Environmental Assessment

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Chapter 1 Introduction

Introduction

This Environmental Assessment (EA) has been prepared for the Prineville Field Office's proposed action to maintain and improve sage-grouse habitat through vegetative manipulation. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a "Finding of No Significant Impact" (FONSI). A FONSI is a document that briefly presents the reasons why implementation of the proposed actions will not result in "significant" environmental impacts beyond those already addressed in the land use plan covering the area. If the decision maker determines this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project.

A decision record may be signed to document the decision following public comment on the EA.

Proposed action

The Prineville District BLM proposes to maintain or improve sage-grouse habitat suitability through vegetation management on public land around Millican, Brothers, Hampton and Paulina. A combination of the following vegetation management actions is proposed: cut juniper, prescribe burn rangeland, transplant or seed grasses, forbs (herbs) or shrubs, or mow or crush shrubs. Actions would occur on up to 13,600 acres per year within the 616,600 acre project area.

Background

Greater sage-grouse (*Centrocercus urophasianus*) are listed as a BLM sensitive species and an Oregon State vulnerable species. Sage-grouse populations have been extirpated from five states, and are declining across much of their remaining range. Prineville District's sage-grouse population has been steadily declining for years; some estimates place the 1980 population up to three times current levels (Hagen 2005). In 2010, the US Fish & Wildlife Service issued a finding that sage-grouse warranted listing as threatened or endangered under the Endangered Species Act of 1973, but listing was precluded by other higher priority listings.

The Prineville District provides important shrub steppe habitat necessary to sustain sage-grouse. The District lies on the northwestern fringe of currently occupied sage-grouse habitat within the United States (not including isolated populations found in the Columbia Basin of Washington State). It is important that this habitat remain connected to other sagebrush areas within the state. Oregon's greater sage-grouse are important to the North American population and management actions in the state will have implications on a much larger scale.

Possible factors contributing to population declines or reduced habitat quality include weather, predation, juniper expansion, parasites and disease; and human influences, such as insecticides, land development, livestock grazing, recreation use, roads, utility lines, and fences (Hagen 2005). While there are many potential causes of the population declines observed in sage-grouse, a primary factor is habitat loss. Within Oregon, it is estimated that the range of habitat for sage-grouse has been reduced by 21 percent from that found at pre-European settlement. Sage-grouse require large areas with a variety of sagebrush communities to meet life-history needs. Habitat assessments for over 700,000 acres of sage-grouse habitat across the Prineville District indicate that, in many areas, vegetative conditions do not provide the necessary habitat structure or plant species composition required for successful breeding, nesting, and brood rearing. The assessments also indicate that connectivity with other sagebrush habitats is being reduced.

Habitat loss occurs when shrub steppe is converted to crops, grassland, or juniper woodland. The latter scenario has had a large impact on grouse habitat on the Prineville District. Past fire suppression and other human and natural factors have allowed the encroachment of young juniper into shrub steppe habitats. This decline in habitat quality has a negative impact on sagebrush obligate species such as the greater sage-grouse, sage thrasher, sage and Brewer's sparrows, and pygmy rabbit.

The Oregon Department of Fish & Wildlife's 2005 Greater Sage-Grouse Conservation Assessment and Strategy for Oregon ("Strategy") (Hagen 2005) describes encroaching juniper as a threat to sagebrush habitats, and identifies the Prineville region as having the greatest amount of encroaching juniper in the sage-grouse range (page 52). Page 58 states that within the Prineville District, sage-grouse's "Current range and habitat is limited primarily by juniper encroachment." The Strategy states, "To maintain connectivity efforts will be required to rehabilitate acres lost to conversion of exotic weeds and grasses, juniper encroachment, and seedings within the extant range of sage-grouse."

Need for action

The District needs to maintain habitats that are currently providing suitable habitat conditions for sage-grouse and improve shrub steppe habitats that are degrading by removing juniper and/or shrubs, or seeding shrubs, grasses or forbs. The District has implemented some juniper removal projects in the past that have improved sage-grouse habitat and prevented decline of existing suitable habitat. However, most of these projects have been at a small scale (often just a few hundred acres per year) which is not keeping pace with continued habitat degradation and loss (see Chapter 3 for details on the rate at which habitat is becoming unsuitable for sage-grouse). There is a need for a faster approach, given the growing threat to sage-grouse from juniper encroachment (as outlined in the ODFW Strategy, Hagen 2005), and the finding from the U.S. Fish & Wildlife Service that sage-grouse warrant listing as threatened or endangered under the Endangered Species Act of 1973. The listing was precluded by other higher priority listings.

Associated benefits of the proposed action include improved watershed health, improved vigor of native sagebrush-bunchgrass communities, and improved habitat for other species associated with open sagebrush habitat.

Purpose of action

The overall purpose of the project is to manage vegetation in order to maintain or improve sage-grouse habitats within the project area.

The purposes below are taken from the BLM Resource Management Plans (RMP) that direct BLM public land management within the project area, and from the Oregon Department of Fish & Wildlife's 2005 Greater Sage-Grouse Conservation Assessment and Strategy for Oregon ("Strategy") (Hagen 2005). The Oregon State Office BLM signed this Strategy and agreed to implement it where possible.

- Maintain existing shrub steppe habitats in the existing sage-grouse range in order to sustain sage-grouse populations and protect options for the future (page 48 in Upper Deschutes RMP (USDI BLM 2005)).
- Maintain wildlife habitat and rangeland health through juniper and shrub control (pages 88-90 in Brothers/La Pine RMP and Rangeland Program Summary Record of Decision (USDI BLM 1989)).
- Maintain or enhance the current range and distribution of sagebrush habitats in Oregon, and manage those habitats in a range of structural stages to benefit sage-grouse (Strategy page 66).
- Focus on managing for 70 percent or more of sagebrush habitats in class 3 (5-15 percent sagebrush canopy cover), 4 (15-25 percent sagebrush canopy cover) or 5 (25 percent or greater sagebrush canopy cover), with an added emphasis on classes 4 and 5 (Strategy, pages 5 and 66). The emphasis on classes 4 and 5 on public land is because most private land in the project area is in class 3 (Strategy, pages 5 and 66). This is consistent with BLM Technical Bulletin 417 (Karl & Sadowski 2005). The desired densities of shrubs, juniper, grass and forbs on those ecological sites within the project area most important to sage-grouse are shown in Table 1, below. These desired densities are based on Natural Resource Conservation Service (NRCS) Ecological Site Descriptions (USDA NRCS 2011) and desired vegetation compositions for sage-grouse habitat as outlined in the Strategy. For sites not shown in Table 1, desired densities would be based on NRCS descriptions.

Table 1. Ecological sites and percent canopy cover.

Ecological Site and precipitation (inches/year)	Public Acres	Current Canopy Cover						Desired Canopy Cover					
		Shrub			Grass	Forb	Tree	Shrub			Grass	Forb	Tree
		Bitter-brush	Sage-brush	Rabbit-brush			Jun-iper	Bitter-brush	Sage-brush	Rabbit-brush			Jun-iper
Arid plains 8-11	53,294	0	8-12	5	10-30	5-10	0	0	15	0-5	30	20	0
Claypan 12-16	19,513	0	10-12	1-5	20-40	5-7	1-5	0	15	0-3	30	20	1
Droughty loam 11-13	59,983	1	5-12	5-9	30-40	5	1-3	1	10	0-2	40	30	1
Dry lakebed 10-12	4,065	0	10-12	7-10	35-45	5	0	0	15	0-3	40	30	0
Dry ponded clay 6-10	2,074	0	8-10	1-5	25-50	1-3	0	0	10	0	85	5	0
Gravelly terrace 10-12	6,710	0	1-22	0-10	1-22	1-9	0	1	15	0-2	25	25	0
Lakebed	700	0	0	0	0-40	7-40	0	0	0	0	50	30	0
Loamy 12-16	1,847	0-3	1-24	0 -13	20-56	1-63	0-14	0	15	0-3	35	25	0
North slopes 12-16	6,943	0-12	1-30	0-13	17-60	4-32	0-37	5	10	0-2	40	25	0
Ponded clay	4,660	0	3-12	1-5	5-15	1-3	0	0	15	0	40	30	0
Pumice 10-12	26,557	9	31	6	15	8	0-7	>15	10-15	0-2	25	25	0
Pumice 8-10	80,597	0	0-40	8	22	9	0-15	0	20-35	0-2	25	25	0
Pumice claypan 10-12	57,548	0	1-43	10	19	9	0-15	0	20-35	0-2	30	20	0
Pumice flat 10-12	53,271	0	0-40	7	15	13	0-10	0	20-35	0-2	25	25	0
Pumice north 10-12	10,705	17	24	7	33		5-23	>15	10-15	0-2	30	20	0
Pumice stony loam 10-12	7,731	7	17	5	43	9	1-27	>15	10-15	0-2	30	20	1-5

Public involvement

The BLM mailed 100 scoping letters in August 2008, and received 17 comment letters in return. The letters were from The Nature Conservancy, the Oregon Department of Fish & Wildlife, Oregon Wild, the Oregon Natural Desert Association, and a number of individuals including people who live in the project area. Many of those comments are summarized and addressed in this EA in the Issues section and in Alternates considered but eliminated. In many cases the comments led to the incorporation of project design features into the action alternatives.

Issues

Issues considered in detail

An issue is a point of disagreement, debate, or dispute with an action based on an anticipated effect. While many issues may be identified during scoping, only some are analyzed in the EA. The BLM analyzes issues in an EA when analysis is necessary to make a reasoned choice between alternatives, or where analysis is necessary to determine the significance of impacts. To warrant detailed analysis, the issue must also be within the scope of the analysis, be amenable to scientific analysis rather than conjecture, and not have already been decided by law, regulation, or previous decision. Significant effects are those that occur in several contexts (e.g., local and regional) and are intense (e.g., have impacts on public health or unique areas). For more information on significance, see pages 70-74 in the BLM NEPA Handbook H-1790-1 (USDI BLM 2008).

The following issues were raised by the public or BLM staff, or both, and are considered in detail in this EA:

- ISSUE: How would the proposed vegetative burning, cutting, mowing, and/or crushing change the amount of **sage-grouse habitat** in the project area?
- ISSUE: Would **visual resources** be affected by the proposed actions?
- ISSUE: What would be the effect of the proposed treatments on **carbon storage or greenhouse gas emissions**?

Issues considered but eliminated from detailed analysis

While a number of other issues were raised during the scoping period, not all of them warranted detailed analysis to make a reasoned choice between alternatives or to determine the significance of impacts. Appendix A describes issues not analyzed in detail or considered further in this EA.

Chapter 2 Alternatives

The NEPA directs the BLM to "study, develop, and describe appropriate alternatives for recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources..." (NEPA Section 102(2)(E)). The range of alternatives explores alternative means of meeting the purpose and need for the action. The No Action alternative is the only alternative that does not respond to the purpose and need for the action.

The number of acres treated under each action alternative (Alternatives 2 and 3) would be based on current and desired plant community structure (see Table 1 in Chapter 1) and the assumption that funding level would be similar regardless of alternative. The figures are for the life of the project, which is assumed to be 25 years, more or less. Acres treated annually would vary depending on actual conditions at treatment sites, BLM budgets, opportunities for partnerships with private landowners, agencies or organizations, and other factors. Chapter 3 has additional details on analytical assumptions.

The project area includes all currently occupied sage-grouse habitat within the Prineville District, as well as some adjacent areas. Treatments in Alternatives 2 and 3 would be prioritized on those ecological sites most important to sage-grouse within currently occupied range, though treatment unit boundaries may include other ecological sites as well as potential but unoccupied habitat, or newly documented occupied habitat.

Alternative 1, No Action

The No Action Alternative provides a baseline for the comparison of alternatives. This alternative represents the existing condition. Vegetation management would not occur under Alternative 1, the No Action Alternative.

Alternative 2, Mechanical Treatment Emphasis (Proposed Action)

This alternative would include the following actions/project design features (PDF):

1. **Cut, mow, or crush young juniper and/or shrubs on 10,200 acres annually.**
    - Pile or scatter the downed vegetation, including juniper limbs.
    - Allow removal of tree boles via personal use permits (generally firewood), commercial sales, or other methods.
    - This treatment would not occur in Wilderness Areas, WSAs, areas with wilderness characteristics, or in areas designated in the Resource Management Plan as Visual Resource Management Class I.
    - Large ponderosa pine, Douglas fir, old growth juniper and any trees with raptor nest or cavities would not be cut (further described in Appendix B).
    - Rest areas from livestock grazing after treatment (see details in Appendix B).

2. **Prescribe burn 3,400 acres of standing live vegetation, and about half of the areas that have already been treated by cutting, mowing or crushing.**
    - Temporarily close some roads for a few hours during prescribed burns.
    - Prescribed burning would not be permitted within ½ mile of pygmy rabbit burrows.
    - Large ponderosa pine, Douglas fir, old growth juniper and any trees with raptor nest or cavities would not be burned. Before burning in areas with these trees, trim all limbs within three feet of the ground, remove all shrubs and small trees (no old growth) within ten feet, and pre-burn any remaining vegetation around the tree.
    - This treatment would occur in WSAs only if certain conditions were met (see Appendix B).
    - Rest burned areas from livestock grazing before and after treatment (see Appendix B).
    - Prescribed burning would include one or more of the following:
        - Broadcast burning: moderate to high intensity burning of surface fuels across entire area.
        - Jackpot burning: low intensity burning of concentrations of fuels.
        - Hand pile burning: fuels piled by hand, typically piles are 6' X 6' X 6'.
        - Machine pile burning: fuels piled by equipment for burning, typically piles are 20' X 20' X 20'.
        - Swamper burning: fuels added gradually and continually to a burning pile over the course of the day.

3. **Seed or root stock transplant 500 acres per year of native or non-native forbs, grass, or shrubs or a combination, generally on sites also treated mechanically or by prescribed burn.**
    - Native species would be emphasized except on more heavily disturbed sites where a combination of native and non-native species is likely to be more successful.
    - Seeding would be done using vehicle-mounted broadcaster at about 20 pounds per acre, or rangeland drill at about 10 pounds per acre, between November and February.

4. **Require a number of additional PDFs, as described in detail in Appendix B.**

The treatment method (e.g., cut with chainsaw or feller-buncher, burn, seed) selected for a particular site would depend on the existing ecological condition of the site, desired plant densities for the site (as described in Chapter 1 Purpose), and additional PDF described in Appendix B. The selection process would begin by determining the ecological condition of a site using BLM's Ecological Site Inventory procedures (Habich 2001). Using this procedure, the BLM measures current density of trees, shrubs and grasses and classifies the site as early, mid or late seral, or potential natural community. The soil sensitivity and presence of invasive plants, including noxious weeds, would also be factored in.

If current tree or shrub densities are higher than desired, the treatment would likely involve cutting, mowing, burning or otherwise reducing the abundance of the plant type that exceeds the desired amount. If grass, forb or shrub densities are lower than desired, the treatment may involve reducing trees, or seeding or transplanting grass, forbs, or shrubs.

The treatment selection process described earlier in this chapter, and the PDFs in Appendix B are part of this alternative.

Most issues were considered but eliminated from detailed analysis due to incorporation of comprehensive PDFs. Therefore, this alternative includes monitoring of project layout and implementation to ensure the PDFs are adhered to and are effective in minimizing undesirable effects. Specific monitoring is described in the PDFs. The frequency and methodology of this monitoring may be further defined in the Decision Record following public comments on the EA.

Alternative 3, Pyric Emphasis

Alternative 3 would be the same as Alternative 2, except for the number of acres receiving each treatment. Table 2 summarizes the differences between the two action alternatives. Alternative 3 would emphasize the use of fire as an initial treatment method. All treatment selection criteria, PDFs and monitoring would be the same as in Alternative 2. As with Alternative 2, the acres treated annually would vary depending on a number of factors. Chapter 3 has additional details on analytical assumptions.

Table 2. Comparison of acres treated annually under each alternative.

Acres treated annually	Alternative 1	Alternative 2	Alternative 3
Cut, mow or crush vegetation	0	10,200	3,400
Prescribe burn live vegetation	0	3,400	10,200
Prescribe burn areas already cut, mowed or crushed	0	5,100	1,700
Seed or transplant forbs, grass and shrubs	0	500	500

Conformance with land use plan

Upper Deschutes Resource Management Plan (2005)

Alternatives 2 and 3 would be in conformance with the Upper Deschutes RMP (USDI BLM 2005).

Page 27, "Objective V-1: Maintain and restore healthy, diverse and productive native plant communities appropriate to local site conditions."

Page 28, "Allocations: Vegetative restoration treatments may be accomplished by a variety of methods including but not limited to mechanical, prescribed fire, and grazing. Specific project prescriptions will be appropriate to site conditions, plant community types and resource objectives, and will be detailed in project level plans and NEPA analyses."

Page 28, "Guidelines: Emphasize managing special status species habitats. Seed or plant grasses, forbs, shrubs and trees where appropriate to achieve a variety of objectives. Use native species for a majority

of restoration treatments. Examples of when use of non-natives may be appropriate include: when advantageous for quick soil stabilization, when aggressive competition with invasive weeds is needed..."

Page 30, "Objective V-1a: Maintain/restore large contiguous stands of healthy, productive and diverse native shrub steppe plant communities throughout their historic range...Rationale: on most historic shrub steppe sites, western juniper will be reduced to widely spaced old trees or small patches on ridge tops or other focused locations..."

Page 31, "Guidelines: Composition, density and distribution of young western juniper will be reduced to historic levels...A primary criterion for prescribing treatment is when juniper occurs at a density and/or distribution determined to be outside its historic range of variability...Vegetation treatments to maintain or restore shrub steppe communities will be based on a landscape level restoration of broad vegetative types...Priorities will include restoration of sage grouse and other special status species habitat."

Brothers/La Pine Resource Management Plan (1989)

Alternatives 2 and 3 would be in conformance with the Brothers/La Pine RMP (USDI BLM 1989) by meeting objective 4 on page 12: "Provide optimum habitat diversity for game and non-game wildlife species." The actions would also follow the guidelines for juniper and shrub control projects on pages 88-89, including "Mosaic patterns will be incorporated into all control projects...Juniper control projects will be restricted to no more than 60 percent removal of juniper trees with leave areas...." The actions would also follow the standard operating procedures on page 90 including, "All actions will be consistent with the BLM's Visual Resource Management criteria," "In crucial wildlife habitat...work will be scheduled during the appropriate season to avoid or minimize disturbances," "Surface disturbance at all project sites will be held to a minimum."

Alternatives considered but eliminated

Prohibit hunting of sage-grouse

Several comments provided during the scoping period suggested that the best thing for sage-grouse would be to quit hunting them. This alternative is not included in this EA, as it would not meet the purpose which is to improve sage-grouse habitat. In addition, the State of Oregon establishes regulations for game animals which is outside of BLM's control.

Stop suppressing wildfires

A scoping comment suggested the BLM should stop putting out wildfires if it wants to reduce juniper. This was not considered as an alternative in this EA because it would not respond to the purpose and need. Wildfires are impossible to predict, and it could be many years before one occurred within the project area on enough acres to make a measureable effect. In addition, many of the areas needing treatment require selective removal of just juniper, not shrubs. This could not be achieved using

wildfire, as fire consumes shrubs as well as trees. Additionally, the resource management plans covering the project area already allow BLM to let many wildfires burn. Specific objectives from the applicable resource management plans are on pages 101 and 102 in the Brothers/La Pine RMP (USDI BLM 1989), and pages 27, 60 and 61 in the Upper Deschutes RMP (USDI BLM 2005).

Restrict off road use

Scoping comments suggested the EA should consider closing roads and limiting off road use. Designating areas open, limited or closed to off road vehicle use is a decision made at the land use plan level, not in EA level implementation decisions. Enforcing off road vehicle use is a tool already at BLM's disposal. Therefore, this EA does not include actions that would change OHV designations or enforcement of those designations.

Prevent and remove weeds

A scoping comment suggested the EA should include actions to prevent and remove weeds. The decision to treat noxious weeds was made after a previous EA (USDI BLM 1994b) so weed control would occur in the project area in accordance with that decision, rather than being reconsidered in the current EA. Improving sage-grouse habitat would result in healthier plant communities that are more resistant to noxious weed establishment and spread.

Change or eliminate livestock grazing

A scoping comment suggested that grazing contributes to juniper spread, and the EA should therefore consider reducing grazing as a means of improving sage-grouse habitat. Empirical evidence supporting the claim that grazing directly increases western juniper expansion and infill varies geographically. In western Colorado, tree seedling and saplings were significantly greater in grazed areas than ungrazed areas (Shinneman and Baker 2009). However in southern Utah, tree densities of western juniper related species were similar in grazed and ungrazed areas (Harris et al. 2003). Furthermore, studies in western Idaho and central Oregon found no difference in tree densities between range conditions and concluded, that grazing was not a major facilitator in tree infill and expansion (Burkhardt and Tisdale 1976; Knapp and Soule 1996; Soule and Knapp 1999, 2000; Soule et al. 2003 in Romme et al. 2009). Therefore, changing or eliminating grazing was not considered in this EA as a way of reducing juniper spread. The action alternatives do include modifying livestock grazing after most treatments to enhance grass, forb and shrub seedling establishment, and before prescribed fire to allow more accumulation of fine fuels to allow fires to spread more easily.

Chapter 3 Affected environment & environmental effects

Introduction

This chapter combines descriptions of the affected environment and effects for each of the three issues identified for detailed analysis in this EA.

The **affected environment** includes a brief description of the present condition and trend of issue-related elements of the human environment that may be affected by implementing the proposed action or an alternative. It describes past and ongoing actions that contribute to present conditions, and provides a baseline for analyzing cumulative effects.

The **effects** are the known and predicted effects from implementation of the actions, limited to the identified issues. Direct effects are those caused by the action and occurring at the same time and place. Indirect effects are those caused by the action but occurring later or in a different location. Cumulative effects result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Reasonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends. The analysis of cumulative effects includes other BLM actions, other federal actions, and non-federal (including private) actions.

The description of the current state of the environment provided in the affected environment section inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis than would attempting to establish such a starting point by "adding" up the effects of individual past actions. The importance of "past actions" is to set the context for understanding the incremental effects of the proposed action. This context is determined by combining the current conditions with available information on the expected effects of other present and reasonably foreseeable future actions. By comparing the total effect of the "no action" alternative to the effects of each action alternative, we can discern the "cumulative impact" resulting from adding the "incremental impact" of the proposed action to the current environmental conditions and trends.

Sage-grouse habitat

Existing environment

As described in the Need section of Chapter 1, sage-grouse populations are declining throughout the west, and the Prineville District provides important year round habitat for sage-grouse. There are about 60 leks (sage-grouse breeding sites) within the project area. About 80 percent of the time, sage-grouse nest within four miles of leks (USDI BLM 1994a). The majority of public land within the project area falls within four miles of a lek. Important ecological sites for sage-grouse are shown in Table 1 in Chapter 1. Other ecological sites within the project area provide connectivity for sage-grouse.

The BLM has inventoried some but not all of the planning area to determine which areas provide suitable habitat for sage-grouse. The ODFW Strategy (Hagen 2005, page 143) estimates eight percent "high viability habitat" and 33 percent "moderate viability habitat" on public and private land surrounding the Prineville District. Based on information in the Strategy, district inventory data and personal observations, the BLM estimates 50 percent (308,300) of the public land in the project area is currently marginal or unsuitable for sage-grouse and in need of active management. The other 308,300 acres of public land in the project area would be assumed to be suitable.

As stated in Chapter 1, sage-grouse habitat is becoming less suitable over time as it becomes dominated by juniper. Young juniper outcompete other native plants for water, nutrients and sunlight, causing a decline in plant diversity and shrub/native grass abundance, an increase in bare ground, and an increase in invasive weedy species. Encroaching juniper reduces nesting habitat condition because juniper outcompete shrubs and grass, reducing their cover below that typically used by nesting birds. Also, juniper can serve as perches for raptors, deterring grouse use near trees. Loss of suitable sage-grouse habitat can occur even without loss of shrubs: with fire exclusion some areas have developed higher than desirable densities of shrubs which can decrease the abundance and health of important grasses and forbs. On some sites the proposed actions are designed to increase grass, forb and/or shrub cover by removing trees; on other sites the goal is to increase grass and forb cover through seeding or transplanting, or by reducing shrubs and/or trees. Juniper encroachment into shrub steppe communities which previously did not support trees or high densities of trees will continue to decrease diversity (vegetation and structural) and disrupt ecological processes (e.g., nutrient cycling).

The rate at which areas are moving from suitable to unsuitable for sage-grouse is variable. This analysis assumes sites with juniper become "marginal" for sage-grouse midway between initial encroachment and stand closure, or at a rate of 1.2 percent per year, using estimates from a summary prepared by Miller and others (Miller et al. 2005). The rate of movement from suitable to unsuitable is assumed to be slightly slower (.8 percent) on sites where the concern is lack of or too much sagebrush.

Effects

Alternative 1 (no action) would include no vegetative treatments. Given current trends and using the assumptions stated above, each year about 3,400 acres of suitable habitat would become unsuitable. In 25 years without treatment 84,900 acres of suitable habitat would move to marginal or unsuitable, leaving 223,400 acres of suitable habitat for sage-grouse in the project area. These effects would be reversible with future vegetative treatment as long as soil productivity is maintained.

The effect described above for Alternative 1 would also occur in **Alternatives 2 and 3,** resulting in the same number of acres moving from suitable to marginal or unsuitable. However, Alternatives 2 and 3 also include steps to maintain or improve the utility of those ecological sites most important to sage-grouse, and maintain habitat connectivity on other sites. As described in detail above under existing environment, cutting and thinning young juniper under the action alternatives would improve (amount quantified below) sage-grouse habitat suitability by maintaining or improving ecological condition of shrub-steppe and old growth juniper plant communities. Prescribed burns would improve sage-grouse

habitat suitability by reducing juniper and sagebrush densities and increasing bunchgrasses and annual and perennial forbs.

The effects of **Alternative 2** on sage-grouse habitat suitability would be the same as for Alternative 3, and are therefore not addressed separately. After the first year 13,600 acres of unsuitable habitat would be treated and become suitable, while about 3,400 acres of untreated suitable habitat would become unsuitable, for a net gain of 9,900 acres of suitable habitat annually, adding 247,500 acres of suitable habitat over the next 25 years. This effect would be semi-permanent, lasting 50 years or more before vegetation matures and re-treatment would be necessary. After 25 years, the total suitable habitat for sage-grouse in the project area would be 563,800 acres. This would be 340,400 more acres of suitable habitat than under Alternative 1.

Alternative 3. Same effects as described above under Alternative 2.

Cumulative effects. Other ongoing and future actions in or near the project area that would affect sage-grouse habitat include vegetative treatments on adjacent lands, large public and private land developments, and climate change. Some untreated suitable sage-grouse habitat on private land would shift to unsuitable, as would occur on public land. These actions would continue under Alternative 1, 2, and 3, and thus the effects would accrue with those predicted for each alternative.

The amount of vegetative treatments occurring annually on adjacent private lands is unknown, but for purposes of analysis it is assumed to be about half the amount proposed in Alternatives 2 and 3 for public land (given expense of treatments, and observations of past actions within the project area). The amount of suitable versus unsuitable habitat was assumed to be similar to the ratio on public land. Therefore, under all alternatives 10,900 acres would move from unsuitable to suitable annually on private land in the project area. Untreated suitable sage-grouse habitat is assumed to move to unsuitable at a rate similar to that on public land, such that 5,500 acres would move from suitable to unsuitable annually. The net change on private land would be 5,400 acres moving from unsuitable to suitable each year. This would occur under all alternatives, including the no action and both action alternatives.

The only proposed large scale projects within the planning area that would be expected to have an effect on sage-grouse habitat are a wind farm (52 turbines) and four mile road and powerline proposed for West Butte (on public and private land within project boundary). Utilizing sound contour models to analyze the effects of the West Butte project, the BLM estimates 9,300 acres of habitat on private and BLM administered land would be affected, potentially making the sage-grouse habitat unsuitable when turbines are operating. This effect would occur under all alternatives.

Although global and national estimates of climate change are available, regional and state-specific estimates and quantification techniques are in varying levels of development. The uncertainty regarding regional changes in climate means that it is not currently possible to predict the specific effects of climate change on resources within the planning area. Additionally, the changes would be so gradual that they would not likely be observable over the life of the project. Regardless of the eventual change

in climate, the effects would be largely the same in all alternatives, so a comparative analysis of effects of climate change on resources would not help the BLM decision-maker choose between alternatives.

Under Alternative 1, the various ongoing and future actions on public and private land in the planning area would combine for short term effect moving 5,400 acres from suitable to unsuitable. In Alternative 2, the net change short term would be moving 6,000 acres from unsuitable to suitable. Alternative 3 would have the same effects as Alternative 2. The long term effect in Alternative 1 would be 40,800 acres becoming suitable; in Alternatives 2 and 3 the net effect of all actions in the planning area after 25 years would be 373,200 additional acres of suitable habitat.

Visual resources

Existing environment

This section describes two aspects of visual resource management. First, there are the **RMP objectives**, which all implementation level actions must meet. Second is an explanation of **visual quality**. Implementation actions can have short term, long term and positive and negative effects on visual quality as long as the RMP's Visual Resource Management (VRM) Class objectives are still met.

VRM Class Objectives. An evaluation of the area's scenic quality was completed in 2005 for the southeast portion of the project area (USDI BLM 2005, Appendix H) and in 1989 for the rest of the project area (USDI BLM 1989, pages 128-129). These plans designated the public land in the project area into four Visual Resource Management (VRM) Classes based on scenic quality, sensitivity level, and distance from sensitive viewing areas. The BLM's Visual Resource Inventory Manual (USDI BLM 1986) describes the four VRM classes, each with an objective which prescribes the amount of change allowed in the characteristic landscape.

Most of the project area (59 percent/365,400 acres) is in VRM Class IV, where the level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

About 30 percent (186,500 acres) is in VRM Class III, where the level of change to the characteristic landscape can be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

There are 40,200 acres in VRM Class II. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape must be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Within the project area there are 24,500 acres of VRM Class I. These acres are within the Horse Ridge Area of Critical Environmental Concern (ACEC), South Fork Crooked River ACEC, North Fork Crooked River ACEC, North Fork Wilderness Study Area (WSA), South Fork WSA, Cougar Well WSA, and Hampton Butte WSA. All WSA and ACEC are VRM Class I. In this class the objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

Visual quality. The 616,600 acre project area possesses a variety of landform and vegetation features that contribute to the area's scenic quality. The various buttes, dry canyons, rivers and streams, old growth juniper, and wide open spaces are valued by those recreating on public land, as well as by those driving through on Highway 20 or other roads. While individual houses are occasionally visible, in general the project area is a natural appearing landscape, with only a few highly visible constructed features such as transmission lines, communication towers, roads, fences and corrals. Vegetation is a mixture of open grassland, dense shrubs, and stands of juniper. This is seen as a stippled or mottled pattern of dark green juniper against a light green or brown background, depending on the time of year. The lower slopes of buttes are a more consistent dark green color due to juniper cover than the upper elevation areas which are seen in greater relief. At certain times of the year, cheatgrass produces a pattern of light yellow or green patches at the base of individual juniper trees. One of the most striking visual features of the project area is the opportunity for long range views. There are numerous locations with high quality views, including foreground views of native grasses and rugged old growth junipers, as well as vantage points with dramatic views of the high desert and its many buttes.

Effects

All of the alternatives include project design features (see Chapter 2 Alternatives and Appendix B) that ensure attainment of the RMP prescribed VRM Class objectives described above. Implementation level actions can have a short or even long term effect on visual quality as long as the VRM Class objectives described above are still met.

Under **Alternative 1**, no actions would occur, so there would be no change in visual qualities. Other ongoing or future actions within the project area would have an effect. Effects of ongoing and future actions that would occur under all alternatives are discussed in the cumulative effects section, below.

Alternative 2. This alternative would not cut, mow or crush trees or other vegetation in areas designated VRM Class I. Burning would be permitted in all VRM classes, but only in VRM Class I if the actions would not change the characteristic landscape and would not attract attention. A number of design features would be applied if burns were conducted in these areas (see the full list in Appendix B).

The primary effect of juniper cutting (up to 10,200 acres annually) on visual quality would be a short term (up to three years) increase in the color contrast between needles on dead and live juniper trees. Dead trees would have a period where needles are reddish before needles turn grey and fall off. This contrast would diminish over the long term. Project design features (Appendix B) such as scattering

and/or burning cut tree limbs and using non-linear treatment boundaries would minimize this short term effect.

While there would be a short term increase in color contrast, there would not be a change in texture contrast. The existing texture of the landscape is mottled or rough regardless of whether there have been vegetative treatments or not. The proposed treatments would increase vegetative diversity and help highlight old growth juniper trees, increasing visual quality over the long term. Patches of old growth juniper tree stands in the project area would help reduce visual color, line and form contrasts from the proposed action. There would be no effect on the opportunity for long range views.

Other ongoing or future actions within the project area would also have an effect on visual quality. Effects of ongoing and future actions that would occur under all alternatives are discussed in the cumulative effects section, below.

Effects from **Alternative 3** would be similar to Alternative 2, except that there would be fewer acres where a short term effect would occur, as only 3,400 acres annually would be cut, mowed or crushed.

Cumulative effects. Other ongoing or future actions in or near the project area that could combine with project actions to affect visual quality include large scale juniper cuts or the installation of wind turbines, powerlines, or roads. There is a 52 turbine wind farm and four mile road and powerline proposed for West Butte (on public and private land within project boundary), but other projects are not known at this time. Analysis for the West Butte project found that the project would meet the VRM objectives for the area, but there would be minor effects on visual quality, primarily from the powerline which could be seen from Highway 20. The effects of this other actions combined with the effects of the actions proposed in Alternatives 2 and 3 would not be cumulatively significant.

Carbon storage and greenhouse gas emissions

Existing environment

Rangeland carbon levels depend on local climate, natural disturbances, human management, age and vegetation type. Management actions affect greenhouse gas levels because carbon is removed, released and/or rearranged in the organic matter throughout the rangeland ecosystem. Carbon calculations used for this analysis are based on broad assumptions and estimates based on regional averages. Carbon calculations for affected environment and environmental effects in this analysis are meant to serve as relative indices of the net effect of project actions, rather than precise estimates of actual tons of carbon. The carbon affected environment consists of carbon stored in vegetation growing on site. Currently, there are an estimated 27,985,300 metric tonnes of carbon stored across the 616,600 acres in the project area. This estimate is based on 12.4 metric tonnes of carbon per acre on shrub/woodland (Brown et al. 2010), and 3.66 metric tonnes of carbon dioxide equivalent (CO2e) per metric ton of carbon.

Effects

Alternative 1. Plant communities store carbon during vegetative growth, and emit carbon as plant materials decay, resulting in additional storage each year. Assuming rangelands have 12.4 metric tonnes of carbon per acre (Brown et al. 2010), and they accumulate carbon at about 2.5 percent per year (using Svejcar et al. 2008), vegetative growth on all public land in the planning area would result in the storage of 712,200 metric tonnes of CO2e in the short term (after one year). Counting just those acres untreated in Alternative 1 but treated in the other alternatives (13,600 acres), CO2e storage would be estimated at 481,100 metric tonnes and accumulation in the short term would be 15,727 metric tonnes. In the long term (25 years), accumulation on the untreated acres (265,000 acres that would be treated in other alternatives) would be around 9,829,300 metric tonnes of CO2e.

Alternative 1 does not include any burning or other vegetative treatments; therefore it would not produce any greenhouse gas emissions other than from vegetative decay which was already accounted for in the net annual carbon accumulation figure.

Alternative 2. The proposed actions would result in carbon dioxide emissions as a result of tree bole removal or burning, and fuel use from operations such as cutting, crushing and mowing vegetation. After treatments, vegetative growth would result in storage of carbon.

Alternative 2 would burn 8,500 acres, emitting 115,900 metric tonnes of CO2e. The consumption of carbon in prescribed burns is estimated to be 30 percent based on past actions on Prineville District. This assumes 50 percent of the carbon is in trees boles, 10 percent of the boles are consumed by burns, and 50 of the remaining aboveground carbon is consumed. If juniper is removed from the site and burned, carbon is released, but if the trees are used in furniture or buildings, little carbon is released. While both action alternatives would allow removal of boles, the carbon balance analysis assumes none would be removed prior to burning.

Fuel used by equipment and vehicles during burning, cutting, mowing and crushing on 18,700 acres (some areas would receive multiple treatments) would produce an additional 400 metric tonnes of CO2e. This is based on: Vehicle and machinery use during project implementation would also release greenhouse gases, at a rate of about 25 gallons per day for 10 days to treat 100 acres, based on previous Prineville District actions. Vehicles convert gasoline to greenhouse gasses, primarily carbon dioxide, but also methane and nitrous oxide, at a rate of 19.4 pounds per gallon (EPA 2011).

Carbon storage would be similar to Alternative 1 in the short term, except that the acres treated would no longer store as much carbon as the untreated acres, and the annual accumulation on these acres would be less than in Alternative 1. New growth of vegetation in treated areas would likely accumulate carbon at a faster rate than untreated areas, but the rates are variable and site specific, therefore this analysis assumes the same rate for all areas. In the short term (one year), the 13,600 acres that would be cut, mowed, crushed and or burned would accumulate 11,000 metric tonnes of CO2e. In the long term, accumulation would amount to 275,200 metric tonnes of CO2e. Cutting, mowing and crushing trees and shrubs don't remove carbon from the site, but subsequent burning on site or in gathered

firewood does. This analysis assumes that treatments would remove on average 30 percent of the carbon on site, based on past actions on the Prineville District.

Emissions over the life of the project, assuming 25 years, would be 2,907,500 metric tonnes of CO2e.

Current annual U.S. emissions of carbon dioxide total 6 billion tons (EPA 2009, p. 2-3), and statewide emissions are 70,000,000 (Oregon Global Warming Commission, 2009). Therefore, annual emissions from Alternative 2 would be .002 percent of nationwide emissions and 0.166 percent of statewide emissions.

Alternative 3 would result in the emission of 162,500 metric tons of CO2e in the first year, and 4,062,500 in the long term (25 years). Annual and long term accumulation would be the same as Alternative 2. Annual emissions from Alternative 3 would be .003 percent of nationwide emissions and 0.232 percent of statewide emissions.

Cumulatively, the primary factor on greenhouse gas emissions within the project area is carbon storage by vegetation. As stated in the affected environment section, current storage by vegetation in the project area is 27,985,300 metric tonnes of CO2e. Storage on the 495,300 acres of private land within the project area is estimated at 22,479,200.

Summary of effects

Table 3. Summary of environmental effects.

	Alternative 1	Alternative 2	Alternative 3
Suitable sage-grouse habitat (public acres)			
Currently in project area	308,300	308,300	308,300
Added annually by project actions	0	13,600	13,600
Lost annually from not treating	3,400	3,400	3,400
Total in project area after 25 years	223,400	563,800	563,800
Suitable sage-grouse habitat (estimates for private acres)			
Currently in project area on private land	495,300	495,300	495,300
Added annually by actions on private land	10,900	10,900	10,900
Lost annually on areas not treated on private land	5,500	5,500	5,500
Visual resources (public acres)			
Short term effects (up to 3 years)	0	10,200	3,400
Long term effects (residual after 3 years)	0	0	0
Carbon (metric tonnes CO2e) on public acres			
Short term (1 yr) accumulation in project area	15,700	11,000	11,000
Short term emissions from project actions	0	116,300	162,500
Long term (25 yrs) accumulation in project area	9,829,300	275,200	275,200
Long term emissions from project actions	0	2,907,500	4,062,500

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Appendices

Appendix A, Issues considered but eliminated from detailed analysis

The following issues were raised by the public or BLM during early scoping for this project. They have considered but eliminated from detailed analysis, often because project design features (PDF) added to the action alternatives eliminate or reduce effects on the resource. The PDFs are briefly mentioned below, but are described in detail in Chapter 2 Alternatives or in Appendix B, or both.

- **How would the alternatives affect federally listed threatened, endangered or proposed species or habitat designated "critical" or "essential"?** None of these species or habitats occurs within the project area. Because these species and their habitats do not occur in the project area the proposed action alternatives have no potential to affect these species, so they will not be discussed further in this analysis.
- **What would be the effects of juniper removal on Columbia spotted frog habitat?** This is a BLM sensitive species. There are 800-1,500 acres of Columbia spotted frog habitat in the project area, all in riparian areas. Juniper removal would be expected to increase the amount of water available for riparian plant species, thereby improving riparian area function, with a consequent improvement of spotted frog habitat. However, most of the project area is upland rather than riparian areas, so the benefits, while likely, would be relatively small (.002 percent of the project area), and analysis would not provide a basis to help compare alternatives. Therefore, this issue is not analyzed in detail in this EA.
- **How would human activity during treatments affect mule deer, elk, and pronghorn winter survival?** While these species do not have any special status designation, they are considered species of local interest. BLM land often supports large contiguous blocks of un-fragmented habitat used by wintering herds of mule deer, elk and pronghorn. BLM's management of winter range assists in attainment of ODFW's management objectives for mule deer, elk, and pronghorn. Animals use these ranges between December 1 and April 30th, at a time when the animals' energy resources are compromised and harsh weather conditions such as deep snow can limit food availability. Disturbances cause animals to deplete their already low energy reserves, making it even tougher to survive through the winter. The action alternatives include PDFs (described in detail in Chapter 2 and Appendix B) to ensure this project would not have the potential to significantly affect wintering mule deer, elk and pronghorn. Therefore, no potentially significant effects are expected, and this issue is not analyzed in detail in this EA.
- **What would be the effects of juniper removal on mule deer, elk, and pronghorn habitat?** These animals need winter ranges with good quality sagebrush and bitterbrush. Juniper removal is expected to improve forage quality for mule deer, elk, and pronghorn habitat. Research by Rowland et al. 2008 in Central Oregon documented a decreasing canopy cover of sagebrush with increasing canopy cover of juniper. They summarized that the densities and size distribution of juniper trees observed pose substantial risk to sagebrush communities in central Oregon. Rowland et al. 2008 stated that within sagebrush communities of this John Day province, intensive management through removal of encroaching juniper may be prudent. Miller et al. 2005 showed sharp increases in shrub

canopy cover following the removal of juniper. As juniper crown cover increases, understory composition changes, with decreasing understory diversity and eventual loss of the shrub component. This EA includes actions to reduce expansive young juniper, allowing for a healthier shrub component with an increased canopy cover. Foraging areas for deer, elk and pronghorn are expected to improve as the nutritious values of the shrubs increase. One scoping comment expressed a concern about juniper removal because deer and elk browse on the berries and other foliage. These animals occasionally browse on juniper, but it is not considered to be highly palatable due to the high concentrations of oxygenated monoterpenes shown to inhibit rumen microbial function (Schwartz et al. 1980). The project would not result in the eradication of juniper, only reduction. Removing juniper would increase the vigor and palatability of more desired shrubs such as antelope bitterbrush and sagebrush species, as well as grasses and forbs that meet the dietary requirements of deer, elk and pronghorn. Forage quality is not currently considered a limiting factor on most ranges, however, an improvement in the animal's body condition may improve over-all survivability of animals, reproduction and improve defense mechanisms to ward off predators and disease. Western juniper stands provide excellent hiding and thermal cover for mule deer and other wildlife, however, some removal is necessary to improve shrub stands, as shrubs provide good habitat values relative to hiding and thermal cover, and forage (Leckenby et al. 1986), therefore the differences between alternatives are not expected to be measurable. As there is no potential for significant effects on these species, a detailed analysis addressing this issue is not included in this EA.

- **How would <u>pygmy rabbit</u> foraging habitat and burrow stability be affected by removal of vegetation and by soil compaction from vehicles?** Pygmy rabbit is considered a BLM sensitive species. Roughly 30 percent of the project area may support pygmy rabbits; however, survey efforts have been limited. Some occupied habitat has been atypical of that thought to be used by pygmy rabbits. Prescribed burns would temporarily (10-15 years) remove plants that pygmy rabbits feed on, but 70 percent of the project area would retain moderate to high densities of sagebrush. Surface disturbance by cattle has been shown to collapse pygmy rabbit burrows (Rauscher 1997; Siegel Thines et al. 2004), therefore vehicles traveling off road near burrows would potentially collapse burrows. To ensure this project would not have the potential to significantly affect pygmy rabbits, PDFs limit actions near burrows (e.g., survey prior to treatments and no off-road travel within ¼ mile of burrows, described in more detail in Chapter 2 and Appendix B). Since no potentially significant effects to pygmy rabbits are expected, this issue is not analyzed in detail in this EA.
- **How would <u>raptor nest success</u> be affected by activities associated with treatments?** Landscape scale projects encompass many different species of raptors as well as nesting territories. Species would include bald eagle, golden eagle, and various buteos and accipiters. Territories include roosts, foraging areas, and nests and nest structures which, depending on species, could be a tree or rock formation. Treatment of encroaching young juniper is expected to decrease vegetative competition for the larger and older juniper and pine trees. Overall the proposed vegetation management is expected to improve nest tree condition because wildfire could kill the larger pines which are rare in this landscape. Thinning woody vegetation from around existing and potential nest trees prior to prescribed fire would reduce the potential for large tree losses. Human disturbance during the critical periods of incubation and the early nesting stages can be fatal to embryos and nestlings

(Richardson and Miller 1997). To protect nesting raptors the action alternatives include PDFs (e.g., seasonal closures in Upper Deschutes RMP (USDI BLM 2005), page 47) that prohibit project activity near nests during nesting season. The rationale for these PDFs is described in detail in the Upper Deschutes RMP, and that analysis formed the basis for the inclusion of the PDFs in this EA. Therefore, no potentially significant effects to raptor nest success are expected, and this issue is not analyzed in detail in this EA.

- **How would raptor foraging habitat be affected by juniper removal?** Juniper encroachment into shrub steppe habitat has reduced the amount of open foraging habitat for raptors in the project area. Raptors such as golden eagle and ferruginous hawk need open vegetation that supports their foraging behavior of continual low flight. Juniper removal is expected to improve foraging habitat for a broad-spectrum of raptors. Retention of old growth juniper is included in all alternatives, which would maintain large perching and nesting structures. Given the protection of old growth trees, the BLM expects only beneficial effects on raptor foraging habitat, and no potential for significant effects. A detailed analysis addressing impacts to raptor foraging habitat is therefore not included in this EA.
- **What would be the effects of treatment activities on bald and golden eagle winter survival?** Bald eagle is a BLM sensitive species. Both bald and golden eagle are protected by the Bald and Golden Eagle Protection Act. The golden eagle population is currently thought to be in decline. To ensure this project would not have the potential to significantly affect wintering eagles, project design features protect and enhance roost trees, limit treatment activity seasonally near roost sites. Also, thinning young juniper would maintain and improve developing young pine stands to provide future roosts. Because these design features have been added to the action alternatives, no potentially significant effects are expected, and this issue is not analyzed in detail in this EA.
- **Would juniper removal affect birds that depend on juniper?** One scoping comment said, "birds depend on juniper...most birds are found in mid successional stands." At least 12 species of birds feed on the fruits of juniper (Gabrielson and Jewett 1940, Maser and Gashwiler 1978). Western juniper berries are the sole winter food used by Townsend's solitaires and make most of the American robin's diet throughout the winter (Lederer 1977, Poddar and Lederer 1982). Other birds that commonly feed on the berries include cedar waxwings, flycatchers, mountain bluebirds, and thrushes (Sutton 1951). In eastern Oregon, avian species diversity and richness were found to be greater in Phases I (early encroachment) and II (co-dominant) western juniper mountain/big sagebrush communities compared to mountain big sagebrush communities, where trees were absent. This diversity resulted from an increase in tree-nesting species like chipping sparrow, flycatchers, Cassin's finch and house finch. Maximum densities of these species were reached at relatively low densities of western juniper (Noson 2002). Noson (2000) reported Brewer's sparrows, vesper sparrows, and sage thrashers showed a strong negative correlation to juniper density increases and to area occupied by western juniper. Sage thrasher was most sensitive to western juniper encroachment, sharply declining at very low western juniper densities. Reinkensmeyer (2000) reported a 90 percent decline in sage thrasher densities in western juniper stands with just six percent tree cover (in Miller 2005). Abundance of tree-nesting species including flycatchers, mountain chickadees, dark-eyed juncos, house wrens, chipping sparrows, and mountain bluebirds

increased in the early stages of woodland encroachment (Phase I). However, continued increase in juniper dominance did not result in an increase in these species. These studies suggest that as woodland succession enters Phase III (juniper dominance), avian abundance, diversity, and richness would decline with loss of understory species and structural complexity. Sagebrush obligate species, including sage-grouse, are sensitive to western juniper encroachment into sagebrush communities. The juniper density at which greater sage grouse use declines or ceases has not been determined. However, in central Oregon, sage grouse avoided western juniper communities for nesting and winter use (USDI BLM 1994A). As tree densities increase and woodland area continues to expand, sage grouse habitat will decline, especially in mountain big sagebrush habitat below 7,000 feet. The proposed project is not expected to eliminate the food source for the many species of birds that disseminate and utilize juniper fruits. Therefore, there would not be a potentially significant effect, and this issue is not considered in detail.

- **How would removal of trees affect <u>bat</u> roosting?** All known bat species in the project area that roost in trees typically utilize large conifer snags, specifically ponderosa pine and Douglas fir. Maternity colonies in juniper woodlands most likely roost in adjacent rock features. Although maternity colonies myotis species may form in old-growth snags if the temperature and wind conditions are adequate, the size of the colony is likely to be small. Species that may roost in western juniper snags include: silver-haired bat, western long-eared bat, fringed myotis, and long-legged myotis. Only one species (long-legged myotis) has been known to roost in western juniper snags, but specifics on tree size, old-growth status, or maternity colony or male/non-reproductive female were not mentioned (Baker and Lacki 2006). The fringed myotis is a BLM special status species, however this bat typically roosts in rock crevices, caves, mines, buildings, and large Douglas fir snags (O'Farrell and Studier 1980, Weller and Zabel 2001). To ensure this project would not have the potential to significantly affect tree-roosting bats, all treatments would be designed to protect large ponderosa pine, Douglas fir, and old growth juniper. Since no potentially significant effects to bat roosting habitat are expected, this issue is not analyzed in detail in this EA.
- **How would the alternatives affect <u>green-tinged paintbrush</u>?** Green-tinged paintbrush is endemic to central and south-central Oregon. Green-tinged paintbrush is a BLM designated sensitive species. There are twelve known populations in the planning area. These populations contain one to over a 1,000 individuals. Eleven of the populations have been mapped and encompass 1,715 acres. The remaining known population is at least 500 acres. Green tinged paintbrush is hemi-parasitic (obtains some of its nourishment from a host plant). Its primary hosts are sagebrush (*Artemisia tridentate)* and bitterbrush (*Purshia tridentate)*. Project actions that would affect this plant by decreasing host plants include burning, mowing, and track vehicles. To ensure this project would not have potentially significantly effects on this plant, PDFs have been added to the action alternatives that would prevent any potentially significant effects to green-tinged paintbrush; therefore this issue is not analyzed in detail in this EA.
- **Would <u>soil productivity or stability or plant community structure</u> be affected by the proposed actions?** A scoping comment suggested that cutting and removing juniper depletes soil nutrients. Many studies have shown that tree or shrub removal can leave soil vulnerable to erosion from wind or water, and vehicles and machinery can compact soil. Vehicles can carry and spread weeds;

vegetative treatments can leave bare ground areas which are susceptible to invasion and spread of weeds. Some soils and plant communities (such as those dominated by Wyoming big sagebrush) are especially susceptible to erosion and invasive species. The EA includes a number of project design features (see Appendix B) that would prevent any potentially significant effects on soil or plant community structure. Therefore, these issues are not analyzed in detail in this EA.

- **How would old growth trees be affected by the alternatives?** There are some old growth juniper and ponderosa pine in the project area. These trees provide visual interest and diversity as well as wildlife habitat. The EA includes several project design features (described in detail in Appendix B) that prevent cutting old growth trees, and limit burning when there are old growth trees in the area. These design features prevent any potentially significant effects on old growth trees. Therefore, the issue is not analyzed in detail in this EA.
- **Would the proposed actions affect Wilderness Study Areas (WSA)?** There are about 24,000 acres of WSA within the planning area. The BLM manages WSAs such that the wilderness characteristics are not impaired. Wilderness characteristics are defined in Section 2(c) of the Wilderness Act and consist of size (area is at least 5,000), naturalness (area appears affected primarily by the forces of nature), and outstanding opportunity for solitude or primitive, unconfined recreation. Alternatives 2 and 3 include PDFs that prohibit or limit actions in these areas, thereby eliminating potentially significant effects. Therefore the issue is not considered in detail in this EA.
- **How would lands with wilderness characteristics outside of WSAs be affected by the alternatives?** There are 65,000 acres with wilderness characteristics (outside of WSAs) within the project area, and 218,200 acres that may have wilderness characteristics but have not been inventoried. The action alternatives in this EA would not permit cutting, mowing or crushing vegetation in areas with wilderness characteristics. Prescribed burning would be allowed provided several PDFs are adhered to (see details in Chapter 2 and Appendix B). Therefore, the actions proposed in this EA would not have a potentially significant effect on wilderness characteristics, and the issue is not considered in detail in this EA.
- **Would the proposed project have an effect on the local or regional economy due to lost income to grazing permittees from unavailable forage?** One of the design features included in this EA involves resting treatment areas from livestock grazing typically one growing season prior to burning, and two growing seasons after burning, seeding, or other treatment. This allows plants to grow to build up fuels to foster burning, or seedlings to establish after a burn, seeding or other treatment. This would mean a temporary loss of livestock forage for some permittees if the permittee did not have the ability to easily shift use to another pasture or allotment. In most instances proposed treatments can be coordinated with the timing of the "rest" and the "deferred" times of grazing in a permittee's grazing system, cutting down on the loss of actual time or years they couldn't graze. Most of the permittees in the project area have allotments with multiple pastures where accommodations can be made with their grazing system during the time of a treatment. Of the 65,000 animal unit months of forage (the amount required for one cow and calf for one month) available in the project area, about two percent involves allotments with only one pasture and where the permittee has no other allotment. The BLM has made a determination that this would not constitute a potentially

significant effect on the local or regional economy, and the issue is therefore not considered in detail in this EA.

- **Would contracts for vegetative treatments have an effect on the <u>local or regional economy</u>?** The proposed action does not specify whether the BLM or contractors would conduct treatments, but if the work were contracted it would contribute to the local or regional economy. The BLM does not generally contract for burning and seeding, but it often contracts for juniper cutting. If contracts were awarded for 100 percent of the Alternative 2 cut/mow/crush treatments (up to 10,200 acres annually), and we assume one person treats four acres per day on average, this would be the equivalent of 10 full time jobs each year. For comparison, the nearby cities of Bend, Redmond and Prineville employ 30,151 people (US Census Bureau, 2002) therefore the project would contribute at most .03 percent of the jobs in the area. While every added job is a benefit, .03 percent would not represent a potentially significant effect on the economy, therefore the issue is not considered in detail in this EA.
- **How would project activities and treatments affect <u>cultural and paleontological resources</u>?** Cultural and paleontological resources are known to occur within the project area and additional resources would be expected when cultural resource inventory is completed. Known or expected site types would include lithic scatters, obsidian quarries and procurement areas, pictographs and petroglyphs, rock features, prehistoric wooden structures, standing or collapsed historic period structures, troughs, fences, historic trails or roads and associated features like blazed trees or cairns, refuse scatters, and possibly short-duration mining sites. The proposed treatments including cutting junipers, crushing and mowing shrubs using ground based-equipment, piling and burning slash, prescribed fire, removing cut trees through firewood permits or commercial sales, and seeding or planting root stock have the potential to cause surface and sub-surface damage to cultural resources. Design features have been developed and incorporated into to this EA, including inventory protocols, specific protections, and delayed implementation. Because of these design features, the BLM expects no potentially significant effects on cultural properties or paleontological resources. Therefore, the issue is not considered in detail in this EA.
- **Would there be an effect on <u>recreation</u> opportunities?** The primary recreation activities that currently take place within the project area include camping, backcountry exploration, and hunting for pronghorn, deer and elk, hiking, photography, and wildlife viewing. Hunting seasons start in late summer and continue through the fall. Camping is generally associated with hunting. Backcountry exploration usually occurs with four-wheel drive, or ATVs when accessible. Wet, muddy conditions generally limit this use in the spring. Proposed project activities would not restrict public access except some roads or areas may be closed for a few hours during burning operations, potentially restricting access if there were no alternative routes in the area. These effects would be short term and would affect few, if any, recreationists. Therefore, this issue is not considered in detail in this EA.
- **How would public and firefighter <u>safety</u> be affected by the alternatives?** The proposed action of cutting, mowing or crushing 10,212 acres per year could result in increased wildfire danger due to heavy fuel loads in some areas. There could also be an increased threat from wildfire to private lands (safety as well as structures, forage, fences, aesthetics) as a result of increased fine fuel loads

from mechanical treatments. To reduce the hazard, the proposed alternatives include a design feature to reduce fire danger within the wildland urban interface (generally the area within ½ mile of groups of homes or other structures). With this design feature, there is no potential for significant safety concerns, therefore the issue is not considered further in this EA.

- **Would smoke from prescribed burning affect <u>air quality</u>?** Smoke released from prescribed burning contains several chemicals, including criteria pollutants Carbon Monoxide & Particulate Matter, that are known to cause harm to people and the environment. The Clean Air Act and its amendments define the Environmental Protection Agency's responsibilities for protecting and improving the nation's air quality and require the EPA to set National Ambient Air Quality Standards (NAAQS) for certain pollutants (criteria pollutants). The amended Clean Air Act also places the major responsibility for achieving NAAQS on the states via their implementation plans. As such, all prescribed burns would comply with Oregon Smoke Management Plan: "ORS 477.013 requires the State Forester and the Department of Environmental Quality to approve a plan for managing smoke in areas that they are to designate, for the purpose of maintaining air quality. The plan must designate areas within which all burning must comply with the plan." (Oregon Revised Statutes, Volume 12, Chapter 477, 2009). Clearance to burn must be coordinated with Smoke Management at Oregon Department of Forestry (ODF) prior to ignition. During the months that prescribed burning occurs daily smoke management forecast and burning instructions are issued by an air quality forecaster from ODF or DNR, which is used by the BLM to help determine optimal burning conditions. Final permission to burn comes from either the smoke management forecast instructions or verbally from the forecaster. Since there would be no potentially significant effect on air quality, the issue is not considered in detail in this EA.

Appendix B, Project design features

The following actions are part of the action alternatives. While they are organized below under the main resource for which they are designed to reduce undesirable effects, some of them would reduce impacts to more than one resource.

Safety

Fuel loading remaining after mechanical treatments within the wildland-urban interface (WUI) would be reduced to 3.3 tons/acre or less for woody debris that is one inch or less in diameter. The WUI is generally the area within ½ mile of groups of homes or other structures, though it may expand further in forested areas or where steep slopes could affect wildfire behavior. Some roads would be closed for a few hours during prescribed burning operations.

Wildlife

Prior to any treatment, the BLM would complete clearances for locally important or special status species. Clearances involve: a) assessing the potential for the action to have an undesirable effect, b) ensuring the action includes design features specified in the Decision Record and other relevant decisions, and c) recommending changes to the action that would reduce effects below those analyzed in the EA.

Large ponderosa pine and Douglas fir, all old growth juniper, and any trees with raptor nests or roosts or cavities would not be cut or burned. When conducting prescribed burns in areas with raptor nests, eagle roosts, or old growth trees, cut and remove all limbs within three feet of the ground on these trees, remove all small and shrubs within 10 feet of the tree (except no old growth trees), and pre-burn any remaining vegetation around the tree. No old growth trees would be cut or burned, regardless of species, even if they are near a nest tree where smaller trees may be cut to reduce chance of fire spread. For the purposes of this EA, old growth juniper are defined by physical characteristics (rounded tops or spreading canopies, dead branches covered with fruiticose lichen, and bark with deep furrows), and old ponderosa pine are those greater than 18 inches in diameter at breast height.

Do not allow vehicles off road within ¼ mile of pygmy rabbit burrows. Do not conduct prescribed burns within ½ mile of pygmy rabbit burrows.

Pretreatment and treatment activities within mule deer, elk or pronghorn winter range would be completed within a two week window if conducted between November 1 and May 1 (depending on species, see page 47 in Upper Deschutes RMP(USDI BLM 2005)). The Upper Deschutes RMP includes a discussion of the rationale for the closure windows for various species.

Project activity would not be allowed from **December 1 to April 1** within ½ mile of bald and golden eagle winter roost sites, or from January 1 through August 31 within ¼ to ½ mile of raptor nests (depending on species, see page 47 in Upper Deschutes RMP).

Wilderness

Mechanical treatments would not be allowed within Wilderness or Wilderness Study Areas (WSA). Lands not in Wilderness or WSAs would be inventoried for wilderness characteristics prior to treatment. All alternatives would ensure that lands with wilderness characteristics (LWC) retain their wilderness characteristics. Therefore mowing, crushing and juniper cutting would not occur on LWCs unless a future land use plan designates these as allowable uses in these areas.

Prescribed burning would occur in Wilderness, WSA, or LWC only if all of the following conditions (from pages 48-49 of BLM Manual H-8550-1 (USDI BLM 1995)) are met:

- Action is necessary to maintain a fire-dependent natural ecosystem.
- The action does not adversely impact wilderness values within any portion of the area.
- Only natural (e.g., rivers) or existing (e.g., roads) fire breaks are used.
- Fire camps are outside the area.
- Motorized vehicle use is minimized.
- The action is not precluded by land use plan.

Prior to any treatment, the BLM would assess the potential for the action to have an undesirable effect on these resources, ensure the action includes the above design features, and modify the action as needed to reduce effects below those analyzed in this EA.

Vegetation

Prior to any treatment, the BLM would complete clearances for locally important or special status plants. Clearances involve: a) assessing the potential for the action to have an undesirable effect, b) ensuring the action includes design features specified in the Decision Record and other relevant decisions, and c) recommending changes to the action that would reduce effects below those analyzed in the EA.

Around small populations of green tinged paintbrush (50 acres or less), do not broadcast burn or mow within 250 feet, and do not allow track mounted harvesting equipment with 100 feet. Around large populations of green tinged paintbrush (more than 50 acres), do not broadcast burn, mow, or use track mounted harvesting equipment on more than 50 percent of the population's area every 50 years.

Treatments would be monitored for spread of weeds or new populations. If weeds are detected, appropriate corrective action would be applied as described in existing BLM guidance. If weeds are detected, appropriate corrective action would be applied as described in the Prineville District Integrated Weed Management Plan (online at http://www.blm.gov/or/districts/prineville/plans/activityplans.php) or subsequent weed management plan.

All contractors and land-use operators moving surface-disturbing equipment in or out of weed infested areas would be required to clean their equipment before and after use on public land. Contractors

would be given noxious weed information at pre-work meetings and asked to report any populations of noxious weeds in or near work areas. Any weed sighting information would be forwarded to the District Noxious Weed Coordinator.

Seeds would be obtained from a certified weed-free source.

Trees with old growth characteristics would not be cut or burned. Western juniper old-growth characteristics: rounded tops or spreading canopies, dead branches covered with fruiticose lichen, and bark with deep furrows. Ponderosa pine old growth: greater than 18 inches in diameter at breast height.

At least four young trees per acre would be left in old growth stands to provide recruitment trees for when the old trees die. Old growth stands are where there are five or more old growth trees per acre.

Trees with paint, signs, blazes, or fences attached to them would not be cut.

Grazing

After treatments, livestock grazing would not be permitted the remainder of the calendar year, and through the growing season of the next year, or until the BLM has determined that soil and vegetation have recovered sufficiently to support livestock grazing. Livestock grazing may continue in pastures if the disturbance event did not result in undesirable soil or vegetative conditions, or if grazing would not impede site recovery.

Livestock exclusion after disturbance events would not be required if livestock are not trailed through the affected area, and attractants (e.g., water, supplemental feed, salt) are not provided within one mile. Attractants may be closer if physical barriers (e.g., rimrock, fences) prevent livestock access to the affected area.

The BLM would allow prescribed or permitted livestock grazing if closely monitored and designed to accomplish resource objectives (e.g., to control invasive plants, or assist in getting broadcast seeds worked into the soil).

Sites proposed for prescribed burning may be rested from livestock grazing for one or two years prior to treatment.

Cultural

Locate, protect and preserve historic and archaeological resources in accordance with legal authorities and policies prior to implementation (Upper Deschutes RMP (USDI BLM 2005) and Brothers/La Pine RMP (USDI BLM 1989)). This includes planning and conducting compliance for Section 106 of the National Historic Preservation Act. Section 106 compliance includes consultation with the Oregon State Historic Preservation Office (SHPO) and interested tribes.

All treatments would be designed to avoid disturbance to historic properties and paleontological resources. Project design shall avoid treatment to sensitive areas or modify treatments to avoid impacts.

Any new discoveries of cultural or paleontological resources during implementation would temporarily stop project activities until a district cultural specialist has completed an assessment and coordinated with SHPO, if required.

Woody debris created by treatments would not be piled within boundaries of archaeological sites.

Trees with historical significance (survey trees, blaze trees, juniper structures, etc.) would be retained.

Visual resources

The following project design features would apply across the project area:

- Use BLM contrast rating methods and complete VRM contrast rating worksheets (Visual Resource Contrast Rating Handbook 8431-1, USDI BLM 1986b) during project design.
- Assess the change in contrast due to increased visibility of rights of way and adjacent structures and adjust treatments as needed to meet or exceed VRM standards.
- Design treatments to mimic patterns found in the characteristic landscape as well as to improve long distance scenic view opportunities.
- Locate actions that cause greater contrast such as landings, swamper burn piles, machine piles, etc. in order to meet or exceed VRM standards.
- In locations where trails or roads are visible or potentially visible as part of a wide, panoramic view, consider locating treatment edges at or near these routes, to avoid routes bisecting cleared areas.
- Identify existing and proposed trail and right of way routes prior to vegetation management treatments to ensure sufficient screening vegetation would be left to meet or exceed VRM standards.
- Do not locate burn piles, landings, or other major features on existing or proposed trail corridors.
- Within 200 feet of proposed tails, stumps from cut trees would be 12 inches or less, or no higher than surrounding vegetation to maintain visual aesthetics of the open, sagebrush-steppe community.
- Cut faces of visible trees would be oriented away from the trail.

The following would apply to all treatments in VRM Class II areas:

- Within VRM Class II areas visible from key observation points, do not use treatment methods that introduce high or moderate/high levels of contrast.
- Identify photo monitoring points to be used in the overall monitoring process to assess the length of short term visual impacts.

- Use computer generated seen area mapping to aid in vegetation treatment design, particularly in the location of swamper burn piles, landings, and other features that may create higher levels of contrast. On mid slopes, limit loading and yarding to bench locations not visible from key observation points. On mid slopes, limit burn pile number, size and location such that they are effectively screened from areas with high public sensitivity such as highways and high public use areas.
- Leave adequate junipers along property lines (meander the treatment boundary) to avoid strong line and color contrast between BLM and private property, unless fuels can be treated simultaneously on BLM and adjacent private property.
- Leave adequate junipers along property lines to partially screen views of structures from view from areas of high public sensitivity.
- Limit heavy equipment use to designated equipment trails and existing roads. Designated equipment trails would be rehabilitated following use. Rehabilitation would involve "erasing" the trail by pulling in berms, or covering with branches, brush, boulders, etc. such that the trail is disguised and can be naturally revegetated or artificially seeded.
- On slopes above 20 percent, do not use skidders or other treatment methods that potentially produce high or high/moderate contrast potential or other mechanical treatments that leave vertical lines on the slopes.
- On moderate and steep slopes, do not use a consistent treatment along the entire length of existing roads and ROWs, particularly those that are perpendicular to the slope. Consistent and similar mechanical treatments (e.g., boom operated fellers) along both sides of roads/utility lines serve to strengthen the dominance of these linear features, which contrast with the characteristic landscape.
- Burn piles would not be used on slopes above 20 percent in immediate foreground view of key observation points, unless they can be strategically located to effectively screen them by placing in blind areas behind leave tree crowns.
- All stumps would be no higher than 4 inches on the uphill side within 200 feet of designated roads and trails. Based on post treatment evaluation, BLM may paint visible cut faces (stumps and stems) with an appropriate color selected from the BLM list of environmental colors and selected to match the surrounding landscape post treatment type.
- Hand cutting of trees within 200 feet of designated roads and trails would include scattering of slash and moving of tree stems outside of immediate viewshed of designated roads and trails and scattering sufficiently to reduce height below or equal to surrounding shrub vegetation. If no screening shrubs exist, trees would be removed outside the trail corridor and treated by lop and scatter, chipping or other methods.
- Hand piling and burning would be done outside of the immediate foreground view of designated roads and trails.

In VRM Class I, the following PDFs would apply:

- Cutting, crushing and mowing would not be permitted in VRM Class I areas.

- Prescribed burning would be permitted in these areas only when the applicable PDFs listed above for VRM Class II are applied.
- No treatments would occur in the Horse Ridge Area of Critical Environmental Concern/Research Natural Area.

Soil

This section describes project design features that would ensure maintenance of soil productivity.

Objectives

- Limit annual grass expansion – Do not increase existing annual grass foliar cover by more than 5 percent absolute throughout area burned.
- Maintain perennial bunchgrass cover – Do not reduce existing perennial grass foliar cover by more than 5 percent absolute throughout area burned.
- Keep detrimental soil impacts (see definition below) to ≤ to 15 percent of the treatment area – This applies to non-sensitive soil areas for water or wind erosion. If detrimental impacts are greater than 15 percent of the treatment area, use restoration treatments such as erosion control treatments, subsoil tillage for compacted ground, and seeding native plants for areas with soil sterilization or soil displacement.
- Apply restoration treatments to all detrimentally impacted soils in sensitive soil areas.

Definitions

A **detrimental soil impact** is when native perennial grass cover is not expected to re-establish itself naturally on the affected or disturbed area within two years after the disturbance.

Fall burning generally occurs late August through early October, when fuel moisture levels are lowest for the year.

A **sensitive soil area** is any soil area with properties that meet <u>one of</u> the HIGH threshold criteria in the table on the following page.

Table 4. Soil vulnerability to site degradation.

Properties[1]	LOW	MODERATE	HIGH	Restrictive feature
Slope (percent) Kw < 0.20[2] Kw 0.20 – 0.36 Kw >0.36	 <20 <15 <10	 20 - 40 15 - 35 10 - 25	 >40 >35 >25	Steep slopes – Water erosion
Wind erodibility group (Surface layer)[3]	5, 6, 7, 8	3,4, 4L	1, 2	Wind erosion hazard
Available water capacity (average to 40 inches or limiting layer) (inches)	>0.10	0.05 - 0.10	<0.05	Droughty soils
Salinity (MMHOS/CM) (surface layer)	<8	8 - 16	>16	Excess salt
Sodium adsorption ratio (surface layer)	<8	8 - 12.9	≥13	Excess sodium
Depth to bedrock/ cemented pan (inches)	>20	10 - 20	<10	Rooting depth
Soil moisture regime	Xeric or wetter: avg. annual or effective precipitation ≥12 inches	Xeric or wetter: avg. annual or effective precipitation ≥12 inches	Aridic or drier: avg. annual or effective precipitation <12 inches	Dry effective soil moisture regime
Slope and aspect	All slopes and aspects that do not meet the criteria for HIGH Vulnerability	All slopes and aspects that do not meet the criteria for HIGH Vulnerability	Areas with slope gradients >12% on S, SW, or SE aspects (113-247 degrees)	Dry aspect slope

[1] Use the representative value for the range in soil properties for Available water capacity, Salinity, Sodium adsorption ratio, and Depth to bedrock/cemented pan.

[2] For each of the three Kw ranges under slope, a) use the representative value for the range in soil properties, and b) K Factor of surface layer adjusted for the effect of rock fragments (Kw).

[3] The wind erosion hazard was determined by looking at the Wind Erodibility Group (WEG) of the soil. The soil's WEG represents the soil's resistance to soil blowing, and is based on the soil properties of the surface layer. Soil properties used to determine WEG include soil texture, organic matter content, presence of carbonates, rock fragments, and mineralogy (USDA NRCS 2011).

Prescribed burning

Fall prescribed burning would be allowed when 1, 2, or 3 are true:

1. On sites with any slope or aspect and all three of the following are true:
    - Idaho fescue is greater than 10 percent of the total stand foliar cover and Idaho fescue is found in the plant interspaces (openings between trees and shrubs) not just in the shade of trees
    - Cheat grass is less than 5% of the total stand foliar cover
    - Rabbit brush is less than 5% of the total stand foliar cover

    AND one of the following is true:
    - Mountain big sagebrush makes up 96% or more of the sagebrush shrub community which means Wyoming big sagebrush or Basin big sagebrush is less than 5%; AND soil moisture regime is Xeric = (average annual precipitation or effective precipitation is greater than 12 inches) and ecological condition is Mid Fair, Good or Excellent
    - Soil moisture regime is Aridic= (average annual precipitation or effective precipitation is less than 12 inches) and ecological condition is Good or Excellent
2. On sites where the slope is > 12 percent and the average annual precipitation is > = 8 inches and all of the following are true:
    - Aspect is between 300 to 360 and 0 to 50 degrees (NNW, N, NNE.)
    - Cheat grass is < 5% total stand foliar cover
    - Rabbit brush < 5% total stand foliar cover
3. On poor to mid fair ecological condition sites (regardless of slope, aspect, or annual precipitation) where a restoration seeding treatment is planned and would result in an increased amount of shrub and/or perennial grass cover over what currently exists.

Fall prescribed burning would not be allowed on sensitive soil areas (definition, above) if:

- The aspect is south and average annual precipitation is less than 14 inches.
- The aspect is east or west and average annual precipitation is less than 12 inches.

Prescribed burn treatments that include **single tree burns** would only be allowed when:

- The ground is frozen and/or covered with snow, or in the early spring when the soil is wet. Additionally,
- Eighty percent of the burned juniper needles are left non-volatilized (needles remain on branches).
- Before burning trees that are 18 feet or taller, remove all limbs 3 feet or less from the ground to maintain 90 percent of foliar perennial bunch grass cover at the base of the burned tree.

Treatments that include **swamper, jackpot, or hand pile burns** may be used on any site, regardless of slope, aspect, annual precipitation, or soil sensitivity, as long as they are done when the ground is frozen and/or covered with snow, or in the early spring when the soil is wet.

Mechanical juniper treatments

This can be done by hand with a chainsaw, or with heavy equipment (see restrictions on equipment, below). Leave slash in contact with the ground unburned or jackpot burn when the ground is frozen and/or covered with snow or in the early spring when the soil is wet.

Equipment use (including vehicles and heavy equipment)

The following would apply to equipment used for any treatment:

- To reduce effects from soil compaction, operate equipment when soils are dry or frozen. Soils are wet when they are at or above field capacity in the top three inches of the soil surface. Cease operations when equipment tracks are creating ruts ≥ 3 inches deep with one pass or when equipment is slipping or sliding.
- Do not use crawler tractors with brush rake for building slash machine piles.
- To reduce soil disturbance and compaction, machine pile using excavator with grapple.
- As an alternative to machine or hand pile burning, masticate or chip fuel loads on site.
- Limit ground based mechanical treatments to slopes of less than 35 percent.
- Operate equipment smoothly and efficiently to limit sharp turns, moving backward and forward over the same piece of ground causing soil displacement, compaction and increasing potential for erosion.
- Limit equipment passes to four or fewer trips over a single piece of ground to prevent a detrimental soil impact. If five or more trips are likely, designate skid trails 100 feet or more apart.
- Twelve inches or more of continuous slash on a skid trail would allow a "forwarder" to transport logs from the treatment area to a landing using more than five passes without causing detrimental soil compaction.

Restoration

- Apply erosion control treatments (i.e. water bars or water dips) to abandoned skid trails and camouflage skid trails next to the existing road system to prevent people from driving these trails. This would apply to all areas; however, erosion control treatments would only be necessary where needed to prevent site degradation.
- Apply erosion control or subsoil tillage treatments to newly created juniper thinning access routes after the treatment is complete.
- Fell juniper on newly created juniper thinning access routes when finished with the juniper thinning projects. Block and camouflage access to prevent the transportation network from increasing in extent.
- Subsoil till compacted ground to improve the chance for native plant re-establishment. This would be used on landings, skid trails, or unauthorized routes. This would generally only be done if detrimental soil impact exceeds 15 percent of the treatment area.
- Do not subsoil till when the soil is wet as the desired compaction layer shattering will not occur.

- Do not subsoil till when soil is frozen.
- Do not subsoil till if soil is less than or equal to 12 inches deep to bedrock or a dense pan layer.
- If shanks on the equipment used to subsoil till won't go into the ground because it is too hard, pull slowly in over a fill slope or dig a trench with cat blade and enter from the trench.
- Use 2 shanks with wider wings instead of 3 for coarse stony soils and when brush is dense. Stones and brush will pass through the shanks with this setup.
- On roads and trails and on steeper grades (greater than 10 percent), subsoil till the full width of the compacted roadbed, including the ditch line, to insure more even distribution of moisture. If the full width is not subsoil tilled, water flow in uneven subsoil tillage would be concentrated without an outlet, potentially creating an erosion problem.
- Do not concentrate any runoff to the subsoil tilled area.
- Compacted roads will not transmit water into the road-bed, so could subsoil till during the winter if surface is not too wet or puddled. Better to subsoil till in the spring than in the fall. Moisture can be drawn up into the upper profile in the fall, which will extend the time that an area can be subsoil tilled. However, there is a point when the compacted zone is too dry and will fracture in large blocks. It is preferred for the top compacted zone to fracture into medium to small fractures and not leave big non-fractured chunks. This tends to happen when too dry or when subsoil tilling a thick bunch of compacted sod.
- A better subsoil tillage result (energy transfer) is produced by going slower rather than faster in tilling.
- For excavator subsoil tilling, pull logging slash and debris and soil organic matter (SOM) into the skid trail from areas surrounding the skid trail. For improved soil productivity add organic matter.
- Implement erosion control treatments on all routes, ways and skid trails showing signs of erosion, rutting and/or uncharacteristic water flow paths, rills, gullies or deposition. Install erosion and sediment barriers for controlling water flow and drainage to stabilize the soil. For permanent well-traveled roads, use water dips instead of water bars to make travel easier.
- Drill or seed on the contour for slope gradients greater than 5 percent.

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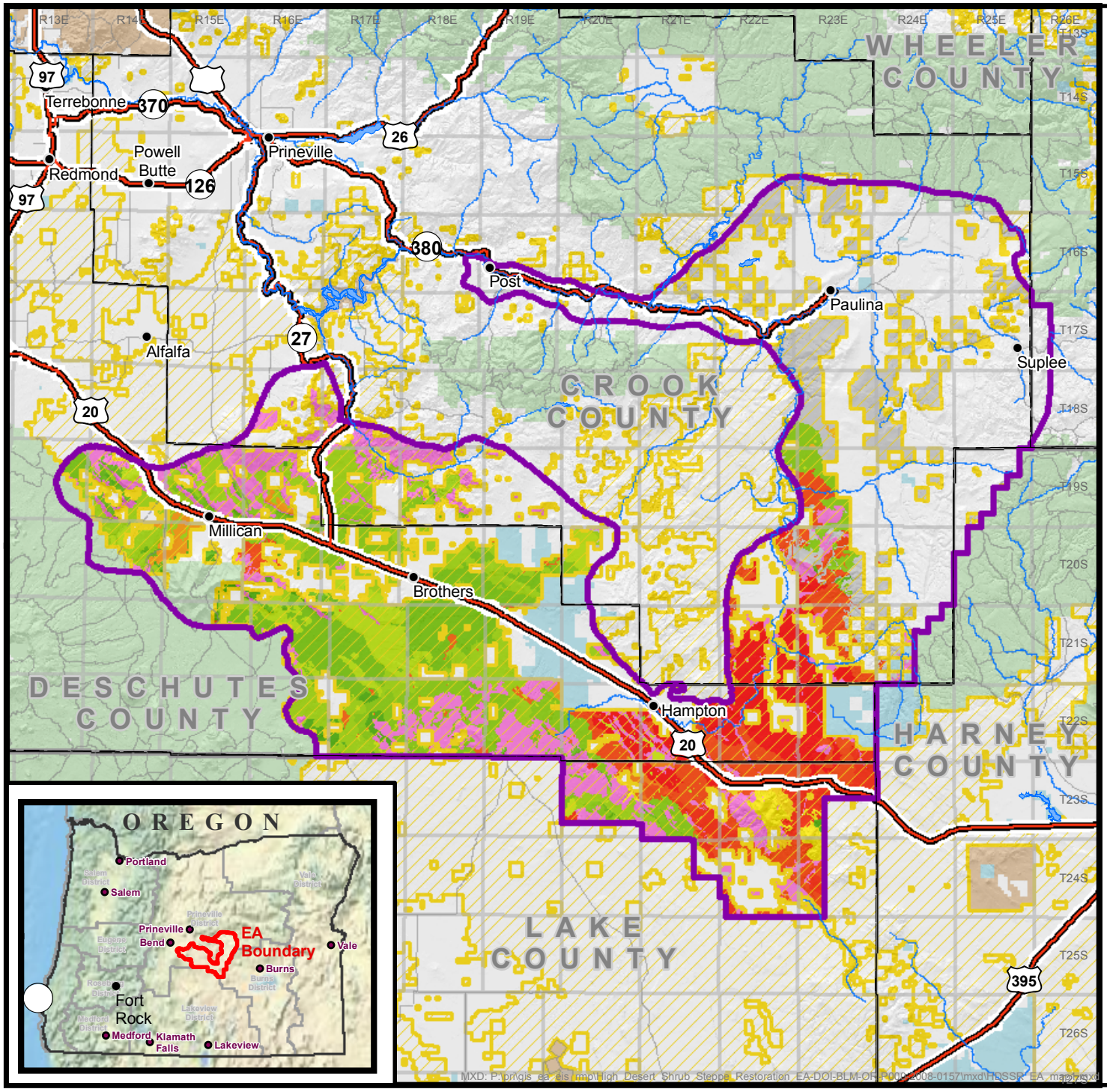
Appendix D, Maps

Map 1: Ecological Sites

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT
High Desert Shrub Steppe Restoration

EA-DOI-BLM-OR-P000-2008-0157



Legend

- EA Boundary

Ecosite

- ARID PLAINS 8-11 PZ
- CLAYPAN 12-16 PZ
- DROUGHTY LOAM 11-13 PZ
- DRY LAKEBED 10-12 PZ
- DRY PONDED CLAY 6-10 PZ
- GRAVELLY TERRACE 10-12 PZ
- LAKEBED
- LOAMY 12-16 PZ
- NORTH SLOPES 12-16 PZ
- PONDED CLAY
- PUMICE 10-12 PZ
- PUMICE 8-10 PZ
- PUMICE CLAYPAN 10-12 PZ
- PUMICE FLAT 10-12 PZ
- PUMICE NORTH 10-12 PZ
- PUMICE STONY LOAM 10-12 PZ
- Other Ecosites
- Undefined

Administered Lands

- Bureau of Land Management
- U.S. Forest Service
- Other Federal
- State
- Local Government
- Private

N W E S

0 5 10 15 Miles

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

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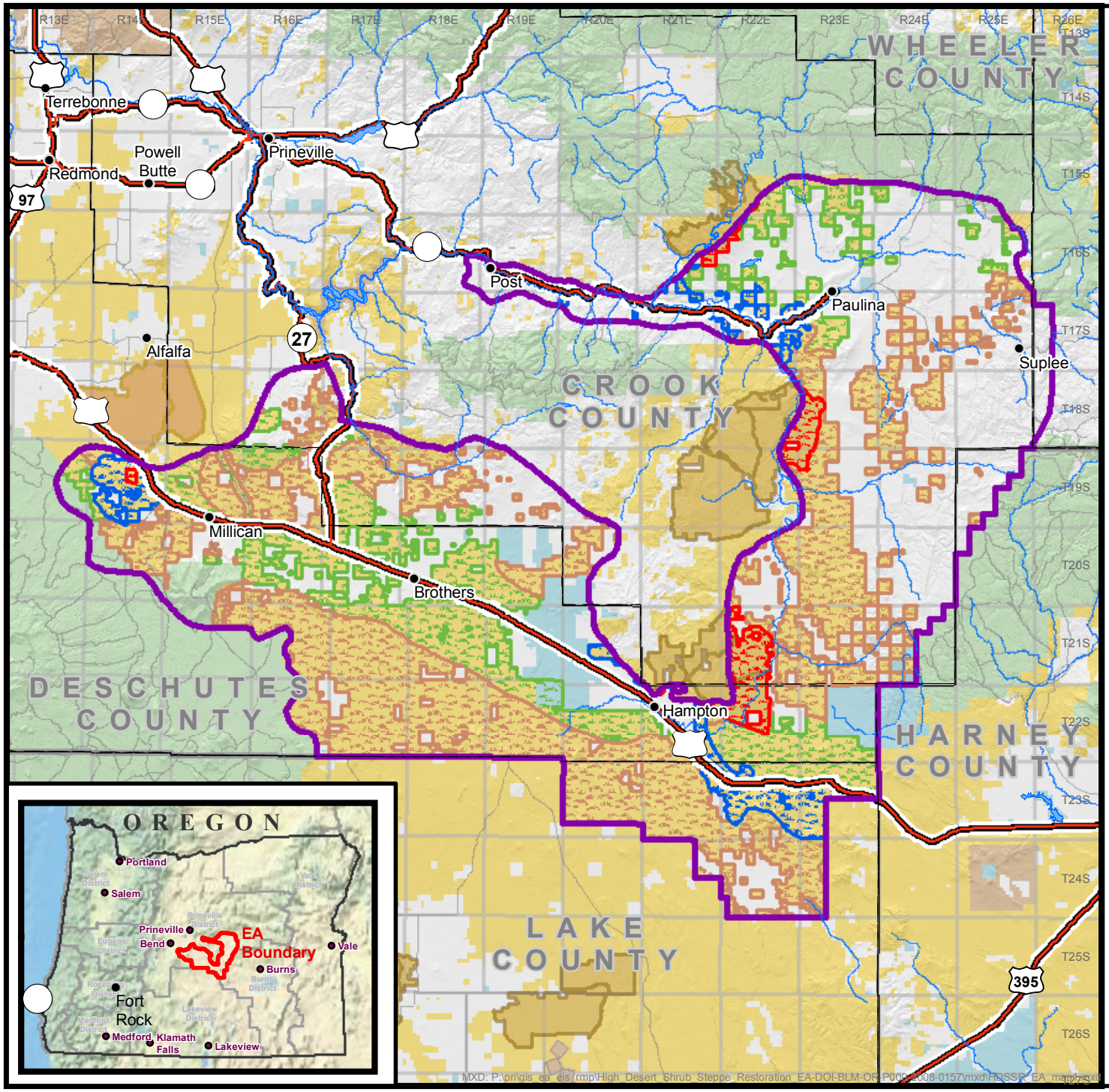

Map 2: Visual Resource Management

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT
High Desert Shrub Steppe Restoration

EA-DOI-BLM-OR-P000-2008-0157

Legend

- EA Boundary
- VRM Class
  - 1
  - 2
  - 3
  - 4
- Wilderness Study Areas
- BLM Wilderness
- Administered Lands
  - Bureau of Land Management
  - U.S. Forest Service
  - Other Federal
  - State
  - Local Government
  - Private

N W E S

0 5 10 15 Miles

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C2011-04-14