDaniel	Recreation, VRM
Jason Tarrant	Range
Steve Haney	GIS, Maps
Shawn Thornton	GIS, Maps
Kim Thompson	Planning/NEPA
Adam Raymond	Planning/NEPA

Appendix 1 Issues Considered but Not Analyzed in Detail (NAID)

Cultural Issue NAID #1: How would proposed Project activities, through ground disturbance or other physical impacts, affect cultural resources such as archaeological and historical sites, artifacts, and features?

This issue was considered but not analyzed in further detail as it was determined that the proposed project activities would not affect any historic properties. Impacts to National Register of Historic Places (NRHP) listed or eligible/unevaluated archaeological sites would be avoided by the establishment of buffers within which no project activities would take place (see Appendix 3, PDF No. 9). If any archaeological sites are inadvertently discovered during project implementation, the BLM would suspend activities and follow an established protocol (see Appendix 3, PDF No. 10).

The Project archaeologist conducted archival research, a site files search, and field survey to identify cultural resources located in the planning area, with the results detailed in a cultural resource inventory report. The report documents all precontact and historic archaeological sites and isolated finds identified in the planning area and provides an assessment of their NRHP eligibility. Non-eligible archaeological sites and isolated finds do not require further consideration. Project activities are designed to avoid eligible and unevaluated archaeological sites.

Cultural Issue NAID #2: How would the Project affect sites of traditional cultural or religious significance to tribes, such as from ground-disturbing activities or by altering accessibility or use?

This issue was considered but not analyzed in further detail because no sites of traditional cultural or religious significance to tribes were identified in the Planning Area and therefore there is no potential for significant effects. If any sites are identified during Project implementation, the BLM would suspend activities and follow an established protocol (see Appendix 3, PDF No. 10) to protect the site.

In November 2022, the BLM initiated tribal consultation to identify places of traditional cultural or religious significance to tribes who take interest in the planning area. This consultation did not result in the identification of any sites of concern to tribes that would be impacted by Project activities.

Botany Issue NAID #1: How would soil disturbance, decreases in woody vegetation cover, and fuel treatments affect the introduction and spread of non-native invasive plants and noxious weeds?

Background

Invasive plants are nonnative plants with the potential to cause ecological damage or economic losses. Noxious weeds are a subset of invasive plants designated by a county, state, or federal

agency as injurious to public health, agriculture, recreation, wildlife, or property. In this assessment, the term "invasive plants" includes noxious weeds.

The BLM botanist used botany survey reports and invasive plant infestation data in the BLM's Vegetation Management Action Portal (VMAP) to characterize and evaluate invasive plant infestations within the Planning Area. The VMAP dataset represents the known distribution and abundance of priority noxious weeds on the Medford District (Map 2), but it does not include most other invasive plants species. The BLM botanist gathered information about unmapped invasive plant occurrences from vascular plant survey reports completed from 2003 to 2023. The BLM has documented 79 naturalized and invasive nonnative plant species on 783 sites, totaling an estimated 226 net infested acres in the Planning Area (Table 6). Over 90 percent of these infestations are smaller than 0.1 acre and 25 infestations are one-acre or larger. Most infested acres occur within 50 feet of a road.

The BLM botanist categorized the potential ecological impacts of invasive plants species occurring in the Planning Area based on the Oregon Department of Agriculture's Noxious Weed Policy and Classification System (ODA 2023), California Invasive Plant Inventory Database ratings (Cal-IPC 2023), and professional experience, resulting in three ratings:

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes result in moderate to high rates of dispersal and establishment.

Moderate: These species have observable, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. They have moderate to high rates of dispersal, but their establishment generally follows disturbance events. Their distribution and ability to colonize a variety of habitats ranges from limited to widespread.

Limited: These species are invasive, but their ecological impacts are minor and/or transitory. They have low to moderate rates of invasiveness and tend to be only locally persistent, often as a result of recurring disturbance. Their distribution and ability to colonize a variety of habitats is limited.

Map 2. Distribution of Managed Invasive Plants within the South Clark Forest Management Area

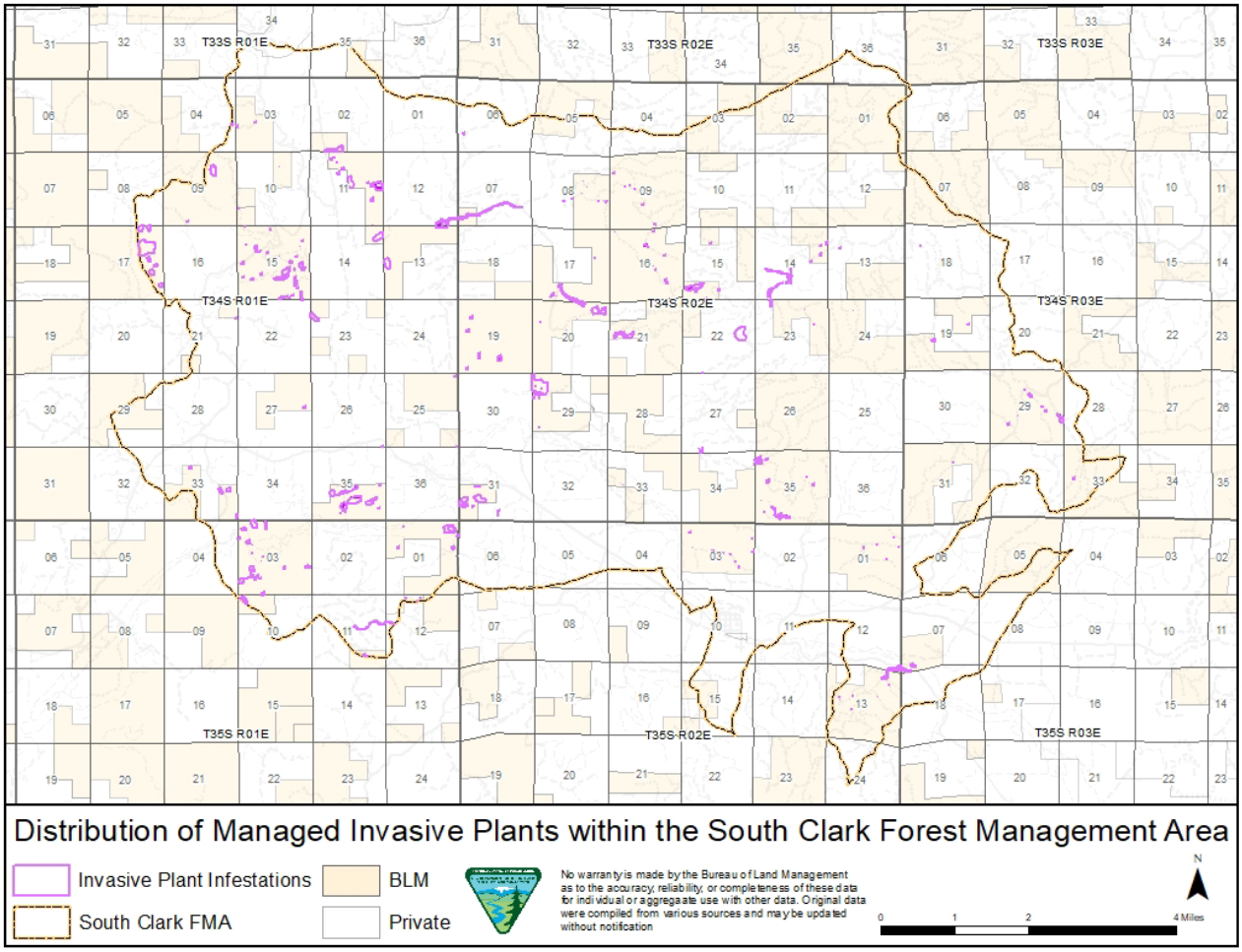


Table 6. Naturalized and invasive nonnative plants in the Planning Area

Species Name	ODA Status	Rating	Sum	Estimated Net Acres	Predominant habitats in the project area
Agrostis capillaris	-	limited	17	1.7	Open, disturbed areas often at low elevations
Aira caryophyllea	-	limited	21	2.1	Shallow disturbed soils, roadsides, talus, rock outcrops
Anthriscus caucalis	-	limited	2	0.2	Widespread in woodlands, riparian areas, roadsides
Arabidopsis thaliana	-	limited	1	0.1	Disturbed areas, particularly near cities and towns
Arrhenatherum elatius	-	limited	1	0.1	Meadows and pastures
Avena fatua	-	limited	2	0.2	Widespread in disturbed grasslands, roadsides
Bromus diandrus	-	moderate	6	0.6	Disturbed and mostly dry grasslands, rangeland, roadsides
Bromus hordeaceus	-	limited	18	1.8	Disturbed and mostly dry grasslands, rangeland, roadsides

Species Name	ODA Status	Rating	Sum	Estimated Net Acres	Predominant habitats in the project area
Bromus japonicus	-	limited	2	0.2	Disturbed and mostly dry grasslands, rangeland, roadsides
Bromus sterilis	-	limited	8	0.8	Roadsides and waste places
Bromus tectorum	-	moderate	20	2	Disturbed grasslands, rangeland, chaparral, roadsides
Centaurea solstitialis	B	high	2	0.2	Woodlands, fields, pastures, roadsides
Centaurea stoebe ssp. *micranthos*	B	high	1	0.1	Forest openings, meadows, fields, roadsides, wastelots, and open areas
Centaurium erythraea	-	limited	1	0.1	meadows, prairies, and wasteland
Cerastium fontanum ssp. *vulgare*	-	limited	11	1.1	Disturbed areas, yards, wet meadows, open woods
Cerastium glomeratum	-	limited	13	1.3	Widespread in disturbed sites and open habitats, including serpentine substrates
Cichorium intybus	-	limited	7	0.7	Roadsides, cultivated sites, disturbed openings, river bars and floodplains
Circium arvense	B	high	1	0.1	Disturbed areas, cultivated fields, pastures, forest openings
Circium vulgare	B	moderate	25	2.5	Widespread in roadsides, meadows, riparian areas, burned areas, other disturbed openings
Crepis capillaris	-	limited	1	0.1	Widespread in roadsides, disturbed openings
Cynoglossum officinale	B	high	4	0.4	Roadsides, fields, meadows, forest edge, ditches, and other disturbed open areas
Cynosurus echinatus	-	moderate	38	3.8	Open woodlands, forest edges, roadsides
Cytisus scoparius	-	moderate	3	0.3	Roadsides, disturbed sites, pastures, and forest and woodland edges
Dactylis glomerata	-	limited	7	0.7	Pastures, meadows, woodlands, roadsides
Daucus carota	-	moderate	3	0.3	Widespread in disturbed soil, cultivated ground, meadows, open woodlands
Dianthus armeria	-	limited	6	0.6	Roadsides, fields, forest edge, wastelots, and other disturbed areas
Dipsacus fullonum	-	moderate	5	0.7	Widespread in roadsides, ditches, pastures, cultivated fields, and other open habitats
Draba verna	-	limited	21	2.1	Disturbed areas, roadsides, pastures, lawns, fields, grassy hillsides
Erodium cicutarium	-	limited	15	1.5	Roadsides, meadows, woodlands, forest openings, disturbed open habitats
Galium parisiense	-	limited	2	0.2	Disturbed open riparian areas, woodlands, cultivated sites
Geranium dissectum	-	limited	8	0.8	Disturbed open riparian areas, woodlands, cultivated sites
Geranium molle	-	limited	11	1.1	Disturbed open riparian areas, woodlands, cultivated sites
Holcus lanatus	-	limited	12	1.2	Moist disturbed sites, roadsides
Holosteum umbellatum	-	limited	2	0.2	Disturbed, open areas, roadsides, fields, wastelots, and other disturbed areas
Hypericum perforatum	B	moderate	34	3.4	Widespread in roadsides, rangeland, floodplains, disturbed openings

Species Name	ODA Status	Rating	Sum	Estimated Net Acres	Predominant habitats in the project area
Hypochaeris glabra	-	limited	4	0.4	Roadsides, rocky balds, meadows, wastelots, and other disturbed open areas
Hypochaeris radicata	-	limited	24	2.4	Widespread in roadsides, cultivated sites, disturbed openings
Lactuca serriola	-	limited	9	0.9	Grasslands, open hillsides, roadsides, disturbed areas
Lathyrus latifolius	B	moderate	4	0.6	Widespread in roadsides, woodlands, forest openings, disturbed open habitats
Leucanthemum vulgare	-	moderate	25	2.5	Widespread in roadsides, meadows, river bars
Linum perenne	-	limited	1	0.1	Disturbed areas, roadsides, pastures, gardens
Matricaria discoidea	-	limited	2	0.2	Roadsides, river floodplains, meadows, waste places, disturbed areas
Myosotis discolor	-	limited	17	1.7	Widespread in oak woodlands, rocky openings, thin soils
Phalaris arundinacea	-	limited	2	0.2	Stream banks, meadows, fields, roadsides, irrigation ditches, disturbed open places
Phleum pratense	-	limited	1	0.1	Old fields, pastures, rangelands, and disturbed sites
Plantago lanceolata	-	limited	15	1.5	Widespread in roadsides, pastures, cultivated fields, and other open habitats
Plantago major	-	limited	2	0.2	Roadsides, fields and other disturbed, open areas
Poa bulbosa	-	moderate	23	2.3	Disturbed grasslands, chaparral, roadsides
Poa compressa	-	limited	2	0.2	Roadsides, moist or mesic meadows, disturbed areas, pavement cracks
Poa pratensis	-	limited	13	1.3	Disturbed and often moist meadows, roadsides, riparian areas
Potentilla recta	B	high	1	0.1	Roadsides, fields, trails, and disturbed ground
Ranunculus muricatus	-	limited	1	0.1	Ditches and other moist places, often on cultivated land
Ranunculus repens	-	limited	16	1.6	Road ditches, irrigation ditches, riparian areas, wet meadows
Rosa canina	-	limited	2	0.2	Roadsides, thickets, forest edge, and other disturbed areas
Rosa rubiginosa (R. eglanteria)	-	limited	20	2	Roadsides, thickets, shorelines, pastures, and other disturbed, open areas
Rubus bifrons (R. armeniacus)	B	high	23	45.13	Widespread in riparian areas, drainage ditches, forest openings, roadsides
Rubus laciniatus	-	limited	4	0.4	Roadsides, riparian areas, forest openings
Rumex acetosella	-	limited	16	1.6	Widespread in disturbed open sites
Rumex crispus	-	limited	10	1	Widespread in disturbed open sites
Sanguisorba minor	-	moderate	2	0.2	Roadsides, fields and disturbed, open areas
Schedonorus arundinaceus	-	limited	7	0.7	Grasslands, meadows, pastures, roadsides
Scleranthus annuus	-	limited	18	1.8	Disturbed soils, waste lots, cultivated areas

Species Name	ODA Status	Rating	Sum	Estimated Net Acres	Predominant habitats in the project area
Senecio sylvaticus	-	limited	1	0.1	Disturbed areas, pastures, roadsides
Sonchus asper	-	limited	1	0.1	Open woods, meadows, hillsides, dunes, streambanks, disturbed sites
Sonchus oleraceus	-	limited	1	0.1	Hillsides, roadsides, streambanks, fields, disturbed areas
Taeniatherum caput-medusae	B	high	19	13.3	Roadsides, meadows, rangeland, chaparral, open woodlands
Taraxacum officinale	-	limited	29	2.9	Widespread in disturbed soils, cultivated sites, meadows, riparian areas, openings
Thinopyrum intermedium	-	limited	1	0.1	Open areas
Torilis arvensis	-	moderate	29	2.9	Widespread in woodlands, riparian areas, roadsides
Tragapogon dubius	-	limited	17	1.7	Widespread in disturbed soils, cultivated sites, rangeland, forest openings
Trifolium dubium	-	limited	19	1.9	Widespread in roadsides, ditches, pastures, cultivated fields, and other open habitats
Trifolium pratense	-	limited	8	0.8	Widespread in roadsides, ditches, pastures, cultivated fields, and other open habitats
Trifolium repens	-	limited	8	0.8	Fields, lawns, roadsides, waste places
Valerianella locusta	-	limited	8	0.8	Moist, open places, often in disturbed soil
Ventenata dubia	B	moderate	3	0.3	Roadsides, meadows, rangeland, chaparral
Verbascum blattaria	-	limited	3	0.3	Widespread in disturbed open sites
Verbascum thapsus	-	moderate	21	2.1	Widespread in disturbed open sites
Vicia sativa	-	moderate	8	0.8	Roadsides, woodlands, forest openings, disturbed open habitats
Vulpia myuros	-	limited	12	1.2	Disturbed and well-drained soils

Assuming no major changes in the typical types and extent of natural disturbances in the Planning Area, the BLM assumed that under the No Action Alternative of the FEIS for Vegetation Treatments using herbicides on BLM Lands in Oregon, invasive plants would continue to spread on average, at 12 percent annually (BLM 2010b, pp. 135-137). Invasive plants can spread over great distances by wind, water, animals, and humans through vehicle and foot traffic. A majority of spread would occur along roadsides, riparian areas, grasslands, and open woodlands.

Proposed Actions in Alternatives 2, 3, 4, and 5 would disturb vegetation and soil in ways that would stimulate existing invasive plant seed banks, reduce barriers to invasive seed dispersal, and improve site conditions for invasive plant establishment and growth. The rate of invasive plant spread for some species would exceed the average baseline rate. Areas that would be particularly vulnerable to weed invasions would include newly disturbed soil, such as in skid trails, landings, newly constructed roads and routes, decommissioned roads, and burn pile scars. The susceptibility of these sites to invasive species would further increase where soil disturbance would be accompanied by reduction in woody vegetation cover. Invasive plants would invade these disturbed areas by seeds transported by vehicles, equipment, or individuals during management actions; by the public or landowners using roads and lands within the Planning

Area; or by animals, wind, or water. Where soil disturbances would be more severe or extensive, invasive plant infestations could persist and become sources for further invasive plant spread.

However, BLM botanists would evaluate and monitor infestations and disturbed areas to determine when and where to take management action. The Medford District currently uses an integrated approach to manage invasive plants in ways that minimize adverse effects to ecological function and economic values. For each infestation, the BLM botanist would establish an action threshold and monitor to determine if the threshold has been reached or exceeded. Action thresholds are the levels of ecological or economic damage permitted before treatments are needed, and these thresholds differ across sites, projects, and species. For example, for most invasive plant species, the action threshold would be different along a disturbed roadside than it would be next to a population of a Special Status species known to be intolerant of the invasive plant. For a given site, some aggressive invasive plant species may reach the threshold very quickly, while for other species the threshold may rarely be reached at any site. Species with "high" effects ratings would be prioritized for treatment over species with "limited" effects ratings. Species only strongly associated with roadsides or not capable of persisting in forests or woodlands would not be prioritized because their ecological effects would be minor or transitory (less than three years).

The BLM botanist would select invasive plant control methods that would be most effective for the target species and appropriate for the infested site, including the presence of sensitive or high-value resources. Selection of treatment methods is guided by Department of the Interior policy which states, "Bureaus will accomplish pest management through cost-effective means that pose the least risk to humans, natural and cultural resources, and the environment" and requires Bureaus to "establish site management objectives and then choose the lowest risk, most effective approach that is feasible for each pest management project" (BLM 2007). Control methods considered for the Planning Area would include manual (such as pulling and grubbing), mechanical (string trimmers and mowers), and herbicide spot treatments (with backpack or utility terrain vehicle sprayers). This combination of control treatments available for use in the Planning Area is estimated to be, on average, 80 percent effective at controlling invasive weed infestations with the initial treatment.

To improve long-term success and reduce the chance of secondary invasion (the colonization of a second invasive plant species after treatment of the primary infestation), control treatments would often be coupled with competitive seeding and application of weed-free mulch. The objective of competitive seeding would be to provide a desirable native vegetative component to compete with invasive plants in treatment areas. When revegetating disturbed sites in the Planning Area, the BLM botanist would select locally adapted native grass and forbs seeds that are genetically appropriate for each revegetation site, thereby increasing the probability of successful and persistent native plant establishment that is resistant to invasive plants.

Rationale

This issue was considered but was not analyzed in further detail because with the implementation of PDFs and invasive plant control treatments and monitoring before and after Project implementation there is not a measurable difference between Alternatives 2 through 5 to invasive plant spread through the Planning Area. Because this project is in a watershed categorized in the PRMP/FEIS as having an abundant relative density of invasive plant species (2016a, pp. 419-

437) and the proposed acres of timber harvest are within the acres analyzed in the FEIS, there is also no potential risk for the introduction of invasive species beyond that analyzed in the FEIS, to which this analysis tiers. PDFs, such as seeding disturbed areas with native species and mulching with weed-free straw, would aid the establishment of desirable vegetation that would then compete with invasive plants. An integrated invasive plant management approach would include annual monitoring and evaluation of existing and new infestations to determine the appropriate management response.

The BLM considered this issue, but did not analyze it in detail, because there are no potential significant impacts beyond those analyzed in the PRMP/FEIS. In the FEIS, the BLM analyzed the effects of management actions on the introduction and spread of invasive plant species in terms of susceptibility and risk. The FEIS analysis found that there would be a moderate overall risk of introduction and spread of invasive plant species and that discussion is incorporated here (BLM 2016a, pp. 419-437). Further, no new information has been brought forward that would change the FEIS analysis. There is an abundance of naturalized and invasive nonnative plants occurring within 100 feet of project activities and project haul routes (Table 7). Invasive annual grasses, including medusahead rye, cheatgrass, and bristly dog tail grass are common in meadows and along roads in forest openings. St. John's wort, ox-eye daisy, hairy cat's-ear, and garden burnet are naturalized plants frequently found along roads and pullouts. Many species, including bull thistle, teasel, and Himalayan blackberry are more common in riparian areas. The selection of any Action Alternative would result in a short-term pulse in invasive plant abundance following project implementation but, within approximately five years, new infestations would be outcompeted by native woody vegetation or be controlled by BLM. Eight invasive plant species, bull thistle, Canada thistle, houndstongue, meadow knapweed, perennial pea, scotch broom, sulphur cinquefoil, and yellow starthistle are limited (occupying less than one cumulative acre) near project activities under these alternatives. These species are rated high for potential ecological effects and have the ability to persist in some of the Planning Area's habitat types; however, because the BLM currently has effective treatment methods available for these invasive species, new infestations would be controlled before they have a chance to become well-established and cause adverse effects.

Table 7. Abundance and proposed management approach for mapped priority invasive plant infestations affected by Alternatives 2-5

Species	Alternative 2		Alternative 3		Alternative 4		Alternative 5		Management Approach	
	Net Acres	# of Sites	Net Acres	# of Sites	Net Acres	# of Sites	Net Acres	# of Sites	Pre-project	Post-project (3 years)
Forest Management										
Bull thistle	0.3	12	0.3	12	0.3	12	0.3	12	Spot spray, hand pull	Monitor, treat as needed
Canada thistle	0.1	1	0.1	1	0.1	1	0.1	1	Spot spray	Monitor, treat as needed
Houndstonge	1.8	12	1.8	12	1.8	12	1.8	12	Spot spray, hand pull	Monitor, treat as needed
Meadow knapweed	0.1	1	0.1	1	0.1	1	0.1	1	Spot spray	Monitor, treat as needed
Yellow starthistle	22.0	11	22.0	11	22.0	11	22.0	11	Spot spray, hand pull	Monitor, treat as needed

Perennial pea	0.1	1	0.1	1	1.0	1	0.1	1	Spot spray, hand pull	Monitor, treat as needed
Scotch broom	0.3	3	0.3	3	0.3	3	0.3	3	Spot spray, hand pull	Monitor, treat as needed
Subtotal	*24.7*	*41*	*24.7*	*41*	*25.6*	*41*	*25*	*41*		
Haul Route Renovation and Reconstruction										
Bull thistle	0.3	13	0.3	13	0.3	13	0.3	13	Spot spray, hand pull	Monitor, treat as needed
Houndstongue	5.2	7	5.2	7	5.1	6	5.2	7	Spot spray, hand pull	Monitor, treat as needed
Meadow knapweed	0.2	1	0.2	1	0.2	1	0.2	1	Spot spray	Monitor, treat as needed
Perennial pea	0.2	7	0.2	7	0.2	7	0.2	7	Spot spray, hand pull	Monitor, treat as needed
Sulphur cinquefoil	0.5	5	0.5	5	0.5	5	0.5	5	Spot spray, hand pull	Monitor, treat as needed
Yellow starthistle	2.5	2	2.5	2	2.3	2	2.5	2	Spot spray, hand pull	Monitor, treat as needed
Subtotal	*25.4*	*35*	*25.4*	*35*	*25.1*	*34*	*25*	*35*		
Temporary Route and New Road Construction										
Bull thistle	0.1	4	0.1	4	N/A	N/A	0.1	4	Spot spray, hand pull	Monitor, treat as needed
Houndstongue	0.2	2	0.2	2	N/A	N/A	0.2	2	Spot spray, hand pull	Monitor, treat as needed
Subtotal	*0.3*	*6*	*0.3*	*6*	*0*	*0*	*0*	*6*		

Botany Issue NAID #2: How would ground disturbance, decreases in woody vegetation cover from timber harvest, fuels reduction treatments and related activities affect the persistence of federally listed and Bureau Sensitive plants and fungi in the Project Planning Area?

Background

Activities such as timber harvest, fuels reduction, and associated activities have the potential to affect federally Threatened & Endangered (T&E) and Bureau Sensitive vascular plants, lichens, bryophytes and fungi. These affects can be directly through the loss of sites and habitat or indirectly due to changes in microsite conditions related to canopy cover, ground cover, compaction, other elements, soil erosion, or increased competition from non-native vegetation, if not conducted with protective measures.

The BLM completed botanical surveys and reviewed BLM Geographic Biotic Observation (GeoBOB) and ORBIC (Oregon Biodiversity Information Center) occurrence data for federally T&E and Bureau Sensitive vascular plants, lichens, bryophytes and fungi in the Planning Area (GeoBOB 2023, ORBIC 2023). All surveys were completed by professional botanists between 2013 and 2023 following requirements and protocols for federally listed T&E and Bureau Sensitive vascular and nonvascular plants, where ground-disturbing actions are proposed in the South Clark Project.

Fungi primarily grow underground as mycelial networks with conifers, hardwoods and/or decaying wood and do not produce sporocarps (fruiting bodies) every year and are usually only

present for a limited time. As such, fungi species are impractical to survey (Cushman et al. 2020, pp. 14-15) and surveys for them are not required under the RMP. However, any Bureau Sensitive fungi located during surveys for vascular and nonvascular Bureau Special Status species are documented (BLM 2016a, pp. 518-519) A portion of the suitable habitat for sensitive fungi within the Planning Area was surveyed from 2013-2015 when equivalent-effort fungi surveys were required for Survey and Manage species.

Mature multi-layered canopy, and structurally complex stands supply habitat for most of the rare fungi on the Bureau Sensitive list, which describe the stands in less than six percent of the units proposed for treatment. The BLM would protect all known sites and any sites discovered incidentally during other Special Status plant surveys. Surveys for other projects within the Planning Area have documented Bureau Sensitive fungi. There are two known sites of *Sarcodon fuscoindicus* in Project activity areas. Because less than six percent of the units proposed for treatment contain suitable habitat for any Bureau Sensitive fungi species, the low occurrence of Bureau Sensitive fungi sites in the range of the Planning Area, and the 'no treatment buffer' that will protect the *Sarcodon fuscoindicus* sites from direct or indirect effects from project activities, there is a low probability of any Bureau Sensitive fungi occurring where activities are proposed or any Bureau Sensitive fungi species declining due to Project activities.

Botany surveyors documented one federally listed species, *Fritillaria gentneri*, and eleven Bureau Sensitive vascular, fungi, and lichen species within the Planning Area boundary. *Fritillaria gentneri* and four Bureau sensitive species have sites in or within one hundred feet of proposed Project activities. Eight sites of *Fritillaria gentneri*, three sites of *Cypripedium fasciculatum*, seven sites of *Ranunculus austrooreganus*), six sites *of Arabis modesta*), four sites of *Limnanthes floccosa ssp. bellingeriana,* and two sites of the Bureau Sensitive fungi *Sarcodon fuscoindicus*, were documented in or within 100 feet of Project units or other Project related disturbances (Table 8). The other known Federally Endangered and Bureau Sensitive species sites in the Planning Area boundary are greater than one hundred feet from proposed Project activities.

The thirty Federally Endangered and Bureau Sensitive plant sites (Table 8) in and within one hundred feet of units or project activities would not be impacted by project activities because they would be marked with 25-foot to 100-foot diameter no-treatment buffers to ensure they are not damaged by project or unexpected incidental activities. Buffer widths were prescribed based on the affected species' biology, habitat needs, population size, rarity, and management recommendations or requirements in applicable USFWS consultation requirements or other conservation documents. Re-vegetating disturbed areas with native species would reduce soil erosion and suitable conditions for invasive species to become established, further reducing potential impacts to Bureau Sensitive and T&E plant sites and suitable habitat.

Table 8. Special Status Plant Buffers in the Planning Area

Species	Common Name	Buffer Width (diameter in feet)	Number of Potentially Affected Sites (total; # in units; # w/in 100' of activities)	Number of Sites on District, % of total potentially affected (within 100' of project activities)
Arabis modesta	Rogue Canyon Rockcress	25 ft	6; 3; 3	65; 9.23%
Cypripedium fasciculatum	Clustered Lady's Slipper	100 ft, but treat fuels in buffer during dormant season if cover >60%, no piles in buffer	3; 2; 1	1387; 0 .22%
Fritillaria gentneri	Gentner's Fritillary	Varies 25-100 ft	8; 5; 3	363; 2.2%
Limnanthes floccosa ssp. bellingeriana	Woolly Meadowfoam	25 ft, but treat fuels in buffer during dormant season if cover >60%, no piles in buffer	4; 1; 3	227; 1.76%
Ranunculus austrooreganus	Southern Oregon Buttercup	25 ft but treat fuels in buffer during dormant season if cover >60%, no piles in buffer	7; 4; 3	165; 4.24%
Sarcodon fuscoindicus	Violet Hedgehog	100 ft	2; 2; 0	13; 15.38%

Rationale

This issue was considered but not analyzed in further detail because with the completion of required surveys and the protection of known sites under all action alternatives (see Appendix 3, Table 23, PDF #8), there is no potential for significant direct or indirect impacts to Bureau Sensitive plants or fungi, or federally listed T&E species.

Revegetating disturbed areas with native species removes potential indirect impacts to T&E species, Bureau Sensitive plants and fungi from soil erosion and competition from invasive plants (PDF #3). The BLM determined that the actions proposed under all action alternatives are "not likely to adversely affect" T&E plants or their critical habitat because they are not in or near any areas proposed for treatment or other activities and damaged areas would be revegetated with native species to prevent indirect impacts.

The FEIS, to which this analysis tiers, concluded that conducting surveys and applying conservation measures would be sufficient to protect sites from direct and indirect impacts and would ensure T&E and Bureau Sensitive plant and fungi species would persist in the Planning Area, prevent species from needing further protection under the ESA, prevent adding cumulative effects to these species during implementation of the project, and would not have additional

effects beyond those analyzed in the FEIS (BLM 2016a, pp. 517-543). That discussion is incorporated here by reference.

Soil Issue NAID #1: How would proposed timber harvest and associated activities, and fuels reduction treatments affect soil quality (compaction, displacement, burning, and change in organic matter and soil chemistry) in the Treatment Areas?

Background

For this review, the BLM evaluated the potential effects to soil quality based on acres of detrimental soil disturbance, which is consistent with the analytical methods used in the FEIS, to which this EA tiers (BLM 2016a, p. 745). Detrimental soil disturbance is defined as the limit where the naturally occurring soil properties change to a reduced state and the inherent soil capacity to sustain growth of desired vegetation is reduced (BLM 2016b, p. 303).

Detrimental soil disturbance can occur from erosion, loss of organic matter, severe heating to seeds or microbes, soil displacement, or compaction (BLM 2016b, p. 109). For this review, the BLM used the Forest Service Soil Disturbance monitoring protocol (USDA GTR WO-82b) to measure detrimental soil disturbance.

In the FEIS, the BLM incorporated an assumption of 10 percent growth loss in the vegetation modeling of future stand growth over the length of the next rotation in stands with 20 percent detrimental soil disturbance levels (BLM 2016a, p. 752). Management direction in the RMP limits the increase of detrimental soil disturbance to 20 percent of any given harvest unit and includes all types of disturbances, including those resulting from treatments as well as new road and landing areas (BLM 2016b, p. 109; BLM 2016a, p. 752).

Proposed treatments that have the potential to affect soil quality in harvest units are timber harvest (ground-based and skyline-cable yarding), road and landing construction (temporary), and machine pile burning and underburning (a.k.a. broadcast burning) (BLM 2016a, pp. 746, 752, 756). Other proposed road construction (permanent) and fuels reduction treatment activities would impact soil quality outside of the harvest units and are evaluated separately.

The BLM assumes that hand pile burning, landing pile burning, and lop-and-scatter methods of fuels reduction treatments would not result in measurable detrimental soil disturbance because the small hand piles would not likely reach adverse temperatures, the landing piles would be burned on areas already detrimentally disturbed (landings), and lop-and-scatter would occur through low or no-impact manual labor, consistent with the assumptions in the FEIS (BLM 2016a, pp. 756-757). Therefore, these actions are not considered further.

Full decommissioning is proposed on eight segments of road. Full decommissioning would involve mechanical decompaction of the road bed. This footprint of decompaction may recover functionally and support vegetative growth in the future after decompaction and subsequent natural soil forming processes occur. If full decommissioning is not possible due to reasons listed in Chapter 2, decommissioning may occur and those roads would remain compacted. Therefore, there would be no change in soil productivity on those road beds.

To evaluate the potential effects to soil quality, the BLM calculated the current amount of detrimental soil disturbance in treatment areas by using available Geographic Information System (GIS) information and field verification. Then estimated the amount of detrimental soil disturbance that would occur from the proposed treatments. The BLM added the current and anticipated amount of detrimental soil disturbance to assess whether the 20 percent threshold would be exceeded in the ground-based harvest units (Meredith 2023).

For this evaluation, the BLM assumed that:

- Existing roads are 45 feet wide, consistent with the assumption made in the FEIS for the RMP (BLM 2016a, pp. 752-753). These roads were removed from the harvest unit area for detrimental soil calculations because these areas have been permanently taken out of production and no longer function as forest soils.
- Existing footprints from past forest management and other activities visible in the LiDAR hillshade layer, Topographic Position Index layer and/or slope layer have detrimental soil disturbance. Skid trails are assumed to be on average 12 feet wide.
- Temporary roads will be assumed to be 14 feet wide.
- Landings are a maximum of 0.5, 1 or 3 acres depending on the logging system needs (see Table 4). Landing locations and area are determined through using the shapefile of proposed landings. The overall acreage would be the same as assumed in Table 4 of Chapter 2.
- Newly constructed permanent roads would be 45 feet wide, and in locations where the road corridor is within Harvest Land Base, the LUA would be changed to DDR (BLM 2016b, p. 54).
- Existing footprints (skid trails, landings, and other non-road footprints) are assumed to be detrimentally disturbed. If they are not currently detrimentally disturbed, it is assumed that they would be after use during the proposed management activities.
- Skyline-cable yarding would result in 12 percent detrimental soil conditions in the treated stand, and ground-based yarding systems would result in 35 percent detrimental soil conditions in the treated stand (BLM 2016a, p. 746). These percent disturbances are based on what the impacts would be if there were no BMPs applied. The BMPs are in place to meet the management direction of 20 percent detrimental soil disturbance level.
- For this project, the BLM incorporated numerous BMPs from the RMP as PDFs to reduce impacts to soil quality within the treatment areas (see Appendix 3, PDFs #27-40, 43-45, 49-52, 58-60, 68-72).

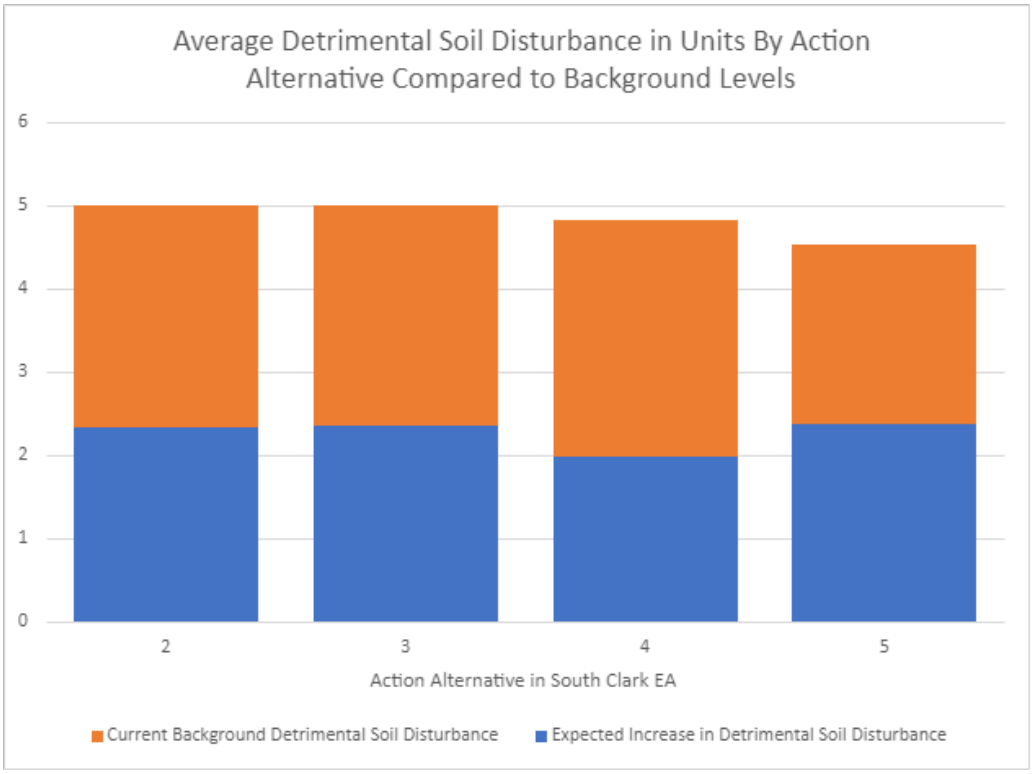
Rationale

This issue was considered but not analyzed in further detail because the BLM would apply BMPs and site-specific PDFs that would reduce the acreage of detrimental soil disturbance from timber harvest, road construction, and fuels treatments to below the required 20 percent detrimental soil disturbance level. Therefore, soil quality impacts from this Project would be within the levels anticipated and accounted for in the FEIS (BLM 2016a, pp. 745-765). The BLM incorporated an assumption of 10 percent growth loss in the vegetation modeling of future stand growth over the length of the next rotation in stands with 20 percent detrimental soil disturbance levels (BLM 2016a, p. 752). This is in line with the Soil Management Direction to limit detrimental soil disturbance from forest management operations to a total of < 20 percent of the harvest unit area. Where the combined detrimental soil disturbance from implementation of

current forest management operations and detrimental soil disturbance from past management operations exceeds 20 percent of the unit area, apply mitigation or amelioration to reduce the total detrimental soil disturbance to < 20 percent of the harvest unit area (BLM 2016b, p. 109, BLM 2016a, p. 752). In past project implementation, the required PDFs have been successful in limiting the acreage of detrimental soil disturbance and improving the quality of soils that have had detrimental disturbance where amelioration activities occur.

There is less than three percent existing detrimental soil disturbance in this Planning Area. For that reason, the total acreage of all proposed ground-based and cable/ground-based units was used to determine the known amount of detrimental soil disturbance in the units.

Figure 1. Average Percent Anticipated Detrimental Soil Disturbance Compared to Background Levels



The amount of existing disturbance, as well as the amount of anticipated disturbance was compiled by using GIS data and based on the assumptions stated above. For each harvest unit, existing skid trails (and other footprints that were not roads) and proposed new landings, temporary routes, and pre-designated skid trails were identified and accounted for in the percentage of detrimental disturbance.

Currently, an average of approximately 2.6 percent (Alternative 2 and 3), 2.8 percent (Alternative 4), and 2.15 percent (Alternative 5) of the area within the proposed units have detrimental soil disturbance. With the proposed activities in Alternatives 2 and 3, the percentage would increase to 5.01 percent (with a range of 0-19.0 percent), Alternative 4 would increase to 4.8 percent (with a range of 0-19.7 percent), and Alternative 5 would increase to 4.53 percent (with a range of 0-19.7 percent) (Figure 8). New skids trails that have not been pre-designated

and skyline corridors and helicopter yarding soil disturbances are not included in the calculation. Refer to the discussion about incorporation of PDFs for designated skid trails and yarding corridors below. All ground-based units and actions planned were included in the average detrimental soil disturbance calculations.

Alternative 2 and 3 vary from Alternative 4 due to no new road construction proposed in Alternative 4. No new road construction leads to the need for larger landings and the need for more pre-designated skid trails in the harvest unit area in Alternative 4. Alternative 5 has less (4.53%) total expected detrimental soil disturbance than the other action alternatives due to less percent existing detrimental disturbance in the proposed units in Alternative 5 than the other action alternatives (Meredith 2022). Soil remediation of temporary roads would occur and would help the soils in these areas recover and support trees. In past project implementation, removing rock, loosening the compacted sub-grade, replenishing some of the organic matter, and implementing erosion-control measures have successfully established trees and protected the soil environment (BLM 2016a, p.754).The length of time it would take to restore the soil in these footprints would vary; therefore, for this project, these activities were included in the percent of detrimentally disturbed soil, even though the impacts would be temporary in some cases.

In timber harvest units, where new skid trails and yarding corridors would be created, the BLM would require the use of existing footprints where feasible and limit designated skid trails to less than 15 percent of the harvest unit area (PDF # 28); limiting the width of skid trails (PDF #29); and restricting ground-based yarding and soil decompaction operations when soil moisture exceeds 25 percent (PDF# 30). Per PDF # 36, the BLM would limit non-specialized ground-based equipment to slopes generally less than 35 percent. Where it is necessary to exceed these gradients (over short distances) to access adjacent tractor areas, ridge tops or existing footprints would be used where possible.

Specialized ground-based equipment would operate on stable slopes between 35 percent and 50 percent (see Section 2.2.2 and PDF #36). Equipment may be allowed on slopes over 50 percent if there is an existing skid trail, adequate slash mat, or for short distances to access more gentle ground. The BLM would approve project design based on equipment capabilities and would monitor activities and discontinue any harvest activities if the degree of soil disturbance and/or area of detrimental soil disturbance indicates the detrimental soil disturbance threshold would be crossed.

Machine piles of harvest slash would be located on existing footprints to the greatest extent possible, minimizing the area of soil heating on undisturbed soil. Also, machinery would stay on existing footprints (i.e., previously used skid trails per PDF #82) (see also Section 2.2.4). Therefore, there would be minimal to no increase in detrimental disturbance from this activity.

Overall, for Alternatives 2, 3, and 4, the soils within harvest units from proposed timber harvest, temporary road and landing construction, pre-designated skid trails, in addition to the existing disturbance, would result on average between 4.5 to 5 percent detrimental disturbance. If new skid trails were up to the maximum threshold of 15 percent, the maximum amount of total detrimental soil disturbance would be between 19.5 percent to 20.1 percent depending on the alternative. Due to how close this threshold is, machines will need to use existing footprints. If

skid trails do not exceed 15 percent of the area (including when on existing footprints, then the 20 percent threshold is expected to be met.

Underburning the activity fuels in proposed units would be proposed in units with five to seven tons of fuel per acre. Underburning expected to result in low to moderate severity burning due to the fuels loads and time of year. This severity of burn results minimal damage from soil heating, Nitrogen loss, exposed mineral soil and erosion potential, or root and soil microbial mortality (Busse et.al 2014, p. 103). Localized detrimental disturbance may occur where and if a large wood debris is consumed and allowed to smolder for long periods of time. Large wood varies across the units and depending on fuel moistures, may not be consumed. The overall amount of detrimental disturbance in the treatment unit would be low and would not exceed the 20 percent disturbance threshold (BLM 2016a, p. 757).

Approximately 2.99 miles (Alternatives 2 and 3) or 2.50 miles (Alternative 5) of permanent roads are proposed to be constructed. No new roads are proposed under Alternative 4. Where permanent roads are constructed, these areas would be re-allocated from their current land use allocation to DDR-TPCC (Road) (up to 31.56 acres in Alternatives 2 and 3, 20.58 in Alternative 5, and no acres in Alternative 4). The BLM acknowledged in the RMP (BLM 2016b, p. 51), "the BLM will add additional areas to this allocation [DDR-TPCC] …. when examinations indicate that an area meets the criteria for reservation." As noted on page 54 of the RMP (BLM 2016b), road corridors and quarries are designated as DDR. Therefore, new permanent roads would not be counted toward detrimental disturbance. These areas would be a permanent loss of soil productivity. In the FEIS, the BLM analyzed for up to 97 miles of permanent road construction within the first decade in the Medford District (BLM 2016a, p. 791). There has been approximately 17.23 miles of permanent road constructed or planned to be constructed under timber sale contracts awarded from 2016 to present on the Medford District. This Project, combined with recent timber sales projects, would result in up to 20.22 miles of new permanent roads constructed from projects planned under the RMP. This equates to up to approximately 21 percent of the permanent road construction anticipated in the first 10 years of the FEIS (BLM 2016a, p. 791).

In summary, current levels of detrimental soil disturbance, planned temporary infrastructure, and PDFs to be implemented on this Project ensure that the allowable 20 percent threshold for detrimental soil disturbance would not be exceeded in the units and analysis beyond what is contained in the FEIS is not needed.

A reasonably foreseeable action that has the potential to impact soil productivity in some Treatment Areas in the Fredenburg road area (34S-2E-26, 27, 34 and 35 and 35S-2E-3) are the proposed Fredenburg Recreation Project (trail system) proposed actions (section 3.2 Ongoing and Reasonably Foreseeable Actions). This trail system will go through proposed roads. Where possible, trails would be located on existing footprints. Parking areas would be located on proposed South Clark Project landings. If it is determined that a trail would result in the soils of a timber unit being over the 20 percent soil disturbance threshold, modifications to the trail system would need to be made.

Soil Issue NAID #2: What would be the impact of proposed timber harvest and yarding, fuels reduction treatments, and road/route/landing construction, renovation, reconstruction, and decommissioning on fragile soils classified under the TPCC?

Background

For this review the BLM included the whole Planning Area (see Section 1.2) for the geographic scope. There are soils weathered from pyroclastic parent material throughout the Planning Area. These parent materials weather to clays that shrink and swell with changes in soil moisture, which can result in soil movement in wet conditions. The Medford Timber Production Capability Classification inventory identifies these clay areas on BLM as Fragile for Mass Movement (FP). Further classification determines whether these areas would be appropriate for harvest land-based activities with the addition of project design features or BMPs (this is classified as FR-P, Fragile for Mass Movement-Restricted) versus non-suitable for harvest-land based activities and then moved into a DDR land use allocation (this is classified as Fragile for Mass Movement - Non-Suitable Woodland (FN-P)). Management direction from the RMP for DDR is "manage areas identified as unsuitable for sustained-yield timber production through the Timber Production Capability Classification system, for other uses if those uses are compatible with the reason for which the BLM has reserved these lands (as identified by the Timber Production Capability Classification codes (BLM 1988; BLM 2016b, pp. 55-56). The reason for classifying FN-P is that the site is too fragile to have a sustainable timber harvest, therefore would not be included in timber harvest units.

In the Soils Management portion of the RMP, the relevant management objective to "provide landscapes that stay within natural soil stability failure rates during and after management activities" and the direction to "avoid road construction and timber harvest on unstable slopes where there is a high probability to cause a shallow, rapidly moving landslide that would likely damage infrastructure (e.g., BLM or privately owned roads, State highways, or residences) or threaten public safety (BLM 2016b, pp. 109-110). These would be achieved through using the TPCC information, Oregon Department of Geology and Mineral Industries (DOGAMI) (rock type and SLIDO data), LIDAR hillshade and slope information, and field review to inform decisions about which locations are stable for timber harvest.

In the Project Area there are locations with steep slopes (over 60 percent) and surface ravel potential. Timber harvest on these slopes could result in soils that are difficult to reestablish/reforest due to the potential for soil loss, subsequent off-site erosion and surface ravel covering seedlings. Due to these risks, these areas are classified as Fragile Gradient soils (FG). Similar to the FP soils, these may be categorized as suitable for timber harvest with operational restraints (FR-G) or non-suitable (FN-G) for timber harvest and removed from the Harvest Land Base.

During review of the proposed timber harvest areas in this Project, the BLM identified unstable or steep slopes greater than five acres that are unsuitable for timber harvest that should be converted to FN-P or FN-G (non-harvest land base). The BLM identified approximately 283 acres total for conversion to FN-P or FN-G. These acres would not be treated in the Project, and the BLM is in the process of reviewing and removing these acres from the HLB and updating its TPCC and geographic information systems accordingly. In addition, the BLM identified unstable slopes or steep, gravelly slopes that are unsuitable for timber harvest that occupy less

than five acres. These areas would be buffered/skipped from the units. Some of the soils with minimal slope stability indicators, that would not conflict with the management direction, would be harvested with modifications. Potential modifications include: the exact placement of road (i.e., move to a ridge instead of mid-slope), equipment exclusion zones, or changing to a less ground disturbing logging system (i.e., ground-based changed to skyline or helicopter).

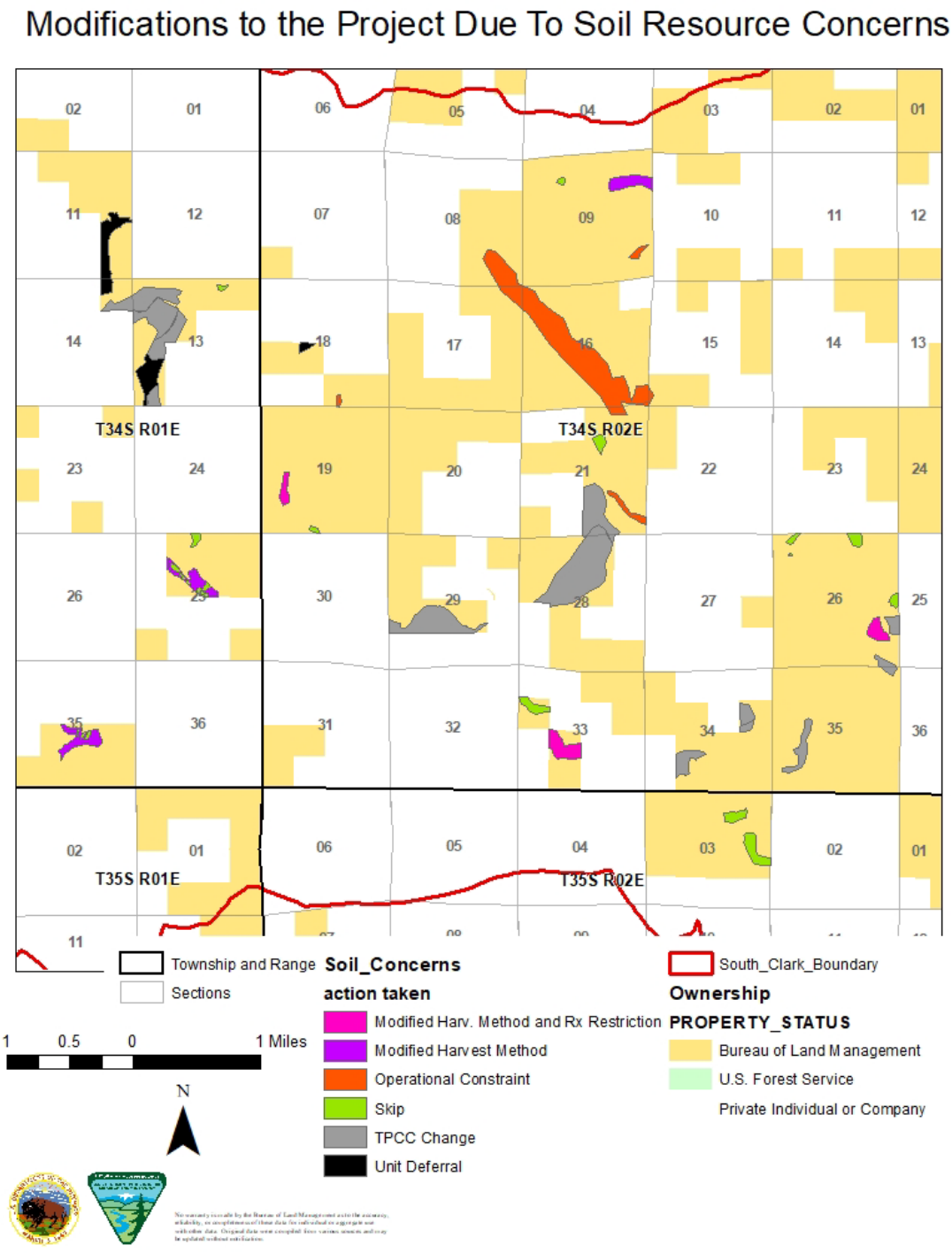
Rationale

The BLM did not analyze this issue in detail due to BMPs, PDFs, and avoidance of unstable and steep gradient areas. During project planning, acres were dropped and proposed to have a land use allocation change (see next page, *Map 3. Modifications to Address Soil Stability Concerns*). These are HLB units that were determined to not be suitable for commercial timber harvest due to unstable slopes and are in the process of being removed from the HLB.

Within the proposed units, the BLM made additional design changes to address soil stability issues. These design changes involve logging system change from more ground disturbing to less ground disturbing, equipment exclusion areas, buffers, skips, prescription changes and proposed road location adjustments. If additional slope stability locations are found during project implementation, they will be either buffered, dropped, or have an appropriate design change to meet the management direction of the RMP. Therefore, the BLM would meet the Soils Management Direction as well as the DDR-TPCC Management Direction.

This issue was considered but not analyzed in further detail because the design of the timber sale, through the use of helicopter, cable yarding, and temporary road placement, avoids or greatly reduces the potential for impacts to soils classified as fragile due to concerns with slope stability. PDFs in Appendix 3 also ensure slope stability issues associated with FP and FG soils will not have an effect beyond what was analyzed in the FEIS and will follow management direction for soils. The BLM followed the management direction for DRR-TPCC soils in the RMP to "designate additional lands as District-Designated Reserve – Timber Production Capability Classification through updates to the Timber Production Capability Classification system and remove those lands from the Harvest Land Base when examinations indicate that those lands meet the criteria for reservation" (BLM 2016b, pp. 55-56). The BLM also followed the Management Direction for Soils Resources to avoid road construction and timber harvest on unstable slopes where there is a high probability to cause a shallow, rapidly moving landslide that would likely damage infrastructure or threaten public safety (BLM 2016b, pp. 109-110). For these reasons, the Project would meet the required management direction for DDR-TPCC.

Map 3. Modifications to Address Soil Stability Concerns



Background for Hydrology Issues NAID #1 through NAID #3

Hydrologic Analysis Area

The Hydrologic Analysis Area is comprised of 34 drainages which contain all areas where any project elements are proposed, including haul. All drainages within this area drain to the NW and flow into the Rogue River via Big Butte Creek. The Hydrologic Analysis Area matches the boundaries of these drainages and is displayed in Map 4.

The Hydrologic Analysis Area is contained entirely within the Big Butte Creek Watershed. Mild, wet winters and hot, dry summers characterize the area. During the winter months, the moist, westerly flow of air from the Pacific Ocean results in frequent storms of varied intensities. Average annual precipitation ranges from approximately 35 inches at the mouth of Big Butte Creek to approximately 80 inches on the upper slopes of Mount McLoughlin. Streamflows in the Big Butte Watershed fluctuate with seasonal variation of precipitation. Moderate to high flows occur from mid-November through May. Streamflows during the months of April and May and part of June are augmented by melting snowpack in the high elevations. Low flows for Big Butte Creek coincide with the period of low precipitation from July through September or October (BLM 2008a). Low flows for Big Butte Creek coincide with the period of low precipitation from July through September or October (BLM 2008a).

Map 4. South Clark Hydrologic Analysis Area. Labeled drainages correspond with the drainages in Table 9

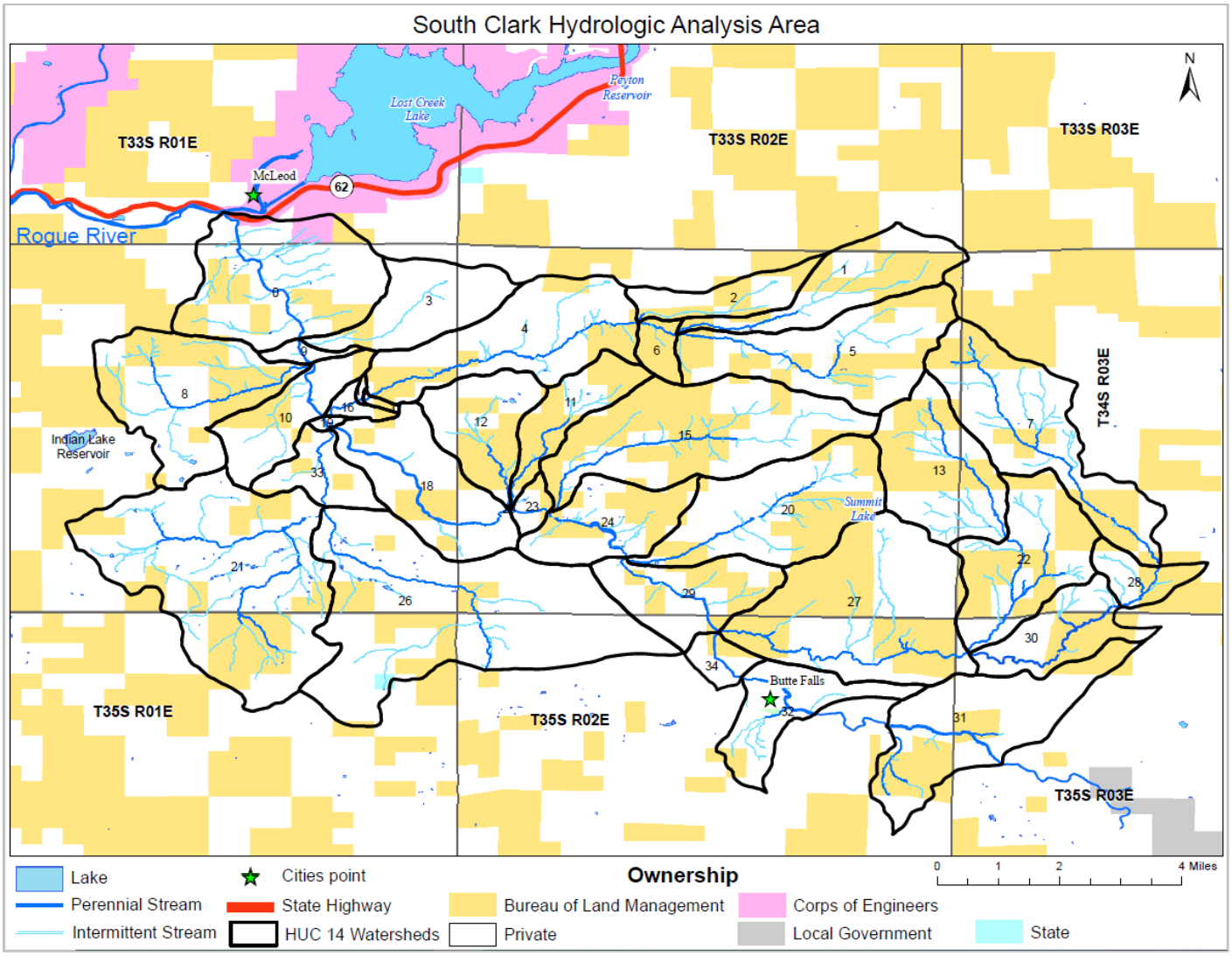


Table 9. 14-digit Hydrologic Units and Corresponding Land Ownership Acres Within the Hydrologic Analysis Area

Drainage (numbered by watershed in Map 4)	**BLM**	**Private**	**Corps of Engineers**	**State Lands**	**US Forest Service**	**Total**
0. Big Butte Creek below Vine Creek, above Rogue River confluence	707	1,830	184	0	0	2,721
1. Clark Creek above S. Fork Clark Creek	734	724	0	0	0	1,457
2. North Fork Clark Creek	366	374	0	0	0	740
3. Vine Creek	83	1,234	0	0	0	1,317
4. Clark Creek below N. Fork Clark Creek, above irrigation diversion "A"	624	1,730	0	0	0	2,354
5. S. Fork Clark Creek	956	1,462	0	0	0	2,418
6. Clark Creek below S. Fork Clark Creek, above N. Fork Clark Creek confluence	290	0	0	0	0	290
7. Jackass Creek	959	1,565	0	0	0	2,524
8. Crowfoot Creek	1,062	1,280	0	0	0	2,342
9. Big Butte Creek below Crowfoot Creek, above Vine Creek	6	153	0	0	0	159
10. Big Butte Creek below Clark Creek, above Crowfoot Creek	292	784	0	0	0	1,076
11. Gray Creek	660	218	0	0	0	878
12. Unnamed Big Butte Creek tributary in 34S-2E-30	555	680	0	0	0	1,235
13. Upper Eighty Acre Creek including unnamed tributary in 34S-3E-30 SW1/4 SE1/4)	824	1,042	0	0	0	1,866
14. Clark Creek below irrigation diversion "B", above irrigation diversion "C"	5	21	0	0	0	26
15. Dog Creek	1,619	1,509	0	0	0	3,128
16. Clark Creek below irrigation diversion "C", above Big Butte Creek confluence	29	128	0	0	0	157
17. Clark Creek below irrigation diversion "A", above irrigation diversion "B"	23	18	0	0	0	41

Drainage (numbered by watershed in Map 4)	**BLM**	**Private**	**Corps of Engineers**	**State Lands**	**US Forest Service**	**Total**
18. Big Butte Creek below Unnamed tributary 17100307040624 in 34S-2E-30 SW1/4 NE1/4, above McNeil Creek	376	1,469	0	0	0	1,845
19. Big Butte Creek below McNeil Creek, above Clark Creek	0	49	0	0	0	49
20. Box Creek	964	1,454	0	0	0	2,418
21. Neil Creek	1,356	3,408	0	0	0	4,764
22. Lower Eighty Acre Creek (below Unnamed tributary in 34S-3E-30 SW1/4 SE1/4, above North Fork Big Butte Creek)	924	995	0	0	0	1,919
23. Big Butte Creek below Dog Creek, above Gray Creek	70	131	0	0	0	201
24. Big Butte Creek below Box Creek, above Dog Creek	576	728	0	0	0	1,304
25. Big Butte Creek below Gray Creek, above Unnamed tributary 17100307040624 in 34S-2E-30	0	1.1	0	0	0	1.1
26. Middle McNeil Creek (below Unnamed tributary in 35S-2E-6 SE1/4 SW1/4, above Neil Cr.)	714	4,447	0	33	0	5,194
27. N. Fork Big Butte Creek below Eighty Acre Creek, above S. Fork Big Butte Creek	1,800	1,758	0	0	0	3,558
28. N. Fork Big Butte Creek below Jackass Cr., above Friese Cr.	248	238	0	0	0	486
29. Big Butte Creek below North/South Forks Big Butte Cr. confluence, above Box Cr.	488	857	0	0	0	1,345
30. N. Fork Big Butte Creek below Friese Creek, above Eighty Acre Creek	431	669	0	0	0	1,100
31. S. Fork Big Butte Creek below Bowen Creek, above Doubleday Creek	836	1,525	0	0	0	2,361

Drainage (numbered by watershed in Map 4)	**BLM**	**Private**	**Corps of Engineers**	**State Lands**	**US Forest Service**	**Total**
32. S. Fork Big Butte Creek below Ginger Cr., above Hukill Cr.	82	1,053	0	0	9	1,144
33. Lower McNeil Creek (below Neil Creek, above Big Butte Creek confluence)	127	576	0	0	0	703
34. S. Fork Big Butte Creek below Hukill Creek, above N. Fork Big Butte Creek	89	234	0	0	0	323

Table 9 provides the acres by drainage, and ownership status in those drainages. The total area of the Hydrologic Analysis Area is 53,444 acres (83.5 square miles). Of this area, 35.3 percent are BLM-owned lands (18,875 acres). The drainages that make up the Hydrologic Analysis Area range in size from 1.1 to 5,194 acres. The drainage boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream, or similar surface water. Analysis at the drainage-level scale is broad enough to assess the cumulative effect of actions that, taken individually (site scale) would not be impactful, but when combined with effects from other activities occurring within the drainages, would have a potential impact. As the size of the analysis area increases, there is an increasing possibility of potential effects becoming undetectable at the broader scale. The boundaries of analysis for each issue were performed at the smallest scale possible depending on the best available science and amount of information available. Hydrology Issue NAID #1 was analyzed at the sub-watershed scale in order to best coincide with previous analysis performed in the FEIS (BLM 2016a) and other relevant scientific papers. Hydrology Issues NAID #2 and #3 were analyzed at the drainage level scale that matches the boundaries of the Hydrologic Analysis Area seen above in Map 4.

Hydrology Issue NAID #1: How would the proposed Project activities (including reduction in canopy cover from timber harvest and openings created by the construction of new roads and landings) effect water quantity (i.e., the risk of peak flow and low flow events) within Project Area sub-watersheds?

Background

Water quantity in the Hydrologic Analysis Area is a function of natural and human-caused factors. Natural site factors include climate, geology, and geographic location. Natural processes that have influenced water quantity include floods, wildfires, and drought. Past human activities that have altered water quantity in the Analysis Area include land clearing (for agricultural and residential use), timber harvest, road construction, water withdrawals, and fire suppression.

A considerable reduction in vegetation canopy below historic levels has the potential to cause the following hydrologic process changes: reduced interception, reduced evaporation, and reduced transpiration (i.e., more precipitation reaches the soil surface and less water consumption by plants); increased snow accumulation in the transient snow zone; increased snow melt rate in transient snow zone; and increased soil water content (Moore and Wondzell 2005).

Possible effects on the streamflow regime from these hydrologic process changes include reduced time to hydrograph peak; increased frequency of peak flows; and increased magnitude of peak flows. Altered peak flows would affect stream channel condition by eroding streambanks, scouring streambeds, and transporting and depositing sediments if the magnitude of flow reaches the level required for sediment transport. These are normal occurrences in a dynamic, properly functioning stream system; however, increases in the magnitude and frequency of peak flows due to forest management activities, particularly road construction and timber harvest, can intensify the effects. The risk of peak flow enhancement from forestry-related impacts would be estimated from methods in the Oregon Watershed Assessment Manual (OWAM) (OWEB 1999, p. IV-11). Using the methodology in OWAM, the risk of peak flow enhancement is low when canopy cover is greater than 30 percent within the analyzed drainages.

Hydroregions are a classification of landscapes based on the precipitation type and longevity. Within the Planning Area there are three distinct hydroregions: rain, snow, and rain-on-snow (ROS). In the rain-on-snow region, a mixture of snow and rain occurs between approximately 3,500 and 5,000-feet elevation, this region is also referred to as the Transient Snow Zone (TSZ). The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Snowpack in this elevation range is often shallow and are quickly melted by rain (ROS event) and warm winds. Greater snow accumulation can occur in clearings, producing the potential for higher peak flows during ROS events. Peak flows occur during the winter when periodic snowfall totally or partially melts during warm, mid-winter ROS events. In a normal water year, low flows coincide with the period of low precipitation from July through October. Considerable flows can also be produced by local, high-intensity summer storms, although these events are relatively rare, and their effect is limited to the local area.

The FEIS addressed the effects of peak flows in the transient snow zone hydroregion only, since there is limited evidence that timber harvest activities can elevate peak flows in the rain or snow-dominated hydroregions (Grant et al. 2008). In the FEIS the BLM analyzed the effects on peak flows at the sub-watershed level (BLM 2016a, pp. 384-394). Sub-watersheds are 10,000–40,000 acres in size and have a single outlet. The BLMs FEIS peak flow analysis addresses sub-watersheds that meet all the following three criteria: (1) BLM-administered lands are more than 1.0 percent of the sub-watershed; (2) the sub-watershed has more than 100 acres of BLM-administered lands in the ROS hydroregion; and (3) more than 60 percent of the sub-watershed is in the ROS hydroregion (BLM 2016a, pp. 386-387). Based on these criteria, BLM identified seven sub-watersheds in western Oregon that would be susceptible to detectable change in peak flow response, but none of those seven sub-watersheds are located within the Projects' Hydrologic Analysis Area. Of the sub-watersheds that overlap with the Hydrologic Analysis Area, none contain greater than 60 percent ROS hydroregion (the highest amount is 30 percent in the North Fork Big Butte Creek Sub-watershed). A map of the HUC 12 sub-watersheds that overlap with the Hydrologic Analysis Area are shown below in Map 5.

Map 5. Map of the HUC 12 Sub-watersheds That Overlap with the Hydrologic Analysis Area Showing Alternative 2/3 Harvest Units

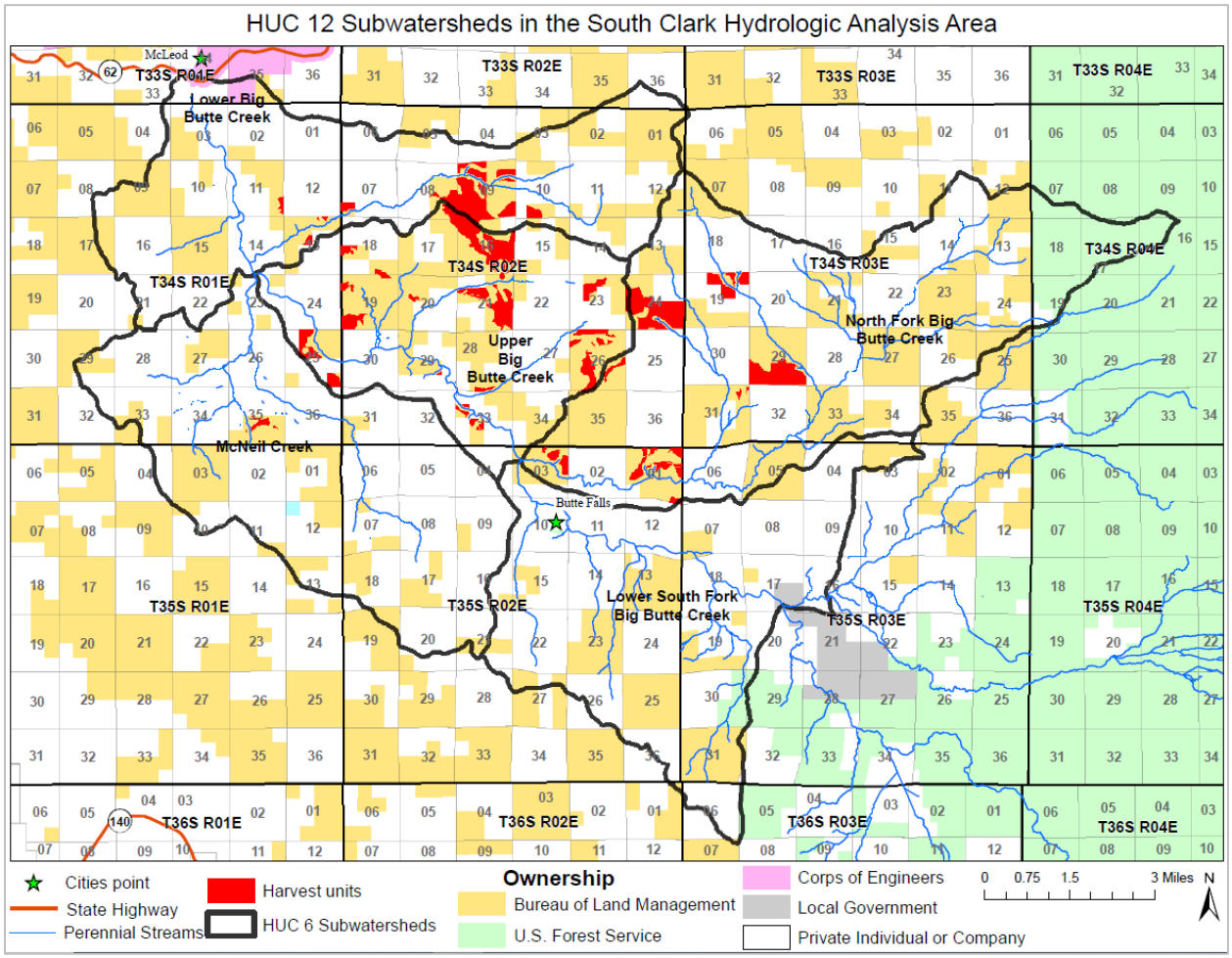


Table 10. Total Acres and Percentage of Rain and Rain-on-snow (ROS) Hydroregions Within Each of the HUC 12 Sub-watersheds That Intersect With the Hydrologic Analysis Area

Sub-watershed Name	Total Area (Acres)	Rain Hydroregion (Acres)	Snow Zone (Acres)	Transient Snow Zone (Acres)	TSZ%
Lower Big Butte Creek	15,145	11,019	0	4,126	27.2%
Upper Big Butte Creek	12,355	9,889	0	2,466	19.6%
North Fork Big Butte Creek	21,974	15,125	248	6,601	30.0%
McNeil Creek	16,282	15,860	0	422	2.6%
Lower South Fork Big Butte Creek	15,787	12,266	0	3,521	22.3%
Totals	**81,543**	**64,159**	**248**	**17,136**	**21.0% (Average)**

Streamflows are naturally low during the summer due to low precipitation, reduced soil drainage, and sustained high evapotranspiration. Water withdrawals across the analysis area exacerbate the low flow condition. Fire suppression has resulted in overly dense forest stands with high evapotranspiration rates that contribute to decreasing the amount of water available for summer streamflows.

Following timber harvest, reduced interception and reduced evapotranspiration lead to increased water yield including increased low flows (Harr 1983). Harvested areas do not permanently change streamflow; as planted, naturally regenerated, and remaining trees and vegetation grow, interception and evapotranspiration change over time and reduce streamflow to pre-harvest levels or the hydrologically recovered state. The rate and trajectory of low flow hydrologic recovery occur on a continuum that is influenced, in addition to stand age, by the intensity and arrangement of harvest, retention of pre-harvest vegetation, species composition, precipitation, aspect, disturbance, stocking density, geology, soil properties, and stream and hillslope gradients (Moore and Wondzell 2005; Perry 2007; Perry and Jones 2016).

Paired watershed studies do not provide data on BLM's harvest treatments under the RMP. However, paired watershed studies analyzed by Perry (2007) and Perry and Jones (2016) do provide a frame of reference for interpreting the potential effects of BLM's forestry activities on low flow potential. The authors report on reference and treatment catchments of 22 to 250 acres in the Willamette and Umpqua National Forests in western Oregon. In thinning treatments in the South Umpqua Experimental Forest (SUEF), catchments that somewhat resemble harvest treatment in the RMP, Perry and Jones (2016) found that initial summer streamflow surpluses were lowest and disappeared more quickly relative to other more intense harvest treatments, and summer deficits did not emerge over time. Low flow hydrologic recovery is partially influenced by harvest treatment, and these thinning results demonstrate quick hydrologic recovery following a period of low flow surplus.

Patch cutting 30 percent of the 169-acre Coyote Creek WS2 catchment in the SUEF has no analogue on federal lands managed under the RMP; however, the relative intensity of harvest and the cut block arrangement provide a frame of reference for interpreting the effects of harvest with residual trees. Table 4–F (Perry 2007, p. 68) shows only surplus flow post-harvest for the period of record, and Appendix C (Perry 2007) shows that WS2 absolute change in flow hovers around the zero-line July through September, indicating that patch cutting as implemented has minor to no effect on summer streamflow.

Riparian reserves are one of the features that distinguish RMP treatments from the more sizable buffer-less patch cuts and entire catchment clearcuts analyzed by Perry (2007) and Perry and Jones (2016). Retention of pre-harvest stand basal area in aggregated groups and individual trees outside of and in addition to the riparian reserve, less dense planting prescriptions, and mixed species planting prescriptions would reduce pre-to-post-harvest low flow changes. Retained portions of the stand would exhibit declining transpiration with increasing age, offsetting increased transpiration from younger vegetation. Harvest units that straddle ridges would not concentrate potential flow changes in any one catchment, as was done in the experimental forests. Results in Perry (2007) suggest that sites with north-facing units would have lower summer streamflow deficits as well.

Coble et al. (2020) reviewed catchment studies (in the greater Pacific Northwest including those used by Perry and Jones 2016) on the long-term effects (>10 years) to low flows from harvest activities. Few studies in their review included riparian buffers in their treatments, but they observed that a range of low flow responses occurred in the studies that retained riparian buffers, under varying upland harvest intensities. Coble et al. (2020) also concluded that the magnitude of low flow responses attenuates downstream as a broader mosaic of stand ages occurs and multiple hydrological periods are represented. The catchments in the study did not demonstrate a decline in low flows.

Climate change projections for the future indicate that the Pacific Northwest is likely to experience much greater average warming than other regions in the United States with increased precipitation in the winter and the same or decreased precipitation in the summer (Furniss et al. 2010, p. 17). As a result, projected hydrologic changes, particularly the changes in snowpacks and runoff patterns are among the prominent and important consequences. Declines in snow water equivalent occurring in low and mid-elevation sites would result in earlier spring flows and lower late season flows. Changes in average annual streamflows would also decrease. Flood severity would increase because increased interannual precipitation variability will cause increased runoff in wet years and increased rain-on-snow probability in low elevation snowpacks (Furniss et al. 2010, p. 20).

Rationale

Under any of the action alternatives, no detectable changes in peak flows would result from the proposed vegetation treatments or road construction activities. Under all Action Alternatives, commercial harvest treatments will result in patches with less than 30 percent canopy cover. However, all sub-watersheds in the Hydrologic Analysis Area are rain-dominated sub-watersheds. As noted above, none of the rain-dominated sub-watersheds identified in the FEIS as susceptible to peak flows are located within the South Clark Forest Management Hydrologic Analysis Area.

Overall, road construction activities from the South Clark Forest Management Project will result in an increase in roaded area from 3.74 percent to 3.76 percent (an increase of 0.02 percent) in the HUC 12 sub-watersheds that overlap the Hydrologic Analysis Area. The percentage of roaded area is estimated at 4.27 percent or less for each of the HUC12 sub-watersheds, well below 12 percent (see Table 11 below); which is the threshold that has the potential to result in an elevated risk of peak flow enhancement according to studies (Ziemer 1981, Harr 1975). After harvest treatments are complete, temporary roads would be decommissioned. Decommissioning includes ripping/decompacting soils and leaving the area water barred, mulched, blocked, and seeded with native plants (as needed). Road decommissioning activities would be limited to the dry season or when soil moisture does not exceed 25 percent (Appendix 3, PDF#59). The seasonal limitations in combination with the use of slash/mulching and seeding would help these areas recover and protect exposed soils from precipitation events (Appendix 3, PDF #60). Applying slash and mulching on top of ripped soils has been shown to increase hydraulic conductivity (Luce 1996), leading to more natural hydrologic runoff and infiltration patterns over time. After successful reclamation, forest hydrology impacts will be reduced to background levels over time and would not contribute to an elevated risk of peak flow enhancement.

Due to road placement and the implementation of PDFs, there will be no new permanent roads constructed that cross streams or have hydrologic connectivity to any water feature. Keeping new roads hydrologically disconnected from streams is beneficial as roads have the ability to influence peak flows and low flows, potentially to a greater degree than harvest. Roads influence low flows in minor headwater catchments by diverting subsurface flow laterally across hillslopes with the net effect being an increase in flows in some streams at the expense of others (Moore and Wondzell 2005). A total of up to 2.99 miles of new permanent road would be constructed as part of this project. Assuming a 45-foot average width, this translates to 16.3 acres of new openings/roaded area created. These openings are spread out among four different sub-watersheds and result in a maximum impact of a 0.06 percent increase in roaded area in the Upper Big Butte Creek sub-watershed (see Table 11 below). Considering the size of the Hydrologic Analysis Area and the existing road network, the increase in roaded area from this project would not result in a detectable impact on peak flows within the individual sub-watersheds or the Hydrologic Analysis Area as a whole. Decommissioning of up to 1.44 miles of permanent road could also occur as part of this project and would serve to further mitigate any impacts described above.

Table 11. Roaded Areas by Sub-watershed

Sub-watershed Name	Area (Miles^2)	*Current Roaded Area (%)	New Permanent Road Construction (Miles)	*Roaded Area after project (%)	^Net Roaded Area Increase (%)	Permanent Road Decommissioning (Miles)
North Fork Big Butte Creek	34.4	4.12	0.56	4.13	+0.01	0.96
Lower South Fork Big Butte Creek	24.7	4.81	0	4.81	0	0
McNeil Creek	25.5	4.24	0.03	4.24	+0.001	0.33
Upper Big Butte Creek	19.3	3.76	1.44	3.82	+0.06	0.15
Lower Big Butte Creek	23.7	4.07	0.97	4.10	+0.03	0
Total	127.5	4.20% (Average)	2.99	3.75% (Average)	+0.02% (Average)	1.44

*Roaded Area is calculated as the roaded area (assuming an average 45ft width) divided by total sub-watershed area and expressed as a percentage.
^Net Roaded Area Increase is calculated as the Roaded Area% after the project minus the current Roaded Area %.

Temporary roads and landings would reduce canopy cover during their construction and use. These areas would be planted after use and the canopy cover would return once the area is re-vegetated with shrubs and trees (five to 15 years depending on growing conditions). The reduction of canopy cover in the footprint of these roads and landings and the proposed permanent roads would be inconsequential and would not appreciably change the risk to peak

flow enhancement within the Hydrologic Analysis Area.

The effect of proposed BLM timber harvest on low flows is considered but not analyzed in detail in part because stand ages that maintain and restore summer water availability (amount, duration, and spatial distribution) already occur or are on a trajectory to occur on much of the BLM-administered lands within the Planning Area for the RMP and much of the BLM-administered lands within the Hydrologic Analysis Area.

As mentioned in the background section above, paired watershed studies analyzed by Perry and Jones (2016) provide a frame of reference for interpreting the potential effects of BLM's forestry activities on low flow. They found that initial summer streamflow surpluses were lowest and disappeared quickly relative to other more intense harvest treatments, and summer deficits did not emerge over time. The BLM, based on these results, expects harvest in the South Clark Forest Management Project to produce similar relatively minor and short-lived low flow changes.

Perry and Jones (2016) also concluded that summer deficits in low flows did not emerge over time in WS2, a study catchment with 1.5-to-3.2-acre patch cuts. Similarly sized group select openings will occur in the South Clark Forest Management Project selection harvest prescriptions (openings up to four acres in size), but the openings would not occur in the RR or in close proximity to one another as in WS2. Based on this information, it is reasonable to expect that summer low flow deficits would not occur with widely distributed and less intense group selection openings farther from streams.

From Alternatives 2 through 5, the prescriptions with the lowest potential relative density (RD) retention levels are regeneration harvest (5-30 percent post-harvest RD depending on LUA) and selection harvest (20-30 percent post-harvest RD depending on LUA). In each selection harvest unit, the BLM would leave a minimum of 10 percent of the stand area untreated. Further comparison of the prescriptions from each action alternative can be seen in Section 2.8.

Retention of pre-harvest stand basal area in aggregated groups and individual trees outside of and in addition to the RR, less dense planting prescriptions, and mixed species planting prescriptions would reduce pre-to-post harvest low flow changes. Retained portions of the stand would exhibit declining transpiration with increasing age, offsetting the increased transpiration from younger vegetation. In addition, maintaining the RRs in the South Clark Forest Management Project would enhance stream-groundwater interactions (Moore and Wondzell 2005) and benefit flow maintenance. Water storage capacity in the smaller headwater streams and larger perennial streams in the vicinity of the proposed units would moderate potential harvest-related summer streamflow changes.

The South Clark Forest Management Project includes the retention of older trees of a certain size as defined in the RMP (BLM 2016b, pp. 62-87). The BLM infers from the literature that tree retention, including the RR, the spatial arrangement of commercial harvest both within unit and on the landscape, and the intensity and timing of thinning would all serve to moderate summer streamflow surpluses and deficits. The riparian reserve widths in this area are 190 feet wide (one site potential tree height). Since there is no riparian thinning proposed as part of this project,

there will be no harvest units closer than 190 feet from any stream. Any harvest related low flow changes would be immeasurable in absolute terms at the sub-watershed scale given patterns of land ownership/management and interannual streamflow variability, which is highly variable depending on the amount and timing of precipitation which falls during any given water year. This issue was considered but not analyzed in detail as there is no potential for detectable effects to low flows from the proposed project.

Management actions that improve and sustain watershed resilience would moderate future impacts caused by climate change (Furniss et al. 2010). Vegetation treatments under all the alternatives would decrease the likelihood that a high intensity wildfire would occur within the treated areas. This would maintain or improve watershed resiliency for those areas, potentially reducing effects of increased peak flows. In addition, road maintenance activities such as improving surfacing, installation of rolling dips, and other storm-proofing activities will increase the resilience of portions of the permanent roads that provide access for project activities, potentially reducing road failures and sediment delivery from peak flow events.

The BLM did not analyze this issue in further detail because there is no potential for significant effects beyond those already analyzed in the FEIS, to which this EA is tiered (BLM 2016a, pp. 384-394).

Cumulative effects from past actions in addition to the Ongoing and Reasonably Foreseeable Actions (Section 3.2) to the five sub-watersheds in this project were also considered. The 2020 South Obenchain Fire and additional timber harvest on private land has contributed to increased open areas within these sub-watersheds in recent years. Removal of forest basal area is used as a surrogate for reductions in leaf area in the rain-dominated hydro region. The most consistent mechanism for producing peak flow changes is related to reduced evapotranspiration following harvest, resulting in higher soil moisture levels (Grant et al. 2008, BLM 2008). For rain-dominated hydroregions, Grant et al. 2008 found that "if less than 29% of the watershed is harvested, there are no data supporting a resultant increase in peak flow; in fact, the first detectable reported value occurs at 40 percent." (Grant et al. 2008, p 34). All five sub-watersheds in the hydrologic analysis area are rain dominated hydroregions. A similar analysis was conducted during the 2008 FEIS for the revision of the Western Oregon BLM RMPs. That analysis concluded that precipitation dominated sub-watersheds that exceed 29 percent basal area removed or equivalent clearcut area are potentially sensitive for peak flow increases, that analysis is incorporated by reference (BLM 2008, Appendix III, pp. 226-230).

To account for the removal of forest basal area and evaluate the recent effects from fire and private harvest on top of the additional acreage to be removed as part of the South Clark Forest Management Project, Equivalent Clearcut Areas (ECAs) were calculated for each sub-watershed to see if any surpass the 29 percent threshold for potential increases in peak flows. ECA serves as a surrogate for forest basal area removal, any forested lands that have had forest canopy reduced below 30 percent contribute to this area. The National Agriculture Imagery Program (NAIP) aerial photography from 2020 (after the South Obenchain Fire) was used to identify ECAs in each watershed. Areas that contribute to ECA include forested lands that have been harvested and exhibit 30 percent or less canopy cover, openings created by roads and landings, and areas burned by the fire that were reduced to below 30 percent canopy cover. Natural areas that contain less than 30 percent canopy cover (meadows, rock outcrops, waterbodies etc.) were

excluded. While open natural areas are a factor in peak flow timing, these areas contribute to the baseline natural hydrologic regime for the watershed and are not affected by timber harvest activities. ECA acres added from Alternative 2 (highest amount of regeneration harvest and potential openings created) was added to the baseline ECA to determine the post-project ECA for each sub-watershed; the results can be seen below in Table 12. This method has the potential to over-estimate ECA in some locations as it does not account for canopy regrowth in recently harvested areas. In addition, skips, gaps, and specific unit prescriptions are not accounted for in harvest units; resulting in the assumption that all areas in harvest units will result in <30 percent canopy cover. In reality there will be areas in harvest units that retain higher volumes of canopy cover that will not contribute to ECAs. However, these assumptions are useful in determining the maximum potential impact of the Project.

Table 12. Effective Clearcut Areas by Sub-watershed

6th field Sub-watershed	Sub-watershed Area (acres)	*Baseline ECA (acres)	^Added ECA (acres)	#Post-project ECA %
North Fork Big Butte Creek	21,990	4,749.0	819.6	25.3
Lower South Fork Big Butte Creek	15,800	4,263.8	6.1	27.0
McNeil Creek	16,294	2,685.3	32.7	16.7
Upper Big Butte Creek	12,365	1,081.8	981.0	16.7
Lower Big Butte Creek	15,157	1,398.8	460.7	12.2

* Baseline ECA is calculated as the sum of existing ECA acres from previous disturbance and timber harvest, plus existing openings created by roads and landings.
^ Added ECA is calculated as the sum of ECA acres created by timber harvest, road construction, and landing construction in Alternative 2 (highest potential impact alternative) of the South Clark Forest Management Project.
# Post-project ECA % is calculated as the ((Baseline ECA + Added ECA)/Sub-watershed area) *100

No cumulatively measurable or significant alterations to the hydrologic function or quantity of waters in any of the sub-watersheds are anticipated. Any enhanced peak flows in Big Butte Creek or its tributaries will not be measurable because proposed treatments are such a low portion of the overall contributing ECA area (0.04 – 7.9 percent) in each sub-watershed and none of the sub-watersheds surpass the 29 percent threshold for potential impacts. The sub-watershed with the highest potential ECA area post project is Lower South Fork Big Butte Creek (post-project ECA of 27 percent). However, this watershed is still below the threshold for potential peak flow effects in rain dominated sub-watersheds. In addition, this project will only contribute 6.1 acres of ECA to the 15,800-acre watershed, so the impact from the South Clark Forest Management Project on peak flows will not be measurable. Since this analysis used the highest potential impact alternative (Alternative 2) and found that there would be no measurable impact to peak flows, and this process has the potential to over-estimate ECA; the BLM infers that all the other action alternatives will have an equal to or lesser effect of peak flows. Based on this analysis, there will be no cumulatively detectable impacts to peak flows from this project.

Hydrology Issue NAID #2: How would the proposed Project activities affect stream temperature, dissolved oxygen, and sedimentation within streams inside the Hydrologic Analysis Area? Specifically, for drinking water (within the range of natural variability for meeting Oregon Department of Environmental Quality [ODEQ] water quality standards) and 303(d) listed streams.

Background

The 2008 Water Quality Restoration Plan (WQRP) for the Big Butte Creek Watershed (BLM 2008a) identified 303(d) listed streams and established standards for meeting Total Maximum Daily Loads (TMDL) as identified in the 2008 Rogue River Basin Water Quality Management Plan (ODEQ 2008). Within the South Clark Forest Management Project Hydrologic Analysis Area, there are two 303(d) listed streams as of the newest Impaired Waters list from ODEQ in 2022: Upper Big Butte Creek and North Fork Big Butte Creek. Both streams are listed due to stream temperature issues. Upper Big Butte Creek also contains one reach that is listed due to dissolved oxygen (DO) issues. Within the Hydrologic Analysis Area, there are approximately 34 acres of overlap with the Ginger Springs Municipal Source Water Protection Watershed, however, there are no project activities occurring within this area and no impacts are anticipated.

Stream temperature is influenced by riparian vegetation, channel morphology, hydrology, climate, and geographic location. While climate and geographic location are outside of human control, the condition of the riparian area, channel morphology and hydrology can be altered by land use. Human activities that contribute to degraded thermal water quality conditions in the Big Butte Watershed include agricultural activity, rural residential developments, water withdrawals, timber harvests, local and forest access roads, and state highways. For the Rogue Basin temperature TMDL, there are four nonpoint source factors that have the potential to result in increased thermal loads: stream shade, stream channel morphology, flow, and natural sources (BLM 2008a, p. 18). Timber harvest, road construction, and landing construction are the activities specific to the Project that have the potential to affect stream temperature conditions in the Hydrologic Analysis Area.

Reduced concentrations of DO in streams occur when conditions include low flows, warm temperatures, shallow stream gradients, fresh organic matter inputs, and high respiration rates. Current forest management activities and the use of stream buffers suggest that reduced levels of DO in streams from forest management would occur only under unusual circumstances (MacDonald et al. 1991). Low summertime stream DO values in Big Butte Creek can result from high temperatures and lack of turbulence during summer low flows (BLM 2008a, p. 26), neither of these things will be affected by the Project.

The BLM inventoried streams in the Project Hydrologic Analysis Area to ensure all areas needing riparian reserve protection were identified. The inventories assessed stream periodicity and location, documented the location of wetlands and springs, and identified unstable areas adjacent to water features. Streams, wetlands, springs and sensitive areas identified were excluded from commercial treatment units and buffers in the form of riparian reserves were established to ensure that any off-site sediment would be filtered prior to reaching these areas. RRs were laid out according to guidance from the RMP; intermittent and perennial streams receive a buffer distance of one site potential tree height, springs and wetlands <1 acre in size receive a 25-foot buffer, while natural ponds/lakes and wetlands >1 acre in size receive a 100-

foot buffer (BLM 2016b, p. 77, Table 6).

The potential impacts to water quality from the use of skid trails for logging, use and construction of landings, and roadwork (road renovation, construction, decommissioning, and haul) would be minimized or eliminated through careful project design and implementation, including use of BMPs as PDFs (Appendix 3).

Roads have the greatest potential to influence water quality in forested watersheds. Roads have three primary effects on hydrologic processes: (1) they intercept rainfall directly on the road surface and road cutbanks, as well as affect subsurface water movement down the hill slope; (2) they concentrate flow, either on the surface or in adjacent ditches or channels; and (3) they divert or reroute water from paths it otherwise would take if the road were not present (Gucinski et al. 2001). These effects from roads on hydrologic processes all have the potential to deliver sediment to streams and degrade water quality.

Potential impacts include both short-term (one to three years) and ongoing (chronic) impacts. Short-term impacts stem from activities that include new ground disturbance, such as construction or maintenance of road segments. These activities expose bare ground, leading to increased potential for erosion and transport of sediment to stream channels. Sediment contribution to stream channels stemming from these activities diminishes after one to three years (Luce and Black 2001; Megahan 1974). Weathering of road surfaces has the potential to lead to chronic sediment and turbidity contributions to aquatic habitats, and maintenance and use of roads (such as for timber hauling) can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999; Reid and Dunne 1984). Intercepted runoff that becomes concentrated over erodible road surfaces mobilizes and transports sediment with it. Surfaces armored by pavement do not experience this type of chronic weathering, while rocked roads are more resistant than natural-surface roads. For these reasons, natural-surface (or depleted rocked surface) roads with a high degree of hydrological connectivity are more probable than surfaced roads (rocked or paved) to contribute sediment to streams.

Rationale

This issue was considered but not analyzed in further detail as the project was designed to maintain water quality in all streams within the Hydrologic Analysis Area. Impacts would be reduced to the point that they would be undetectable beyond background levels, consistent with the impacts anticipated and accounted for in the FEIS to which this EA tiers (BLM 2016a, pp. 401-408).

Proposed activities that have the potential to be hydrologically connected to the stream network include timber hauling, road construction/renovation, and road decommissioning. These hydrologically connected actions would result in sediment input during timber operations (one to five years), but it would be undetectable above background levels in the Hydrologic Analysis Area. The FEIS described the effects of road construction on sediment delivery to streams and concluded that increases in sediment would increase less than 1.0 percent above current levels of fine sediment delivery over the next 10 years (BLM 2016a, pp. 401-408). This amount does not represent a consequential difference in comparison to the existing sediment delivery (BLM 2016a, pp. 405 - 406). That discussion is incorporated here by reference. Therefore, because this

project was designed to comply with the management direction of the RMP and would incorporate relevant BMPs, the South Clark Forest Management Project would not exceed the anticipated effects accounted for in the FEIS.

There are 25 pre-designated skid trails proposed, totaling approximately 1.96 miles in length. Of the 25 proposed skid trails, five are located within portions of RRs. These five pre-designated skid trails are needed to transport materials from harvest units outside of RR's to existing roads that are within RR's. The proposed skid trails would be used during the dry season when soil moistures are low and the chance for runoff and erosion are low. There will be no pre-designated skid trails that cross streams. Water quality would be maintained using PDFs when creating and using skid trails for timber harvest. Examples of the PDFs deployed include restricting the location of heavy equipment (and therefore skid trail locations) at least 50 feet away from streams, except on improved roads or designated stream crossings, and on slopes less than 35 percent (Appendix 3, PDF #21), blocking skid trails to prevent public motorized vehicle use and other unauthorized use by October 15 of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season (Appendix 3, PDF #31), and the application of post-treatment erosion control measures would be implemented on all pre-designated skid trails and would stabilize any disturbed soils before the wet season when erosion rates increase (Appendix 3, PDF #32).

Permanent roads totaling up to 2.99 miles and temporary roads totaling up to 1.56 miles would be built to access treatment units and landings. These roads would be constructed outside of RRs; therefore, there would be no stream crossings or hydrologic connectivity to streams. These roads would have nominal cut and fill and would drain overland with limited concentration of flow. All temporary routes would be fully decommissioned after harvest is completed.

One temporary road crosses an irrigation ditch located in Unit 1-1. This crossing location was field inspected by the Project hydrologist and fish biologist and determined to be a suitable location for a crossing to occur; recommendations for the least impactful crossing designs were passed along to the engineering team, including the option of utilizing a temporary bridge at the site. Water quality at this crossing will be maintained by the application of the relevant BMPs and PDFs, including limiting work to the dry season, suspending activities when precipitation is forecasted, and the stabilization of disturbed areas during work suspension or upon completion of crossing structures (Appendix 3, PDFs #52 and #56). All other temporary roads are located within Treatment Areas (outside of riparian reserves) and would be decommissioned after use and de-compacted to the pre-existing condition.

Water quality would be maintained using PDFs when completing roadwork for timber haul. Examples of PDFs to maintain water quality during roadwork include restricting the roadwork to be done during the dry season, suspending work during forecasted rain events, stabilizing disturbed areas during work suspension and the application of erosion control techniques (Appendix 3, PDFs #58, #56, #32).

Maintenance of roads would have a neutral or net positive result on sedimentation; and have no impact on DO levels or stream temperatures over time. Short-term disturbance would lead to overall improvement in road conditions through adequate blading, replacement and additions of

cross-drains where needed, cleaning ditches while retaining ground cover, adding or re-building waterbars, and providing for unobstructed flow at culvert inlets. The maintenance actions would prevent erosion by dispersing flow overland instead of letting it concentrate on roadbeds or along ditches for long distances.

There are approximately 77.5 miles of road that are proposed to be used for timber haul. 51.5 miles of these roads are improved with an aggregate surface, 14.4 miles are natural surface, 11.6 miles have an unknown surface type. Non-paved haul routes would cross streams and canals/ditches a total of 71 times, the majority of which (53 of 71) would cross intermittent streams. A variety of PDFs will be used to disconnect streams from haul routes, including the installation of protective features such as straw bales, wattles, silt fences, geo-fabric rolls, and waterbars where there is potential for haul-related road sediment to enter the aquatic system (Appendix 3, PDF #45). Given the limited number of perennial crossings and wet season haul restrictions on roads without adequate surfacing (Appendix 3, PDF #44), sediment inputs to aquatic habitat from haul would only occur during a precipitation event following a season of hauling and would be spatially spread over a high number of input locations. Therefore, it is extremely unlikely that sediment input from haul would be detectable above background levels. Over the long-term, road renovation on haul routes (where the BLM adds rock to depleted areas and natural surface roads) would reduce road-related sediment inputs. For further discussion on sedimentation, see Fisheries NAID Issue #1.

The decommissioning of approximately 2 miles of road would de-compact the roadbeds and increase infiltration; resulting in a stable, well-drained, maintenance free condition that would produce limited road-related sediment. All decommissioning work would be limited to the dry season (May 15- October 15), or when soil moisture does not exceed 25 percent as allowed by the Authorized Officer (Appendix 3, PDF #59).

Although the implementation of any of the Action Alternatives has the potential to contribute limited amounts of additional sediment to aquatic habitats; given the overall magnitude, the spatial and temporal distribution of the inputs, seasonal timing of inputs, and the use of project design features to minimize any inputs, the sediment contributed to aquatic habitats and water quality by this Project would be undetectable beyond background levels. Because water quality would be maintained in the Hydrologic Analysis Area drainages, there would be no effect to drinking water (within the range of natural variability for meeting ODEQ water quality standards), ODEQ- designated Source Water Protection watersheds or 303(d) listed streams. Therefore, there is no potential for detectable effects beyond those already analyzed in the FEIS to which this EA tiers (BLM 2016a).

Water quality of all streams in the Hydrologic Analysis Area, including the two relevant 303(d)-listed streams, would not be impacted due to this project. The issues of concern for each of these streams would be protected through the implementation of PDFs related to timber harvest activities, hauling, and road work (Appendix 3). Stream temperature is a 303(d)-list issue of concern for Upper Big Butte Creek and North Fork Big Butte Creek; however, this project will not impact stream temperature above background levels. None of the four factors that have the potential to result in increased thermal loads as identified in the 2008 WQRP (stream shade, stream channel morphology, flow, and natural sources) will be negatively impacted by this

project. Overstory treatments would occur outside the primary shade zone and no treatments are proposed within RRs; therefore, stream shade will not be affected. Natural sources and stream channel morphology will not be impacted by any activities in the Project as there are no new stream crossings and there will no impacts to stream channels, stream sedimentation beyond background levels, or nearby water sources (springs, seeps, wetlands, etc.). Streamflows in Upper and North Fork Big Butte Creeks will continue to be variable based on the fluctuation of seasonal weather patterns, there will be no impacts to flow regimes from the South Clark Forest Management Project. See Hydrology Issue NAID #1 for the discussion regarding water quantity/flows, no detectable impacts are expected to peak flows or low flows. Natural sources of thermal loading include drought, floods, fires, insect and disease damage to riparian vegetation, and blowdown in riparian areas. These natural events and their effects on stream temperature are considered natural background and no attempt is made to quantify the impact or frequency of such events in the 2008 WQRP (BLM 2008a, p. 20).

Dissolved Oxygen (DO) the 303(d)-list issue of concern for Upper Big Butte Creek. Influences on levels of dissolved oxygen include stream temperatures (higher temperatures reduce the solubility of oxygen in water), organic matter loading and high nutrient levels, and sedimentation (sediments embedded in the channel prevent DO from permeating into interstitial areas) (DaSilva et al. 2013). The 2008 WQRP for Big Butte Creek states that "DO generally is not sensitive to forest management activities that avoid adding logging slash to streams and use stream buffers to protect stream temperature" (BLM 2008a, p. 26). The Project will not impact stream temperatures, nutrient levels, or sedimentation. There will be no addition of slash to streams and the Project includes the presence of stream buffers in the form of riparian reserves. Based on the analysis above and the implementation of relevant PDFs, there would be no impacts to any of these DO influencers; therefore, DO levels will not be negatively affected by the Project.

The analysis and numbers laid out for this issue apply to Alternative 2 (see Section 2.4). Alternative 2 has an equal to, or higher, volume of potentially hydrologically connected activities when compared to the other four alternatives; therefore, any impacts of the other Alternatives would be assumed to be less than or equal to the analysis above.

Hydrology Issue NAID #3: How would the proposed Project activities affect RR function ?

Background

All sub-watersheds within the Hydrologic Analysis Area are Class 1 watersheds according to the RMP (BLM 2016b, p. 50). Within riparian reserves, the BLM is proposing up to 6.6 acres of new landing construction, 0.12 miles of pre-designated skid trails, 0.044 miles of temporary road construction, and up to 0.91 miles of road decommissioning. These actions have the potential to impact RR function by affecting surface and subsurface flow interception, overstory canopy cover, and/or soil erosion and runoff regimes.

The BLM is proposing the construction of 35 new landings that contain overlap with portions of the outer zone of RRs. The landings are adjacent to project units and would be up to one acre in size depending on the use. Landings were only placed within RRs when there was no operationally feasible alternative. A variety of PDFs will be deployed to reduce the potential

impact of landing construction in RRs, including the application of erosion control techniques (Appendix 3, PDF #32) and limiting construction to the dry season (Appendix 3, PDF #52). All landings with RR overlap will be temporary and will be decommissioned after use, this will include decompacting soils and applying native seeds (Appendix 3, PDF #55).

Sections of temporary roads and pre-designated skid trails will be built in outer portions of RRs in order to transport materials from treatment units located outside of RR to pre-existing roads inside of RRs. These sections of skid trails and roads were placed inside of RRs due to a lack of operationally feasible alternatives outside of RRs in those locations.

Rationale

Assuming a 45-foot road width and a 15-foot skid trail width, the proposed activities as described above would occur on 0.14 percent of RR acres (12.0 of 8,562 acres) in the Hydrologic Analysis Area. The application of PDFs to each activity within RRs would further limit the impact to a level that would be undetectable beyond background levels.

The 2016 FEIS found that road construction outside of the sediment delivery distance would ensure that the RR would maintain an effective sediment filtration area along streams. While the proposed landing construction and road decommissioning would have the potential to disturb soils in the RR, these areas are located outside of the mean sediment travel distance of 40 feet (BLM 2016a, pg. 407). For RR landings located in the outer zone of the RR with sediment from the area being captured on-site; the sediment filtering function of the adjacent riparian reserves will be maintained and will help to mitigate any sediment from reaching stream channels. All landings that are spatially inside the inner or middle zone of RR are located on the upslope side of an existing road. These landings were placed in these locations in order to facilitate the movement of timber from units outside of RR to existing roads. There were no operationally feasible alternative locations for these landing locations. The proposed PDFs are designed to maintain riparian function by limiting sediment delivery during these activities; for example, application of erosion-control techniques would reduce or eliminate offsite sediment transport (Appendix 3, PDF #55).

Road decommissioning has the potential to result in short-term (one to three years) impacts in the form of soil disturbance and increased susceptibility to erosion in the time between disturbance and the re-establishment of vegetation. However, removing these roads from the landscape will result in long-term benefits to the watersheds from which they are removed. Road decommissioning will result in de-compacted roadbeds that will be more suitable for vegetation growth. By reducing soil compaction, hydrologic connectivity and infiltration capacity will be increased, resulting in more natural flow regimes and leading to healthier and more robust riparian areas. All decommissioning work would be limited to the dry season (May 15- October 15), or when soil moisture does not exceed 25 percent as allowed by the Authorized Officer (Appendix 3, PDF #59).

The 2016 FEIS analyzed the impacts to effective shade along streams as a result of timber harvest activities under the 2016 RMP and found that shade quality along perennial and fish-bearing streams would be maintained (BLM 2016a, pp. 369-384). Proposed landing construction and road decommissioning would not remove stream canopy because they are proposed in areas

with existing openings. There are no proposed harvest or fuels treatments located within the primary shade zone or riparian reserves as a part of this project, therefore the associated impacts will be less than or equal to those analyzed in the 2016 FEIS and stream shading will be maintained.

Riparian function of wood recruitment would be maintained during the proposed road and landing construction by retaining any cut trees in RRs as down woody material or by moving trees for fish habitat restoration (Appendix 3, PDF #22). There are no proposed stream crossings or unstable roads that closely parallel streams in the Project, therefore there are no actions that have the potential to impact stream channel function or bank stability.

This issue was considered but not analyzed in further detail since RR impacts would be consistent with those anticipated and accounted for in the Hydrology section of the FEIS for the RMP to which this EA tiers (BLM 2016a, pp. 369-418). The proposed treatment units are located outside of the primary shade zone, and road/landing construction is located outside of the mean sediment travel distance where operationally feasible. Riparian reserve function would not be impacted to an extent observable beyond background levels.

Fisheries Issue NAID #1: How would sedimentation from ground disturbance by forest management (timber harvest using ground-based yarding, skyline-cable yarding, and specialized ground-based mechanized equipment methods) and road work (road and landing construction, reconstruction, and decommissioning) affect federally listed and native fish species and their habitats?

Background

This review focuses on the impacts for Alternative 2 as this is the Alternative that would have the potential for the greatest impact to fish and aquatic habitat (see Tables 3 & 4, in Section 2.8 for a summary of actions within the Planning Area). Ground disturbing activities in or near stream channels and hydrologically connected roads have the greatest potential to impact federally listed and native fish species and their habitat (aquatic habitat) by increasing erosion and sediment transport to, and storage in, stream channels. For this Project, the following proposed actions have the potential to contribute sediment to streams:

1. Forest Management: ground-based, skyline-cable and helicopter yarding, timber haul, and skid trails.

2. Roadwork activities: road and landing construction, renovation, improvement, and road decommissioning.

The Planning Area contains the following ESA-listed anadromous fish species (threatened): SouthernOregon/Northern California Coho Salmon.

In 1997, the Southern Oregon/Northern California Coasts (SONCC) Evolutionary Significant Unit (ESU)of Coho Salmon (*Oncorhynchus kisutch)* was listed as “threatened” with the possibility of extinction under the Endangered Species Act (ESA) by the National Marine

Fisheries Service (NMFS).

On May 5, 1999, the NMFS designated Coho Critical Habitat (CCH) for SONCC Coho Salmon. Critical habitat includes "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers." It further includes "those physical or biological features essential to the conservation of the species and which may require special management considerations or protection...",including all historically accessible waters (F.R. vol. 64, no. 86, 24049). The upper distribution of CCH is often determined by fisheries biologists, using available information and professional judgment to make an educated estimate of coho's historical presence. In the absence of natural barriers, steelhead distribution is often used to define CCH for Endangered Species Act listed threatened SONCC Coho Salmon. Determinations are usually based on stream conditions (e.g. stream size, gradient, presence, and nature of natural barriers such as waterfalls).

Under section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, the BLM must analyze the effects to Essential Fish Habitat (EFH), which is defined by NMFS and includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This definition includes all waters historically used by anadromous salmonids of commercial value (in this instance, coho). EFH within the planning area is identical to CCH. There is limited updated information about the full distribution of resident native fish species within the Analysis Area. For analysis purposes, steelhead and coho are used to identify CCH, and cutthroat trout distribution is used to identify fish-bearing streams. Steelhead (CCH/EFH) occupy approximately 46 stream miles, and cutthroat trout occupy approximately 72 miles of stream in the Analysis Area (see Map 6).

In addition to fish species listed under the Endangered Species Act, the planning area has two Bureau Sensitive fish species. The life history and habitat usage of these Bureau Sensitive fish species are sufficiently similar to ESA-listed fish species to allow them to be analyzed together. The following designated Bureau Sensitive fish species are present in the planning area: Steelhead (Klamath Mountain Province; Winter and Summer Run) and Pacific lamprey.

Fish and Designated Habitat

Aquatic habitat character and quality are directly related to sediment. Sediment occurs naturally instream systems and can affect fish either directly or indirectly. Sediment transported to aquatic habitats may either settle into the aquatic substrate or result in increased turbidity, depending on the sediment particle size, stream gradient and flow velocity, and nature and timing of the inputs. Both sediment and turbidity can be detrimental to aquatic organisms and their habitats in excessive amounts or durations (Meehan 1991). This analysis focuses on increased sediment production from proposed activities and their potential to deliver sediment to stream channels as the primary mechanism that may have potential impacts to aquatic habitats. The potential impacts to aquatic habitats from these activities would be minimized or eliminated through projects design and implementation, including the use of BMPs as PDFs, and riparian reserves.

The analysis area contains approximately 72 miles of fish bearing streams (Map 6), including streams designated as Coho Critical Habitat (CCH) and Essential Fish Habitat (EFH) for populations of threatened Southern Oregon/Northern California Coasts (SONCC) Coho salmon.

The Planning Area contains the following anadromous and resident fish species:

Anadromous Fish Species [(*)14]

SONCC Coho Salmon (*Oncorhynchus kisutch*)
Chinook Salmon (*Oncorhynchus tshawytscha*)
Steelhead (*O. mykiss*) - summer and winter
Pacific lamprey (*Entosphenus tridentatus*)

Resident Fish Species

Cutthroat trout (*O. clarkia*)
Rainbow trout (*O. mykiss*)
Sculpin (*Cottus* spp.)
Redside Shiner (*Richardsonius balteatus*)
Klamath small-scale sucker (*Catostomus rimiculus*)

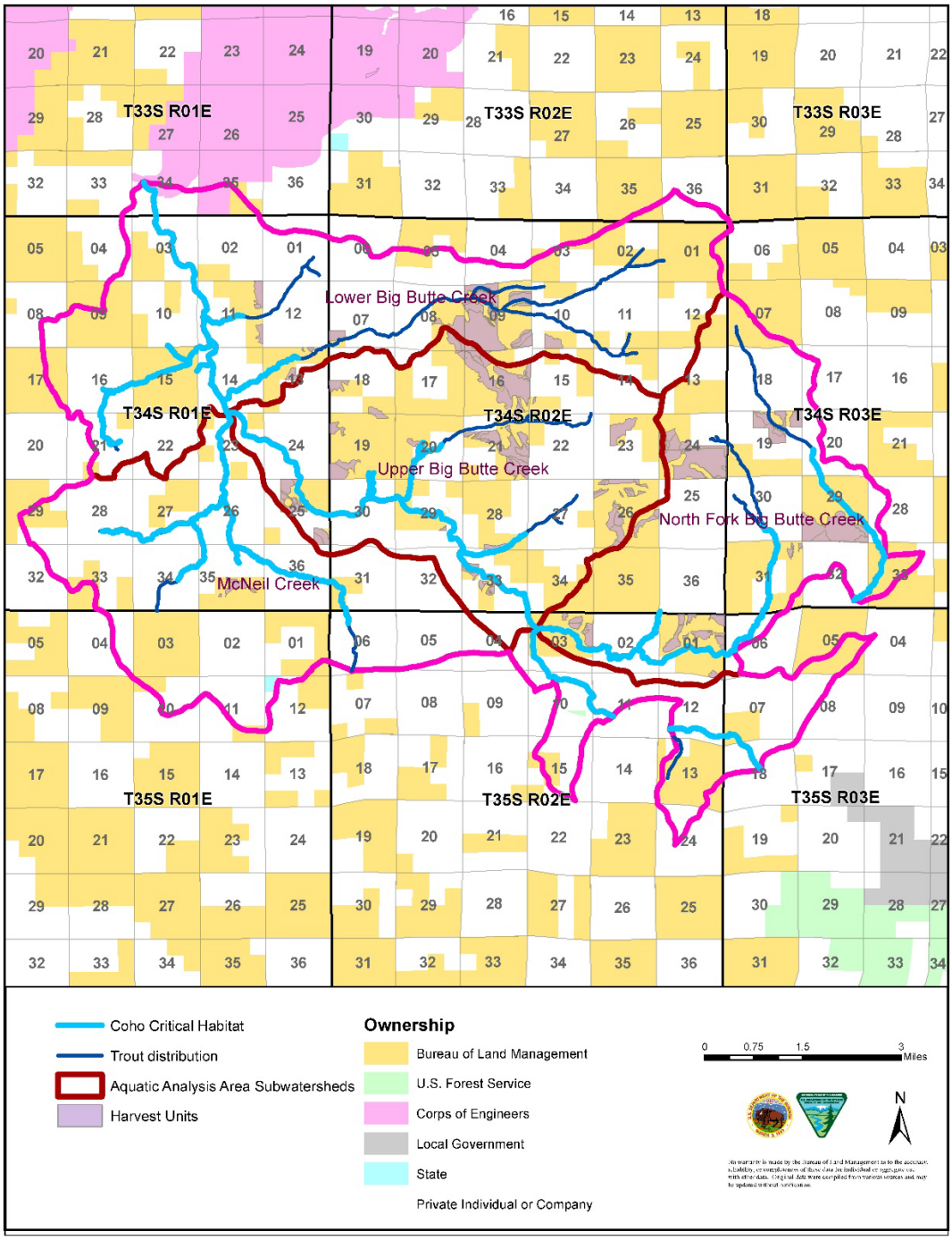
In the analysis area Coho and steelhead are present in Big Butte, Vine, Crowfoot, Clark, McNeil, Neil, Quartz, Dog, Box, North Fork Big Butte, South Fork Big Butte, Eighty Acre, and Jackass Creeks, and unnamed tributaries to North Fork Big Butte, McNeil, Big Butte, and Crowfoot Creeks.

Most of the larger streams in the Analysis Area are perennial (e.g. Big Butte, North Fork Big Butte, South Fork Big Butte, Clark Creek) with enough base flow that they can sustain robust fish populations during all times of the year (base flow refers to the lowest amount of stream flow that a stream experiences- usually during the summer, late summer and early fall months before fall precipitation begins recharging overland stream flows). However, the upper reaches of many of the tributaries to those larger streams (e.g. Dog Creek, Eighty Acre Creek, Quartz Creek) experience reduced flows during summer and fall. In those tributaries, autumn and winter water flows of any given year largely dictate the extent of Coho and steelhead distribution/migration in the Analysis Area. For example, McNeil Creek supports spawning for both Coho and steelhead but in typical flow year, it becomes a series of disconnecting pools by August, forcing Coho and steelhead juveniles to migrate downstream, thus not providing good rearing habitat. Streamflows are naturally low during the summer due to low precipitation, reduced soil drainage, and sustained high evapotranspiration. Water withdrawals across the Analysis Area exacerbate the low flow condition.

There is limited information about the full distribution of resident native fish species within the Analysis Area. Cutthroat and rainbow trout are also present in the streams listed above for Coho and steelhead and inhabit numerous tributaries to these streams; their life histories allow for their population distribution to extend further up tributaries, higher up in sub-watersheds (see Map 6 on the following page). In the Analysis Area it is likely that Pacific lamprey, Klamath small-scale sucker, and sculpin species would not be present within higher elevation tributaries due to the lack of sustained stream flows- i.e. low base flow does not provide for the aquatic habitat these species need.

[14] * The Southern Oregon/Northern California Chinook Coastal ESU is an ESA Candidate species but has not yet been listed.

Map 6. Fish Distribution in South Clark Forest Management Aquatic Analysis Area Showing Alternatives 2 & 3 Harvest Units



Rationale

This issue was considered but not analyzed in further detail as proposed actions would either not have connectivity to streams, hence there would be no causal mechanism to input sediment into streams, or the use of Best Management Practices (BMPs) as Project Design Features (PDFs) and RMP buffer distances would protect aquatic habitat function. Additionally, the project was designed to maintain water quality, or would reduce impacts to the point that they would be undetectable beyond background levels (see Hydrology Issue NAID #2 for further discussion about effects to water quality).

This analysis assumes that riparian reserves are effective at precluding sediment transport to aquatic habitat from upland areas of disturbance. Rashin et al. (2006) found that sediment delivery to streams is unlikely when erosion features (e.g., yarding corridors) are greater than 32 feet (10 meters) from the channels. In the Project Area, riparian reserve widths average 190 feet for streams (in the Big Butte watershed), 100 feet for lakes, natural ponds, reservoirs, and wetlands larger than one acre, and 25 feet for ponds, constructed water impoundments, and wetlands smaller than one acre (including springs). Only log haul, some designated skid roads, and road and landing maintenance are proposed in riparian reserves in this Project. The buffer widths incorporated into this project are in excess of the 10 meters reported by Rashin et al. (2006) as being effective at protecting aquatic habitat from sediment inputs.

Proposed activities that would be hydrologically connected to the stream network include road construction/renovation, road decommissioning, and timber hauling. These hydrologically connected actions would result in minor levels of sediment input during timber operations (one to five years), but it would be undetectable above background levels in the Project Area (see Hydrology NAID Issue #3). The FEIS described the effects of road construction on sediment delivery to streams and concluded that increases in sediment would increase less than 1.0 percent above current levels of fine sediment delivery over the next 10 years (BLM 2016a, pp. 401-408). This amount does not represent a consequential difference in comparison to the existing sediment delivery (BLM 2016a, pp. 405- 406). That discussion is incorporated here by reference. The Project was designed to comply with the management direction in the RMP and would incorporate relevant BMPs, therefore the South Clark Project would not exceed the anticipated effects accounted for in the FEIS. With the exception of timber haul, these proposed activities do not have close enough proximity to streams to affect aquatic habitat. Regarding timber haul, there is only one natural surface road crossing over a CCH stream (on Eighty Acre Creek) and that is a dry season only haul route.

The BLM evaluated the effects of road construction and subsequent sediment delivery to fish species in the FEIS (BLM 2016a, pp. 297-300). The BLM concluded in that analysis that there would be no detectable effect to fish or stream channels from the 1.0% of additional sediment from roads (BLM 2016a, pp. 297-298). At the site scale, small accumulations of fine sediment would begin to fill pool-tails, or these fines would become embedded in gravel substrates used for spawning. These sediments would be flushed during subsequent high flows and dispersed downstream where no discernable effect would be detected (BLM 2016a, p. 298). Additionally, The FEIS concluded that BMPs are effective for controlling sediment entering streams from BLM roads and that BMPs protect water quality; therefore prescription of applicable BMPs are required design components in all forestry related projects (BLM 2016a, p. 404) (see Appendix 3 for a list of BMPs applicable to the Project).

Roadwork Activities

As stated in this EA in the Hydrology NAID Issue #2, roads have the greatest potential to influence water quality in forested watersheds. The effects from roads on hydrologic processes all have the potential to deliver sediment to streams and degrade water quality. Impacts include both short-term and ongoing (chronic) impacts. Short-term impacts stem from activities that include new ground disturbance, such as construction or maintenance of road segments. Short-term impacts of sediment contribution to stream channels stemming from these activities diminishes after one to three years (Luce and Black 2001; Megahan 1974). Weathering of road surfaces can lead to chronic sediment and turbidity contributions to aquatic habitats, and maintenance and use of roads (such as for timber hauling) can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999; Reid and Dunne 1984). Intercepted runoff that becomes concentrated over erodible road surfaces mobilizes and transports sediment with it. Surfaces armored by pavement do not experience this type of chronic weathering, while rocked roads are more resistant than natural-surface roads. For these reasons, natural-surface (or depleted rocked surface) roads with a high degree of hydrological connectivity are more probable than surfaced roads (rocked or paved) to contribute sediment to streams.

Short sections of temporary roads and pre-designated skid trails would be built in the outer portions of RRs; these would be placed within RRs when there was no operationally feasible alternative for a location. The BLM is proposing up to 2.99 miles of new permanent road construction and 1.56 miles of temporary road construction. There are approximately 0.02 miles of new temporary road and 0.01 miles of new permanent road within the outer zone of RRs; these are next to resident fish-bearing streams (none are next to CCH/EFH streams). Under Alternative 2 the BLM is proposing 35 new landings that have some overlap with portion of the outer zone of RRs. A variety of PDFs will be deployed, designing the Project's landings in way that reduces the potential impact of landing construction in RRs, including the application of erosion control techniques (Appendix 3, PDF #32) and limiting construction to the dry season (Appendix 3, PDF #52) in order to reduce the potential for sediment to reach aquatic habitats. All landings with RR overlap would be temporary and would be decommissioned after use, this would include decompacting soils and applying native seeds (Appendix 3, PDF#55), which will help to accelerate site recovery and reduce potential longer-term impacts from having open, compacted areas within RRs.

Of the 25 pre-designated skid trails, five are located within portions of RRs. Of those, only three short segments are within riparian reserves adjacent to fish (trout) streams: along North Fork Clark Creek totaling approximately 0.03 miles. The five pre-designated skid trails that are within RR are needed to transport materials from harvest units outside of RRs to existing roads that are within RRs. The three pre-designated skids trails that are next to fish streams are above the road, skidding down to the existing road and not directly adjacent to the fish bearing stream. The proposed skid trails would be used during the dry season when soil moistures are low and the chance for runoff and erosion are low. There would be no pre-designated skid trails that cross streams; though one would cross a ditch used for domestic water and agricultural purposes but does not contain fish species. Water quality would be maintained through the implementation of PDFs when creating and using skid trails for proposed harvest activities. Examples of water quality maintenance include restricting the location of heavy equipment (and therefore skid trail

locations) to at least 50 feet away from streams (except on improved roads) and on slopes less than 35 percent, blocking skid trails to prevent public motorized vehicle use and other unauthorized use by October 15 of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season, and the application of post-treatment erosion control measures would be implemented on all pre-designated skid trails and would stabilize any disturbed soils before the wet season when erosion rates increase (see Hydrology Issue NAID #2 for further discussion on how water quality will be maintained) (see Appendix 3 for a list of applicable PDFs).

Site surveys on streams within the Planning Area done in the summer of 2023 indicated 10 out of 19 (52.6%) stream reaches surveyed -in their current condition- exceed the Oregon Department of Fish and Wildlife's habitat benchmark for substrate composition of fine material (a combination of sand, silt and organic material) (Foster, 2001). This habitat benchmark states that silt-sand-organics compositions in excess of fifteen percent are undesirable in areas with volcanic parent material. Although sand, silt and organic matter are natural components of stream systems, excessive amounts of these small particles contribute to the embeddedness of the substrate. Excessive deposits of fine sediments severely restrict spawning habitat for salmonids by filling in the spaces between larger substrate particles and also reduce habitat for macroinvertebrates, such as aquatic insects, which are the primary food source for juvenile salmonids. Existing road densities within the Planning Area (see Hydrology NAID Issue #1, Table 11) and recent forest management activities on private lands are likely contributors to the overall sediment load these streams are experiencing.

The proposed Project would not contribute to an overall increase in the sediment budget because the proposed activities were designed to comply with the SWO ROD/RMP management direction (see Section 1.4, discussion above, and Hydrology Issues NAID #1, 2, and 3 discussions) and overall road densities due to these proposed activities would increase from between 0.001-0.06% (an overall average increase of 0.02%).

It has been found that the disturbance from road renovation, maintenance (e.g. where the BLM adds rock to depleted areas and natural surface roads, providing for unobstructed flow at culvert inlets, and ditch cleaning while retaining ground cover), adding or re-building waterbars, and cross-drain improvements on haul routes can result in short-term (i.e. approximately 1-3 years, (Luce and Black, 2001)) increases in the overall sediment budget within a drainage. However, the result of road maintenance and renovation in the long term (over 3 years) is one of less erosion and sedimentation with an overall reduction in road-related sediment inputs. All impacts from road related activities would be within the anticipated effects analyzed for in the FEIS.

Road decommissioning would de-compact roadbeds and increase infiltration; resulting in a stable, well-drained, maintenance free condition that would result in little to no road-related sediment. All decommissioning work would be limited to the dry season (May 15- October 15), or when soil moisture does not exceed 25 percent as allowed by the Authorized Officer (Appendix 3, PDF #59), which will help prevent stream sedimentation to fish and aquatic habitats.

Timber Haul

There are approximately 77.5 miles of roads (including county roads) that are proposed to be

used for timber haul. Of these roads, 51.5 miles are improved with an aggregate surface, 14.4 miles are natural surface, and 11.6 miles have an unknown surface type. Non-paved haul routes would cross streams a total of 71 times, and of those, only one crosses a Coho/CCH stream (see Tables 13 & 14). Given the limited number of perennial crossings (13) and wet season haul restrictions on roads without adequate surfacing (Appendix 3, PDF #44), sediment inputs to aquatic habitat from haul would only occur during a precipitation event following a season of hauling and would be spatially spread over a high number of input locations. A variety of PDFs will be used to disconnect streams from haul routes, including the installation of protective features such as certified weed-free straw bales, wattles, silt fences, geo-fabric rolls, and water bars to divert flow into vegetation sufficient to filter flow where there is potential for haul-related road sediment to enter the aquatic system (Appendix 3, PDF #45) Therefore, any sediment inputs from haul would not exceed the effects already analyzed for in the FEIS. .

Table 13. Total Number of Stream Crossings by Stream Type within the Analysis Area by Action Alternative

	Stream Crossings[15] (Perennial/Intermittent)	Fish-Bearing[16]	CCH/EFH
All Action Alternatives	13/55	10	1

Table 14. Total Number of Stream Crossings by Road Surface Type within the Analysis Area

	Stream Crossings (Perennial/Intermittent)[17]		Fish-Bearing		CCH/EFH	
	Natural	**Rocked**	**Natural**	**Rocked**	**Natural**	**Rocked**
All Action Alternatives	4/11	10/46	2	7	1	0

Forest Management

Proposed forest management (ground-based yarding, skyline-cable yarding, and helicopter yarding) would have no hydrologic connectivity to stream channels, and hence no causal mechanism would exist for these actions to input sediment into stream channels (see Hydrology Issue NAID #3 for further discussion about sediment effects). Additionally, these proposed actions are further than 32 feet away from aquatic habitat, a distance which would prevent effect to aquatic habitat, and PDFs, such as constructing water bars and using erosion-control techniques on skid trails, limiting ground based yarding activities to times when soil moisture content is <25%, and limiting road and landing construction to the dry season would minimize the potential for sediment delivery into streams to such levels that would be indistinguishable

[15] There are a total of 71 stream crossings, and 4 canal crossings.

3 Fish bearing and CCH/EFH are subsets of the total number of crossings. These numbers are not cumulative across the table.

[17] There is one crossing unaccounted for in this table: on an unknown road surface type on private land.

beyond background levels.[18]

Conclusion

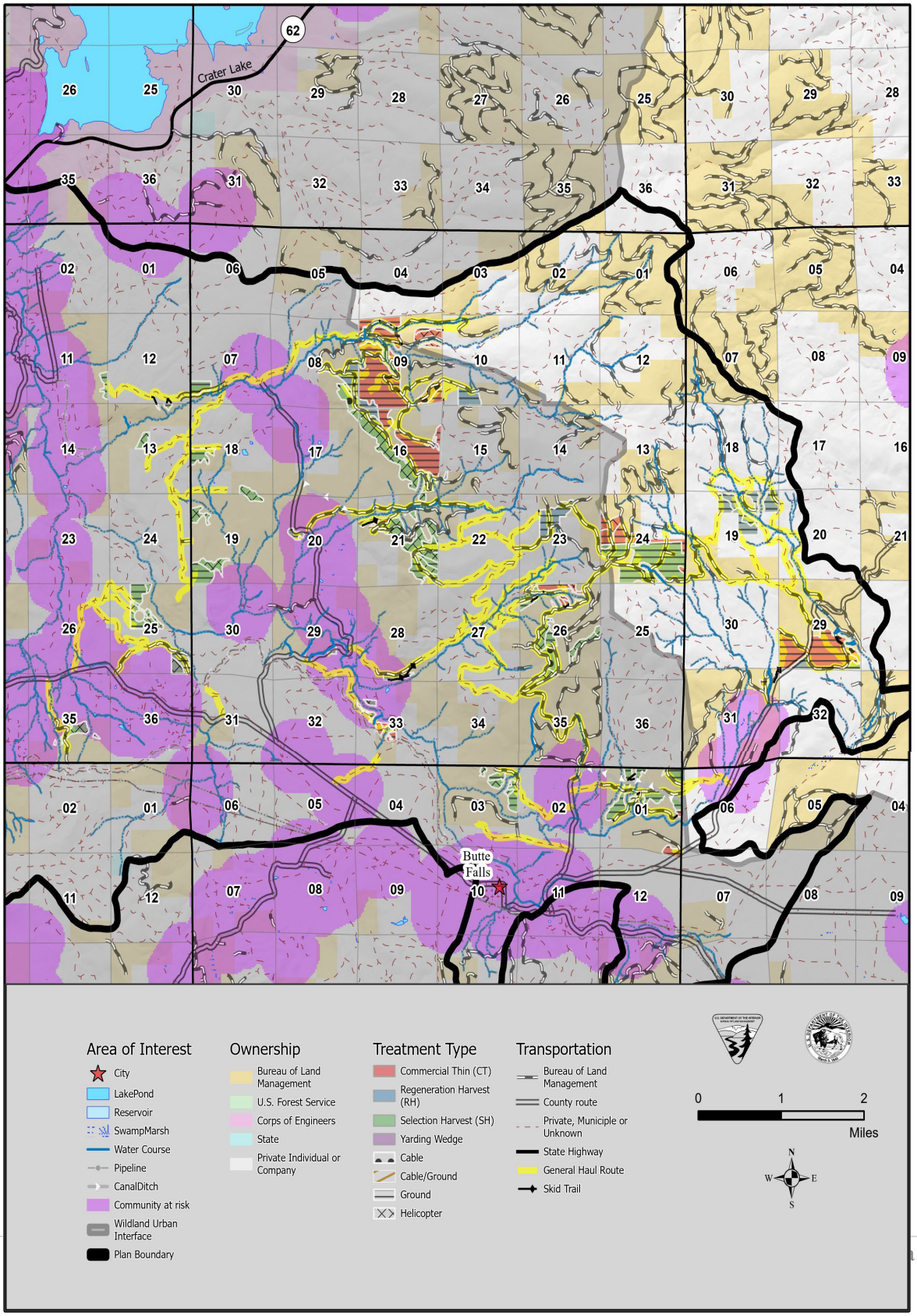
The delivery of sediment to fish-bearing and non-fish-bearing streams from proposed timber harvest, roadwork (road and landing construction, renovation, improvement, and decommissioning), and timber haul is presented in the water quality issue (see Hydrology Issue NAID #2). The BLM summarizes that water quality would be maintained in the Planning Area and there would be no effects to drinking water (within the range of natural variability for meeting ODEQ water quality standards), ODEQ-designated Source Water Protection watersheds, or 303(d) listed streams. See Hydrology Issue NAID #2 for more information on how effects from the proposed activities to water quality were considered. The same rationale is relative to aquatic habitat and discusses how the proposed activities would maintain water quality (aquatic habitat).

In conclusion, although the implementation of any of the action alternatives would contribute additional sediment to aquatic habitat, given the small overall magnitude, the spatial and temporal distribution of the inputs, the seasonal timing of inputs, and application of PDFs, the sediment and turbidity contributed to aquatic habitats and water quality by the Project would be undetectable beyond background levels in downstream fish habitat, nor would they further compromise riparian function. Therefore, there would be no measurable effect to fish or fish habitat and proposed activities would not result in adverse effects to fish, fish habitat, or water quality.

[18] Rashin, et. al. 2006 found RR widths of 32 ft (10 m) to be effective at filtering sediment. All proposed ground disturbing activities are further than 32 feet from streams. See Rationale discussion in the Fish NAID section for further discussion of effectiveness of RR widths.

Fire and Fuels

Map 7. Wildland Urban Interface and Community at Risk (Showing Alternative 3 Harvest Units)



Fire/Fuels NAID #1: How would stand structural changes and residual activity fuels associated with timber management affect stand-level fire hazard in the timber harvest units? How would the number of acres at risk in Wildland Developed Areas change from timber management and the hazardous fuels reduction treatments?

Background

This issue focuses on evaluating how timber management and activity fuels would affect stand-level fire hazard and what the subsequent risk near human populations would be. Fire hazard refers to the ease of ignition and potential fire behavior (including resistance to control) of the fuel complex, defined by the volume and arrangement of fuel layers, including surface, ladder, and canopy fuels (Calkin et al. 2010). Fire behavior has a direct effect on fire severity, mortality, suppression tactics, and the initiation of crown fire, which presents the greatest resistance to control and the largest potential to threaten wildland urban interfaces (WUI) (Graham et al. 2004) (BLM 2016a, p. 254).

Fire risk describes the likelihood, susceptibility, and intensity for wildfire and adverse effects to human values. The BLM assumes that a one-mile buffer around the West Wide Wildfire Risk Assessment Wildland Development Areas (or where people live) are a highly valued resource (BLM 2016a, p. 253), representing the geographic scope of possible immediate risks to the public and firefighter safety within close proximity to communities located within the larger Wildland Urban Interface (WUI) (RVIFP 2019)" (BLM 2016a, p. 253). The Rogue Valley Integrated Fire Plan (2019) defined a local WUI area, per the guidelines of the Healthy Forest Restoration Act (2003), based on infrastructure, vegetation condition, topography and geographic features, where strategic fuel reduction can reduce risks from large, severe wildfires and promote fire-adapted communities. Collaborating partners, including the BLM, use Community Wildfire Protection Plans (CWPP) and WUI boundaries for local coordination, prioritization, and implementation of landscape-level fuel treatments (BLM 2016a, p. 255).

Stand-Level Fire Hazard from Timber Harvest (Within and Outside the WDA and WUI)

Commercial thinning, and selection harvest are proposed on approximately 2,237 acres of BLM-administered lands in the Planning Area depending on the selected alternative. Regeneration harvest is planned for 276 acres in Alternatives 3 and 4. Proposed regeneration harvest increases to 1,087 acres in Alternative 2. Alternative 5 has no regeneration harvest proposed. Harvest prescriptions are consistent with the management direction in the RMP for stands in the HLB. These harvested acres would result in a young stand and a high density young stand structural stage that would the shift the relative stand-level fire hazard from moderate to high for up to 50 years on this dry forest site.

In the FEIS, the BLM analyzed in detail the effects from timber harvest on fire hazard within close proximity to WDAs (BLM 2016a, pp. 253-264). In that analysis, the BLM assigned forest structural stages (BLM 2016a, Appendix C, pp. 1203-1206) to a relative ranking of stand-level fire hazard (BLM 2016a, Table 3-34, p. 254). Commercial thinning and selection harvest are planned in stands with the following structural stages: Young Stands-High Density with structural legacies, Mature Stands with multi-layered canopies, and Structurally Complex-Developed Structurally-Complex. These stands have current stand-level fire hazard ratings of

high and mixed. The proposed thinning activities would take these overstocked stands that range from approximately 160-360 ft^2 basal area per acre and reduce basal area to between approximately 80-180 ft^2 basal area per acre in thinned stands, depending on the alternative. The overall reduction in stand density would shift the stand-level fire hazard ratings to moderate and mixed. This post-harvest reduction of stand-level high hazard acres over a 50-year period is consistent with the fire hazard analysis in the FEIS (BLM 2016a, Figure 3-18, p. 263). Post-harvest activity fuels treatments would further reduce the stand-level fire hazard in thinned stands.

South Clark Forest Management Project activity fuels would be treated where determined appropriate by the Butte Falls Field Office Fuels Management Specialist (e.g., lop and scatter, prescribed fire, or removal) generally within two years, thus any increase in surface fuel loading would be temporary. The type of activity fuel treatment will be based on surface fuel loading, aspect, slope, access, and location of each unit, including proximity to WDA and WUI.

Treatments of residual activity fuels by burning or removing most of the slash in the unit would reduce horizontal and vertical fuel loading and connectivity, to result in expected flame lengths less than four feet under typical fire weather conditions. The effects of the temporary increase in risk from residual activity fuels are within the scope of those effects analyzed for in the FEIS (BLM 2016a, pp. 260 and 263, Figure 3-380). That analysis, which is incorporated here by reference, concluded that immediately following commercial harvest, residual activity fuels left on the forest floor (e.g., tree tops and limbs) would increase surface fuel loadings and have the potential to increase surface fire behavior and pose a risk to the residual stand and other values, if not adequately treated (BLM 2016a, p. 269, Omi and Martinson 2013, Weatherspoon and Skinner 2005, Fule et al. 2001). The FEIS indicates that residual activity fuel loading depends on harvest type and the amount of material removed (BLM 2016a, pp. 265-266). The risk these activity fuels pose increases near human values (i.e., WDAs). That analysis concluded that in the interior/south the PRMP would result in an average of approximately 72,000 acres per decade of very high and high risk from activity fuels on dry forest sites (BLM 2016a, pp. 268-269) if left untreated. The analysis in the FEIS provided an estimate of potential future work needed to reduce the risk associated with activity fuels. The FEIS also identified that a variety of follow-up treatments (e.g. prescribed fire, biomass removal, and mechanical manipulation, etc.) can reduce surface fuels and reduce the risk associated with activity fuels (BLM 2016a, pp. 266, 269).

Potential Fire Risk from Proposed Activities Proposed in the WDA and WUI

The underlying land ownership within the WDAs consists of 33,902 acres (65 percent) of privately owned land and 18,443 acres (35 percent) of BLM-administered land.

Under Alternative 2, of the 1,087 acres of regeneration harvest, 5.5 acres are within the WDA and 608 acres are within the WUI. These harvested acres would result in a young stand and a high density young stand structural stage that would the shift the relative stand-level fire hazard from moderate to high for up to 50 years on this dry forest site. This shift from moderate to high will occur with or without immediate activity fuels treatment. Activity fuels treatment would provide for a short term (one to three years) reduction of stand level fire hazard.

In Alternatives 3 and 4, none of the proposed 275 regeneration harvest acres are within the identified WDAs and 152 of the proposed regeneration harvest acres are identified as WUI, therefore there would be a negative effect in the WUI acres and no effect on the WDA acres. The 275 acres of regeneration harvest would result in a young stand and a high density young stand structural stage that would the shift the relative stand-level fire hazard from moderate to high for up to 50 years on this dry forest site. This shift from moderate to high will occur with or without immediate activity fuels treatment. Activity fuels treatment would provide for a short term (one to three years) reduction of stand level fire hazard.

Under Alternatives 3, 4, and 5, approximately 1,962 acres of commercial thinning and selection harvest would reduce stand-level fire hazard from high to moderate. Post-harvest activity fuels treatments would further reduce the stand-level fire hazard in the thinned stand. Under these Alternatives, the timber harvest and subsequent treatment of activity fuels would result in a decrease in overall fire hazard within the WDA boundaries.

Table 15. Pre- and post-stand-level fire hazard with stands in the WDA. Stand-level hazard rating based on FEIS (Table 3-34, p. 254)

Proposed Treatment Within WDAs	Existing Stand Level Hazard	Post Treatment Stand-level Fire Hazard Rating
Regeneration Harvest (Alternatives 2, 3, and 4)	Moderate	High
Selection Harvest (Alternatives 2,3,4, and 5)	High	Moderate
Commercial Thinning (Alternatives 2,3,4, and 5)	High	Moderate

Rationale

This issue was considered but not analyzed in further detail because there is no potential for significant effects beyond those that have already been analyzed in the FEIS (BLM 2016a, pp. 253-270), to which this EA is tiered. At this time, nothing has changed relevant to the FEIS analysis and no new information has been determined that would change the outcome of the FEIS analytical conclusions.

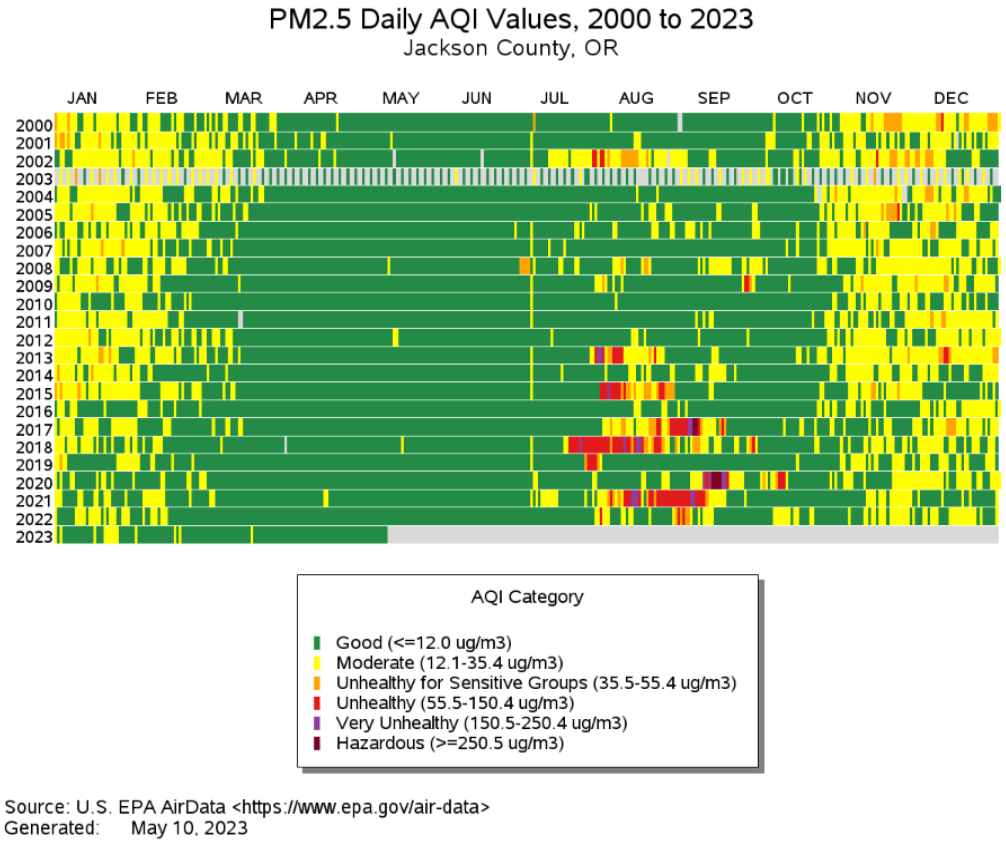
In summary, the proposed Project timber harvest activities would shift stand-level structural stages, stand-level fire hazard, and residual activity fuels at levels consistent with what was analyzed and disclosed in the FEIS and referenced above. In Alternatives 3, 4, and 5, timber harvest followed with activity fuel treatments would lower the overall stand-level fire hazard. In Alternative 2, timber harvest on approximately 50 percent of the harvested acres would remain at a stand level hazard of high for the next 50 years. As stated above, the stands selected for harvest currently have stand-level fire hazard ratings of high and mixed. If the No Action Alternative is selected, these hazard ratings would remain unchanged and stand level hazard would remain and is consistent with the FEIS, to which this issue tiers to. The Action Alternatives would reduce Moderate or High fire hazard within close proximity to Wildland Developed Areas (WWRA 2013) to a greater extent than the No Action Alternative in 50 years (BLM 2016a, p. 260).

Fire/Fuels Issue NAID #2: How will prescribed burning activities affect air quality (taking climate change into consideration)?

Background

The combination of weather patterns and topography of the Rogue Basin contribute to regional air quality problems. The American Lung Association has ranked the Medford / Grants Pass metropolitan area as 11th in their annual State of the Air report's list of People at Risk In 25 U.S. Cities Most Polluted by Year-Round Particle Pollution (Annual PM2.5; ALA 2021). Poor air quality can develop when a major polluting activity or event combines with temperature inversions and strong high-pressure systems that create stagnant air. Valleys can trap and concentrate pollutants, exacerbating the effects of stagnant air. Sources of pollutants may be chronic, such as from a factory or homes heating with wood during the winter, or transient, such as from prescribed burning or wildfires. Wildfires tend to be the primary contributor to air quality concerns within the Medford District, particularly in July and August (BLM 2016a, pp. 155-157) and into October in some recent years (Figure 2). The EPA Daily air quality index for Jackson County in Oregon indicates that daily emissions (PM 2.5) have been increasing during summer months over the past 20 years (Figure 2).

Figure 2. Air Quality Index for Jackson County from 2000 to 2023



The EPA daily Air Quality Index in Jackson County (2000-2023). Air quality during the period from November through March is characterized mostly as moderate. Most emissions during this period are attributed to residential heating with wood, which is frequently trapped beneath temperature inversions.

Summer month (July – September) air quality has been mixed from good to hazardous, emissions during this period are attributed to wildfire smoke. Notable large wildfire years in southwest Oregon are evident in the record (2002, 2013, 2015, 2017, 2018, 2020, and 2021). Air quality from April to June is characterized as mostly good. This timeframe typically coincides with favorable conditions for implementation of prescribed under burning.

The Oregon Department of Environmental Quality (ODEQ) Air Quality Division implements the U.S. Environmental Protection Agency's (EPA's) air quality regulation standards. The ODEQ has delegated prescribed fire smoke management responsibilities to the Oregon Department of Forestry (ODF). For all prescribed burning activities, the Medford District is required to comply with the Oregon Smoke Management Plan (ODF 2019: OAR 629-048) as outlined in the FEIS (BLM 2016a, pp. 146-151).

The Oregon Smoke Management Plan outlines best burn practices in the Emission Reduction Techniques section (ODF 2019: OAR 629-048-0210). The practices are designed to minimize emissions from prescribed burning, and "ensure the most rapid and complete combustion of forest fuels while nearby, "non-target" fuels are prevented from burning." These best management practices include, "covering of piles sufficient to facilitate ignition and complete combustion, and then burning them at times of the year when all other fuels are damp, when it is raining or there is snow on the ground." The section continues, stating that "when piles are covered as a best burn practice and the covers are to be removed before burning, any effective materials would be used, as long as they are removed for re-use or properly disposed of. When covers will not be removed and thus will be burned along with the piled forest fuels," the covers must consist of approved materials, which includes polyethylene (PE) sheeting (ODF 2019: OAR 629-048-0210). Removal of PE sheeting from piles in advance of burning increases safety risks, operational cost, particulate emissions, and reduces the pace and scale of hazardous fuel reduction.

Piles will be burned during colder and wetter periods, punctuated by wet, icy, and snowy conditions. Removal of PE sheeting from piles in advance of burning would increase risk and exposure of field personnel to injury and illness from additional hours of driving, hiking steep terrain, rolling debris from deconstructed piles, and inclement weather. As shown in a case study on the Klamath National Forest, the additional time devoted to PE removal (up to 20 minutes per pile) and disposal resulted in a 60 percent reduction of acres burned (Mike Appling, personal communication, September 23, 2021 to October 6, 2021). This reduces production, increases per unit cost, and leaves more acres of handpiles on the landscape, increasing the probability of those piles burning intensely in a wildfire.

Piles from which PE sheeting has been removed become vulnerable to wetting rains and wetting of fuels, prior to ignition. Wrobel and Reinhart (2003) examined the use of PE sheeting to enhance combustion efficiency of piles, and found that uncovered piles have increased fuel moisture, reduced combustion efficiency, and require more accelerants (up to three gallons of fuel) to achieve sustained pile ignition, compared with PE covered piles, this finding is consistent with local knowledge and experience. The polyethylene ensures low moisture content of the wood and facilitates rapid and efficient ignition and consumption of fuels to minimize residual smoke (Aurell et al. 2017).

Use of Kraft paper as a substitute for PE sheeting would contribute toward decreased burning efficiency because environmental conditions in the region quickly deteriorate the material. An extensive review by Worbel and Reinhardt (2003) found Kraft paper less effective at minimizing moisture intrusion into piled wood (also consistent with local knowledge and experience), resulting in similar conditions as uncovered piles. The additional weight of Kraft paper also contributes to decreased production and increased per unit cost of covering piles. While combustion studies examining the difference in pyrolysis of polyethylene versus lignocellulosic materials (Kraft paper) have found that emission from Kraft paper combustion were lower than polyethylene, both materials produce many of the same substances (Garcia et al. 2003). Additionally, Kraft paper is often coated with paraffin wax (a derivative of petroleum) or polyethylene to improve water resistance properties.

Current scientific literature does not disprove that burning PE sheeting would produce unique chemicals or classes of chemicals that are not also found in emissions from burning wood debris (Worbel and Reinhardt, 2003; Aurell et al. 2016). Ultimately, combustion of wet piles results in more particulate emissions than dry piles (NWCG 2020 PMS 420-3). Comparisons of post-harvest slash machine pile burning indicate that dry piles covered with polyethylene sheets have lower emissions than uncovered wet piles (Aurell et al. 2016). Additionally, initial entry fuel reduction treatments (i.e., thin and handpile burn) provide the opportunity for follow-up treatment, via maintenance underburning, which eliminates the need for piles and thus PE sheeting.

The Oregon Smoke Management Plan designates Smoke Sensitive Receptor Areas (SSRA), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629048-0140. The SSRAs within the Medford District are Grants Pass and the Bear Creek Valley, as described in OAR 629-048-0160 (BLM 2016a, Map 3-1, p. 149). The objective of the Smoke Management Plan is to minimize smoke emissions from prescribed burning from entering the SSRAs. Medford District is also required to comply with the Oregon Visibility Protection Plan (ODF 2019: OAR 340- 200-0040, Section 5.2) which mandates that prescribed burning does not affect the visibility of Class I areas. Local Class I areas include Crater Lake National Park, Kalmiopsis Wilderness, and Rogue Wilderness (BLM 2016a: Map 3-1, p. 149). The Planning Area is not within a Class I area.

Prior to conducting prescribed burning activities the BLM must register prescribed burn locations with Oregon Department of Forestry in compliance with Oregon's administration of the Clean Air Act. The specific location, size of the burn, fuel loadings, ignition source, time, and duration of ignition are reported prior to ignition. The timing of all prescribed burning would be dependent on weather and wind conditions to help reduce the amount of residual smoke to the local communities. The day before each planned burn, ODF meteorologists evaluate this information along with the forecasted weather for the next day to determine whether smoke from a given burn is likely to enter a SSRA or effect a Class I area. This information is used to determine the appropriate time to conduct the planned prescribed burn, to minimize smoke from prescribed fire. The BLM must follow these instructions in compliance with Oregon's administration of the Clean Air Act, including the Best Burn Practices; Emission Reduction Techniques section (ODF 2019: OAR 629-048-0210) of the Oregon Smoke Management Plan

and the Oregon State Implementation Plan for Air Quality. Additionally, all prescribed burn plans must also comply with the Interagency Prescribed Fire Planning and Implementation Procedures Guide (NWCG 2017 PMS 484).

Smoke from prescribed fire and wildfire produces carbon monoxide, particulates, and other air toxins. The main criteria pollutant of concern for BLM management activities is particulate matter (PM10 and PM2.5) (ODEQ 2003, 2009, 2012, 2013a). In addition to posing a human health risk due to the small size, particulate matter produced from wildland fires are excellent at scattering light, thereby reducing visibility. Carbon monoxide, on the other hand, while a substantial human health risk, dilutes rapidly, making it a hazard to firefighters only. As such, the BLM analyzed effects of particulate matter emissions and visibility in the FEIS (BLM 2016a, pp. 145–163). That analysis, incorporated here by reference, examined emissions (PM10 and PM2.5) from prescribed fire treatment of both natural hazardous fuels and activity fuels. The FEIS concluded that the RMP would result in an approximate seven percent increase over current conditions of particulate emissions (PM10 and PM2.5) created from prescribed fire actions implemented across the Western Oregon planning area. On the Medford District, implementation of the RMP would produce 690 PM2.5 tons per year (BLM 2016a, p. 161, Figure 3-12) over the 50-year analytic period. However, adherence to the requirements of the Oregon Smoke Management Plan would continue to limit impacts to human health and visibility from prescribed fires.

Rationale

This issue was considered but not analyzed in detail because this EA tiers to the FEIS analysis, which estimated the effects on air quality based on the magnitude of treatments on this landscape and disclosed those effects (BLM 2016a, pp. 158-163). In the South Clark Forest Management Project there is no potential to exceed the magnitude of treatments analyzed in the FEIS, and no anticipated effects under any Alternative that would exceed those stated in the FEIS. Additionally, there are no new circumstances or information related to the Project or Planning Area that would change the effects anticipated by the FEIS.

All Alternatives would be consistent with the actions analyzed in the FEIS. Required measures would apply to all Action Alternatives to meet the Oregon State Implementation Plan of the Clean Air Act (including application of BMPs indicated above) and the EPA's Interim Air Quality Policy on Wildland and Prescribed Fires. Polyethylene (PE) sheeting will be placed on burn piles and not removed prior to burning. Common to all Action Alternatives are other means of treating fuels, such as biomass removal, which would result in less smoke emissions than prescribed burning. However, prescribed fire would be necessary to meet ecological objectives and complete and maintain Proposed Actions in most instances.

The FEIS suggests future climate impacts could create more smoke production from wildfires than historic levels (BLM 2016a, p. 163), due to longer fire seasons and more severe burning conditions, which would lead to more acres burned and increased fire severity. This trend appears evident the Medford daily Air Quality Index between 2000-2023 (Figure 2). However, as wildfires interact with areas treated to improve wildfire resistance, smoke emissions would be reduced. For example, proposed actions would reduce the likelihood of stand-replacing fire (Issue #3, BLM 2016a, p. 271) and would result in reduced smoke production, when interacting

with future wildfires (Liu et al. 2017; Long et al. 2017) as less forest fuel (e.g., tree canopy fuel) would be consumed by wildfire. Treatments would also provide opportunities to limit large fire growth, which would reduce wildfire smoke production.

For the above reasons, further analysis of this issue is not necessary for making a reasoned choice among the Alternatives. Additionally, effects among all Alternatives would be within those analyzed in the FEIS, therefore, was not carried forward for further analysis.

Greenhouse Gas Emissions, Carbon Storage, and Climate Change Issue NAID #1: How would the Proposed Action affect greenhouse gas emissions, carbon storage, and climate change?

Background
The effects of the South Clark Forest Management Project on greenhouse gas emissions, carbon storage, and climate change were not analyzed in detail because, regardless of project-specific or site-specific information, there would be no potential for reasonably foreseeable significant effects of the proposed alternatives beyond those disclosed in the FEIS.

Rationale
The effects of the alternatives contained within the South Clark Forest Management Project on carbon storage and greenhouse gas emissions tiers to the analysis in the FEIS. As described below, the alternatives are consistent with the RMP. The Action Alternatives would not have significant effects beyond those already analyzed in the FEIS. While analysis of the project-specific and site-specific conditions could give greater specificity to the analysis in the FEIS, there is no potential for reasonably foreseeable significant effects of the Alternatives beyond those disclosed in the FEIS. The analysis in the FEIS addressed the effects on carbon storage and greenhouse gas emissions of implementing the entire program of work associated with forest management and other activities based on high quality and detailed information (BLM 2016a, pp. 165-180, 1295-1304). The information available on project-specific and site-specific conditions, while more specific, is not fundamentally different from the information used in the FEIS analysis of effects on carbon storage and greenhouse gas emissions, and thus cannot reveal any fundamentally different effects than that broader analysis.

The FEIS upon which the RMP was based examined the science regarding climate change, carbon storage, and greenhouse gas emissions. The FEIS analysis in Volume 1 on pp. 165-211 is relevant to this Project and is incorporated by reference.

The FEIS concluded that the approved RMP supports the State of Oregon's interim strategy for reducing greenhouse gas emissions (BLM 2016a, p. 173). Both the State of Oregon's strategy and federal climate change strategies have goals to increase carbon storage on forest lands to partially mitigate greenhouse gas emissions from other sectors of the economy. Neither the State of Oregon nor the federal government have established specific carbon storage goals so quantifying BLM's contribution to that goal is not possible. Assuming no changes in disturbance regimes such as fire and insects (acres affected and severity of impact) from the recent past, timber harvesting is the primary activity affecting carbon storage (BLM 2016a, p. 169).

The FEIS estimated the effects of implementing actions consistent with the Southwestern Oregon RMP as follows:

The carbon storage and greenhouse gas emissions analysis were based on assumptions concerning the level of management activity:

- The FEIS assumed an average annual harvest level of 278 MMbf per year (205 MMbf from the HLB and 73 MMbf from non-ASQ related harvest) over the entire decision area (BLM 2016a, p. 307). The planned annual harvest for the Medford District is 51 MMbf (37 MMbf from the HLB and 14 MMbf from non-ASQ related harvest). Projected harvest levels from the South Clark Forest Management Project, when added to projected harvest levels from other projects since RMP implementation began on the Medford District, fall within the FEIS analysis.
- Activity fuels treatments are aligned with the harvest program with estimated acres of prescribed fire treatment type provided by the Woodstock model (BLM 2016a, p. 1300). The decadal average of activity fuels prescribed burning for the first 20 years of the RMP would be an estimated 64,806 acres over the entire decision area (BLM 2016a, p. 362). The Medford District decadal average for prescribed burning for the first 20 years is 25,221 acres. Proposed treatment of harvest related activity fuels within the South Clark Forest Management Project would not exceed the District annual average and would be within the amount analyzed in the FEIS.

Table 16. Estimation of Carbon and Greenhouse Gas Emissions

	Current	2033	2063
Carbon Storage	336 Tg C	404 Tg C	482 Tg C
Greenhouse Gas Emissions	132,032 Mg CO2e/year	256,643 Mg CO2e/year	230,759 Mg CO2e/year

Source: Table A-1 in FEIS.

Tg - Teragram. One million metric tons; Mg – Megagram. Metric ton. Approximately 2,205 pounds; CO2e – carbon dioxide equivalent.

There is no new information or changed circumstances that would substantially change the effects anticipated in the FEIS. This is because:

1. The harvest levels remain within the range of that analyzed in the FEIS (Table 17).

Table 17. Medford District Offered Harvest by Volume 2018-2022

Year	FEIS MMBF Projected for Harvest for Medford District	MMBF Offered by Medford District	% Offered Harvest of FEIS Annual Harvest Level
2018	51	23.4	46%
2019	51	37	72.5%
2020	51	41.3	81%
2021	51	35.4	69%
2022	51	34.8	68%

Source: BLM Facts website.

2. The decadal average of prescribed burning for the first 20 years of the RMP would be an estimated 64,806 acres over the entire decision area (BLM 2016a, p. 362). The Medford District decadal average of prescribed burning for the first 20 years of the RMP would be an estimated 25,221. If all 2,238 acres analyzed in the EA would be treated for activity fuels they would fall within the District decadal average. The acres of activity fuels prescribed burning and tonnage consumed remains within the range analyzed in the FEIS (Table 18).

Table 18. Prescribed Burning Treated by Year in the BLM Medford District (GeoCortex Public Webmap)

Year	FEIS Analysis for Annual Medford District Prescribed Fire (acres)	Total Prescribed Fire Implemented by BLM Medford District (Acres)	Percent Fuels Treated of FEIS Analysis Annual Prescribed Fire Levels
2016	2,522	561	22%
2017	2,522	2,420	96%
2018	2,522	2,299	91%
2019	2,522	2,086	83%
2020	2,522	872	35%
2021	2,522	1,861	74%
2022	2,522	1,299	52%

Range/Grazing Issue NAID #1: How would vegetation changes from proposed timber harvest affect grazing and rangeland management in the allotments within the Planning Area?

Background

Of the 52,345-acre South Clark Forest Management Project Area, 18,443 acres are BLM-administered lands. There are 17,638 acres (96 percent) of BLM-administered lands available for grazing. The Planning Area contains portions or entireties of the Summit Prairie, Big Butte, Neil Tarbell, Derby Road Sawmill, Bear Mountain, Crowfoot, Crowfoot Creek, and Cobleigh Road grazing allotments. The 17,638 acres of BLM-administered lands available for grazing in the Planning Area is approximately 12 percent of the total allotment acreages for the grazing allotments.

There are 12 lessees who have a total of 15 grazing leases within the Planning Area for authorization to graze. The 1,464 cattle authorized to graze 3,494 AUMs is calculated using entire allotment acreage, which includes use outside the Planning Area boundary. The authorized cattle numbers, authorized AUMs (animal unit month), and the season of use listed in Table 19 are calculated for the whole grazing allotment. The seasons of use range from April 16 to October 13 annually.

Table 19. Grazing Allotment Acres Across All Lands Within and Outside of Planning Area

Allotment Name (# leases)	Summit Prairie (8)	Big Butte (4)	Neil Tarbell (1)	Derby Road Sawmill (1)	Bear Mountain (1)	Crowfoot (0)	Crowfoot Creek (1)	Cobleigh Road (0)	Total
Total Allotment Acres	91,216	44,239	562	524	1,329	9,365	516	89	**147,840**
Total Allotment Acres in Planning Area	37,136	2,929	547	100	62	715	516	89	**42,094**
Current Authorized AUMs	1,656	1,575	55	30	108	0	70	0	**3,494**
Current Authorized # of Cattle	669	666	37	10	54	0	28	0	**1,464**
Season of Use	4/16 - 9/30	4/16 – 10/13	4/16 – 5/30	4/16 – 7/15	4/16 – 6/15	5/1 – 7/15	4/16 – 6/30	6/1 – 7/15	**4/16 - 10/13**

Table 20. Maximum Percent of BLM Grazing Allotment Harvested

Allotment Name	Total BLM Allotment Acres (in and out of Planning Area)	BLM Allotment Acres in Planning Area	Harvest Acres within the Allotment	Percent BLM Acres Treated in the Allotment
Summit Prairie	30,579	14,561	2,238	7%
Big Butte	21,802	1,236	0	0%
Neil Tarbell	518	503	0	0%
Derby Road Sawmill	524	100	0	0%
Bear Mountain	1,006	20	0	0%
Crowfoot	7,400	613	0	0%
Crowfoot Creek	516	516	0	0%
Cobleigh Road	89	89	0	0%
Total	**62,434**	**17,638**	**2,238**	**7%**

The forested portions of these grazing allotments are seldom accessed by livestock resulting in utilization levels that are generally none to slight (zero to10 percent) within the forest plant community. The AUM rates/carrying capacities that are approved in a grazing lease account for the zero to10 percent limited use in forested areas.

Rationale

This issue was considered but not analyzed in further detail because there is no potential for the

Project to cause a significant effect to grazing resources nor will it cause any changes to rangeland management. Acres considered in this analysis assumed the maximum harvest potential for the Project (Alternative 2). Harvest in the Project will not cause changes to the AUMs or change the size of allotments. Proposed timber harvest would decrease stand density, increasing forage production by allowing more sunlight to the forest floor for understory growth of herbaceous vegetation in the allotment where timber harvest is proposed. Therefore, forage would increase post-harvest within treatment units but due to the small percentage (zero to seven percent) of treatment acres within allotments (see Table 20) it would not be significant. Harvest may influence known patterns of grazing use and distribution but is not likely due to the number of acres treated in comparison to the number of acres that are available for grazing use (Table 20), therefore it would not expand animal usage of forested areas. Annual compliance and utilization monitoring occurs within the allotments and would occur where timber harvest activities are implemented.

Silviculture Issue NAID #1: How would changes in canopy cover affect the potential for blowdown within and adjacent to harvest units?

Background

Blowdown, also known as windthrow, is defined by a tree or trees uprooted or felled by the wind (BLM 2016a, p. 1084). Blowdown is an abiotic naturally occurring inherently random weather phenomenon that has the potential to modify the composition, structure, and ecological functions within the proposed forested treatment units. These modifications present tradeoffs to various forested resources based on the objectives identified for these areas such as, fiber production, stand and individual tree vigor and growth, and wildlife habitat values. While there is a level of risk for windthrow events, depending on many biotic and abiotic influences, predicting windthrow would be speculative because there is no science or tools available to provide a useful estimate of the probability, likelihood, severity, magnitude and extent of such an event – if it were to actually happen.

Two of the main factors that predispose stands to windthrow include high height to diameter ratios (large/long canopies) and the topographic position (ridge, mid-slope, valley bottom) (Mitchell 2000). The residual stands' spatial arrangement of trees and where they sit on the landscape, as well as the crown condition of leave trees can both be incorporated into a prescription and logging operation implementation to decrease the probability of a damaging wind event that could potentially lengthen the time for canopy cover to recover to the desired condition. Even so, the BLM acknowledges the potential, and it has been documented that post-logging blowdown or windthrow can be an undesirable side effect of thinning, especially during the first three to five years following treatment (Cremer et al. 1982). However, windthrow occurs in both managed and unmanaged stands and low levels of windthrow may be desirable for wildlife habitat and stand complexity.

Rationale

This issue was considered but not analyzed in further detail because the context of wind events combined with the anticipated effects from the Alternatives indicate there is no reasonable possibility of significant effects. The prescriptions and project design features minimize the likelihood of increasing susceptibility to blowdown in thinned stands and to a lesser degree

(lower green tree retention) in regeneration harvest stands. Additionally, "*this type of mortality is often irregular or episodic in nature and is inherently difficult to predict the exact time in which it will occur"* (BLM 2016a, p. 1203). There is a risk of windthrow for both treated and untreated stands and it cannot be predicted where or when a windstorm could occur. Smith et al. (1997) recommend that retaining the largest and most well-developed trees because of their "thriftier crowns and stronger stems" can lower the potential for blowdown.

The various selection harvest and commercial thinning prescriptions, proposed under all Action Alternatives, would minimize blowdown risk by focusing on retaining the largest and most well-developed trees and removing low vigor trees, minimizing openings in areas that are inherently higher risk such as on ridgetops, and leaving aggregates of structural elements in the stand. Under Alternatives 2, 3, and 4, where regeneration harvest is proposed, the variable retention prescriptions would retain pre-harvest basal area levels (15-30 percent in LITA and 5-15 percent in MITA) in a variety of spatial patterns, including aggregate groups and individual trees, which would reduce some of the risk of blowdown. However, the BLM acknowledges that "risk" of blowdown is higher in stands with less retention of tree density post harvest such as regeneration harvest stands compared to stands that are thinned (Cremer et al. 1982, Smith et al. 1997).

Table 3 in the *Summary Comparison of the Action Alternatives* in Section 2.8 of the EA, and Appendix 2, Table 26 in *Proposed Treatments by Action Alternative* shows the extent and magnitude of the proposed treatments. Alternative 2 has the greatest potential to increase the risk of blowdown with 1,087 acres of regeneration harvest proposed. Alternatives 3 and 4, with 276 acres of regeneration harvest proposed, would result in less risk than Alternative 2. Alternative 5, which includes no regeneration harvest, would result in the lowest increase in risk for blowdown. Further analysis would not provide additional predictability or contribute to the decision-making process.

Wildlife Issue NAID #1: How would the alternatives affect NSO nesting-roosting or foraging habitat function?

Background

The Project is located within the range of the northern spotted owl (NSO) (*Strix occidentalis caurina*) which is listed as threatened under the Endangered Species Act (ESA). Currently within the NSO Analysis Area there are 6,291 acres of nesting-roosting and foraging habitat on federally-managed lands.

For this assessment, the Spotted Owl Analysis Area was defined by using a spotted owl metric to determine areas indirectly affected by the Proposed Action. For northern spotted owls, the areas directly or indirectly affected are usually based on the radius of a circle that would capture the provincial home range, which is 1.2 miles for the Cascades West Province where the Project is located.

Based on this distance, the Spotted Owl Analysis Area represents all federal lands within 1.2 miles of proposed treatment units and all lands within any overlapped associated provincial home ranges of known spotted owl sites that could be directly, indirectly, or cumulatively

impacted by the Proposed Action.

The following actions have the potential to affect NSO nesting-roosting and foraging habitat by modifying, downgrading, or removing habitat: timber harvest, new road/route construction, roadside vegetation management, and landing construction. Modifying habitat means when an action removes some trees, or reduces the availability of other habitat components, but does not change the current function of the habitat because the conditions classifying it would remain post-treatment. Downgrading alters the condition of NSO habitat, so it no longer contains the variables associated with nesting-roosting and foraging. Downgraded units would contain trees >11 inches in diameter and enough tree canopy cover to support NSO dispersal. Removal alters NSO habitat so that it no longer functions as nesting-roosting, foraging, or dispersal habitat. Roadside treatment maintenance would not change the function of the larger stand of NSO habitat beyond the road prism. The road prism area has been previously disturbed, and the vegetation does not contribute to the function of the adjacent habitat. Treatments would not occur beyond the original road prism/clearing limits.

The South Clark Forest Management Project is within the West Cascades Province. One of the NSO demographic study areas in the West Cascades Province is the South Cascade Demography Study Area (SCS). Recent annual reports for this study area indicate a decline in the NSO population and an increase in barred owl detections (Dugger et al., 2019; Dugger et al., 2020; Lesmeister et al., 2019; Lesmeister et al., 2020; Franklin et al. 2021), which supports the overall NSO population decline predicted in the FEIS (2016a, pp. 961, 962, 969).

Currently within the NSO Analysis Area there are 6,291 acres of nesting-roosting and foraging habitat (37 percent of total federal acres). Action alternatives 2, 3, and 4 would reduce the amount of nesting-roosting (NR) and foraging habitat in the NSO Analysis Area, leaving 29 percent of total federal acres as NR and foraging habitat. Of nesting-roosting and foraging habitat in the Analysis Area, Alternatives 2 and 3 leave 4,654 acres, Alternative 4 leaves 4,678 acres, with Alternative 5 having the lowest reduction leaving 5,853 acres post-treatment. The BLM explained that under the RMP, BLM-administered lands would support 352,100 acres of strongly-selected-for habitat in 10 years, a 2.0 percent increase from the current level, and then would support increasing acres of strongly-selected-for habitat each subsequent decade, reaching 496,800 acres in 50 years, a 44 percent increase from the current level. This habitat development was nearly identical under a “no harvest” reference analysis (BLM 2016a, p. 994). The amount of nesting-roosting and foraging habitat modified, downgraded, or removed varies by Alternative and is presented in Tables 21 and 22.

Table 21. Effects of Commercial Harvest and Road and Landing Construction on Nesting-roosting and Foraging Habitat in the NSO Analysis Area

Action Alternative	UNIT TREATMENT ACRES						
	Foraging Downgraded	Foraging Modified	Foraging Removed	Nesting-Roosting Downgraded	Nesting-Roosting Modified	Nesting-Roosting Removed	Total
Alternative 2	0	2	1,103	0	0	534	1,639
Alternative 3	606	2	497	94	0	440	1,639
Alternative 4	603	2	477	94	0	439	1,615
Alternative 5	0	1,019	54	366	0	19	1,458

Table 22. Effects of Roadside Maintenance Treatment on Nesting-roosting and Foraging Habitat

Action Alternative	ROADSIDE TREATMENT ACRES		
	Adjacent to Foraging	Adjacent to Nesting- Roosting	Total
Alternative 2	6	15	21
Alternative 3	6	15	21
Alternative 4	4	12	16
Alternative 5	4	14	18

Rationale

The BLM did not analyze this issue in further detail because there is no potential for significant effects beyond those already analyzed in the FEIS, to which this EA is tiered. The BLM designed the Project to follow the management direction from the RMP for each LUA. In the FEIS, the BLM modeled for variable retention harvest in LITA and MITA and selection harvest in the UTA (BLM 2016a, Table C-13, p. 1186). The Alternatives proposed in the South Clark Forest Management Project would apply various amounts of commercial thinning, regeneration harvest, or selection harvest. By the allocation of the HLB, the BLM made all lands in this allocation available for timber harvest and planned that all HLB lands over time would be harvested, consistent with the management direction (BLM 2016b, p. 126). The BLM, in the FEIS, analyzed the effect of allocating the Planning Area to the HLB on NSO nesting-roosting habitat (BLM2016a, pp. 346-347, 928-947). The FEIS analyzed the effect of this harvest of NSO habitat together with the effects of other RMP decisions and concluded that implementation of the RMP would contribute to a landscape that supports large blocks of NSO habitat that are capable of supporting clusters of reproducing owls, distributed across a variety of ecological conditions and spaced to facilitate owl movement between the blocks (BLM 2016a, pp. 932-941). Those analyses are incorporated here by reference.

The U.S. Fish and Wildlife Service (USFWS) confirmed in their BO on the RMP that these analyses are a reasonable approach to assessing NSO habitat change in the Planning Area resulting from timber harvest, ingrowth, and wildfire because it reflects the application of best available science and the acreages of land that will be subject to the range of management activities in the land use allocations in the RMP (USFWS 2016, p. 603).

As described earlier in the EA, the South Clark Project is within the FEIS analysis area and only implements activities analyzed in the FEIS. The FEIS assumed an average annual harvest level of 278 MMbf per year (205 MMbf from the Harvest Land Base and 73 MMbf from non-ASQ related harvest) over the entire Western Oregon FEIS decision area (FEIS, p. 307). The expected annual harvest for the Medford District is 37 MMbf from the Harvest Land Base (FEIS, p. 341), and the South Clark Project would harvest 11.0 to 28.5 MMbf. Because the Project implements only a portion of the projected annual and decadal timber harvest within the HLB, the project presents no potential of exceeding the effects of implementing the SYU's timber harvest program of work, which were already disclosed in the FEIS (BLM 2016a, pp. 350-361, 1215-1217). With the incorporation of PDFs to align the Project with the RMP's required management direction, this project presents no new or unique facts or circumstances that deviate from the modeling assumptions used in the FEIS or would cause the SYU to harvest in excess of the projections or owl effects analysis of the FEIS.

Alternative 5 commercially treats eight percent less (181 acres) than Alternative 2, reduces 181 acres of NR and foraging from being downgraded, modified, or removed, and treats two acres total (versus 47 acres) in the nest patches of sites with higher NSO Conservation Priority (Categories 1, 2 and 3a). This change would potentially have large impacts by maintaining habitat in historic activity centers that would allow for re-occupation of these sites, which follows the intent of Recovery Action 10 from the Northern Spotted Owl Recovery Plan, which is to protect, enhance and develop habitat in the quantity and distribution necessary to provide for the long-term recovery of spotted owls (USDI FWS 2011, p. III-43 – 47). Given the severe biological stressors currently affecting the NSO, when designing, locating, and implementing actions in the HLB, the BLM would reduce, avoid, or delay negative impacts to NSO known sites located in the HLB, and avoid causing the abandonment of NSO known sites located in other land use allocations, to the extent consistent with the management objectives and management direction for the HLB (BLM 2016b, p. 129). Alternative 5 was designed to reduce, avoid, and delay negative impacts to NSO Conservation Priority Sites, consistent with RMP-ROD Appendix A guidance (BLM 2016b, p. 130), and NSO Recovery Plan Recovery Action 10 guidance (USDI FWS 2011, p. III-43 – 47).

In conclusion, none of the alternatives have the potential for significant effects to NSO habitat beyond those already analyzed in the FEIS because the project design and site-specific information is consistent with analysis in the FEIS. In addition, the Project would not result in substantially different effects than what was analyzed for in the FEIS, to which this EA tiers, and there is no new information that would substantially change the conclusion reached in the FEIS.

Wildlife Issue NAID #2 How would the proposed alternatives affect the NSO's ability to disperse between, and through, large blocks of NSO habitat?

Background

Dispersal function for the spotted owl consists of an assemblage of conifer-dominated forest stands that the owls can use for dispersal movements across the landscape. Dispersal habitat for spotted owls includes nesting-roosting, foraging, and dispersal-only habitat. Fifth field watersheds can provide a landscape-level qualitative evaluation for dispersal function using the concepts of Thomas, et al. (1990), as described below, along with more recent analyses of dispersal function per Lint, et al. (2005) and Davis, et al. (2011). Thomas, et al. (1990), originally recommended assessing dispersal habitat conditions on the quarter-township scale and managing forested landscape so 50 percent of each quarter-township contain dispersal habitat. These levels were used to describe suitable habitat to support the transient phase of spotted owl dispersal. Since then, the USFWS has generally recommended using a 5th field or larger landscapes for assessing dispersal habitat conditions because watersheds or provinces offer a more biologically meaningful way to evaluate dispersal function.

More recent information (Davis, et al. 2016), suggests that landscapes having at least 40 percent of dispersal habitat conditions (including both older and younger forests) would be sufficient to support spotted owl dispersal across the landscape. Miller et al. (1997, p. 145) also found that dispersing spotted owls selected for closed-sapling-pole saw timber stands. In general, dispersing spotted owls tend to avoid more open forest conditions (Miller et al. 1997). Fragmented forest landscapes are more likely to be used by spotted owls in the transience phase as a means to move rapidly between denser forest areas (Courtney et al. 2004, pp. 5-13; USDI FWS 2012a, p. 71906). Movements through closed canopy forests occur during the colonization phase when owls are looking to become established in an area (Miller et al. 1997, p. 144; Courtney et al. 2004, pp. 5-13). Transient dispersers use a wider variety of forest conditions for movements than colonizing dispersers, who require habitats resembling nesting-roosting and foraging habitats used by breeding birds (USDI FWS 2012a, p. 71902).

The South Clark Project is within the Big Butte Creek 5th field watershed. Table 23 provides estimates of the current NSO dispersal habitat conditions within the watershed associated with the South Clark Project. This information represents the best available habitat data and analysis approach to evaluate dispersal-habitat function for NSOs. For this evaluation, the BLM used the updated Medford BLM habitat to characterize nesting-roosting, foraging, dispersal, capable, and non-habitat across the region and across all ownerships.

Table 23. Dispersal Habitat Conditions (Acres and Percent of Total Acres) in the Watershed Associated with the South Clark Project

Watershed	Current	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Dispersal Acres and % of Total Acres				
Big Butte Creek	101,400 (65%)	99,179 (63%)	99,944 (64%)	99,968 (64%)	101,283 (65%)

Rationale
The dispersal removal associated with the South Clark Project would not drop the amount of dispersal habitat below the 40 percent threshold post-harvest in the watersheds (Table 23).

The effect of timber harvest from the proposed alternatives on NSO habitat for dispersing in the Planning Area is not analyzed in detail because there is no potential for significant effects beyond those already analyzed in the FEIS, to which this EA is tiered. The FEIS evaluated landscape dispersal capability across all ownerships and across the entire Western Oregon Decision Area (USDI BLM 2016a, p. 947). The FEIS concluded that actions implemented under the RMP would maximize the BLM's contribution to a landscape that facilitates northern spotted owl movement between and through large blocks of nesting, roosting, and foraging habitat and ensures the survival of dispersing owls (BLM 2016a, pp. 946-947). That analysis is incorporated here by reference. As described in this EA, the BLM designed the Project to follow the management direction from the RMP. For the South Clark Project, the BLM evaluated potential effects of the project to dispersal function at a more localized watershed scale. As mentioned above, 5th field watersheds can provide a landscape-level qualitative evaluation for dispersal function at a more localized scale.

Removal of dispersal-only habitat, as well as nesting-roosting and foraging habitat used for dispersal, would occur from the proposed timber harvest and road and landing construction. As noted in Table 23, all dispersal habitat removal associated the South Clark Project would not drop the amount of dispersal habitat below the 40 percent threshold post-harvest in the Big Butte Creek watershed. The removal of dispersal-only, nesting-roosting, and foraging habitat would not preclude owls from dispersing throughout the NSO Analysis Area post-treatment. The units would be dispersed throughout multiple sections and large blocks of non-habitat would not be created that would create barriers or preclude owls from dispersing through the watershed. Therefore, the owls would still be able to disperse throughout and between the watersheds. Forest landscapes traversed by dispersing owls typically include a fragmented mosaic of roads, clear-cuts, and non-forested areas, and a variety of forest age classes ranging from fragmented forests on cutover areas to old-growth forests (Forsman, et al. 2002).

There is no new information that would substantially change the conclusion reached in the FEIS, to which this EA is tiered. As described above, the effects to dispersal function at the landscape scale from the proposed EA are within the analysis for spotted owl dispersal within the FEIS. Additionally, the watersheds would continue to support spotted owl dispersal at the landscape scale.

Wildlife Issue NAID #3: How would proposed forest vegetation treatments and new route and landing construction affect NSO critical habitat?

Background
In November 2021, the USFWS revised the designation of critical habitat for the NSO by withdrawing the January 15, 2021 final rule (USDI FWS 2021a). The revised designation of critical habitat (CH) from the 2012 critical habitat rule reduced the amount of CH by approximately 204,294 acres, mostly on harvest land base in Oregon, and became effective on

December 10, 2021 (USDI FWS 2021b). A critical habitat unit identifies geographic areas on federal land that contain features essential for the conservation of the NSO and may require special management considerations. This project is in CHU 10, sub-unit KLE-5. Approximately 14 percent (2,460 acres) of federal land, within the NSO Analysis Area, is designated as critical habitat (primarily federal lands are designated as critical habitat, with a small amount of State and local government lands, range wide, designated as CH). Of the spotted owl critical habitat in the NSO Analysis Area, 77 percent (1,885 acres) is dispersal quality habitat (nesting-roosting and foraging plus dispersal-only habitat), and 54 percent (1,321 acres) is nesting-roosting and foraging habitat.

Rationale

The effect and the proposed alternatives on NSO CH in the Planning Area is not analyzed in detail because there is no potential for significant effects beyond those already analyzed in the FEIS, to which this EA is tiered (BLM 2016a, pp. 990-993). The analysis of the RMP on NSO critical habitat was based upon the vegetation modeling (including timber harvest and growth) in the FEIS. The USFWS predicted, in the Biological Opinion for the Western Oregon Resource Management Plan (2016), that uneven-aged management would result in the loss of primary biological features, such as nesting-roosting and foraging habitat, in the HLB. The Service also concluded that these losses would be mitigated because during this same time span, NSO habitat in critical habitat in reserved LUAs would develop through ingrowth and through management actions, such as thinning designed to speed the development of critical habitat primary biological features (USFWS 2016, pp. 690 and 691).

The BLM designed this project to follow the management direction from the RMP for each LUA. In the FEIS, the BLM modeled for variable retention harvest in LITA and MITA and selection harvest in the UTA (BLM 2016a, Table C-13, p. 1186). The action alternatives proposed in the South Clark Project would apply various acres of commercial thinning, regeneration harvest, and selection harvest. By the allocation of the HLB, the BLM made all lands in this allocation to be available for timber harvest and planned that all HLB lands over time would be harvested, consistent with the management direction (BLM 2016b, p. 126). Because the project implements only a portion of the projected annual and decadal timber harvest within the HLB, the project presents no potential of exceeding the effects of implementing the SYU's timber harvest program of work, which were already disclosed in the FEIS (BLM 2016a, pp. 350-361, 1215-1217). With the incorporation of PDFs to align the project with the RMP's required management direction, this project presents no new or unique facts or circumstances that deviate from the modeling assumptions used in the FEIS or would cause the SYU to harvest in excess of the projections or owl effects analyzed in the FEIS. That analysis is incorporated here by reference.

Under Alternative 2 (maximum treatment between all alternatives) the proposed treatments within the Harvest Land Base would reduce the amount of dispersal-only habitat in CH by 13 acres and nesting-roosting or foraging habitat by eight acres in the NSO Analysis Area. Additionally, under Alternative 2, proposed landing construction would reduce nesting-roosting, foraging, or dispersal habitat by one acre in riparian reserve and by two acres in Late-Successional Reserve (see also Wildlife NAID #12 for effects to LSR). However, the potential reduction of spotted owl habitat would not alter the intended sub-unit function of providing

connectivity between subunits and critical habitat units because these changes are insignificant at the sub-unit scale and therefore, would not affect the dispersal of owls between sub-units. Additionally, the proposed actions would not affect the ability for the critical habitat subunits to provide demographic support because incidental take of spotted owls would not occur under all action alternatives, so the proposed actions would not affect spotted owl occupancy at active sites.

As described in the EA, the proposed South Clark harvest is well within the projected annual and decadal timber harvest within the HLB, which was the basis for the spotted owl critical habitat analysis in the FEIS. The Project is consistent with the FEIS projections as to the rate and intensity of harvest by CHU subunit (RMP Terrestrial BiOp at 505-510; 684-687; 694-696); Therefore, the project presents no potential of exceeding the effects of implementing the SYU's timber harvest program of work. There is no new information that would substantially change the conclusion reached in the FEIS, to which this EA is tiered.

Wildlife Issue NAID #4: How would noise from proposed activities affect NSOs during their nesting season?

Background
Nesting owls are confined to an area close to the nest, but once the young fledge, they can move away from noise and activities that might cause them harm. The BLM is conducting surveys to protocol in the spotted owl Analysis Area (as defined in Wildlife Issue NAID #1) to determine occupancy and nesting status (USFWS 2012b, Revision). No timber harvest, road/landing construction, post-harvest fuels, or roadside treatments would occur within the distances specified in Appendix 3 from occupied owl sites (PDF #14), between March 1 and July 15. The restriction may be extended up to September 30 based on site specific conditions.

Rationale
This issue was considered but not analyzed in further detail because the potential for NSOs to be impacted by noise associated with proposed project activities is eliminated through the implementation of PDFs. These PDFs would restrict activities to outside of the breeding season for occupied owl sites (if located), and/or occur at or beyond recommended disturbance distance thresholds from known, occupied owl sites. These PDFs are derived from disturbance and disruption distances for spotted owls from the FEIS Biological Opinion (USDI FWS 2016; Table 227, pp. 597-600 & Table 50, pp. 230-232). The RMP includes the following management direction: "Do not authorize timber sales that would cause the incidental take of NSO territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP has begun" (BLM 2016b, p. 121). This direction would also apply to incidental take as a result of noise generated from timber harvest activities. Therefore, the Project will not cause incidental take from noise disturbance through implementation of PDFs. This issue is not analyzed in detail because there is no effect to spotted owls from noise disturbance since all project activities would follow mandatory PDFs that restrict activities to outside of the breeding season and are at or beyond recommended disturbance distance thresholds.

Wildlife Issue NAID #5: How would the action alternatives affect known wildlife species found on the Oregon/Washington State Director's Special Status Species List (BLM 2021) and their habitat in the Planning Area?

Background
Wildlife survey databases were reviewed for known locations of Special Status Species. For species not directly observed within the Planning Area, the BLM wildlife biologist determined whether or not a species' known range extended into the Planning Area (based on literature review and historic records), whether or not surveys located a species, and whether or not a species' habitat was present within the Planning Area.

Bureau Sensitive wildlife species known to be, or could be, present in the Planning Area are: bald eagle (*Haliaeetus leucocephalus*), Lewis' woodpecker (*Melanerpes lewis*), grasshopper sparrow (*Ammodramus savannarum*), monarch butterfly (*Danaus plexippus*), western bumble bee (*Bombus occidentalis*), foothill yellow-legged frog (*Rana boylii*), fringed myotis bat (*Myotis thysanodes*), Townsend's big eared bat (*Corynorhinus townsendii*), pallid bat (Antrozous pallidus), fisher (*Pekania pennant*), Oregon shoulderband mollusk (*Helminthoglypta hertleini*) Siskiyou hesperian mollusk (*Vespericola sierranus*), and western pond turtle (*Actinemys marmorata*).

Through habitat modification or ground disturbance, activities that may impact special status wildlife species present in the Planning Area include timber harvest and yarding (ground-based and skyline-cable), fuels reduction treatments, roadside vegetation treatments, and road and landing construction. Activities that would not affect habitat but may cause noise disturbance include road renovation and improvement, timber haul, and road decommissioning.

Rationale
This issue was considered but not analyzed in further detail because there is no potential for significant effects or significant effects beyond what was analyzed in the FEIS (pp. 825-852, 890-894), to which this EA is tiered. The incorporation of PDFs further reduces any potential impacts to special status wildlife species that may be present in the Planning Area. The BLM would retain sufficient habitat to support special status wildlife species to persist within the Planning Area.

1. How would proposed changes in forest canopy and structure from vegetation treatments and road work activities affect late-successional characteristics, snags and coarse woody debris, and the wildlife dependent on these structures (NSO, fisher, and bats)?

Background
Snags and coarse woody debris are important habitat elements for a variety of wildlife species, including T&E and Bureau Sensitive Species. The BLM's Planning Criteria Document (BLM 2014) summarizes habitat needs for these species, which was the basis of the FEIS to which this EA is tiered.

Fisher were detected along the eastern edge of the Planning Area in 2010 and 2012. Cameras were deployed within the Planning Area in 2010, 2011, 2012, and 2022.

Three Bureau Sensitive bats have been observed in the Planning Area. The Bureau Sensitive Species are fringed myotis (*Myotis thysanodes*), Townsend's big-eared bats (*Corynorhinus townsendii*), and pallid bats (*Antrozous pallidus*).

Northern spotted owls (*Strix occidentalis caurina*) historically were present in the Planning Area.

Rationale
The effect of the alternatives on snags and coarse woody debris is not analyzed in detail because there would be no potential for effects beyond those analyzed in the FEIS, to which this EA is tiered. With PDFs to align the Project with RMP required management direction, the Project presents no new or unique facts or circumstances that deviate from the modeling assumptions used in the FEIS. The FEIS analyzed the effects of timber harvest and other RMP decisions on the density of snags and coarse woody debris (BLM 2016a, pp. 843-844; 1657-1666). That analysis assumed a magnitude and intensity of timber harvest and vegetation management treatments that include the acreages and treatment types proposed and projected an increase in habitat for species dependent on these legacy structures in stands of all ages. That analysis is incorporated here by reference. Additionally, RMP management direction and the PDFs will ensure all actions retain large snags and coarse woody debris except where necessary to remove for safety, operational, or fuels reduction reasons.

For species dependent upon late-successional characteristics unique stand features such as snags, large down woody material, large hardwoods, and legacy trees these features would be retained to maintain desired structural components for wildlife in treated stands (Section 2.2.1, BLM 2016b, pp. 62-63, 65, 68). Under all Alternatives there would be less than an 11 percent reduction in acreage of habitat on BLM-managed land that exhibits late-successional characteristics: large overstory trees (>21 inches in diameter), cavities, and multiple tree layers. Unique stand features listed above would also be retained in these acres and could continue to be used. There would continue to be a minimum of 4,488 acres retained on BLM-managed land exhibiting these late-successional characteristics with approximately 1,258 acres (28 percent) in LSR. PDFs such as the retention of key structural elements such as legacy trees, snags, large down woody material, and large hardwoods, would lessen impacts to these species. Following treatments, these species would persist in the Planning Area, and that late-successional habitat would rise from current below-average levels to average, historical levels over the next 50 years. This is consistent with the findings in the FEIS, which concluded that the combined amount of mature and structurally-complex forest habitat in the Western Oregon Planning Area in 50 years (68– 80 percent) would be within the range of the average historic conditions, as would the amount of stand establishment and young forests (BLM 2016a, p. 840).

2. How would the proposed vegetation treatments affect bald and golden eagles and their habitat?

Background
The USFWS listed bald eagles as an endangered species under the ESA on March 11, 1967 (fws.gov 2022), reclassified them as a threatened species July 12, 1995 (USDI FWS 1995), and delisted them due to recovery on July 9, 2007 (USDI FWS 2007). Bald eagles are currently Bureau Sensitive species, and bald and golden eagles are protected under the MBTA and the

Bald and Golden Eagle Protection Act. Bald and golden eagles have been observed within the Planning Area. They primarily nest in mature or old-growth trees; snags (dead trees); cliffs; rock promontories; rarely on the ground; and with increasing frequency on humanmade structures such as power poles and communication towers.

Rationale

The effects of the proposed alternatives to bald and golden eagles are not analyzed in detail because there would be no potential for effects beyond those analyzed in the FEIS, to which this EA is tiered (BLM 2016a, pp. 825-828, 883-885). The proposed vegetation management activities would not affect the persistence of eagles in the Planning Area. Additionally, the implementation of PDFs would prevent disturbance to nesting eagles by implementing seasonal restrictions during the breeding season. The PDFs would apply if a new nest were found within the specified buffer distances. In treated stands, legacy trees would be retained to maintain desired structural components for eagle nests, and buffers and seasonal restrictions would be implemented at known eagle nest sites (PDF # 13). This is consistent with the management direction in the RMP, which states to protect known eagle nests (including active nests and alternate nests) and bald eagle winter roosting areas; and prohibit activities that will disrupt bald eagles or golden eagles that are actively nesting (BLM 2016b, p. 116). This is also consistent with the findings in the FEIS (BLM 2016a, p. 828), which concluded that overall bald eagle populations would continue to grow, habitat availability would increase, and the seasonal restrictions would avoid disruption of nesting.

3. How would the proposed vegetation treatments affect western pond turtles and their habitat?

Background

Western pond turtles are associated with ponds, rivers, and large waterbodies and spend most of their life cycle in aquatic environments but must leave the water to dig terrestrial nests and lay their eggs. The western pond turtle requires aquatic habitat for feeding/basking and open upland habitat for nesting/overwintering. There is a known observation of western pond turtle, and their habitat exists, within the Planning Area.

Rationale

Landings and temporary road and temporary skid trail construction overlaps riparian reserves (RR) across the project area, occurring in 0.13 percent of RR reserve acres in the Project Area (see also Hydrology Issue NAID #3). Individual western pond turtles nesting or over-wintering upland from water sources may be impacted in the short-term, but the area would continue to function as habitat. Following treatments, the BLM anticipates the western pond turtle population would persist in the Planning Area. The RRs throughout the Planning Area would continue to function as habitat for these species. Very few individuals or nests have the potential to be impacted, so it would not rise to a population level effect. The addition of PDFs would minimize the potential for impacts even more. This is consistent with the findings in the FEIS, which concluded that there would be no change in western pond turtle habitat across the Western Oregon Planning Area by the year 2063 (BLM 2016a, p. 1670, Table S- 33).

4. How would the proposed vegetation and fuels treatments affect western bumble bees and their habitat?

Background
Western bumble bees (*Bombus occidentalis*) are a Bureau Sensitive species. Bumble bees require a constant and diverse supply of flowers that bloom throughout the colony's life cycle, from spring to autumn (Xerces Society and Thorp 2010, p. 11). These resources would typically be found in open (non-forested) meadows in proximity to seeps and other wet meadow environments. Bumble bees are generalist foragers, meaning they gather pollen and nectar from a wide variety of flowering plants (Xerces Society 2013, pp. 27-28). Preferred habitat for western bumble bees includes meadows, oak woodlands, and brush fields with floral resources. The Project is not proposing treatments in any of these habitats.

Rationale
Treatments in conifer forests are not expected result in direct effects to western bumble bees because most units do not provide high quality habitat due to relatively high canopy cover and the lack of important floral species. No treatments are occurring in the species' high-quality habitat, like meadows, oak woodlands, or brush fields with floral resources.

There are no known historic records of western bumble bees within the Planning Area. The effect of the proposed actions on Bureau Sensitive bumble bees was considered but not analyzed in further detail because there is no potential for significant effects.

Wildlife Issue NAID #6: How would timber harvest and forest management activities affect gray wolf denning and rendezvous sites during their reproductive season?

Background
West of Highways 395/78/95 the gray wolf (*Canis lupus*) was removed from the federal ESA Threatened and Endangered list on January 4, 2021, then relisted on February 10, 2022 as Federally Endangered. An Area of Known Wolf Activity (AKWA) is designated by Oregon Department of Fish and Wildlife (ODFW) showing where an individual or group of wolves have been documented repeatedly over a period of time. The Planning Area is within an AKWA.

Wolves are habitat generalists and roam across large areas. Important attributes of wolf habitat include forest cover, public land, high ungulate density, low livestock density (BLM 2016a, p. 892) and minimal human activity (Oakleaf et al. 2006, Belongie 2008). GPS location data indicated wolves in Oregon primarily use forested habitat with seasonal shifts to more open habitats that reflect seasonal distributions of prey (e.g., lower elevation elk wintering areas) (Oregon Department of Fish and Wildlife, 2015). Important wolf habitat components for reproduction are denning sites and rendezvous sites. Den sites may be in hollow logs, clefts between rocks, deep riverbank hollows, spaces under upturned trees or rock overhangs, or in abandoned dens of other animals.

PDFs would minimize potential effects to wolves by retaining potential denning structure on the landscape under each alternative. Additionally, PDFs would also prevent disturbance to known

active den sites. Communication with the USFWS and ODFW regarding wolf dens and rendezvous sites will continue on an annual basis during the life of the Project. If a den or rendezvous site is identified prior to, or during project activities, consultation Project Design Criteria will be implemented.

Rationale

The effect of the proposed actions on gray wolves was considered but not analyzed in further detail because there is no potential for significant effects beyond what has already been analyzed in the FEIS, to which this EA is tiered (BLM 2016a, pp. 890-894). That analysis concluded that there is sufficient habitat in the Planning Area to support gray wolves. The FEIS (BLM 2016a, p. 892) stated "Land-use practices do not appear to be affecting viability of wolves and do not need modification to conserve the subspecies. Land development projects can render some areas less suitable for wolves, but land-use restrictions are not necessary to ensure conservation of the subspecies." Under all action alternatives large coarse woody debris would be retained to maintain desired structural components to support wolves denning and rendezvous sites. Additionally, there is no potential for significant impacts to wolves due to the Project because of the incorporation of PDFs. Effects from disturbance would be assessed on an ongoing basis throughout the life of the project through annual updates and communication with the USFWS and ODFW. A one-mile seasonal restriction from noise disturbance would be implemented for known active den sites from March 1 through June 30 (PDF #11) if located.

Wildlife Issue NAID# 7: How would proposed vegetation treatments and new road and landing construction affect the species addressed by the Migratory Bird Treaty Act and their habitat?

Background

Land birds use a wide variety of habitats, including late-successional forests, riparian areas, brush in recovering clear-cuts, small trees in developing stands, oak-savannahs, grasslands, meadows, and chaparral habitats. An objective of the RMP is to conserve or create habitat for species addressed by the Migratory Bird Treaty Act (MBTA) and the ecosystems on which migratory birds depend (BLM 2016b, p. 115).

In 2021, the USFWS released The Birds of Conservation Concern 2021 (BCC) (USDI FWS 2021c) to highlight which species should receive special attention in land management activities. This publication identifies species, subspecies, and populations of migratory and non-migratory birds in need of additional conservation actions, updating the Birds of Conservation Concern List from 2008. This list meets USFWS mandates for the conservation of migratory game birds and non-game birds. Bird taxa considered for the BCC 2021 lists include nongame birds, and gamebirds without hunting seasons or where hunting is minimal. Excluded from consideration for the BCC 2021 are bird species not protected under the Migratory Bird Treaties, bird taxa already listed as threatened or endangered under the ESA, or taxa that only occur irregularly or peripherally in the USA.

Landbird species of conservation concern that may be affected by forest treatments and that have been located within, or are within range of, the Planning Area are: evening grosbeak,

flammulated owl, long-eared owl, olive-sided flycatcher, rufous hummingbird, varied thrush, and Vaux's swift. Habitat for seabirds and shorebirds will not be affected under the Project; therefore, those bird species will not be included in this analysis.

Rationale

The effects of the proposed alternatives to landbird populations in the Planning Area are not analyzed in detail because there is no potential for effects beyond those already analyzed in the FEIS, to which this EA is tiered (BLM 2016a, pp. 830-852). The FEIS concluded there would be a 57 percent reduction in rufous hummingbird habitat, a 59 percent reduction of olive-sided flycatcher habitat, a 25 percent increase in varied thrush habitat, and a 22 percent increase in Vaux's swift habitat across the Western Oregon Planning Area by year 2063. For the 34 Landbird Focal Species that were analyzed, the FEIS concluded that 26 would see an increase in habitat by 2063 while eight would see a decrease (BLM 2016a, pp. 1691-1697, Table S-37). For the flammulated owl and evening grosbeak, whose habitat requirements are like that of the varied thrush, the combined amount of mature and structurally-complex forest habitat in the decision area in 50 years (68–80 percent) would be within the range of the average historic conditions, as would the amount of stand establishment and young forests (BLM 2016a, p. 840). Habitat preferences for the long-eared owl are like those of the olive-sided flycatcher. As stated above, there would be up to a 59 percent reduction in habitat by 2063.

Proposed treatment areas would likely occur over the course of at least three to five years within the 18,447 acres of BLM-administered lands in the Planning Area. Up to 13 percent of BLM lands within the Planning Area would be treated, but staggered treatments would reduce the immediate disturbance to nesting birds to an undetectable level. Over time, these treatments would create a mosaic landscape with increased structure and biodiversity, which may provide a long-term benefit to bird and wildlife species.

There would be no perceptible shift in species composition during the breeding season following treatment, and future breeding seasons, because of the limited scale of habitat modifications in relation to the Planning Area.

Adequate undisturbed areas within and adjacent to the Planning Area would maintain habitat for displaced individuals and snags that would be retained would continue to provide nest structures. This issue was considered but was not analyzed in further detail because there would be no perceptible shift in species composition because undisturbed areas within and adjacent to the Planning Area would maintain habitat for displaced individuals. Overall, populations in the region would be unaffected due to this small amount of habitat and/or reproduction loss. Analyzing bird populations at this scale is supported by Partners in Flight (California Partners in Flight 2002). Currently existing populations of migratory birds would continue to persist in the Planning Area post-treatment.

Wildlife Issue NAID #8: How would proposed treatments affect snags and large hardwoods used by woodpeckers and cavity nesters?

Background

Snags and coarse woody debris are important habitat elements for a variety of wildlife species,

including T&E and Bureau Sensitive species. Snags and large live hardwoods frequently contain cavities and are a vital source of shelter, food, and safety for many birds and mammals that are cavity nesters. Some cavities are excavated by birds (primary-cavity users) while others are created by decay associated with wounding or branch mortality. Two Bureau Sensitive woodpeckers, Lewis's woodpecker (*Melanerpes lewis*) and white-headed woodpecker (*Dryobates albolarvatus*), may be present in the Planning Area. Lewis's woodpeckers are associated with open woodlands near streams and rivers. Habitat preference includes hardwood oak stands with scattered ponderosa pine near grassland shrub communities. Lewis's woodpeckers may be present in the Planning Area during the fall and winter seasons (migratory). The white-headed woodpecker is typically associated with open ponderosa pine, sugar pine, or mixed conifer stands dominated by ponderosa pine. They forage on ponderosa pine seed and insects and use large snags (> 20 inches) for nesting.

Other woodpeckers present in the Planning Area are pileated, hairy, downy, acorn, and northern flicker. Other bird cavity nesters that may be present include red-breasted sapsucker, wood duck, tree swallow, western bluebird, and multiple species of owls. Mammals that may be present in the Planning Area that rely on cavities are fisher, raccoons, squirrels, porcupines, deer mice, and flying squirrels.

Rationale

The effect of the alternatives on snags and coarse woody debris is not analyzed in detail here because there would be no potential for effects beyond those analyzed in the FEIS, to which this EA is tiered. With PDFs to align the project with RMP required management direction, the project presents no new or unique facts or circumstances that deviate from the modeling assumptions used in the FEIS. The FEIS analyzed the effects of timber harvest and other RMP decisions on the density of snags and coarse woody debris (BLM 2016a, pp. 843-844; 1657-1666). That analysis assumed a magnitude and intensity of timber harvest and vegetation management treatments that include the acreages and treatment types proposed, and projected an increase in habitat for species dependent on these legacy structures in stands of all ages. That analysis is incorporated here by reference. The BLM would retain unique stand features, such as large snags (except where necessary to remove for safety, operational, or fuels reduction reasons) and hardwoods, which would maintain desired structural components for woodpeckers and cavity nesters (BLM 2016b, pp. 62-63, 68, 71, 76). Additionally, timber harvest treatments would promote and retain healthy ponderosa pine trees greater than 36 or 40 inches in diameter (depending on LUA) within the mixed conifer stands. Habitat would be retained for Lewis's woodpecker because no treatments are proposed in oak woodland habitat. Overall, woodpecker and cavity dependent species habitat would be retained or promoted through proposed treatments. Individuals may be impacted if a snag is felled for safety reasons or removed by fuels treatments. There is no potential for adverse impacts to these species at the population level.

Wildlife Issue NAID #9: How would the forest management activities affect competition or displacement between barred owls (*Strix varia*) and NSOs?

Background

Barred owls exert pressure on northern spotted owls through interference competition, where

barred owls deny spotted owls access to resources through territorial interaction, and exploitation competition where barred owls use some or all of the resources necessary for spotted owl fitness (e.g., prey species), reducing their availability to NSOs (Wiens et al. 2014, p. 30). Demographic evidence strongly suggests that barred owls are the dominant competitor (Franklin et al. 2021, entire). The most recent spotted owl meta-analysis (Franklin et al. 2021 entire) found range-wide evidence that the negative consequences of competition with barred owls have increasingly overwhelmed the decreasing spotted owl population since the 2016 meta-analysis (Dugger et al. 2016, entire).

Barred owls and spotted owls have a high degree of niche overlap, preferentially selecting for the same forest cover types and food resources, although the barred owls' niche width is wider than spotted owls, preying on a wider variety of species and at least in some forest types, selecting for a wider variety of forest cover types (Wiens et al. 2014; Irwin et al. 2020). Barred owls' more generalist character allows them to have relatively smaller home ranges and produce more young annually than the more specialized northern spotted owl (Hamer et al. 2007; Singleton et al. 2010; Wiens et al. 2014).

Where one species is competitively dominant over another and where there is a high degree of habitat overlap, only spatial segregation would ameliorate the effects of such competition. For two competitor species to persist on the same landscape, there must be exclusively suitable habitat for both species (i.e., areas only used by one of the two species, or some other form of spatial or temporal niche separation) (Carrete et al. 2005). There is currently little evidence suggesting that spotted owl habitat is not also selected for by barred owls (Wiens et al. 2014; Franklin et al. 2021). Dugger et al. (2011) suggested that in their Southwestern Oregon study area, exclusive spotted owl habitat may not exist. Some studies found that spotted owls used steeper slopes, particularly draws and drainages, when barred owls were present (Wiens et al. 2014; Irwin et al. 2020) and may expand their home range use area to forage in areas further from their nest site (Irwin et al. 2020, Table 3, p. 109). These behaviors are likely the result of attempts to avoid interactions with barred owls, decreased prey availability due to barred owl additive predation, or both. Spotted owls are central place foragers and likely have a finite limit on the expansion of their home range before they become energetically limited (Rosenberg and McKelvey 1999) and unsuccessful in reproduction or territorial defense.

Natural spatial segregation is unlikely for barred owls and spotted owl populations. Barred owls are present and expanding in population and space throughout the spotted owl range (Franklin et al. 2021; Lesmeister et al. 2022). Fine scale spatial segregation (within territory) may reduce the effects of barred owls on spotted owls, but the overall magnitude of the barred owl effect is several times larger than any habitat effect (Dugger et al. 2011; Franklin et al. 2021).

Rationale

The effects of the proposed Alternatives on interactions between barred owls and NSOs are not analyzed in detail because there would be no potential for significant effects beyond those analyzed already in the FEIS, to which this EA is tiered (BLM 2016a, pp. 947-973). The FEIS described the effect of competition from barred owls on NSOs and concluded that current research provides no evidence that the BLM can manage individual forest stands to provide NSOs with a competitive advantage over barred owls (BLM 2016a, pp. 947– 948; Dugger et al.

2011; Wiens et al. 2014). That discussion is incorporated here by reference.

There is no evidence that "more" acres of older forest would alter the competitive relationship between barred owls and northern spotted owls at the population levels, particularly given barred owls' demonstrated ability to rapidly expand in range and population. Most research and modeling show a general expectation of wide scale and continuing declines in spotted owl populations regardless of retention of habitat (BLM 2016b, Figure 3-188, p. 959; Wiens et al. 2014; Yackulic et al. 2019; Franklin et al. 2021). This is reflected in the declining trend in spotted owl occupancy observed throughout their range (Franklin et al. 2021), even though during the same time, habitat was increasing (Davis et al. 2022). Habitat is clearly important for spotted owls (e.g., Yackulic et al. 2019), but barred owl presence on spotted owl territories was the primary factor negatively affecting apparent survival, recruitment, and ultimately, rates of population change. The effects of barred owls in all demography study areas analyzed in Franklin et al. (2021) were negative regardless of habitat quantity, or the relative suitability of habitat. Demography is the statistical study of populations using surveys and statistical models to analyze the size, movement, and structure of populations.

For example, barred owls have now largely displaced northern spotted owls in Olympic National Park and Mount Rainier National Park, which contain large areas of older forest and do not allow commercial timber harvest (Lesmeister et al. 2018; Mangan et al. 2019). Davis et al. (2022) estimated that the range wide carrying capacity for northern spotted owls (maximum number of owl sites that could be contained in a given landscape based on biological and physical features) on federal lands has increased by 3.5 percent from 1993 to 2017, but territory occupancy had declined by approximately 62 percent. In the Final EIS for the 2016 RMP, BLM modeled spotted owl population response to the Proposed RMP implementation scenario and compared it with a No Harvest Reference Condition and found that there was no discernable difference in population trajectories. Retaining any additional forest in reserves on BLM managed land would not contribute more to northern spotted owl population status (BLM 2016a, p. 936, Fig. 3-189). The projected negative trajectory for the northern spotted owl remains the same regardless of whether BLM harvests in the HLB at the levels established in the RMP or foregoes harvest in these land use allocations entirely.

The population simulations in the FEIS acknowledged that spotted owl populations in the Western Cascades Province would continue to decline, and the FEIS did not show discernable differences among the alternatives when compared to the No Timber Harvest reference analysis (BLM 2016a, p. 961, 962, 969). Additionally, as described above, barred owl invasion, regardless of harvest, is likely to continue to be the driving force behind the decline of NSO occupancy and reproduction in the Treatment Area (BLM 2016a, pp. 947-973; Dugger et al. 2016). Therefore, the results of the recent studies do not present new information that would create new effects to spotted owl populations since the FEIS. Instead, research reaffirms the importance of older forest conditions and managing for large blocks of unfragmented older forest (Dugger et al. 2011, p. 2463; Wiens et al. 2014, pp. 36–38; BLM 2016a, p. 948).

Wildlife Issue NAID #10: How would forest management activities affect deer and elk winter range and migration routes?

Background
The South Clark Planning Area contains 41,361 acres of Jackson County-designated Deer and Elk Winter Range, 14,329 acres of which are on BLM-administered lands (35 percent). The Planning Area also contains 1,168 acres of BLM-designated Deer and Elk Management Areas. There are no Project activities proposed within BLM Deer and Elk Management Areas. Within Jackson County Winter Range, up to 1,685 acres of treatments are proposed (12 percent of total winter range acreage on BLM).

Rationale
This issue was considered but was not analyzed in further detail as the proposed actions would not have the potential to lead to adverse effects on winter range or deer and elk migration. The management activities would be short in duration, largely conducted outside of the winter season, staggered across five years, and would have a beneficial effect on deer and elk habitat.

During the spring and autumn migrations, deer and elk migrate through and into winter range in the Planning Area as evidenced by a telemetry study conducted by the Oregon Department of Fish and Wildlife. Migration routes would not be blocked by the Proposed Actions and forage would continue to be available on up to 96 percent of winter range within the Planning Area during implementation. The harvest treatments would be scattered throughout the Planning Area with up to a mile and a half between treatment units, allowing deer and elk to avoid noise disturbances during implementation. Additionally, harvest operations would typically only occur in a one-square-mile section at a time, leaving the entire rest of the Planning Area available for migration, forage, and shelter during implementation.

While timber harvest can reduce the amount of cover available for these animals, making them more vulnerable to predation, harvest can benefit deer and elk forage in several ways. Forest harvesting often involves the removal of older trees, which allows sunlight to reach the forest floor. This increase in sunlight can stimulate the growth of understory plants and grasses, which provide a source of food for deer and elk. Forest harvesting can also create openings in the forest that allow for the regeneration of new vegetation. These new plants provide a fresh source of food for deer and elk. Harvesting can create edge habitats, which are areas where different types of vegetation meet. Edge habitats provide a variety of food sources and cover, which can be especially beneficial to deer and elk. Harvesting can also improve the nutrient quality of vegetation in the area by reducing competition among trees for nutrients, which can lead to increased nutrient availability in the soil.

Additionally, measures to prevent the introduction and spread of non-native invasive plants that compete with native forage would be applied, and native grass seed would be applied on decommissioned roads, skid trails, and landings allowing those sites to return to forage for deer and elk (PDFs 5, 31, 32, 43, 51, 53, 55, 58, 60, 61, 68, and 72).

Wildlife Issue NAID #11: How would the action alternatives affect Franklin's bumble bee and their habitat in the Planning Area?

Background

The Franklin's bumble bee (*Bombus franklini*) was federally listed as endangered under the Endangered Species Act in 2021 (USDI FWS 2021d). South Clark is within the historic range of the Franklin's bumble bee, and potential habitat is located within the Planning Area.

Foraging and nesting habitat for Franklin's contains native flowering plants that provide both pollen and nectar throughout a colony's active flight period (May – September). A varied assortment of plant species with staggered floral deterioration must be present in abundance. Floral forage must be available throughout the active flight season, which is exemplified by wet meadow environments. Nesting may occur within 100 meters of substantial floral resources, while overwintering habitat includes forested areas within 100 meters of substantial floral resources.

Franklin's bumble bee High Priority Zones (HPZs) contain all known historic observation locations of Franklin's bumble bee, in addition to habitat conditions and floral resources most likely to support the species. HPZs also include a 1.9-mile buffer around each historic Franklin's bumble bee observation. The subgenus' typical dispersal distance is likely less than 1.9 miles (3 km) (Hatfield, pers. comm. 2017; Goulson 2010, p. 94), and the typical foraging distance is less than 0.6 miles (1 km) (USDI FWS 2018). The Planning Area contains part of an HPZ.

Non-forested habitat within the Planning Area primarily consists of dry meadows, fields of ceanothus and manzanita, and oak savannah, and is lacking substantial floral resources from May all the way through September.

The proposed treatments include construction of one or two helicopter landings (depending on action alternative) in non-forested habitat, each of which are approximately one acre in size. The proposed helicopter landings are approximately three miles from a current Franklin's bumble bee HPZ. Up to 170 acres of proposed forest treatment units are within 100 meters of non-forested habitat. The nearest proposed forest treatment unit is approximately a tenth of a mile from an HPZ.

Rationale

This issue was not analyzed in detail because the proposed action is not expected to adversely affect habitat at the local scale.

Across the South Clark Planning Area, there are no proposed treatments within a current Franklin's bumble bee High Priority Zone (HPZ). Outside the HPZ, harvest activities from the South Clark Project would result in ground disturbance (an activity that leaves depressions or wheel tracks on the soil, or involves removal of forest floor layers, displaced soil, soil erosion, or soil compaction) on up to two acres due to construction of landings in meadows and other open plant communities containing flowering herbaceous species during the growing, flowering, and seed production periods. The remainder of the Project harvest units are within conifer forests with high (> 56 percent) canopy cover, and floral resources are not expected to be substantial or of high quality. No treatments are proposed within 100 meters of potential meadows within HPZ.

For this assessment, the Franklin's Bumble Bee Analysis Area is defined as BLM-managed lands within 3 kilometers of the proposed two acres of landing construction within meadow habitat. The proposed South Clark landings within meadow habitat are approximately 4 kilometers from an HPZ. Up to 27 acres of South Clark treatments in forested habitat would occur within 100 meters of meadow habitat within the Analysis Area.

Ground disturbance affecting floral resources would affect up to approximately two acres of low-moderate quality floral resources and may occur during the growing season of floral resources and during the active flight season (May 15 through September 30) for Franklin's bumble bee. Impacts to the forage habitat would be soil disturbance, potential removal of organic layers/leaf litter/duff, and the removal of individual floral resources. For harvest activities that may occur outside of the active flight season, given the low/moderate quality of the floral resources, it is unlikely that a queen is overwintering within the Analysis Area since the pollen/nectar available would not be conducive to supporting a productive colony. The loss of the floral resources is expected to be temporary since floral resources would likely re-establish from adjacent seed sources following implementation.

The South Clark Project includes actions to contain, control, and eradicate existing infestations of noxious weed species as authorized under the Decision Record for the Integrated Invasive Plant Management for the Medford District Environmental Assessment (DOI-BLM- ORWA-M000-2017-0002-EA) on BLM-administered lands. These actions would include up to six acres of torch burn of invasive plants, and up to three acres of herbicide application within the Franklin's Analysis Area. These actions would occur in recently disturbed areas and outside of potential Franklin's habitat.

Franklin's bumble bee has not been detected since 2006. Regular surveys in areas believed to have the most likely conditions to support occupancy have failed to detect any individuals since 2006. General intensive surveys in the region also have not detected Franklin's bumble bees (e.g., Galbraith et al. 2019; Fisher et al. 2022). The best available evidence indicates it is highly unlikely that Franklin's bumble bee would be present in the Analysis Area. If the BLM identifies any Substantial Floral Resources within or adjacent to proposed treatment units, the BLM will consult with the Service and apply pertinent seasonal restrictions as appropriate to avoid any adverse impacts (PDF #12).

As described above, no proposed treatments would occur within potential meadow habitat (i.e., foraging and nesting habitat) in an HPZ, and a total of two acres of treatments would occur within potential meadow habitat outside of an HPZ. Approximately 27 acres of South Clark treatments would occur within 100 meters of potential meadow habitat (i.e., overwintering and nesting habitat) outside of the HPZ. The likelihood of direct and indirect negative impacts to Franklin's bumble bee individuals is very low (discountable) because individuals are unlikely to be in the Analysis Area and a small percentage (one percent) of the available potential Franklin's bumble bee meadow habitat in the Analysis Area would be impacted by the Project treatments. Additionally, the PDF (#12) requiring seasonal operating restrictions, including restricting habitat modifying actions, will be implemented if pre-treatment field reviews identify Substantial Floral Resources within any treatment units.

Wildlife Issue NAID #12: How would proposed roadside maintenance and temporary road and landing construction in the LSR affect the current function of spotted owl habitat and the development of nesting, roosting habitat?

Background

The RMP provides a network of late-successional reserves and connecting riparian corridors. Approximately seven percent (1,258/18,447 acres) of BLM lands within the Planning Area are designated as Late-Successional Reserves (LSR). The management objectives within LSR are to maintain nesting-roosting habitat for NSO; promote the development of nesting-roosting habitat for NSO in stands that do not currently support NSO nesting-roosting; and to promote the development and maintenance of foraging habitat for NSO, including creating and maintaining habitat to increase diversity and abundance of prey for NSO (BLM 2016b, p. 70). Management objectives within LSR where trees are cut for yarding corridors, skid trails, road construction and maintenance, and landings are to retain cut trees in adjacent stands as down woody material, move cut trees for placement in streams, or sell trees, at the discretion of the BLM. Maintain nesting-roosting habitat refers to a silvicultural activity that maintains structural characteristics such that the stand continues to support the same northern spotted owl life history requirements in a manner that does not necessarily change their use by northern spotted owls (BLM 2016b, p. 70). Tables 24 and 25 display treatment acres within the LSR LUA in the Planning Area.

Table 24. Effects of Roadside Maintenance Treatment Adjacent to NSO Habitat in LSR

Action Alternative	Adjacent to Foraging	Adjacent to Nesting-Roosting	Adjacent to Dispersal	Total
Alternative 2	1	4	7	12
Alternative 3	1	4	7	12
Alternative 4	1	4	5	10
Alternative 5	1	3	5	9

Table 25. Effects of Temporary Road, and Temporary Landing Construction on NSO Habitat in LSR

Action Alternative	Dispersal Removed	Foraging Removed	Nesting- Roosting Removed	Total
Alternative 2	1	0	1	2
Alternative 3	1	0	1	2
Alternative 4	1	0	1	2
Alternative 5	1	0	1	2

Rationale

The majority of the treatment polygons within LSR are a tenth of an acre or less, are dispersed across the Planning Area, and would have no effect on the functioning of LSR NSO habitat of the adjacent stands. The largest continuous polygon within LSR is three acres of roadside treatment along an existing road within a 118-acre block of LSR. This linear treatment is spread out across 0.7 miles and would have no effect on the functioning of LSR NSO habitat of the adjacent stand. All of the treatment polygons of nesting-roosting habitat removal are two-tenths of an acre or less, are dispersed across the Planning Area, and would have no effect on the functioning of nesting-roosting habitat in LSR of the adjacent stands.

The BLM did not analyze this issue in further detail because there is no potential for significant effects beyond those already analyzed in the FEIS, to which this EA is tiered. The BLM designed this project to follow the management direction from the RMP for each LUA. Within LSR the RMP allows for "the construction, modification, maintenance and removal of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, as long as the forest stand continues to support the same northern spotted owl life history requirements: nesting-roosting habitat continues to support northern spotted owl nesting-roosting; dispersal habitat continues to support northern spotted owl movement and survival" (BLM 2016b, p. 71).

Appendix 2: Proposed Treatments by Action Alternative.

The tables in this appendix provide a more detailed look at the set of proposed actions summarized in Chapter 2, Section 2.6, Table 3 of the EA. The values (acres, miles, etc.) presented in the tables within this appendix are based on Geographic Information System (GIS) data and are rounded to the nearest whole acre or 1/10 of a mile; acres may differ from those reported in individual timber sale contracts/prospectuses due to differences in electronic mapping software versus data collected from GPS units. GIS calculates from horizontal distances and GPS accounts for slope distance. Total acres may vary slightly from other tables displayed throughout this document and the analysis file due to methods used for rounding data outputs. The acreage differences that may be detected are within less than (+-) 1.0 percent of the total project acreage analyzed and would not contribute to any differences in effects reported.

Table 26. Proposed Timber Harvest Units by Action Alternative

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
T35S - R02E - Section 1										
1-1	100	100	100	UTA	50-270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
1-2	17	17	17	LITA	170, 270	G	RH, 15-30% BA	CT, 25-35% RD, 80-120 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
T35S - R02E - Section 3										
3-1	32	32	32	UTA	100-160	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
3-2	17	17	17	UTA	100, 120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R01E - Section 11										
11-3	12	12	12	UTA	80	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R01E - Section 13										
13-1	4	4	0	UTA	120	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
13-2	3	3	3	UTA	270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA

[19] Based on 10-year age class information in the Forest Operations Inventory (FOI) database. Calculation is derived from the age class birth year of the stand layer designated for management. If the stand has multiple tree layers, an assignment is made for that portion of the stand that is going to be managed. Ten Year Age Class - stand ages 5-14 are assigned 10, stand ages 15-24 are assigned 20, etc. Due to logging systems multiple FOIs may be combined in one unit. If there are two stands in a unit, both stand ages are shown. For three or more FOIs in a unit the stand age is shown as a range.

[20] Yarding method is based on the percent slope within most of the harvest unit and may differ if the purchaser chooses to use specialized ground-based equipment (see Section 2.2.2) or other equipment allowed within the slope restrictions.

[21] Values for regeneration harvest prescriptions represent the percent pre-harvest basal area that would be retained (USDI 2016c, pp. 64, 66).

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
13-3	11	11	5	UTA	270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R01E - Section 25										
25-1	20	20	20	UTA	60-110	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
25-2	13	13	13	UTA	60-110	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
25-3	5	5	0	UTA	270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
25-4	4	4	0	UTA	270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
25-5	39	39	16	UTA	80, 270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
25-6	3	3	0	UTA	270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
25-7	1	1	0	UTA	270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
25-8	4	4	5	UTA	80	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
25-9	3	3	0	UTA	270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
25-10	9	9	9	UTA	80	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R01E - Section 35										
35-1	26	26	26	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S – R02E – Section 7										
7-1	21	21	21	UTA	110, 270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 8										
8-1	46	46	46	MITA	170-270	G	RH, 5-15% BA	RH, 5-15% BA	RH, 5-15% BA	CT, 35-45% RD, 140-180 BA
8-2	8	8	8	UTA	80-220	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
8-3	20	20	20	UTA	80, 220	C	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 9										
9-1	7	7	7	LITA	60	G	RH, 15-30% BA	RH, 25-35% BA, 100-140 RD	RH, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
9-2	17	17	17	LITA	60	H	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-3	6	6	6	LITA	60	H	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-4	9	9	9	LITA	60	G	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-5	15	15	15	LITA	60	C, H	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-6	14	14	14	LITA	60	G	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-7	1	1	1	LITA	60	G	RH, 15-30% BA	CT, 25-35% BA, 100-140 RD	CT, 25-35% BA, 100-140 RD	CT, 35-45% RD, 140-180 BA
9-8	167	167	167	MITA	60, 170	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
9-9	11	11	11	MITA	170	G	RH, 5-15% BA	RH, 5-15% BA	RH, 5-15% BA	CT, 35-45% RD, 140-180 BA
9-10	1	1	1	MITA	60	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
9-11	6	6	6	MITA	60	C	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
9-12	21	0	21	MITA	60	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	--	CT, 35-45% RD, 140-180 BA
9-13	27	27	27	MITA	60	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
9-14	3	0	3	MITA	60	C/G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	--	CT, 35-45% RD, 140-180 BA
9-15	27	27	27	MITA	60	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
T34S - R02E - Section 10										
10-1	30	30	30	LITA	290	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
T34S - R02E - Section 15										
15-1	2	2	0	LIT	170	H	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	--
T34S - R02E - Section 16										
16-2	105	105	105	LITA	120	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
16-3	1	1	0	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
16-4	5	5	5	UTA	120	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
16-5	6	6	0	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
16-6	100	100	100	LITA	80-170	H	CT, 20-30% RD, 80-120 BA	CT, 20-30% RD, 80-120 BA	CT, 20-30% RD, 80-120 BA	CT, 35-45% RD, 140-180 BA
16-7	8	8	8	UTA	80-170	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
16-8	9	9	9	LITA	80-170	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
16-9	20	20	20	LITA	60-170	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
T34S - R02E - Section 17										
17-1	1	1	1	UTA	80, 220	C	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
17-2	6	6	6	UTA	80, 220	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 18										
18-1	17	17	17	UTA	80, 170	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
18-2	23	23	23	UTA	120	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 19										
19-1	17	17	17	UTA	60, 120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
19-2	19	19	19	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
19-3	34	34	34	UTA	120	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 20										
20-1	9	9	9	UTA	60	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 21										
21-1	5	5	5	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
21-2	100	55	92	UTA	60-270	H, G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
21-3	55	55	55	UTA	80, 270	G, H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
21-4	6	6	6	UTA	60-270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
21-5	13	13	13	UTA	120	C/G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 23										
23-1	54	54	54	LITA	80, 170	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
T34S - R02E - Section 24										
24-1	18	18	18	LITA	160	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-2	179	179	179	UTA	160	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
24-3	3	3	3	LITA	160	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-4	3	3	3	LITA	160	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-5	29	29	28	UTA	140, 270	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
24-6	3	3	3	UTA	140	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
24-7	14	14	14	LITA	80, 140	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-8	2	2	2	LITA	80, 140	H	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-9	10	10	0	LITA	140, 270	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	--
24-11	12	12	12	LITA	270	H	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-12	20	20	11	LITA	140, 270	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
24-13	3	3	0	UTA	250	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
24-14	14	14	14	LITA	250	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	SH, 35-45% RD, 140-180 BA

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
T34S - R02E - Section 26										
26-1	18	18	13	LITA	100, 250	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	SH, 35-45% RD, 140-180 BA
26-2	3	3	3	LITA	250	H	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	SH, 35-45% RD, 140-180 BA
26-3	11	11	11	LITA	250	C	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	SH, 35-45% RD, 140-180 BA
26-4	4	4	4	UTA	120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
26-5	22	22	0	UTA	120	C	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
26-6	3	3	3	UTA	100	C/G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
26-7	29	29	6	UTA	100-250	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
26-8	2	2	2	LITA	250	H	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
26-9	3	3	3	LITA	250	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
26-11	52	52	20	UTA	100-270	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
3-2	17	17	17	UTA	100, 120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
3-2	17	17	0	UTA	100, 120	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	--
T34S - R02E - Section 28										
28-1	13	13	13	UTA	80, 140	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 29										
29-1	2	2	2	UTA	130	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R02E - Section 33										
33-1	4	4	4	MITA	240	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
33-2	13	13	13	MITA	240	G	RH, 5-15% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
33-3	6	6	6	UTA	220	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA

Unit No.	Alts 2 & 3 Acres	Alt 4 Acres	Alt 5 Acres	LUA	Stand Age[19]	Yarding Method[20]	Alternative 2 Prescription (Type, Target RD and/or BA[21])	Alternative 3 Prescription (Type, Target RD and BA)	Alternative 4 Prescription (Type, Target RD and BA)	Alternative 5 Prescription (Type, Target RD and BA)
33-4	7	7	7	UTA	220	H	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
T34S - R03E - Section 19										
19-4	5	5	5	LITA	120	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
19-5	56	56	56	LITA	100, 140	G, H	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
19-6	28	28	28	LITA	100	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
19-7	18	18	18	MITA	100, 140	G	RH, 5-15% BA	RH, 5-15% BA	RH, 5-15% BA	CT, 35-45% RD, 140-180 BA
T34S - R03E - Section 29										
29-2	177	177	177	LITA	60-270	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
29-3	15	15	15	LITA	60, 100	C	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA
29-4	9	9	9	UTA	100	G	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 20-30% RD, 80-120 BA	SH, 35-45% RD, 140-180 BA
29-5	16	16	16	LITA	100-270	G	RH, 15-30% BA	RH, 15-30% BA	RH, 15-30% BA	CT, 35-45% RD, 140-180 BA
T34S - R03E - Section 31										
31-1	8	8	8	LITA	160	G	RH, 15-30% BA	CT, 25-35% RD, 100-140 BA	CT, 25-35% RD, 100-140 BA	CT, 35-45% RD, 140-180 BA

Land Use Allocation (LUA)
LITA – Low Intensity Timber Area (Harvest Land
MITA – Medium Intensity Timber Area (Harvest Land Base)
UTA – Uneven-Aged Timber Area (Harvest Land Base)

Yarding Methods
G – ground-based
C – skyline-cable
H – helicopter

Prescriptions
CT –commercial thinning
SH – selection harvest
BA – basal area
RD – relative density

Table 27. Proposed Road Construction Alternatives 2, 3, and 5

Permanent Construction		Temporary Construction	
Location (T-R-S)	**Miles**	**Location (T-R-S)**	**Miles**
T35S R02E 01	0.02	T34S R01E 08	0.09
T35S R02E 02	0.02	T34S R01E 09	0.22
T35S R02E 03	0.06	T34S R01E 11	0.48
T34S R03E 29	0.46	T34S R01E 12	0.16
T34S R02E 08	0.08	T34S R01E 18	0.06
T34S R02E 09	0.40	T34S R01E 19	0.57
T34S R02E 10	0.19	T34S R01E 22	0.50
T34S R02E 13	0.06	T34S R01E 22	0.50
T34S R02E 16	0.19	T34S R01E 29	0.37
T34S R02E 18	0.08		
T34S R02E 19	0.02		
T34S R02E 21	0.30		
T34S R02E 22	0.00		
T34S R02E 24	0.01		
T34S R02E 25	0.36		
T34S R02E 26	0.12		
T34S R02E 35	0.03		

Table 28. Proposed Road Decommissioning in Alternatives 2, 3, 4, and 5 (see Map 46 in Appendix 5)

Type	Road Number	Miles
Fully Decommission	34-1E-25.0	0.33
	34-2E-21.0	0.54
	34-2E-22.0	0.15
	34-3E-19.0	0.33
	34-3E-29.0	0.40
	34-3E-29.5	0.23
Total		**1.98**

Table 29. Roadside Vegetation Management by T-R-S (see Map 46 in Appendix 5)

Township-Range-Section	Alternative	Miles	Land Use Allocation
34S-01E-25	2, 3	0.28	DDR
	4, 5	0.33	
34S-01E-35	2, 3	0.26	
	4	0.32	
	5	0.34	
34S-02E-07	2, 3	0.13	
34S-02E-08	2, 3	0.68	
	4, 5	0.34	
34S-02E-09	2, 3	0.04	
		0.27	LSR
	4, 5	0.01	
	4, 5	0.02	DDR
34S-02E-10	2, 3, 4	0.25	
	5	0.23	
34S-02E-16	2, 3	0.95	
	4	0.98	
	5	0.76	
	4	0.02	HLB
34S-02E-20	2, 3	0.60	DDR
	4, 5	0.59	
34S-02E-23	2, 3	0.15	
	4, 5	0.17	
	2, 3, 4, 5	0.67	LSR
34S-02E-24	2, 3	0.99	DDR
	4, 5	0.84	
34S-02E-26	2, 3	2.11	DDR
	4	0.76	
	5	0.50	
	2, 3, 4	0.51	LSR
	5	0.21	
34S-02E-28	2, 3, 4, 5	0.64	DDR
34S-02E-35	2, 3	1.61	
	4, 5	1.56	
34S-03E-19	2, 3, 5	1.44	
	4	0.78	
	2, 3, 4, 5	0.06	LSR
34S-03E-29	2, 3	1.39	DDR
	4	1.02	
	5	1.36	
34S-03E-31	2, 3	0.04	

35S-02E-01	2, 3	1.52	DDR
	4	1.23	
	5	1.08	
	2, 3	0.49	LSR
	4	0.36	
	5	0.24	
	4, 5	0.03	RR
35S-02E-03	2, 3, 4, 5	0.20	DDR

Appendix 3: Project Design Features

Project Design Features (PDFs) are an integral part of the Action Alternatives (Alternatives 2-5). They are developed to avoid or reduce the potential for adverse impacts to resources. PDFs include seasonal restrictions on many activities that help minimize erosion and reduce disturbance to wildlife. PDFs also outline protective buffers for sensitive species and delineate measures for specific areas, such as protecting riparian reserves (RRs). Where applicable, PDFs reflect Best Management Practices (BMPs). BMPs are designed to prevent and reduce non-point source pollution and maintain water quality at the highest practicable level to meet water quality standards and Total Maximum Daily Load (TMDL) as set by ODEQ (BLM 2016b, pp. 163-164). BMPs correspond to the BMP numbers in Appendix C of the 2016 SWO ROD/RMP and are cited below (e.g., SP 03, TH 11).

The PDFs listed below would be carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the operations of contractors to ensure that contract specifications are implemented as designed.

Table 30. Project Design Features

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
1	SP 01, SP 02, SP 03, SP 05, SP 06, SP 07	Apply and incorporate spill prevention and abatement BMPs into design plans prepared by the BLM and included as part of the timber sale packages. These BMPs are present with full text on pages 200 to 203 of the RMP.	x	x	x	x	x	x	x	x	x
2	R63, BLM 2018 p. 54	Ensure hay, straw, and mulch are certified as free of prohibited noxious vegetative parts or seeds, per 75 FR 159:51101-02. Hay must be from native grasses only. Straw or hay must be obtained from the BLM or purchased from growers certified by the Oregon Department of Agriculture's Weed Free Forage and Mulch Program or approved by the project botanist. Apply native seed and certified weed-free mulch to areas, such as cut and fill slopes and waste disposal sites, that have the potential for sediment delivery to wetlands, riparian reserves, floodplains and waters of the state. Apply seed upon completion of construction and as early as practical to increase germination and growth.	x	x	x	x	x	x	x	x	x
3	BLM 2016b, p. 106, BLM 2018 p. 54	Revegetate disturbed soils with locally adapted native seeds and plant materials as prescribed by the field office botanist, and mulch. Need would be determined by the field office botanist, based on the level of disturbance and the presence of priority non-native invasive plants. Planting and/or seeding would occur between September 1 to March 31, or as otherwise approved by the field office botanist.		x	x	x	x	x	x	x	x

PDF Number.	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
4	BLM 2016b, p. 93, BLM 2018, pp. 44, 271-273	Monitor and treat priority non-native invasive plant infestations in project treatment units, staging areas, and along access routes prior to project implementation as funding allows. Conduct three years of post-project monitoring, and re-treat if infestations have reached or exceeded action thresholds, as funding allows.		x	x	x	x	x	x	x	x
5	BLM 2016b, p. 106, BLM 2018, p. 273	Implement weed prevention measures throughout project implementation. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas. BLM will provide maps of current infestations in the Planning Area. • Make an effort to inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.		x	x	x	x	x	x	x	x
6	BLM 2016b, p. 93, BLM 2018, pp.271-273	Require cleaning of vehicles and equipment travelling off roads, trails, or temporary routes prior to entry onto BLM-administered lands. Ensure all plant material, soil, and debris is removed from the vehicle undercarriage. Cleaning may be completed using pressure washing or compressed air and brushing		x	x	x	x	x	x	x	x
7	BLM 2016b, p. 93, BLM 2018, p. 273	Clean all equipment off site or at sites authorized by the sale administrator before leaving the project site if operating in areas infested with weeds.		x	x	x	x	x	x	x	x
8	BLM 2016b, p. 106	Implement no-entry buffers around known Bureau Special Status plant sites as listed in the table below. The use of skid trails and/or skidding logs through plant site buffers would not be allowed.		x	x	x	x	x	x	x	x

PDF 8 - Bureau Special Status Plant Buffers

T-R-S	Common Name	GeoBOB Flora Site ID	Buffer Width (distance from perimeter of site)	Proximity to Project Activities
T34S-R03E-S29	Violet Hedgehog	15189	100'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19507	25'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19508	25'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19509	25'	In Project Activity Area
T34S-R02E-S18	Gentner's fritillary	19490	25'	In Project Activity Area
T35S-R01E-S12	Gentner's fritillary	2182	25'	In Project Activity Area
T34S-R02E-S19	Gentner's fritillary	13140	25'	In Project Activity Area
T34S-R02E-S19	Gentner's fritillary	13668	25'	In Project Activity Area
T34S-R02E-S20	Gentner's fritillary	16698	25'	In Project Activity Area
T34S-R02E-S20	Gentner's fritillary	9995	25'	within100'
T34S-R02E-S21	Gentner's fritillary	13670	25'	within100'
T35S-R02E-S03	woolly meadowfoam	19501	25'	In Project Activity Area
T35S-R02E-S09	woolly meadowfoam	13677	25'	within100'
T34S-R02E-S18	woolly meadowfoam	9378	25'	within100'
T35S-R02E-S03	woolly meadowfoam	19502	25'	within100'
T34S-R02E-S35	Southern Oregon buttercup	15722	25'	In Project Activity Area
T35S-R02E-S03	Southern Oregon buttercup	19755	25'	In Project Activity Area
T34S-R02E-S35	Southern Oregon buttercup	19510	25'	within100'
T34S-R02E-S22	Gentner's fritillary	9385	25' to edge of road prism	within100'
T34S-R03E-S29	Violet Hedgehog	15189	100'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19507	25'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19508	25'	In Project Activity Area
T34S-R02E-S21	Rogue Canyon rockcress	19509	25'	In Project Activity Area
T34S-R02E-S18	Gentner's fritillary	19490	25'	In Project Activity Area
T35S-R01E-S12	Gentner's fritillary	2182	25'	In Project Activity Area

T-R-S	Common Name	GeoBOB Flora Site ID	Buffer Width (distance from perimeter of site)	Proximity to Project Activities
T34S-R02E-S19	Gentner's fritillary	13140	25'	In Project Activity Area
T34S-R02E-S19	Gentner's fritillary	13668	25'	In Project Activity Area
T34S-R02E-S20	Gentner's fritillary	16698	25'	In Project Activity Area
T34S-R02E-S20	Gentner's fritillary	9995	25'	within100'
T34S-R02E-S21	Gentner's fritillary	13670	25'	within100'
T35S-R02E-S03	woolly meadowfoam	19501	25'	In Project Activity Area

PDF Number	BMP Number. or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
9		Place a no-entry buffer around National Register of Historic Places (NRHP)-listed or eligible/unevaluated archaeological sites located within the Area of Potential Effect. The BLM archaeologist will establish a buffer sufficient to protect each site from adverse impacts of any proposed activities, taking into account all elements of the cultural site that contribute to its NRHP eligibility. No treatments would occur within this buffer. Timber identified for removal next to a buffer would be directionally felled away from the buffer for175 feet.	x	x	x	x	x	x	x	x	x
10		If, during project implementation, the contractor encounters or becomes aware of any archaeological, historical, or paleontological sites, features, or artifacts on federal lands, the contractor shall immediately suspend all operations in the vicinity and notify the BLM Contracting Officer. The BLM Contracting Officer will consult with the Field Office Archaeologist and determine appropriate actions to prevent the loss of significant cultural or scientific values. The project may be redesigned to protect the cultural or scientific values present, or evaluation and mitigation procedures will be implemented based on recommendations from the Field Office Archaeologist with concurrence by the BLM Authorized Officer and State Historic Preservation Office. Work may not proceed until authorization to proceed is issued by the Contracting Officer after approval by the District Archaeologist.	x	x	x	x	x	x	x	x	x
11	BLM 2016b, p. 118	There are currently no known gray wolf dens or rendezvous sites in the Project Area. If a gray wolf den or rendezvous site is identified prior to or during project activities, implement a seasonal restriction from April 1 to July 15 and suspend project activities located within one mile of a known den or rendezvous site. Because these sites are difficult to locate and can change from year to year, this would be assessed on an ongoing basis throughout the life of this project through annual updates and communication with the USFWS and Oregon Department of Fish and Wildlife.	x	x	x	x	x	x	x	x	x
12		To avoid killing or harming Franklin's bumble bee, habitat modifying actions in meadows (with floral resources that provide foraging for Franklin's) will not occur between May 15 and September 30, and habitat modifying actions will not occur 100 meters adjacent to meadows (with relevant floral resources) from October 1 through May 15. Considerations on the type of action, habitat quality, proximity, duration etc. can inform modifying the timing and duration provided in the PDF.	x	x	x	x	x	x	x	x	
13	BLM 2016b, p. 116 and National Bald Eagle Management Guidelines (USFWS 2007)	Do not remove overstory trees within 330 feet of bald eagle or golden eagle nests, except for removal of hazard trees. Do not conduct timber harvest operations (including road construction, tree felling, and yarding) during the breeding season (Feb. 1 to Aug. 15) within 660 feet of bald eagle or golden eagle nests. Decrease the distance to 330 feet around alternate nests within a territory, including nests that were attended during the current breeding season but not used to raise young, or after eggs laid in another nest within the territory have hatched. Seasonal restriction includes helicopter landing in T34S, R01E, Section 25 NE, and units 25-3, 4, 5, 9, and 10 in T34S, R01E, Section 25, and unit 21-2 in T34S, R02E, Section 21.	x	x	x	x	x	x	x	x	x

<table>
<tr><th rowspan="3">PDF Number</th><th rowspan="3">BMP Number or ROD/RMP Citation</th><th rowspan="3">PDFs for the South Clark Forest Management Project</th><th colspan="10">Applicable Action</th></tr>
<tr><th colspan="3">Timber Harvest</th><th colspan="2">Fuels Reduction</th><th colspan="3">Roadwork</th><th>Other</th></tr>
<tr><th>Helicopter</th><th>Ground-based</th><th>Skyline-Cable</th><th>Hand Pile and Burn</th><th>Underburned</th><th>Construction/ Improvement</th><th>Renovation</th><th>Decommission</th><th>Timber Haul</th></tr>
<tr><td>14</td><td>BLM 2016b, p. 115</td><td>Seasonally restrict timber harvest activities from March 1 to July 15 but may be extended up to September 30 if late nesting or nesting re-attempts are confirmed, within 0.25-mile of known active NSO sites or within 0.5-mile for helicopter operations and blasting. The seasonal restriction could be waived if non-nesting status is determined. If any new owls are discovered in harvest units following the sale date, activities would be halted until mitigation options are determined. Follow USFWS recommended noise disturbance distances for activities other than timber harvest to avoid disturbance to NSOs.
<table>
<tr><th>Activity</th><th>Buffer Distance Around Owl Site</th></tr>
<tr><td>Light maintenance (e.g., road brushing and grading) at campgrounds, administrative facilities, and heavily used roads</td><td rowspan="3">0.25 mile</td></tr>
<tr><td>Burning (prescribed fires, pile burning)</td></tr>
<tr><td>Log hauling on heavily used roads</td></tr>
<tr><td>Chainsaws (felling hazard/danger trees)</td><td rowspan="2">200 feet</td></tr>
<tr><td>Heavy equipment (for road construction, road repairs, bridge construction, culvert replacements, etc.). This distance is for the equipment used in the example activities, not the activities themselves.</td></tr>
<tr><td>Blasting</td><td rowspan="2">0.5 mile</td></tr>
<tr><td>Helicopter</td></tr>
<tr><td>Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment</td><td>400 feet</td></tr>
<tr><td>Tree Climbing</td><td>100 feet</td></tr>
</table></td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td></tr>
</table>

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
15	BLM 2016b, p. 117	No confirmed den sites are located within 50 feet of proposed treatment areas, however, if a confirmed fisher den site is found: ▪ Maintain ≥ 80% canopy cover within at least 50 feet of documented fisher natal and maternal dens. ▪ No activities may occur within stands containing known fisher den sites from March 1 to July 30. ▪ Maintain sufficient (at least 60%) canopy cover on a within-stand average basis. ▪ Protect fisher denning structures by retaining ≥ 24" diameter snags, down woody material, and live trees with cavities in the stand and if, for safety concerns, it is necessary to fall such snags or live trees with cavities, retain those cut trees or snags in the stand as additional down woody material. ▪ Do not apply vegetation treatments to all portions of the stand.	x	x	x	x	x	x	x	x	
16	BLM 2016b, p. 115	Restrict the use of motorized equipment and vehicles to existing roads within the following naturally occurring special habitats to maintain their ecological function: seeps, springs, wetlands, natural ponds, and natural meadows.	x	x	x	x	x	x	x	x	x
17	F 07, BLM 2016b, p. 187	For activity fuels reduction treatments in the RR LUA (all zones of both perennial and intermittent streams): • A no-cut buffer of 60 feet from perennial/fish-bearing streams and 35 feet from intermittent/non-fish-bearing streams would be applied. - Treatments within RRs would follow management direction for canopy cover and trees per acre as outlined in Table 10 of the RMP (e.g., retain 50% canopy cover per acre in the inner zone of fish-bearing or perennial streams, maintain at least 30% cover and 60 tpa in the outer zone along fish-bearing, perennial and intermittent streams) (BLM 2016b, pp 82-84). • Piles would not be placed in channel bottoms or dry draws.				x	x				
18	BLM 2016b, p. 77	Do not cut vegetation within the extent of the unstable areas that are above or adjacent to stream channels and are likely to deliver material such as sediment and logs to the stream if the unstable area fails. Extend the riparian reserves to include stable areas between such an unstable area where there is potential for the failure to reach the stream.	x	x	x						
19	BLM 2016b, p. 77	Do not cut vegetation within 25 feet of natural ponds < 1 acre or wetlands <1 acre (including seeps and springs), and constructed water impoundments (e.g., canal ditches and pump chances of any size).	x	x	x						
20	BLM 2016b, p. 68	Reserve dominant madrone, bigleaf maple, and oak trees >24 inches DBH, except where falling is necessary for safety or operational reasons and no alternative harvesting method is economically viable or practically feasible. If such trees need to be cut for safety or operational reasons, retain cut trees in the stand.		x	x						

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21	BLM 2016b, p. 76	Do not operate machinery for timber harvest within 50 feet of streams (slope distance), except where machinery is on improved roads, designated stream crossings, or where equipment entry into the 50-foot zone would not increase the potential for sediment delivery into the stream.	x	x	x						
22	BLM 2016b, p. 75	Where trees are cut for, skid trails, landings, road construction, maintenance, and improvement in the Inner Zone or Middle Zone, retain cut trees in adjacent stands as down woody material or move cut trees for placement in streams for fish habitat restoration, at the discretion of the BLM. In the Outer Zone, retain cut trees in adjacent stands as down woody material, move cut trees for placement in streams for fish habitat restoration, or sell trees, at the discretion of the BLM.	x	x	x			x	x	x	
23	BLM 2016b, pp. 62-63, 71, 76.	Maintain existing snags except those that need to be felled for safety reasons or for logging systems (e.g., skyline corridors) to minimize impacts to cavity-dependent species. Snags felled for safety reasons would be left on site.		x	x						
24	BLM 2016b, pp. 62-63	Within commercial harvest stands in the Harvest Land Base, retain existing large down woody material >20 inches in diameter at the large end and >20 feet in length; and down woody material 6-20 inches in diameter at the large end and >20 feet in length in decay classes III, IV, and V (BLM 2016b, p. 62-63), except for safety, operational, or fuels reduction reasons.		x	x		x				
25		During logging or forest management operations, use techniques, such as directional falling, to prevent damage to fences, cattle guards, livestock watering troughs and other improvements. If damage to range improvements does occur, the BLM shall be notified immediately, and proper repair or replacement would occur within two weeks. Proper repair of fences and gates includes keeping wire properly attached to posts, splicing or replacing broken wire in kind, repairing structures such as corners, stress panels or gates, and any other work necessary to keep improvements functional. Repair of structures such as stress or corner panels and gates requires pre-approval by BLM staff. Repair or cleaning of cattle guards damaged or filled with sediment by logging activities would require approval of BLM road engineering staff for structural integrity and public safety compliance.		x	x	x	x				
26		During logging and forest management activities, operators shall keep all gates closed and all livestock containment systems functional to keep livestock in authorized areas.		x	x	x	x				

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27	BLM 2016b, p. 63	Locate skid trails to minimize disturbance to down woody material. Where skid trails encounter large down woody material, a section would be bucked out for equipment access. The remainder would be left in place and would not be disturbed, unless they pose a safety hazard.		x							
28	TH 08, TH 12, TH 15	Incorporate existing skid trails and landings as a priority over creating new trails and landings where feasible, into a designated trail network for ground-based harvesting equipment. Limit designated skid trails to <15 percent of the harvest unit area to reduce displacement or compaction to acceptable limits. Consider proper spacing (on average 100 feet), skid trail direction and location relative to terrain and stream channel features.		x							
29	TH 09	Limit width of skid trails to single-width or what is operationally necessary for the approved equipment. Where multiple machines are used, provide a minimum sized pullout for passing.		x							
30	TH 11	Restrict ground-based yarding and soil decompaction operations from October 15 to May 15 generally, or when soil moisture exceeds 25 percent. The Authorized Officer may issue a waiver, with support from the BLM soil scientist and based on site conditions.		x							
31	TH 19	Block skid trails to prevent public motorized vehicle use and other unauthorized use by October 15 of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season. Place woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of skid trails leading off system roads or landing areas in all ground- based yarding units upon completion of yarding to block and discourage unauthorized vehicle use. If there is not enough available slash to cover the first 100 feet of skid trails, apply seed and mulch to the area.		x							
32	TH 06, 16	Apply erosion-control techniques (e.g., water bar, native seed, weed-free mulch, scatter chipped material, or scatter limbs and other fine material) on skid trails, forwarder trails, yarding corridors, landings, and other disturbed areas where potential for soil erosion or delivery to waterbodies, floodplains, and wetlands exist, or as identified by the Authorized Officer.	x	x	x					x	
33	TH 17	Construct water bars on skid trails using guidelines in Table C-6 (RMP, p. 191) where potential for soil erosion or delivery to waterbodies, floodplains, and wetlands exist, or as identified by the Authorized Officer.		x	x						

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34	TH 20	In upland units, allow harvesting operations (cutting and transporting logs) when ground is frozen or adequate snow cover exists to prevent soil compaction and displacement. The Authorized Officer would consult with a watershed specialist (hydrologist, soils scientist, or fisheries biologist) to determine appropriate conditions. If conditions change during operations where detrimental soil compaction and displacement is occurring, operations would be stopped immediately.		x							
35	TH 13	Limit non-specialized skidders or tracked equipment to slopes generally less than 35 percent except when using previously constructed trails or accessing isolated ground-based harvest areas requiring short trails over steeper pitches. Limit non-specialized skidders or tracked equipment to slopes less than 35 percent, except when using previously constructed trails or accessing isolated ground-based harvest areas requiring short trails over steeper pitches. End-line yarding may occur on slopes over 35 percent for short distances where needed. Ground-based equipment would be stationed outside of the area greater than 35 percent unless the conditions above are met. Also, limit the use of this equipment when surface displacement creates trenches, depressions, excessive removal of organic horizons, or when disturbance would channel water and sediment as overland flow. Create skips, defer portions of units or change logging systems to helicopter where the soils show indicators of mass movement.		x							
36		Limit the use of specialized ground-based mechanized equipment (those machines specifically designed to operate on slopes greater than 35 percent which includes tethered ground-based equipment) to slopes less than 50 percent, except when using previously constructed skid trails, adequate slash mat (to minimize erosion and displacement) or accessing isolated short skid trails over steeper pitches. Stop the use of this equipment if surface displacement creates trenches, depressions, excessive removal of organic horizons, or if disturbance would channel water and sediment as overland flow. Unit design would be determined based on specific equipment and operator capabilities and would be monitored during implementation by the Authorized Officer with input from the soil scientist and/or hydrologist.		x							
37	TH 21	Minimize the area where more than half of the depth of the organically enriched upper horizon (topsoil) is removed when conducting forest management operations.		x							
38		If operators are using feller-bunchers or cut-to-length harvesters off designated skid trails: - Allow mechanized equipment capable of creating and walking on slash (such as a cut-to-length system) to work off designated skid trails for one or two passes on at least eight inches of slash and under dry soil conditions (less than 25 percent soil moisture content. The Authorized Officer, with input from the soil scientist, can provide waiver for soil moisture if minimal soil disturbance would occur due to site conditions. - Allow mechanized equipment (feller-buncher systems) to work off designated skid trails during the dry season (soil moisture content less than 20 percent) for one or two passes only (one round-trip). The BLM may issue a waiver of the soil moisture if minimal soil disturbance would occur based on site conditions. - Use low, ground-pressure equipment off designated skid trails. - Restrict all other use of ground-based equipment to designated skid trails. - Stop equipment use off designated skid trails if logging equipment is causing soil disturbance above a Class 1 (Page-Dumroese et al. 2009, pp. 6, 14, 15, and 27-33), or as determined by the Authorized Officer.		x							

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39		Decompact landings and heavily compacted skid trails in regeneration units. Depth needed to be ripped would be dependent on how deep the compaction layer is and would be site-specific.	x	x	x						
40		Fell and yard trees 21 inches DBH and smaller designated for cutting to an approved landing location as either whole trees or log segments. If excessive stand damage occurs from whole tree yarding, as determined by the Authorized Officer, bucking, limbing, or both would be required.		x							
41		Prior to yarding, fell trees over 21 inches DBH designated for cutting, completely delimb and cut into log lengths not to exceed 44 feet.		x							
42		Any infrastructure impacted by logging or road operations (trails, service roads, kiosks, fences etc.) would be restored to their conditions as it was prior to logging operations.		x	x						
43	BLM 2016b, p. 93, BLM 2018, pp. 54, 273	Seed and mulch the top 20 feet of skyline-cable yarding corridors where yarding logs to the road results in extended soil exposure.			x						
44	R 93, R 94	Landing operations and log/rock hauling could occur with a conditional waiver during the wet season (October 16 to May 14) on roads determined to have adequate surfacing as identified in the EA (Map 1. In addition, a selection of roads and landings have been identified as available for wet season haul if adequate rock is added to the roadbed prior to haul (Map 1). If the Authorized Officer, in consultation with field office watershed specialists and engineers, determines that hauling will result in road damage or the transport of sediment to nearby stream channels based on soil moisture conditions or rain events, the conditional waiver for hauling may be suspended or revoked.									x
45	R 94, R 13, R 64	Install protective features such as certified weed-free straw bales, wattles, silt fences, geo-fabric rolls, and water bars where there is potential for haul-related road sediment to enter the aquatic system. Maintain protective features by removing accumulated sediment and placing sediment in stable location where it cannot enter the aquatic system.						x	x	x	x

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
46	R 68	Restrict the application of dust abatement materials, such as lignin or magnesium chloride, during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25 feet of a water body or stream channel).						x	x	x	x
47	R 95	Remove snow on surfaced roads in a manner that will protect the road and adjacent resources. Retain a minimum layer (4 inches) of compacted snow on the road surface. Provide drainage through the snowbank at periodic intervals to allow snowmelt to drain off the road surface. (Applies to wet season haul routes only)						x	x	x	x
48	R 96	Avoid removing snow from unsurfaced roads where runoff drains to waters of the State (applies to wet season haul only).						x	x	x	x
49		Ground-based and cable landings shall be no larger than 0.5 acres, helicopter landings shall be no larger than 1 acre and service landing shall be no larger than 3 acres.						x			
50	R 01, R 02, R 03	Locate temporary roads, permanent roads, and landings on stable locations, such as ridge tops, stable benches, or flats where feasible. Use existing jeep roads, skid trails, and landings where possible. Locate newly constructed routes and landings away from slide areas, headwalls, seeps, springs, high landslide hazards locations, and riparian reserves, unless there is no practicable alternative. Locate new routes in locations to minimize stream crossings. Locations would be approved by the Authorized Officer before construction.						x			

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
51	R 06, BLM 2016b, p. 93, BLM 2018, p. 273.	Confine pioneer roads (i.e., clearing and grubbing of trees, stumps, and boulders along a route) to the construction limits of the roadway width to reduce the amount of area disturbed. Storm proof or close pioneer roads prior to the onset of the wet season. Apply seed and mulch to closed roads when they will not be needed the next year.						x			
52	R 62	Limit new permanent roads, temporary roads, and landing construction and road improvements to the dry season (generally May 15 to October 15), or when soil moisture does not exceed 25 percent. Keep erosion control measures concurrent with ground disturbance to allow immediate storm proofing.						x			
53	R 07, R 08, R 12, R 11 BLM 2016b, p. 93, BLM 2018, p. 273	Design road cut and fill slopes with stable angles, to prevent erosion and prevent slope failure. End-haul material excavated during construction where side slopes exceed 60 percent, in fragile for mass movement soils (FP) or on any side slope where side-cast material may enter wetlands, floodplains, or waters of the State. Use controlled blasting techniques to minimize loss of material on steep slopes or into wetlands, riparian reserves, floodplains, or waters of the State. Locate waste disposal areas outside of wetlands, riparian reserves, floodplains, and unstable areas to minimize risk of sediment delivery. Apply erosion control prior to the wet season. Prevent overloading areas, which may become unstable. Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). Apply seed and mulch to waste disposal areas and notify botanist of final locations of any waste piles. Maintain stockpiled, uninfested material in a weed-free condition.						x	x		
54		Do not cut vegetation within the extent of the unstable areas that are above or adjacent to stream channels and are likely to deliver material such as sediment and logs to the stream if the unstable area fails. Extend the riparian reserves to include stable areas between such an unstable area where there is potential for the failure to reach the stream.									
55		For landings located within riparian reserves, decompact/rip soils to a depth suitable to break up the compaction layer after use is completed. Apply native seed and weed-free mulch (or utilize other natural on-site material) to stabilize the area after ripping. Apply erosion-control techniques (e.g., waddles, hay bales, or silt fences) around the area if the potential for soil erosion or delivery to waterbodies, floodplains, and wetlands exist, or as identified by the Authorized Officer.	x	x	x						

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
56	R 66	Suspend ground-disturbing activity if forecasted rain would saturate soils to the extent that there would be potential for movement of sediment from the road to wetlands, floodplains, and waters of the state. Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground-disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include, but are not limited to, erosion control blankets and mats, soil binders, soil tackifiers, and slash placement.						x	x	x	
57	BLM 2016b, p. 93, BLM 2018, p. 273	Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. All material, including rock and gravel, utilized in the construction, improvement, or renovation of roads must be free of noxious weeds. Aggregate stockpiled between June 16 and October 31 of the previous year would not be accepted unless inspected by the project botanist. Sources of all imported fill material will be inspected by the field office botanist for weeds before use.						x			
58	R 62	Road renovation and improvement would occur during the dry season (May 15 to October 15). Variations in these dates would be permitted dependent upon weather and soil moisture conditions and with a specific erosion control plan (e.g., rocking, waterbarring, seeding, mulching, barricading) as determined by the Authorized Officer in consultation with aquatic and/or soils scientists. All road and landing construction activities would be stopped when a storm event resulted in degrading conditions as evidenced by turbid runoff, turbid ditch flow, ponding, or rutting or other displacement in excess of two inches. Watershed specialists would closely monitor storms that result in precipitation and would convey pertinent information to the Authorized Officer. Similarly, the Authorized Officer would convey road, landing, and ditch conditions to the aquatic and/or soil specialists.						x	x		
59		Limit road closure and decommissioning work to the dry season (generally May 15 to October 15), or when soil moisture does not exceed 25 percent as allowed by Authorized Officer.							x	x	
60	R 63, R 83, R 91	Decommission temporary roads upon completion of use. Decompact (using equipment approved by Authorized Officer) and water bar all temporary routes and associated landings, and roads identified for full decommissioning to a depth of 18 inches or bedrock (whichever is shallower). Avoid subsoiling areas near tree roots and where there are rocks larger than 2 feet across. Apply seed and mulch and block upon completion of use. Seeding and mulching would occur in the same operational season that construction activities.								x	

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
61		Do not allow culvert removal and replacement from October 15 to May 15. Variations in these dates would be permitted dependent upon weather and soil moisture conditions and with a specific erosion control plan (e.g., rocking, waterbarring, seeding, mulching, barricading) as determined by the Authorized Officer in consultation with aquatic and/or soils scientists.							x	x	
62	R 70	Retain ground cover in ditch lines, except where sediment deposition or obstructions require maintenance						x	x	x	
63	R 47, R 77	Provide for unobstructed flow at culvert inlets and ditchlines.						x	x	x	
64	BLM 2018, p. 273	Aggregate, including riprap, from a commercial source would be weed-free or would have to be crushed between November 1 and June 15 immediately prior to application. Aggregate stockpiled between June 16 and October 31 of the previous year would not be accepted.							x		
65		Conduct a post-activity fuels assessment in treated areas. Modifications or additional treatment recommendations would be based on the fuels assessment and the amount of slash created during harvest and pre-commercial thinning project activities. Treatments including, but not limited to, hand or machine slash piling, slash pile burning, underburning, or biomass removal may be needed to further reduce the fuels hazard to an appropriate level within all treatment units.				x	x				
66	F 07	Do not machine pile slash within riparian areas and do not hand pile slash within 35 feet from intermittent stream channels and 60 feet from perennial streams.				x					
67	F 04	Avoid delivery of chemical retardant foam or additives to waterbodies, and wetlands. Store and dispose of ignition devices/materials (e.g., flares) outside RRs or a minimum of 150 feet from waterbodies, floodplains, and wetlands. Maintain and refuel equipment (e.g., drip torches and chainsaws) a minimum of 100 feet from waterbodies, floodplains, and wetlands. Portable pumps can be re-fueled on site within a spill containment system.				x	x				

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
68		Disperse slash piles across the treatment areas. Do not construct landing piles within 30 feet of dripline of leave trees. Burn slash piles when soil and duff moisture content is high. Where possible, build piles on skid trails or landings. Apply seed and mulch to burn scars.				x					
69	F 06	In underburning units, consume only the upper horizon organic materials and allow no more than 15 percent of the burned area mineral soil surface to change to a reddish color.					x				
70	F 08	Avoid creating piles greater than 16 feet in height or diameter. Pile smaller materials and leave pieces > 12” diameter within the unit. Create multiple small piles in landing to reduce pile size or remove material off-site where feasible. Reduce burn time and smoldering of piles by extinguishment with water and tool use.				x					
71	F 09	When burning machine-constructed piles, preferably locate and consume organic materials on landings, skid trails, or roads. If piles are within harvested units and more than 15 percent of the burned area mineral soil (the portion beneath a pile) surface changes to a reddish color, then consider that amount of area towards the 20 percent detrimental soil disturbance limit.				x					
72	M 05	Use erosion-reduction practices, such as seeding, mulching, silt fences, and woody debris placement, to limit erosion and transport of sediment to streams from quarries.						x	x		
73	M 02	Prevent overburden stockpiles from entering wetlands, riparian reserves, flood plains, and waters of the State.						x	x		
74	R 35	Install underdrain structures when roads cross or expose springs, seeps, or wet areas rather than allowing intercepted water to flow down gradient in ditchlines.						x	x		

PDF Number	BMP Number or ROD/RMP Citation	PDFs for the South Clark Forest Management Project	Applicable Action								
			Timber Harvest			Fuels Reduction		Roadwork			Other
			Helicopter	Ground-based	Skyline-Cable	Hand Pile and Burn	Underburned	Construction/ Improvement	Renovation	Decommission	Timber Haul
75		Keep service pad and helispot construction no larger than necessary and obtain approval from the Contract Administrator before construction.	x								
76		Lift logs vertically (without horizontal movement) to a height above the adjacent leave trees.	x								
77		Vertically lift multiple log turns from a small enough radius to result in minimal damage to the residual forest stand as determined by the Authorized Officer.	x								
78		Restrict aerial operations within 0.5 mile of any residence to an operating time of 6:00 a.m. to 6:00 p.m., Monday through Friday.	x								
79		A dropline with a minimum length of two hundred (200) feet is required.	x								
80		For Helicopter units whole tree yarding will be allowed as long as residual stand damage is minimized. Yarding of unmerchantable material is not required. If excessive stand damage occurs as determined by the authorized officer, trees will be required to be bucked into lengths no longer than 44 feet and will be completely delimbed prior to being yarded.	x								

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- The South Clark EA project uses BMPs/PDFs to address the effects to aquatic communities that are discussed in this paper. Roads and haul routes in this EA will be hydrologically disconnected from streams and associated aquatic communities.

United States District Court for the District of Oregon Eugene Division. 2022. Opinion and Order: Civ. No. 1:20-cv-00952-AA.

- The South Clark EA addresses the effects of the proposed treatments on spotted owl habitat, and it addresses the influence of barred owls. Effects to spotted owls using Recovery Action 10 is addressed under the proposed treatments in Alternative 5. Additionally, the BLM's contribution towards Recover Action 32 is addressed through the Late-Successional Reserve system.

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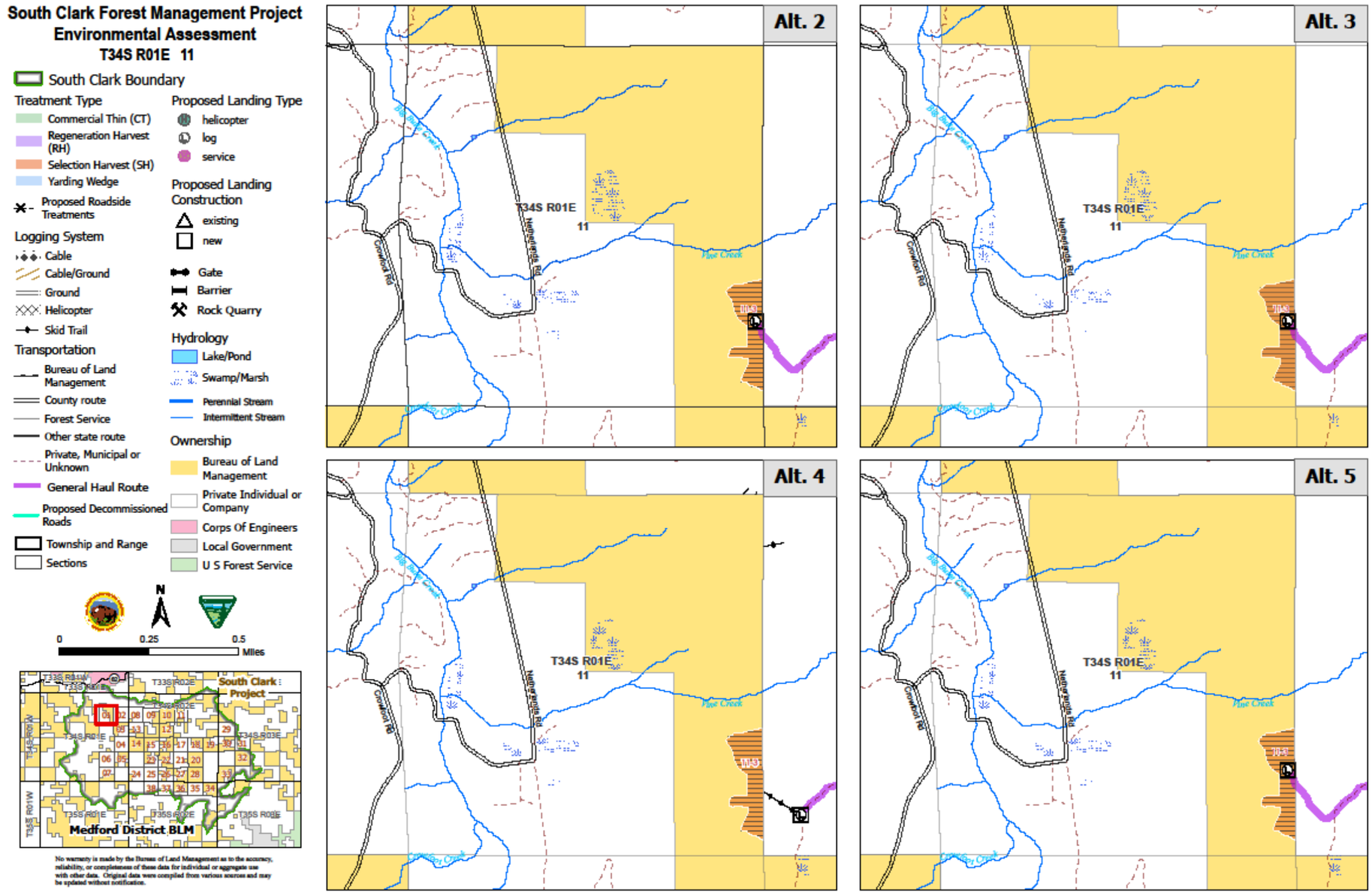
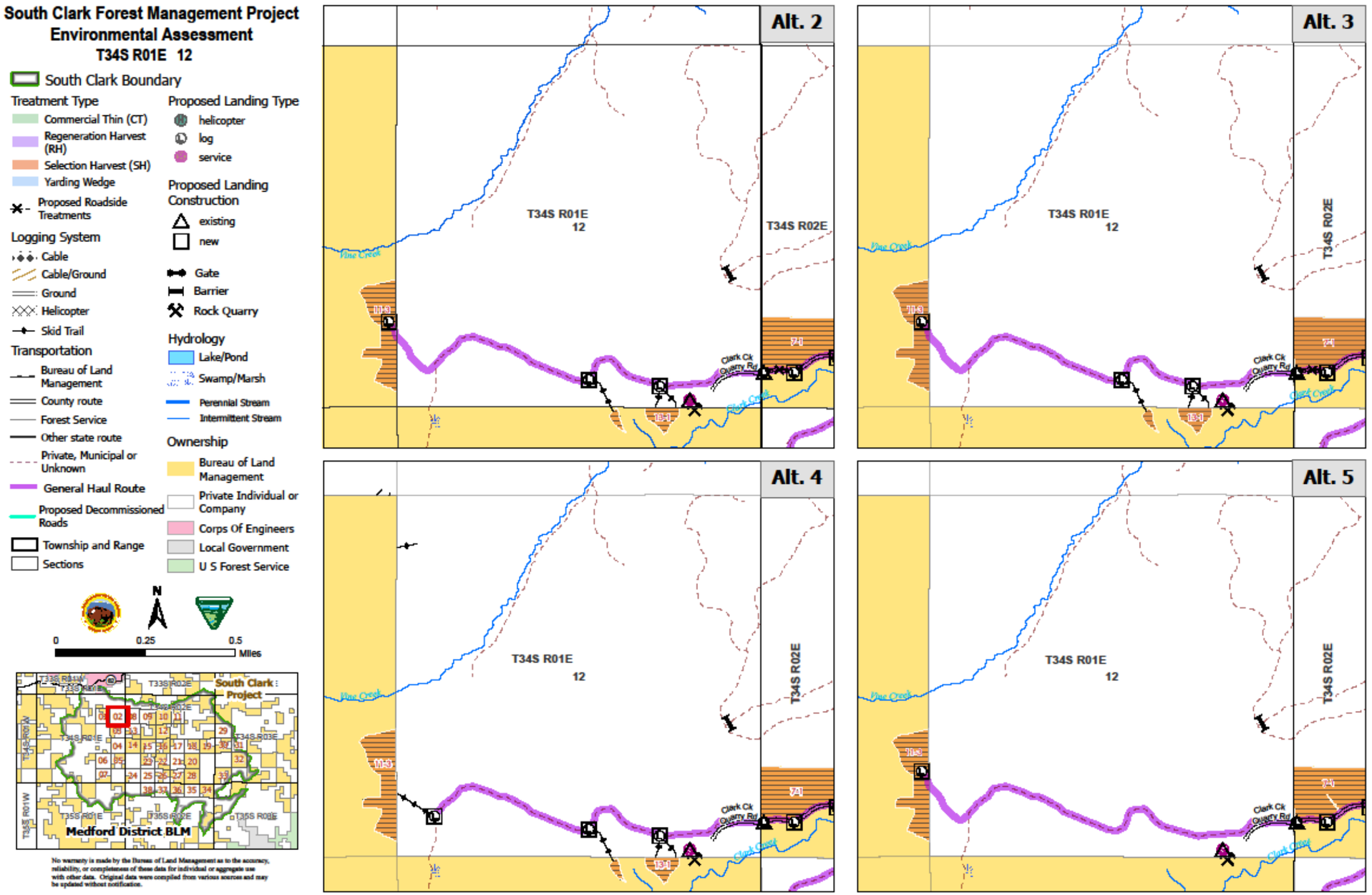
Appendix 5: Maps

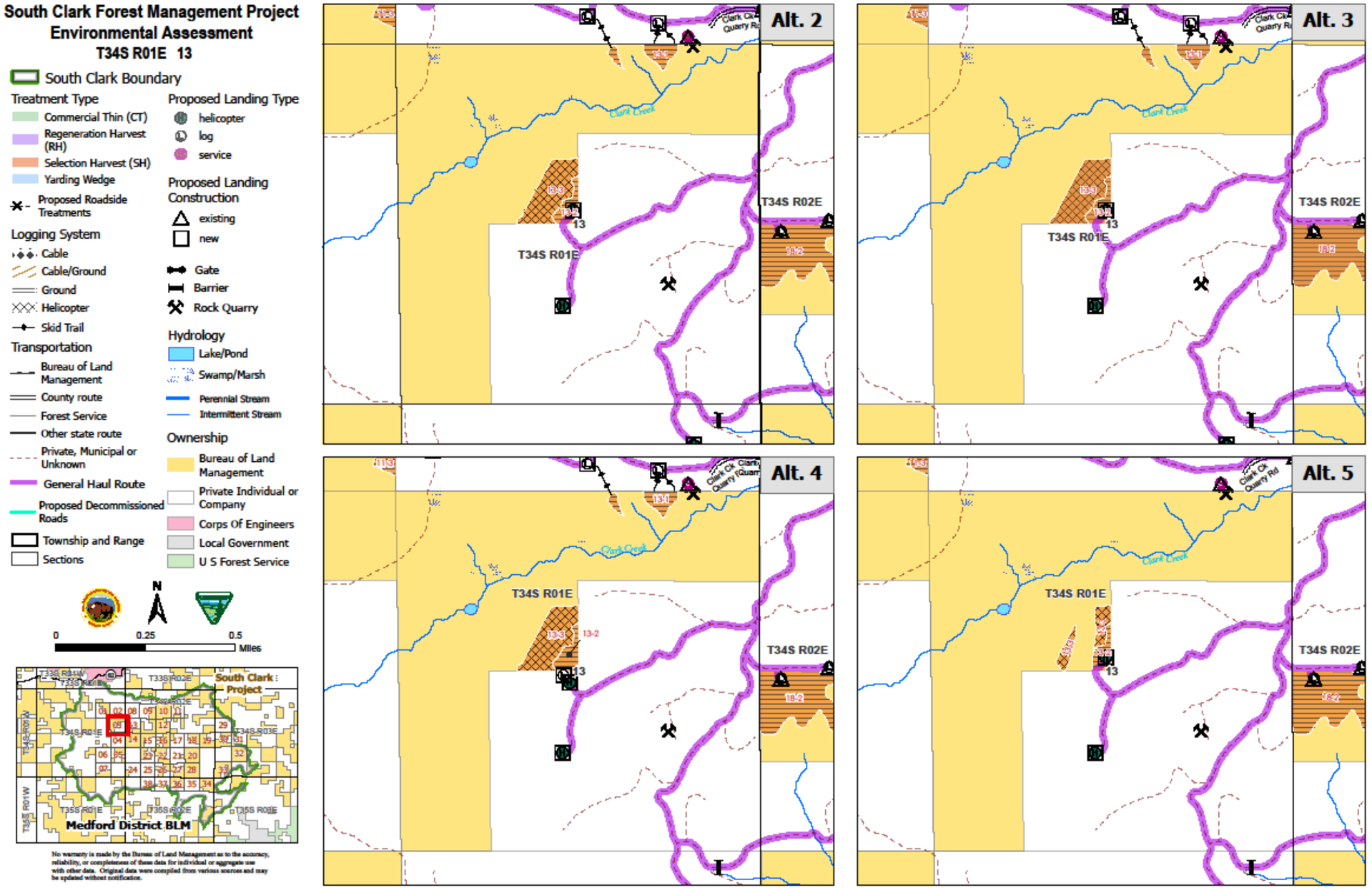
Map 8. Proposed Treatments T34S-R01E-11



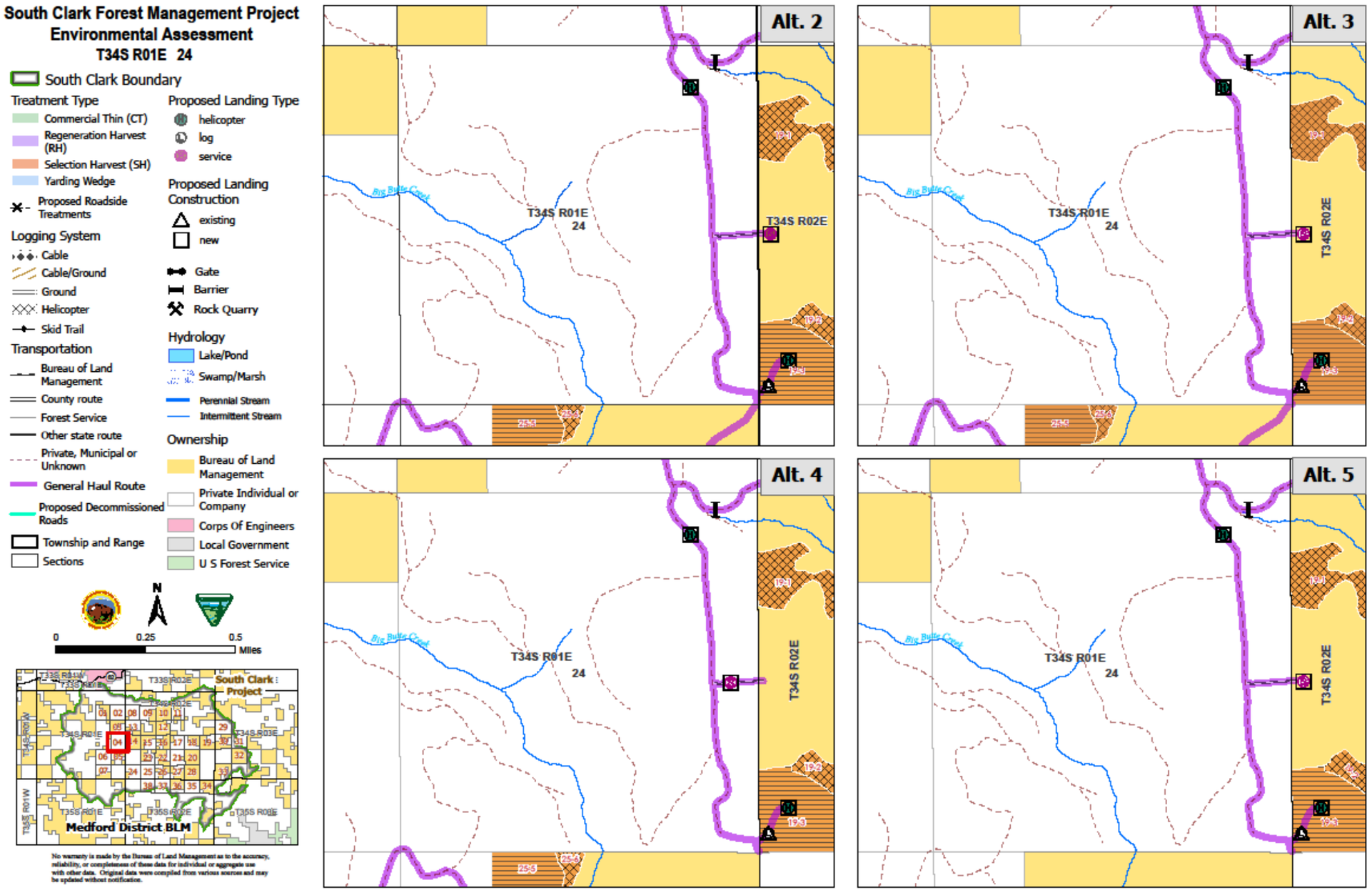
Map 9. Proposed Treatments T34S-R01E-12



Map 10. Proposed Treatments T34S-R01E-13



Map 11. Proposed Treatments T34-R01E-24



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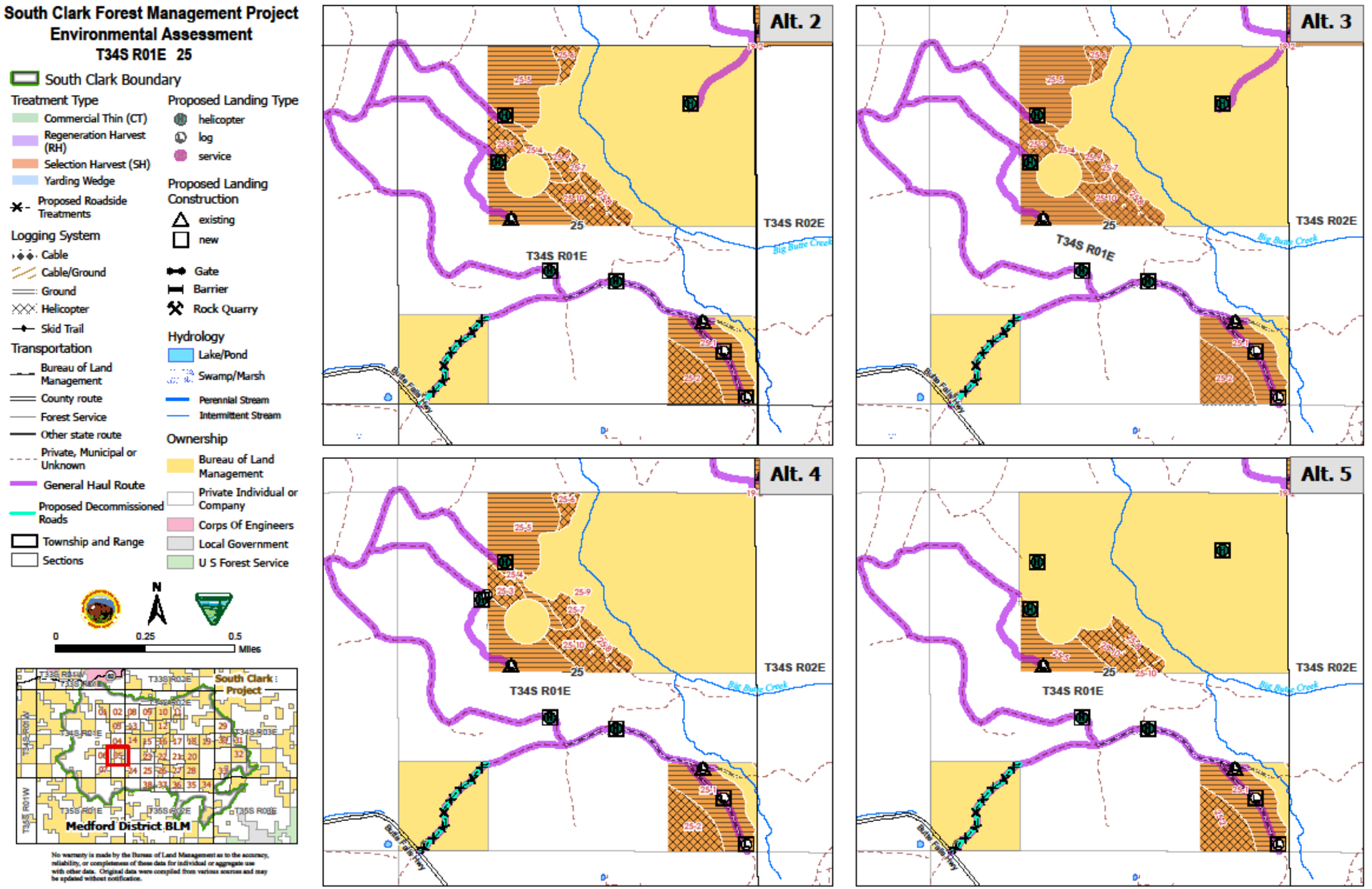
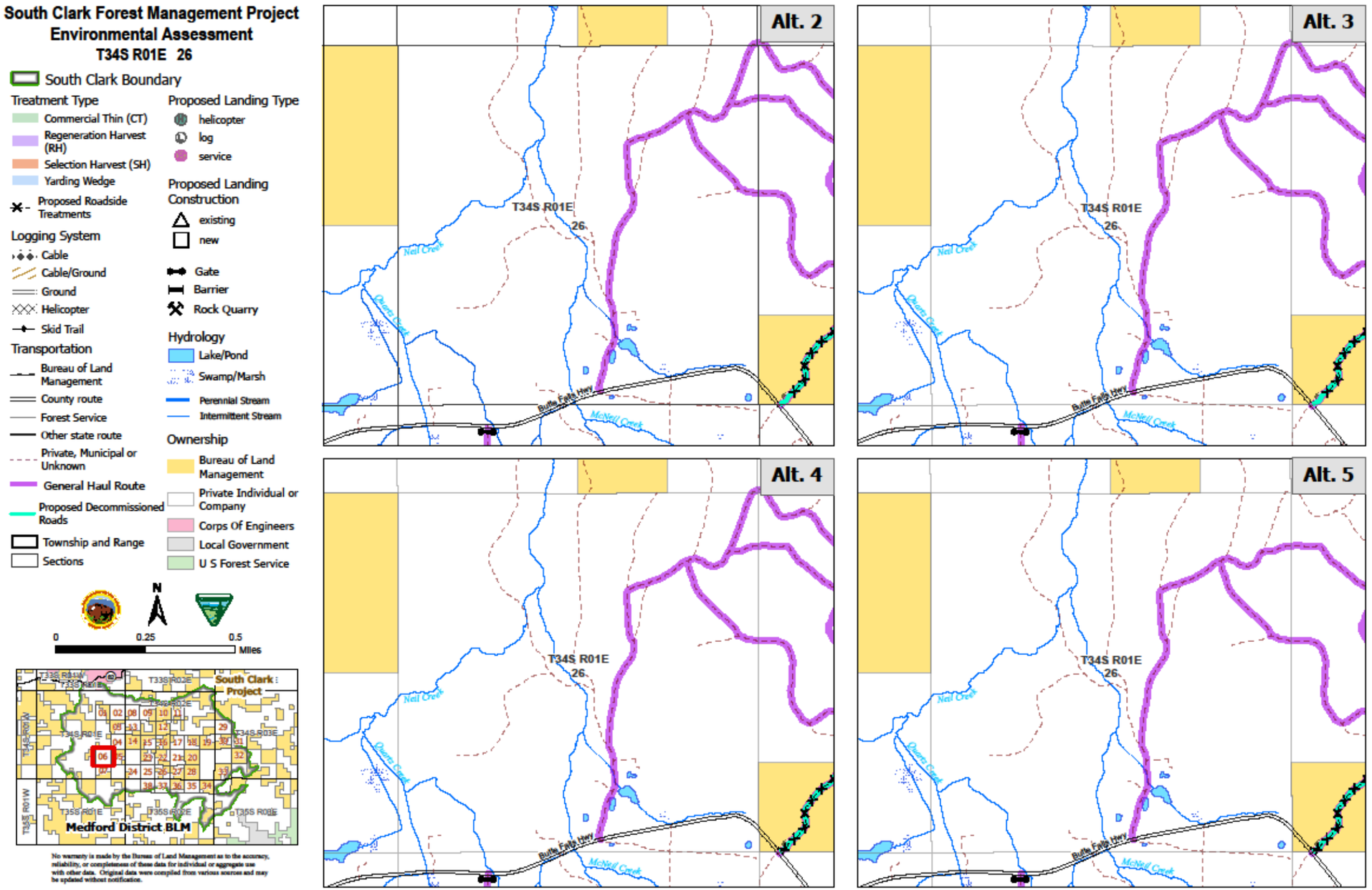
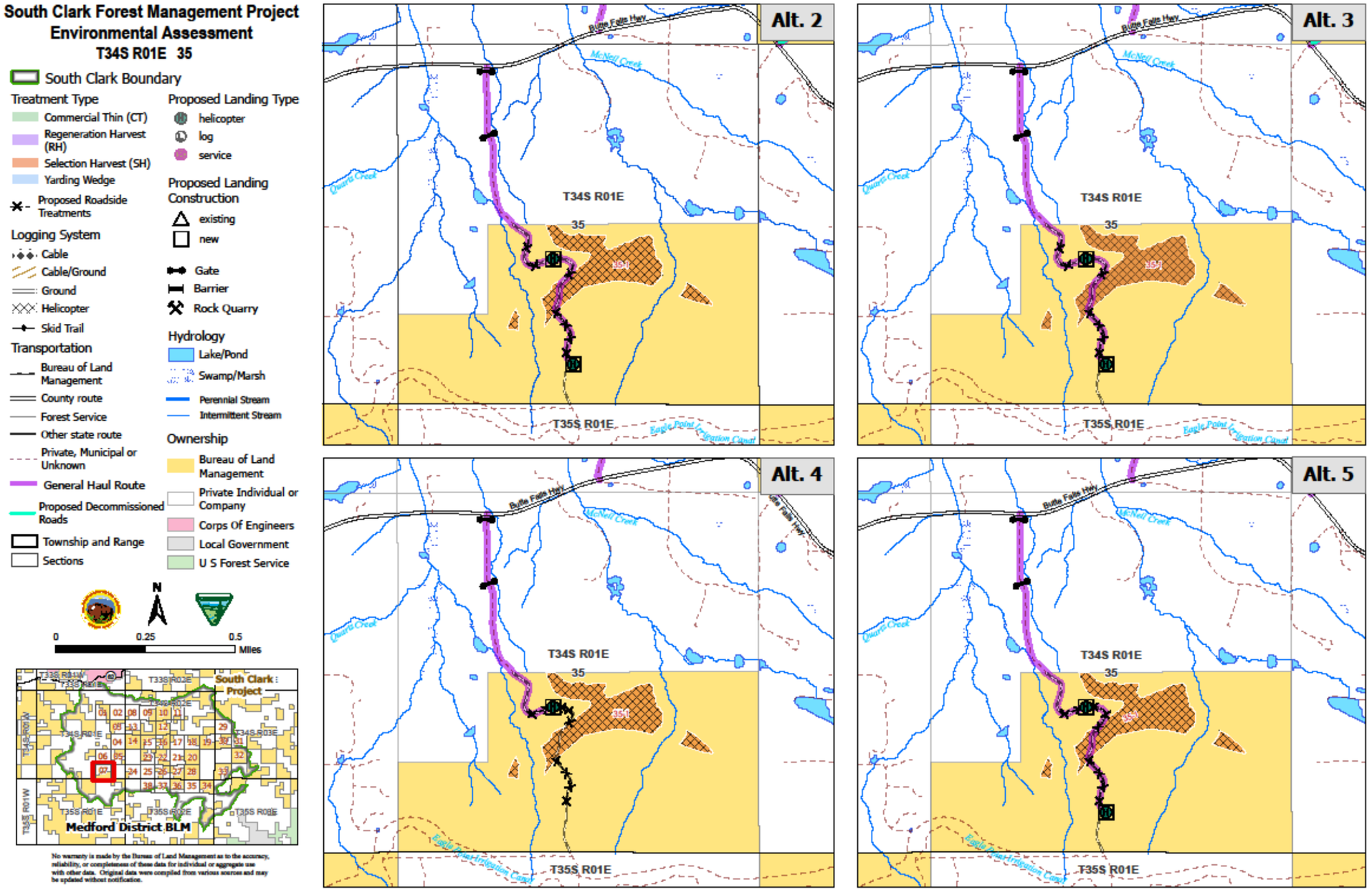


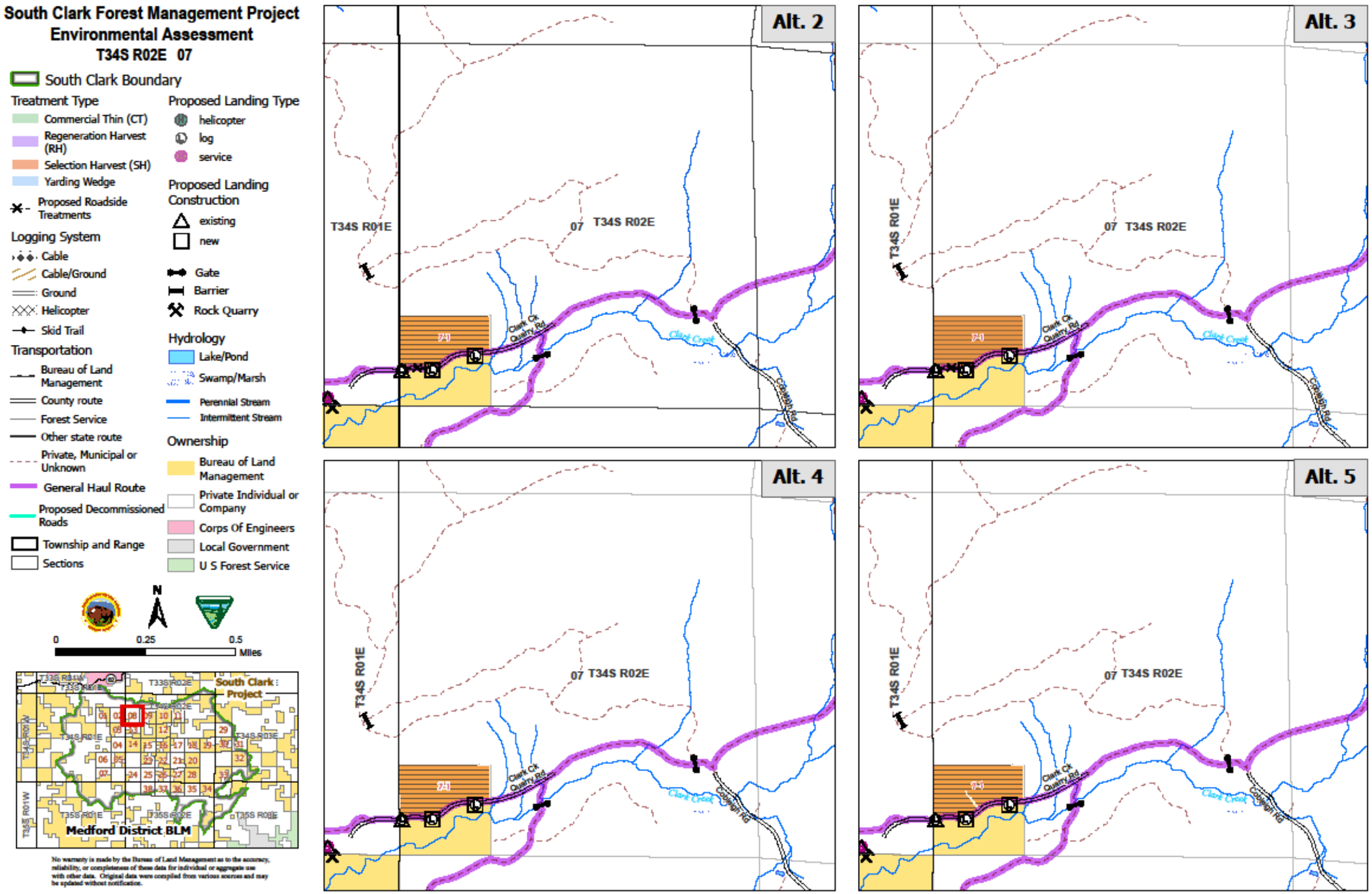
Map 13. Proposed Treatments T34-R01E-26



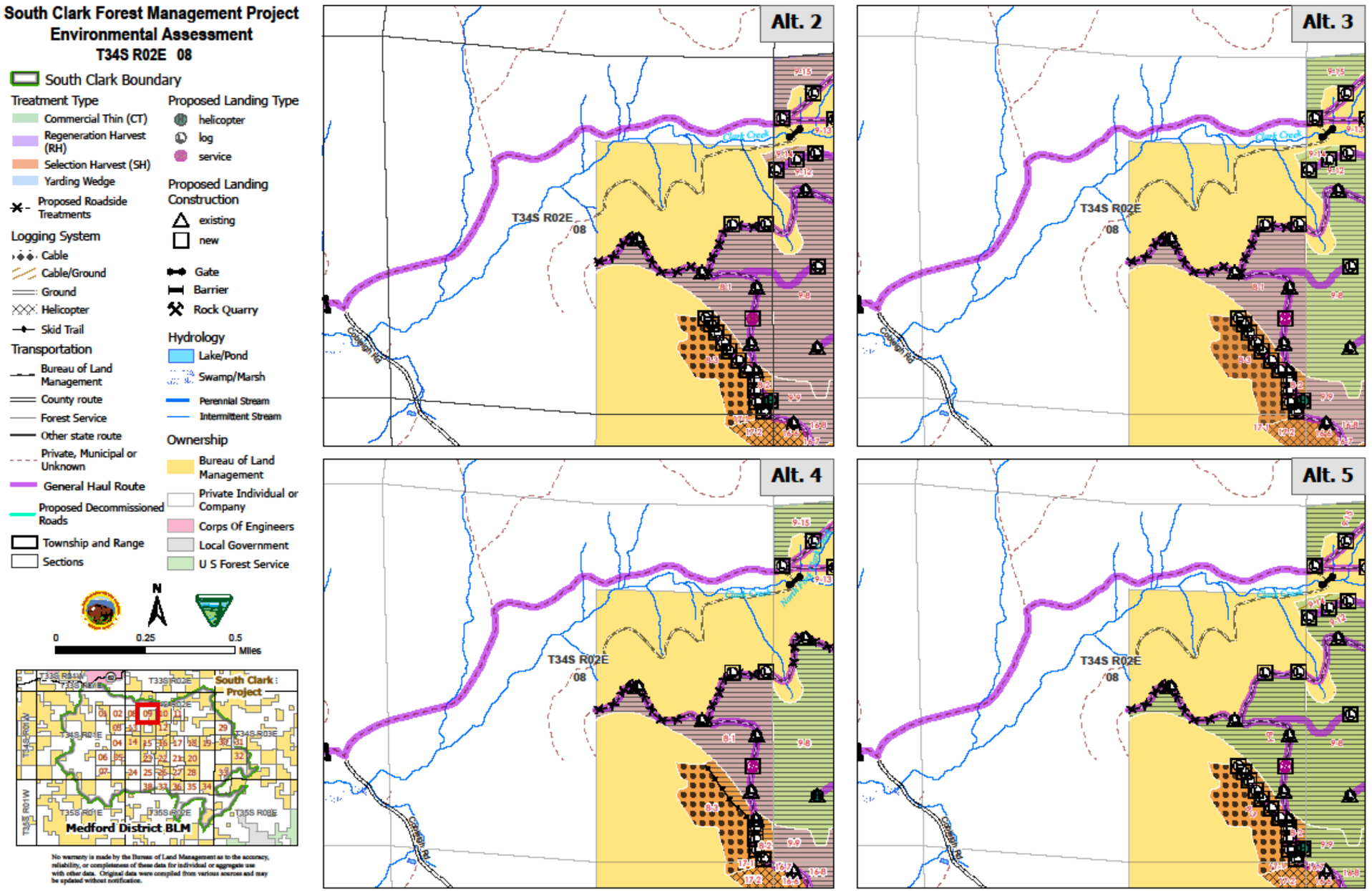
Map 14. Proposed Treatments T34-R01E-35



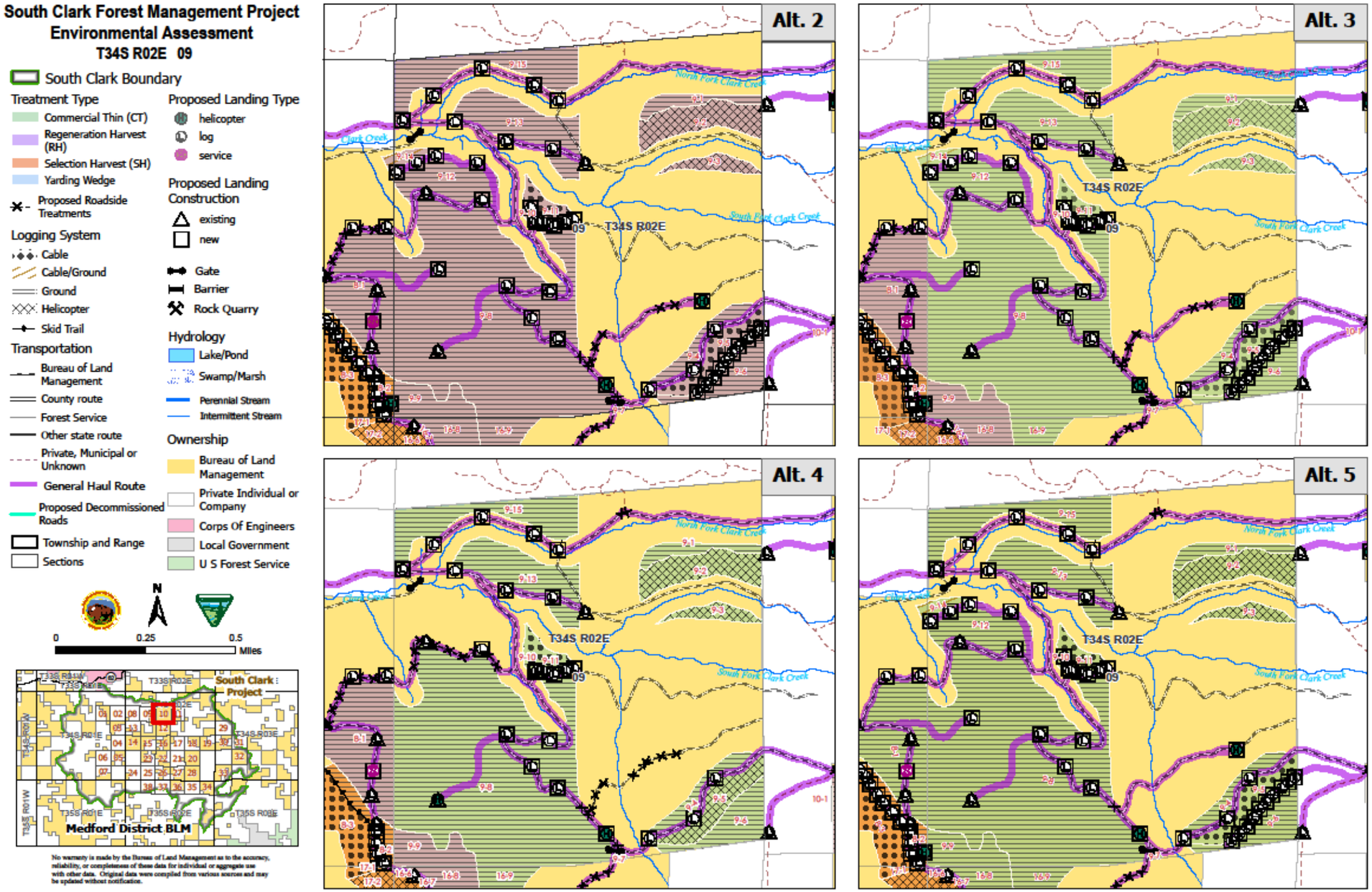
Map 15. Proposed Treatments T34-R02E-07



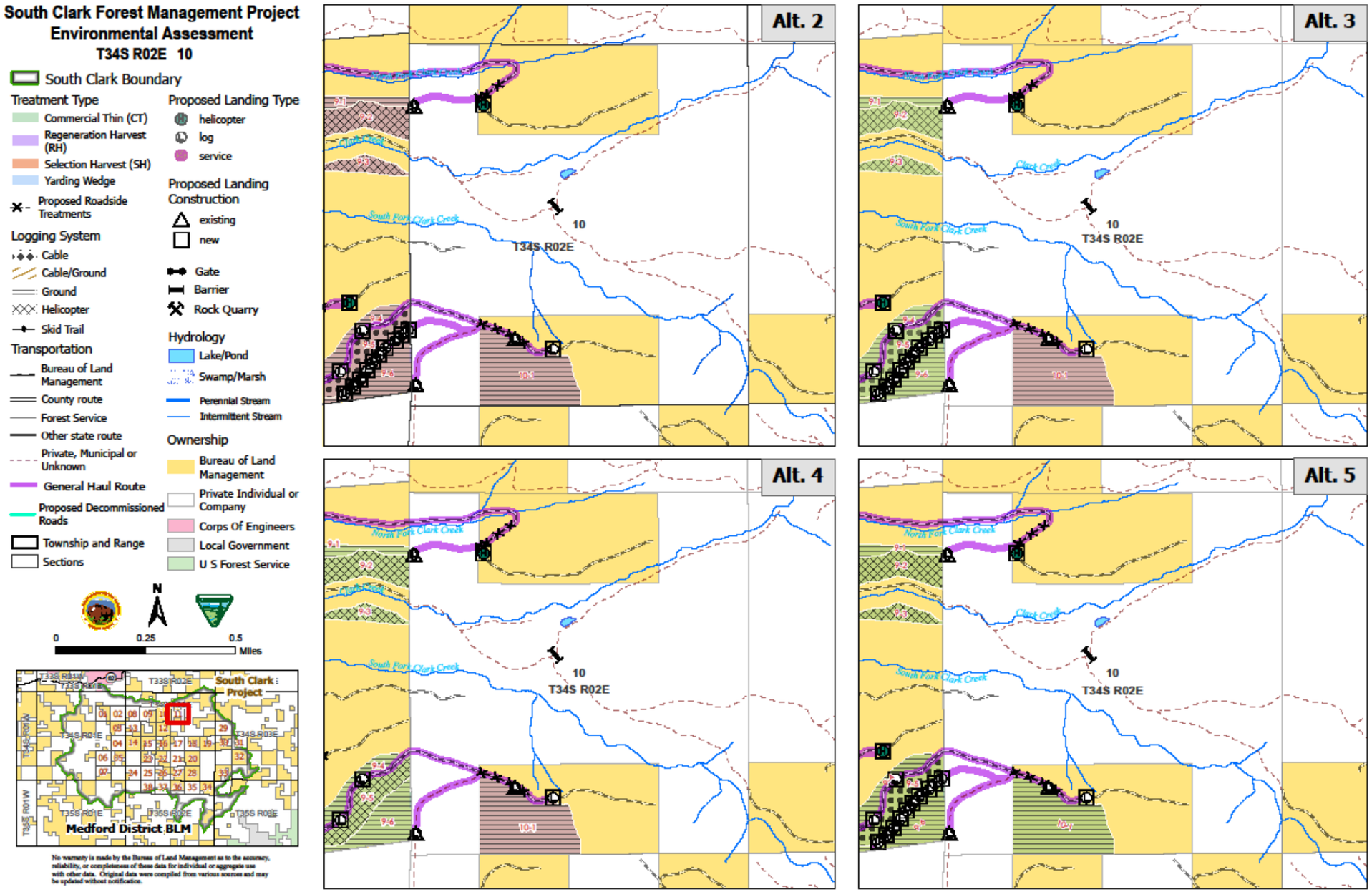
Map 16. Proposed Treatments T34-R02E-08



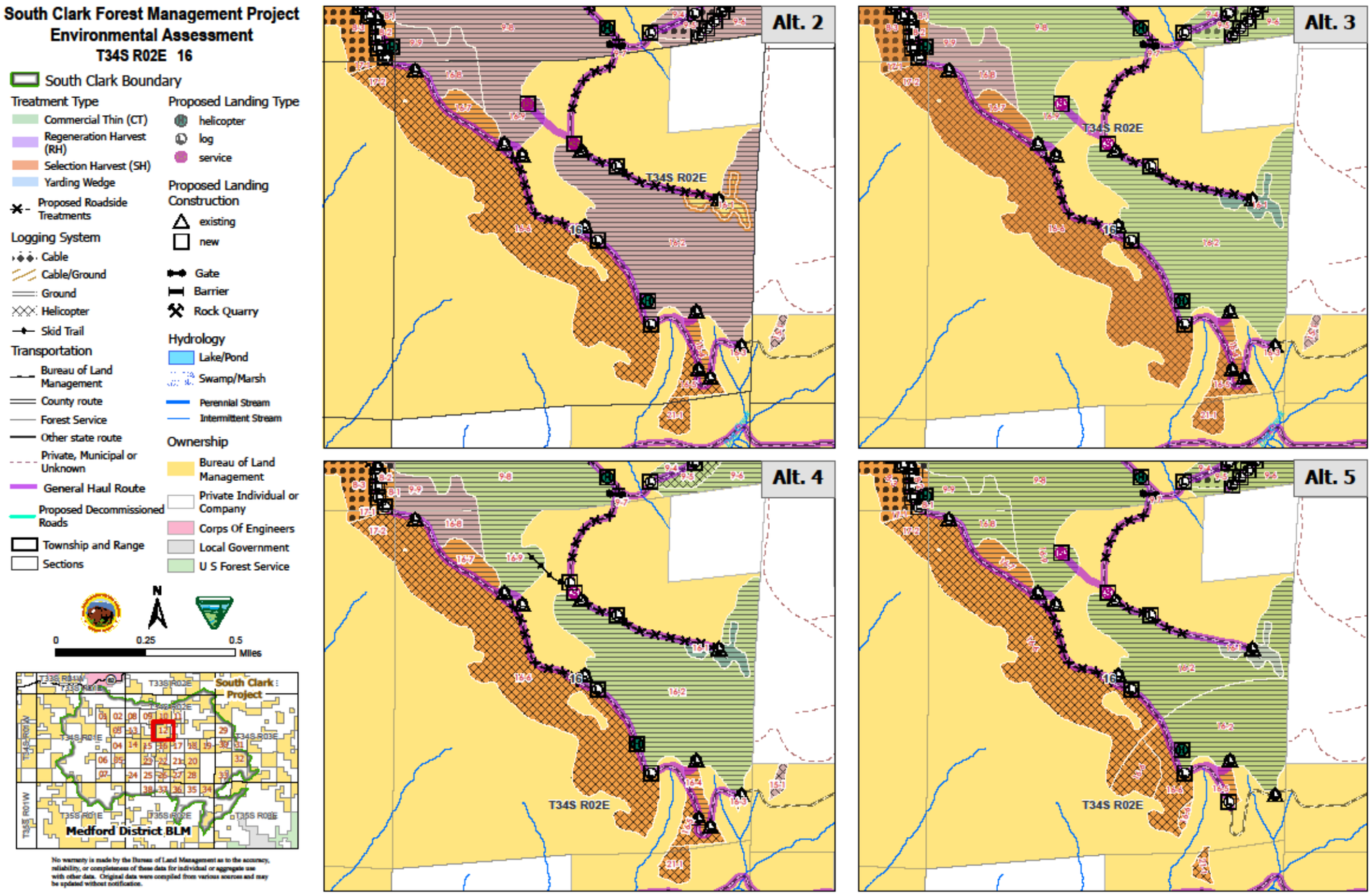
Map 17. Proposed Treatments T34-R02E-09



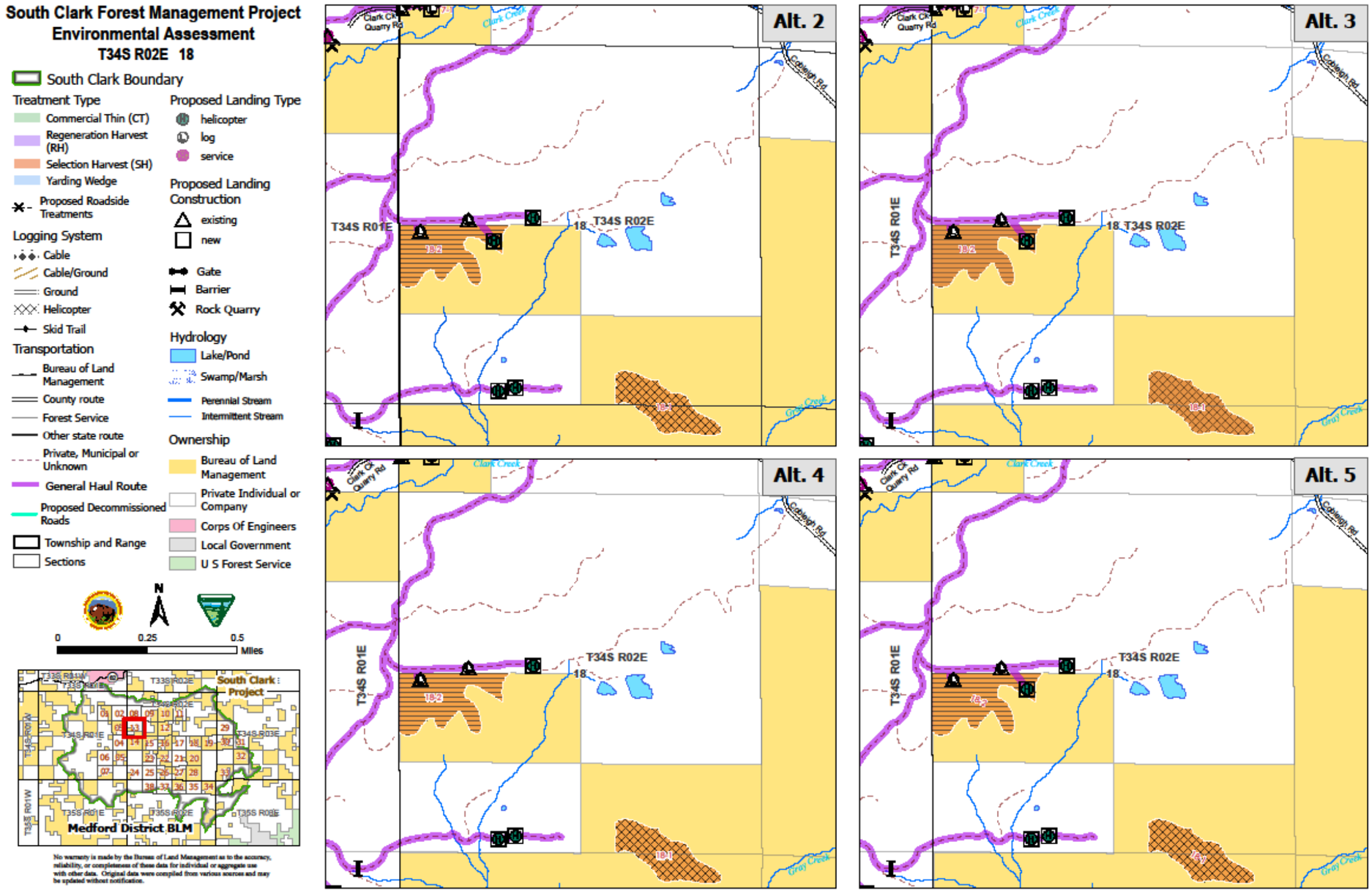
Map 18. Proposed Treatments T34-R02E-10



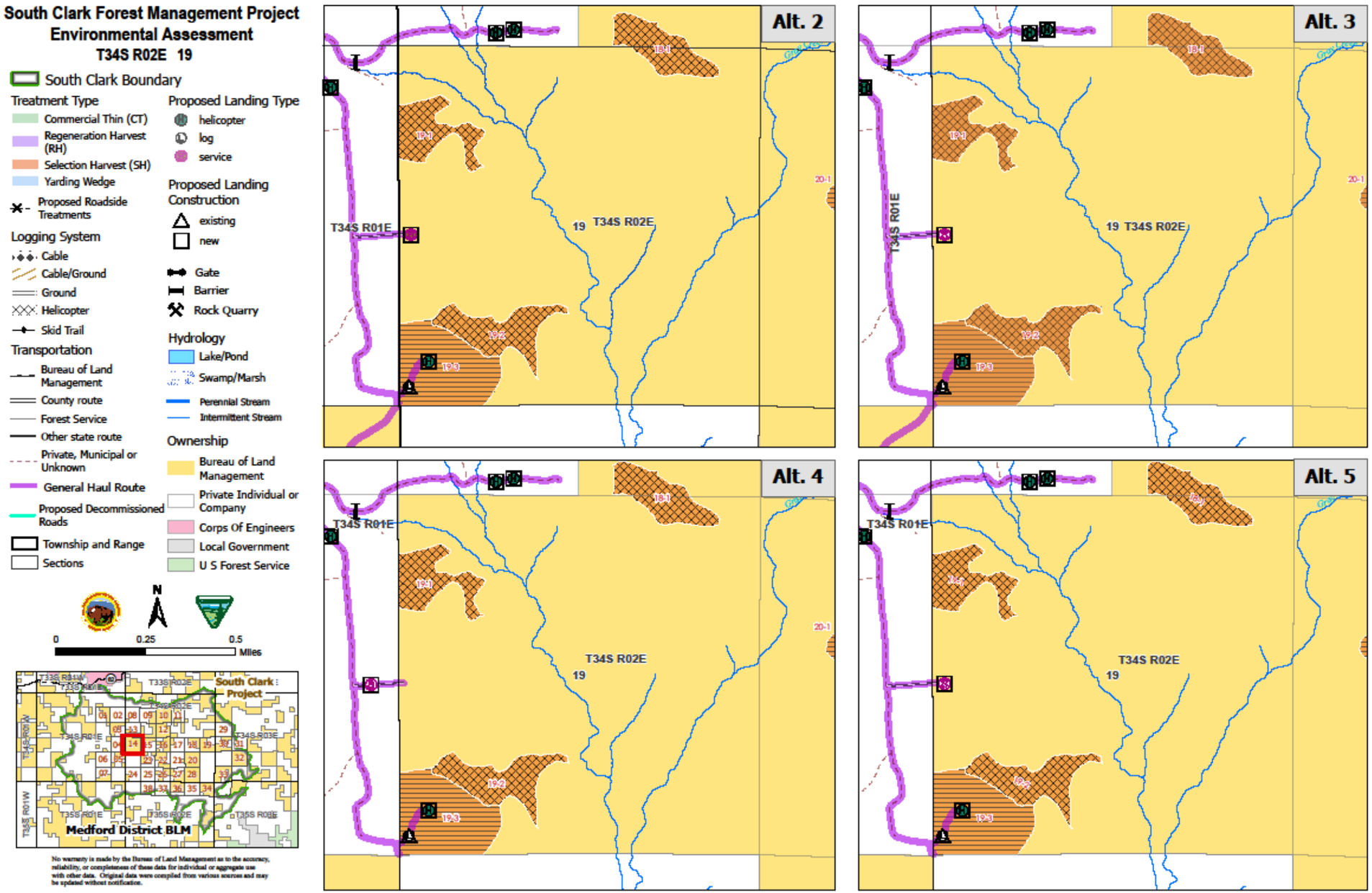
Map 19. Proposed Treatments T34-R02E-16



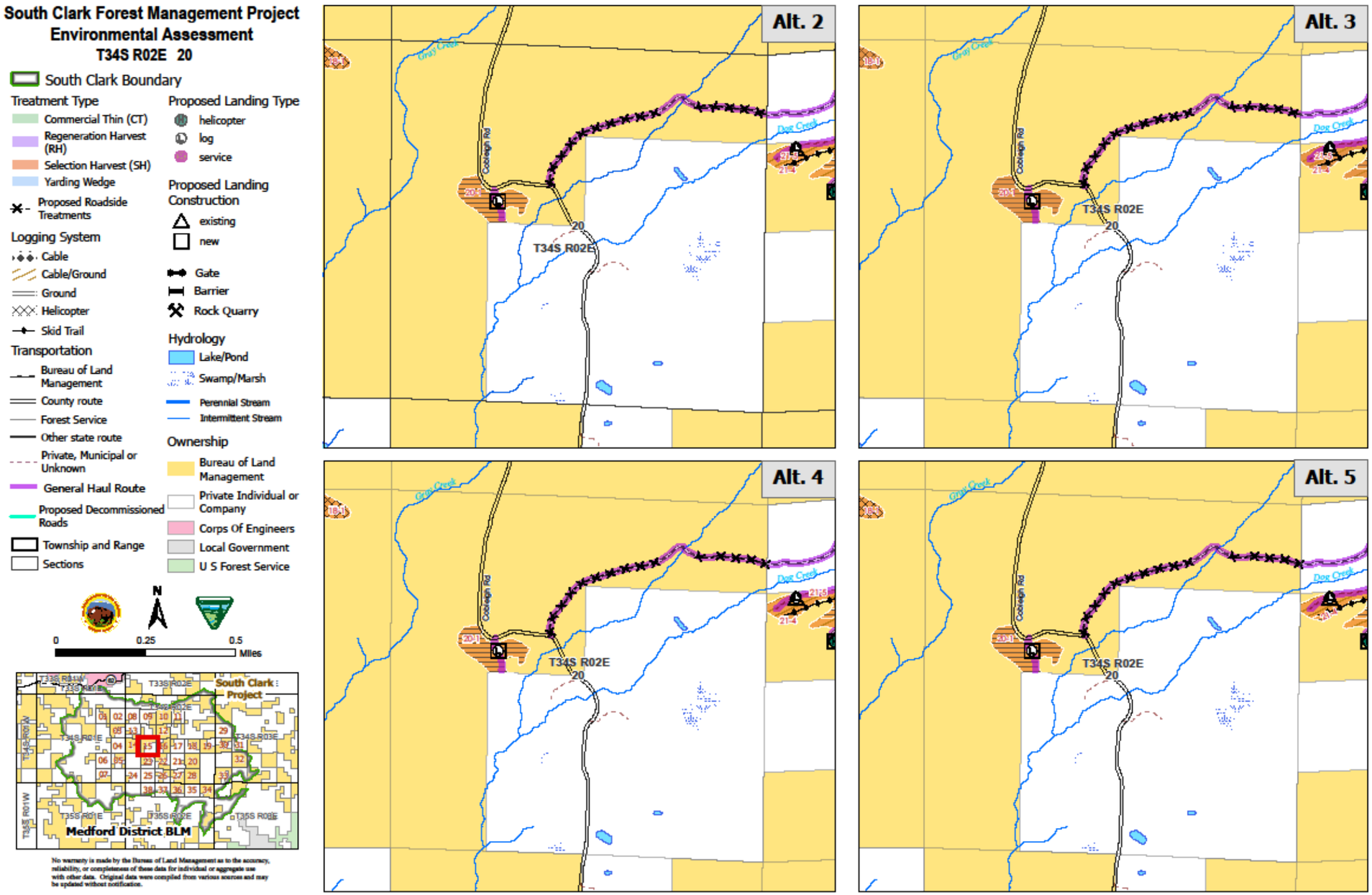
Map 20. Proposed Treatments T34-R02E-18



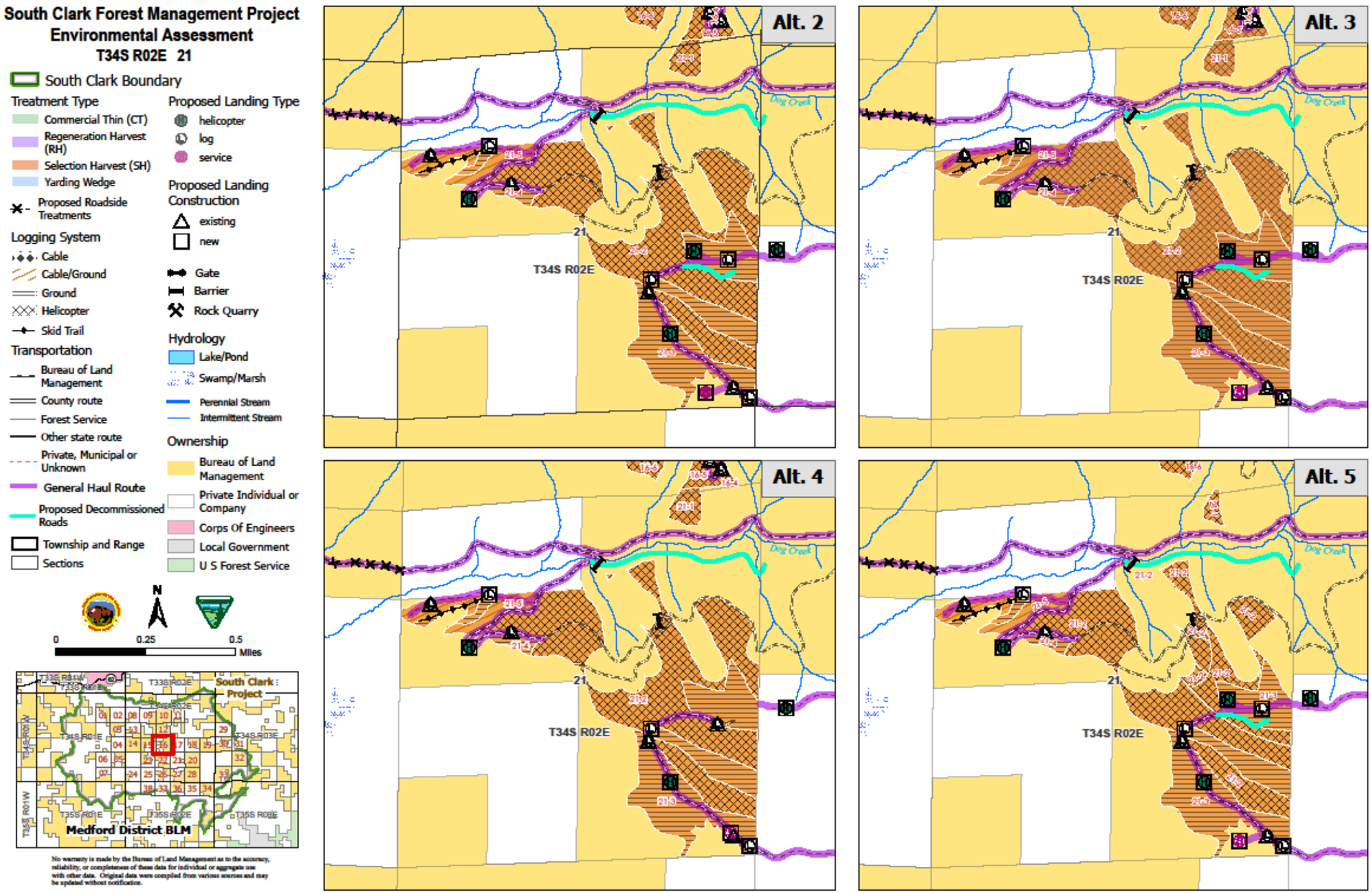
Map 21. Proposed Treatments T34-R02E-19



Map 22. Proposed Treatments T34-R02E-20



Map 23. Proposed Treatments T34-R02E-21



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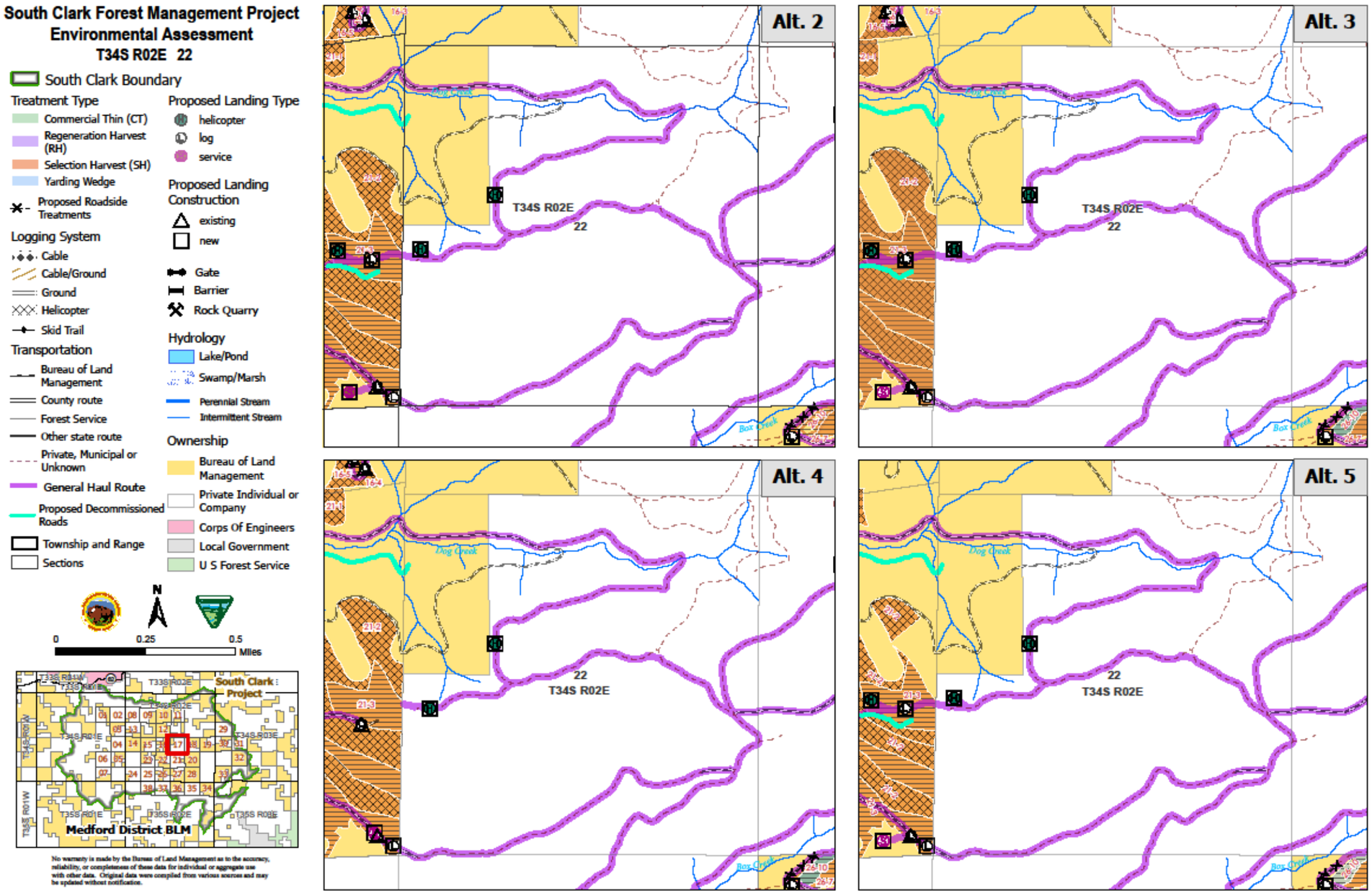
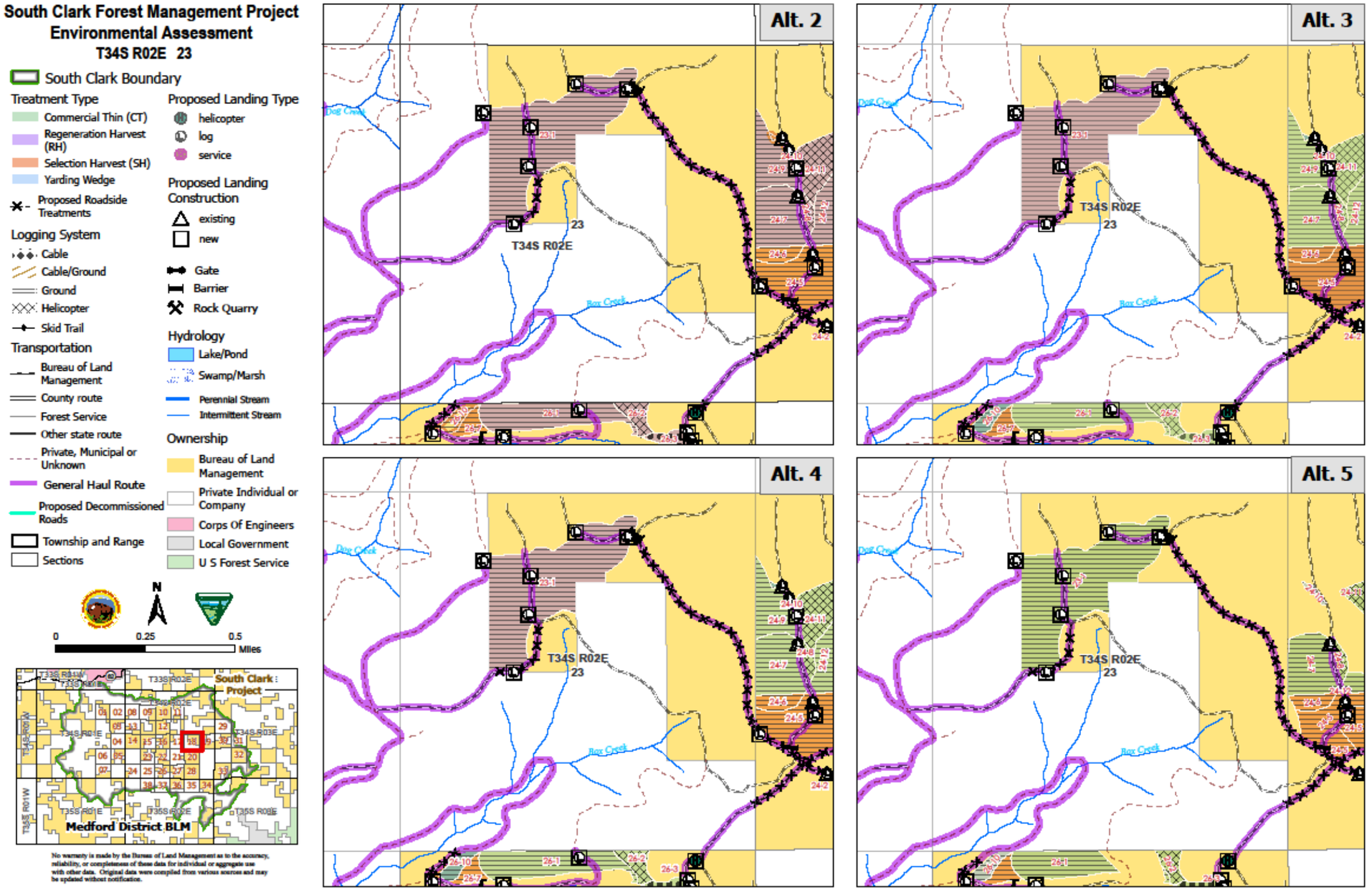
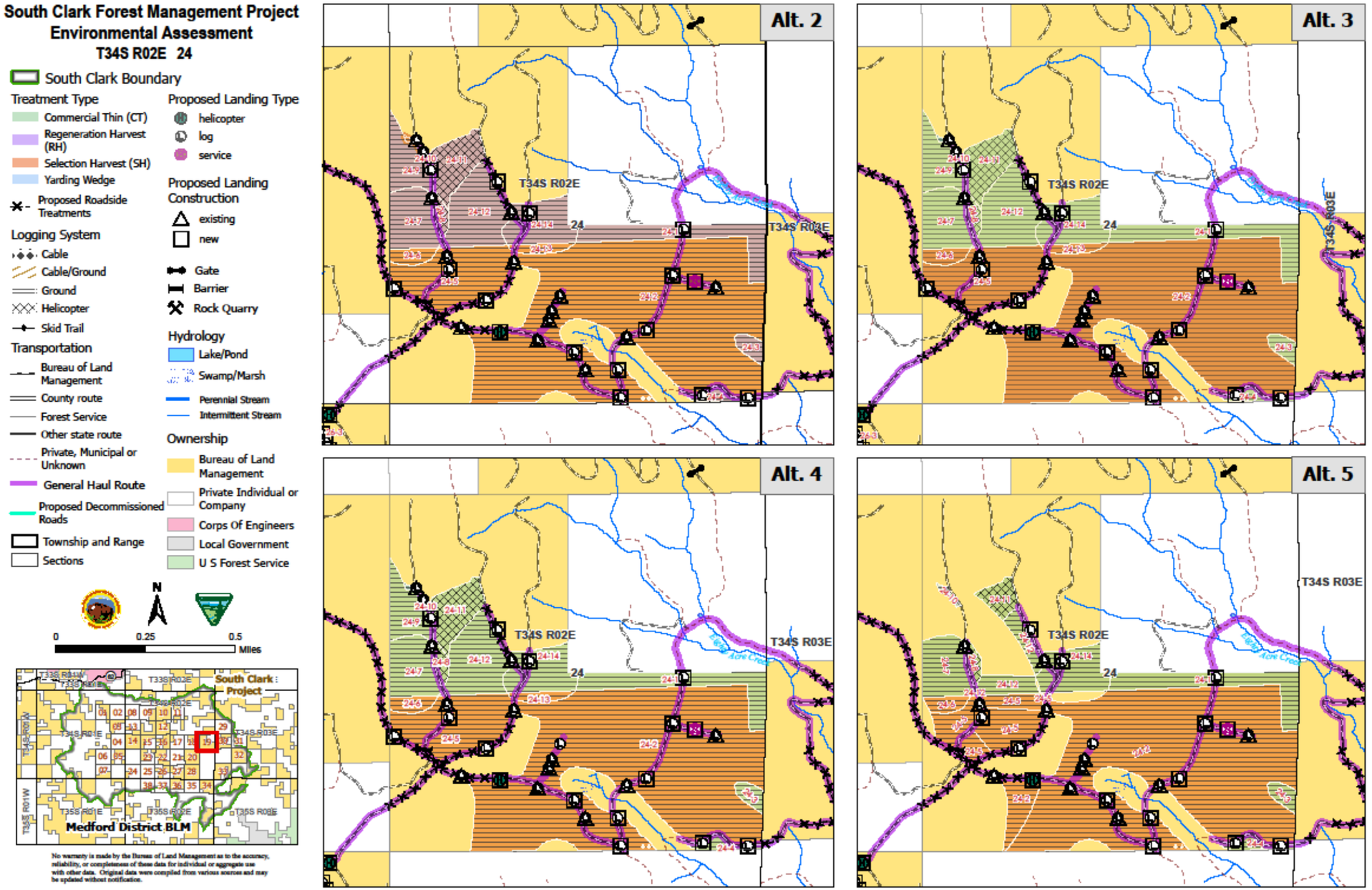


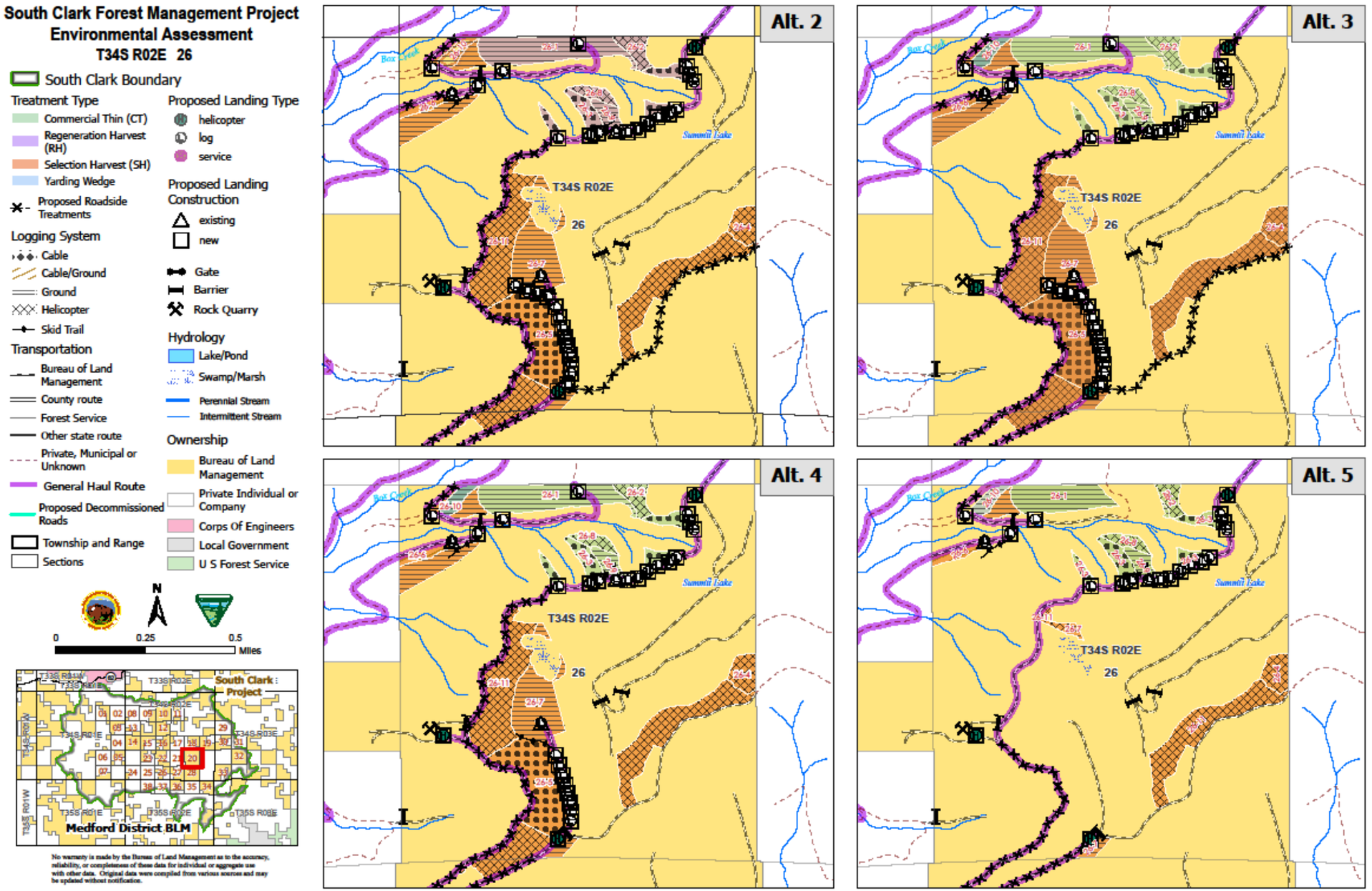
Map 25. Proposed Treatments T34-R02E-23



Map 26. Proposed Treatments T34-R02E-24



Map 27. Proposed Treatments T34-R02E-26



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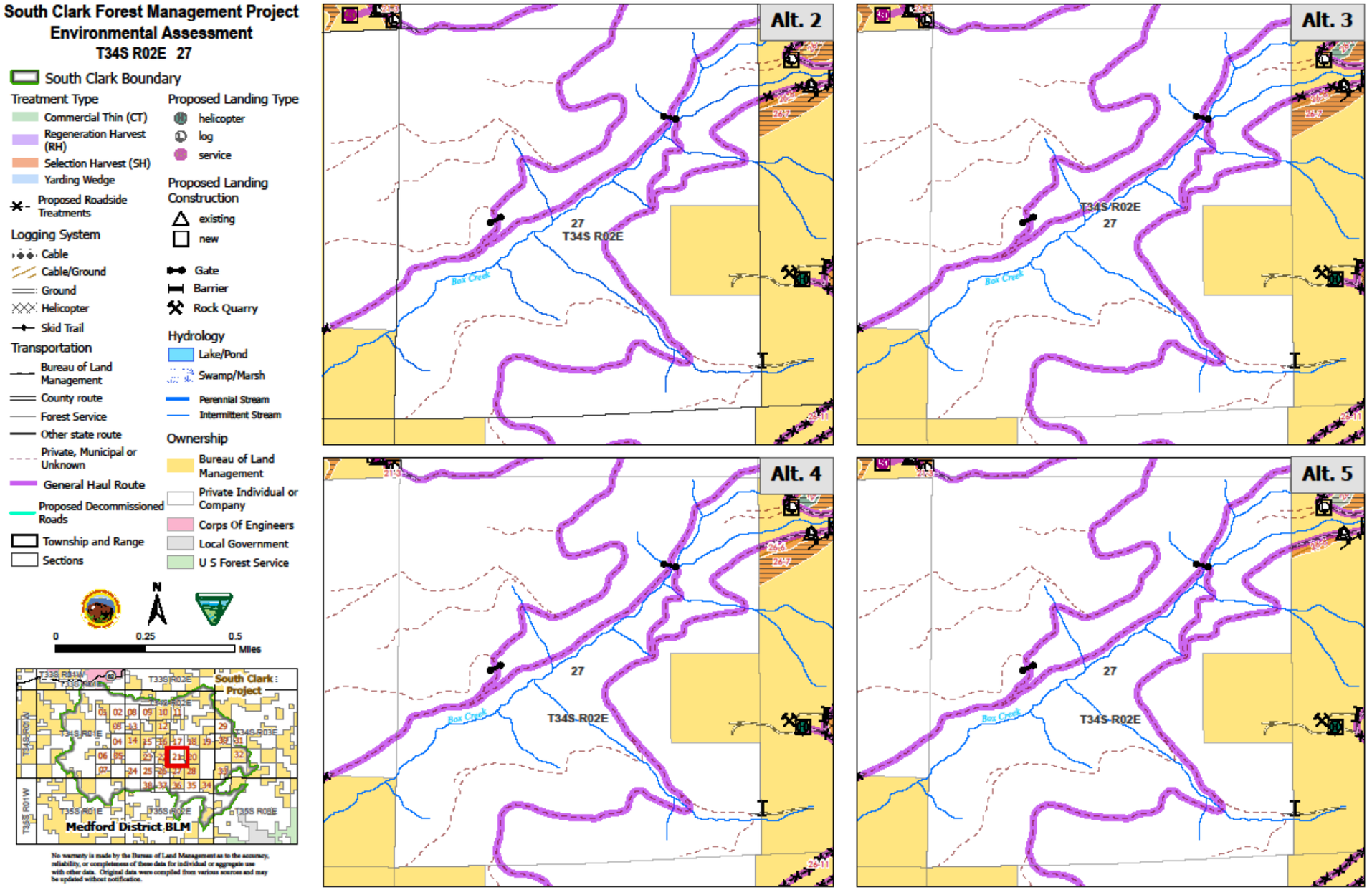
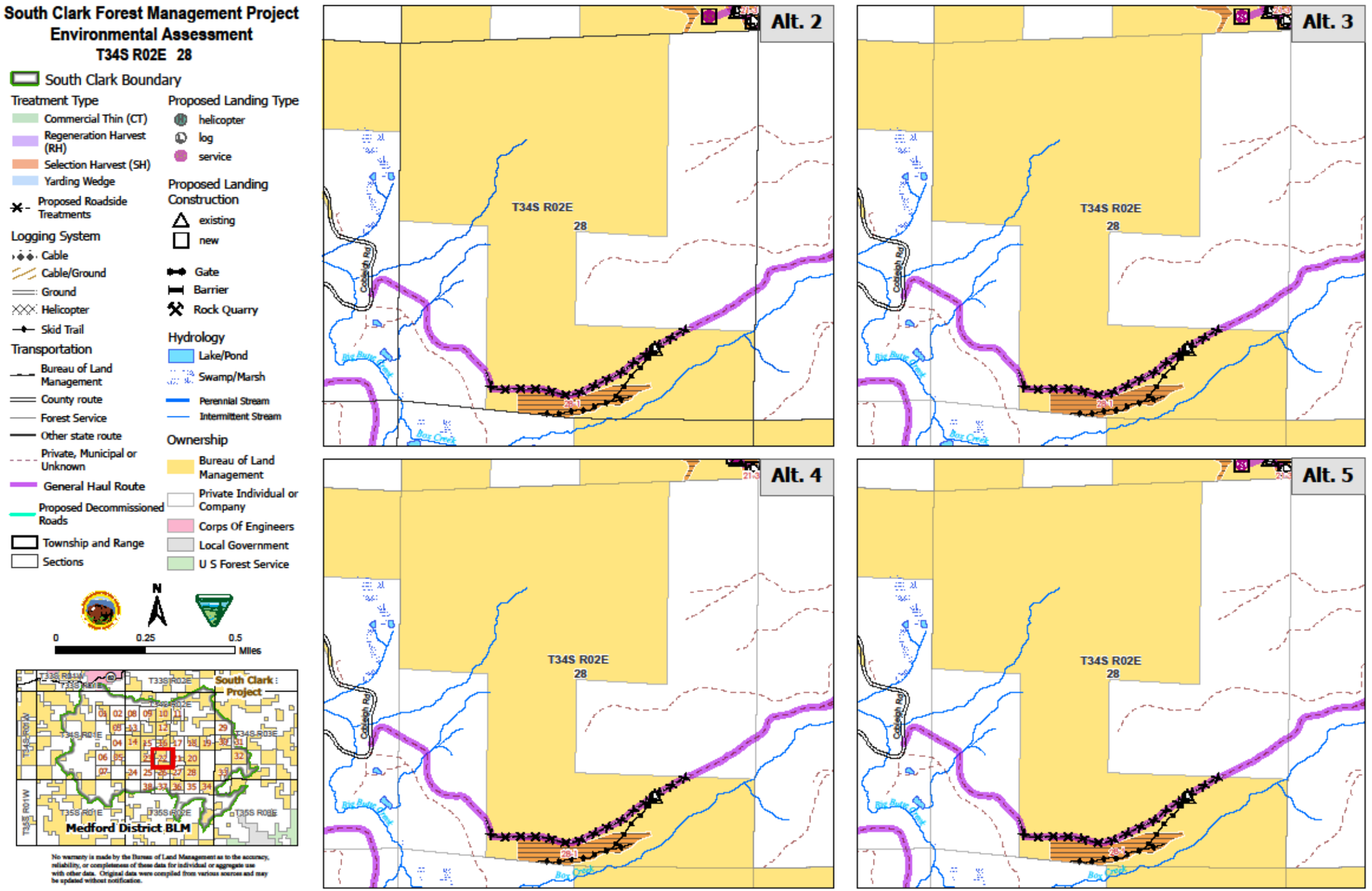
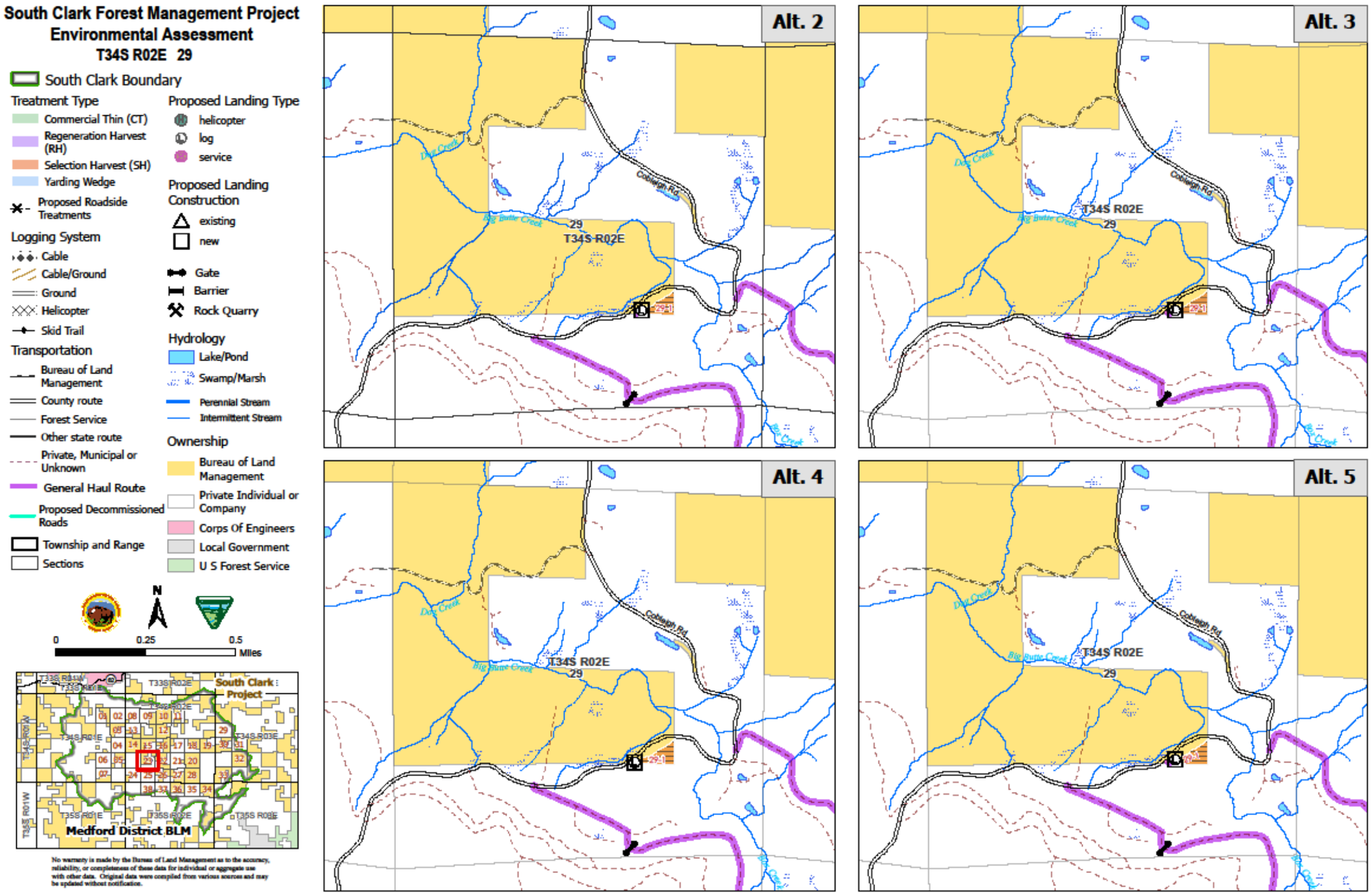


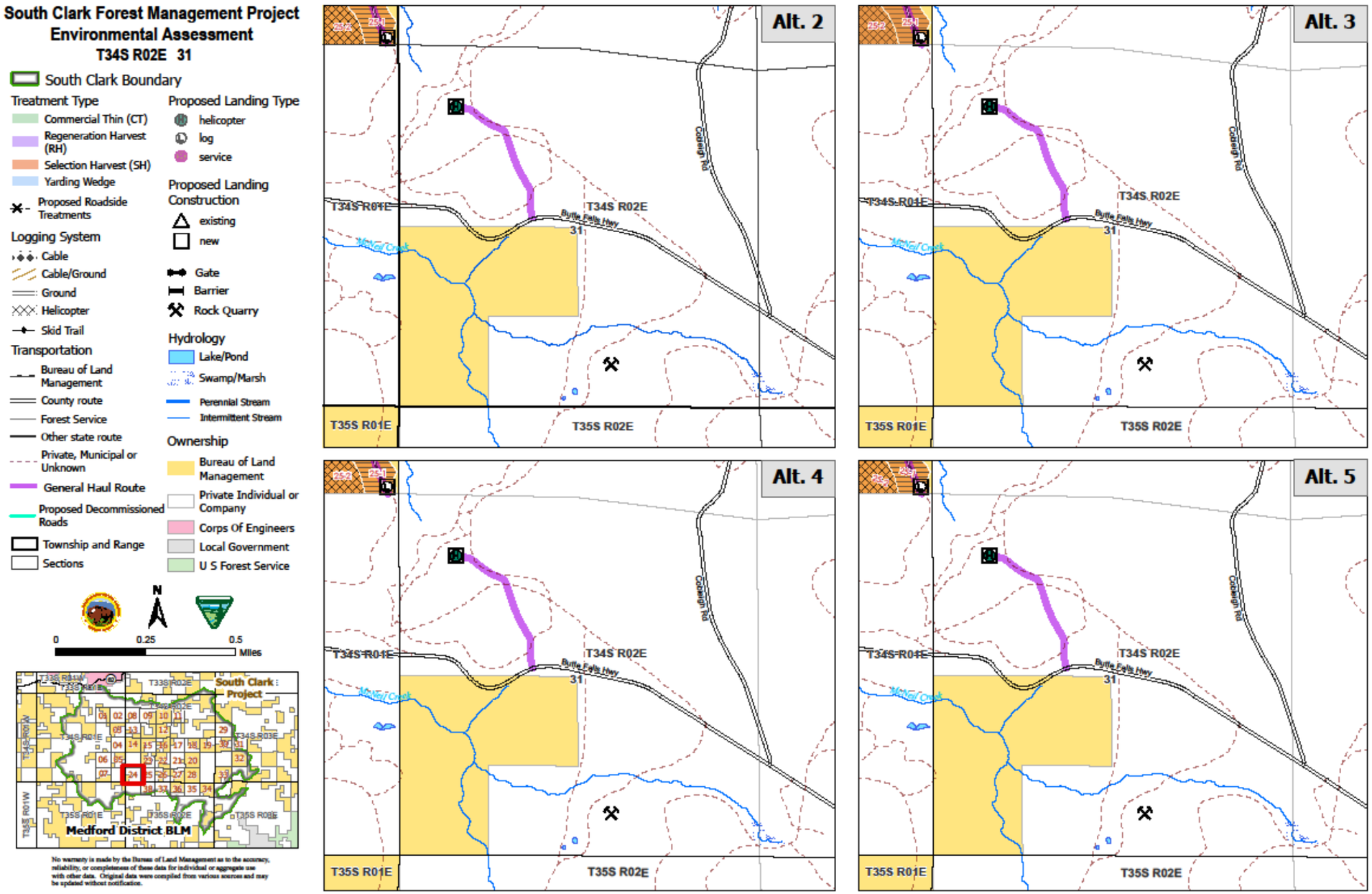
Map 29. Proposed Treatments T34-R02E-28



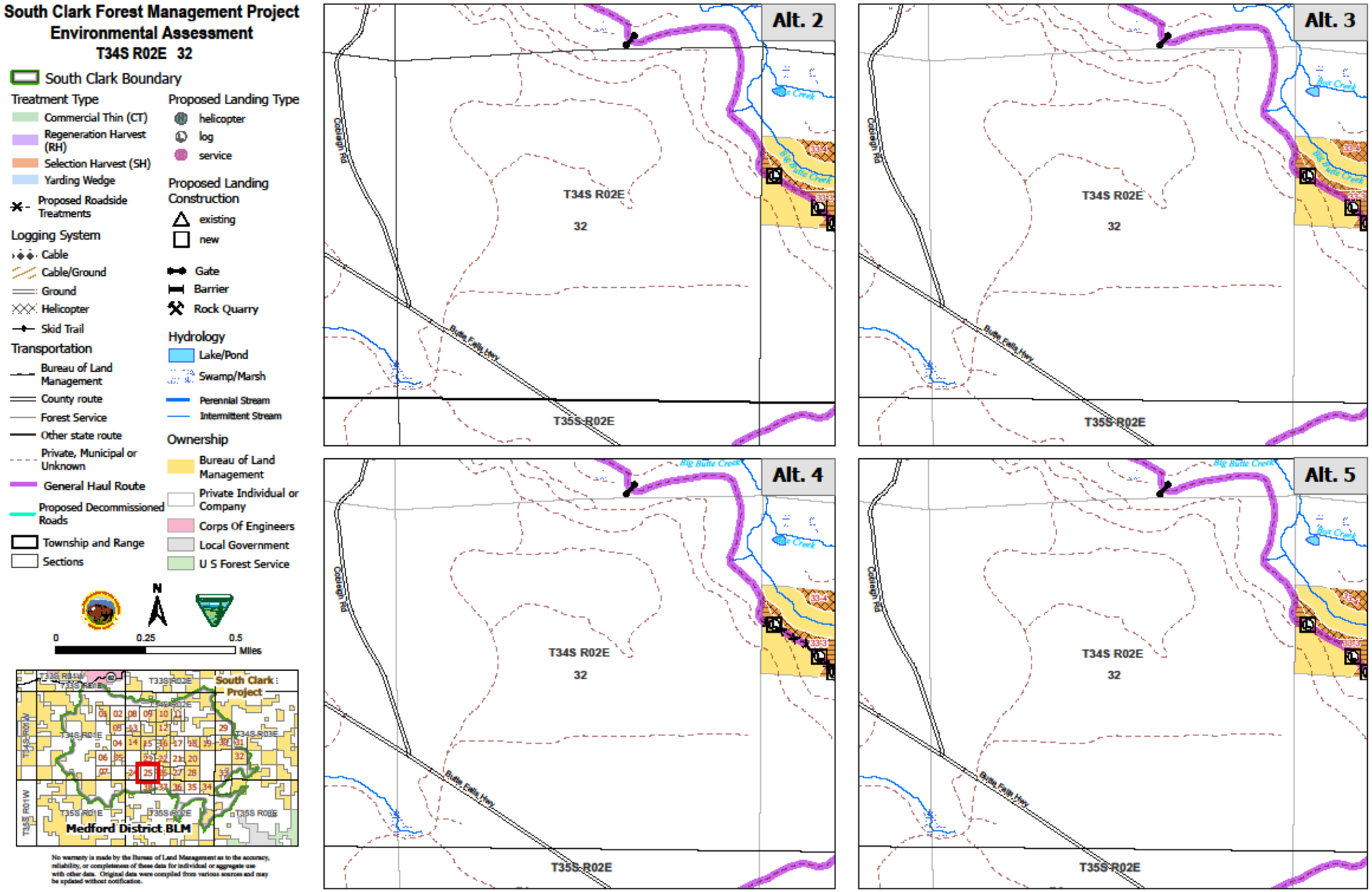
Map 30. Proposed Treatments T34-R02E-29



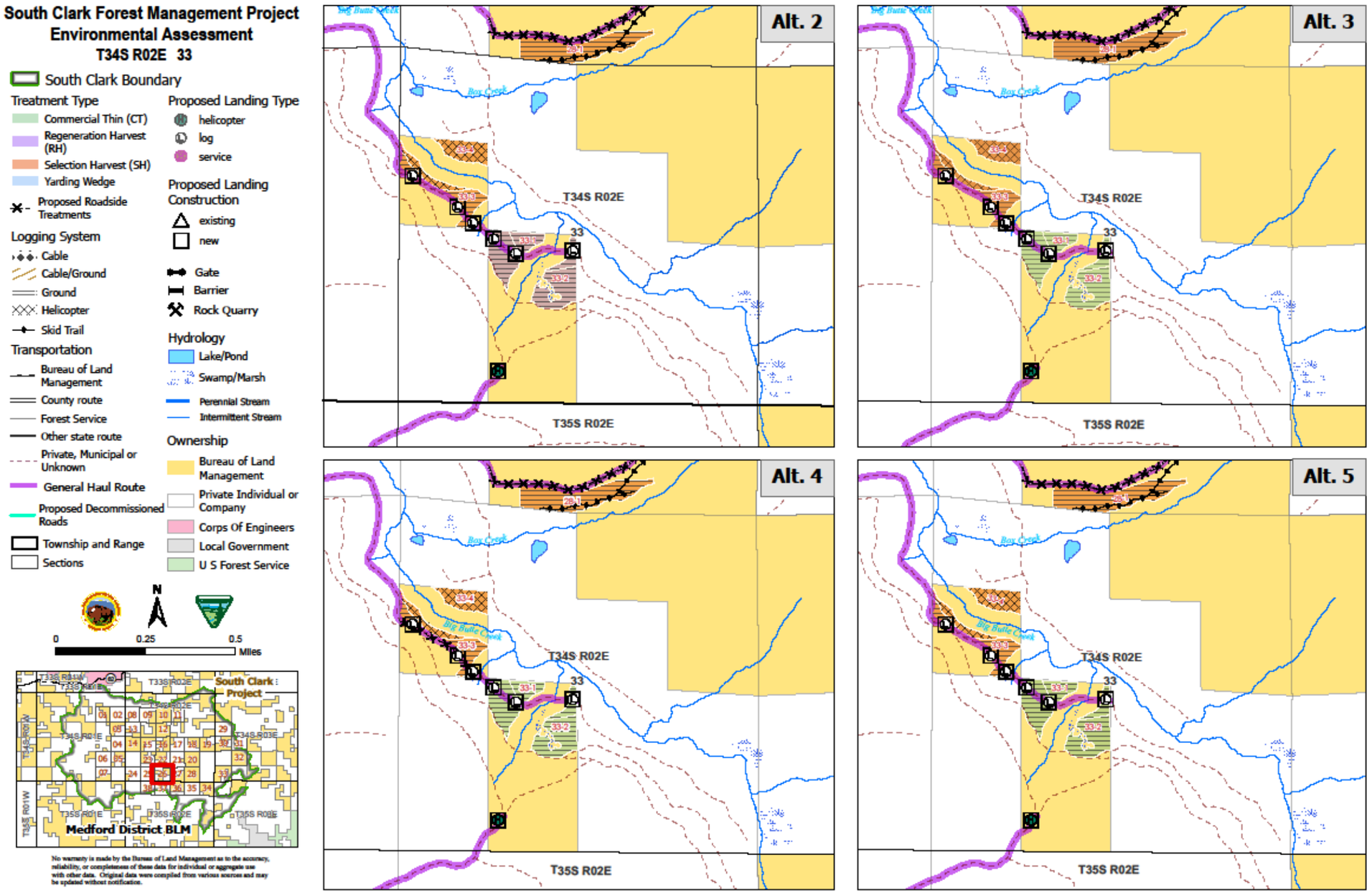
Map 31. Proposed Treatments T34-R02E-31



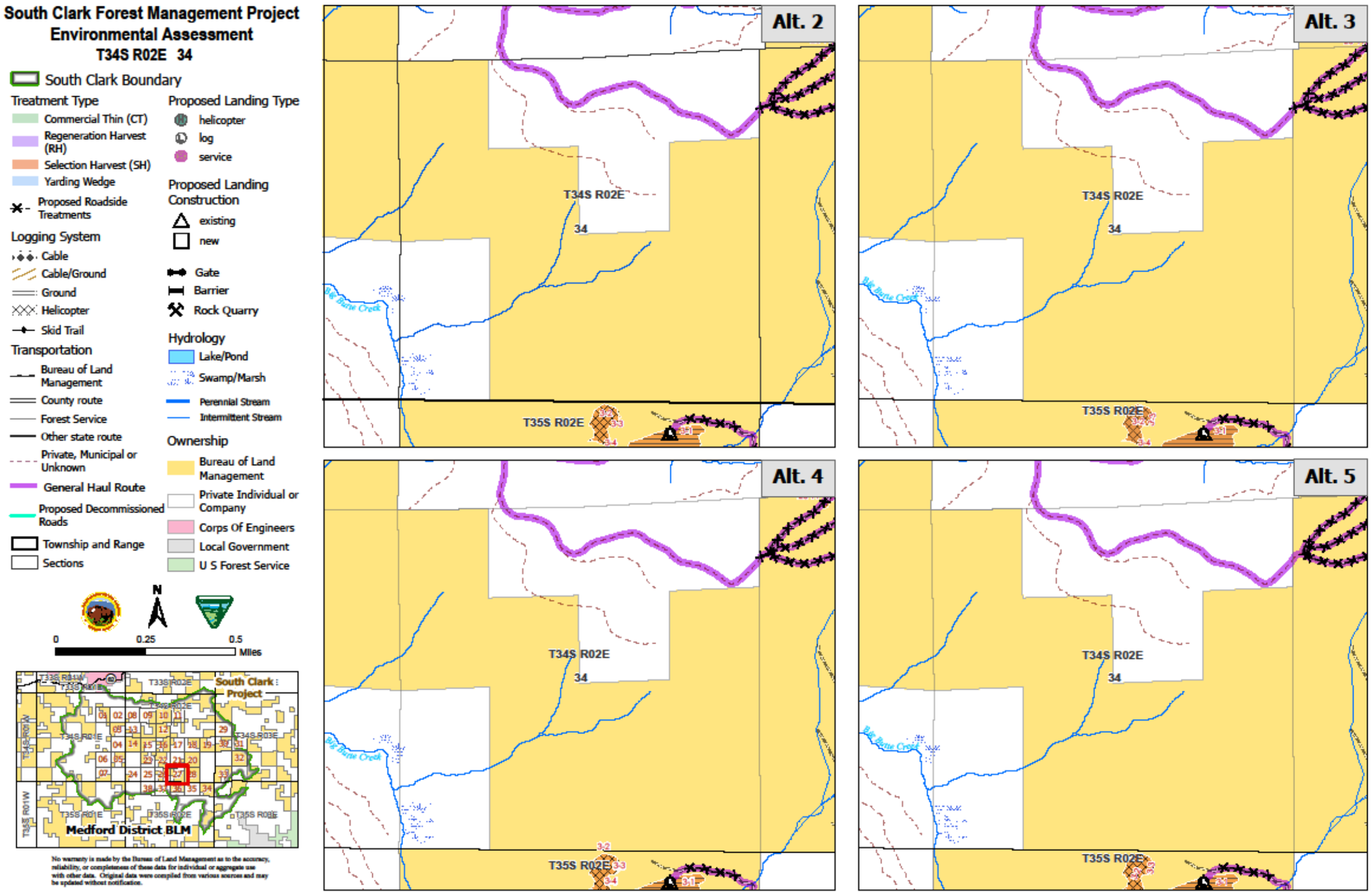
Map 32. Proposed Treatments T34-R02E-32



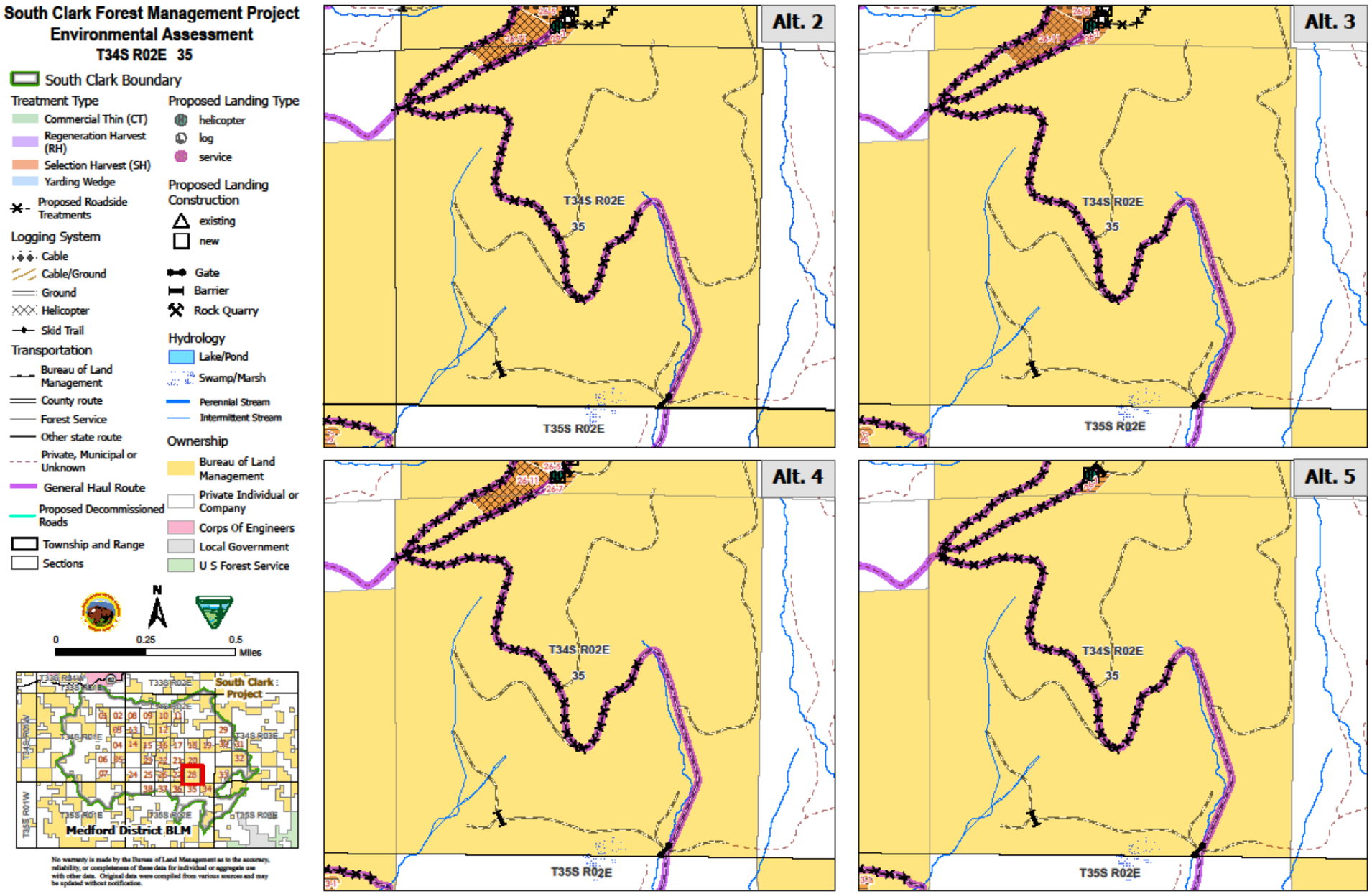
Map 33. Proposed Treatments T34-R02E-33



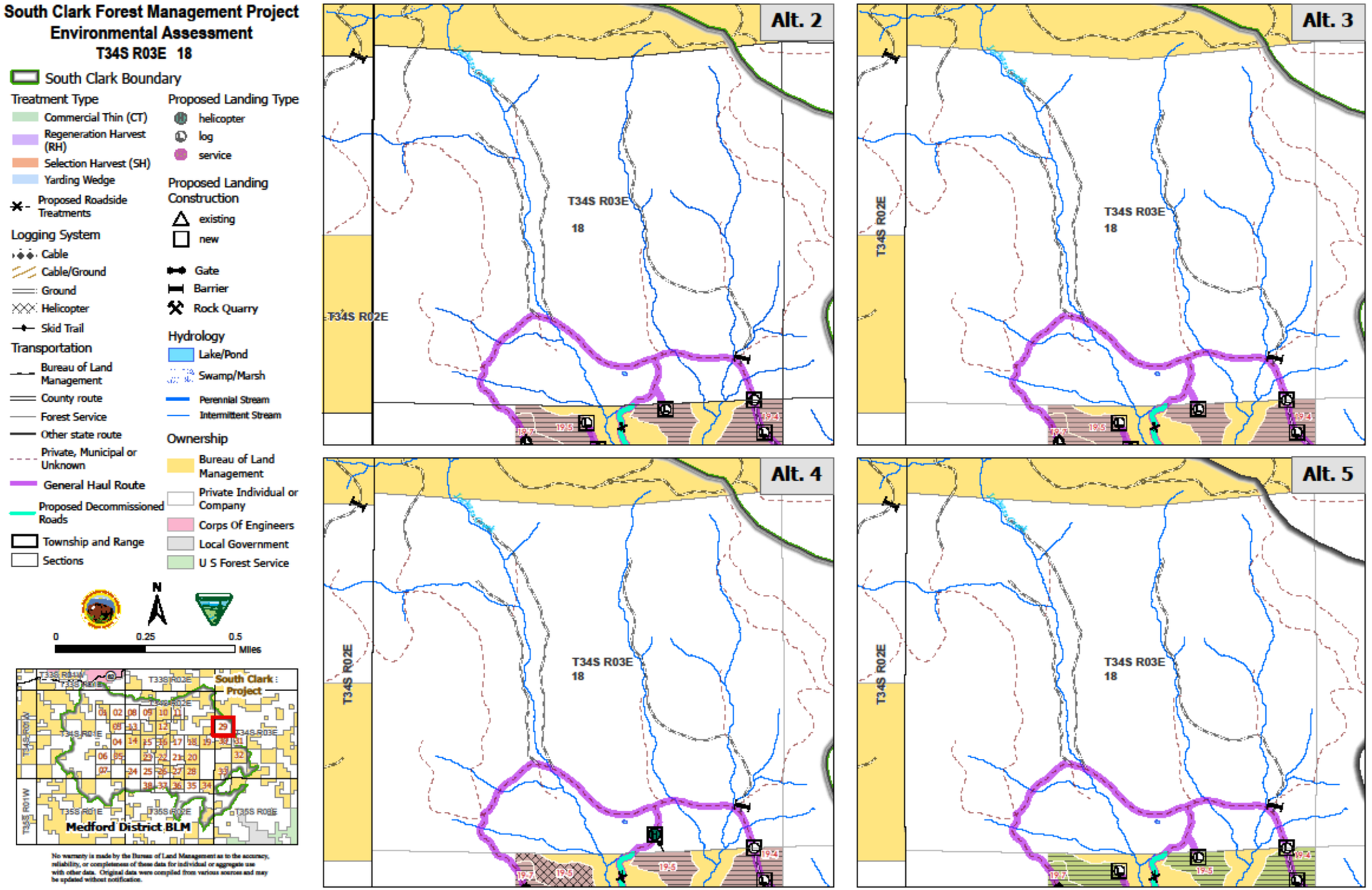
Map 34. Proposed Treatments T34-R02E-34



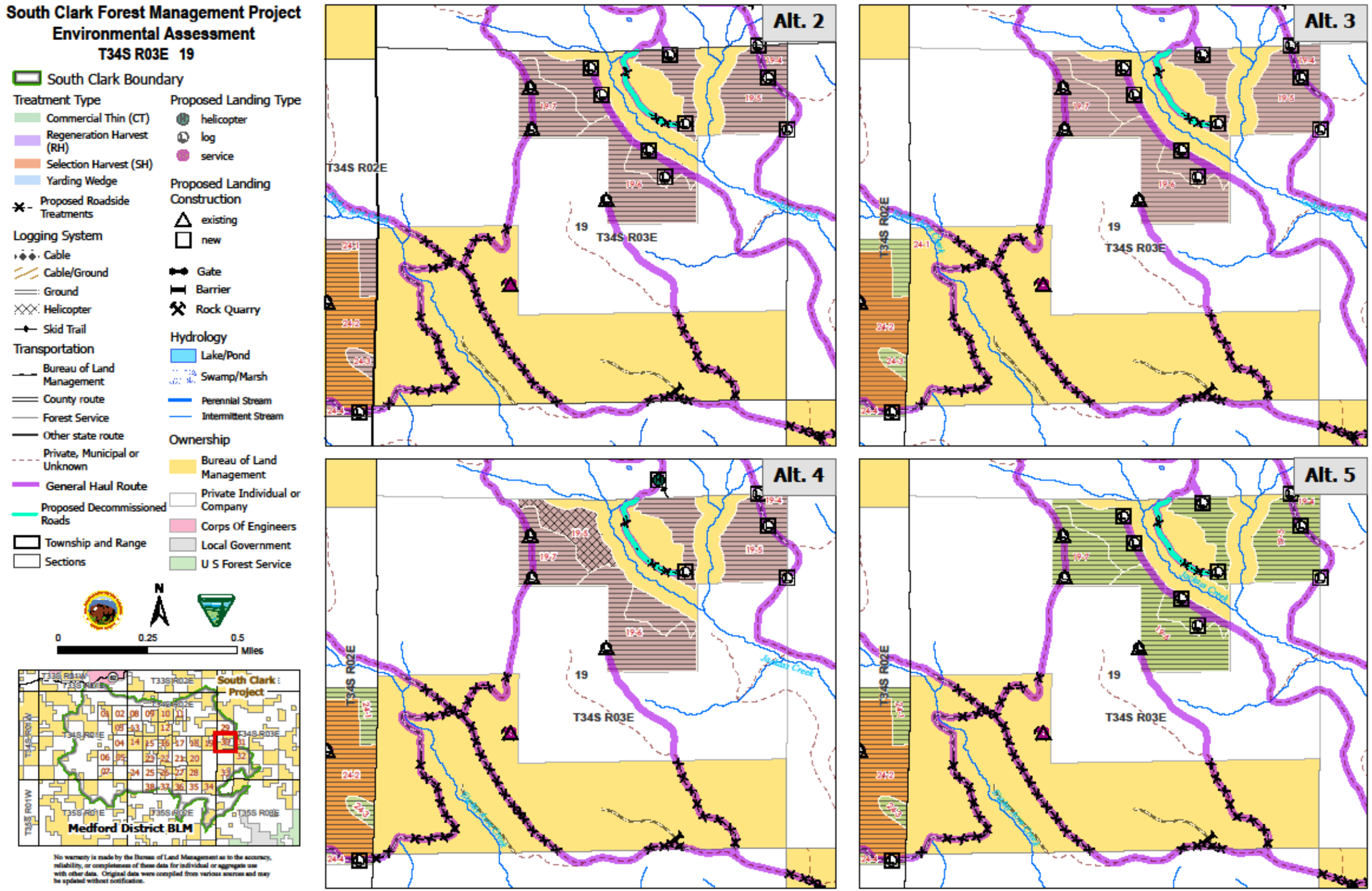
Map 35. Proposed Treatments T34-R02E-35



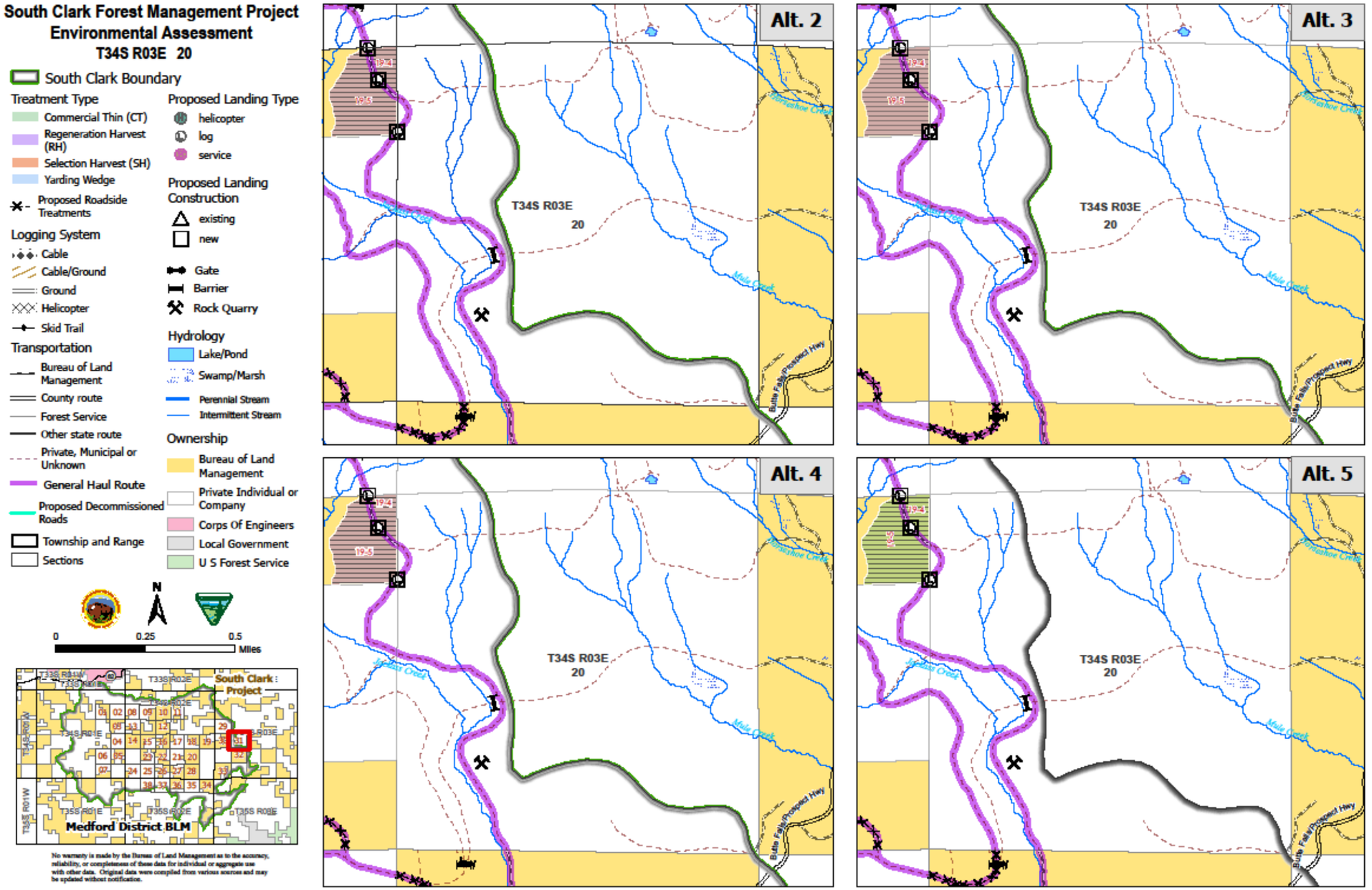
Map 36. Proposed Treatments T34-R03E-18



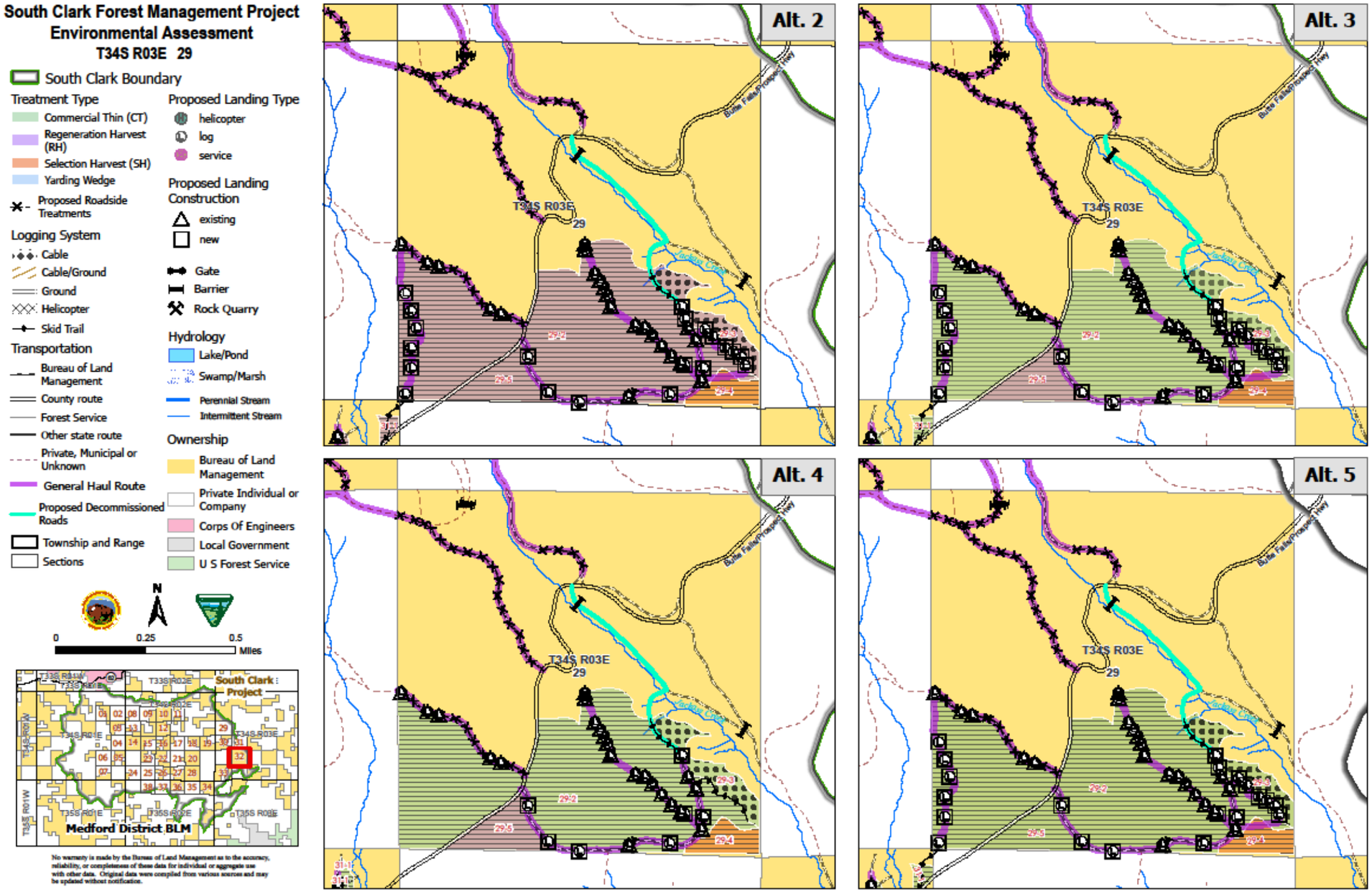
Map 37. Proposed Treatments T34-R03E-19



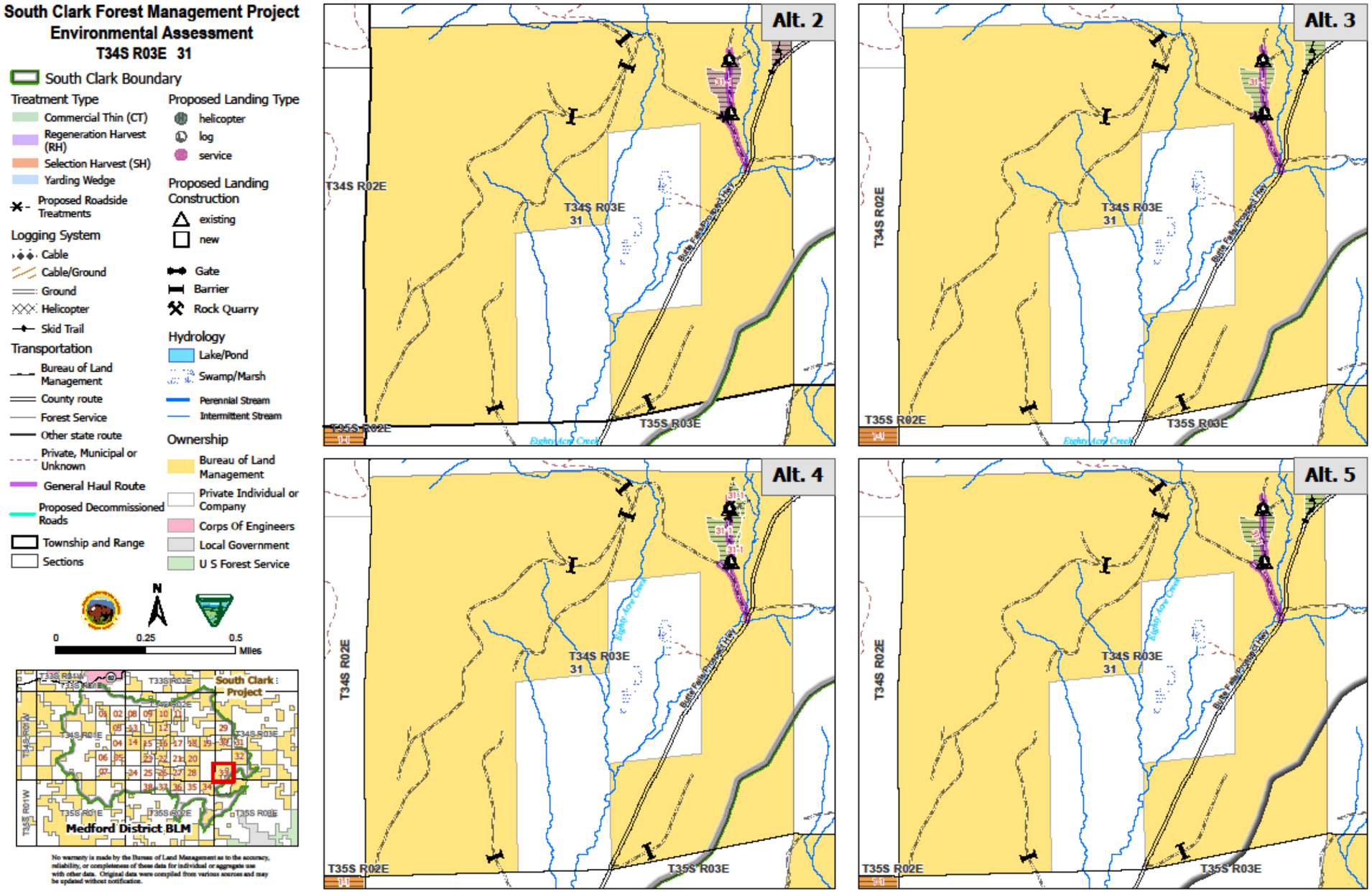
Map 38. Proposed Treatments T34-R03E-20



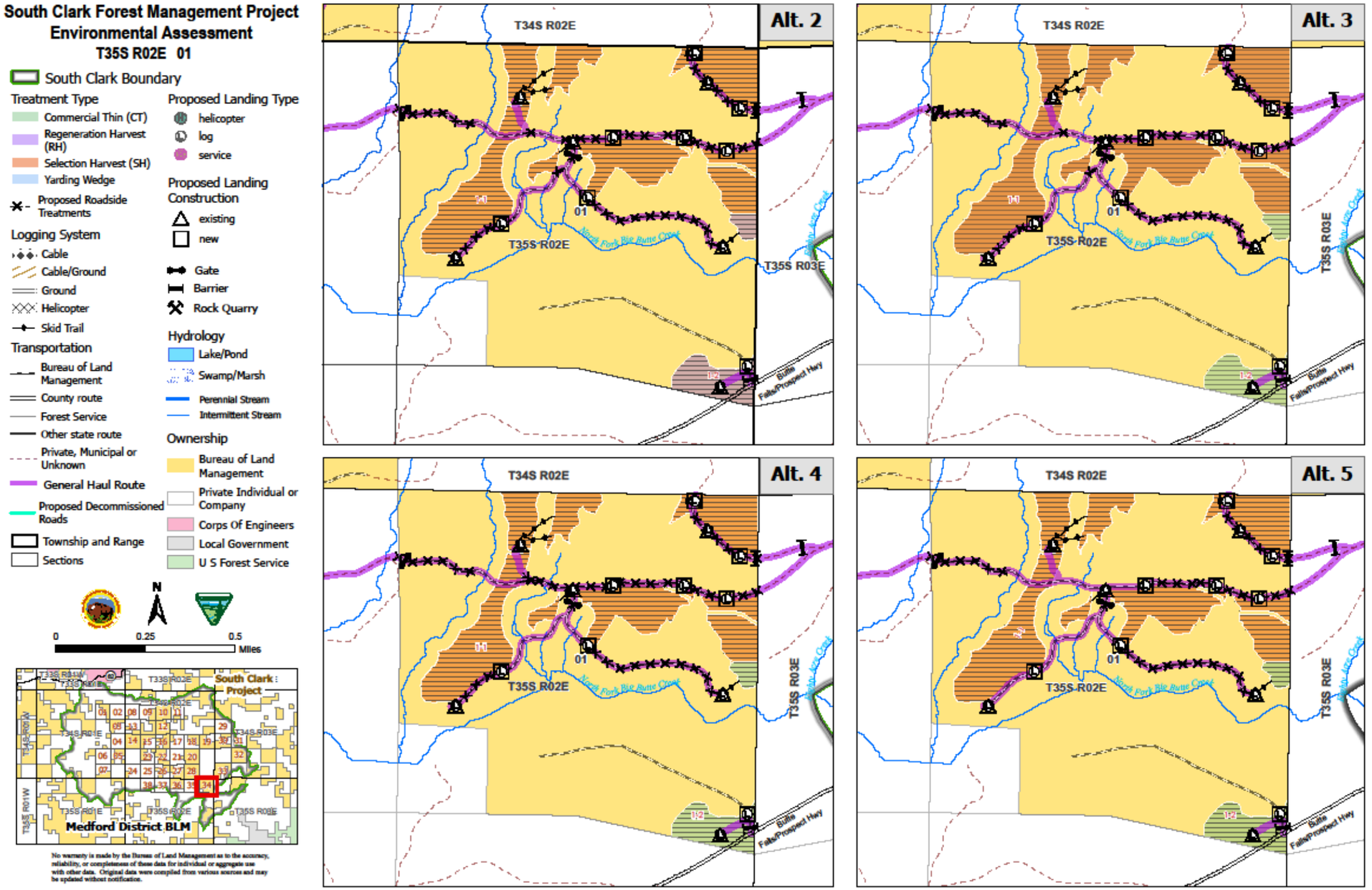
Map 39. Proposed Treatments T34-R03E-29



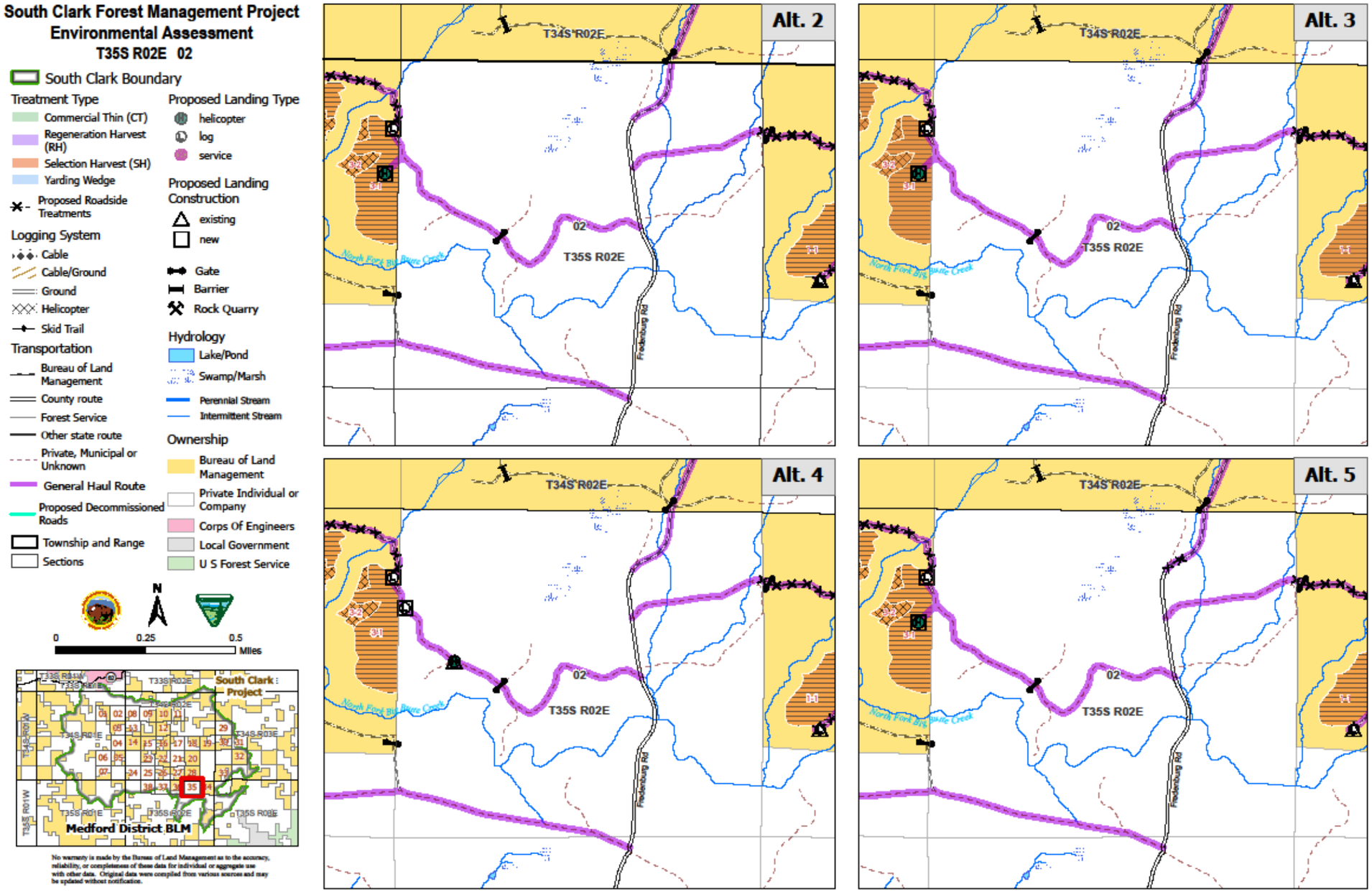
Map 40. Proposed Treatments T34-R03E-31



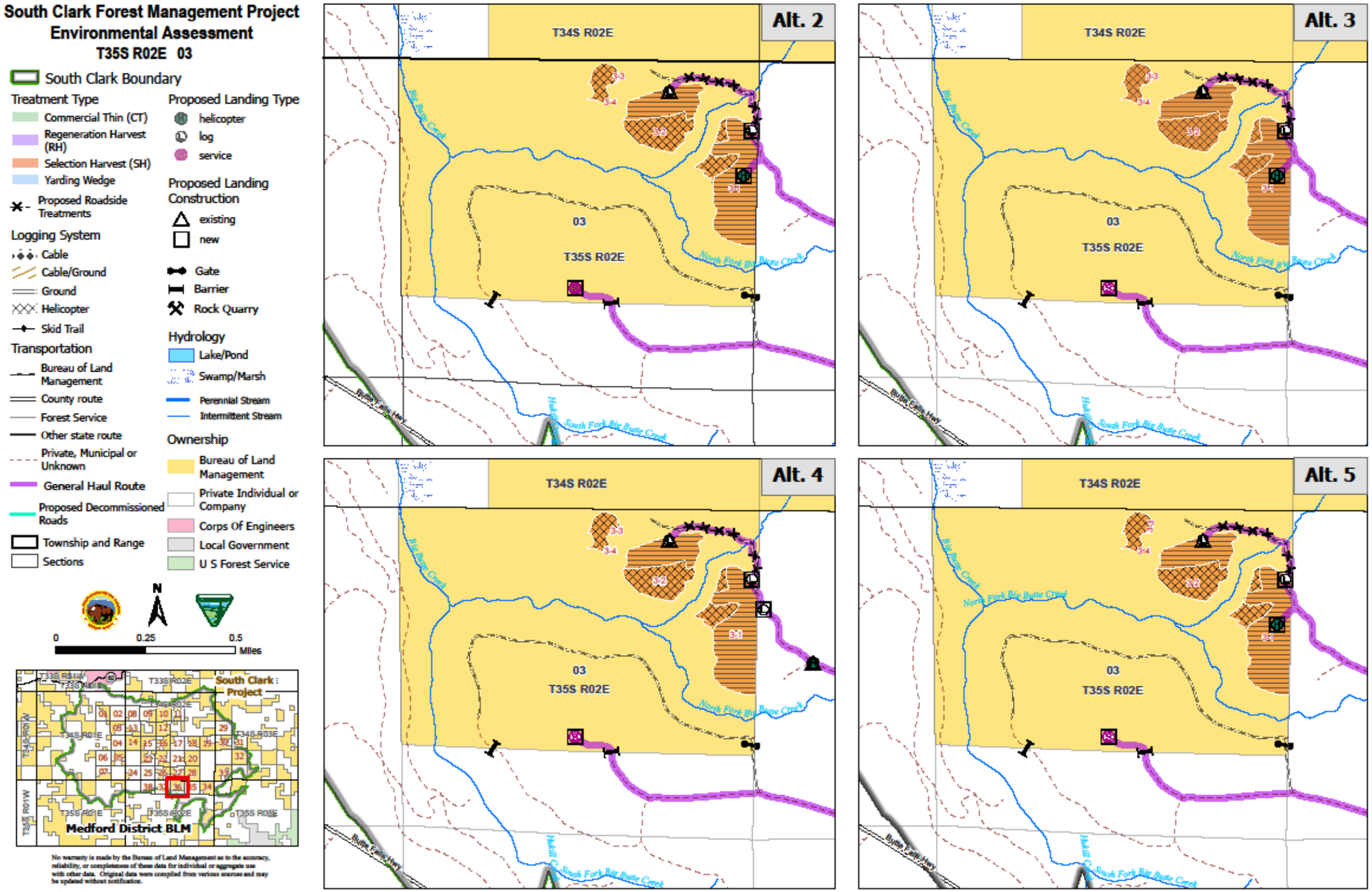
Map 41. Proposed Treatments T35-R02E-01



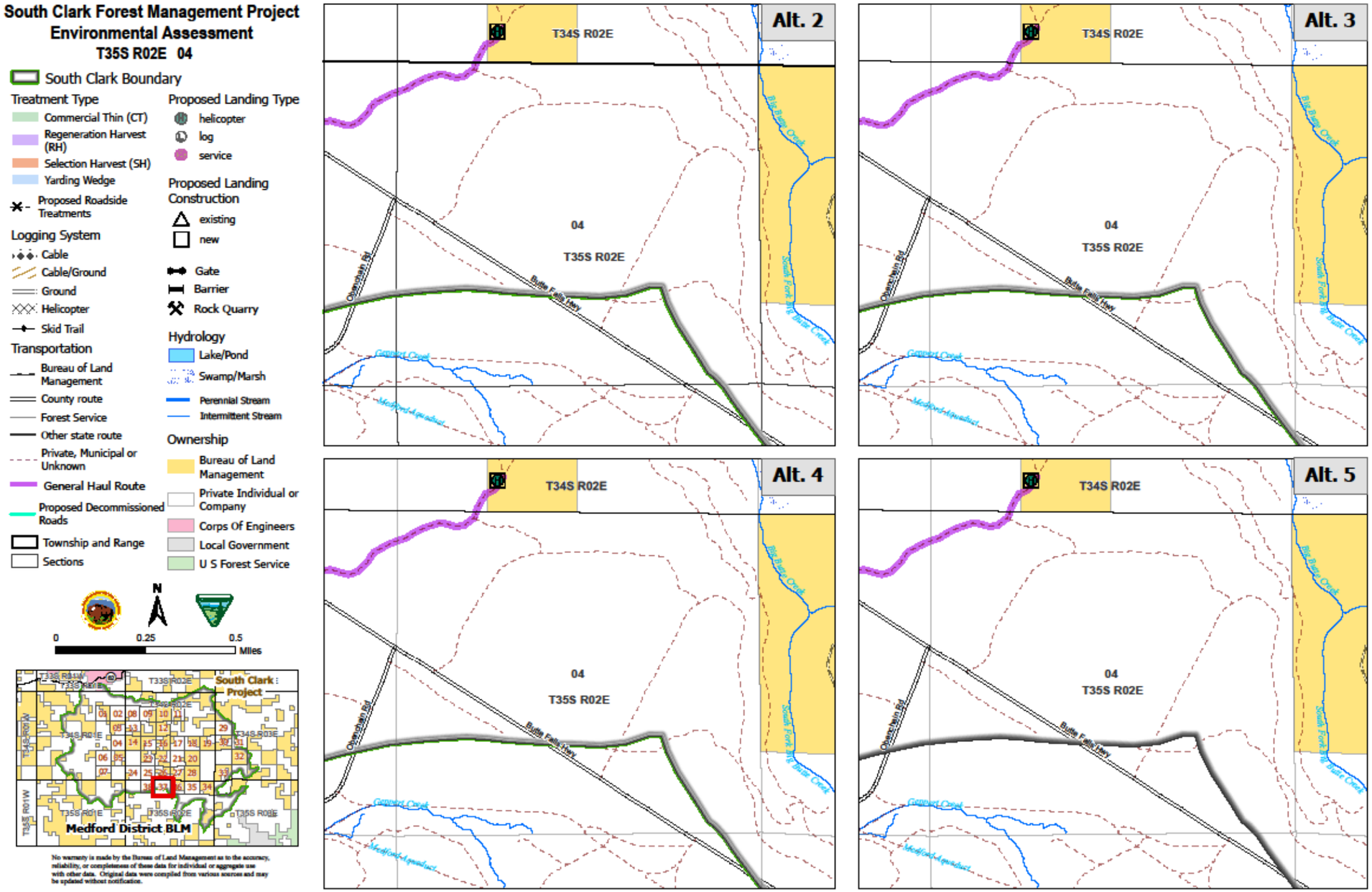
Map 42. Proposed Treatments T35-R02E-02



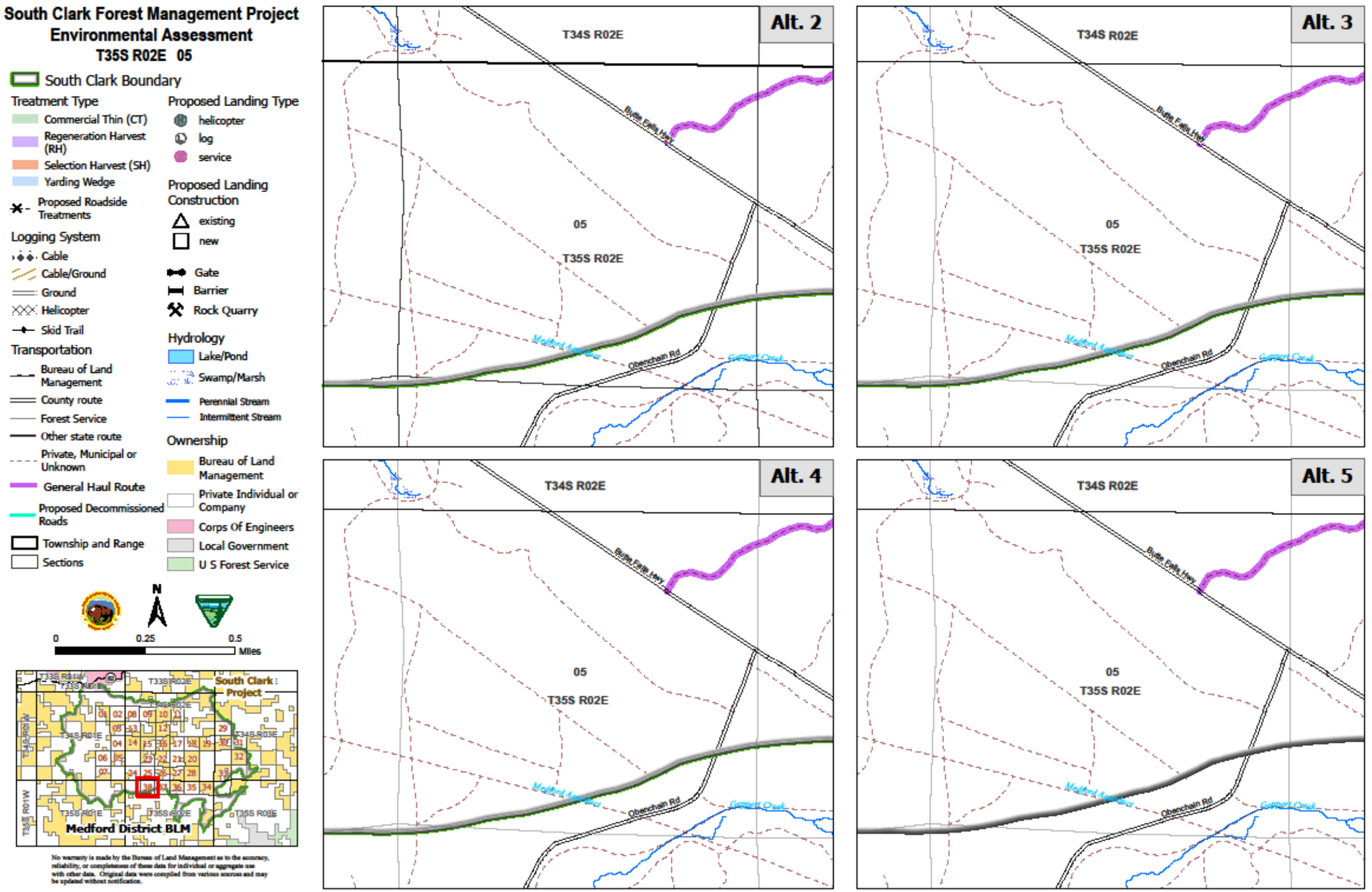
Map 43. Proposed Treatments T35-R02E-03



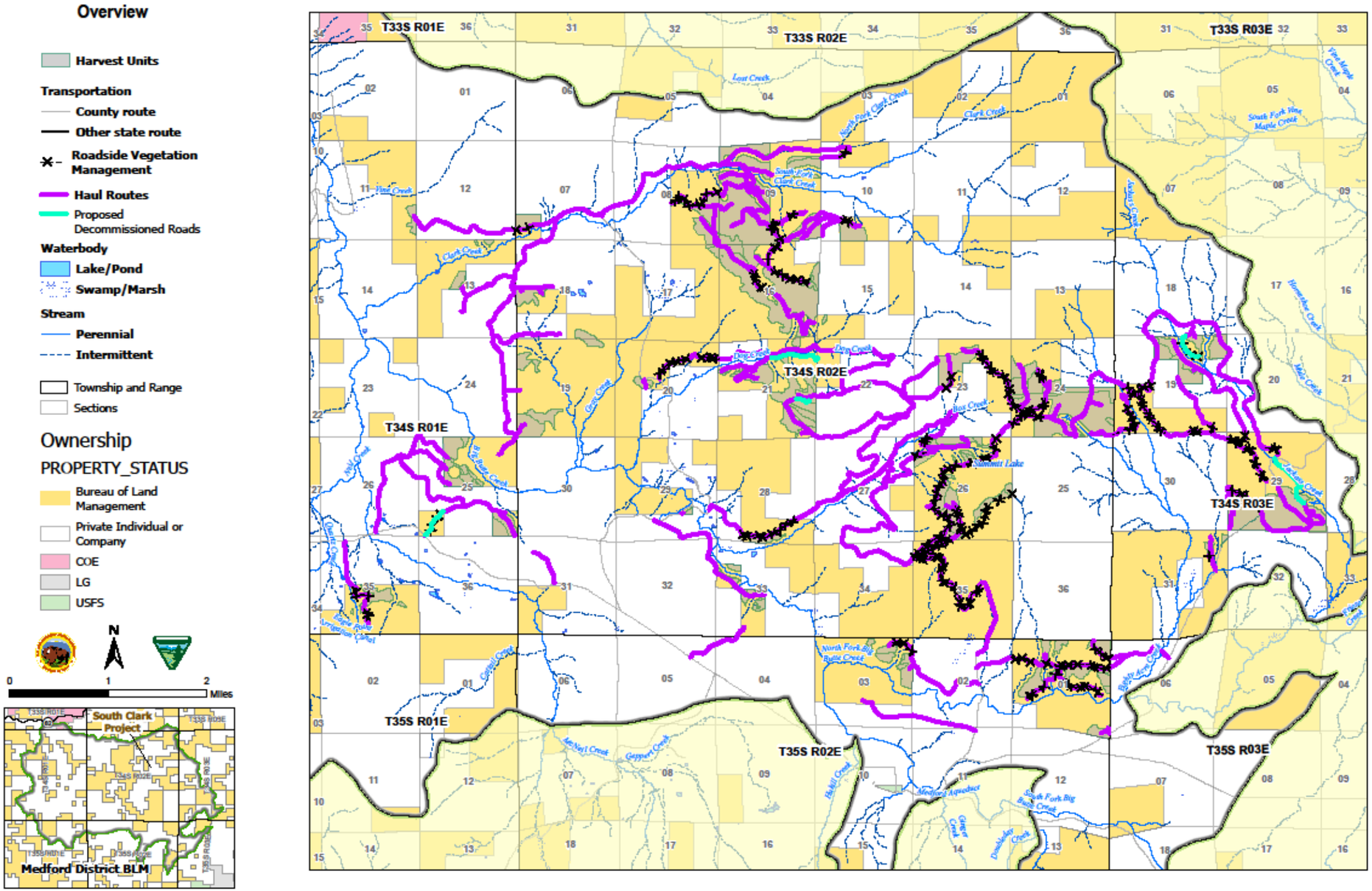
Map 44. Proposed Treatments T35-R02E-04



Map 45. Proposed Treatments T35-R02E-05



Map 46. Overview of Haul Routes, RVM, and Decommissioned Roads Showing Alternative 2/3 Harvest Units



Glossary

Allowable Sale Quantity (ASQ) - The timber volume that a forest can produce continuously under the intensity of management described in the RMP for those lands allocated for permanent timber production. The terms 'annual productive capacity,' 'annual sustained yield capacity,' 'sustained yield capacity,' and 'allowable sale quantity' are synonymous**.**

Animal Unit Month (AUM) – The amount of forage necessary for the sustenance of one cow or its equivalent for 1 month.

Basal area - The cross-sectional area of a single plant stem, of all stems of a species in a stand, or of all plants in a stand (including the bark) that is measured at breast height (about 4.5 feet up from the ground) for larger plants (like trees) or measured at ground level for smaller plants.

Bed load – Coarse sediment particles with a relatively fast settling rate that move by sliding, rolling, or bouncing along the streambed in response to higher stream flows.

Best Management Practices (BMPs) – Methods, measures, or practices designed to prevent or reduce water pollution. Usually, BMPs are applied as a system of practices rather than a single practice.

Biological Opinion – The document resulting from formal consultation that states the opinion of the Fish and Wildlife Service or National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existence of ESA-listed species or results in destruction or adverse modification of critical habitat.

Board foot (bf) – A lumber or timber measurement term. The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

Cable (skyline) yarding – The movement of cut trees or logs from the area where they are cut to the *landing* on a system composed of overhead suspended cables.

Canopy cover – A measure of the percentage of ground covered by a vertical projection of the tree crowns.

Consultation – A formal interaction between the U.S. Fish and Wildlife Service and another Federal agency when it is determined that the agency's action may affect a species that has been ESA-listed as threatened or endangered or its critical habitat.

Cutslope – The vertical cut adjacent (Uphill) to the road, where earth is removed to accommodate the road. The cutslope is part of the road prism.

Decompact – To break up and loosen compacted roadbed to allow infiltration of rainwater and improve natural runoff patterns, restore groundwater movement through the roadbed, and to enhance vegetative root growth.

Diameter breast height (DBH) – The diameter of the stem of a tree measured at 4.5 feet above the ground level on the uphill side of the stem. See *quadratic mean diameter*.

Distinct population segment (DPS) – a discrete population of a species and the smallest portion of a vertebrate species that can be protected under the Endangered Species Act.

Down woody material/coarse woody debris – Portion of a tree that has fallen, or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Dry season (for roads) – An annually variable period of time, starting after spring rains cease and when hillslope subsurface flow declines; drying intermittent streams and roadside ditches. Generally June through October, but may start or end earlier depending on seasonal precipitation influences.

Endline/bull-line - a ground-based yarding method where a cable is dragged from the skidder to the log and the log is dragged along the ground to a skid trail.

Environmental Impact Statement (EIS) – A detailed statement prepared by the responsible official in which a major Federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed.

Fillslope – Result from construction of a roadway above the original ground level and is below the road grade (downhill). The fillslope is part of the road prism.

Ground-based yarding – The movement of cut trees or logs from the area where they are cut to the landing through the use of mechanical equipment or animals that move along the ground.

Group selection harvest – Areas in a *commercial thinning* or *selection harvest* entry where trees are harvested in groups of varying sizes. Synonymous with 'patch cut,' and 'gap creation.' See also *group selection opening*.

Group selection opening – The resulting forest condition, which exists after *group selection harvesting* is employed. An area in the *stand* with a low level of *canopy cover* and relatively few remaining *overstory* trees. Synonymous with 'gap.'

Guylines – A stationary line used to support or stabilize a spar. A wire rope cable used to secure a tower or spar tree to stumps, deadman anchors, or heavy equipment for cable logging purposes.

Harvest Land Base – Those lands on which the determination and declaration of the Annual Productive Capacity/Allowable Sale Quantity (ASQ) is based. The ASQ is based on implementing a set of specific timber management activities and assumes those practices will be repeated over time and results in a sustainable harvest level.

Helicopter yarding – The movement of cut trees or logs from the area where they are cut to the landing through the use of helicopters.

Landing – A cleared area in the forest to which logs are yarded for loading onto trucks for transport.

Land Use Allocation – The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Management direction – Rules in an RMP that identify where future actions may or may not be allowed and what restrictions or requirements may be placed on those future actions to achieve the objectives set for the BLM-administered lands and resources.

Management objective – Descriptions of desired outcomes for BLM-administered lands and resources in an RMP; the resource conditions that the BLM envisions or desires would eventually result from implementation of actions consistent with the RMP. As such, management objectives are not rules, restrictions, or requirements by which the BLM determines which implementation actions to conduct or how to design specific implementation actions.

Mbf – Thousand board feet. This is a measurement unit of timber used for the sale of timber and calculating road use fees. **MMbf** – million board feet.

O&C lands – Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Public domain lands – Original holdings of the United States never granted or conveyed to other jurisdictions or reacquired by exchange for other public domain lands.

Quadratic mean diameter – The diameter of the tree of average basal area in a stand at breast height. See *diameter breast height*.

Regeneration harvest(ing) – Any removal of trees intended to assist regeneration already present or make regeneration possible.

Relative density (RD) – A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum based on tree density, size, and species composition. Relative density percent is calculated by expressing *Stand Density Index (SDI)* (Reineke 1933) as a percentage of the theoretical maximum SDI, which varies by tree species and range. Curtis's relative density (Curtis 1982) is determined mathematically by dividing the stand basal area by the square root of the *quadratic mean diameter*. See also *Stand Density Index*.

Resource Management Plan (RMP) – A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, management objectives, and management direction.

Selection harvest(ing) – A method of uneven-aged management involving the harvesting of

single trees from stands (single-tree selection) or in groups up to four (4) acres in size (group selection) without harvesting the entire stand at any one time.

Skips – Portions of a *stand* generally left untreated after a *commercial thinning* or *selection harvest*. Skips are used to increase variability of forest conditions in the post-harvest stand, and to create desirable habitats and ecological conditions.

Soil compaction – An increase of the soil bulk density (weight per unit volume) compared to undisturbed soil, and a decrease in porosity (particularly macropores) resulting from applied loads, vibration, or pressure.

Soil productivity – Capacity or suitability of a soil, for establishment and growth of a specified crop or plant species.

Stand Density Index (SDI) – Reineke's (1933) stand density index is a function of quadratic mean diameter and number of trees per unit area. SDI can be interpreted as the number of 10-inch trees that would experience approximately the same level of inter-tree competition as the observed number of trees with the observed mean diameter. See also *relative density*.

Surface Ravel - A general term that describes the bouncing, rolling or sliding motion of individual particles down a hillslope. This may occur during dry conditions and is one of the sediment transport processes in steep and semiarid landscapes.

Sustained yield – The board foot volume of timber that a forest can produce in perpetuity at a given intensity of management; the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources.

Sustained yield capacity – See *allowable sale quantity.*

Sustained yield unit (SYU) – An administrative unit for which an allowable sale quantity is calculated; in western Oregon, the six sustained yield units correspond to the Coos Bay, Eugene, Medford, Roseburg, and Salem Districts, and the western portion of the Klamath Falls Field Office.

Tailhold – An anchor (usually trees or stumps) used to secure the end of a log yarding (tramway) cable. Anchors may also include mechanical devices such as heavy equipment.

Temporary Road – A short-term use road authorized for the development of a project that has a finite lifespan (e.g., a timber sale spur road). Temporary roads are not part of the permanent designated transportation network and must be reclaimed when their intended purpose has been fulfilled.

Thinning – A silvicultural treatment made to reduce the density of trees primarily to improve tree/stand growth and vigor, or recover potential mortality of trees, generally for commodity use.

Timber Production Capability Classification (TPCC) – The process of partitioning forestland within the sustained yield unit into major classes based on the biological and physical capability of the site to support and produce forest products on a sustained yield basis using operational management practices.

Timber volume – Amount of timber contained in a log, a stand, or a forest, typically measured in board feet or cubic feet.

Turbidity – The cloudiness exhibited by water carrying sediment; the degree to which suspended sediment interferes with light passage through water.

Uneven-aged management – A silvicultural system that simultaneously maintains high degree of tall forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Harvesting methods that develop and maintain uneven-aged stands are single-tree selection, group selection, and thinning.

Variable-retention regeneration harvest or variable retention harvest – An approach to regeneration harvesting that is based on the retention of structural elements or biological legacies from the harvested stand for integration into the new stand to achieve various ecological objectives. The resultant stand is generally two-aged or multi-aged. The major variables in variable- retention harvest systems are the types, densities and spatial arrangement of the retained structures; (1) aggregated retention is the retention of structures as (typically) intact forest patches within or adjacent to the harvest unit; (2) dispersed retention is the retention of structures or biological legacies in a more or less scattered pattern. Variable-retention regeneration harvest is synonymous with green-tree retention, retention harvest, retention forestry.

Wet season (for roads) – An annually variable period of time, starting after precipitation amounts saturate soils. This occurs after the onset of fairly continuous fall rains, which result in seasonal runoff in ephemeral and intermittent stream channels and from the road surface and ditches. Generally, November through May, but could start or end earlier depending on seasonal precipitation influences.

Wildland Urban Interface (WUI) – The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.

Yarding – The process of moving cut logs to a landing, particularly by cable, ground-based or helicopter yarding systems.

Yarding wedge – Non-treatment area needed to facilitate timber yarding.